RATIONALITY AND POLITICS IN BUREAUCRATIC DECISION-MAKING:

A STUDY OF THE DECISION TO ESTABLISH A SECOND ALUMINIUM SMELTER IN NEW ZEALAND

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by

A.J. Miller

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Preface

In July 1980 the National Government selected a proposal by the Fletcher-Alusuisse-Gove consortium for the establishment of an aluminium smelter which would take up the last and greatest part of a 5000 Gigawatt-hour electricity concession. This decision provides a convenient end-point for a long and complicated period of energy planning where a major concern has been the utilisation of surplus energy resources. The history of this decision will be traced in this study beginning with the discovery of the surplus energy resources in 1978.

A considerable part of this decision-making has been conducted inside the government bureaucracy and in secret. This study focuses exclusively on this bureaucratic decision-making providing a detailed discussion of the energy planning issues and also endeavouring to treat the decision as the outcome of organisational processes. It is an important theoretical concern that only through an understanding of behavioural processes can the importance of managing the decision process be fully appreciated.

Some of the circumstances in which this study was undertaken must be mentioned in order to explain the approach that has been adopted. The structure of this study has been largely determined by the requirements of a second report which is a detailed chronology of events commissioned by the Treasury. It has been through producing this Treasury report that access has been permitted to departmental files providing by far the greatest amount of research material. Access to government officials has also been assisted. However, because of the requirements of the Treasury report and the sensitivity of the issues covered, it has not been possible to interview key participants in the decision outside the government bureaucracy. It should also be noted that the controversy which has marked the public debate on the aluminium smelter and associated issues has also been evident in the bureaucratic decision-making where sharp interdepartmental differences appeared.
This context has meant that when the interviewing was
carried out in late 1980 and early 1981, many officials
still felt unable to give a completely frank and
detailed account of events.

Despite these circumstances, many officials have been of
considerable assistance to me and have been very generous
with their valuable time. In particular I wish to
acknowledge the assistance given to me by Mr Rob Laking and
Mr Howard Fancy. I am also grateful for the kind and
patient supervision offered to me by Professor Keith
Jackson and for the generous services of Mr Richard
Kennaway and Dr. Keith Ovenden.
CHAPTER 1

A BEHAVIOURAL MODEL OF DECISION-MAKING
1.1 Rationality and politics

This study of organisational decision-making is prompted by the empirical observation that wide discrepancies exist between the ideally rational decision and the way decisions are actually made in organisations. Although the emphasis will be on understanding decision-making behaviour, this focus on a rational model (which prescribes methods for ordering objectives, finding and evaluating alternative means) provides a standard by which decision-making may be judged. Of course, if this standard is too unrealistic it will provide a poor prescription. As Aaron Wildavsky argues, the essence of rationality is intentionality, therefore, decision-making should be judged by the achievement of intended results.¹ This standard may invalidate a stringent rational model.

"If planning were judged by results, that is, by whether life followed the dictates of the plan, then planning has failed everywhere it has been tried. Nowhere are plans fulfilled. No one, it turns out, has the knowledge to predict sequences of actions and reactions across the realm of public policy, and no one has the power to compel obedience."²

What is needed, then, is a model of decision-making which is adapted to the realities of knowledge and power. Some attention will be given in this section to the rational model and to strategies for decision-making which recognise these constraints. Following this section a behavioural model of organisational decision-making will be developed which assumes the partial ignorance and relative powerlessness of the decision-maker. This latter model is not, of course a prescription; some discrepancy between the ideal and practice must remain.

² Ibid., p.8.
In order to solve a problem, the rational model\(^1\) requires that a decision-maker should:

1. Establish a complete set of operational goals. Goals should be stated explicitly and concretely. Vague or abstract goals are not clear guides to action although their non-operational character may be convenient for other purposes, for example, evading commitments or gathering widespread support. Ideally, all the goals and objectives will be commensurable so that the consequences of any action can be evaluated in terms of a single index of values.

2. Prepare a complete set of alternative policies.

3. Prepare a complete set of consequences likely to ensue from each alternative policy. These consequences are represented as valid predictions of the costs and benefits of each alternative policy in terms of the operational goals.

4. Calculate the difference between the benefits and costs for each alternative and choose that alternative whose consequences rank highest on the index of operational goals.

This is clearly a very rigorous model for decision-making. Some of the main criticisms raised against it emphasise the limits of knowledge. The injunction to be comprehensive in the search for alternatives and the prediction of consequences ignores the limited competence of the human decision-maker, the inadequacy of information, and the costliness of analysis. In reaction to these failings some theorists, most notably Charles Lindblom, have proposed a strategy of incrementalism. The basic requirements of this model are that new policies should not be much different from existing ones and little effort should be made to predict their distant consequences. Also, policies need only be evaluated by those parties directly interested and no attempt should be made to evaluate policies as alternatives to each of the existing policies.\(^2\) This model takes the status quo very seriously.

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1 Adapted from Yehezkel Dror, Public Policymaking Reexamined (Bedfordshire: Leonard Hill Books, 1973), pp.132-140.

but is claimed to be rational rather than conservative in an ideological sense. Only by taking small forays into an uncertain world can the policy-maker be reasonably sure that a policy will be successful. If it does fail then, at least, it will not have been a disaster and it will then be clearer as to the appropriate manner in which to make another small adjustment. Another feature of incrementalism is termed by Lindblom "reconstructive analysis".\(^1\) This questions the treatment of goals as stable abstract values and suggests that in practice it is necessary to constantly reassess goals in light of the development of available means.

These are important arguments but it is doubtful whether they support a purely incrementalist strategy. For example, incrementalism displays extreme pessimism about the possibilities for human problem-solving abilities or for basing decisions on valid knowledge. Obviously these are not absolute constraints or no form of problem-solving would be feasible. Instead, they must be openly treated as relative barriers which allow the application of the rational model in many circumstances. The costliness of analysis and delay is another important consideration but the emphasis is more likely to be placed by the proponent of the rational model on the costs of error.\(^2\) If the benefits of search can be predicted fairly accurately then it may be possible to make some trade-off between these two approaches. Reconstructive analysis can be readily incorporated in the rational model if the requirement is relaxed that a complete preference-ordering be constructed. An important objection to incrementalism concerns its claim that it avoids disasters. Sometimes large problems arise which necessitate dramatic solutions and a failure to take up the challenge, that is, a decision

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to proceed incrementally, would result in a disaster.\textsuperscript{1} It can also be argued that from incremental beginnings large scale failures may grow. Often a small change will involve a commitment to further changes but because the eventual costs and benefits have not been estimated the final outcome may turn out to be a disaster.\textsuperscript{2}

Neither model is a perfect strategy for decision-making. Their applicability will depend on circumstances, particularly, on the amount of uncertainty involved in the decision. A judgement will also need to be made about how fundamental or new the problem in question is and how acute the dissatisfaction with the present.

Another important criticism of the rational model, avoided in the discussion so far, concerns the manner in which goals are set. The rational model assumes consensus about goals or else domination, the ability of a decision-maker to impose a single set of goals. Where there is disagreement and power is dispersed it is more likely that a decision will be obtained through a bargaining process. Here such devices as threats, bribes, trades, and compromises enable the distribution of resources roughly according to the skill and power of the participants but rarely in accord with the intentions of any one group. This "conflict resolution" model has the flavour of realism and it may be that the rational model's assumptions about goals deny it any real-world applicability. Graham Allison\textsuperscript{3} takes the view that the model is of little descriptive value as does Keith Ovenden who has applied the model in a study of the nationalisation


\textsuperscript{2} Ibid., p.54.

\textsuperscript{3} Graham T. Allison, Essence of Decision: Explaining the Cuban Missile Crisis. (Boston: Little, Brown and Co, 1971).
of the British Steel industry. Ovenden concludes that the rational-actor model

"... is inaccurate and of no utility. We have seen over and over again that governmental goals - in both parties - were neither clearly specified nor clearly understood, and that although individual ministers did sometimes seek the rational maximisation of specific objectives, they often had to do so in a context of hostility from their own colleagues in the government and on the back benches. As far as British politics is concerned, this model distinguishes itself by its failure to fit the facts. It can be discarded permanently". ¹

This, of course, is an observation about the way policy is made, not necessarily about the way it should be made. Nevertheless, if decisions are made by bargaining then the rational model will serve as a poor prescription for decision-making. This description of decision-making remains to be tested. In any case, Ovenden's remarks do not deny rationality a place in decision-making. Instances can be found where rationality informs the stands taken by important participants. It is the final policy outcome which cannot be related to specific, predetermined goals, thereby invalidating the model. The question arises, then, as to whether the bureaucracy is sufficiently unified to qualify as a "rational actor". It may be that, because of their subordinate role, government officials will act in a relatively integrated fashion in carrying out tasks assigned by ministers. In addition, it is possible to identify norms which are likely to reduce conflict. In particular, there is the public service ethic of neutrality and this is likely to be reinforced by norms of objectivity which are associated with expertise.

Despite the relatively low legitimacy of bargaining in a bureaucratic setting, this model should still have some

prescriptive value. An exercise in pure rationality which attempted to disregard diverse political forces would inevitably serve particular interests but would not directly (if at all) enhance the final outcome. Ideally, diverse demands should somehow be coordinated in phase (1) of the decision process to ensure that other phases - the search for alternative policies, the application of causal knowledge to predict the consequences of these policies - can proceed to a solution that will maximise the achievement of the combined values.

It is argued in favour of incrementalism that it assists this process in a number of ways, most notably because the small changes advocated by incrementalism are likely to attract wider support than radical changes.\(^1\) Once again, a judgement is called for as to the need for radical change. Also, it may be that incrementalism over-emphasises the need to secure agreement about a policy at the expense of obtaining a policy based on sound knowledge.

Rationality is possible within the constraints of partial ignorance and relative powerlessness. It is now necessary to build up a behavioural model of how an organisation which is subject to rational norms decides in conditions of incomplete knowledge. Some of the potential for intra-organisational conflict will then be explored together with the opportunities for the exercise of power in decision-making.

1.2 "Bounded rationality" and organisational processes

The pure rationality model has been shown to make excessive demands on the human decision-maker in its requirements for the construction of a complete preference function, the discovery of all alternatives, and the assessment of all

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consequences. Herbet Simon has attempted to redeem rationality by introducing his concept of "bounded rationality". ¹ Because of the inability of the human mind to bring to bear upon a single decision all the aspects of value, knowledge and behaviour that are relevant, choice is always exercised with respect to an approximate, simplified "model" of the real situation. We can only speak of rationality relative to the frame of reference of the decision-maker. Hence, instead of a calculated choice among alternatives, choice behaviour is often better described psychologically, in terms of stimulus and response. Where a stimulus corresponds to experience the response may have already been developed and learned, hence the stimulus will initiate a routine action. Sometimes, however, problem-solving activity is necessary to complete the response. This activity is distinguished by the extent to which it involves search behaviour which is aimed at the discovery of action alternatives or the consequences of action. This search process is partly random but will also be routinised to some extent, that is, it will tend to follow familiar paths. ² Typically, search is not concerned with the discovery and selection of the optimal alternative as in the pure rationality model. Rather, the decision-maker will stop searching once he has found a satisfactory solution. This standard is related to experience, rising whenever alternatives prove easy to discover, falling whenever they are difficult to discover. ³ This approach can be contrasted with an economic model of search where the standard is to optimise by balancing the marginal improvement in alternatives available through search with the marginal cost of undertaking that search. The value of Simon's model of which he calls "satisfactory" behaviour is its recognition that an individual cannot actually know


³ March and Simon, Ibid., p.141.
in advance the benefits and costs of search, at least, not
to a degree which would enable him to optimise.

The model developed so far describes essentially psychological
processes of individual decision-making. Of greater
interest, therefore, is March and Simon's elaboration of
this model based on their contention that

"the basic features or organisation structure
and function derive from the characteristics
of human problem-solving processes and
rational human choice".\(^1\)

Given human cognitive limits and the complexity of the
problems people face, organisation represents an adaptation
to the imperatives of rationality by controlling for the
human decision-maker the premises of decisions and the
flow of information.

An important way in which organisation simplifies choice
is through specialisation. Individuals deal with complex
problems by substituting them with a simplified model
of reality or by splitting them up into quasi-independent
parts which can be handled by problem solving processes.
In organisations large complex tasks are broken down in a
similar way so that individuals and groups can handle
parts of the task which are sufficiently simple to be
encompassed by a human mind.\(^2\) This allocation of particular
tasks to sub-units is associated with the allocation of
sub-goals whereby the purpose or function of the sub-unit
is defined. Sub-goals are designed to limit the focus
of attention to enable rational decision-making but in so
doing they tend to cause the sub-unit to ignore in its
decisions other sub-goals and the goals of the larger
organisation. This tendency of sub-units to be biased
towards their own "definition of the situation" is
reinforced by a number of factors.

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One such factor is selective perception which is basically a feature of individual behaviour. Individuals interpret and try to make sense out of their lives. They form attitudes and beliefs which we assume are related to their cognition (perceptions of the properties of events, other actors, etc). Hence, regularities in the limits of cognition are of interest to the extent that they promote certain kinds of beliefs and values. As discussed above, one important way in which cognition is limited is through the establishment of sub-goals which limit the focus of attention of individuals. Because attention is directed down certain paths the perceptions of reality will tend to reinforce the subgoals, confirm the definition of reality that is already held. However, perception can also be related more directly to attitudes; individuals see what they like. Perceptions discordant with an individual's perception of reality will tend to be "filtered out before they reach consciousness" or reinterpreted so as to remove the discrepancy.¹

March and Olsen have elaborated the mechanism of selective perception in belief formation including two interesting variables by which we may characterise individuals: the degree of trust an individual has in the ability and motives of others and the degree of integration of the individual into the organisation.² Among the propositions generated by March and Olsen's scheme are the following. An organisational participant who is integrated into an organisation will like what he sees; he will obtain pleasures from being part of the organisational process that are independent of the actual decision outcomes. An individual who feels alienated from the organisation will tend to dislike what is going on in the organisation.

¹ March and Simon, op.cit., p.152
Where organisational participants trust each other there will be a tendency for these participants to share the same attitudes and perceptions. To a large extent this behaviour derives from cognitive limitations and the consequent need to rely for information on others. In these circumstances greater reliance will be placed on trusted people with a consequent convergence of views within the relationships of trust. ¹

Relationships of trust provide an informal kind of communications channel which may cut across sub-units and undermine sub-goals. Generally, however, much interaction and communication occurs within sub-groups (or other organisational "in-groups", for example, groups based on a common professional background) so that the selective perception of individuals tends to be mutually reinforcing. Sub-unit bias is also reinforced by the classificatory schemes that are developed within the unit as a convenient and efficient way of communicating information. The world tends to be perceived by the organisation members in terms of the particular concepts that compose the organisation's vocabulary. When a conceptual scheme becomes "reality" in this way it leads to what March and Simon call "uncertainty absorption".

"Uncertainty absorption takes place when inferences are drawn from a body of evidence and the inferences, instead of the evidence itself, are then communicated." ²

Anything that does not fit easily into the conceptual scheme is not easily communicated. The "facts" that are communicated can be disbelieved but they cannot be properly checked unless the work of the specialised sub-unit which produced these "facts" is to be duplicated. This has consequences for the power structure of the organisation as

¹ March and Olsen, op.cit., pp.64,5.
² March and Simon, op.cit., p.165.
March and Simon note:

"... by the very nature and limits of the communication system, a great deal of discretion and influence is exercised by those persons who are in direct contact with some part of the "reality" that is of concern to the organisation".1

Uncertainty absorption will be considered further in the later discussion of power.

Sub-goals are also reinforced through selective exposure to environmental stimuli. Specialised sub-units tend to have dealings with different parts of the organisation's environment and consequently develop distinct definitions of the situation which are based on this narrow "window" on external reality. Hence, sub-goals, as aspects of the definition of reality, can be partly established in the course of sub-unit contacts with the organisational environment and they are reinforced by continuing contact.2

A further important way in which decision-making is simplified in organisations is through the establishment of programmes and standard operating procedures. These represent the memory of the organisation as they provide "tried and true" ways of handling recurring problems. Established rules, techniques, records and obligations guide and assist the fallible human decision-maker. When the organisation meets a problem for which it has no response it initiates a search for a new routine procedure.3 Because of cognitive limitations the search for and discovery of alternatives is carried out sequentially. Furthermore,

1 March and Simon, op.cit., p.165
2 March and Simon, Ibid., p.153
3 In March and Simon's scheme problems come into existence when the organisation fails to satisfy one or more of its goals. Solutions are new programmes which lift performance to satisfactory levels.
there is no attempt to be comprehensive. Instead, search is terminated once a satisfactory alternative has been found. This means that the order in which the search is carried out is of critical importance. Typically, the generation of alternatives will not be random but will be directed by programmes and the biases that derive from the specialisation of problem-solving in sub-units.

Although this discussion suggests the potential for considerable intra-organisational conflict, it must be acknowledged that in March and Simon's scheme the emphasis is really on coordination. The organisation is treated as having goals which are factorised into sub-goals to enable rational decision-making to be undertaken within manageable limits. Hence, to a large extent, sub-unit biases reflect the way the organisation has shaped the premises on which decisions are to be made. Behaviour is controlled, not by direct commands, but by the organisational moulding of the values and information which organisational participants use to make their decisions. While this emphasis on latent control offers a valuable perspective, it is likely that it obscures the extent to which conflict is a normal part of organisational life. To extend the above discussion with a more realistic analysis of the nature of conflict between sub-units it will be useful to turn to the work of Cyert and March.

Cyert and March challenge the assumption that organisations are oriented toward a specific goal. Instead of conceiving of goals as being decomposed from the top down, as it were, Cyert and March treat goals as being built from the bottom up. "People (i.e. individuals) have goals, collectivities do not". Within the organisation goals are multiple

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and conflicting and to the extent that there is consensus on organisational goals such as "maximise profit" or "maximise national benefit", this is possible because such goals are rather ambiguous and not operational, they do not indicate the specific operations or steps that must be taken to achieve them. Operational goals are not agreed upon and hence tend to be pursued through a bargaining process. This leads to a conception of the organisation as a coalition of participants.\textsuperscript{1,2}

Not all outcomes will be the result of bargaining. Much conflict in organisations is latent because all goals cannot be considered simultaneously. The assumption of an omniscient bargaining process is excluded by cognitive limitation; at any point in time attention will tend to be limited to some sub-set of relevant goals and may, therefore, overlook conflicting goals. It follows that, contrary to much conventional thinking, organisations may satisfy conflicting goals by attending to them sequentially.\textsuperscript{3}

This possibility suggests a need to research the ways in which attention is focussed in an organisation. Sometimes attention may be focussed by experience. For example, a group which seeks to increase the level of investment in power stations may suddenly find its goals receiving general attention following an occurrence such as a power shortage. Attention may also be focussed deliberately, for example, by the circulation of a report which seeks to promote a particular policy. Evident in these examples is a close and reciprocal relationship between problems and goals which is an important part of the theory. Because

\begin{enumerate}
\item Cyert and March, \textit{op.cit.}, p.28.
\item Cyert and March develop this model in relation to a business firm and they postulate about five operational goals relating to sales, production etc. There is, therefore, a tendency to identify the members of the coalition with the principal organisational sub-units. As I discuss below, Cyert and March do not account for the development of these operational goals.
\item Cyert and March, \textit{op.cit.}, p.35.
\end{enumerate}
the organisation is oriented toward meeting the specific operational demands of coalition members (sequential attention to goals) we may expect that the organisation will be preoccupied with immediate problems and that little serious effort will be made at long term planning. This "fire department" characteristic of organisations - running from one crisis to another - may also be derived from another proposition: the organisation's tendency to avoid uncertainty. Because the organisation is typically confronted by a very uncertain environment but has limited time and capacity with which to correctly anticipate events, it avoids this requirement by using procedures which focus on the short term.1 Organisations develop routines for attention allocation which "tend to give priority to those things that are immediate, specific, operational and doable; they tend to ignore things that are distant, general and difficult to translate into action."2 Hence, it is the pressing problems which the organisation solves, but rather than attempt to anticipate all eventualities the organisation will await further developments and adjust the solution as necessary.

The extent to which conflicting goals can be attended to sequentially, or even simultaneously, can be related to the amount of "organisational slack". Slack refers to an excess of resources in the organisation above the amount that is necessary to meet the demands of the coalition members.3,4

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1 Cyert and March, op.cit., p.119.
2 March and Olsen, op.cit., p.50.
3 Cyert and March, op.cit., pp.36-38.
4 A coalition is viable so long as the payments made to the various coalition members are adequate to keep them in the organisation. In the long run the demands of all members should adjust to equal the supply of resources. However, as in the market place where market imperfections impair the adjustment of supply and demand, so in the organisation there will be frictions in the mutual adjustment of payments and demands. These frictions are factors such as incomplete information about the resources available, difficulty in interpreting the resource prices. As a result of these frictions the sum of resources available to the organisation is ordinarily greater than the sum of payments required to maintain the coalition. This difference, which is the "slack" allows inconsistent demands to be satisfied. Although the basis of the concept is uncertainty, in the literature it appears to be used more loosely as 'resources in excess of demands'.
An important source of slack is external to the organisation, the result of a benign environment (Cyert and March use the example of a business firm faced with a strong boom period). Taking such environmental changes as a readily identifiable source of slack it will be interesting to examine the internal processes which may result from changes in the level of slack. As implied above, we may expect that with a relatively high level of slack conflict will be reduced, more participants will be able to satisfy their demands. Olsen suggests that associated with a high level of slack will be a tendency for participants to define their goals in fairly non-operational terms. Slack also permits the use of inconsistent premises for decisions in different parts of the organisation.\(^1\) When slack is reduced, however, goals will be made more explicit and inconsistencies will become more apparent as competing demands are made on a declining store of surplus resources. For the purposes of this study where the organisation is the government bureaucracy it will be convenient to discuss slack in relation to segments of the bureaucracy which are concerned with specific policymaking areas and have their own distinct environments. This approach allows the further hypothesis that, where slack is reduced with regard to a particular area of policy-making, there will be a tendency for relatively part-time participants (that is, participants who are involved in decision-making on a number of fronts and can only spend a limited amount of time and energy for any particular decisions) to become more involved in pressing their demands. Slack may also affect the time taken over a decision, for example, the greater the slack the easier it will be to find a satisfactory solution and, in consequence, the less the delay.

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1.3 Conflict

The preceding discussion has sought to develop a number of characteristics of organisational decision-making derived from the assumption of limited knowledge. The essential model is of organisational decision-making as a process of solving immediate problems through biased and limited search for short-run solutions. To a large extent decision-making follows standard operating procedures which tend to stabilise the process. In the transition from the work of March and Simon to Cyert and March it is hoped that greater realism has been added to the model through the more explicit treatment of conflict. Nevertheless, it is apparent that Cyert and March largely assume conflict by postulating multiple goals without saying much about how these different goals come about. Simon and March pay greater attention to this aspect but because they proceed from the universal assumption of cognitive limitations their discussion is phrased more in terms of psychological processes than of structural variables appropriate to organisations. To remedy these defects it is necessary to give the organisation a more structural form and to extend the discussion of sub-goal formation.

Harold Wilensky distinguishes three main aspects of structural differentiation: specialisation, centralisation, and hierarchy. Specialisation enables the organisation to draw on a range of skills and expertise thus alleviating human problem-solving limitations. In a specialised structure the attention of participants is focussed on narrow problem areas. The primary cost of this structure is parochialism - the tendency for sub-group and individuals to believe that their specialised problems are the most crucial to the organisation. This parochialism also implies the tendency of experts to produce information which is misleading or irrelevant for actual policy needs.¹

Wilensky summarises the dilemma of centralisation as follows:

"Plans are manageable only if we delegate; plans are coordinated in relation to organisational goals if we centralise."²

Coordination ensures that criteria are applied consistently at all levels of the organisation. It is especially important in highly specialised organisations because of the interdependencies that are involved; if one part of the organisation fails to perform its allotted function all will be affected. However, centralised decision-making can overload the people at the top of the organisation. It also tends to produce decisions based on inaccurate and irrelevant information. This latter feature is entailed by the problems of specialisation (for example, uncertainty absorption) but also by problems of hierarchy.

Hierachy refers to the formal management structure of the organisation. Wilensky notes that in a hierarchy "the problem of control-coordinating specialists, getting work done, securing compliance - is solved by rewards of status power and promotion". Where these rewards are at stake and the performance of subordinates is evaluated on the basis of the information transmitted to superiors, it is apparent that hierarchy will be conducive to concealment and misrepresentation. Conflict is also likely to develop as individuals and groups vie for these rewards. Unfortunately, the nature of the research undertaken for this study does not permit the investigation of these rewards as motives for individual behaviour. Nevertheless, the importance of career interests must be acknowledged, particularly in a major decision where the opportunities exist for significant individual contributions and where individual achievement is likely to be widely noticed.

Cyert and March incorporate conflict in their model of organisational decision-making but they are not very specific about its determinants. From the work of Wilensky and March and Simon (despite the emphasis these latter writers place on harmony and control) it is apparent that task differentiation provides an important foundation for the development of particularistic attitudes and values.

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2 Wilensky, op.cit. p.58.
Accordingly, structural differentiation will be treated as an important variable in explaining the development of disparate and conflicting demands. However, following Pettigrew, this model may be extended by three other factors which may be associated with the development of conflicting demands: past experience, uncertainty, and external pressures.1

Precedent exerts a strong influence in any particular decision. This has been an important theme in the earlier discussion of standard operating procedures; the organisation faces much uncertainty but needs certainty in order to function and so relies on routine patterns of action which are the lessons of experience. This does not mean that the organisation is static, but change is incremental and follows that well-worn paths of established adaptations. Another aspect of precedent is embodied in what Cyert and March call "mutual control systems" which are mechanisms designed to stabilise coalitions and, we may infer, the pattern of demands. One such mechanism is the budget which represents "an explicit elaboration of previous commitments."2 Wildavsky also recognises this aspect of budgets in his aphorism:

"The largest determining factor of the size and content of this year's budget is last year's budget."3

A second major mutual control system is the division of labour which helps to define the limits of discretion and hence constrains the actions and objectives of sub-groups.

The essential point is that prior programmes, decisions, commitments must be investigated in order to understand conflict. However, unlike Cyert and March, we cannot assume that objectives are stabilised merely because "human beings have limited capacities and limited time to devote to any particular aspect of the organisational system".4 This begs the question of how a given pattern of objectives came about.

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2 Cyert and March, op.cit., p.33.
4 Cyert and March, op.cit., p.32.
In addition, therefore, it will be useful to consider the prevailing distribution of power.

Conflict is likely to be aggravated by uncertainty. For example, in a situation where the outcomes of alternative policies are uncertain a variety of policies may be advocated in equal fervour since the arguments used in support of each cannot be made subject to scientific validation.\(^1\) However, the meaning of uncertainty need not be confined to lack of knowledge concerning cause and effect.\(^2\) In this discussion uncertainty will also be used to refer to ambiguity in organisational processes, goals, problems, tasks, interdependencies and the like. Hence, for example, an ambiguous problem may encourage the development of disparate demands because the limits of goal relevance may not be clear. Another example is a situation where the responsibility for a particular task is uncertain leading a number of sub-units to compete to undertake the task in order to further their own interests and objectives.

External pressures also contribute to internal conflict.\(^3\) Reference has already been made in the discussion of March and Simon's work to the way in which organisational sub-units, because of their specialised nature, tend to have dealings with a limited part of the organisational environment. This selective exposure, it was claimed will tend to reinforce any biases to which the sub-unit is subject. This model can be extended by giving the environment a more active role. For example, Cyert and March have supplemented their theory of search with what they call a "mating theory of search".

"Not only are organisations looking for alternatives; alternatives are also looking for organisations".\(^4\)

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1. Pettigrew, op. cit., p.228
2. The term 'uncertainty' is usually related to outcomes. For example, in economics uncertainty refers to the condition where there is more than one possible outcome for a decision and the probability of outcome is unknown.
It will be interesting to investigate, then, the way parts of the environment seek out parts of the organisation favourable to them, or try to exploit existing cleavages. For example, in a situation where there are a number of industries competing to buy a national resource, we may expect that their negotiating strategies will have some influence over the outcome and that, where there are internal differences concerning the decision, these are likely to be accentuated by the industry strategies.

1.4 Power

In the model developed so far the organisation is assumed to be subject to criteria of rationality and hence needing certainty. Because uncertainty is the prevailing condition, coping with uncertainty becomes the prime determinant of behaviour. In the main, the organisation strives for this by dividing up tasks and specializing activities until conditions of certainty or near certainty are achieved. Through this division of work a number of interdependent sub-units are created. These sub-units tend to develop distinct goals which may receive expression in some decision context as a demand. The diversity of demands will be related to the extent of structural differentiation but it is also important to consider the history of past conflicts and decisions, uncertainty, and external pressures. In the absence of a unified preference ordering or sufficient organisational slack, diverse demands will predispose the organisation to internal conflict.

Cyert and March have suggested that conflict will be resolved through a bargaining process. However, these writers give little attention to the structure in which this political process is played out, or to the composition of the sub-groups and the resources at their disposal. Unless the dominant coalition is to be conceived trivially as a number of evenly-matched participants combined to form a majority, it will be more useful to introduce the
concept of power to explain the gathering of support for
demands. An understanding of power is a necessary complement
to the model of bounded rationality.

"Decision-making in organisations is not merely
a thought process that balances goals and means,
or a choice process in which the environment
is discriminated as a limit to choice only
through the mind of the decision-maker. Rather,
it may be understood as a political process that
balances various power vectors".1

The following discussion will endeavour to identify some
important factors which affect the distribution of power
among organisational sub-units. It is derived from the
work of Hickson et al. whose consistency of approach with the
tradition established by Simon, March and Cyert is evident
in their conception of organisations as "interdependent
systems in which a major task element is coping with
uncertainty".2 Power relations are established through
an imbalance in the interdependence of sub-units, that is,
through some sub-units becoming relatively more dependent
on other sub-units. Hickson follows Emerson in maintaining
that dependency in a social relation is the reverse of
power. To explain what factors affect power, therefore,
it is necessary to discover what factors affect dependency.3

Hickson argues that, since uncertainty is a central problem
facing organisations, those sub-units that cope the most
effectively with the most uncertainty will make other sub-
units dependent on them. In any particular decision
situation power will be conferred on those sub-units which
can cope with the kinds of uncertainty which are most
critical to the decision outcome.4

1  Pettigrew, op.cit., p.265.
2  D.J. Hickson, C.R. Hinings, C.A. Lee, R.E. Schneck,
   and J.M. Pennings, "A strategic contingencies' Theory of
   Intraorganisational Power", Administrative Science Quarterly,
3  Hickson et al., op.cit., pp.218,8.
4  Ibid. pp.219,220.
Although uncertainty is a normal part of organisational life, it is important to bear in mind the organisational response to this condition, particularly the programming of activities. Where activities are fairly routinised the pattern of discretion and influence might be expected to be broadly associated with the formal organisational hierarchy. However, in situations where existing programmes prove inadequate, some specific expertise will be required to formulate a new programme, cope with the uncertainty. Hence, in analysing the strategic use of uncertainty we are largely concerned to generate observations about the relative power of specialised sub-units and about the occasions for the dependency of superiors (senior officials, ministers) on their expert subordinates.

If a specialised sub-unit creates a new programme which removes uncertainty altogether it will lose the source of its power over dependent sub-units and superiors. Crozier, who was one of the first writers to investigate the importance of uncertainty in organisational power relationships, has outlined the self-defeating nature of expert power:

"The invasion of all domains by rationality, of course, gives power to the expert who is an agent of this progress. But the expert's success is constantly self-defeating. The rationalisation process gives him power, but the end results of rationalisation curtail this power. As soon as a field is well covered, as soon as the first intuitions and innovations can be translated into rules and programmes, the expert's power disappears." ¹

Although removing uncertainty tends to be self-defeating, the sub-unit's power need not be so shortlived:

"If a sub-unit can cope, the level of uncertainty encountered can be increased by moving into fresh sectors of the environment, attempting fresh outputs, or utilising fresh technologies." ²

² Hickson et al., op.cit., p.220.
Since it is the capacity to cope that is important, Hickson's theory must be contrasted with Cyert and March's concept of uncertainty avoidance. These writers stress the organisation's need for certainty and the consequent development of short-term programmes and negotiated environments. Clearly, this behaviour can only be expected where uncertainty is not being used as a strategic resource. Alternatively, perhaps, uncertainty avoidance may be a strategy employed by dependent sub-units.¹

While coping with uncertainty may give a sub-unit power, this power can only be maintained so long as the sub-unit cannot be easily replaced. Using the analogy of the market-place - monopolies are more powerful than firms which have competitors. This idea can be represented by the term "substitutability" which Hickson employs to predict the power of a sub-unit:

"The lower the substitutability of the activities of a sub-unit, the greater its power within the organisation".²

We may expect that dependent sub-units and superiors will attempt to make a sub-unit which can cope with uncertainty substitutable. Strategies to achieve this may include setting up independent task forces or employing outside consultants. Substitutability will be enhanced where a sub-unit's task description is fairly routinised.³ That is, if a sub-unit uses a well-defined technology to cope with uncertainty, that technology will be available to other sub-units to perform the same task. It should be noted that routinisation of technology need not impair the ability to cope

¹ A note is also necessary on March and Simon's concept of uncertainty absorption since these writers relate the concept to power (eventhough they otherwise have very little to say bout power). Since this concept is essentially derived from a discussion of classificatory schemes resulting from cognitive limitations, it is better distinguished, for our purposes, from the intentional use of uncertainty as a strategic resource.

² Hickson et al., op.cit., p.221.

³ Ibid., p.224.
with uncertainty. Indeed, it is likely that a sound and established technology will enhance coping with uncertainty.

Coping with uncertainty and substitutability affect power because the sub-units within an organisation are assumed to be interdependent. However, there are degrees of interdependence. In recognition of this Hickson has developed a third variable, "centrality", which further differentiates sub-unit power. Centrality has two aspects, "pervasiveness" and "immediacy", both of which are positively related to sub-unit power. Pervasiveness is defined as "the degree to which the workflows of a sub-unit connect with the workflows of the other sub-units".¹ Immediacy is defined as "the speed and severity with which the workflows of a sub-unit affect the final outputs of the organisation".² By way of example, it is suggested that Treasury, as a component of the government bureaucracy, appears to have high pervasiveness but relatively low immediacy. Treasury's tasks require it to interact with all other departments but, where this work is largely the review or monitoring of other departmental activities, Treasury is likely to have low immediacy, that is, the cessation of this work would not quickly and substantially impede these other activities.

In the literature on organisations relatively little attention has been paid to the important but rather elusive concept of power. Hickson's model of intra-organisational power is valuable as an endeavour to correct this neglect. Nevertheless, it can only be credited with offering a very partial understanding of power in organisations. The complexity of the concept of power limits any attempt here at a more realistic exposition. However, some weaknesses of Hickson's approach will be acknowledged and hopefully redressed.

1  Hickson et al., op.cit., p.221.
2  Hickson et al., Ibid., p.221.
A prominent characteristic of Hickson's model is its emphasis on structure. The organisation's structural layout determines the source of power. One problem with this view is its tendency to take for granted the current arrangements.¹ The possibility that powerful agents may have a hand in structuring the organisation will be discussed shortly by introducing the notion of domination in organisation. A second weakness was in the model's identification of organisational actors with sub-units. Powerful individuals and groups will not necessarily be specialised and it hardly seems likely that specialised sub-units will be perfectly harmonious entities acting in a unified way. This weakness is inherent in the model and may only be alleviated here by considering a second axis of structural differentiation. As well as analysing conflict founded in the "horizontal" differentiation of specialised groups it may also be interesting to consider the possibility of conflict founded in "vertical" differentiation, that is, between the levels of the internal hierarchy. Whereas the attention of subordinates tends to be narrowly focussed, superiors are obliged to take a broader view because of their control of a number of subunits, their breadth of contact with other sub-units and organisations, and their responsibilities toward the decision-making centre of the organisation. This latter aspect may be exemplified by the roles of senior officials who have close contacts with ministers and hence must secure their acceptance and follow their directions but who must also function as leaders of technical staff, often conforming to and projecting to outsiders the standards and values particular to a sub-group. Since these roles are not always compatible, conflicts may develop within hierarchies. The kind of power resources mentioned by Hickson are likely to be relevant to the settlement of

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such conflict. However, because hierarchy has a strong normative aspect, it may be that the power relationships between superiors and subordinates will be more usefully characterised by the ability of the superiors to maintain the legitimacy of their authority. This legitimacy, as Pettigrew observes, is problematic:

"... a superior's competence in a major group activity, his "interest in group members", and his "interest in group activity" are all critical to his ability to legitimate his power. Such legitimation is an important factor in a superior's ability to generate support for and therefore compliance with his demands. We shall see that, if a superior is considered to make excessive demands, is held responsible for failures, and is thought of as being manipulative and seeking personal power, he is unlikely to receive group support".1

Although hierarchy is a structural determinant of power it is largely ignored by Hickson. For example, the extent of an expert's power based on coping with uncertainty will also depend on the possibility of his communicating the nature of that expertise, that is, on his position in the communication structure. A similar variable is the expert's access to the formal centre of decision-making, the apex of the organisation. Another fact about organisational hierarchies which power-seeking experts have to remember is the power of superiors to influence career prospects. In short, it is important not to overlook the distribution of power embodied in the formal organisational structure and associated roles.

The concept that transforms "less dependence" into power is derived from Dahl's operational definition of power. This is that the power of a person A over B is the ability of A to ensure that B does something he would not have done otherwise.2 In a decision-making process it seems reasonable

1 Pettigrew, op.cit., p.231.
2 Hickson et al., op. cit., p.218.
to assume that the ability to modify conduct will be largely manifest in the decision outcome. That is, the "winners" will have been able to obtain a solution consistent with their demands. Although this approach to the study of power tends to focus on intra-organisational conflict, it should not be imagined that power is only exercised in competitive situations. Power may not always be manifest but it is latent wherever an opportunity exists for organisational decision-making. Where there is substantial agreement over values and the legitimacy of current arrangements is not in dispute it may be more appropriate to conceive of power as being in the service of dominant ideas, themselves the product of past conflicts. This possibility suggests, for our purposes, a conception of power as the ability to impose a particular definition of the situation. The definition of the situation may be a particular solution or goal imposed by a powerful individual or group but it may also be more generalised goals which structure the problems that arise, set their "terms of reference". Freedman adopts this perspective in a discussion of the power structure assumed by the model of rational decision-making:

"If the policy output appears to have a coherence and substantive content that might justify the description "rational" then this reflects the ability of a particular group to dominate proceedings ... Domination within a power structure does not necessarily mean an involvement or even a deciding role in all issues, but the capacity to designate the broad objectives of policy and organise the process so as to create a reasonable degree of certainty that individual results will conform to basic objectives. By getting chosen perspectives and procedures entrenched, specific approaches to problems and patterns of approved behaviour become defined, justified and institutionalised".

The study of organisational decision-making can be viewed as the study of patterns of bias in the ways in which problems and solutions are included or excluded from a decision process. One important source of bias can be found in the strategies of powerful participants. The exercise of power must be carefully investigated in terms of intentionality and evidence of "winners" and "losers" in order to distinguish it from a second important source of bias. This latter assumes uncertainty and the limited attention focus of the decision-maker. Here bias is to be found in such processes as standard operating procedures, problemistic search and uncertainty avoidance where a main research interest is the unintended consequences of action.
PART 1

THE POLITICS OF ABUNDANCE (1978-1979)
Energy planning background

The state has a central role in the production of energy in New Zealand. A network of power stations and state coal mines has long been held in public ownership and this has been extended more recently with the government acquiring a half share in the Maui gas field. In part, this situation reflects the vital importance for the nation's economic well-being of ensuring adequate supplies of energy. State involvement has also been necessary to supply the large amounts of capital and the managerial expertise required in the major energy development projects. A further possible justification for state involvement is the desirability of coordinating the development of the various energy resources to meet goals such as efficiency, conservation, or diversification.

This latter aim of coordinating energy planning has been of lesser relevance for much of the post-war period. A main concern of planners has been to achieve the rapid build-up necessary in electricity generating capacity. Otherwise, New Zealand's energy needs have been adequately met by its coal industry (in decline because of falling demand for coal) and by readily available supplies of imported petroleum. Hence, it has been possible to undertake much energy planning within the organisationally independent sectors of coal and electricity. However, during the 1970s a number of factors have complicated the energy scene entailing a broader planning perspective.

One such factor has been the addition of a further major indigenous energy resource, namely, the Maui gas field which was discovered in 1969. Soon after discovery it was decided that most of the gas should be used in electricity generation since this was the only available use which would enable the high level of offtake necessary to ensure the viable exploitation of the field. This decision had a number of consequences for existing power planning arrangements.
In particular, the New Plymouth power station was converted during construction from coal to gas and it was decided that the greater part of the generation from the large coal and gas fired station to be built at Huntly would also be based on gas. A further consequence was the decision to drop plans for a nuclear power station which was to have been commissioned in 1977.

In 1974 a nuclear power station was again included in the power development plans for commissioning in 1988. However, in 1977 plans for the station were again dropped, this time because of a revised forecast of electricity demand which estimated a significant reduction in the rate of growth.\(^1\) This drop in electricity demand may be considered a second important source of uncertainty since it portended considerable adjustment in supply arrangements, particularly in light of the Government's confirmation in 1976 of its intention to proceed with the Clutha hydro-electric development through its selection of "scheme F".

A third important source of uncertainty in energy planning can be associated with the fourfold increase in the price of oil which followed the lifting of the oil supply embargo imposed in October 1973 by the Organisation of Arab Petroleum Exporting Countries. This led to planning to insulate the country against future price rises and supply interruptions. One important aspect of this planning was the investigation of the potential for petrochemical applications for Maui gas.

These are among the main changes which occurred in the energy field in the 1970s. Their impact on energy planning and particularly power planning over the years 1978 to 1980 will be investigated further in the course of this study. For the moment it is pertinent to consider, in general terms, the reorientation in planning organisation and goals which

followed these events. In 1977 government administration and coordination of energy planning was strengthened through the amalgamation of the New Zealand Electricity Department, the Mines Department and the Ministry of Energy Resources to form the Ministry of Energy. The new ministry comprised four divisions: Electricity (NZE), Mines, Planning, and Policy. This reorganisation may be seen as facilitating the planning necessary to cope with the increasing interdependence of energy forms. The integration of energy planning has also been necessary to ensure the careful management of indigenous resources as exploitation of these resources has increased.

As a first step toward establishing a more comprehensive and coordinated approach to energy planning the new ministry produced in May 1978 an official statement of energy planning goals. Four main goals were listed as central to the Government's "energy strategy":

(1) To ensure that energy supplies are adequate, now and in the future, to enable the community to continue to meet its economic and social objectives.

(2) To ensure energy in its various forms is produced and used in the most economic, efficient and reliable manner.

(3) To reduce the nation's dependence on imported energy.

(4) To ensure a balance between the adverse environmental effects of energy developments and their benefits.¹

Presumably, it was the intention of the Ministry of Energy in formulating these goals to provide the foundation for rational decision-making. Hence, these goals also provide some context for the following discussion. If they rarely impinge on the conduct of planning then we may have occasion to question their operational worth or the validity

of the rational model.

Energy planning constitutes a principal focus of chapter II. To begin with, the origins of the large electricity surplus which ultimately would provide the basis for plans for new smelting capacity, will be discussed. The implications of this surplus for energy planning will also be examined together with initial efforts to find industrial applications for the surplus.
CHAPTER 2

THE ORIGINS OF THE ELECTRICITY SURPLUS
2.1 The Committee to Review Power Requirements

By 1978 responsibility for forecasting New Zealand's power requirements had been in the hands of the Committee to Review Power Requirements (CRPR) for two decades. The CRPR had, for the most part, a respectable public record with projections. However, in more recent years this record had been tarnished by criticisms that the CRPR was severely overestimating future power requirements. In 1978 the CRPR implicitly recognised the validity of much of this criticism as it substantially revised the assumptions on which it had based its earlier forecasts. In fact, the CRPR had been over-estimating requirements for some years so that the modest efforts of successive committees to lower their long-term forecast had produced a rather disappointing track record. For example, at the end of the 15 year forecast for 1974, the predicted demand in 1989 was 53,113 gigawatt hours (GWh). With each successive forecast the projected 1989 figure was lowered, reaching 32,675 GWh in 1978.\(^1\) This over-estimate of 60 percent in the space of five years has contributed to the Government's commitment to much unnecessary capacity, given the long lead-time for the installation of new generating capacity.

The CRPR's meeting in 1978 was particularly important because the large oversupply of electricity revealed to officials was much greater than that previously recognised. Shortly after the CRPR's meeting in May, the dimensions of the problem were substantially apparent as questions were raised about the future of such large-scale projects as the development of Maui gas, Clutha and Huntly coal. However, it would take three months before the various options open to planners could be adequately investigated and recommendations formulated for inclusion in the CRPR report's companion document, the Report of the Planning Committee on Electric Power Development (PPC). This report summarises the annual updating by electricity planners of the power development programme that must be followed to supply the projected demand.

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In 1978 the CRPR was faced with a provisional figure for the increase in electricity generation over the past year of 1.6%. This contrasted with the 1977 CRPR's forecast growth of 5.6%. In 1977 a similar discrepancy had been evident between the 8.5% forecast and the 3.2% achieved. In retrospect, one might think that the trend for demand to fall should have been sufficiently pronounced to be recognisable in the early 1970s. For example, an analysis taking the average annual growth rate for successive periods of eight years, shows that the growth rate had dropped from a high of 9.3% over the years 1959-66 to 5.2% in the period 1967-74. Despite this, the 1974 report projected growth rates of 8.8% in 1976 dropping to 6.5% by 1986, and remaining at that level thereafter. The main question, therefore, must be to ask why the CRPR was so slow to incorporate the developing trend in its long-term forecast.

It should firstly be noted that the years 1973/74 witnessed a period of power shortages which would have helped justify such high estimates and strengthened the longstanding resolve that the country should never again have to face the kind of power cuts which occurred in the 1940's and 1950's. Furthermore, even if there were indications of new trends in electricity consumption, it was difficult to know what factors to attribute them to, and hence difficult to determine how permanent such trends might be. Perhaps aware that electricity demand was changing, the CRPR decided to emphasise in the 1975 report the uncertainties they faced by listing eight factors tending to increase demand, and nine which would tend to decrease demand. The report observed that, "there is still a good deal of uncertainty regarding the degree of importance any one factor will assume, and the time it will take to become effective".

3 Ibid., p.5.
Nevertheless, there are limits to the extent to which the undoubted hazards of forecasting can be used to justify such policies. By 1977 these limits had clearly been surpassed.

In 1977 there was considerable disagreement over the probable future level of demand. This disagreement was not resolved and the final report contained 'majority' and 'minority' forecasts. A 'minority' viewpoint was also included which noted that whereas domestic consumption per head of population grew at an average rate of 3 percent over the previous decade and at a lower rate subsequently, the majority forecast implied a growth rate slightly over 4 percent for the coming decade. This was in spite of an apparent reversal of historical pricing policy and the likelihood of the continuance of the energy conservation programme.¹ The minority group also considered that insufficient account had been taken of revised estimates of New Zealand's population and economic growth rates.² The majority, on the other hand, felt that even though circumstances were changing, there was still insufficient certainty about these factors to change the long-run view at that time.³

The final report required that the power planning committee should make provision for 47,664 GWh of demand by the end of the forecasting period in 1991.⁴ This meant that allowance would have to be made for an additional 26,749 GWh over existing demand.

In 1978, with the existing level of demand only slightly increased, the estimate for 1991 was 36,019 GWh requiring an additional 14,754 GWh or just over half of the extra generating

¹ In 1976 the Government decided to endeavour to maintain the price of electricity at a level reflecting the long run marginal cost.
⁴ Ibid., p.19. The minority's estimates were for 41,747 GWh.
capacity required the year before. 1 Further progression of the trends incorporated in the minority estimates enabled the 1978 CRPR to reach a consensus about future requirements. Agreement was assisted by a move to more explicitly recognise the uncertainty inherent in the Committee's estimate by preparing two sets of forecasts for the 15 year period. The 'upper' and 'lower' forecasts describe the different levels of consumption that would arise from the variability of economic growth and population growth as well as the possible effects of major policy and technological changes in energy. While the most likely forecast fell between these two estimates, the Committee, in placing emphasis on the avoidance of restrictions, recommended that the 'upper' forecast form the basis for power planning. 2

In 1979 the forecasts were to be lowered further, perhaps indicating that the 1978 revision was as large as was decently possible at the time. Nevertheless, the 1978 forecast involved changes in some crucial assumptions. It could no longer be assumed that the GDP growth rate could be translated into an electricity growth rate. Nor could it be assumed that the GDP growth rate would soon be restored to the level experienced in the CRPR's earlier history. The CRPR had also anticipated much more electric heating, largely on the basis of differences in consumption between rich and poor areas and the presumed improvement of the latter. 3 By 1978 this assumption no longer seemed tenable. The CRPR had also underestimated the impact of price rises on electricity demand, the degree of market saturation which had taken place, and the extent to which the substitution of electricity for other energy forms was a finite and well advanced process. 4

2 Ibid., p.18.
3 Interview: J. Lermit (NZE), December 1980.
While these various factors emphasise the complexity and uncertainty involved in forecasting, there are few who doubt (including some within the NZE) that the CRPR was slow to take account of these factors because of the vested interests of the majority of its members. The internal cleavage of interest was most clearly evident in the 1977 split report. On this occasion the majority group's reluctance to adjust to the changing circumstances is made more understandable when the background of the power men who composed it is taken into account. In each case these members were representatives of the electricity supply industry, two being drawn from the NZED and two from the Electrical Supply Authorities (ESA). This group would have seen considerable benefit in the maintenance of a secure margin over future demand levels since this would help to maintain the NZED workforce while protecting both the NZED and the ESAs from any public backlash which might have occurred in a period of shortfall. ¹

This industry group managed to impose a conservative bias by declining to incorporate many of the new factors affecting demand in the forecasting methodologies. However, an aspect of past methodologies which was particularly favourable to the industry had been maintained. This was the practice of basing the long-term forecasts on a five-year projection drawn up by the Power and Finance Utilisation Committee (PFUC). This body contains representatives from the ESAs and analyses short-term forecasts from these numerous authorities, each forecast reflecting the kinds of domestic, commercial, and industrial growth probable in the locality. While such information about local conditions may be valuable to forecasters in the very short term, towards the end of the five-year period these forecasts become less reliable and have a

¹ The ESAs are responsible for the distribution and sale of electricity in their respective regions. As servicing agencies they pass on their costs to the consumer while being spared any contribution to the cost of new capacity. To the extent that the ESAs may have difficulty passing on cost increases and so maintaining their profitability, then the ESAs should have an interest in restraining the cost of generation. However, the tendency of the ESAs to support the NZED suggests that they are generally more concerned to maintain a comfortable margin of supply
tendency to over-estimate requirements. 1 Obviously, any bias in the PFUC estimates was only compounded by the tendency of the CRPR to extrapolate the five-year forecasts to cover the full fifteen year period. However, as the need to produce more realistic forecasts has become more pressing, correspondingly less attention has been paid to the PFUC forecasts. The point has now been reached where the PFUC's forecasts officially still have a key place but in practice are only received so that the ESAs may be seen to be involved. 2 Nevertheless, the ESAs retain much influence through their two representatives on the CRPR.

The three members of the minority group, by contrast, could afford to take a more detached approach to forecasting, although the Treasury representative typically attempts to reduce investment in new capacity as much as possible consistent with a reasonably secure margin of supply over demand. The other two members of this group were the representatives of the Ministry of Energy Resources and the Department of Statistics. Although this minority group again acted fairly cohesively in 1978 to argue the case for a low forecast, little is known about the nature of the committee's debate. However, as will be seen, forecasting work in 1978 was not finalised with the production of the CRPR report.

2.2 Power Planning: "Continuation" or "Minimum Investment"

Each year, after the May meeting of the CRPR, there is a delay of some months, usually until August, before the committee's report is tabled in Parliament. During this period, work proceeds on the power plan, culminating in the meeting of the PPC in June when its annual report is settled. This document

1 Interviews: P. McKenzie and J. Lermit.

2 Interview: J. Lermit.
is tabled in the House at the same time as the report of the CRPR and provides a plan of the new generating capacity that must be constructed in order to meet the forecast levels of electricity demand. Much of the groundwork for the PPC report, like the CRPR report, takes place in the NZE. However, the composition of the annual meeting of the PPC is slightly different, having in most years three representatives from the NZED, three from the ESAs, two from the Ministry of Works and Development (MOWD) and another representative for each of the Treasury and Ministry of Energy Resources. In 1978, following the creation of the Ministry of Energy, the PPC now contained three representatives of the Ministry of Energy's Electricity Division (in practice, the same people who represented the NZED) and instead of the Ministry of Energy Resources' representative, there was one from the new Ministry's Policy Division and one from the Planning Division.

However, power planning in 1978 was to involve a departure from previous practice through a much more significant development: the intervention by other departments in the work traditionally done by the NZED, now the Electricity Division of the Ministry of Energy. The Cabinet Economic Committee (CEC) authorised this wider involvement in power planning because it was concerned that the various implications of the CRPR's reduced demand forecasts should be thoroughly investigated. The initiative, however, was Treasury's.

While Treasury was happy that a much more realistic appraisal of the nation's energy needs was evident in the CRPR report, it could not be sure that the PPC would respond with equal flexibility to the new circumstances.\(^1\) After all, the committee could be divided 8 members to 2 in favour of those parties interested in the supply of electricity. The MOWD in particular could be expected to resist the prospect of a considerable drop in the size of its operations.

\(^1\) Interview: P. McKenzie.
As a first step to ensuring that all the issues received a proper airing, Treasury sent a report on 29 May to the Minister of Finance, Mr. Muldoon, outlining some of the most serious planning issues and seeking a directive for the Official Economic Committee to report on the various options open to power planners. Upon Muldoon's agreement, a report was prepared and presented to CEC on 7 June. The report was drawn up in the Ministry of Energy because it drew on power planning work already in progress. This fact also accounts for the speed with which the document was prepared. However, it was only intended as something of an interim report and its main purpose was to secure more substantial analysis of the options open to power planners. In order that this fuller report should provide some input into the power plan, it would be considered by the CEC before the power plan could be tabled. Officials anticipated that their deliberations would be completed by the end of July and that a deferral of the power plan would therefore be necessary.

Ministers were presented with a brief outline of the problems which confronted officials. The central issue concerned the surplus generating capacity. It was apparent that power stations already under construction - the four hydros, Ohau A, B and C, and Rangipo, and the two thermal stations, Huntly and Marsden B - could provide sufficient capacity to meet forecast demand until 1990 with substantial excess in the middle years in both the South Island hydro and North Island thermal components of the system. All the stations under construction were too far advanced for any delay to be practical. Instead, power planners had to decide if any further planned capacity should be proceeded with, in particular, whether the Clutha scheme should be deferred beyond the fifteen year scope of the power plan. If South Island hydro development was to be


continued, large amounts of water would have to be spilled, even in average river flow years. However, better utilisation of this resource could be achieved if a second Cook Strait cable was installed enabling the excess power to be transmitted north. An important aspect in assessing the economics of this proposal would then be the savings in natural gas and coal that could be made in the North Island thermal stations. ¹

While savings in these non-renewable and costly fuels offered some benefits, the issue was complicated by previous Government commitments to the exploitation of these resources. The first platform of the Maui gas field was to come on stream in 1979. This platform would supply a mixture of natural gas and condensate, this latter being the most valuable component. Because there was no facility for reinjecting the gas into the field, some viable use had to be found for the gas, for the associated condensate to become available. When the Maui field was developed the scope for using large quantities of gas for anything other than electricity generation was limited. Other projects, such as reticulation, were constrained by the long lead times necessary in setting up the plant and establishing distribution systems and markets. This situation led to the NZED being given an initial allocation of 80% of the 'take or pay' quantities and it was on the basis of the availability of this fuel that much of the new capacity was designed. The 'take or pay' agreement requires that the Government pay for a certain quantity of gas each year, regardless of whether that gas is actually taken, in order to enable the Maui project to service its commitments. In the case of a shortfall, the gas would be regarded as "pre-paid" and available in any subsequent year of the contract. Hence, if Electricity Division was unable to use the gas and no other user was found, then the Government would find itself diverting current investment resources into paying for natural gas several years in advance of when it would actually be needed;

a cost similar to that incurred with the excess generating capacity. However, there was the possibility that a higher future use value might justify paying for the gas while leaving it in the ground. Two other penalties derived from the shortfall in condensate takeoff. Under the Maui contract the condensate is the property of the Offshore Mining Company.\(^1\) If the condensate was not being extracted, the result would be a reduced cash-flow to the company, perhaps jeopardising the viability of the enterprise. The second cost arose from the need to spend overseas funds on extra imported fuel in order to replace the condensate that would otherwise have been used in the Marsden refinery.\(^2\)

In these circumstances the planning issues relating to gas and electricity were closely linked. Unless an alternative use for the gas was found, the government would have to decide whether to defer the construction of planned power stations - particularly the Clutha station. However, even if Clutha was deferred, a substantial surplus would still result, requiring a reduction in thermal generation. If priority was to be given to gas in this situation, then severe cutbacks would have to be made in the coal industry. The main impact of this decision would be on the new Huntly mines designed to supply the Huntly power station after its commissioning in 1980. In this case, wasteful over-investment would be transferred to the coal sector while the cutbacks might cause a damaging retrenchment in the coal industry as a whole.

CEC did not discuss in any depth the implications of the changes in power requirements but directed officials to proceed with a further paper on this matter. The Prime Minister, Mr. Muldoon, expressed some concern that there was no attempt to explain in

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1 The Offshore Mining Company is a Petrocorp (wholly Government-owned) company which holds a 50 percent share in Maui Developments Limited, the joint venture which owns the Maui field. The other 50 percent is held by Shell, BP and Todd Oil Services Limited.

the paper why the earlier forecasts for power demand had been so inaccurate. Officials then embarked on an explanation which covered the changed assumptions concerning such factors as population growth, economic growth, and new house estimates. Officials also mentioned that for the last three years some members of the CRPR had urged the majority of the committee to give more consideration to the slower rate of economic growth and the apparent trend for demand to level off.¹

Despite these remarks the Prime Minister was still dissatisfied and unable to place complete faith in the CRPR's most recent forecasts. Mr. Muldoon's comments leave the impression that he was less concerned that the CRPR might have been continuing in its tendency to over-estimate; rather, he seemed to think that the committee may have over-reacted so that it was now producing forecasts that were too low. Mr. Muldoon believed that the economic situation might be much improved over the coming decade and that, accordingly, forecasters should be careful when making predictions on the basis of currently depressed economic conditions. Similar optimism coloured Mr. Muldoon's assessment of the electricity surplus. In his opinion, rather than abandoning work already started, the Government should continue construction, recognising that there could be a resulting surplus of power. If a surplus was created, the Government would then give consideration to the introduction of a new energy intensive industry to use this power.² It is not clear from Mr. Muldoon's remarks whether he considered the Clutha scheme to be among those projects to which the Government was committed. The meeting concluded with a directive to officials to prepare for the committee a further paper detailing the forecast power requirements and expanding on the basis for these estimates.

² Ibid., p. 2.
Following the CEC meeting of the 7 June, officials were now charged with producing two reports, one dealing with the changes in power requirements, the other with the implications of these changes for the power plan. To this end a meeting of the Officials Sub-Committee on Energy was called to be held on the 26 June. This sub-committee was part of the Officials Economic Committee which is chaired by Treasury. It had been in existence for a number of years, its main purpose apparently being to enable officials from the departments concerned with energy, to chair meetings. Mr. Ian Dick, Head of the Ministry of Energy's Planning Division, chaired this first meeting.

A number of officials from the four divisions of the Ministry of Energy attended, as well as officials from Treasury, Trade and Industry, the Prime Minister's Department, and the Ministry of Works and Development. The main work of the meeting was to set up five interdepartmental working parties, appoint their members, and specify their terms of reference.\(^1\) Three of these working parties dealt with the three major energy sectors of electricity, natural gas, and coal. Their terms of reference were broad but they were primarily concerned to contribute to the report on power planning. A fourth working party set up to consider the potential for industrial development based on the various energy forms is of particular interest. This group's meetings were chaired by Mr. Falconer, the Assistant Secretary Industrial Development in the Department of Trade and Industry. Naturally, because investigations were already proceeding in this department to identify possible new industries, Mr. Falconer was able to make the largest contribution within the Industrial Development working party. However, it is also significant that the efforts of Mr. Falconer and the people who worked under him in his division appear to have been motivated by a more serious commitment to actually establishing new energy intensive industries than was perhaps evident among other members of the

Officials Sub-committee. After all, most members of the committee anticipated that the exercise would be completed with the presentation of their reports to CEC. In this context the main use of any potential electricity intensive industries which might be found in the meantime, was to provide Ministers with some cause for optimism that things were perhaps not as bad as they seemed.\(^1\) Mr. Falconer's team, on the other hand, would continue to look for ways of utilising the surplus until major efforts to find industrial applications for the electricity were renewed in 1979.

The fifth working party to be created at this first Sub-committee meeting was concerned with drafting the report explaining the changes in power requirements. This working party contained no member of the CRPR's "industry group", suggesting that the Sub-committee did not intend a revision of the forecasting work conducted by the CRPR in May. Treasury's concern in setting up the Sub-committee had been to investigate the implications of the forecasts for power planning, not the forecasts themselves. This latter exercise had been initiated by the Prime Minister at the CEC meeting of 7 June. Since all the major differences between officials had apparently been settled in the context of the CRPR's deliberations, the main concern of the Sub-committee was that this latest exercise should give the CRPR's forecasts a patina of respectability.\(^2\) As will be seen, the Sub-committee's purposes were not fully met for, while Peter McKenzie of Treasury and David Craig of Planning Division quickly drafted a report adequate for these purposes, Ian Dick, the remaining member of the working party, decided to pursue in a separate report some of the arguments he had raised within the CRPR.

For the next four weeks the various working parties met on a number of occasions to prepare submissions for another meeting of the Officials Sub-committee on Energy. This meeting was to be held on 24 July by which time it was intended that a definitive report on the energy planning questions should be available. In the meantime, officials from the Ministry of Energy had been

\(^1\) Interview: D. Harcourt.

\(^2\) Interview: D. Harcourt.
acquainted with their Minister's point of view. At a meeting held in the Minister's office on 13 July Mr. Gair indicated that he was looking for a bold solution to the problem of how to use the excess Maui gas. Mr. Gair believed that the Maui agreement should be maintained because the gas price was good. Uses for the gas could be found in processes that would enable the substitution of large quantities of imported fuel. The Minister also believed that hydro development should be continued because it is a renewable resource.¹

At the end of the discussion the consensus of opinion conformed substantially with the Minister's initial views. As a result of this meeting it seems that Ministry of Energy officials were confirmed in the opinion, or converted to it, if necessary, that the Clutha power scheme should continue (with a second cable to transmit the excess north) and also that a large petrochemical industry was both necessary and feasible.

A CEC paper drafted by Mr. Ian Dick recommending that all these projects be proceeded with, was tabled for discussion at the meeting of the Officials' Sub-committee on Energy on the 24 July.² Central to the paper was the assumption that some major project had to be launched in order to use the Maui gas supply in the most efficient and productive manner. Given this commitment, development of the South Island hydros and North Island geothermal stations could be pursued as planned. On top of all this the paper also recommended that the Huntly West mine should be completed and put into production as a means of ensuring the survival of the coal industry.

Some members of the committee resisted the idea that the Clutha scheme should proceed. On being advised of the meeting held between Energy officials and Mr. Gair at which it was decided

¹ W.S. Partel (Ministry of Energy internal memorandum), "Notes for the coal committee meeting to report to the Officials Sub-committee on Energy", 17 July, 1978.

that Clutha should proceed, Mr. Cook of Treasury responded that the committee's task was to advise the Government of the options available to it. Mr. Cook persuaded the committee to leave the matter open. The general feeling of the meeting was that the conclusions of the Chairman's draft report could not be substantiated until the output from the working parties had been analysed within the framework of a national benefit exercise. This would be undertaken by Treasury and the results would be available in time for a further meeting of the committee on the 7 August.¹

A report of the working party on industrial development was also tabled on the 24 July but it was not a significant document, probably only serving to indicate to most officials that this matter could be let ride.² Only three significant new users of electricity were identified and one of these, New Zealand Steel's new flat products development, had already been provided for in the current estimates of electricity requirements. Of the other two, the prospect of the addition of a third potline at the New Zealand Aluminium Smelter's plant at Bluff must have seemed a little remote after the renegotiation of the contract in 1977. Much more likely to proceed was the proposal to manufacture ferrosilicon advanced by N.Z. Steel in conjunction with a Norwegian company, Elkem Spigerverket. This company had offered to test local quartz gravels as one input in a process which would consume 500 GWh of electricity per annum. With these few proposals the working party on industrial development had largely served its purpose and it could now quietly wind down, at least from its interdepartmental status.

When the Officials Sub-committee met again on 8 August, it had before it a redrafted CEC paper on the implications of the changes in power requirements. However, the redrafted report


still proposed the continuation of Clutha on schedule. Other recommendations were for a deferral of the Ohaki geothermal development for about seven years and the deferral of a decision on the future of Huntly West mine until "the other electric power planning decisions have been made". In the final Officials Economic Committee paper it was recommended that CEC should "give guidance" to officials as to whether Clutha should proceed on schedule or be deferred for at least 7 years, and whether Huntly West should proceed or be maintained at the lowest possible level of production, or be mothballed. CEC was also requested to note that the establishment of a major petrochemicals industry (50 petajoules of gas per year or more) would provide the required additional market for gas to substantially meet the "take or pay" quantities.

On the whole these recommendations seem rather crude in their simplicity. Despite the efforts of some fairly high-powered working parties, little refinement of the basic options appears to have taken place, perhaps indicating that the four weeks allotted to the task was much too short a time in which to solve the nation's main energy problems. However, there was also a certain amount of hesitation, especially on the part of officials from the Ministry of Energy, to make any cutbacks in existing or prospective development. This was most clearly the case with the Huntly mines development, a project which seemed likely to be the first casualty but which was defended with rather spurious arguments about the need to ensure the survival of the coal industry in New Zealand. It is also rather disturbing that few officials outside Treasury questioned the need for the Clutha scheme, even though it could have been deferred at the same time as most of the liquid fuels projects went ahead (synthetic fuels development may have had to be left out).


Optimisation in terms of the efficient use of resources does not seem to have been the main goal of officials. If it had been, Ministers might have been presented with a selection of integrated power plans each placing priority on the utilisation of certain resources to the exclusion of others. Instead, Ministers were left to make a decision on each project in isolation and not as part of a coherent energy package. The options with regard to each project were neatly summarised in the report as "continuation" and "minimum investment". In listing the advantages of the continuation option the report placed emphasis on the need to concentrate future investment on renewable indigenous resources. This goal had recently been elevated to official policy through its inclusion in the Ministry of Energy's public document on energy policy, Goals and Guidelines: An Energy Strategy for New Zealand. However, the preferential use of renewable resources was also something of an emotive issue and it was readily called upon to justify the continuation of Clutha and Ohaki. Unfortunately, this conviction was not maintained with proper consistency because, as has been seen, those same proponents of the continuation of Clutha and Ohaki also tended to favour the retention of Huntly West and the maximum use of natural gas. Further inconsistency was evident in NZE's longer-term 30 year programme. In the final 15 years of this plan half of the development expenditure was to be spent on thermal stations that would burn on gas and coal.

A second advantage of "continuation" was that this option enabled the retention of much of the MOWD's expertise in the fields of hydroelectric and geothermal development. Although this option required a substantial reduction in the construction work planned in the 1977 Power Plan, the cut-back would not be as drastic as under the minimum investment option which

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entailed a virtual cessation of work between 1984 and 1988. The report commented that, in this latter case, "Expertise both private and public that had been built up over many years would be lost unless alternate projects requiring similar skills were found for that period".¹ This claim, as it was stated, would almost certainly prove correct. Unfortunately, it was not accompanied by any prediction as to the likely impact of such retrenchment on hydroelectric and geothermal development once this development was renewed.

Little attention was paid in the report to the employment benefits of continuation. A third major advantage of continuation lay in the regional development benefits it would bring. These benefits would be received in the Taupo area which was associated with Ohaki and in Otago where, as the report observed, the Clutha project was expected "to act as a catalyst to further development of agriculture and horticulture (through irrigation) and tourism".²

The report cited two main advantages of the minimum investment option. The main advantage was the cost savings, estimated as $500 million over the power planning period. Although this figure represented a considerable saving, the report noted that the continuation option involved a reduction in the level of investment which planners had decided to undertake in the 1977 Power Plan by $1,500 million (the minimum investment option involving $2,000 million less investment).³ The second advantage of minimum investment was that, by deferring the construction of new generating capacity, some of the "take or pay" quantities of Maui gas could be used in thermal generation.

² Ibid.
³ Ibid., p. 6.
However, it was calculated that only 34 percent of the "take or pay" deficit could be avoided in this way, meaning that the problem of finding a use for the Maui gas was to a large extent independent of the electricity surplus.¹

In these circumstances it is understandable that officials should evince an optimistic frame of mind with regard to petrochemicals, despite the uncertainties that faced these proposals. As the report on energy implications admits: "The financial and technical details are not yet precisely defined".² At the Sub-committee meeting, Mr. J. Hogg, the Chairman of the natural gas working party, continually warned against over-optimistic assessments in this area. Whereas most of the committee were hoping for a 60/40 blend of methanol and gasoline, investigations had not yet proved the feasibility of this blend and it may have been that a 15/85 blend was a more realistic target. The main alternative to methanol blends was synthetic gasoline but the disappointing results of some preliminary analysis made this proposal equally uncertain.³

It seems that CEC received a much brighter picture of the prospects for a petrochemicals industry. Indeed, much of the discussion at the CEC meeting of 15 August centred on this aspect of the Sub-committee's report on power planning.⁴ Presumably, the enthusiasm of officials soon infected Ministers. When discussion finally turned to the Clutha development, it was suggested that there would be some justification in deferring the project. However, Ministers took the view that regardless of the action which the Government took in relation to the Clutha development, a major use for Maui gas would still


2 Ibid., p. 10.

3 Minutes, "Interdepartmental Committee on Petrochemicals: Meeting 25 July 1978".

4 CEC minutes, "The Implications of Changes in Power Requirements", 15 August 1978, p.3. Also, Interview: P. McKenzie.
be required. This judgement apparently justified the premature commissioning of Clutha. Ohaki and Huntly West were also to be continued, although production at the mine would be at the lowest possible level.

In selecting this course, Ministers were able to approve, without alteration, a draft copy of the 1978 Report of the PPC which had also been submitted for their consideration. This report was based on the 'continuation' option and it was signed by all the members of the PPC with the exception of the Treasury representative, who preferred to defer giving his signature until CEC had made a decision on the Sub-committee's report. The actual recommendation contained in the Power Plan included the deferral of the two Clutha dams which fell within the planning period, Clyde and Luggate, by two years. Ohaki was also deferred by one year. All the other minor delays were largely due to construction difficulties. The Plan also provided for the deletion of 5 stations: Arapuni B, Auckland No.1 and No.2, Motu, Whakamaru B. Huntly was to be continued with three of its four units fired by coal in place of natural gas.

With this decision CEC had done little to mitigate the wasteful over-provision of generating capacity. The importance of developing renewable resources, together with regional development and manpower considerations, were probably more influential factors. However, it may be that the Government had other, publicly 'unmentionable', motives. Here one must include the Government's inclination to preserve the hard-won Clutha scheme from any renewed assault by environmentalists and other opposed groups. Such opposition would naturally intensify once it was revealed that the scheme was no longer needed for about another decade. Another, rather


more immediate concern of the Government, must have been the forthcoming election, then only three months away. Naturally, the Government would be seeking to avoid any embarrassing reversal of previous power planning arrangements, particularly with regard to such a sensitive project as the Clutha Valley Development.

This same CEC meeting also spent some time considering the second report produced by the Sub-committee, this one examining the reasons for changes in the predicted power requirement. This brief report provided sufficient reconciliation between the 1977 and 1978 forecasts to remove the Prime Minister's misgivings. However, the report did not satisfy the main objective of officials, which was merely to display general agreement on the forecast. A dissenting opinion was attached to the report by Ian Dick, the Chairman of the working party concerned with forecasting. According to Dick the CRPR had seriously underestimated saturation and other factors so that if his methodology was employed, forecast demand levels could be shown to be even lower than those predicted by the CRPR. Although Dick's dissenting opinion received much attention by Ministers, the efforts of other officials to demonstrate that Dick's methodology was unsound, and their otherwise impressive unanimity, combined to persuade Ministers to accept the 'upper' estimates of the 1978 CRPR as a suitable basis for planning.

With this matter settled, the 1978 report of the CRPR could now be published. The 1978 power planning report had endured a more intensive scrutiny to emerge largely unscathed in defiance of the original objectives of Treasury in setting up the Officials' Sub-committee on Energy. This report was now also immediately available for publication.

2.3 The First Moves to Utilise the Surplus

The Government had approved a programme of power development which did little to diminish the sizeable electricity surplus developing in the South Island. Preliminary estimates indicated that an excess of at least 1,500 GWh per annum would be available throughout the 1980's. With the planned installation of a second Cook Strait cable by 1985, sufficient capacity would exist to transmit the South Island surplus north in the latter part of this period, thereby avoiding the use of some costly thermal capacity. Of course, a second cable was not without its own cost and figures of up to $160m were quoted at the time.\(^1\) This costly prospect, together with the more definite supply situation following the power planning exercise, encouraged officials to look for alternative means of putting the South Island surplus to good effect.

At a meeting of officials on 15 August to discuss a draft CEC paper on proposed increases in electricity bulk tariffs, representatives of the Electricity Division of the Ministry of Energy proposed that, as one means of disposing of the South Island's electricity surplus in a productive way, a differential tariff for all South Island consumers should be established. Trade and Industry and Treasury did not favour this proposal for a number of reasons which may be briefly repeated here. Firstly, the relative advantage received by South Islanders would represent little to each individual consumer so that there would probably be no lasting beneficial effects. Secondly, such a tariff benefitting both domestic and industrial consumers alike, appeared to run directly counter to the Government's policy of energy conservation. Thirdly, the South Island's case on regional development grounds for such a differential tariff, would be no greater than that of some regions in the North Island. Fourthly, a precedent might be set for the regional pricing of nationally-owned goods and services.\(^2\)

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In order to productively utilise the surplus, officials in Trade and Industry and Treasury believed that any concessional tariff should be restricted to industrial development. Accordingly, NZE's proposal was dropped and replaced by a recommendation to CEC that some of the provisions of section 34 of the Electricity Act, 1968, entitling the Minister of Energy to reduce the bulk tariff for certain qualifying industries should be applied in the South Island. To qualify, an industry would have to prove that its establishment or expansion depended on the concession and was in the national interest. Other recommendations largely pertained to the proposal to increase the bulk tariff. Officials believed that a 15 percent rise would be adequate to meet NZE's needs.\textsuperscript{1} CEC referred these matters for the consideration of Cabinet on 28 August. Here it was decided that a 5 percent increase would be adequate. Cabinet approved the recommendation that reductions in the bulk tariff could be allowed to certain industries to be determined on a case-by-case basis. This decision gave new impetus to inquiries into potential industrial users of the surplus.

At this stage Trade and Industry had received two promising proposals. The most advanced proposal concerned the manufacture of ferrosilicon. New Zealand Steel and its foreign partner, were still awaiting the results of tests on South Island quartz gravels. The other proposal, from Ulvac Corporation of Japan, entailed the establishment of a plant manufacturing ultrafine metal powders. All the raw materials would be imported, apart from the electricity requirements which came to 45 GWh per year.

A third potential customer made its advances to the Government in September. Treadwell Corporation of America, acting on behalf of an undisclosed client, was undertaking a feasibility study on the establishment of a ferromanganese plant. The

\textsuperscript{1} CEC paper, "Electricity Bulk Tariff for 1979/80", 20 August, 1978, p.5.
company approached the New Zealand Government to see if interest existed in a $120m industry which would consume about 800 GWh per year. The first advice of the proposal was enthusiastically received within Trade and Industry and arrangements were made for a visit by a representative of Treadwell on 19 October.¹

In preparation for this meeting officials met on a number of occasions in an endeavour to assess the national benefits which the project might bring and also to form an electricity pricing policy. This latter exercise was undertaken by officials from Treasury and the Ministry of Energy. Papers presented by both departments agreed that the nature of electricity costs would be shaped by three distinct phases within the next 15 years.² In the short-term up to the commissioning of the DC link across Cook Strait in 1985, an 800 GWh industry would consume most of the South Island surplus. Under these conditions production costs would be close to zero. Distribution and other costs would give rise to a figure of approximately 0.75c/kWh. After 1985 all of the industry's load would reduce power transmitted to the North Island, therefore increasing thermal generation which would involve a fuel cost of about 1.1c/kWh. Treasury and Energy disagreed on the correct figure for the total mid-term costs with Treasury suggesting a cost of supply of about 2.1c/kWh, while Energy claimed it would be closer to 1.3c/kWh. Agreement on electricity prices for the mid-term was particularly desirable as it was unlikely that the plant would come on-stream before 1985. After a couple of meetings, these departments agreed on a cost of 1.5c/kWh. In the long-term, after about 1990, the cost of supply would be related to the unit cost of new power stations being developed at that time, resulting in an approximate figure of 3.5c/kWh.

1 Cable to Trade and Industry, 19 September, 1978.

The price at which electricity could be sold would need to be related to these incremental costs of supply. However, it was noted that the cost of supply was best treated as just one factor determining the minimum acceptable price, and that other advantages and disadvantages of the project should also have a bearing. A further point which received some emphasis was that in future years New Zealand would not be a cheaper supplier of electricity than other countries. For this reason it was recommended that it should be made clear to any potential large-scale consumers that New Zealand could not be regarded as a long-term source of cheap energy.¹

These policy considerations were conveyed to Dr. Muller, Treadwell's representative, at his meeting with officials in Trade and Industry on 19 October. Muller was advised that the company could receive an attractive price during the period of surplus but in the long term it would have to bear the full cost of supply. No indication of these short and long term costs was given, although officials did quote the bulk tariff (1.9 cents/kWh). Muller responded that this tariff "wouldn't be a starter". He claimed that Iceland had offered electricity at 0.4 cents/kWh and that the prices in some Australian states were also much lower. However, electricity was an important consideration but not the only one; New Zealand had other attractions which would need to be evaluated. In this regard, officials noted that one reason for Iceland being largely ruled out as a site was its insistence on a 55 percent equity share. They mentioned that New Zealand was becoming increasingly receptive to foreign investment and would not necessarily require equity participation in a ferromanganese plant. The government's main concern would be to ensure that an adequate return was received on the resources involved.²

¹ Minutes of meeting in Trade and Industry called to discuss the proposal to establish a ferromanganese plant in New Zealand, 13 October, 1978.

² Minutes of meeting between officials and Treadwell representative on proposal to establish a ferromanganese plant, 19 October, 1978.
The cautious approach of Treasury and Energy to the ferromanganese proposal does not seem to have been reflected in Trade and Industry's attitude to electricity-intensive industries in general. Investigations in this department were headed by Bill Falconer, his principal assistants were David Harcourt and Bruce Carrie. Of this group, Harcourt was particularly concerned to find some way of utilising the electricity surplus. Indeed, "Disposing of the Electricity Surplus" was the title of a brief internal paper drawn up in late November by Harcourt which summarised the "state of play" with the various projects. Among the half dozen projects under investigation none were certain to go ahead and some were likely to be abandoned. By November some doubt had been cast on the viability of New Zealand Steel's proposed ferrosilicon smelter, initially favoured because of its use of indigenous minerals. Even at an electricity price of 1.5c/kWh the smelter would lose money, perhaps $4.5m per year. Work was still proceeding at a fairly preliminary stage on four other proposals, namely, New Zealand Steel's flat products development (600 GWh), Ultrafine Metal Powders (45 GWh), Ferronickel (250 GWh) and Ferromanganese (800 GWh). The possibility of negotiations opening between the Government and Comalco over the company's planned third potline looked remote although officials had, as yet, made little effort to persuade the Government to act.¹ In these unsatisfactory circumstances it seemed, to Harcourt at least, that some initiative should be made, preferably in the form of a paper to CEC. Such a paper would recommend that negotiations be opened with Comalco and that the Government should approach Treadwell with a view to embarking on more detailed discussions. It would also recommend that CEC approve expenditure on the employment of consultants to advise Government on such matters as raw material supplies and costs, the development of any new plants, and market trends in relation to the kinds of industrial applications which might make the best use of the surplus.²


2  Ibid., p.3.
In the following week Harcourt wrote a draft CEC paper which was ostensibly concerned with the need to engage consultants. However, in places the paper reads more like an advertisement for New Zealand's energy resources and for the multinationals which might utilise them.

This aspect of the draft, and its use of the request for consultants largely as a pretext on which to promote industrial applications for the surplus, probably rendered it unsuitable for use. Nevertheless, it is not possible to say why no further paper on these issues was sent to CEC. Instead, some of the circumstances which may have served to restrain Trade and Industry's activity may be listed. An important factor, although one difficult to assess, is the conservatism in other departments towards sales to large electricity users. This attitude combines a reluctance to deal with large multinationals of the Comalco variety (particularly suspect after the recent difficult renegotiation of the Comalco supply contract) and a similar hesitation to supply cheap electricity over long periods because the prevailing conception of this commodity is of something expensive which should be conserved. This kind of conservatism is most apparent in 1979. However, Trade and Industry would certainly have had to show some sensitivity to this attitude in 1978. The rejection of Harcourt's paper suggests that officials in this department were not entirely agreed on the best approach.

Another constraint may have been the absence of a clear ministerial directive on such issues as the kind of electricity intensive industries (EII) which should be developed; the nature of any concessions; whether, in fact, the surplus should be treated as a resource to be utilised for industrial development. Hence, a request for the employment of consultants, for example, may have seemed premature while a policy on the surplus and its

uses remained to be elaborated. Another factor impeding Trade and Industry's promotion of EIFs may have been the uncertain division of departmental responsibilities in this area. Some officials in Trade and Industry were aware that, unless an effort was made to justify the leading role which that department was gradually assuming in the investigations, some resistance might be encountered from the Ministry of Energy given that department's responsibility under the Electricity Act for the development of energy based industries. It is not known what efforts, if any, were made at this time to settle this matter. However, a letter from Falconer to the Secretary of Energy, dated 8 December, is of interest in this regard because it shows Trade and Industry to be taking a fairly assertive line. In its introductory remarks the letter refers to Trade and Industry as "co-ordinating the interdepartmental analysis" of a number of energy-intensive projects. The letter then proceeded to assign a number of tasks to the Ministry of Energy related to the costing of energy for large-scale industrial development. Falconer clearly intended to institute a much more thorough costing exercise than that which had been hurriedly carried out prior to Muller's visit in October. Another feature of the letter was the requirement that analysis should be carried out independently of any specific project. This is significant because it contributed to a redefinition of the problems facing officials in terms of the utilisation of surplus resources. In the case of electricity, it involved the recognition that a quantifiable block of power could be costed and, ultimately, advertised for sale.

Treasury appears to have been somewhat surprised by this letter, particularly since Trade and Industry had been rather silent on these matters for the previous two months. Accordingly, the energy section of Treasury resolved to take a closer interest in developments in this field. At a meeting held in Trade


and Industry on 14 December to discuss the forthcoming visit of a West German investment mission, Stephen Graham, the Treasury representative, was acquainted with Falconer's attitude to energy-intensive industries. Falconer, who chaired the meeting, suggested that the opportunity for investment in EIIIs should be emphasised to the mission since some industries would have to be found to utilise the surplus electricity which would be available over the next 10 years. Graham felt that this was a dangerous view in its implications. In his opinion the point should be made clearly to any potential foreign users of New Zealand's electricity, that this country could no longer produce electricity cheaper than other countries and, although these industries may get concessions during the surplus years, the rate charged after this period would need to be tied to the long-run incremental cost.¹

This view was repeated on other occasions but there is no evidence that Treasury's attitude to EIIIs acquired any more depth than this in late 1978 or early 1979. If the Government was to establish EIIIs to utilise the surplus, then a lot of work would need to be done to resolve a number of uncertainties, not the least of which concerned the quantity and cost of the electricity available, the level at which an internationally competitive price might be reached, the kinds of industries which would return the most benefit. Treasury did not press to have matters such as these investigated. Instead, the department was apparently content to react to developments as they happened, mainly in connection with the ferromanganese proposal since this proposal made the most progress during this period. This approach probably reflects Treasury's wariness of developing largescale EIIIs and a consequent reluctance to initiate investigations into industrial applications of the surplus.

¹ S. Graham (internal Treasury memo.), "Visit of West German Investment Mission (BDI): March 1979".
The impression is created of this period that, depending on the determination of the ferromanganese proponent, the issue of the industrial utilisation of the electricity surplus could well slide into a kind of bureaucratic limbo. Of course, one must also take into account the determination of Trade and Industry to promote EIIIs. Because of this department's role it is difficult to say whether this period is better described as the twilight period of the 1978 power planning exercise, or the dawn of a new period where industrial applications for the surplus would be sought. The ambiguity exists because, although Falconer initiated an electricity pricing exercise, this particular exercise was not carried through to a conclusion but was overtaken by a new initiative to find industrial uses for the surplus. In the meantime, some useful information was generated, for example, that about 2,000 GWh might be available for industrial use. Moreover, there was little real advance on the pricing methodology of October. One can only guess how these investigations might have evolved (or wound down) because the new initiative had the full weight of a Prime Ministerial directive.
CHAPTER 3

THE DEVELOPMENT OF A CONCESSIONAL TARIFF FOR LARGE ELECTRICITY-INTENSIVE INDUSTRIES
3.1 The Prime Minister's Initiative: An Investigation of the Industrial Potential of the Surplus

The Prime Minister had been among the first to see the potential for industrial use of the surplus. At a CEC meeting in June 1978 when the large overinvestment in electricity generating capacity was revealed to Ministers, the Prime Minister's reaction was to treat the excess capacity as a bonus to be capitalised on.\(^1\) One may suppose that he took a close interest in subsequent developments as they were reported to him by Ron Allan of the Prime Minister's Department.\(^2\)

In January or early February 1979, the Prime Minister met with Mr. P.W. Blakeley, the General Manager of NZE. The full outcome of this meeting is not known, although the subject of the electricity surplus is reported to have been raised. Blakeley acknowledged to the Prime Minister that a considerable and lasting surplus did exist.\(^3\)

On 9 February, a brief letter was passed from Bernard Galvin, the Permanent Head of the Prime Minister's Department, to Noel Lough, the Secretary to the Treasury. The letter contained a request from the Prime Minister for an analysis of New Zealand's forecast energy surplus and the prospective energy-intensive industries which might utilise it. This was an enormous task because it covered the analysis of petrochemical applications for Maui gas, as well as industrial uses for the electricity surplus. The economics of such projects would obviously depend to a large extent on the cost of the energy they used. This energy had, in turn, to be costed in its various alternative uses. For example, the opportunity cost of gas used in a petrochemicals industry would probably have to be related to the value of this gas in thermal generation, depending on the overlap in requirements. The value of gas used in power stations would also be related to the price which

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1 Discussed on p.40

2 Allan was himself a strong advocate of using the surplus industrially and he appears to have been in fairly close collaboration with Harcourt during this period.

3 Interviews: D.C. Cook (NZE) and W. Nicolson (NZE), December, 1980.
EIIs were prepared to pay for their electricity. Revenue from EIIs would also affect the economics of those planned hydro stations - particularly on the Clutha river - to which the government was not yet irrevocably committed. In this way a web of interrelationships can be built up between the main energy forms and their uses, existing and potential. Some of the issues relating to energy planning will be elaborated later. For the moment it is interesting to note how officials approached the task of planning for the intricate analysis that would be required.

The responsibility of dealing with the Prime Minister's request fell to Rob Laking, the newly appointed director of Treasury's Industry Division (which comprises industry and energy sections). Laking called a meeting of the principal officials involved in energy planning for industry to decide on the course of action which should be taken. This meeting was held on 19 February. Laking, Falconer, Dick and Allan were the senior officials of the four departments represented.

An important function of the meeting was to acquaint departmental representatives with each other's views on the electricity surplus and EIIs. Up to this point Treasury and Energy had expressed neither support nor strong objection to the development of EIIs. Treasury's main requirement had merely been that any companies should pay the LRMC of supply when the surplus ran out.¹ This point had been accepted in principle by Trade and Industry although this department was keen to base the long run tariff on the bulk tariff employing the assumption that the bulk tariff would approximate the LRMC (some matters relevant to this assumption are discussed below). If an internal discussion paper written in preparation for the meeting by Harcourt and Carrie is any indication of Trade and Industry's stance, it can be seen that this

¹ S Graham (internal Treasury memo) "Forecast electricity surplus, potential energy intensive industries and an appropriate pricing policy - notes for the meeting on Monday 19 February, 1979" 16 February, 1979.
department's policy concerns were rather narrow and largely restricted to the structure of a concessional tariff for large users. The structure of the tariff should meet four main criteria, briefly: the initial price should be low to be competitive; the tariff should increase gradually rather than suddenly as costs increase; the process of price increase should be explicit and settled to avoid the lengthy delays that negotiation would entail; and, finally, the user should have to meet the cost of new generating capacity.\(^1\) Whether these matters were discussed is not known, although it is clear from later events that a tariff structure was not settled at the meeting. Instead, it is likely that the preoccupations of Treasury and Energy kept discussion to a more basic level. Ian Dick declared his opposition to EIIs because he believed that the sale of cheap electricity to large foreign companies would be impossible to justify politically - particularly in light of a 60 percent increase in the bulk tariff approved by Cabinet on 12 February 1979 (discussed later).\(^2\) Treasury's position is more ambiguous because this department appears to have suspended judgement on EIIs until the completion of the electricity costing exercise but, at the same time, pressed for the deferral of some power stations - a measure which would reduce the duration of the surplus.

Naturally, these positions were not reconcilable in the space of one meeting. The main outcome of the meeting appears to have been a decision to institute an exercise which would fairly promptly meet the Prime Minister's request as it related to the use of surplus electricity. Accordingly, officials would continue the exercises to identify the short and long run marginal costs of producing electricity and potential industrial applications for the surplus electricity. They would also


2  D. Harcourt, unofficial minutes of meeting, 19 February, 1979.
institute an exercise to determine an internationally competitive price for electricity.  

In concentrating on EIIs, officials had selected a manageable fraction of the whole energy planning exercise. This was largely justified by the urgent need to get some results to Ministers. However, this exercise would drag on for some months, finally culminating in a report to CEC in late August. During this time the opportunity existed to incorporate EIIs within an integrated energy planning exercise of the kind alluded to above. As will be seen, this opportunity was largely allowed to pass.

Although a comprehensive energy planning exercise was not possible within the few weeks up to, say, the end of March and was perhaps better left as an adjunct to the Power Planning exercise as in 1978, there were still a number of other issues which warranted immediate attention. In particular, the exercise to identify potential industrial applications needed to be given a clearer focus. Trade and Industry apparently had very little policy in the area but was intent on inviting another Comalco-style operation to New Zealand. Of course, a prospective customer may have had some local participation. This possibility immediately suggests the need for a wider strategy; what kind of priority would such applicants get? Should New Zealand give preference in its dealings with companies from certain countries over others? What are the dangers of dealing with multi-nationals? For example, would New Zealand have to take special precautions in its dealings with a company which both provided the raw materials and exported the finished product?

On another level such a strategy might question whether all industrial development was advantageous per se. What kind of benefits did the nation hope to receive: wages, taxation, foreign exchange? How would they be assessed? What kind of

legal questions were most important? What, in particular, could be learnt from the Comalco experience? There is no evidence that any of these questions were raised at this time let alone answered satisfactorily. While it could be countered that many of these broader issues would be faced when the government actually entered into negotiations with a company, it should nevertheless be apparent that if there were a number of customers the government might have to make its choice between them in a fairly aimless fashion. There was also the danger that one particular customer might be seized on by the government. To take one plausible scenario, the Prime Minister's Department could have taken up the cause of a potential new industry and succeeded in gaining the Prime Minister's support before the proposal could be properly evaluated or compared with other proposals.

Following the meeting of 19 February, an interdepartmental working party was set up to supervise the investigation into the surplus, EIIs, and an appropriate pricing policy. While these investigations were proceeding, some important decisions were made relating to electricity pricing policy for existing consumers.

3.2 Shifts in Electricity Pricing Policy

On 28 August 1978, Cabinet had approved a 5% increase in the electricity bulk tariff to be effective from 1 April 1979. This rise was the minimum necessary for NZE to break even during the 1979/80 financial year and it was decided upon despite officials' recommendation for an increase of 15%. Cabinet's decision is probably best seen in the light of the approaching election. This reason also helps explain why, at a suitable point after the Government's return to power, officials recommended a further increase in the bulk tariff. At its meeting on 12 February 1979 Cabinet approved another increase of 55% which, because of administrative problems, would be effective from 1 May.\(^1\) It was intended that the

overall increase of 60% would allow a substantial contribution to electricity capital works while at the same time the Government's 1979/80 deficit before borrowing would be reduced by $137 million. Economic as well as financial considerations helped justify the increase. In an energy pricing package of 1976 the Government had adopted a policy of moving energy prices towards the long-run marginal cost of supply. Officials claimed that a 60% increase in the bulk tariff would enable this policy to be implemented with respect to electricity since the resultant average real price of 3.2 cents per unit would now cover the cost of new generating capacity, such as the Clutha Valley and Tongariro schemes, estimated at 3.0 cents per unit. In this way, a pricing system was replaced which had effectively subsidised the price of power.

However, by the end of the month the new pricing system included another, more selective subsidy. On 27 February CEC approved a proposal for a 25% electricity concession to assist the development of new or existing industries in the South Island. This proposal differed from that advanced by NZE in August of the preceding year, in that the concession was limited to industrial consumers and was therefore likely to return relatively greater benefits for the revenue foregone.

2 Ibid., p.2.
3 CEC minute, "Electricity Concessions for South Island Industry", 27 February, 1979. The CEC minute noted that large EIs (over 25 GWh p.a.) would be excluded and would continue to negotiate individual concessions).
The circumstances were also rather different on this occasion. By this time Ministers had taken up what was previously just a departmental initiative. On 28 January the Minister of Regional Development (Mr. Cooper) announced in Dunedin that a policy to provide cheaper power for South Island industry might come into effect on 1 April. He added that he would soon be having talks with the Minister of Energy to hasten the introduction of the policy.\(^1\) It is perhaps also relevant that the proposed concessions accompanied a rather more substantial tariff increase than that contemplated in 1978.

Naturally, the size and suddenness of the bulk tariff increase provoked considerable public reaction. Among the more outraged consumers, if their press coverage is anything to go by, were a number of large electricity-intensive companies. Claiming that the increase would seriously damage their competitiveness or viability, some of these firms persuaded NZE that a need existed for a scheme to provide temporary relief from the increase. Briefly, the scheme worked out by NZE proposed that firms in the export business whose export sales would be prejudiced by the increased electricity prices should be given a rebate which would be decided on a case by case basis.\(^2\) This proposal was considered by Cabinet on 12 March along with two dissenting reports from Trade and Industry and Treasury. The main objections of these two departments pertained to the administrative difficulties such

\(^1\) Evening Post, 29 January, 1979.

a scheme would entail. Presumably, it was with these objections in mind that Cabinet referred the matter to CEC for consideration, thereby requiring a single agreed report from officials which would take into fuller account the administrative problems.

It was apparent to officials that Ministers believed some relief from the price increase should be given. With this in mind officials presented a proposal to CEC on 24 April which differed from the original proposal only in the measures taken to ensure its more efficient and equitable application. Officials agreed that aid should be confined to electricity intensive exporting firms. After some brief discussion of the likely cost - estimated at between $10m and $20m - CEC agreed to recommend the proposal to Cabinet. Cabinet subsequently approved the proposal.

3.3 The EII Investigations Get Underway

During these months of February, March and April, when the Government was showing its determination to price electricity at something like its long-run marginal cost, while allowing concessions for hard-hit sectors, officials continued in their endeavours to establish energy costs for project evaluation. This task was made complex by the need to find the economic cost or 'shadow price' for each energy resource. The economic cost is the greater of the long-run marginal cost of supply and the opportunity cost in alternative uses. In the case of natural gas the long-run marginal cost was minimal because the Maui platform, the major cost component of supply, could be treated as a sunk cost. However, the cost of supply could not be treated as certain while a decision remained to be made on whether to proceed.

1 CEC minute, "Electricity Bulk Tariff Increase: Relief for Selected Consumers", 24 April 1979.
with a second offshore platform. 1 While the long-run marginal cost of gas was low, it was necessary to establish the value of gas in various uses, that is, its opportunity cost. A number of papers were directed towards this complex problem - a problem which had to be resolved before the long-run marginal cost of electricity could be determined, given that gas (along with coal and oil) was an input for electricity generation. 2

One of the early working party papers on electricity costing attempted to define the bounds within which different methods could be used to assess the effect of excess capacity on marginal cost. 3

A method which would calculate the lowest marginal cost of supplying electricity could be derived from the assumption that investment in new generating capacity during the period of the Power Plan is effectively "sunk". Proceeding with the Power Plan, and thereby creating a large surplus, would mean that an increment of new demand from an electricity-intensive industry would not call for capital expenditure of be brought forward for several years, perhaps decades (depending on the size of the increment). This additional capital expenditure, when discounted to reduce it to its "present worth", would make a very small contribution to the marginal cost of generating electricity. 4 Without this new increment the marginal cost during the period of surplus would be just the minimal cost of running hydro stations and burning a little fuel in thermal stations, although later on in the period thermal generation would become more important.

4 Refer to p.125ff. for a discussion of discounting.
Alternatively, in order to determine the upper bound on the marginal cost, the assumption would be made that the Government had planned the new capacity in anticipation of the requirement of new industry. For this exercise the actual Power Plan could be stretched, the gaps between the commissioning of new stations lengthened, to create a notional Power Plan which just covers normal requirements. The marginal cost of meeting an increment in demand would then be the present value of the cost of bringing forward the capital expenditure and fuel costs, while just covering normal requirements. As new stations are brought forward the Power Plan shrinks back towards its original form. Using this method the marginal cost is significantly higher because the new stations, instead of being built for manpower utilisation, regional development or other reasons and then being effectively written off as a sunk cost, are treated as a cost incurred in supplying this new increment so that the cost of new capacity is therefore discounted over a much shorter period.

In early March Ron Allen of the Prime Minister's Department produced a brief note intended to further refine the approach that should be taken when costing electricity for electricity-intensive users. Allan provided a number of arguments that could be used to justify the rise in the bulk tariff whilst giving discounts to major new users. In suggesting that discounts could be offered, Allan was not opposed to the application of a long-run marginal cost pricing policy. In fact, he argued that because New Zealand's relatively cheap projects have already been completed, leaving only the more expensive ones, the consumer should be told, through prices, of the cost of his increased power demand. This policy would enable investment decisions to be made by consumers in the light of more realistic energy costs than those which might obtain during a short-lived period of surplus. While it could be argued that applying an LRMC pricing policy denies New Zealand

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consumers the benefits of electricity projects developed in earlier years when they were cheaper (in real terms) than the more expensive ones of the future, it is nevertheless impractical to charge only new users at the LRMC. Instead, a standard cost is applied across-the-board. However, it is possible to offer short-term discounts during a period of surplus where the incremental demand is identifiable. That is, special arrangements can easily be made for a major new user to be charged for a temporary period at a rate reflecting the immediate cost of supply, in other words, the short-run marginal cost (SRMC). This SRMC corresponds to the "lower bound" on costs mentioned above during the period where capital expenditure is treated as a sunk cost.

During March some modest progress was made with the various proposed electricity-intensive industries, making the need for a conclusion to the energy costing exercise all the more pressing. Officials were advised that a representative of Ulvac Corporation intended to visit New Zealand in early May to discuss the company's proposal to establish an ultrafine metal powders plant. With regard to the ferromanganese proposal, Dr. Muller had suggested that New Zealand was the site favoured by his corporation but that the client company had yet to reach a final decision on the issue. In order to help maintain the company's interest in New Zealand, Harcourt mentioned, in reply to Muller, the 60 percent increase in the bulk tariff but added that the Government was considering "appropriate tariffs" for major new users.¹ It must have been a source of some frustration for both parties that the Government was, as yet, unable to give any details of possible concessions. Two other proposed industries, ferro-silicon and ferronickel, were also proceeding, the former through the employment by the Government of a consultant to visit Elkem Spigerverket in Oslo, the latter receiving a boost from a 27 percent increase in the market price of its product.²

¹ Letter from Harcourt to Muller, 19 March 1979.
By the end of March it seemed to Harcourt that the full energy costing exercise would not be completed for at least another month and that the preparation of a CEC paper might take an additional couple of weeks. In view of the state of the ferromanganese proposal and the imminent visit of a representative of Ulvac Corporation, Harcourt called a meeting of the electricity-intensive industries working party in order to gain a fuller indication of electricity prices for the benefit of these proponents. Both Harcourt and Allan saw this move as a way of speeding up the investigations.\(^1\) For his part, Allan intended to raise the question of concessional tariffs for new users with the Prime Minister before the working party meeting. In so doing, Allan expected to get authority to inject a little more urgency into the pricing exercise.\(^2\)

It is not clear what form this authority took, if indeed it was forthcoming. However, there is evidence that Allan played a fairly major role at the working party meeting which was held on 2 April. Allan contributed a proposal to offer concessions to electricity-intensive industries which located in the South Island. Under his scheme the rate per kilowatt would be set initially at half the bulk tariff. The concession would abate at 5 percent a year from 1986 until, in 1994, the full bulk tariff rate would apply.\(^3\) It is interesting to note that Harcourt and Carrie, Trade and Industry's representatives at this meeting, had proposed an almost identical schedule of charges in the internal paper they had written almost six weeks earlier. A principal advantage claimed for this tariff was that the price charged initially would be competitive with such alternative suppliers as the Australian states of Tasmania and Victoria. The schedule also provided for fairly gradual increases in price. Of course, this feature was subject to the future alterations which would be made to the bulk tariff. Provided the bulk tariff was not raised above the LRMC of supply, there seemed little scope for further sharp increases.

1 Interview: D. Harcourt, December 1980.


3 Minutes, "Notes of a meeting held on 2 April 1979 and called to discuss electricity tariffs for major new users".
However, a point either overlooked or avoided by the proponents of this tariff concerned the more likely event that the bulk tariff would slip back in real terms because of the Government's distaste for raising power charges, especially near the end of its term in office. In this case, the taxpayer would be subsidising the industry if the charges dropped below the SRMC during the period of discounts and the industry would certainly be subsidised once it reached the bulk tariff. Nevertheless, the existence of political constraints on inordinate price increases could be seen as a third attraction of such a scheme. By relating the tariff directly to the bulk tariff, potential investors would know that any increase in the electricity charges made to them would have to be borne by all the other consumers as well. Perhaps the principal attraction, as far as Trade and Industry and the Prime Minister's Department were concerned, of a price related to the bulk tariff, was that it would provide a single, easily-understood and relatively neutral schedule of charges to offer to potential investors. It was apparent to these departments that the alternative, a tariff negotiated with each industry in an effort to get the best possible deal for the nation, would require so much extra bureaucratic intervention that it would significantly delay the date when the new industry could begin to take advantage of the surplus.¹

Treasury and Energy, on the other hand, were opposed to a schedule based on the bulk tariff and, correspondingly, these two departments appear to have been much less concerned to find a means of utilising the surplus. Only a little evidence of the stance the Ministry of Energy took at this meeting is available but it appears that the Ministry found it hard to reconcile the policy of increasing the bulk tariff to cover the cost of new power stations with the proposal to offer electricity to selected industries at less than the previous bulk tariff in order to dispose of a surplus. Of course, the contradiction is not one of theory and it seems that Energy was more concerned

¹ Interview: B. Carrie and D. Harcourt, December, 1980.
about the political repercussions of the scheme. The two Treasury representatives at the meeting, Stephen Graham and Roger Proctor, were rather disturbed by Ron Allan's approach. Graham claimed that there was the danger with Allan's approach that the Government might be selling electricity in the early years of the surplus at a rate below the SRMC. Furthermore, as a result of a possible downturn in the economic fortunes of the industry, the Government might find itself "locked-in" to this price. Similarly, at the end of the period of surplus, the price should not be the bulk tariff but the LRMC; it was not enough for Allan to claim that the former was likely to approximate the latter.¹

On a number of other issues officials found substantial agreement. One of the main points decided was that the real price charged under any concessional tariff should be stepped up gradually over the period rather than increased abruptly as marginal costs increased. Those present also felt that before the 1979 CRPR forecasts became available, the "lower" estimates of the 1978 CRPR should be used in any exercise to establish the size and term of the surplus. Preliminary estimates suggested that the 1979 forecasts would approximate the 1978 "lower" forecast. On the basis of this forecast, it appeared to officials that an initial package of 2,000 GWh could be offered to potential customers. This rather arbitrary amount did not exhaust the whole of the surplus which, when expressed diagrammatically, had the form of a hump;

¹ S. Graham (internal Treasury memo.), "Concessional Electricity tariff for surplus generating capacity", 4 April, 1979.
the biggest discrepancy between supply and demand occurring in 1983 when at least 8,000 GWh would be available in excess of requirements. Obviously, all this capacity could not be utilised without the need to bring on new capacity in the following year. Two thousand GWh, however, seemed to fit comfortably within the "hump" while allowing the surplus to last until about 1992/93. At the close of the meeting Dick Pearce, the NZE representative, agreed to prepare a schedule of marginal costs of supplying 2,000 GWh of additional demand in the South Island for each year from 1979 through to the point where new capacity would have to be provided to meet such demand. It was intended that the results from this exercise would contribute to a draft CEC paper which Harcourt was to write.¹

The meeting of 2 April is important because it provides a fairly clear summary of the state of official policy on electricity-intensive industries. Sufficient agreement was evident on the principle of a concessional tariff to enable the drafting of a CEC paper, although some officials in the Ministry of Energy were not entirely reconciled to the idea and it seemed likely that they would offer resistance if the concession should fall below that offered under the recently established South Island scheme.² The debate over whether the tariff should be related to the bulk tariff or the LRMC, would continue to trouble officials for some time. As progress was made with the electricity costing exercise, schedules were developed which were based on the bulk tariff but approximated marginal costs. However, this didn't remove the underlying issue which concerned whether a single, easily advertised tariff should be established

¹ Minutes "Notes of a meeting held on 2 April 1979 and called to discuss electricity tariffs for major new users".

or whether each industry's tariff should be negotiated to secure the best deal for the nation (the proponents of an advertised tariff doubted whether negotiations would necessarily secure the best deal possible). Another problem was the profile which the tariff would have. Essentially, the question here was whether the initial price should be below the SRMC. The most complex problem involved deriving a schedule of marginal costs for the new increment of demand. This matter was not a major source of contention between officials who, for the most part, were content to rely on the work of Electricity Division.¹

A couple of weeks after this last working party meeting, Harcourt drew up a draft CEC paper.² It proposed that an electricity concession should be made available to new export based industries located in the South Island whose demand exceeded 25 GWh per annum. This proposal was presented as a natural extension of two recent government decisions on electricity concessions to industry. On 28 August 1978 Cabinet had agreed to allow reductions in the price of electricity to new or expanding industries which were in the national interest and their establishment or expansion depended on the concession. On 27 February CEC agreed to a 25 percent concession and it widened the criteria on which South Island industries could qualify. However, concessions to industries requiring more than 25 GWh per year were to be negotiated on a case-by-case basis, having regard to the national and regional benefits involved. The draft CEC paper maintained that this

¹ However, one issue which did crop up in this context was whether Clyde (the first Clutha station) should be treated as a sunk cost. In part, the problem lay in the fact that, although the government was committed to proceeding with the project, funds had only been spent on investigation work. Otherwise little is known about this issue which was resolved in favour of including the capital cost of Clyde in the marginal cost of supply.

latter category of industry now deserved attention in view of the surplus in electricity generating capacity which was developing in the South Island. Industries should be attracted which could utilise an initial 2,000 GWh of electricity in the South Island. To this end a tariff would be advertised both in New Zealand and overseas and electricity would be allocated to those industries offering the greatest benefits to the nation. This tariff would be set at a level above the marginal cost of supply in each year.

The paper could only form the outline of a report to CEC because it lacked any survey of the industries which might utilise the surplus and because the electricity costings on which the new tariff would be based were not yet available. In what it contained, the paper was designed to be uncontentious although it did propose to advertise a fixed tariff. This proposal was still opposed at the working party level where Steven Graham continued to press for the negotiation of tariffs case by case.

As a stimulus to action the paper was unsuccessful. Further progress now hinged on the results of costing work being carried out by NZE but as the weeks dragged by into May, this information was still not forthcoming. Because of this delay, Laking found himself under increasing pressure from his Minister as well as other departments to make progress in the investigations. Accordingly, in early May Laking and Falconer visited McCool. Their call for some urgent results was rewarded shortly after on 18 May with an interim report from NZE. The report indicated that about 2,000 GWh per annum was available, allowing the period of surplus to extend to 1990. The marginal cost of producing this additional energy was assessed to be "not greater than 1.0 cents/kWh" until the end of the period of surplus beyond which the long run incremental cost of providing new energy would be about 4.0 cents/kWh. The report did not suggest a

tariff but it did set out some objectives of a tariff that were important to NZE. In particular, the absolute minimum for the tariff should be above the lowest existing tariff for large users (received by New Zealand Aluminium Smelters); there should be a reasonable return above the marginal cost of production; and suitable arrangements should be made to ease the transition from the period of low cost surplus power to the period where the tariff was based on the marginal cost of new capacity. ¹

It is difficult to say exactly why this paper was delayed, although it would seem that the problem was not simply the complexity of the arithmetic involved in the costing exercise. Officials from both Treasury and Trade and Industry criticise NZE during this period for being less than completely co-operative in a deliberate effort to slow the investigations down. ² In their opinion, the division's unease with the investigations was attributable to the unusual predicament. After years of dedication to the prevention of shortages, the division now had to adjust to the idea of having a commodity in oversupply and to the prospect of sales to large users at extremely low prices. In these circumstances the division's natural reaction was caution involving the careful rechecking of calculations.

For their part, officials in NZE will readily testify to their desire to protect the interests of electricity consumers. The memorandum of 18 May also gives priority to this objective in setting out certain limits on the tariff for large users. Whether this orientation led to efforts to delay the investigations is difficult to ascertain. However, there is evidence that some disagreement began to develop within NZE during this period over the approach to new EIIis. The precise nature of this disunity is unclear, although it seems that the commercial section resisted the external pressure to produce results. Dave Cook, the Commercial Manager, was one of the few officials embarking on the EII investigations who had experienced the negotiations with

² Interviews.
Comalco and his current concern was to check what he saw as the headlong rush to court new EIIIs, at least until a more considered decision could be made. In Cook's opinion, officials should evolve a strategy before they began to deal with EIIIs. Something of this approach is evident in a memorandum drafted by Cook and sent to his Minister, which requests a more concrete statement of the role of energy in national development policy. The paper lists a number of goals in these policy areas and implies that some tradeoff may be necessary between, on the one hand, such established goals as conserving energy resources (especially through a shift to renewable energy forms) and ensuring reliable energy supplies (in the main through a reduction in dependence on imported energy) and, on the other hand, the more recent objective of utilising cheap energy to promote large scale industry. This latter goal warranted careful attention, in particular, officials needed some direction on the preparedness of Government to actively pursue new EIIIs. The political acceptability of these industries would naturally be closely related to the kind of benefits they would bring - how important, then, was a benefit such as foreign exchange in terms of the government's growth strategy? If the government did favour the development of these industries, then officials would also require direction on such issues as the nature and extent of any subsidies or whether officials should aim for export industries which maximised the value added to their product in New Zealand.

Among all the documents dealing with EIIIs this paper is unique in its effort to make explicit the relevant goals. Unsurprisingly, nothing remains which might indicate that any authoritative specification and ranking of goals resulted from Cook's initiative - the issues were too contentious and complex for this kind of treatment. The most Cook could realistically

1 Interview: D.C. Cook, December, 1980.
expect from his paper was that in drawing attention to these issues some officials might have been persuaded to tread more cautiously in the EII investigations. Although it is not really possible to assess the impact of Cook's personal reservations, it is interesting to note the lull in the investigations into EIIs during the months of June and July. A second, more plausible, explanation may be that officials deferred a report to CEC on their investigations until the completion of the 1979 power planning exercise by which time some of the issues relating to energy policy would have been resolved and others clarified. There is no evidence of such a decision but it need not have been a specific determination, instead evolving with the diversion of attention to the power planning exercise.

In any case, this exercise is important in its own right because of its implications for the handling of the electricity surplus. Once again, the boundaries of this exercise would have to be cast wide to encompass the problems of surplus gas and coal, problems which had been passed on largely unresolved from the preceding year. While some of the possible solutions, especially the liquid fuel options and EIIs, were now more advanced, officials could also anticipate having to deal with a larger electricity surplus in the form of lower forecasts for demand growth. Hence, in 1979 the forecast of the CRPR was awaited, not only as an input into the power planning exercise, but also because it provided an up-to-date estimate of the surplus which might be made available to EIIs. The new forecast became available in late May after the CRPR had met.

3.4 The CRPR Meets

Much of the technical forecasting work was done before the Committee's meeting by Johnathan Lermit working in NZE. Lermit produced a forecast incorporating an extension of the previous year's assumptions about market saturation. This model (which included other estimators such as population and GDP growth) gave rise to a lower level of demand than had been projected in the previous year. Prior to the CRPR meeting, Laking
discussed the model with Lermit and was satisfied with the methodology employed. However, at the meeting itself this forecast soon came under attack from those members of the committee representing the industry, that is, Blakeley and McCool, respectively, manager and deputy manager of the NZE, and the two representatives of the ESA. This group felt that, in reversing the trend of previous years, Lermit's model might have gone so far as to now be underestimating future demand. The representatives from Treasury and the Department of Statistics supported Lermit's forecasts. Treasury further argued that there was no longer any need to continue the practice of previous years of adding a margin of 600 GWh for unforeseen industrial developments. Treasury claimed that the GDP estimates it had supplied for the forecasting exercise were high and that for the economy to reach this level of growth really presupposed the development of new large industries. The majority industry group resisted this argument managing to retain the allowance for an extra 600 GWh.2

The issue of an appropriate forecast was less easily settled. It appears that Ian Dick, the representative of the Ministry of Energy's Planning Division, adopted a mediating role between the two factions. This role was enhanced with the provision by Dick of a second forecast which was broadly in line with Lermit's projection, although rising at the end of the period and below the level of demand forecast by the industry group.3 Such a felicitous location naturally favoured a compromise. It is likely that the industry group, faced with a large and enduring surplus, were not too concerned to press for higher forecasts at this time. In addition, if the industry group wished to use a different forecast, they had to accompany it with some technical justification; this had now been supplied by Dick. Treasury was less satisfied with

1 Interview: M. Wintringham (Treasury), December 1980.
2 Interview: M. Wintringham
3 Interviews: M. Wintringham and T. Lermit (NZE), December 1980.
Dick's more simplistic methodology. However, John Cook, the Treasury representative, believed that the period when Dick's forecast began to deviate most from Lermit's was sufficiently distant for the forecasts to be able to be changed, with little cost, at the following year's meeting. Accordingly, the committee agreed to use Dick's forecast in its report.¹

3.5 Energy Planning in 1979: Some Issues and Orientations

Even with this adjusted forecast the committee had accepted a considerable drop in future demand beneath the level predicted in 1978. As in 1978 the committee derived "upper" and "lower" forecasts from the central estimate and recommended that the "upper" forecast form the basis for planning for system expansion. By comparing the "upper" forecasts for these two years with the 1977 "majority" group's forecast, the magnitude of the changes can be assessed. The following table shows the effect of these changes on forecast demand for the year 1991/92 (the last year of the 1977 forecast period).²

<table>
<thead>
<tr>
<th></th>
<th>1977 Majority</th>
<th>1978 Upper</th>
<th>1979 Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977/78 (actual demand)</td>
<td>21,262</td>
<td>21,262</td>
<td>21,262</td>
</tr>
<tr>
<td>1991/92 (forecast)</td>
<td>47,664</td>
<td>36,019</td>
<td>31,800</td>
</tr>
<tr>
<td>Increase</td>
<td>26,402</td>
<td>14,757</td>
<td>10,538</td>
</tr>
<tr>
<td>Increase as percentage of base</td>
<td>124%</td>
<td>69%</td>
<td>50%</td>
</tr>
</tbody>
</table>

In two years the forecast electricity demand growth up to 1991/92 had been decreased from 124 percent of the 1977/78 actual demand to 50 percent. Most of the implications for energy planning of a large drop in demand had been apparent in 1978. However, the 1978 Power Plan had not done enough

1 Interview: M. Wintringham.

to alleviate the problems of oversupply which were now exacerbated by the 1979 forecast. In fact, early assessments suggested that most of the projected growth over the 15 year forecasting period could be satisfied by the Huntly and Ohau stations. This meant that nearly all the remaining stations which the 1978 Power Plan proposed to commission within the next 15 years - Marsden B, Rangipo, Ohaki, Clyde, Luggate, Auckland Thermal Number 1, and any local authority hydros - would not be needed until about 2010 and no new hydros until about 2025. 1 Because of the long lead times involved in power station construction, the planners were not allowed much flexibility in dealing with this surplus capacity. In 1979 little could be done to defer the completion of stations already underway - Marsden B, Ohau A, B and C, Rangipo, and Huntly. The remaining stations could be delayed with the possibility that Auckland Thermal Number 1 might be deleted from the plan. However, such delays would also be constrained by political considerations and any renewed assault on the Clutha stations by Treasury would have to take into account CEC's decision in 1978 to accept a deferral of only two years for Clyde and Luggate.

As the 1978 planning exercise made clear, the implications of reduced forecasts of electricity demand go beyond wasteful over-investment in generating capacity. With the completion of the planned hydro stations, including Clutha, most of the nation's power requirements could be satisfied by hydro-stations in all except dry years. The only factor inhibiting supply would be the limited transmission capability of the inter-island cable. If a second cable proved economic the South Island system would not be forced to spill water in average flow years, and its surplus power could be transmitted north to relieve most of the costly thermal power stations. 2

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2 Ibid., p.9.
Major costs affecting the viability of this option were involved in the underutilisation of coal and gas resources. A predominantly hydro system with an extra Cook Strait cable might only enable one of the four Huntly machines to continue in operation, preventing anything more than the minimum viable use of the Huntly West Coal Mine. Not only would much of the investment in this plant be wasted but the coal industry would again suffer a crippling downturn after its recent revitalisation. The consequences of this planning for the Maui gas project were potentially more serious. The 1978 Power Plan had already slashed gas requirements for electricity generation producing a significant surplus of unusable gas within the quantities that NZE had contracted to take or pay for. Under the 1979 forecasts, the drop of over 4,000 GWh in demand by 1991/92 seemed to eliminate most of the remaining gas requirements. The Whirinaki, Otahuhu, Stratford, and Marsden A and B thermal power stations were now largely redundant, leaving only New Plymouth operating. Two immediate consequences of this underutilisation of gas were the cost to the government of paying for gas it could not presently use, and the cost of importing petroleum to replace the condensate no longer being generated from Maui.

Ironically, these problems all derived from a condition rare among the developed nations of the world: an overabundance of energy in all the main sectors except liquid fuels for transportation. The solution, therefore, lay in a decision to underutilise one or more of the country's main energy resources. Alternatively, some additional, viable consumers would have to be found. In 1978 the Government had opted for this latter course by continuing a number of large energy projects in the confidence that some large users would turn up. By mid 1979 no large user had yet been set in place. However, the investigation of two main areas of prospect - EIIis and petrochemicals - had been considerably advanced. In effect, with the inclusion of the "underutilisation" option, three main solutions existed for the problem of how to deal with the surplus energy. None by itself was entirely adequate but the interdependence of the various energy resources ensured
that any measure would mitigate the problem across-the-board. Of course, not all the effects need be beneficial. For example, a major disadvantage of cutbacks in hydro construction would be a retrenchment in the construction sector involving increased unemployment among unskilled labour and the dispersal of skilled workers. The optimal solution in these circumstances was liable to involve a combination of measures, a delicate balancing of, for example, manpower considerations with savings from electricity capital works (in the extreme, involving perhaps $4 billion over a 20 year period). The prospects for EIIs would have to be examined in the light of these savings and also under the assumption that liquid fuels would be developed. If liquid fuels were assumed not to proceed, then consideration would need to be given to whether coal should be favoured over gas for thermal generation. In this way, the more realistic permutations would have to be identified and then evaluated.

This, it may be suggested, is the ideal approach. A distressing aspect of the work done on energy planning in 1979 is the extent to which each of the three main solutions was promoted by a different department. This tendency can be associated with the concentration of activity by each of Trade and Industry, Energy and Treasury, in different policy areas. Trade and Industry, along with the Prime Minister's Department, was the most active proponent of EIIs. The efforts of these departments in 1978 had not really been taken seriously; by 1979 Treasury and Energy were responding to Trade and Industry's pressure, although largely because they were under orders from the Prime Minister to investigate the opportunities for EIIs.¹

¹ Trade and Industry's enthusiasm extended beyond government circles. In mid-1979 the department contributed a segment to the government publication, Growth Opportunities advertising the cheap electricity that could soon be available as a result of the surplus. This action seems to have provoked resentment among some officials in NZE apparently because the text was accompanied by a graph displaying bountiful quantities of unneeded electricity based on the "central estimate" of demand but with no recognition of the "upper" estimate or of the 7 percent margin NZE placed on the forecast for contingencies (Interview: S. Wong (NZE)). It was also about this time that Mr. Datson, Deputy Secretary of Trade and Industry, was visiting Europe. During his travels he is reported to have mentioned the cheap power available in New Zealand, even going so far as to suggest an attractive price at which the electricity might be sold.
Trade and Industry's main role in the investigations during this early period was largely confined to making contact with the industries and finding an internationally competitive tariff. However, it is likely that because of its interest in EII's Trade and Industry could have made some contribution to the energy planning exercise. It is also possible that with involvement in wider planning issues Trade and Industry's active promotion of the EII option could have been moderated. Unfortunately, there was little opportunity for this kind of integration of activity largely because the main forum for energy planning at this time was the PPC on which Trade and Industry had no formal representation. In 1978 this exclusion was less significant because on that occasion the Officials Sub-committee on Energy had been called to consider the power plan. With no comparable exercise underway in 1979 Trade and Industry did make a modest effort to gain representation on the power requirements and power planning committees. However, the department's request was easily rebuffed by the Ministry of Energy with the promise of further consideration in the following year when the whole energy planning exercise would be reorganised. As it happens, instead of increasing representation this reorganisation would actually reduce it through the exclusion of Treasury and the Department of Statistics from the new electricity sector committees.

Trade and Industry's promotion of EII's as a solution to some of the major energy problems, corresponds to some extent to the emphasis placed by the Planning and Policy Divisions of the Ministry of Energy on liquid fuel applications of Maui gas. The unease of these divisions over sales of cheap electricity to new, large users has already been mentioned. Instead of

1 Secretary of Trade and Industry to Secretary of Energy, "Committee to Review Power Requirements", 7 May, 1979.

EIIs these divisions favoured liquid fuel projects as a solution to the energy problems. This view was expressed as early as February 1979 in a memorandum from Mr. Duncan, the Secretary of Energy:

"The main problems in energy relate to oil and gas, not electricity. Preoccupation with the electricity situation tends to set up a wrong order of priorities. I think that the present activities on gas use and liquid fuels are all heading in the right direction and that a solution to the Maui problem lies here, rather than in electricity generation."

Other parts of the memorandum suggest that Mr Duncan was taking into account the views of NZE and Mines Division by downplaying arguments for the deferral of planned hydro capacity. In this context, the phrase "wrong order of priorities" covers the option of cutting back in the construction of new generating capacity. Although further investigation would soon justify the status of liquid fuels as the centrepiece of the government's energy strategy, it may be disputed that this status allows the attitude apparent in Duncan's memorandum that liquid fuels alone will provide salvation. The danger of this attitude, of course, is the possibility that opportunities to integrate other options with planning for liquid fuels may not be pursued to best advantage. It is likely that this emphasis on liquid fuels and, correspondingly, the potential for partial, as opposed to comprehensive, planning were exaggerated as the Planning and Policy Divisions became more deeply involved in planning the liquid fuels programme.

Much of this large and complex task was carried out by the Liquid Fuels Trust Board (LFTB) and its consultants, including the American company, A.D. Little Incorporated. The Planning and Policy Divisions contributed to this work as well as co-ordinating the investigations through the interdepartmental Energy Steering Group. Co-ordination was a vital element of the exercise and the consideration given to this task provides a remarkable contrast with the EII investigations. On 24 July the Energy Steering Group presented the first of a number of papers to CEC which were based on the work this Group was doing in parallel with the LFTB. This first paper attempted to give an overview to the investigations and to outline the strategy that should be followed to ensure a timely and proper decision. Some matters requiring early attention included the question of gas availability and the related matters of the properties of the gas field and the level of future demand for gas from reticulation and electricity generation. A second major task involved the identification of packages each composed of various combinations of gas uses such as methanol blends with petrol and/or diesel, Mobil synthetic gasoline production, Compressed Natural Gas and Liquified Petroleum Gas. About six of these packages would then be made subject to economic evaluation once important data had been produced on the opportunity cost of gas and on oil price futures. This economic evaluation would enable a decision on the most appropriate package which would then be settled with the oil companies involved, although this might be affected by an analysis of the nation's capital resources or government consideration of the merits of various ownership combinations.  

In contrasting the planned approach to gas utilisation with the approach taken to the EII investigations, recognition should be given to the matter of government commitment. After the second round of OPEC oil price rises beginning in 1978, the Government had made clear to officials on a number of occasions its determination to develop a liquid fuels industry which would enable substantial energy self-sufficiency in New Zealand. This crucial purpose and direction was absent from the EII investigations. Indeed, some officials doubted whether EIIs would be politically acceptable. As a result, each department took a different course with little effort being made to synthesise or reconcile their partial views. The views of Trade and Industry and the Ministry of Energy have already been outlined. Although Treasury was entrusted by the Prime Minister with the task of co-ordinating the investigations, it would seem that this department was just as guilty of a partial approach through its promotion of a third main solution to the energy problem: the deferral of the Clutha stations.

3.6 Power Planning: Clyde

There is only a small gap between the meeting of the CRPR in mid-May and the meeting of the PPC in early June. Treasury was immediately faced with another rather lonely battle on this latter committee against an industry group which comprised two representatives of the MOWD as well as three from NZE and two from ESAs. In 1978 Treasury's position had been enhanced by a Government directive to officials to comprehensively examine energy planning and to return with a report to CEC outlining the options. In 1979 circumstances were not seen as warranting another fullscale examination. However, Treasury retained its right to report to CEC at any stage on the power planning exercise or on any issue pertaining to this work.

Treasury took advantage of this right early in the exercise. While work was still at a preliminary stage, Treasury produced a draft CEC paper which was sent to the Ministry of Energy on 24 May.¹ The paper recommended that Ministers agree in principle

to the deferral until the early 1990s of the commissioning date of the Clyde power station, with consequential changes to the commissioning date of the four other Clutha stations and to other planned projects. The paper claimed that on the basis of the 1979 CRPR forecast, Clyde could safely be deferred from 1988 to 1993 without the need to advance any other stations.

Restricting the analysis to two options — proceeding on schedule or deferring to 1993 — the paper proceeded to compare the benefits and costs attached to each. An obvious benefit of the deferral option was the savings achieved when both options were costed in 1979 terms at a 10 percent discount rate. This saving was put at $50 million. 1 However, as an NZE memorandum pointed out, this sum was relatively small compared with the overall estimated cost of $880 million for the Clutha projects. A second advantage of deferral related to its impact on the workforce. Departments were largely agreed that by spreading out the construction of Clyde to 1993, steady employment would be continued for another five years for personnel transferred from the Upper Waitaki projects. 2 This would give more security to the workforce, help maintain MOWD's expertise, and would reduce the requirements for houses and amenities in Cromwell. Although some disadvantages for the workforce would also result, they were not major, so that the MOWD's perennial argument about the damage done by workforce reductions now held much less weight.

Commissioning Clyde in 1993 also had the advantage of increasing gas consumption in thermal power stations thereby reducing the take-or-pay surpluses and increasing the production of condensate which could replace imported crude oil. If a petrochemical industry should proceed, then less gas would be available for generation. However, security of supply could still be maintained through a shift to coal burning at the Huntly power

2 Ibid., p.4.
station. Finally, a deferral was seen by Treasury as desirable because it reduced the surplus of hydro capacity in the South Island. Together with the spaced instalment of two extra inter-island cables, a deferral would even out this surplus and reduce it to "much more manageable proportions". While NZE was also concerned to reduce the South Island surplus, this division tended to see the reduction of surpluses toward the end of the planning period as a disadvantage because of the possibility of an unexpected increase in electricity demand. Neither Treasury nor NZE really countenanced EIIs as an alternative way of reducing the surplus. In fact, the Treasury draft noted that, in view of the leads times necessary for the establishment of large EIIs, a significant proportion of the surplus could be utilised for only a few years before the situation reverted to normal. The paper added: "It seems unlikely that the short term advantage gained from using such temporary excesses of power would offset the longer term need to continue supplying electricity, and thus to develop more new stations than would otherwise be required, for the entire 20 - 30 year life of any new industries".

Neither the draft paper nor any amended version on the Clutha development programme was presented to CEC. A possible explanation is suggested by a memorandum written by Mr. Blakeley, General Manager of NZE and Chairman of the CRPR. This paper objects to the Treasury draft not on the grounds of content, but on the matter of principle that for the PPC to continue its allotted function, it could not be obliged to resort for guidance to CEC. In any case, such guidance was not warranted in this case. As Blakeley observed, the Government had, in 1978, given guidance to the electricity planners, and its commitment to develop major hydro schemes such as Clutha had been affirmed in the National Party's Manifesto. Treasury's draft was better

1 Draft CEC Paper, "Development of the Clutha River", 24 May 197, p.6. (The discussion of the cables was speculative for, as the paper acknowledged, their economic viability had not been proved.)

2 Ibid., p.6.
left as a discussion paper for officials prior to the meeting of the PPC. 1 A second explanation for the withdrawal of the paper may be that Treasury’s preferred option - the deferral of Clyde to the early 1990s - was largely accepted by other departments represented on the PPC.

The meeting of the PPC held in mid June was a fairly relaxed one. The main issue was whether the earliest stations for which plans could be altered - Clyde and Ohaki - should be delayed. Despite a pragmatic acceptance by NZE that these stations were not urgently needed, some negotiation was necessary. The MOWD insisted that Clyde be commissioned in 1988 to avoid reductions in the construction workforce. John Cook and Ian Dick, on the other hand, believed that plans could be arranged to enable a deferral to 1996, or even later if necessary. However, all parties had to acknowledge that delays of that magnitude were unlikely to be acceptable to the Government. 2 Once again, the scene was set for a compromise. In the final plan Clyde was deferred to 1991 and Ohaki delayed by two years to be commissioned in 1986. Luggate, the second Clutha station, was deleted from the 15 year power plan as was the gas-fired power station planned for Auckland. Other changes to the 1978 plan involved the mothballing of the Marsden "B" oil fired station on completion and the decommissioning of the Meremere coal fired station in 1984/85. 3 These changes went some way toward reducing the surplus, although not as far as was possible. Figure 1 illustrates the discrepancy between supply and demand as it now existed, and shows the surplus to be at its greatest extent in the early years of the plan due to the completion of the Upper Waitaki and Huntly power stations.

With the completion of the power planning exercise, the extent of the surplus available for EIIs could be more accurately determined. As figure 1 shows, a significant opportunity remained for industrial utilisation of the surplus. Officials considered that no reduction was warranted on the 2,000 GWh
FIGURE 1

DRY YEAR GENERATING CAPACITY AND PROJECTED DEMAND 1979/80 - 1993/94 (GWh)

Notes:

1. Maximum Generation (fuel cost constraint). This assumes that NZE minimise the output from oil-fired stations, specifically: Marsden A and B, Whirinaki operate at less than long-run capacity. Meremere (coal-fired) decommissioned by 1984/85.

2. Maximum Generation: total hydro generation is established under mean and dry-flow conditions; thermal generation is established by taking the maximum possible long-run output from each station, irrespective of operating cost, and constrained only by the technical characteristics of each station. Meremere is assumed to maintain 1,200 GWh output throughout.

increment under investigation. A second important issue affecting the investigations - the cost of the incremental load - had been the subject of a preliminary report from NZE in May. On 15 June NZE produced a second report which included a more definite costing of the surplus.\(^1\) The cost of supplying an extra 2,000 GWh over the period 1981-1990 (the period of surplus power) was now put at 0.7 cents/kWh. The paper outlined some of the costing assumptions and methodology behind this calculation for the benefit of Laking and his subordinates. It also re-emphasised the need for caution in electricity pricing, adding that it would be necessary to negotiate projects individually to ensure that the best arrangements were made. Certainly, the costing of 0.7 cents/kWh should not be simply translated into a tariff. After 1990 the marginal cost of electricity rose sharply because of the need to bring on new capacity. This extra cost was best incorporated in a graduated tariff rising gently from the short-run to the long-run costs. Although the LRMC was estimated to be about 4 cents/kWh, officials in NZE could not be certain of the accuracy of their technique for costing this power. For this reason the bulk tariff (2.2 cents/kWh at 100 per cent load factor) was the recommended charge following the period of low cost surplus power.

3.7 CEC Approves a Concessional Tariff

NZE's work on costing the surplus was an essential element of the EII investigations. The results of this work now enabled officials to resume drafting a paper to CEC on the utilisation of the surplus. However, two more months would elapse before a paper was presented to CEC on 28 August.

It is not clear why this delay occurred. There does not appear to have been any significant debate over the merits of the industrial use of the surplus during this period. The main alternative policy to receive consideration concerned the reduction of retail tariffs for various categories of

existing consumers. This option was mentioned in the CEC paper of 28 August but was rejected because, in general, such concessional tariffs would involve an immediate revenue loss without significantly increasing the demand for electricity. ¹

The main concern of this CEC paper was to suggest potential industrial users of the surplus and to establish the extent and cost of the surplus and a suitable tariff. Some of the problems and disagreements which had been encountered earlier in the investigation relating to these matters, were now of less consequence. For example, the two issues of whether Clyde should be treated as a sunk cost and whether the tariff beyond the period of surplus should be based on the LRMC or the bulk tariff, lost much of their salience because of NZE's difficulty in assessing the LRMC. Also, the low cost of the surplus power meant that doubts could be allayed about the economic viability of the concession. In particular, Treasury's opposition to basing the concession on the bulk tariff in the long-term could be moderated by the establishment of a tariff above the SRMC. However, another early point of contention - the matter of whether the concessional tariff should be fixed at a certain level and then advertised, or negotiated on a case-by-case basis - is unlikely to have been resolved so easily by new information. Judging by the CEC paper, it would appear that the Trade and Industry view prevailed since this paper recommended that sales to large users should be based on a specific graduated tariff. The paper added that the tariff could be made subject to negotiation where officials considered that significant national or regional benefits from an industry should be taken into account. ² No doubt the intention behind this provision was to enable discounts to large industries which could not pay the full tariff. It may be contrasted, therefore, with the earlier Treasury position that the Government should negotiate tariffs in order to avoid being tied to a particular tariff and possibly settling, as a result, for electricity prices lower than those which companies were actually prepared to pay.

The tariff recommended in the paper started low at 1.0 cents/kWh in 1980 to encourage industries to establish early. In 1985 the tariff would increase to 1.2 cents/kWh, remaining at that level until 1990 when it would increase progressively until the bulk tariff rate was reached in 1994.¹ With this structure the tariff was at every point well above the schedule of short-run marginal costs calculated by NZE. The paper added that such a tariff was likely to be competitive with tariffs offered by Australia (especially Victoria and Queensland), New Zealand's principal rival for EIIs. Officials believed that new contracts for major users in Australia were being negotiated in the range of 1.0-1.4 cents/kWh.² The amount of surplus generating capacity was put at 2,000 GWh. However, officials added that this figure was likely to be conservative. Insurance against the surplus being of shorter duration was provided by assumptions of high electricity demand forecasts and no oil-fired generation (excluded for reasons of cost).³ The paper added:

"Although the forecast surplus reduces steadily from about 1983/84 as demand rises and little new generating capacity is commissioned, officials consider that demand could run at least 2,000 GWh a year higher in each of the 15 years with minimal risk of creating a need for higher cost generation or bringing forward the programme of power station construction recommended in the 1979 Power Plan." ⁴

In these circumstances 2,000 GWh was to be treated as a "target surplus" to be absorbed in the meantime. It may be that the extent of the surplus suggested to Ministers was also influenced by the extent of the industrial opportunities available. Of potential users of the surplus, Comalco had

¹ CEC paper, "The Surplus in Electricity Generating Capacity", 28 August, 1979, p.3.
² Ibid.
³ Ibid., p.3.
⁴ Ibid., p.1.
claimed that it could not proceed with a third potline if it were to be charged more than its existing rate (just under 1 cent/KWh). New Zealand Steel's ferrosilica project was also thought to be viable only with an electricity price of less than 0.9 cents/KWh. These were the main potential consumers of the surplus with demand of, respectively, 1,350 GWh and 500 GWh. Other possible consumers were listed in the paper as being the CSR/Baigent pulp mill (250 GWh) and a silicon carbide plant (165 GWh). During Ministers' discussion of the paper some attention was given to the main alternative to concessions to large industrial users, that is, discounts to existing users. Some Ministers feared an adverse reaction from South Island interests if the concession was not made generally available to South Island industry. Accordingly, they proposed that the concession be extended to South Island industries consuming less than 25 GWh, recognising that the justification for such a move would have to be political, not economic. This proposal was finally rejected on the grounds that the surplus should be used to promote new industrial development. If South Island consumers were to be offered any further concessions these should be dealt with under a separate policy. On two other points Ministers' views were more firmly expressed. Firstly, Ministers were opposed to the idea of simply announcing the tariff because they believed that some industries might accept a tariff higher than the one recommended by officials. Negotiations would help ensure that unnecessary concessions were not granted. Hence, instead of advertising a tariff, the government would merely announce the availability of surplus electricity generating capacity. The second point made by Ministers was that the tariff structure should be treated as flexible. However, they agreed that the bulk tariff rate should be reached by the specified date, 1994.

Apart from these few details, Ministers appear to have been generally happy with the content of the paper. The attitude of Ministers and of the Prime Minister in particular, toward EIIs contrasts with the attitude of some officials. Only

2 Ibid.
officials dealing with the investigations in Trade and Industry and the Prime Minister's Department displayed a similar, positive approach. Treasury and Energy, on the other hand, often aired their concerns about EII's but at no stage did they take a stand against them. Their acceptance of the scheme finally proposed to Ministers was to a large extent assisted by the comfortable accommodation within the surplus of the extra 2,000 GWh load. Also, the low cost of this surplus power helped allay doubts about the long term viability of the scheme.

A problem of apparently minor interest to officials concerned the uncertain role of EII's in national development. In terms of industrial development this uncertainty was evident in the absence in the CEC paper of any terms of reference to guide negotiators apart from those already mentioned pertaining to the tariff structure. Similarly, in energy planning, EII's were treated less as a component of an overall plan, and more as a means of utilising any "leftovers" from the liquid fuels and electricity planning exercises. To a large extent this situation developed because no energy planning structure existed capable of developing a comprehensive plan, at least, not of a kind comparable to the 1980 Energy Plan. It may also be attributed to officials' reluctance to investigate EII's and to the probability that officials underestimated the willingness of Ministers to develop EII's.

3.8 Power Planning: A Postscript on Clyde

Some indication of Ministers' attitude to power planning and to EII's, can be found in a rather extraordinary sequence of events culminating soon after this CEC meeting. In the outcome the Clyde dam commissioning date was advanced from 1991 to 1989, apparently to allow for extra industrial development. The 1989 alternative first arose on 18 July at a Cabinet Works Committee (CWC) meeting which was discussing the programme of work for the construction of the Clyde dam
and powerhouse. A major concern for the Committee was to maximise the role of the private sector contractors in the construction programme. Officials from the MOWD claimed that no more than about 60 percent private sector participation could be planned for the 1991 date (this date being recommended in the draft power plan) without risking fluctuations in staffing levels and underutilisation of equipment during this extended programme of work. A 1989 completion date, on the other hand, could allow a greater involvement by private contractors. Ministers were attracted to the 1989 option for this reason but the point was also expressed that if Clyde were commissioned two years earlier, some industry would turn up to use the electricity produced. Cabinet, in considering the report of the CWC on 23 July, agreed that the MOWD should investigate a programme which would enable the dam to be completed by 1989 through the maximum possible use of private enterprise contractors with the planning and administration by MOWD.

On 5 September the MOWD reported again to the CWC but without any details of an alternative programme of work because various uncertainties in the project prevented an accurate assessment. Instead, the department pointed out that since Cabinet's decision the Power Plan had been publicised advocating a 1991 completion date. The department therefore requested a decision on whether 1989 or 1991 should be the target date.\(^1\) At the meeting, Mr. B. Tyler, the Treasury representative, expressed his department's view that the 1989 date would be unacceptable. As a result, the CWC deferred a decision on this matter until officials had further investigated the issues involved and reported back.\(^2\) On

1. CWC paper, "Clyde Dam: Construction of Civil Works", 5 September, 1979, p.3.
13 September Treasury sent a report to the Minister of Finance which maintained that, on the basis of discussions with the MOWD, it now appeared that the degree to which private contractors could be involved in the construction of the Clyde power station was unaffected by the commissioning date.\(^1\) This was followed on 3 October by a further inconclusive report from the MOWD to the CWC discussing the formation of a consortium, including public and private sector resources. The Committee was unable to decide this matter on the information supplied.\(^2\) Instead, it directed its attention to the issue of the timing of Clyde and to a second report produced by Treasury. This report confined itself to power planning considerations and was intended to disabuse Ministers of any idea that the recently established concession for large electricity users would require any alteration of the Power Plan. Demand and supply forecasts were illustrated by a graph which showed that, even if the full 2,000 GWh offered to industry was taken up, no advancement of Clyde would be necessary.\(^3\)

During the meeting, this graph became the subject of an extensive discussion between Ministers and officials. It is likely that Ministers gave close scrutiny to the assumptions underlying the forecasts and were able to expose differences of view between officials present, representing Treasury, MOWD and NZE. However it came about, this uncertainty appears to have been capitalised on by Ministers who successfully advanced the 1989 option, justified in part by the proposed industrial concession. As the minutes of the meeting state: "Discussion revealed that there were many interpretations that could be put on the figures used to formulate the graph, and in view of the discussions currently being held on the establishment of electricity intensive industries, it was considered by the

1 Treasury report to the Minister of Finance, "Clyde Power Station: Commissioning Date", 13 September, 1979.
3 Treasury report to the Minister of Finance, "Clyde Power Station: Commissioning Date", 25 September, 1979.
committee that there was no need to defer the planned finishing date for the Clyde Station from 1989 to 1991." ¹
PART 2

THE POLITICS OF SCARCITY (1979-1980)
Policy Analysis for the Electricity-Intensive-Industry Investigations

The purpose of policy analysis is to help a decision-maker choose the best course of action. Its essence is the rational model (outlined in chapter one) which requires that a wide range of alternative policies are identified and that these are evaluated in terms of the decision-maker's objectives with the best alternative being chosen. This section will endeavour to elaborate this model to provide a rudimentary prescription for policy making on EIIs. One focus is on how the goals might be formulated since this phase of the decision appears to have received little attention in these events. A second focus is the evaluation phase and here some background will be provided on the important technique used by officials of cost-benefit analysis.

Policy making is generally initiated by the recognition of a problem. A problem arises when differences exist between the values and aspirations of policy makers and their subjective images of reality. The task for the policy analyst is to formulate the problem explicitly, to define objectives, and to ensure that the policy-makers' subjective image of reality accords with the known facts. Unless objectives are precisely spelled out the rest of the analysis will not be directed properly and the final decision will very likely do little to remedy the initial problem.

A major source of impetus for the development of EIIs was the Prime Minister's request for a study of the potential for industrial use of the surplus. The objectives of policy are not revealed by this directive but would no doubt be implicitly recognised by high level officials working closely with the ministers. A fuller statement of the problem is provided by the following quotation from a speech given by the Minister of Energy on 8 March 1979:
"There are some critics who say that we have overproduced in our capital investment in electricity. Those same critics argue that we should not continue with the Clutha development. I am currently preparing a catalogue of growth opportunities... All those new and exciting ventures that New Zealanders have been talking about for years are being listed, examined for their advantages, analysed for their prospects and foreign exchange earnings and I believe that the availability of electricity to support such projects will allow us to restore moderate rates of economic growth which will provide new work opportunities, and confidence in restoring our balance of payments to a surplus, and providing the challenges to New Zealanders to embark on new ventures. There is no limit to the prospects." ¹

By utilising the resource provided by the surplus generating capacity the minister hoped to achieve three main objectives (not counting the apparent aim of relieving the embarrassment caused by the surplus): restore growth, provide new work opportunities, and restore the balance of payments to surplus. These objectives are obviously derived from a particular theory about New Zealand's economic performance and current predicament. This theory should be a prime concern of the policy analyst in order to ensure that the main problems have been correctly diagnosed. Without attempting a full statement of the problem here, it may nevertheless be useful to supply some details of the context in which policy on EIIIs was developed.

New Zealand's economic performance in the 1970s was characterised by a much lower rate of growth than in the previous decade, by persistent balance of payments deficits and indicators. These indications are represented in the following tables.

Real GDP Growth and the Balance of Payments Deficit

<table>
<thead>
<tr>
<th>March Years</th>
<th>Average Annual Real GDP Growth</th>
<th>Average Balance of Payments Current Account Deficit as a Percentage of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960-69</td>
<td>4</td>
<td>$1^{3/4}$</td>
</tr>
<tr>
<td>1970-74</td>
<td>$4^{1/2}$</td>
<td>$-1^{1/2}$</td>
</tr>
<tr>
<td>1975</td>
<td>4</td>
<td>$-1^{4/5}$</td>
</tr>
<tr>
<td>1976</td>
<td>1</td>
<td>$-9$</td>
</tr>
<tr>
<td>1977</td>
<td>0</td>
<td>$-6^{1/2}$</td>
</tr>
<tr>
<td>1978</td>
<td>$-3$</td>
<td>$-4^{3/4}$</td>
</tr>
<tr>
<td>1979*</td>
<td>$2^{1/2}$</td>
<td>$-3^{1/2}$</td>
</tr>
<tr>
<td>1980*</td>
<td>$1^{1/2}$</td>
<td>$-3^{1/2}$</td>
</tr>
<tr>
<td>1975-80*</td>
<td>1</td>
<td>$-7$</td>
</tr>
</tbody>
</table>

* Estimates and Forecasts

Estimated Private Sector Investment

<table>
<thead>
<tr>
<th>March Years</th>
<th>$ million</th>
<th>% change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1971/72</td>
<td>935</td>
<td>na</td>
</tr>
<tr>
<td>1972/73</td>
<td>1,073</td>
<td>14.8</td>
</tr>
<tr>
<td>1973/74</td>
<td>1,221</td>
<td>13.8</td>
</tr>
<tr>
<td>1974/75</td>
<td>1,185</td>
<td>-2.9</td>
</tr>
<tr>
<td>1975/76</td>
<td>1,079</td>
<td>-8.9</td>
</tr>
<tr>
<td>1976/77</td>
<td>1,082</td>
<td>0.3</td>
</tr>
<tr>
<td>1977/78</td>
<td>865</td>
<td>-20.1</td>
</tr>
<tr>
<td>1978/79</td>
<td>826</td>
<td>-4.5</td>
</tr>
<tr>
<td>1979/80</td>
<td>793</td>
<td>-4.0</td>
</tr>
<tr>
<td>1980/81*</td>
<td>724</td>
<td>-9.0</td>
</tr>
</tbody>
</table>

* Forecast

The exception to this pattern was a brief boom experienced in 1973 and 1974 which was associated with expansionary budgets and a rapid increase in export prices. The sudden reversal following this period was precipitated by the world recession, the increase in oil prices and rapid increases in import prices. Initially, counter cyclical measures helped to sustain the level of domestic demand and employment but they did not reduce inflation or import demand. Following the election of the National Government in 1975, policy shifted in 1976 and 1977 toward combatting the large balance of payments deficit and high inflation through a reduction in internal spending. From a high of 17.6 percent in 1976 inflation fell to 10.1 percent in 1978. The balance of payments problem was also relieved somewhat, assisted by an increase in agricultural production and prices. However, these policies also produced a drop in production and a sharp rise in unemployment. The number of persons registered as unemployed jumped from around 5,000 in 1977 to about 24,000 during 1978. From late 1977, Government policy turned again to stimulating demand. In 1978 there was some recovery led by consumption growth but this was not associated with any recovery in private sector investment. Instead, this demand was met by reducing inventories, utilising excess production capacity, and imports. As a consequence, there was no reduction in the level of unemployment. In fact, unemployment worsened during 1979. Further consequences were an increase in inflation and a growth of imports (although this latter was partly attributable to the cost of oil which more than doubled in 1979). Despite this growth in imports the external deficit was by this stage markedly reduced from the levels of the mid 1970s. This may be attributed to the effect of the earlier depressed state of consumption and investment on imports, to an improvement in agricultural exports and to a significant growth in manufactured exports.\(^1\)

Although there were signs in 1979 that New Zealand was emerging from the recession, the economy was still dominated by a set of interrelated problems. The prospects are considered by the Economic Monitoring Group in the 1979 report:

"Faster growth could be achieved in the short-term by government pursuing an expansionary budget policy, but this would be at the cost of a larger balance of payments deficit and would require a level of overseas borrowing higher than the current level. Internal inflation would also continue at the current high rate or accelerate further,... On the other hand, government could achieve lower balance of payments deficits and lower inflation by a severe reduction in domestic demand and spending. This would however, be at the expense of economic growth. Unemployment would increase further and associated social and confidence problems would be aggravated."

Because of these circumstances the report advised:

"Unless effective policies are introduced to restructure the New Zealand economy in a way that eases the balance of payments constraint, it seems unlikely that any internally generated growth in demand can be sustained at the rates achieved prior to the mid 1970s."¹

This view appears to have entered the conventional wisdom on economic policy and it is reflected, to some extent, in the above extract from Mr Birch's speech where he refers to the importance of foreign exchange benefits in assessing new industries. The external deficit is seen as a structural constraint because it is associated with a number of factors which have in recent

¹ Economic Monitoring Group, *op.cit*, 1979, pp.19,20
times had a permanent detrimental impact on the balance of payments. One important factor has been the slowdown in the rate of growth of investment and production in the agricultural sector. Although this problem has domestic causes, it may also be associated with falling export prices and restrictions on access to traditional markets. Another factor weakening New Zealand's balance of payments position may actually be found in earlier protectionist policies in the manufacturing sector aimed at encouraging import substitution. These have often had the harmful side-effect of shifting the composition of imports from finished goods to raw materials so that policies to reduce imports now affect essential inputs and have especially harmful consequences for domestic production and employment. The protection of the local manufacturing sector has had the further disadvantage that, by tending to allow inefficient resource use in some industries, it has increased costs throughout the economy and hence contributed to the decline of New Zealand's main exporting sector. In 1974 another permanent detrimental factor came into play with the sharp rise in oil prices.

Through this kind of diagnosis of the country's economic ills the analyst should be able to refine the objectives of policy. An important long-term objective that can be derived from this analysis is the desirability of restructuring the economy so that more resources are employed in industries which have a favourable impact on the balance of payments. In addition, other sectors should be encouraged to use resources more efficiently in order to lower the cost structure, and hence improve the competitive position, of the export sector. This restructuring will naturally imply trade-offs in the short-term with other objectives for example, reducing inflation. Also, it must be recognised that the kinds of measures which will facilitate resource shifting are strongly coloured by ideological considerations which are independent of the objectives of restructuring.
Here the issues revolve around whether the emphasis in government policy should be on using market forces or more direct forms of intervention. Direct comment on either political attitude is not the province of the analyst but some effort should be made to gauge their practical implications. For example, the Secretariat of the Economic Monitoring Group noted in 1978 that with the difficulties of recession, low investor confidence, and uncertainty in the international economy, the private sector would be reluctant to shift resource into potentially high profit but more risky areas.

"Consequently, we think that it will be necessary for the government to sponsor economic activity and investment directly in the short-run. Desirably this should be done in a manner which will allow some success with short-run employment objectives but which avoids sharp increases in inflation and the balance of payments deficit." ¹

Unfortunately, it is not possible to say with certainty the degree to which this kind of prescription for economic policy would have been shared by the main participants in the EII investigations in 1979. Departmental views on questions of broad economic policy do not appear to have been directly related to the investigations and it would appear that, in general, departments rarely communicate on this level. Furthermore, although it is possible to inquire as to a department's stand on development issues, one cannot be sure that the philosophy is in fact the motivation for policy and not simply a post hoc rationalisation of events.

Much of the impetus for the EII investigations came from officials in Trade and Industry. Although this department's views have received little formal articulation, an important objective which must be noted is the emphasis placed on "going for the big hit", that is, developing a few very large export industries. The development of this view is to a large extent to be associated with the shift in thinking of Mr Datson, the Deputy Secretary of Trade and Industry, from stressing the importance of a sound small business sector to a vision of a growth strategy incorporating a few very big industries. Mr Datson accepts that the balance of payments problem is the single biggest constraint on the New Zealand economy. If this could be relieved he sees the economy shifting into a more positive cycle of growth:

"...once exports are booming and the balance of payments is secure, money becomes easier, the inflation rate much more moderate..., the external currency becomes stronger, productivity is better, fewer government restraints are required, more money can be spent on investment on capital and in research and development; and all these things lead to a better growth in exports, which starts the cycle again."¹

The "big hit" strategy is linked with this theory as a way of utilising resources which require large-scale development and have the potential to earn large amounts of foreign exchange.

Treasury's development philosophy is also rarely articulated in relation to EIIs. By and large this department does not appear to have questioned the kind of projects being advanced or the appropriateness of government intervention. Treasury's main concern was that a rigorous investment criterion should be applied in assessing these projects.

This view is expressed in mid 1979 by Mr Cook, Assistant Secretary:

"In determining such things as whether new energy intensive developments should proceed, I believe that emphasis should be given to the rate of return on the real resources which would be committed to the project and to the associated non-quantifiable social costs and benefits. The fact that an industry may use energy which is surplus in the short term or that it will provide new job opportunities, is not itself sufficient justification for it to be promoted. Nor is it sufficient that an industry will provide a substitute for imports as regard must also be had to the capital costs of the project and to its impact elsewhere in the economy. What is required is an adequate return on the nation's total real resources of materials, labour, capital and foreign exchange committed to the project."¹

Ensuring an adequate return on resources was important for a number of reasons. Firstly, this policy recognised that the inefficient use of resources was a major source of New Zealand's recent economic difficulties. Hence, to continue to invest in low return projects would be to perpetuate a long-standing and crippling problem.²

As will be clear from this study, this problem was particularly evident in the energy sector. Secondly, large projects involve a number of risks which must be allowed for by requiring a secure return. Important risks are cost escalation and construction delays which are especially likely where new technologies are involved.


2 Interview: W.J.P. Cook
There is also the fact that a single large project carries the risk of complete failure whereas this risk is reduced where investment is spread over a number of small industries. Thirdly, Treasury was conscious that the very size of a project can produce a temptation to relax investment criteria, especially where officials are under pressure from their ministers to get a new industry underway.¹

Problem definition as a kind of dialectic between objectives and images of reality is not completed until the analyst has made a survey of available resources. Objectives should be challenging but they should not be unrealistic, hence, objectives must be adjusted in light of evidence about the resources available to assist the attainment of these objectives. So-called "top-down" planning is misleading if it obscures the essential requirement that a certain amount of planning proceed from the "bottom-up" whereby specific projects are identified and tested for their feasibility. Resource assessment is the task which officials were engaged in for much of 1979; determining how much electricity could be made available in a concessional package and at what cost. This is obviously a very important phase of the analysis and it should be concluded before any uses of the resources are arranged. Even designing alternative policies while resource assessment is in progress poses the risk of premature commitment, as will be seen.

The next phase in the analysis is the search for alternative policies. In this case, the search should identify a range of uses for the electricity surplus which are related to some degree to the government's priorities, particularly to the kind of macro-economic objectives outlined above. This task was also carried out in 1979 although officials do not appear to have cast their net very widely in their search for alternatives.

¹ Interview: R.G. Laking
One specific class of solutions had already been suggested by the Prime Minister, that is, making the surplus available at a concessional rate to EIIs. A second class of solutions was contributed by officials and involved some form of discount for existing consumers. This notion of a "class of solutions" is important since it encompasses a range of specific solutions and reminds the analyst that a class of alternatives of a quite different and less obvious nature may also attain the same goals. EIIs are an obvious solution to the government's problem, not least because they have already been tried in New Zealand. However, one cannot expect a decision-maker to be very exhaustive in his survey of alternatives and so the analyst must try to set aside his own parochial concerns in order to identify as many alternatives as possible. It may be then, that another class of solutions could be found in industries which use electricity less intensively than the smelting of metals but which could not be categorised as existing users, for example, in a scheme to enable the cheap irrigation of South Island farmland.

It may be that this class of solutions was dismissed very early and very easily in the investigations. Because the search process is directed by overall objectives, alternatives are subject to superficial evaluation in order to screen out the less helpful. This kind of preliminary screening appears to explain the early demise of the alternative of discounts for general consumers.

As discussed, this latter option was rejected by officials, largely on the grounds that a tariff reduction was unlikely to significantly increase demand but would involve an immediate loss of revenue. Political rather than economic considerations would have to justify such a general concession and hence such a policy should be kept separate from measures to productively deal with the electricity surplus.
Another consideration may have been the 60 percent increase in the bulk tariff. The eagerness of ministers to offer discounts following this large rise, especially to South Island consumers, indicates that some form of concession was not perceived as an embarrassing reversal of policy by them. Instead, it is likely that those officials who had pressed to have the bulk tariff fixed on economic criteria, specifically the requirement that the tariff should approximate the marginal cost of generation, would have resisted another discount as a reversion to an unsatisfactory method of pricing. Although these are important considerations on which to evaluate this second option, it is apparent that the two alternatives were not explicitly compared on the same criteria. This probably reflects the fact that no techniques existed for accurately predicting the impact of a general tariff reduction and, hence, there was little concrete data on which to base a comparison.

The final stage of policy analysis is the evaluation of alternative policies. This involves the prediction of the costs and benefits of each policy in terms of operational goals. The differential between costs and benefits in each case is then estimated and the results compared. The technique of Cost-Benefit Analysis (C.B.A.), used by officials in evaluating EIT proposals, is founded on these simple rules of rationality but its methods are much more sophisticated. The advantage of CBA is that it allows diverse costs and benefits to be measured in the same scale of values. This enables a more precise and, one might say, more scientific form of project analysis than is availed by the rational model with its awkward priority ordering of goals. However, the common yardstick used in CBA is not free from objection since it is based on market prices and society's values are supposedly reflected in peoples' willingness to pay for goods. The implications of this will not be developed here as the present concern is to give some indication of the kinds of costs and benefits included in this
form of evaluation and to highlight some arguments about a central issue of CBA, the level of the discount rate.

Some items must be excluded from the CBA because they are irrelevant to the project under analysis. Costs incurred before the project under evaluation is begun, termed "sunk costs" fall into this category. However, the analyst must be sure that prior investments only be treated as sunk if the resources involved have no alternative uses of value in their present form. Some other items generally omitted are transfer payments, for example, interest payments or tax. Since in the economic evaluation of the project the national viewpoint is being taken, the analyst is not concerned (distributional considerations apart) with the transfer of resources from one part of the economy to another but in the increase in supply of, and the direct claims on, resources in the total economy.

Another issue concerning which items to include in a CBA arises where the costs and benefits of a project have an impact on the sum of social resources but no market exists to require the project to pay for social costs or, alternatively, to enable it to receive payment for social benefits. These uncompensated side-effects are called externalities and although irrelevant to a private sector analysis, they must be incorporated when the national viewpoint is being taken. Since the range of project effects is limitless, the dilemma arises as to which externalities to include in the CBA. In dealing with this issue it will be helpful to mention the distinction which economists commonly make between technological and pecuniary externalities since this latter indicates a class of items which, like transfer payments, must be excluded in order to avoid double-counting.
A technological externality exists when the "technical possibilities of transforming inputs into outputs are changed because of the actions of the externality-creating agent."\(^1\) Pollution is one example of this kind of externality, deriving from the un-priced effects of technological change. A project creates a pecuniary externality when it causes "a change in the output or utility of a third party due to changes in the level of demand."\(^2\) It is usually argued that a pecuniary externality does not reflect real gains or losses but only reflects a transfer of wealth via changes in relative prices and should therefore, be excluded from the evaluation. Hence, although the establishment of an EI may lead to increases in the demand for, say, local housing, the analyst must exclude this benefit assuming that it has been accompanied by a reduction in demand elsewhere in the economy. It will be apparent from this example that a class of benefits broadly termed "regional development" has much in common with pecuniary externalities and, although much vaunted in association with large projects, may actually be theoretically irrelevant. However, a qualification may be added since pecuniary externalities may be treated as relevant to project evaluation if they represent a use of resources which would otherwise lie idle. Hence, a case can be made for taking into account the expansionary effects of a project where that project is established in an economically depressed area.

In deciding which technological externalities to include in the analysis the main difficulties appear to centre on the need for quantification since these externalities, unlike pecuniary externalities, are un-priced. It could be argued that the problem is

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2. Ibid, p. 120
essentially a technical one; what can be included depending on the sophistication of the techniques available to economists for valuing items where no markets exist. From this perspective the limits of quantification are reached when the proxy values (termed "shadow prices") being generated are thought to impair the overall reliability of the CBA. In practice, however, it is likely that a number of political and philosophical considerations will also impinge on the definition of relevant externalities.

Since shadow prices are an estimate of subjective valuations which are not revealed by the market, the economist should ensure that there is a clear public concern so that it is reasonable to postulate a need for monetary compensation. Also, the predication of a market should seem possible and desirable in principle. Although, with ingenuity, almost anything can be represented in money terms, many items are more naturally like the province of social norms and ethics and, in some cases, it might seem immoral to consider placing a money value on an item. One example of a rather borderline class of externalities which is relevant to the evaluation of EIIIs might be the environmental effects. It may be argued that in an period of increasing social awareness of environmental values these kinds of project effects should be included in the CBA unless excluded by technical difficulties of quantification in which case they should be explicitly included in the evaluation as a list of intangible effects.

Shadow pricing is also necessary where the market prices of cost or benefit items do not accurately reflect the resource cost of these items to the nation. The resource cost is also known as the "opportunity cost", the value of the resources in their best alternative use. For example, the resource cost of labour should not be the wage paid to it but the value of the output lost by shifting labour from its previous job to the new project.
In times of high unemployment and when a policy objective is to reduce its level, a case can be made for shadow pricing the labour costs of new, employment-creating projects so that the cost of labour is not overvalued in the project appraisal. In reality, the only established government policy for shadow pricing is for the addition of a 10 percent premium on the value of foreign exchange.\textsuperscript{1} This adjustment may be viewed as operationalising the government's macro-economic objective of relieving the balance of payments constraint since it will bias the results of project evaluation in favour of projects earning foreign exchange. If this use of a premium is meaningful and realistic then it should be inadmissible to claim that an EII is desirable independent of the economic evaluation because it is a large scale exporter. If the premium is thought to be an inadequate measure of the benefit of foreign exchange then it should probably be adjusted otherwise the uncertainty about benefits may be exploited as a cover for less respectable motives in advancing a particular project. There is a strong feeling in some quarters that the premium should be higher to take account of New Zealand's current economic problems. This position is supported by McDonald:

"It is perhaps a reflection of the use of an inadequate foreign exchange premium in project evaluation in New Zealand that high levels of protection, export subsidies and unacceptable high balance of payments deficits continue. The benefits of export oriented and import substitution projects which

\textsuperscript{1} All benefits that accrue from the projects to New Zealand in foreign exchange are weighted up by a premium of 10 percent while the foreign exchange costs are surcharged by the same proportion.
would contribute most to improving the situation
have been persistently undervalued, in competition
for resources with other domestic market oriented
projects.¹

Once the cost-benefit analyst has identified and
valued costs and benefits it is necessary to introduce
the dimension of time and to decide how future benefits
are to be valued compared with the present ones which
have to be foregone in making the investment. Since
investors have a preference for income earned earlier
rather than later, future streams of benefits and costs
must be discounted by a given factor to determine their
present value. For a project to be acceptable in terms
of the cost-benefit analysis, the present value of the
project's benefits must exceed the present value of its
costs; the project's "Nett Present Value" (NPV) must
be greater than zero. The NPV of a project provides
a way of evaluating project returns and gives a
comparison with alternative projects.

The principle of discounting is an important and
unexceptional part of project evaluation. Where the
difficulties arise is in deciding at what level to set
the discount rate. This is a point of contention
among economists but the debate is sharpened, as will
be seen, by the fact that the level of the discount
rate can be decisive in determining the acceptability
of a particular project. Copeland and Rose point out
that there are basically two main theoretical viewpoints on
this subject which may be summarised as follows:

¹ T.K. McDonald and C.J. Ashley-Jones, The Tiwai
Point Aluminium Smelter: The National Economic
Benefits of an Expansion (Wellington: New Zealand
Institute of Economic Research, 1980), pp. 30, 31
"1 The public sector's discount rate should reflect the community's rate of time preference, usually referred to as the social time preference rate. Because the government is planning to use community resources to provide a stream of benefits over time, the relevant criterion is the way in which the community evaluates current as opposed to future benefits.

"2 The public sector should use the same rate of discount as does the private sector. To do otherwise would entail misallocation of resources between the two sectors. In particular, because the rate of social time preference is less than the rate of discount in use in the private sector, use of the time preference rate would commit to low return projects funds which could more profitably be used in the private sector."

This latter argument is the main justification for the official government discount rate of 10 percent. It recognises that resources used in the public sector have an opportunity cost which is the productivity they would have enabled if left in the private sector. By setting the discount rate at 10 percent some limit can be set to government participation in investment. The importance of a 10 percent discount rate is strongly defended by Treasury. It will be recalled that Treasury's main concern in evaluating projects utilising the energy surplus was that a

1 Quoted in M.C. Copeland, Economic Analysis Techniques for Projects, Part I of a three part study for the Road Research Unit of the National Roads Board. (Wellington: New Zealand Institute of Economic Research, 1979) p. 34. In the theoretically perfect economy the rates embodied in these two arguments should be the same, but as the second argument indicates, the world is not perfect (capital is not freely mobile between uses and markets).
rigorous standard should be applied in measuring these projects' return. The main reason given, and this corresponds to the opportunity cost argument above, was that the government should strive for the most efficient use of resources. Much past investment had been in low return projects and had hampered growth. A second reason given was that the rigid investment test provided by the 10 percent discount rate could be treated as an allowance for risk.

Much of the debate is carried out at a very sophisticated level and, even where matters of principle may be accepted, severe empirical problems may remain, especially in determining society's rate of time preference (estimates seem to range from about 3 percent to 7 percent). Nevertheless, it is apparent that behind the abstraction there are some weighty political judgements involved and these may in fact, account for a good deal of the controversy. For example, the principle that prevents the displacement of the marginal private sector project gives the highest of alternative discount rates and leads therefore, to the lowest level of government activity. It is partly justified, then, by arguments that the government should play a supportive rather than controlling part in the accumulation process and, in this way, touches on some of the most politically-charged issues in the definition of the role of the state.

Its political aspects suggest that the discount rate should be a matter of public concern or, at least, subject to some form of parliamentary scrutiny. However, as soon as one investigates a few of the technical arguments surrounding the discount rate it becomes apparent that the assessment of the discount rate will always require a considerable amount of expert judgement.
In these circumstances, it may be a difficult task to isolate those areas where meaningful public debate can occur in order to avoid a simple "rubber-stamping" process in parliament.

It is not necessary to list here all the arguments relating to the discount since few theoretical issues gain much prominence in these events. However, two issues may be mentioned here to illustrate some important difficulties. One objection to a discount rate designed to prevent the government diverting resources from the private sector is raised in this extract from Copeland.

"... the level of total public sector of expenditure and the various levels of expenditure within sections of public sector departments are for the most part set by macro-economic considerations and the pursuit of a number of government policy objectives. Therefore the choice of the discount rate for public sector appraisal will have no effect on the overall government budget deficit and only a very small effect on the levels of expenditure in different areas of the public sector." 1

While an important objection, it is likely that it does not entirely reflect actual practice. For various reasons the budget is not entirely a binding constraint on expenditure and new policies will be subject to various criteria including the discount rate. Also, budget levels may themselves be adjusted over time as efforts are made to reduce differences between marginal project rates of return between departments. Hence, budgets are not designed entirely independently of the discount rate.2

1 Copeland, *op.cit.*, p. 36

Another issue centers on the way the discount rate affects the kinds of investments that are undertaken. A relatively high discount rate is seen by some as having the disadvantage that it is biased towards projects the benefits of which accrue in the short-term. David Craig of Planning Division is one official who argues that a 10 percent discount rate doesn't value the future properly:

"[Discounting at 10 percent] means that in adding up a time-series of benefits, a benefit which is fifteen years off will be reduced to a quarter of its real value at that time, and a benefit which is thirty years off to a mere five percent. So much for our concern for future generations. Whatever the theoretical justification for a ten percent discount rate, one cannot help but feel uncomfortable with a method of analysis which cannot discriminate between the benefit of having a hydro-station which might go on producing electricity for 150 years and a thermal station which is more than likely to be dead at the end of thirty."

This example of a bias against hydro and toward non-renewable sources of electricity is frequently adduced by officials in the Ministry of Energy to discredit the 10 percent discount rate.

In completing this survey of the phases of project evaluation it remains to outline an important technique for handling risk and uncertainty in estimating future costs and benefits. This is the technique of sensitivity analysis which was used by officials in their evaluation of EIs. The method and some criticisms are provided by Copeland:

1. D. Craig, "Energy Supply Options: Key Issues in Long-term Planning," in Energy and New Zealand Society: Fourth New Zealand Energy Conference 1979, Ed. G. Taylor, I, 315. (This article was not written by Craig acting in his official capacity. However similar views were expressed by Craig in an interview)
"In its simplest form this method involves varying the uncertain estimates one at a time and looking at the effect on the overall outcome of the project. This ignores the inter-relationship between variables and it lacks comprehensiveness since it is usually impossible to cover all permutations of variable estimates if a large number of factors are assumed variable. A popular way of conducting sensitivity analysis is to run all uncertain variables at optimistic, most likely and pessimistic levels and this will give an extreme range for a project's outcome. However, even in this case, no measure of the probability of possible outcome values is available and judgement must be applied by the decision maker to the results of the project analysis rather than by the analyst at the data variable level."¹

¹ Copeland, op. cit., p.46
CHAPTER 4

THINKING BIG: RESOURCE RE-ASSESSMENT FOR A NEW SMELTER
4.1 The Response to the 2000 GWh Concession

In late August 1979 New Zealand's Ambassador in Bonn was visited by Andrew Powell, the General Manager of Swiss Aluminium Australia, and Dr Andreas Tischkauser of the Zurich head office of Alusuisse. The purpose of the visit was to discuss Alusuisse plans for expansion and diversification of its aluminium smelting operations. The company wanted to update a survey it had made in Otago in 1973. However, the company was interested to explore other investment possibilities and also to investigate lignite as a source of power. The Ambassador provided some information on New Zealand foreign investment policy and the energy situation although, in this latter regard, without the benefit of any details on concessional tariff for electricity-intensive industries.¹

Soon after the meeting in Bonn arrangements were made for a meeting between Powell and Falconer to be held in Wellington on 13 September.

In the meantime, Trade and Industry had been approached by four companies as a consequence of the ministerial announcement of the new scheme. As might be expected, given the short time lapse, there were no new proposals. New Zealand Steel's longstanding interest in establishing a ferrosilicon plant in Southland was encouraged by advice of the concession. A preliminary feasibility study on the ferrosilicon industry based on Southland quartz gravels had been completed by the company in May, 1979. The study concluded that such a project would be in the national interest but that at the electricity rates available at the time it was not commercially viable.² The new tariff, revealed to the company because of its long and close interest in developments towards the new pricing policy, was seen as improving viability but was also

1 Cable: From Wellington to Bonn, 769. 3 September 1979.

dismissed by the company as insufficient for a successful venture. Further discussion of the profile of the tariff and escalation provisions was seen as necessary and a meeting was arranged between the company and Electricity Division. The immediate outcome of these discussions is not known. However, as will be seen later, by the end of November the Ministry of Energy was recommending a separate tariff for New Zealand Steel, lower than that recently approved by CEC.

Two of the companies which reopened discussions with the Government had proposals to establish silicon carbide plants. The most advanced proposal was that of Ceramco. At a meeting with Trade and Industry in early September the company requested a starting price of 1.3 cents. Officials indicated that this would be possible and that the price would be escalated by 0.2 cents after five years and to take account of inflation. The Ceramco representatives could not immediately guage the effect of this tariff on the viability of the project but mentioned that they would enquire further of a potential German partner. Officials were more reticent in their discussions with Carborundum (New Zealand) Limited, a wholly foreign-owned subsidiary of the American company, largely because they were uncertain whether the company had a definite interest in silicon carbide manufacture in New Zealand. Carborundum also asked if New Zealand could offer a starting price of 1.3 cents. Because 1.3 cents had been offered to Ceramco officials responded positively but then suggested that the company should develop its proposal further and then return for more detailed discussions.

The fourth company to be attracted by the Government's electricity concession was New Zealand Nickel Smelters. The company had been promoting the idea of a nickel smelter since 1975 but the proposal had received little enthusiasm

1 W Falconer to W Duncan. 11 September 1979. p.2.

2 Ibid., p.2.

3 Ibid., p.2.
from the Government, indeed, it had been declined three times at the ministerial level. Nevertheless, on this occasion officials were prepared to reward the persistence of the company with a general description of the kind of electricity tariffs which might be available.¹

This influx of renewed enquiries prompted efforts to apportion departmental responsibilities while ensuring that a measure of co-ordination was maintained. Trade and Industry held a meeting with the Ministry of Works and Development and the DSIR on 12 September to discuss the kind of backup services those departments could provide. More important was the need for a comfortable working relationship between Trade and Industry and the Ministry of Energy. Discussions between Falconer and Bill Duncan, the Secretary of Energy, on this matter seem to have confirmed Trade and Industry's role in the general co-ordination of the exercise. This involved the initial contact with potential investors and pointing them in the direction of the specific advice and consents they required. Trade and Industry would also have the responsibility of putting together any co-ordinated report by departments for ministers. The Ministry of Energy, on the other hand, would be largely concerned with matters relating to the supply of electricity. These would include contractual arrangements.²,³

By the time of the meeting between Falconer and Powell, officials were aware that Alusuisse's main purpose in coming to New Zealand was to investigate possible smelter sites and indicative bulk power rates. Other investment could include some downstream casting operations perhaps incorporating an important new process developed by Alusuisse known as "Caster II".⁴

¹ W Falconer to W Duncan. 11 September, 1979. p.3.
² Ibid., p.3.
⁴ Cable: From Bonn to Wellington, 503. 3 September 1979.
At the meeting on 13 September, Powell expressed his company's interest in locating a smelter in New Zealand and he even made an offer of 1.0 cents/KWh for the electricity. Falconer could not accurately assess the competitiveness of this price, nevertheless, he rejected it outright. Although tactical commonsense would justify this response, Falconer would have been partly constrained by the package chosen by the government on 28 August. While Alusuisse's offer did at least escalate with the initial part of the pricing schedule, it also involved the use of much more electricity than the 2,000 GWh the Government had planned. It also seems that at this time Falconer believed there was little prospect for a second aluminium smelter being invited to New Zealand. Indeed, when Falconer later wrote to his Minister seeking some indication of the Government's attitude he was surprised by the positive reply he received.1 Unfortunately, there is no trace of this correspondence nor any further evidence of the shift taking place in the attitude of ministers until the end of October. In the meantime, the Government was approached by Fletcher Holdings Ltd., a major New Zealand company which had entered into a partnership with Alusuisse.

4.2 Fletcher - Alusuisse - Gove

Fletchers' interest in EIIIs preceded their association with Alusuisse. On various occasions Fletchers had contacted Trade and Industry to discuss EIIIs and projects of this nature being put forward by other companies. Fletchers advised that officials should feel free to advance it with regard to any other such proposals.2 Whether officials introduced Fletchers to Alusuisse is not known although, as is suggested below, it seems likely that Fletchers came to the attention of Alusuisse through earlier contacts with its Australian

1 Interview: W Falconer

2 Interview: G Datson (Trade and Industry), February, 1981.
subsidiaries. In any case, it may be observed that the quickly-arranged partnership indicates that Alusuisse well understood the need for a well placed local contact when dealing with a foreign government.

The new consortium combined Fletchers with Nabalco Aluminium Proprietary Limited of Australia. Forty percent of this company was owned by Swiss Aluminium Australia Limited (a wholly owned subsidiary of the Swiss aluminium producer Alusuisse) and 60 percent by Gove Alumina Limited (51 percent owned by CSR). Gove Alumina was incorporated in 1968 to take up a 30 percent joint venture interest in the Gove project, a 250 million tonne bauxite deposit on the Gove peninsula in the Northern Territory of Australia. Together with Swiss Aluminium Australia, holding the remaining 70 percent interest, Gove Alumina proceeded to develop the site. By June 1978 this development was substantially complete and Nabalco was incorporated with the object of establishing an aluminium smelter. The company got so far as to have chosen a site in the Hunter Valley region and to have negotiated a power supply agreement with the New South Wales government before the state government discovered that planned generation in the early 1980s was insufficient to meet the requirements of all the potential smelter projects. In August 1979 the last remaining blocks of power were awarded to the French aluminium producer Pechiney Ugine Kuhlman. Soon after, Fletchers approached Nabalco to gauge interest in setting up a smelter in the South Island of New Zealand.¹

On 1 October a delegation from Fletchers headed by Owen Lockerbie visited various departments providing them with some background information on the project and attempting to determine their attitude. Overall the company would have detected a gradual warming to the possibility of a second aluminium smelter in New Zealand since the first meeting

between officials and Alusuisse. At the meeting with NZE the General Manager, Mr McCool, informed the company representatives that work had already commenced to assess the availability of 4000 GWh, being 3000 GWh for a new smelter and 1000 GWh for some of the other smaller projects that were currently under investigation. Mr McCool added that he felt fairly confident that the amount of electricity required would be available.¹

A second meeting was held with Ian Dick of the Ministry of Energy's Planning Division. It appears that McCool's confidence was not shared by Dick who suggested that supply was doubtful. Dick also emphasised that the price should be set at the long-run marginal cost of production.² Presumably Dick considered that the Government's pricing policy was only acceptable because it more than adequately covered the cost of the 2000 GWh; if amounts of power larger than the 2000 GWh provided for by CEC were to be sold then the price should be based on sound economic principles rather than simply related to the bulk tariff. The meeting with Rob Laking of Treasury centred on the financial aspects of the proposal. At this time the details the company were able to offer were still rather scanty. The capital cost of the first two potlines, capable of producing 200,000 tonnes per annum, was estimated at $700 million. It was anticipated that more than half of this amount would be spent in New Zealand. The proposed New Zealand participation in these first two potlines was 12½ percent but it was intended that Fletchers should hold a 50 percent share in the third potline, to be developed later, thus bringing the overall participation to 25 percent by the completion of the smelter.³

¹ O Lockerbie (Fletcher Holdings Ltd) to W Falconer, "Smelter Project". 4 October, 1979. pp.1,2.
² Ibid., p.2.
³ Ibid., p.2.
The final meeting was held with Ron Allan in the Prime Minister's Department. Allan discussed the whole project with the company and confirmed his department's continuing interest. He also undertook to convey the urgent need for a power decision to "appropriate persons". The need for urgency derived from further developments in Australia. Pechiney had recently invited Gove Alumina to join it in its new aluminium smelting venture in New South Wales. Pechiney had further advised that if Gove was to proceed with it rather than with Fletchers and Alusuisse then an affirmative response would be required before the end of October. Hence, Fletchers now sought to impose this deadline on the Government for a decision on power availability and cost. Naturally, some firm indications would be needed before this date and, for this reason, representatives of the Nabalco partners intended to visit New Zealand on 25 and 26 October.

In these circumstances it appeared, at least to David Harcourt, that the Government should quickly approve a new tariff based on a revised costing for the supply of 3000 GWh for a 20 year period. With characteristic zeal Harcourt produced a draft CEC paper outlining the need for urgency and recommending a new tariff for FASG. Negotiations with the proponents of other EIIs would proceed on the basis of the decisions made on 28 August. The paper may have been successful as a spur to keep departments moving forward in their investigations of EIIs, in particular, of the possibilities for a second aluminium smelter. However, in its ostensible aim - the speedy presentation of an attractive offer to FASG - the paper failed. Even among those officials who did find the proposal

1 Ibid., p.3.
2 Ibid., p.3
attractive there was the feeling that there were too many risks and uncertainties to justify any other approach at this stage but one of caution.¹

This attitude was reinforced by the receipt in mid October of a formal offer from the consortium. The consortium's proposal included a 20 year contract period and a base price for the electricity of 1.2 cents per kWh.² However, officials noted that the effect of other provisions and rebates requested by the consortium was to lower the electricity price to a level considerably below the basic offer price of 1.2 cents.³ Although officials found this offer quite unacceptable almost two months would elapse before officials were in a position to begin negotiations with the consortium.

In the meantime, officials' initial caution was vindicated with the passing of the end-of-October deadline and the company's failure to withdraw as threatened. Instead, Gove went into partnership with Pechiney in Australia as well as with Fletchers and Alusuisse.⁴ The meetings with the Australian partners planned for the end of October appear to have been dropped, presumably because little of substance would be discussed while officials were still trying to ascertain availability and cost of supply.

4.3 A Point of Transition

On 24 October, CEC considered a report on a request by Comalco for some relief from the May bulk tariff increase. This paper had been through earlier drafts in June and July.

¹ Interview: W Falconer.
³ Interview: B Carrie.
but in its final form there was no mention of making any rebates contingent on the company undertaking to proceed with a third potline. Instead the paper recommended that the Government decline Comalco's request. It may have been that this previously contentious point among officials had now been overtaken by the concessional tariff and the various proposals it had attracted. That is, officials may have become less concerned about whether the price increase would prejudice the expansion of the Tiwai Point smelter because there were now a number of other industries willing to buy the electricity. It is also difficult to say whether this factor had any real bearing on the ministers' decision to decline relief to the company. In any case, it is interesting to note that after a brief discussion of the Comalco issue ministers turned their attention to a related and more immediate issue, namely, the proposal by FASG.

The committee was informed that the consortium had not yet formulated a definite proposal but that it had proposed an electricity tariff under the concessional tariff scheme for large new South Island industrial development. However, this offer was considerably below the rate which officials considered would be acceptable. An acceptable rate would avoid subsidising the smelter and to ensure this, it was claimed, it would be necessary to charge the full bulk tariff from the beginning, that is, over the period of surplus, because the bulk tariff was less than the long-run marginal cost. In response to this point ministers, and the Prime Minister in particular, suggested that there was a need for care to be exercised when discussing the question of electricity prices with the consortium in order to avoid prejudicing progress on the smelter project. They added that any proposal which officials


2 CEC minutes, "Electric Power Supply to Tiwai Aluminium Smelter". 24 October, 1979, p.1.

3 Ibid., p.2.
intended to put to the venture on electricity tariffs should be cleared by the committee first. Presumably, ministers wanted to ensure that officials would not scare off any smelter proponents by demanding too high a price, at least, at the outset.

Among other points covered was a suggestion that it might be preferable to concentrate on the expansion of the existing Tiwai Point smelter rather than the construction of an additional smelter since the former would provide an earlier and higher return given that the required infrastructure was already in place. The comment was then made that the FASG consortium's proposal would not preclude the expansion of the Tiwai Point smelter since there was sufficient surplus generating capacity to supply the requirements of both. However, the surplus would expire at an earlier date and it would be necessary to review the existing power plans.

These remarks provide some evidence of the major shift in policy which took place gradually in October. The remarks were made in passing and therefore do not constitute formal policy but rather reveal a transitional point, particularly in the attitudes of ministers, but also in the stance taken by officials for whom these comments provided a new focus or helped confirm their approach. The established policy had been decided by CEC at its meeting on 28 August. CEC had agreed that, because of the uneven nature of the surplus (represented as a "bulge") only 2000 GWh could be guaranteed to be available throughout a 15 year period. A further significant point was that an extra 2000 GWh of load throughout the forecast period would not affect any power station commissioning dates - except perhaps in the last couple of years where forecasting error was likely to be large anyway.

1 CEC minutes, "Electric Power Supply to Tiwai Aluminium Smelter". 24 October, 1979. p.2.

2 Ibid., p.2.
This meant that the price to be charged for the power could be based on the marginal operating costs of installed plant. Very low rates could be offered before the movement up to the bulk tariff at the end of the period of surplus when new generating capacity would be needed.

The main thrust of this decision had been to find some way of utilising the surplus. By contrast, in October ministers were prepared to contemplate proceeding with two proposals - the new smelter and the Comalco expansion - which together would consume about 4500 GWh of electricity. Thus, ministers had now accepted that more than 2000 GWh could be made available for sale, a position which carried the implication that the country should produce electricity in order to sell it to EII's. Ministers recognised this much in their observation that the commissioning dates of new capacity would have to be advanced. However, the full implication of such a policy had not yet been fully considered by officials let alone formally presented to Government. In particular, ministers could not know the effect such a policy would have on the concessional tariff. Indeed, the additional expense (with the cost of new capacity at between 3 and 4 cents a unit) could well mean that at an unsubsidised rate the Government would find no takers at all. Furthermore, merely advancing the Clutha stations would not cope with the extra demand. Clyde, the first of the Clutha schemes would add only 1500 GWh to the system in a dry year satisfying the extra demand for only one year. Because the Clutha dams were programmed for commissioning at four yearly intervals some other new stations would be required before the end of the forecast period.

The new approach was not directly based on any reassessment of electricity availability or other new information. In part, it seems to have grown out of the enthusiasm generated

1 M Wintringham (Treasury internal memorandum), "The Electricity Surplus and Proposals for New Industrial Developments". 29 October, 1979. p.3.
by the number of offers the Government had received. However, the main factor influencing this reorientation was probably growing optimism about the future of metal prices, especially aluminium prices. Although optimism about prices was not stated as a reason for expanding the concession to encompass an aluminium smelter, it seems reasonable to infer that this was a factor given the stance taken by ministers and officials on later occasions. Also, it is apparent that the aluminium industry as a whole was very enthusiastic about market prospects and the companies that approached the Government in late 1979 and early 1980 cited forecasts of a shortage in the first half of the next decade. This optimism was also clearly evident in industry journals and other publications. For example, the *Financial Times* reported in January 1980:

"Almost any growth in world aluminium use will be too much for producers to cope with in the years immediately ahead ... Producers ... do not expect demand to rise at less than 4 percent a year at any time during the first half of the 1980s. And they believe that demand growth could easily reach 6 percent a year if the general economic outlook brightens."

Against such forecasts the 1.5 billion pounds investment in new smelting capacity planned for Australia must be placed in context. It will only provide an annual growth in world aluminium smelting capacity of 1.5 percent a year during the next 5-6 years as the smelters come into production. Meanwhile smaller investments in other parts of the world, notably in Canada and the Middle East, will add perhaps a further 0.5 percent a year or less to world capacity in the next few years."¹

An important factor contributing to the expected shortfall in supply was the slow down in investment since 1975 in new

smelting capacity. This had a number of causes but a significant one was the rising cost of energy. Energy costs were also a major assumption in forecasting future supplies. Particularly so with respect to Japan which is the main potential market for New Zealand aluminium and which was expected to close a significant part of its high-cost smelting capacity.²

In this context the immediate task for officials was to assess the availability of sufficient electricity to supply the main projects. These were now seen as comprising FASG which required 3000 GWh per year, various other smaller projects such as Ultra-fine metal powders or ferrosilicon together using about 700 GWh and possibly Comalco, requiring another 1300 GWh. These proposals were either the most advanced in their discussions with officials or they seemed the most likely to proceed; they also combined to produce a balanced package which allowed for one new smelter and a number of smaller industries. In this way, 5000 GWh became a natural alternative to the 2000 GWh case in the calculations that were undertaken by the Ministry of Energy in early November. This work would culminate in a paper to CEC on 27 November requesting ministers to decide which package should form the basis for negotiations. Two important issues which appear to have received little scrutiny in the lead up to this CEC decision concerned the availability of the 5000 GWh increment and the implications of sales to large, generally foreign-owned EII's. This may in part be because the period was dominated by another issue with possibly wider implications.

4.4 The Discount Rate Debate

The dispute may be considered initially as a theoretical disagreement over the acceptable rate of return for projects analysed in terms of their costs and benefits to the nation. Hence, the various theoretical arguments outlined above should be borne in mind since they give some background to what is really a longstanding debate within the government. Nevertheless, these arguments were not advanced in a very determined or coherent way during November when they appear to have been complicated by their association with the tasks of extending the concessional tariff and setting a special tariff for New Zealand Steel.

New Zealand Steel's dissatisfaction with the government's minimum negotiating position for the 2000 GWh package quickly resulted in a second, more congenial tariff being promoted by NZE.\(^1\) This tariff was to be exclusively for the ferrosilicon project; a project which Mr Birch was very enthusiastic to see proceed. The proposed tariff incorporated two changes from that agreed to by CEC. Firstly, it assumed that the bulk tariff would be equivalent in future years to its 1979 level of 2.2 cents, and secondly, it assumed that a 25 percent concessional tariff would apply in the South Island. These changes produced a lower tariff overall and one which provided an acceptable rate of return to New Zealand Steel. However, as a Treasury report to Cabinet on the proposal emphasised, the overall return to the nation from the sale of electricity to the ferrosilicon project would be 2 percent under the proposed tariff. This compared with a 6 percent return from the minimum CEC tariff and was well below the Government criterion of 10 percent.\(^2\) Nevertheless,


Trade and Industry and the Ministry of Energy pressed for the lower tariff arguing that Treasury's rule should be set aside to allow a major industrial development to proceed. Treasury managed to avoid making a stand on this issue by recommending a deferral of Cabinet consideration of the proposal until a decision had actually been made on the matter of the South Island 25 percent concessional tariff. This argument successfully postponed a decision until the issue of a special tariff for New Zealand Steel was overtaken by CEC's decision on 27 November to set a new flat rate tariff for a 5000 GWh concessional package. A fortnight later Cabinet accepted officials recommendation that discussions with the company should continue on the basis of the policy established by CEC on 27 November. Treasury had been the main proponent of this approach arguing that since the return to the nation did not appear to be as high 'as from other potential EIIs the project did not warrant special treatment.

At this stage the vulnerability of the 10 percent discount rate appears to have stemmed from its being a hindrance to the development of the ferrosilicon project rather than from any theoretical weaknesses of the discount rate itself. However, this remark must remain speculative in the absence of clear evidence of the nature of the debate at this time or of the role played by Trade and Industry. These aspects come into clearer focus after the debate spilled over into the aluminium smelter investigations.

Before any further discussions with the smelter proponents could take place officials had to assess the amount of electricity that could be made available at a concessional rate and report to CEC with recommendations on the appropriate package size and price. Despite its urgency this task was prolonged by the continuing disagreement over the approach to calculating costs. Numerous draft CEC papers were prepared in November each proving unacceptable to one department or other because of the discount rate used in calculating the electricity price. One such draft paper
which remains is interesting as a summary of the main positions taken by Trade and Industry and the Ministry of Energy.

The paper indicated that 5000 GWh would be available for sale. However, little discussion was provided of the implications of a sale of this magnitude, apart from its effect on the tariff. Whereas the tariff for 2000 GWh agreed by CEC started at 1.0 cents/kWh in 1984/85 rising to the bulk tariff (2.2 cents/kWh in 1979) in 1994/95, the tariff required for a 5000 GWh package would have to begin at 2.6 cents and remain at that level until 1989/90 when the bulk tariff would apply. The bulk tariff during this period of expansion of generating capacity was predicted to be about 3.5 cents/kWh (if based on a 10 percent discount rate) leading the paper to suggest that a tariff calculated on this basis would probably not be acceptable to new industries.¹

A further argument against the 10 percent discount rate is evident in the Ministry of Energy's exploitation of an anomaly in the current pricing policy. Many officials in the department had felt for some time that the discount rate should be lower, some producing discussion papers on the topic. In November Dick Pearce was asked to calculate the return currently obtained on the bulk tariff. Pearce's finding that the bulk tariff was giving a return of around 7 percent became useful ammunition in the discount rate debate. The draft CEC paper claimed that it was inconsistent to retain the bulk tariff on its current basis, equivalent to a 7 percent rate of return on existing assets, and to require new industries to operate on a tariff giving a 10 percent rate of return.² The further implication, that because 7 percent was an acceptable rate of return on electricity

¹ Draft CEC paper, "Concessional Tariffs for New Energy Intensive Industries in the South Island". p.3.
generation in the past it should be accepted in the future, was dismissed by Treasury which maintained that the low returns reflected New Zealand's over-investment in generating capacity and that new generating capacity should not be installed until demand for it is sufficient to earn a 10 percent rate of return on the new investment. As it happens, Pearce later found an error in his calculations and he claims that the true rate of return was much lower than 7 percent, about 3 or 4 percent.\(^1\) Although aggravating the anomaly, this finding also serves to emphasise the dangers inherent in any attempt to define an acceptable rate of return on electricity production as that rate obtained on the bulk tariff. Of course, it is very likely that this policy was advanced largely to give some respectability to the 7 percent discount rate seen primarily as a way of reducing the tariff on a 5000 GWh package. The tariff produced by this alternative approach would begin at 1.15 cents/kWh and remain at that level until 1989/90 when the bulk tariff would again apply. Whether this tariff or one based on Treasury's rule should apply was left as the main issue for ministers to decide.

The arguments raised in this paper in support of a lower discount rate bear little resemblance to the theoretical disputes outlined above. Naturally, one would expect a reassessment of the discount rate to be conducted separately and to be concluded with a separate report to ministers. However, the draft gives no indication that such a reassessment is necessary or forthcoming and it ignores the obvious requirement that such a reassessment precede any decision on the approach to costing the 5000 GWh option. Where economic theory did impinge on the debate it was largely through the efforts of Bruce Carrie (and David Harcourt until he joined another section of Trade and

1 Interview: R Pearce.
Industry in late November) who campaigned both inside and outside Trade and Industry for a thorough reassessment of the discount rate. Carrie favoured a lower discount rate and for the most part he seems to have been concerned to shift the pattern of resource allocation away from those projects offering quick returns. To avoid an overall increase in government investment resulting from this policy Carrie advanced a variety of schemes each including some factor to represent the cost of resources used by the government at the expense of the private sector. For example, one scheme involved a 4 percent discount rate plus a 40 percent shadow price on the capital used. The worth of such an alternative cannot be assessed here. More important for our purposes is the impact of Carrie's campaign on the smelter issue. In the period up to the CEC decision on the 5000 GWh option on 27 November, Carrie's influence appears to have been minimal. However, in late December Trade and Industry presented Treasury with a draft CEC paper drawn up by Carrie recommending a lower discount rate in combination with a shadow price on capital. The paper was described by Mr Clark the Secretary of Trade and Industry as a "pipe-opener" and he added that the investigation intended to follow should be kept separate from any particular investment project such as supply of electricity to a smelter operation. The paper gave impetus to the research already under way in Treasury on the discount rate but failed in the end to change established policy. Treasury confirmed its faith in the 10 percent criterion and its opposition to projects bringing "sub-optimal returns". Treasury's investigations also served to deflect the current round of criticism but they did little to soften the dissatisfaction of other departments.

1 Interview: B Carrie. (This section is also based on a number of brief papers written by Carrie at this time. Carrie did not claim to have conducted a re-evaluation of the discount rate himself. He was mainly concerned to outline its underlying principles and to identify some attractive alternatives to a rate based on the private sector rate of return as a stimulus to further investigation.)
Much of this research was carried out in 1980. In the period of present concern Treasury had to reject a number of draft CEC papers on the concessional tariff for 5000 GWh because they attempted to base tariffs on a 7 percent discount rate.

Treasury's main justification, at least in the eyes of other departments, appears simply to have been that the 10 percent discount rate was established Treasury policy. Rob Laking, as head of the Treasury Division dealing with the smelter discussions, found himself obliged to defend the 10 percent figure with whatever other arguments he could muster. He looked for support in this endeavour to Jas McKenzie, Head of the Economics Division of Treasury. However, McKenzie declined to assist arguing that the discount rate should be kept separate from the smelter issue since a loss on either score would damage Treasury's position on the other. Laking found the strategy sound although it left him rather exposed.  

It would appear, then, that the dispute over the discount rate was carried out at a rather superficial level. Treasury was reduced to stubbornly blocking moves to alter the discount rate. Trade and Industry and Energy, on the other hand, never really mounted a full-scale assault. These departments appear to have been less concerned with the validity of the smelter. Carrie's campaign for a reassessment was less vigorously pursued by his superiors whose main objective at this stage was the tactical one of putting Treasury into retreat on the smelter issue. Hence, while Trade and Industry was prepared to assert in a rather acerbic memorandum to Treasury that the 10 percent discount rate "has no justification in fact or experience", it appears that the department's foremost concern was that, if the criterion was applied to the generation of electricity, "the tariffs required would mean that it was unlikely that any of

1 Interview: R G Laking.
of the projects currently being considered would eventuate. Certainly, the proposed ferrosilicon smelter, the Fletchers Alusuisse aluminium smelter and the Comalco expansion could not eventuate".\(^1\)

The Prime Minister's Department contributed little to the debate over the most appropriate rate of return. However, Ron Allan was able to open a second front of attack on the Treasury position with his suggestion that a service industry such as electricity need not produce a high rate of return on its own, bearing in mind that a smelter would bring other returns to the country apart from the revenue received from the sale of electricity. Laking's initial response was to reject this argument as well. These other downstream benefits depended on the performance of the company. Because these benefits were less reliable, Laking argued that the main objective should be to achieve the accepted rate of return on government resources.\(^2\) Although rational enough, this position did assume that these downstream benefits would not be performance-related. Officials in Trade and Industry, in particular, found this assumption most unreasonable; efforts would be made to tie these benefits to company performance (as opposed to merely accepting company assurances on the nature of these benefits), in the meantime it seemed that Treasury was being unnecessarily obstructive.\(^3\)

In these circumstances, with departments under pressure to produce some recommendations on the 5000 GWh option, the Treasury position began to weaken. There was no prospect of Treasury relinquishing the 10 percent criterion but the second issue relating to the scope of the benefits to be derived from the project did offer room for compromise. The


2 Interview: R G Laking.

3 Interviews: Harcourt and Carrie.
final draft of the officials' paper which went to CEC on 27 November bases electricity prices on a 10 percent rate of return and makes no mention of any alternative criterion. However, the paper does recommend that:

"where substantial additional benefits from an energy intensive industry are likely, the electricity tariff may on a case by case basis be modified to reflect this, provided that in aggregate an adequate overall benefit to New Zealand is achieved".¹

4.5 CEC Decides: 5000 GWh at 2.5 cents/kWh

Essentially, the paper was concerned to stress the impact that varying the amount of electricity supplied would have on the concessional tariff that could be offered. At a level of 2000 GWh per annum, assuming that projects were operational by 1984, a concessional price could be offered for 10 years. Since the projects being contemplated have a project life of at least 20 years it became necessary to set an average price that would reflect both the period of surplus and beyond when new generation is required. This average long term contract price for 2000 GWh was calculated to be 2.0 cents/kWh. By contrast, because a limit of 5000 GWh per annum would necessitate thermal generation to supplement the hydro as well as bringing forward new generating construction, the average long term contract price of 5000 GWh was put at 2.52 cents/kWh. A third option provided for the 5000 GWh package to be divided in two. If a 2000 GWh package was sold first it would be charged at the cheaper rate of 2.00 cents/kWh while the further 3000 GWh would have an average long term price of 2.86 cents/kWh.²

¹ CEC paper, "Concessional Tariffs for new energy intensive industries in the South Island''. 27 November, 1979. p.5.

² Ibid., p.2.
These options were left open for ministers as there was no discussion in the paper of their relative merit. Also absent from the paper was any explanation of how 5000 GWh would be supplied. This crucial matter of availability deserved much closer scrutiny; it could not merely be taken for granted on the basis of Electricity Division's pricing calculations. Various other implications of the sale of 5000 GWh also deserved consideration. In particular, ministers might have been told which resources were being used to generate this electricity and how their depletion might affect planning for future energy resource use. Another, more immediate issue concerned the availability of construction resources, especially skilled manpower, for this strenuous programme which coincided with the construction of a number of other large projects. It is unlikely that officials had the time to investigate these kinds of issues. Even so, it may be questioned whether they had the will to do so. This is an impossible question to answer definitely. However, one can imagine the reluctance of officials, determined to get an alternative concession package to CEC but divided over such a preliminary issue as the approach to the calculation of tariffs, to risk spilling the conflict into other emotion-charged and rather uncertain fields such as long term energy and workforce planning.

It is also interesting to note that the principle of a graduated tariff linked to the bulk tariff, which was the basis of the existing 2000 GWh concession, was rejected in this paper in favour of a flat rate. That is, instead of increasing the tariff by steps up to the bulk tariff, the tariff was expressed as an average of the discounted costs incurred in each year over the whole of the contract period. There is evidence in an earlier memorandum that Trade and Industry had opposed this move. In the opinion of this department a tariff linked to the bulk tariff should be an
interim measure until the discount rate had been considered by CEC early in the following year. The memorandum added that such a tariff would "permit all or most of the projects currently being considered to proceed".\footnote{B D Carrie, "Concessional tariffs for energy intensive industries in the South Island". 14 November, 1979. p.1.} Presumably the department had reason to believe that a tariff based on the bulk tariff would be lower over time than one based on the costs of generating an incremental load of 5000 GWh discounted at the rate of 10 percent. In the final CEC paper, Treasury managed to eliminate this element of uncertainty.

The assumptions and specific methodology behind the flat rate calculations are not very clear. Few of the officials questioned on this matter could recall any of these details and some implied that the origins of the new tariff had always been rather mysterious. To some extent this response may be indicative of a degree of confusion in the pricing calculations. Given the problems with methodology and assumptions that would be encountered later in the area of electricity pricing it is hard to believe that the figures advanced by NZE at this stage were anything more than a hastily produced and necessarily tentative estimate. That they were not treated as such probably reflects the confidence of the other departments in NZE's work but also the urgent need for a tariff for the 5000 GWh option enabling its speedy presentation to ministers.

Ministers showed little hesitation in deciding that the policy for the establishment of EIIIs should be based on the availability of 5000 GWh per annum. The option they selected did not allow a reduced rate for the first consumers to take advantage of the concessional tariff but instead provided a base-line price of 2.52 cents/kWh for the whole package, however it was to be divided up. It was also agreed that, where applicable, factors such as investment allowances, export incentives and special tax regimes may be taken into

\footnote{B D Carrie, "Concessional tariffs for energy intensive industries in the South Island". 14 November, 1979. p.1.}
consideration in negotiating the price. Additional national benefits could also be taken into consideration provided that an adequate overall benefit to New Zealand was achieved.

It is clear from ministers' discussion of the paper that their first concern was that negotiations should proceed smoothly and quickly to a conclusion. The Prime Minister was the most forceful proponent of this view. In his opinion the surplus generating capacity would constitute a wasted resource if it was not used. He believed that the projects would provide wide-ranging economic benefits in terms of the utilisation of other resources and employment. In these circumstances it seemed a questionable practice to the Prime Minister to base tariffs on the marginal cost of additional generating capacity, particularly since this method involved a departure from established pricing practices based on the bulk tariff.\footnote{CEC minutes, "Concessional tariffs for energy intensive industries in the South Island". 27 November, 1979. p.2.} In the atmosphere created by these comments officials could be forgiven for thinking that caution in their dealings with the companies might be interpreted by ministers as an effort to disrupt progress. This impression was reinforced when the committee indicated that there was little need for a strategy in deciding which projects should proceed first. In response to the suggestion that first priority should be given to those projects with a significant local content the Committee took the view that projects should proceed as planning and negotiations were finalised. It was noted that the Carbarundum silicon carbide and the FASG aluminium smelter were currently the most advanced projects.\footnote{Ibid., p.3.}

An additional officials' paper dealing with the electricity prices offered to large users in Australia was also briefly considered by ministers at this meeting. The report had
been prepared by Rob Laking on the basis of his recent visit to Australia. Earlier investigation of overseas pricing and contractual arrangements had been rather unsuccessful. The day before his meeting with Powell, Falconer had cabled New Zealand offices in London and some of the Australian state capitals to initiate enquiries. Interest centred on Australia which was seen as New Zealand's principal competitor for EILs. However, partly because of this element of competition but also because of inter-state rivalry, these enquiries met a very cautious response. The Australians were only prepared to speak in general terms leaving the main question of current contract rates unanswered.¹ Laking had hoped through a more concerted enquiry to gain some information on the prices offered by the state governments. Although state officials remained cautious about revealing details, Laking felt able to conclude that the maximum rate currently being offered was about 1.9 cents/kWh. Furthermore, it seemed that planned generating capacity in Australia was fully committed. Although there was the prospect of considerable future investment in coal-based electricity projects the lead time required for these appeared to give New Zealand some short-term advantage in its negotiating position on prices.² These conclusions provoked little reaction from ministers, largely because they tended to confirm the stand ministers were taking.³

The following day at a meeting of the Cabinet Works Committee Mr Birch requested a paper from his department on the effect the new policy would have on future power planning. This committee had been considering the Electricity Division's submissions on hydro and thermal power station investigation monies for the next five years. However, the paper presented in response to Mr Birch's request would serve wider purposes

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¹ Based on a number of cabled replies from New Zealand trade offices in Australia.


³ Interview: R.G. Laking
than these. To get an appreciation of the possible timing of new generating plant outside the normal 15 year planning period Electricity Division formulated a tentative extended power plan.\textsuperscript{1} This extended plan, spanning a period of 30 years into the future, was compared with the forecast of future demand, also extended to cover a 30 year period. This latter part of the study was based on the "central" demands of the 1979 CRPR (extended on the basis of an assumption that demand would rise towards a plateau) to which was added the 5000 GWh of industrial demand as well as the extra margin of 7 percent normally added to allow for such contingencies as a dry year. These two forecasts of projected demand and supply were illustrated on a graph accompanying the report. From this diagram it appeared that a comfortable margin existed throughout the planning period. The relationship, if any, of this plan to the costing of the 5000 GWh increment at 2.52 cents/kWh was not made clear although the paper did comment that the plan still required detailed costing. However, considerations such as these appear to have been of less concern to Mr Birch who was pleased by the security of supply evident. Some officials claim that Mr Muldoon was also impressed by this simple representation of the availability of the 5000 GWh. No doubt these ministers were able to watch the commencement of the negotiations with the FASG consortium feeling increasingly confident in the policy the Government had adopted.

\textsuperscript{1} M Hewlett (NZE report to minister) "Effects of South Island energy intensive industries on future power planning". 29 November, 1979.
CHAPTER  5

THE NEGOTIATIONS
5.1 The Initial Negotiating Meetings With FASG:
Discounting the Electricity Price

In late 1979 and early 1980 negotiations with the proponents of EIIs dominate the investigations. Following the CEC decision of 27 November 1979 officials could begin to negotiate with companies wishing to develop EIIs requiring more than 2000 GWh. At this time only the proposal from FASG for the establishment of an aluminium smelter was sufficiently advanced for negotiations to commence. This consortium would continue to be the main focus of attention through most of this period of the negotiations. However, by March 1980 agreement would still not have been reached on the critical issue of the electricity price. This delay may be attributed to company intransigence and the slow pace at which other proposals developed but it may also reflect officials' own dilemma in meeting the constraints of electricity cost and availability, on the one hand, and offering a competitive price, on the other. Resolving this dilemma would take time and ingenuity but also entailed a certain amount of interdepartmental conflict.

The Government's negotiating team was decided with little fuss. It was taken for granted that there would be representatives from the four departments which were most involved in the issue, the actual personnel being decided by the departments themselves. More important was the matter of which department should lead the negotiations. According to officials it was generally accepted that Trade and Industry should get this job. The claimed absence of contention is perhaps surprising given that the Ministry of Energy could just as easily have performed the task. To some extent Trade and Industry's role as mediator between the companies and officials may have helped to establish that department's centrality, especially since this role had earlier been formally recognised by the Ministry of Energy. The actual position of head negotiator was taken by Geoff Datson, the Deputy Secretary of Trade and Industry. On returning from an overseas trip in October, Datson had taken over the investigations into the smelter which were then being led by Bill Falconer.
In December the main rival of FASG for the electricity to establish a new aluminium smelter was the American company Martin Marietta Alumina Investments. In early November a representative of the company had visited Trade and Industry for some introductory talks with Mr Falconer. As had been the case with FASG at this time, Falconer was unable to offer any real opportunity for investment while the Government's concessional tariff was limited to 2000 GWh. After this meeting the Martin Marietta proposal did not proceed much further, although the company was clearly still interested, and in mid-December Trade and Industry wrote to the company requesting information that would enable an evaluation of the net benefit to New Zealand of the project. Three other smelter proponents which made contact with the Government around this time were Pechiney, Shell and Reynolds. The exact nature and timing of their contact is not known although each did promise to submit proposals as soon as possible.

The prospect of Comalco expanding its smelter at Bluff had been a source of optimism for the Government since 1978 when the electricity surplus became apparent. However, in 1978 and for much of 1979 the company showed little interest in adding a third potline. A visit by the Minister of Energy to Bluff in mid 1979 seems to have found the company looking much more favourably at plans for expansion. Even so, action by the company was delayed until after the announcement of the concession and the first important meeting with officials was held in December 1979. At the company's request it was arranged that the national benefit analysis would be carried out by an independent consultancy group, the New Zealand Institute of Economic Research. This analysis was expected to take about three months by the time the company had submitted all the necessary details to the Institute. Further discussion of this proposal will be deferred until the period in May 1980 when the negotiations got underway in earnest.
It will be recalled that FASG had made an offer on some contractual details as early as the middle of October. The main feature of this offer was the electricity price of 1.2 cents/KWh. The consortium also proposed a price escalation clause. Initially, escalation would be at the rate of increase in the bulk tariff, then, after the startup of the first potline, 75 percent of the price would be indexed to the price of aluminium. Floor and ceiling prices would be placed on the electricity price for most of the contract period equivalent to 45 percent and 70 percent, respectively, of the South Island bulk tariff. As noted earlier, the effect of these provisions and other rebates was to lower the electricity price to a level considerably below the basic offer price of 1.2 cents/KWh.

The first negotiating meeting was held on 5 December. It was attended by nine government officials and six company representatives including one representative from each of the three foreign partners and Hugh Fletcher who led the consortium's team. Officials outlined the government's policy indicating broadly how it had arrived at an average electricity price of 2.5 cents KWh. It was also explained to the company how the net benefit to New Zealand of the project would be calculated. Policy on this matter was now more sharply defined than it had been at the 27 November CEC when it was agreed that where there were substantial additional benefits the electricity price could be modified to reflect this. This decision gave no guidelines for linking the electricity price to any additional benefits. By 5 December officials in Trade and Industry had solved this problem by taking the policy to its inevitable limit. Since electricity was only part of the whole project, all that was required, therefore, was that the return on the electricity and project combined should exceed 10 percent. Hence, the Government could take into account other project effects

2 B Carrie (Trade and Industry internal memo) "Electricity Negotiations" 4 December, 1979.
which might offset part of the resource cost of electricity enabling the Government to lower the current offer price of 2.5 cents/KWh.

At this first meeting the possibility of interruptability was dealt with. That is, as Hugh Fletcher explained, in dry periods the smelter would either close down or reduce its electricity load. In this way the company hoped to avoid having the cost of extra, dry year, thermal power built into the price contract. NZE promised to look into this matter\(^1\). Mr Datson said that a further significant reduction in the base price could be provided depending on the benefits brought by any downstream processing. The company had earlier offered to include a casting operation and Mr Fletcher confirmed that the company was still considering this option\(^2,3\).

Following this first negotiating meeting officials hastened to calculate the discount allowable for national benefits. It was hoped that the Government would be able to present the company with a more attractive price offer at the next meeting to be held on 12 December. In performing this national benefit calculation it was necessary to ensure that over the life of the project the aggregate benefits including the price paid for electricity should more than cover the resource costs. These resource costs are the opportunity costs of all material and labour used in the project with the most important item being the resource cost of electricity (calculated as 2.5 cents/KWh). Apart from the price paid for the electricity by the company (yet to be negotiated) the most important benefit was the 10 percent premium on the

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\(^1\) R Milner (Trade and Industry internal memo) "Fletchers Aluminium" 5 December, 1979 p 2.

\(^2\) Ibid, p 2.

\(^3\) A number of other matters were tentatively raised and the more important of these will be discussed in the context of later meetings.
nett foreign exchange earnings of the project. Hence, this latter benefit was the basis for the discount from the electricity price from which the offer price to the company was obtained\(^1\). The main data requirement for this exercise was an estimate of the value of the smelter's export, that is, of the world price of aluminium. Obviously, the greater the value of the aluminium being exported, the greater would be the benefit to New Zealand and, correspondingly, the greater would be the deduction from the tariff offered to the company. Since this discount had to apply over the life of the contract, the main problem with this approach lay in establishing an accurate long-term estimate of the metal price.

The company's own estimate of the long-term world price for aluminium was 69.5 cents per pound\(^2\). In order to obtain an independent assessment of aluminium prices Treasury engaged the American consultants Spector Reports Services. However, on 11 December, before any advice from Spector had been

\(\begin{align*}
1 & \quad \text{Obviously, the cost-benefit analysis includes more items than have been presented here. In general terms, the main cost items in the national accounts are the profits remitted abroad, overseas interest payments and capital repayments, domestic and imported capital and current goods. The main benefits are the sales revenue and the foreign equity, debt and working capital inflows.}

\text{The methodology is also more complex. For example, before performing the national benefit analysis it is necessary to draw up a model of company accounts since a number of items used in the national accounts are derived from the company accounts. An example is the profit made by the consortium. The foreign partner's share of this profit is assumed in the national accounts to be entirely remitted overseas.}

2 & \quad \text{B Jameson (Treasury internal memo) "Meeting with CSR/Alusuisse/Fletcher consortium at DTI 12 December" 13 December, 1979 p1.}
\end{align*}\)
received, a meeting was held between officials of Trade and Industry, Treasury and NZE to adjust the 2.52 cents/KWh tariff to allow for additional national benefits. A price of 1.8 cents/KWh was tentatively adopted based on the consortium's own estimate of the price of aluminium. Although the company had been told to expect a reduction for national benefits it is likely that the size and suddenness of the drop contemplated by officials would have been damaging to the government's credibility, especially if it then attempted to hold firm at that level having given away all that it could at the time. Trade and Industry was the main proponent of this new price since they appeared to believe that nothing higher than 1.8 cents/KWh would attract a smelter. It was something of a setback for this department then, when Treasury received a brief report from Spector suggesting that the company's metal price was rather optimistic. By chance, this report arrived just before the second negotiating meeting.

Spector's estimate was for a long-term metal price of 64 cents. Incorporated in the national benefit calculations it had a rather drastic effect on the discount that could be offered. Whereas the consortium's estimate of 69.5 cents allowed a discount of 0.7 cents, Spector's estimate allowed a discount of only 0.4 cents and required an electricity price in excess of 2.1 cents if an overall return of 10 percent was to be maintained. Treasury acted quickly on the basis of this information recommending an offer price of 2.2 cents for the second meeting with the company on 12 December.

Mr Datson accepted that the uncertainty over the metal price prevented officials from offering the company a discount of 0.7 cents but he decided against using Treasury's recommended

1 Letter from Treasury to Secretary of Trade and Industry "CSR/Alusuisse Aluminium Smelter Project" 12 December, 1979.

2 Ibid.
offer price at this stage. Still unable to present the consortium with an indicative price, Datson opened the second negotiating meeting with a discussion of the aluminium price. All the partners agreed that 69.5 cents was necessary to make the project profitable. However, their position did not seem particularly strong as questioning revealed that earlier expansion plans had been based on lower metal prices. Mr Fletcher stated that more important than the future demand/supply situation, which was impossible to predict with any degree of certainty, was the question of the costs of production. He added that it was unlikely that there would be a fall in the real prices of all the principal cost elements of bauxite, labour, capital and electricity. The consortium promised to supply further justification of their price and names of independent sources of information.

The consortium made it clear to officials that it did not consider the price of 2.52 cents/KWh to be at all relevent. After all, the bulk tariff was 2.2 cents and a 25 percent discount was available in the South Island for industries which were being established or expanded. It was generally known that the Government was considering expanding this concession so that shortly all industry in the South Island would be able to buy electricity for about 1.7 cents. Therefore in the opinion of the consortium, the price offered to an aluminium smelter should be something less than that; perhaps about 1 cent per unit with the inclusion of export incentives. Because of the critical importance of the electricity price to the viability of the project, the consortium emphasised the need to get an indicative price as soon as possible.

At one point the meeting was adjourned while officials discussed whether an electricity price could be revealed and what steps

1 B Jameson, "Meeting with CSR/Alusuisse/Fletcher consortium at DTI 12 December" 13 December, 1979 p1.
2 B Carrie (Trade and Industry internal memo) "Smelter Project". 14 December, 1979 p2.
could be taken to expedite the negotiations. It was agreed that to reveal a price, however tentative, would effectively set a maximum which the company would be prepared to pay. When the meeting reconvened officials stated that the electricity price remained dependent on better information about aluminium prices.\(^1\)

This description of the second meeting is very reliant on the little documentary evidence which remains so that its interpretation is especially speculative. However, it is likely that the official explanation for the decision not to reduce the offer price, that is, the claim that a lower price would effectively set a new maximum, disguises a major conflict of views within the negotiating team. After all, it has already been seen that before Treasury's intervention officials were quite prepared to offer 1.8 cents in the belief that this would be the maximum price acceptable to the company. In this context, the decision to defer making an offer more likely reflects Trade and Industry's unwillingness to accept the basis for the 2.2 cents and that department's desire to provide an indicative price which would be more acceptable to the company. This interpretation is reinforced by a note from Datson to his minister which outlines progress with negotiations and mentions a sharp difference of view which was emerging with Treasury over the offer price. In Datson's opinion, the price which would eventually be acceptable to the smelter proponents would probably fall in the range of 1.5 - 1.8 cents/KWh. As a negotiator he felt it was pointless to continue discussions using a minimum price so far in excess of this range. Nevertheless, for the meantime his department would continue, along with Treasury, to obtain further information on long-term trends in the price of aluminium accepting this data to be a crucial determinant of any offer price.\(^1\)

Negotiations were delayed for about one week while departments endeavoured to establish an offer price. During this time the

1 B Jameson, "Meeting with CSR/Alusuisse/Fletcher consortium at DFI 12 December". 13 December, 1979 p 2.

2 G H Datson (report to minister) "Concessional electricity tariffs for new electricity intensive industries". 14 December, 1979 pp 1,2.
company managed to produce evidence from a couple of sources which tended to confirm the price of 69.5 cents per pound. Treasury sent an urgent cable to Washington requesting more information from Spector on their estimate, in particular, on the methodology used. The reply, received on 17 December, indicated that the price of 64 cents was not a forecast of an actual price. Rather, it represented a break-even price so that if actual market prices were above that level producers would have an incentive to install new capacity. This disputed the company's claim that 69.5 cents was required for expansion. However, Spector noted that this price (69.5 cents) was close to current market prices. Spector believed that in real terms prices might stay at this level for some time, they were not likely to rise much above it. After 1985 his forecast was for a drop in price based on the traditional tendency for commodity producers to go through cyclical periods of oversupply.

It is difficult to say precisely what effect this report had on the dispute within the negotiating team although it may be noted that at about this time officials decided on a further significant drop in the offer price. Presumably, Spector's advice suggesting 64 cents per pound to be a rather conservative medium-term estimate weakened Treasury's opposition to a discount based on the company's higher metal price estimate. However, it is clear that Treasury did not capitulate on this point; the metal price was retained at 64 cents and there was no marked increased in the discount for national benefits. Instead, under pressure from Trade and Industry to allow a more "commercially acceptable" price, Laking accepted a reduction

1 Telex from O Lockerbie (Fletchers) to B Carrie, 14 December, 1979.

2 Cable from Treasury to Washington 5017, 13 December, 1979.

3 Cable from Washington 4669, 14 December, 1979.
in the base price from CEC's agreed price of 2,52 cents to 2.2 cents. The technical justification for this move is rather obscure but appears to have been related to the opportunity cost of gas used in the electricity costing.\(^1\) If so, the opportunity cost of gas may have been substituted for its commercial cost in the electricity costing exercise (later, officials in the Ministry of Energy found that they had, mistakenly, been using the commercial cost of coal) or, if already used, the opportunity cost may have been re-estimated. Various estimates of the opportunity cost were put forward at this time and in the following year. The calculations were conducted by the Planning Division of the Ministry of Energy which faced the complex task of settling on a methodology to value gas in its various uses, including the new petrochemical applications.

Officials' decision to lower the offer price to FASG coincided with a meeting between senior officials and the Minister of Energy. The two events do not appear to have been directly related. Mr Birch was mainly concerned to emphasise the need for speed in taking up the employment slack in the South Island with major construction projects. He wished progress to be made quickly on those projects which could be got underway early, such as the Comalco expansion and ferrosilicon. With the main urgency on the smaller projects officials could then afford to take a little more time over negotiations for a new smelter.\(^2\)

The minister's desire to get some of the projects underway quickly reflects their importance to the government. Naturally, the government wanted to be seen to be encouraging industrial development, in particular, industry which would have some impact on the unemployment problem. The government was also

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1 Interview : R Pearce.
sensitive to calls for regional development assistance in the South Island. Just two days earlier Cabinet had agreed to extend the existing 25 percent electricity concession to apply to all industries and certain other consumers in the South Island. This decision was made despite reports to earlier Cabinet and CEC meetings by Treasury and Trade and Industry which expressed those departments reservations about the economic justification of the scheme. In their opinion, the regional benefits would be minimal and the cost, in terms of revenue forgone and administration, could be more effectively compensated under other schemes.

On 20 December officials notified Hugh Fletcher that the government was prepared to drop the average price for a 20 year contract period to 1.8 cents, being the base price of 2.2 cents discounted by 0.4 cents for national benefits. This new offer was included in a formal statement of the Government's position which was intended to be a response to the company's offer of 17 October. Officials added that the price could be lowered further to take account of interruptibility of the load and the foreign exchange benefits which might accompany the addition of Caster II. However, this proposal amounted merely to an expression of interest as interruptibility still required investigation by officials while a rebate for Caster II depended on the provision of further details by the company. Officials also offered to vary the tariff over the 20 year contract so long as the 1.8 cents average was maintained. No export incentives would be provided for the project (existing legislation did not permit this) but the project would be eligible for a 25 percent depreciation allowance and, if located in Southland or Otago, a 20 percent regional investment allowance.

1 Cabinet minute, "25 percent electricity concession for South Island industries". 17 December, 1979.


Tariff escalation was also mentioned in the proposal. This important matter had been raised during the earlier meetings but little progress had been made on it. Officials stated that so long as the real value of the electricity price was maintained the Government was flexible about the choice of escalator.¹ They suggested that an escalation clause could be based entirely on movements in the metal price or it could include an allowance for an inflation index such as the New Zealand Consumer Price Index; in either case the setting of floor and ceiling prices was optional. The escalator would commence June 1979 with adjustments made quarterly.²

In its prompt reply the company rejected the government's price on the grounds that it would not enable an economic project to proceed. Nevertheless, the company stressed its continuing interest in the project and it adjusted its position on escalation. Under their modified proposal the base price of 1.2 cents/KWh as at 1 January 1980 would thereafter be related to movements in the world metal price.³ Previously the company had offered to escalate only 75 percent of the base price. In all other respects the company's proposal of 17 October remained the same.

5.2 The Third Meeting: Some Issues of Strategy
Negotiations resumed after the holiday period on 9 January. At this third meeting little progress was made and it seems that the company was mainly concerned to challenge some of the key assumptions behind the Government's offer. The company argued that the Government's insistence on a 10 percent rate of

¹ CEC had allowed on 27 November that the electricity price could be linked to an index of general cost movement and/or an appropriately calculated price for the aluminium, adjusted for changes in the value of the New Zealand dollar. Hence, the official position was open although Ministers had noted that a metal price escalator would provide an "adequate basis of indexation" from New Zealand's point of view. Clearly, they were optimistic about the future of aluminium in the metal market.

² Letter from G Datson to H Fletcher, "Aluminium smelter project". 20 December, 1979.

return for the project was unrealistic. They doubted whether other investment opportunities existed which offered a higher rate of return. The company itself claimed to expect a lower rate of return despite the fact that it faced higher risks in producing aluminium for the world market compared to the electricity authorities which would have a virtually assured offtake for 3000 GWh over the contract period. The Government's assumption of a long term metal price of 64 cents was also again questioned by the company. Now acquainted with the Government's consultant, the company pointed out that Spector's short-term forecast allowed for a 10 percent premium to be added to the 64 cents and that the current price actually stood at 72.5 cents. Officials were obliged to accept that the estimate was conservative, however, they felt that the 10 percent premium could not be taken to cover the longer term predictions. Hence, the 64 cents would be retained as a base price free from the cyclical variations in the market price.

Other arguments raised by the company seemed to be of a largely tactical nature. These latter arguments included assertions about the more favourable prices and contracts available in Australia. In the case of Comalco's recent decision to build a smelter in Australia it was claimed that the power price was considerably below 1.3 cents. The company also stressed the need for haste if the smelter was to profit from the peak aluminium prices anticipated in the period 1983/85. March 1980 was mentioned as a date for reconsideration of the project.

1 N Broderick (Trade and Industry internal memo) "Meeting with Fletchers to discuss the electricity price for a smelter 9 January 1980" 10 January 1980 p 3.
2 Ibid, pp 2, 3.
3 Ibid, pp 4, 5.
Most of the efforts to pressure officials were rather commonplace and easily ignored. However, officials were sensitive to the assault on the 10 percent criterion and they implicitly acknowledged the need to reconsider the rate of return or the amount of electricity which should be made available. A paper dated 18 January raised these issues for the consideration of the Minister of Trade and Industry. Signed by Mr Datson the paper maintained that a price of 1.8 cents was unlikely to attract any industries. There was a need for movement on both sides in the negotiations with FASG but officials were constrained by the "basic offer price" of 2.2 cents. In order to reduce this price while maintaining a 10 percent rate of return the government would have to reduce the amount of power offered thus deferring the installation of new generating capacity.¹

This course was recommended to the minister although the size of the package which should be offered was left open. Nevertheless, it was noted that a 3,000 GWh package would reduce the "basic offer price" to 1.9 cents enabling an offer price to the companies of 1.5 cents when adjusted for national benefits. The paper also noted that if the quantity of power for sale was not altered, a price of 1.8 cents would reflect a return on new investment of around 7 percent.² Although not presented as a means of reducing the electricity price this information was clearly intended by Trade and Industry to remind the minister of a possible alternative to reducing the package size.

It is not clear whether a decision was made by the minister on the recommendation. Whatever the immediate response, the end result was a continuation of the existing policy. Without attempting to interpret the minister's actions, it could be argued on a number of grounds that at this time the attempt

1 G Datson (Trade and Industry report to minister) "Electricity intensive industries : progress with negotiations" 18 January, 1980 pp 1, 2.
2 Ibid, p 2.
by Trade and Industry to change the basic negotiating terms was premature. For example, the picture of a stalemate in the negotiations with FASG, portrayed by Trade and Industry, obscured the potential for further reductions in price once the interruptibility investigations were completed or, if Caster II should proceed, when the benefit produced by it had been calculated. Other criticisms of changing the policy at this time may be derived from the consequent failure to co-ordinate the EITI investigations as a whole.

To begin with, it may be doubted that the need for a lower, more "realistic" price was so pressing at this stage when so few of the other proposals vying for the electricity had been subject to any formal evaluation. Officials were by now aware of the interest of another four companies in establishing smelters of a similar scale to the FASG proposal. Each of these companies had indicated their intention to submit proposals in the near future. The strongest interest came from Martin Marrietta which intended to commence discussions with officials on 12 February and had already indicated orally that it could offer a price of around 1.3 to 1.5 cents per KWh. Reynolds, Pechiney and Shell were further from submitting their proposals and seemed unlikely to present the Government with a markedly better offer than that already received. Nevertheless, there was a case for allowing most of these proposals to advance further, perhaps to a stage where negotiations could be held or national benefit calculations performed and the results compared.

A more co-ordinated evaluation of the various proposals could help to ensure that the best proposal was chosen by reducing a possible bias towards the early proposals or those most advanced in the negotiations. Since every proposal would be measured against each of its competitors the possibility would be reduced of issues being overlooked, thus avoiding an unfair and partial assessment. Uncertainty would be alleviated by applying information available in relation to one project
to others being investigated concurrently. This strategy could have assisted progress in the negotiations with FASG which by January were being impeded by a lack of information on a number of crucial issues. In particular, officials could not be sure whether 1.8 cents per kWh was an internationally competitive price for electricity and there was continual speculation over the validity of information supplied by the company, especially on the question of the long-term world price for aluminium. Later, officials would find themselves forced to speculate on the extent of the benefits and competitive edge provided by the company's promised new technology.

The necessity to treat all proposals equally would also require that some effort was put into the development of firm criteria for evaluation. In practical terms this could involve the drawing up of a table listing the terms being sought and areas of uncertainty for each of the projects. Policy on such uncertain matters as export incentives could then be established and applied consistently perhaps enabling the issue to be placed above negotiation. In addition, a co-ordinated approach could provide a basis from which to assess the relative levels of risk presented by each project to the nation. This strategy would also have obliged each company to compete with the others for the available power. In this situation the roles could be reversed for FASG which had been attempting to play the New Zealand Government off against some of the Australian states.

Naturally, a thorough comparative analysis would have taken some time to complete and it was not easily undertaken while officials were under pressure from both industry proponents and their own ministers to reach an early conclusion. In these circumstances some effort should be made by officials to appraise ministers of the likely benefits of a co-ordinated approach and of the time it might take. Also, officials
should try to make an objective estimate of the significance of these calls for urgency. If time is short then it may be necessary to set a deadline to encourage progress among other proponents.¹

There is evidence that in January some thought was given to the idea of setting a deadline for the submission of all proposals. ² Despite this, the idea was only ever used as a threat to the companies. This may reflect the fact that so far FASG was the only company to have got underway with negotiations. However, it must also be seen in the context of the strenuous effort by Trade and Industry to reach agreement with FASG. This impression is reinforced by Datson's move to have the package size reduced to a level which would accommodate the most advanced smelter proposal.

A major implication of tailoring the package size and electricity price to the requirements of aluminium smelters and the requirements of FASG in particular, was the almost certain exclusion of most of the smaller EIIIs.³

1 This raises the question of how much progress with negotiations should be required from industry proponents in order to meet the deadline. For example, should the deadline be a date for the submission of all proposals, for the commencement of negotiations, or for final agreement? Each of these dates will reflect a different degree of commitment on the part of the proponents and these dates will also provide different amounts of information on which to base any further screening of the projects. While these considerations might point to a deadline for final agreement as the most desirable, in practice this deadline may be too distant to be effective or acceptable to ministers.


3 If 3000 GWh was allotted to an aluminium smelter then any smaller project wishing to proceed would have to buy an incremental block of power at a price possibly higher than that available to the smelter; obviously an increment approximating the while of the remaining 2000 GWh would require a price in excess of the 2.2 cents incremental cost of the 5000 GWh package.
In January these included the Comalco expansion, New Zealand Steel's ferrosilicon project, the two silicon carbide plants proposed by Ceramco and Carborundum, Mitsubishi's ferro-nickel project, Crown Crystal's proposal for glass manufacture and the Baigents Pulp Mill. Together these proposals presented a potential electricity demand of some 2900 GWh making them an alternative to a 3000 GWh aluminium smelter. In these circumstances the question arises as to how justified the negotiating team was in attaching a lower priority to these smaller industries before the usual quantitative analysis had been performed. It could be argued that some of the most important criteria for assessing these industries were already being tacitly applied by officials. In this regard, two practical criteria poorly fulfilled by the smaller industries may be suggested: "extent of progress" and "likelihood to get underway". Among the smaller industries progress was generally slow, some being yet to submit their proposals, and there was doubt whether some of these projects would proceed at all.\(^1\)

While providing an important basis for discrimination, such tacitly accepted criteria can only be given proper weight when dealt with explicitly and in relation to a number of associated criteria. One advantage of explicitness is that criteria must be rendered in operational terms. For example, the rather hazy criterion of "likelihood to get underway" might require some assessment of the sincerity and determination of a proponent or a preliminary assessment of a project's viability.

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1 It may be recalled that such policy as did exist favoured the smaller industries. At a meeting between Mr Birch and some key officials in late 1979 priority was placed on the establishment of smaller, relatively more labour intensive industries. At the time Mr Birch had little reason to doubt that an aluminium smelter would proceed as well as some of the smaller projects. In this context smaller projects warranted priority not only because they would help reduce unemployment but also because one or two could be got underway faster than a new smelter.
Another advantage of explicitness is that, through a formal presentation of the results of the analysis, all interested parties are able to check that a reasonable decision has been made. Perhaps the most important point about any attempt to screen industries (including setting a deadline) is that it should only be made in the context of clear policy as to the kind of industries that should be developed in New Zealand. For example, with regard to the attempt to exclude most of the small industries, one obvious criterion deserving consideration was the desirability of spreading the country's involvement over a number of industries instead of concentrating on just one thereby increasing the magnitude of the loss should the project fail. Other criteria might be based on a survey of the kind of industries which are most likely to further the Government's macro-economic objectives. That officials recognised the need to define more exactly what they were looking for in the EII investigations is evident in moves during January to hire a second group of consultants.

5.3 The Fourth Meeting: The Employment of Consultants
The rather aimless and inconclusive stage which negotiations had reached at third meeting was again evident at the next meeting between Fletchers and officials held on 29 January. Discussion centred initially on a brief which had been prepared by the company for a meeting between Emmanuel Meyer, the Chairman and Chief Executive of Swiss Aluminium, and the Prime Minister held on 23 January. Trade and Industry officials expressed surprise upon noting that the consortium were still offering to escalate only 75 percent of the electricity price and not 100 percent as recently offered. It was agreed that other differences were accurately represented in the brief.¹

For much of the meeting discussion degenerated into the usual speculation about metal prices. Fletchers requested officials

¹ B Carrie (Trade and Industry internal memo) "Fletchers Aluminium Smelter" 29 January, 1980 p 1.
to go back to Spector to check if he still considered 64 cents to be a realistic price. They quoted Mr Meyer as saying that if the company thought 64 cents was the correct price it would not proceed with the project. Fletchers also provided data from yet another consultant this time indicating an average price for the decade 1980-1990 of 66.8 cents. The meeting concluded with another plea for urgency from Fletchers. They said that they were under a lot of pressure from their customers and added that their Australian partners were particularly impatient fearing that a crash programme underway in Queensland and New South Wales to build new power stations to supply smelters could lead to control being placed on the export of alumina. Officials explained that they were also under pressure, in their case from politicians who were eager to have a decision. However, delays were necessary to allow other projects to reach some degree of finality. Mid to late February was suggested as the earliest possible date for a firm decision on the proposal.  

These comments suggest that the delays - in reality largely due to disagreements between the parties, particularly over the quality of the information they were using - were now being justified by the need for a comparative evaluation of all proposals. It is doubtful whether officials were sincere in their intention to investigate all proposals thoroughly since it was highly unlikely that these proposals could be presented to officials in adequate detail and then evaluated within the next two to four weeks. This problem, together with the areas of uncertainty which troubled the smelter negotiations, led officials to rely more heavily on the advice of consultants in order to ascertain an internationally competitive electricity price and to be able to estimate the national benefit likely to flow from each type of project. Clearly, this kind of advice would have been valuable earlier.

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1 B Jameson (Treasury internal memo) "Meeting on NZ Aluminium Smelter Project - Fletchers, Alusuisse, CSR" 30 January, 1980. pp 1,2.
in the investigations. The advice from Spector was never intended to fulfil this role and it was only as the areas of uncertainty unfolded that officials became aware of the need for a fuller analysis of the nature of and prospects for the different EIIs.

In early January officials in Trade and Industry began to make enquiries overseas to identify a suitable consultant. On the basis of the advice received the American consulting firm of Arthur D Little was selected as having the most comprehensive expertise. The consultant promised to provide information within three weeks on the economic development policies of some of the major contending countries covering such issues as electricity prices, incentives and tax position. Within six weeks information on markets, product price forecasts and potential for downstream processing would be provided enabling officials to determine which kinds of projects might offer the greatest national benefit.

A D Little's report was received during March and April. It is not known whether this report influenced the course of the negotiations. The report's main conclusions broadly confirm the approach already being taken by officials so it is likely that the report did not have a significant impact. For this reason the report may be summarised here.

In dealing with New Zealand's competitive position the report advised that only two other countries, Australia and Canada,

1 Consultant's fees may constrain the use of their services. On 24 January the expenditure of $10,000 was approved to hire these consultants. Subsequent communication with the company indicated that the cost might be considerably higher. On 5 February a further $30,000 was approved.


3 Unfortunately the whole report was not available and preliminary reports from the company have had to be used in the following summary. It is not known, for example, whether A D Little gave officials an estimate of the long-term price of aluminium.
had low-cost surplus electricity available for sale over the period 1980-82. After 1982 Brazil, Venezuela and Mexico were expected to have surplus electricity with a few more countries appearing on the scene later. The cost of new hydro-electric power in Canada varied between 1.4 and 2.8 cents/KWh.\(^1\) In Australia the cost of new thermal capacity was thought to be in excess of 2.5 c/KWh. In Australia Government-subsidised rates to smelters in the order of 1.2 to 1.5 cents/KWh were thought likely to escalate over a period of time to more nearly approximate the true costs of generation. Australia was now concentrating on attracting aluminium smelters and present generating plans would provide enough power to service upward of three additional smelters in the late 1980s in addition to the three which were already under construction. A D Little advised that, to be competitive, starting rates for contracts with new power users should be less than 2.0 cents/KWh in 1980 and preferably around 1.5 to 1.7 cents/KWh.\(^2\)

The main criterion used in assessing which industries were the most suitable for New Zealand was the amount of foreign exchange earned. On this basis the report concluded that a new aluminium industry would be best for New Zealand provided enough electricity could be supplied. The immediate prospects for this industry were good with demand forecast to grow at a rate of 5 percent per annum, outstripping the growth in production capacity over the next decade. The probable annual price increase in real terms was put at 3 percent per annum. Good markets for aluminium were expected to be found in Asia, Japan and North America where

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1 New Zealand prices (one to one exchange rate with US in early 1980).

2 A D Little (Telex to Trade and Industry) "Findings and Conclusions". 18 March 1980 pp 1-4.
domestic smelters were unable to meet demand, mainly because of the rising cost of electricity.\textsuperscript{1,2}

5.4 **Officials Report to Ministers on Progress in the EII Negotiations**

Ministers were brought up to date with progress on the EII investigations through a report presented to CEC on 5 February. The report did not seek any direction from ministers and was probably partly intended to assure ministers that officials were doing their best to make progress in the investigations. In the case of the negotiations with FASG officials advised that their offer of 1.8 cents and the company's offer of 1.2 cents remained unaltered. However, the considerable benefit anticipated with the inclusion of Caster II together with a reduction in the size of the 5000 GWh package were listed in the report as offering some potential for reducing the gap between officials and the company.\textsuperscript{3} Of the other companies which had expressed interest in setting up a new aluminium smelter none had yet supplied officials with details of their proposal although it was anticipated that Martin Marietta would do so within the next few days. Shell and Reynolds remained undecided while Pechiney had recently informed officials that they would not present a proposal. The negotiations with Comalco over their proposal to expand their existing smelter were held up pending the completion of a national benefit assessment which was being conducted by the Institute of Economic Research. The most advanced of the smaller proposals were the two silicon carbide projects proposed by Ceramco and Carborundum and the glass manufacture proposed by Alex Harvey Industries (AHI). Each company had recently supplied officials with details of

\begin{itemize}
\item \textsuperscript{1} A D Little (telex to Trade and Industry) "Power intensive industries" 7 April 1980. pp 1, 2.
\item \textsuperscript{2} The report noted that there were also good prospects for investment in silicon carbide. Ferro-alloys were less attractive because they tend to follow trends in the steel industry which was currently in a situation of overcapacity.
\item \textsuperscript{3} CEC paper "Electricity intensive industries : progress report" 5 February, 1980. p 1.
\end{itemize}
their proposal and they awaited the results of officials analysis and the chance to begin negotiations.¹,²

Ministers spent little time discussing the status report³ and much of their attention at this short meeting was focussed on a brief paper unexpectedly circulated at the meeting by the Minister of Energy. This paper had been prepared in NZE and was mainly concerned to predict whether a real increase in the bulk tariff would be required over the next 15 years. However, its interest to ministers on this occasion lay in part of the report where the method used to calculate the bulk tariff was applied to the task of costing the additional 5000 GWh. It will be recalled that the financial guidelines used in calculating the bulk tariff are set out in section 34 of the Electricity Act 1968. Briefly, the bulk tariff must recover working expenses, interest and depreciation plus up to a further 50 percent of those expenses to be used as a contribution to new capital works. However, setting the bulk tariff in this way does not adequately meet the cost to the nation of generating electricity because NZE has always received a subsidy from the general taxpayers through low interest rate loans and not having


2 A national benefit analysis of New Zealand Steel's ferrosilicon project had shown the project to provide a negative rate of return. Because of this result no offer had been made to the company and it seemed that the project would be unlikely to proceed.

3 Such discussion as there was appears to have centred on the FASG proposal. One minister mentioned a rumour that the CSR company had been offered a large block of electricity by the Victoria State Government and that the company had been asked to make a decision on the offer within the next month. Officials responded that they had received similar information from CSR itself although there remained uncertainties as to the exact nature of the offer, in particular, as to whether the block of electricity was immediately available. This is another example of company pressure (and possibly ministerial pressure) with the tactic again being to emphasise more attractive options available in Australia.
to pay dividends on investments out of revenue. Furthermore, it was theoretically possible, because of the substantial cash surpluses that would be generated under the existing bulk tariff, that EIIIs could be charged nothing for the additional 5000 GWh while still enabling NZE to satisfy the requirements of the Electricity Act.\(^1\) This would of course entail the New Zealand taxpayer and electricity consumers subsidising the EIIIs. The NZE paper did not advocate supplying EIIIs with free electricity. Instead it applied the Electricity Act requirements to the costs associated with the sale of an additional 5000 GWh. On this basis it was found that the revenue obtained over a 20 year contract period by charging at a rate of 1.8 cents/kWh greatly exceeded the cost of the additional 5000 GWh. A price of 1.2 cents/kWh was indicated as being sufficient to cover the incremental cost of the 5,000 GWh.\(^2\)

In focussing on the bulk tariff as the basis for electricity pricing, the paper employed an accountant’s approach to pricing quite at variance with the economist’s marginal cost approach. However, the paper contained no discussion of the alternative methodology nor the fact that based on an economic evaluation an average selling price of 1.2 cents/kWh would provide a rate of return close to zero. This may have led to some confusion among ministers, especially among those who had previously accepted the economic price but now found that not only did the statutory methodology produce more enticing results but also that it was easier to understand for those habituated to thinking in financial terms.

Nearly all the officials present at the meeting favoured rejecting the alternative methodology, many regarding it as something of an embarrassment because of its simplistic approach. However, they were unable to make a decisive recommendation to this effect because the paper had not

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been circulated prior to the meeting and consequently there was no time to formally construct a case for the economic methodology. Indeed, Bren Kennedy, the author of the paper, had declined to allow other officials to see the paper while they waited to enter the CEC meeting. Some officials speculated that Kennedy may have been acting on Birch's instructions in keeping the paper secret; they also perceived the challenge to the economic methodology as a tactic designed to pressure officials to make progress in the smelter negotiations. It is uncertain, then, whether Birch supported the statutory methodology believing it had intrinsic merit or because the introduction of a new factor on the side of proceeding with the smelter provided a signal to officials.

The main significance of NZE's paper, for the purposes of this discussion, is that it provides another indication of growing support within the management of the division for the sale of a large concessional block of electricity. In mid 1979 NZE's attitude had been characterised by suspicion and ambivalence about the whole idea of selling surplus power. This gradually gave way to a mild confidence in late 1979 that 5000 GWh could be supplied. However, in early 1980 calculations were still continuing in NZE without definite answers to the refractory questions of costs and availability. In circumstances where a firm position on the smelter was still evolving, but not too distant, the division may have been susceptible to pressure to take a more positive stand.

One obvious source of this pressure is the minister. Unfortunately, the nature and extent of his role must remain a rather shadowy area in these events. At the least, one might expect the proximity of the management of NZE to their minister to provide some incentive for maintaining a good working relationship and, as a concomitant (although by no means a necessary one), for assimilating some of their minister's goals.
Naturally, a correspondence of goals would be even more likely where a vigorous and demanding minister sought to sway departmental advice in favour of his own objectives. Opinions differ, even among those officials most closely associated with Mr Birch, on the role he played in this respect. However, these differences can to some extent be associated with the different tasks these officials had to perform. Mr Duncan, the Secretary of Energy, felt that his minister "didn't exert undue pressure". Throughout its investigations the Ministry was able to advance its best assessments of cost and availability without interference. Mr Birch was "exploring the smelter issue but not driving it hard". 1 Senior officials more closely involved in the negotiations with FASG give a different picture. Laking, Datson and Robinson (Commercial Manager in Electricity Division, September 1979 - August 1980, and senior representative for Electricity Division on the negotiating team) agree that Birch played an active role, frequently convening meetings of the negotiating team in his office to ensure that the negotiations were progressing. Pressure also came from the Prime Minister but apart from CEC meetings and a few other occasions (yet to be discussed) this was largely indirect, either channeled through Mr Birch, or through the Prime Minister's Department. Both these ministers were concerned that the negotiations should not be allowed to founder and to get a quick decision but their approach may also be seen as consistent with their general administrative style. This may be contrasted with the more relaxed approach of Mr Adams-Schneider, seen by some officials as lacking his colleagues drive and determination.

The political aspects of Kennedy's paper provide its greatest interest; the paper's actual effect on the final outcome must be seen as minimal. Ministers directed officials to report further on the merits of using the statutory methodology to calculate electricity tariffs but they also requested some indication of the rate of return such tariffs

1 Interview: W Duncan
would provide, effectively judging the methodology by its results and on economic criteria. When officials reported back on 19 February, ministers were presented with a strong defence of the method used in calculating the economic price of 2.2 cents. It was claimed that this method ensured that all extra costs incurred in supplying the 5000 GWh were covered by the revenue obtained and that there was no possibility of other electricity users or the taxpayer subsidising the EII.\(^1\)

This defence was readily accepted by ministers thereby settling a rather unnecessary methodological issue.

Ministers also requested on 5 February a comparison of the overall national benefit which would arise from each of the main projects. However, by 19 February most of the companies still had not provided sufficient details for analysis, or officials were still in the process of assessing the national benefit in order to offer a discount on the power price of 2.2 cents. One project on which a preliminary analysis of the national benefit was completed during this fortnight was the silicon carbide industry proposed by Ceramco. Officials' calculations indicated that an offer price of 1.3 cents would be possible. Although negotiations were not yet underway and their initiation depended on the outcome of discussions between Ceramco and their German partner Electrosmeltzwerk, the project did look promising, especially in light of Ceramco's informal suggestion of a starting price of 1.3 cents.\(^2\)

Despite the incomplete nature of their investigations, officials were able to present a summary of the foreign exchange and employment benefits provided by some of the main companies. The table presented to ministers is reproduced below.

1. CEC paper "Electricity intensive industries"
   19 February, 1980 pp 1, 2.

### National Benefit Summary

<table>
<thead>
<tr>
<th></th>
<th>Net Foreign Exchange Earnings $/$/100 Investment</th>
<th>Net Foreign Exchange Earnings $M/100GWh</th>
<th>Employment (persons) per $1 m Investment</th>
<th>Employment (persons) per 100 GWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aluminium</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Fletchers (smelter alone)</td>
<td>31</td>
<td>5.6</td>
<td>1.8</td>
<td>33</td>
</tr>
<tr>
<td>- Martin Marrietta</td>
<td>28</td>
<td>4.9</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>- Comalco Expansion</td>
<td>49</td>
<td>4.9</td>
<td>2.6</td>
<td>26</td>
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<tr>
<td>Ferro Silicon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- NZ Steel</td>
<td>26</td>
<td>5.1</td>
<td>1.7</td>
<td>35</td>
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<tr>
<td>Silicon Carbide</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- Ceramco</td>
<td>111</td>
<td>9.3</td>
<td>6.9</td>
<td>57</td>
</tr>
<tr>
<td>- Carborundum</td>
<td>88</td>
<td>9.7</td>
<td>5.2</td>
<td>57</td>
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<tr>
<td>Glass</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>- AHI Crown Crystal</td>
<td>*</td>
<td>17.6</td>
<td>*</td>
<td>638</td>
</tr>
</tbody>
</table>

* Insufficient information received from company

There are few conclusions about the relative benefit of each project that can be drawn from this table because of the limited nature of the information presented. For example, to draw parallels between Fletchers and New Zealand Steel on this basis would be misleading since the thorough analysis undertaken in 1979 for the ferro-silicon project had indicated that it offered minimal national benefit and could not be considered viable. Nevertheless, it seems clear from the table that the smaller projects concerned with silicon carbide and glass manufacture provide greater benefits than the aluminium smelters relative to their respective levels of investment and electricity consumption. One might also observe that EII and aluminium smelters in particular, are not a very effective method of directly generating employment. Typically, industry employs in the order of 37 people per $1 million of capital invested whereas a new aluminium smelter employs less than 2 people for the same investment.

2. Ibid, p 2.
This mention in the CEC paper of employment benefits provided an important point of comparison between EIIs and other kinds of industries. However, given that the Government had decided in August 1979 to assist the development of new EIIs, this modest reference to development objectives was now rather futile. Furthermore, as a basis for comparison among EIIs, employment benefits were of little relevance since EIIs made a relatively small direct contribution to employment. The main purpose of EIIs was to earn foreign exchange and for a comparison on this basis ministers had to await the results of the national benefit calculations. Of course, with the availability of 5000 GWh, there would be little competition among industries as nearly all could be accommodated within the package.¹ In this situation, the main purpose of the national benefit calculations would be to ensure that each project gave a rate of return in excess of the Government's 10 percent minimum. Some competition for electricity could be expected among smelter proponents. However, by the time of this CEC meeting on 19 February the Government had new cause to believe that no other smelter proponent could improve on the proposal from FASG.

Trade and Industry had recently revised its national benefit analysis of the FASG proposal to test the impact of Caster II, a rolling device which Alusuisse had developed and which Fletchers claimed would add 30 percent to the value of the aluminium produced from one potline. Since officials believed that some of the company's competitors would soon adopt the process the added value was assumed to decrease to 10 percent over 5 years. Even under this assumption Caster II appeared to produce rather amazing benefits enabling the price to be dropped as low as 1.2 – 1.3 cents.² Officials advised ministers that they had recently made an offer to Fletchers based on the benefit from Caster II that would

1 Apart from the proposed Comalco expansion (1350 GWh), six of the small projects had a combined power requirement of 1550 GWh. However, one or two of these could be assumed not to eventuate, particularly New Zealand Steel's ferrosilicon project (500 GWh). The balance of the 5000 GWh would be made up by a new smelter (3000 GWh).

2 B Carrie (Trade and Industry internal memo) "Fletchers Aluminium Smelter" 12 February, 1980.
be equivalent to a power price of 1.5 cents/KWh. They added that in negotiating a power price linked to the inclusion of Caster II the minimum acceptable price could be 1.3 cents.¹

The details available out Martin Marrietta's proposal suggest that this project was unlikely to offer much better returns than Fletcher's. Officials commented on this in the CEC paper adding that recent discussions with the company had indicated that there was little chance of any downstream processing being incorporated in the proposal.² For these reasons a price below the 1.8 cents offered to FASG for an aluminium smelter alone seemed unlikely. It would have been clear to ministers from this comparison that unless other smelter proponents could offer significant downstream processing they could not hope to compete with FASG. Of the other two proponents, Reynolds and Shell, only Reynolds had suggested that some downstream processing might be included. However, given the pressures to read an early settlement in the EII negotiations, it is significant that the Reynolds proposal had as yet made little progress. The company had provided very little information about its project and the first meeting with a company representative was not scheduled to be held until 13 March.³


2 The meetings held with representatives of Martin Marrietta the previous week had been of an introductory nature. The company outlined its proposal to build a $500 million, 180,000 tonne smelter which would eventually employ 1500 - 2000 people. New Zealand participation in the project would be encouraged. As to the power price, the company said it was prepared to offer 1.3 cents which it considered high because of high freight costs and high taxes. Like FASG, the company disagreed with officials use of an aluminium price of 64 cents on the grounds that it was too low. For their part, officials mentioned a likely offer price of 1.8 cents. They emphasised that the price had to be escalated 100 percent but added that they were flexible on the method used. Mr Datson suggested linking escalation to the metal price. (R Milner, "Meeting with Martin Marrietta : 12 February, 1980" 18 February, 1980).

5.5 Downstream Processing and Escalation

Before this CEC meeting of 19 February officials had not had time to update their report on the latest negotiations with FASG. Ministers were possibly informed orally that in the previous week two further meetings had been held during which some progress had been made to include benefits from Caster II in the rebate on the power price.

In planning for these meetings the main problem area for officials had been over the credence they should place in the consortium's claim that Caster II would add 30 percent to the value of the aluminium from one potline. To a large extent this benefit depended on the further claim that competitors would not be able to adopt the process for 7 - 10 years by which time the market would have expanded sufficiently to absorb the extra output. Officials were unwilling to accept that the market advantage would last so long or that the benefits would be so high, particularly since the extra investment of $50 million seemed relatively small. In such conditions of uncertainty a scheme which related the price rebate to the benefit actually achieved was seen as being the most desirable from the Government's point of view. In a telephone conversation between Bruce Carrie of the Economics section of Trade and Industry and Owen Lockerbie of Fletchers the company was tentatively offered a rebate off their electricity bill equal to 50 percent of their taxable income from Caster II. To avoid an initial high price for the electricity before Caster II was installed the Government would further include a "tilt" in the price - the first four years being at 1.5 cents and the remaining 16 years at 1.9 cents but being appropriately discounted to allow for the benefit from Caster II. If Caster II actually produced net returns of 30 percent then the company could expect to receive an effective electricity price of 1.2 - 1.3 cents. Lockerbie's response was that the foreign partners would probably prefer a fixed
price rather than variable rebates, nevertheless, Fletchers would be eager to discuss the proposal.¹

When officials met with the company on 14 February the scheme was again proposed although in a slightly modified form. The proposed basis of the rebate (50 percent of operating surplus on Caster II) remained unchanged; the main difference was the imposition of a floor price of 1.5 cents. This 1.5 cent minimum deprived the consortium of the full benefit of its innovation, should Caster II perform as promised. However, Fletchers would no doubt have hoped for further concessions beyond this rather arbitrary figure.²,³

Proper discussion of the rebate scheme and some other rather tentatively aired issues was left for the second meeting held four days later on 18 February. On this occasion some significant progress was made. In a shift from their earlier position Fletchers accepted the principle of a performance related scheme. Fletchers main objection now centred on the limit placed on the rebate at 0.4 cents; if Caster II performed

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¹ B Carrie (Trade and Industry internal memo) "Fletchers Aluminium Smelter". 12 February, 1980.
³ An alternative approach less likely to make the 1.5 cents figure subject to contention might have been to settle upon a different basis for assessing the performance related rebate whereby the maximum possible rebate would reduce the price to about 1.5 cents instead of 1.2 cents. Of course, if there were better ways of settling the minimum price at 1.5 cents they were now largely precluded by the generous form of rebate Trade and Industry had earlier offered to the company. In these circumstances it would seem a reasonable inference that the idea for a floor price was imposed by the other members of the negotiating team. During the negotiations NZE pressed for the inclusion of a floor price. Whether NZE managed to impose this requirement at this time is not known. Evidence of NZE's concern that a low power price (resulting from discounts for national benefit) would mean a low rate of return to NZE and require some form of compensation is presented in the footnote on page 222.
extremely well the company expected to pay a very low price for the electricity. This position was rejected by officials on the grounds that it would be politically unacceptable to sell power at a very low rate to a foreign company.¹

Progress was also made with the escalation provisions although officials' main objective of 100 percent escalation of the power price was not achieved at this meeting. The continuing conflict over this issue contrasted with the ready confirmation by both parties of the metal price as the basis for escalation.²,³

The lack of contention surrounding this choice of index is perhaps surprising given its implications. For each party a rather different outcome was produced in the event of either a rise or a fall in the metal price. Where metal prices were rising the government could expect its revenue from the sale of electricity to grow. On the other hand, a drop in the metal price presented the risk of government subsidy of the smelter. Trade and Industry had earlier calculated that a 5 percent drop in the metal price would result in a NPV

¹ D Smith (Trade and Industry internal memo) "Note on meeting with Fletchers re Aluminium Smelter Proposal: 18 February" 19 February, 1980. pp 1, 2.

² Substantial agreement on this issue appears to have been reached at the earlier meeting on 14 February. (R Milner, "Meeting with Fletchers, 14 February, 1980". 15 February, 1980. p 2.

³ This index was agreed to without at the same time a date for escalation being settled. Officials hoped to use their June 1979 figure of 64 cents per pound. Hence, a new aspect was introduced to the metal price debate. This was highlighted at the last meeting when Fletchers requested that the power price be adjusted to January 1980 terms. Officials replied that the posted Alcan metal price of US 64 cents percent had since risen to US 68 cents requiring a shift in the power price from 1.8 cents to 1.9 cents. Fletchers responded by claiming that the January 1980 price was in fact US 72 cents per pound suggesting that officials base price of 64 cents was much too low. Once again this issue had to be left unresolved. (D Smith, "Note on meeting with Fletchers re aluminium smelter proposal: 18 February". 19 February, 1980. p 2.)
of $26.2 million (any benefit from Caster II not included in this calculation), in part due to the drop in price from 1.8 cents to 1.71 cents but also to the reduction in foreign exchange earned (without indexation the NPV was $17.3 million). By contrast, the company would receive some protection during a period of depressed metal prices through a linkage between the value of its output and the value of its second largest item of expenditure, namely electricity. In a market with rising metal prices the company would have to pay more for electricity but this would be offset by its increased revenue from metal sales. Despite the superficial symmetry of this arrangement in terms of the winners and losers under different market conditions, it is clear nevertheless, that escalation tied to the metal price transfers much of the risk due to market fluctuation from the company to the Government.

A metal price escalator does not appear to have been perceived as a concession to the company. Officials stated from the outset of the negotiations their flexibility over the choice of escalator. At the meeting with Martin Marrietta a metal price escalator was proposed. It is evident, then, that officials were confident that the metal price would at least keep pace with inflation. Rises in real terms in the metal price were also assumed in the calculation of a fixed discount for national benefits which, as was seen above, accounts for much of the sensitivity of the project's returns to the metal price. Trade and Industry had calculated that with a 5 percent

1. B Jameson (Treasury internal memo) "Alusuisse Aluminium Smelter". 4 February, 1980 p 1. (This memo reported on a "sensitivity analysis" conducted by Trade and Industry to assess the impact on the national benefit of variations in some of the key variables. The most important were found to be the power price, the aluminium price, and Caster II (the latter either included or excluded). It may be noted that the power price was subject to negotiations and that the rebate for Caster II was performance-related.
rise in the metal price the project would have an NPV of $58.4 million not counting the effect of price escalation (Caster II also excluded). The risk that the metal price would not rise in real terms was reduced by the use of the conservative long-term estimate of the metal price of 64 cents per pound. Nevertheless, the question remains as to whether the project's risk should have been reduced further by escalating the power price with some inflation index and by making the discount performance-related.

Some policy on escalation provisions had been established at the CEC meeting of 27 November, 1979 where ministers agreed to officials' recommendation that "the electricity price should be linked to an index of general cost movement and/or an appropriately calculated price of the product concerned, adjusted for changes in the value of the $NZ". This decision gives very little indication of how much risk the Government was prepared to accept. To some extent this decision may reflect a conflict of views at this CEC meeting which is rather vaguely summarised in the minutes. One view was that: "there


2. Early in the negotiations the company advised that it didn't want escalation based on the New Zealand Consumer Price Index. Nevertheless, negotiations could have been based initially on this index with fallback positions being other indexes, for example, the US Wholesale Price Index and combination indexes, that is, indexes based on both general prices and aluminium prices in various proportions.

3. That is, the discount would be adjusted (annually perhaps) according to foreign exchange earnings. I don't know what practical difficulties might be encountered in implementing this measure. However, it should be noted that officials were prepared to make the rebate for Caster II performance-related.

4. The matter of whether discounts for national benefits should be fixed or performance-related does not appear to have been raised at any CEC meetings.

seemed to be merit in linking the electricity tariff to the product price rather than to general cost movements. This approach would provide the companies concerned with a certain degree of security and provide an adequate basis of indexation in the long term from New Zealand's point of view.\textsuperscript{1} In reply it was commented that: "aluminium prices were currently approaching a short-term high and some caution should be exercised if product prices were to be used as the basis for indexation in the case of aluminium smelters".\textsuperscript{2}

This disagreement may not have been simply about probable metal price trends but may also have been complicated by the more fundamental question of how much risk the Government should take. Neither issue was settled very decisively and it could be added that the former was more properly a matter for specialist consultants to determine.

The advances made at these two negotiating meetings with regard to Caster II and escalation, although significant, should be seen in the context of the large differences remaining between the parties. In particular, Fletchers' acceptance of a performance-related rebate for Caster II in no way committed the company to the size of the rebate offered by officials. Fletchers rejected the idea of any limits to the rebate which would, in any case, be subtracted from their demanded base price of 1.2 cents power KWh. In addition, Fletchers demanded export incentives for itself (but not the other partners) as well as the granting of High Priority Status which would involve an extra 20 percent on the investment allowance. These differences could now be brought into sharper focus and it was intended that both sides would draft heads of agreement to present to each other on 21 February. The return of the foreign partners to New Zealand around this time was expected to provide further impetus to the negotiations.

\textsuperscript{1} CEC minutes, "Concessional tariffs for new energy intensive industries in the South Island". 27 November, 1979. p 3.

\textsuperscript{2} Ibid, p 3.
5.6 **An Ultimatum**

On 25 and 26 February representatives of the Australian companies Alusuisse and Gove joined Fletchers for two further meetings with officials. After the recent progress with negotiations any optimism on the part of officials over the outcome of these meetings must have been jolted by the stance assumed by the Australians. Although the consortium made a number of changes to its position, overall these did nothing to improve its offer. At the first meeting officials presented the consortium with a draft Memorandum of Understanding outlining in the form currently acceptable to officials some of the essential points to be covered by any future agreement. Much of the meeting was then devoted to the clarification of the officials' offer for the benefit of the Australian partners. Particular stress was placed on the limit on the Caster II rebate and it was added that this offer was subject to the price being escalated in direct proportion to the Alcan posted price, with the base price being 64 cents per pound.¹

At the second meeting the consortium tabled its response to the officials' offer. A new line of attack soon became apparent with the consortium's sudden acceptance of 1.8 cents per KWh as the base price. However, this would be subject to a rebate of 0.4 cents to be applied when the consortium committed itself to constructing a Caster II plant. Once Caster II actually commenced operations there would be a further rebate equal to one half of the pretax profits accruing to Caster II, but with a maximum of 0.4 cents. This would bring the rebate under Caster II to 0.8 cents making the effective price paid for electricity 1.0 cents per KWh. In addition to this the consortium requested the full benefits of export incentives for Caster II and that the New Zealand partners be entitled to receive export incentives on ingot production.²

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2 Ibid, pp 1, 2.
The consortium agreed to 100 percent escalation of the electricity price but it continued to insist on a base price for escalation of 72 cents per pound, the Alcan price at December 1979. Officials again countered that on the basis of advice from their consultants they believed the December price to have been artificially high, and that 64 cents was a more suitable long term estimate. Officials calculated that if escalation was based on the figure of 72 cents requested by the consortium the effect on the electricity price would be equivalent to a further rebate of 0.2 cents.¹

The magnitude of these differences between the consortium and officials is most simply illustrated when these various rebates and discounts requested by the consortium are added together. This total which officials estimated to be about 1.5 cents would result in an effective price of only 0.3 cents per KWh. This price contrasted with officials minimum offer of 1.5 cents and it obliged officials to warn that if offers from the various proponents were not high enough the government might decide to reduce the amount of electricity for sale, perhaps precluding the establishment of a new smelter.²

Of course, such a threat is not necessarily evidence of a general dismay in the officials camp and in this tough negotiating session it may have merely sufficed to maintain a healthy reciprocity. Some officials, at least, were inclined to interpret the company's stance as another effort to provoke officials into making further concessions. It is difficult to say how widespread among officials this perception or a disposition toward caution may have been because the next initiative to lower the electricity price did not originate within the departments but came instead from the Prime Minister.

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² Ibid, p 2.
Officials had undertaken to respond to the company offer within one week. During this time the Prime Minister received his regular Friday briefing from officials of the Prime Minister's Department. David Young who had now taken over from Ron Allan on the investigation into EII's reported to the Prime Minister on the current deadlock in the negotiations with FASG. Mr Muldoon's reaction was that officials should lower their effective offer price of 1.5 cents per KWh to 1.4 cents.\(^1\) It is likely that his decision was influenced by the discussion of downstream benefits in the CEC paper of 19 February.\(^2\) Here it was claimed that calculations of the benefit added by Caster II allowed a floor price of 1.3 cents. At the time the Prime Minister had expressed some dissatisfaction with the performance-related scheme preferring instead a firm offer price. Now, perhaps sensing that a price drop could precipitate a quick settlement, the Prime Minister saw his opportunity to reduce the price within the limits calculated by officials. This decision was quite unexpected among officials who now regretted the rather careless mention in the CEC paper of a floor price which could only be reached if substantial extra benefits were achieved.\(^3\)

Officials' reply to the company offer was based on this reduction of 0.1 cents. Specifically, they proposed that from the commencement of Caster II a rebate would be deducted equal to one half of the pretax profits accruing to the Caster II plant, except that the pretax effect of any export performance incentive would be deducted before the rebate is calculated. The minimum rebate would be 0.2 cents and the maximum rebate of 0.4 cents. The base price would remain at 1.8 cents. No attempt was made to gain any specific concession from the company in return. Instead, when Datson

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1 Interview: D Young.
2 Suggested in an interview with B Carrie (Young could not recall the Prime Minister's reasoning but suggested that it may have been based on a reduction in the electricity costings. If so, this was an unofficial costing.
3 Interview: B Carrie.
informed Hugh Fletcher of this offer in a personal telephone call, he stressed that this was the government's final offer and that the company would have to meet these terms.\(^1\)

It would seem that this was a quite credible ultimatum for it represents something of a turning point in the negotiations. The ball had now been placed squarely in the company's court and a further two months would elapse before a firm company response had evolved. Within a fortnight Fletchers advised that a price of 1.4 cents could be acceptable but that further negotiations would be required on price escalation and export incentives. Officials were wary of this offer since a compromise on these aspects would have been equivalent to a further reduction in the base price.\(^2\) Towards the end of March the consortium announced that it could not proceed any further without direction from the Alusuisse Head Office in Switzerland. It was expected that the earliest discussions could take place between the consortium and Alusuisse Head Office was late April. Officials did not give any commitment to delay concluding negotiations with other proponents in the meantime.\(^3\)

In retrospect it can be seen that March was a very critical month in the negotiations. Agreement had very nearly been reached with FASC. However, the company's decision to postpone negotiations meant that the EII investigations began to overlap with the work proceeding on the 1980 Energy Plan. The energy planning exercise would soon throw up doubts about the

\(^1\) G H Datson (Trade and Industry report to minister) "Aluminium - negotiations with Alusuisse/Gove/Fletchers" 3 March, 1980. p 1.


\(^3\) Trade and Industry report to minister, "Electricity intensive industries : status report, week ending 28 March, 1980". 31 March
availability and cost of the 5000 GWh package, seriously jeopardising the chances of any new smelter being established. The delay in negotiations with FASG also had the effect of providing other smelter proponents with the opportunity to make more progress. Since no agreements were reached it only remains, in concluding the present discussion of the negotiations, to provide a brief survey of FASG's competitors at this time.

The group of companies competing for the power for a new aluminium smelter now included Comalco. This company's original proposal for a third potline to be added to its plant at Tiwai Point did not preclude the establishment of other new smelters. However, by the end of March Comalco had advised that it would be submitting a proposal for a fourth and fifth potline and that all these developments could include some New Zealand participation as well as downstream processing, including a possible joint venture with Ford in producing motor vehicle components.

The promise of downstream processing was also the main attraction in Reynolds proposal, details of which were presented to officials in mid-March. A casting operation was planned which would utilise 10,000 tonnes of aluminium in the production of automotive components. Another important feature of this smelter was its relatively small size - 140,000 tonnes per year with an electricity requirement of 2,100 GWh. By the end of March officials had completed an analysis of the national benefits of the project and had made an offer to the company for an electricity price of 1.6 cents/KWh.¹ Reynolds had already suggested that a price of 1.4 cents would probably be acceptable provided the export of car components received export incentives. Although this offer was unacceptable to officials it was clear that Reynolds proposal was developing into a major contender. The improvement in Reynolds prospects coincided with the relegation of Martin Marrietta. This company had previously been seen as the main alternative to FASG, if only because of the early contact it had made with officials. However, the company had not provided any detailed proposals for upstream or downstream processing and by the end of March officials had begun to doubt that it would do so.

¹ Letter from G H Datson to L Reynolds, 1 April, 1980.
CHAPTER 6

ENERGY PLANNING IN 1980 AND THE DISCOVERY OF FUEL CONSTRAINTS
6.1 Planning Division Intervenes

In the first week of March the negotiations had reached a critical stage with the presentation of officials' "final offer" to FASG. The Prime Minister's request for a further 0.1 cent reduction in price had been incorporated in the offer producing what officials believed to be the lowest viable price within the cost constraint of 2.2 cents/kWh. Officials had resolved that the company would have to make some move to meet their terms. In these circumstances it came as a particular shock to the negotiating team to learn, in this same week, that the electricity supply situation was not as secure as it had seemed.

In a paper presented to the Minister of Energy on 6 March, Planning Division claimed that with the diversion of 5,000 GWh of South Island hydro electricity to new smelters, North Island load growth after the end of the period of surplus would have to be supplied by a series of thermal power stations.¹ This much was already known. However, the negotiators had believed that all marginal generation would be on gas in existing thermal power stations. They now faced a paper which criticised a commitment to large scale coal-fired generation in this period and they were left to deduce that the gas was somehow no longer available.

Planning's principal concern was that NZE should urgently reassess the amount of electricity that was available for supply on contract. Planning Division claimed that with the sale of 5,000 GWh of electricity to new smelters, Mines Division would be required to supply power stations with 6 million tonnes of coal per year from the Huntly district by the year 2000. Currently, developed mines in the Huntly area were capable of supplying 1.65 million tonnes per year to the Huntly power station. Planning claimed that the feasibility of the massive coal build-up that would be required had not been examined and that the cost of the 5,000 GWh package was probably currently understated.²


2 Ibid., p.3.
Criticism was also directed at the minimal consideration given to broader policy implications of the sale of such a large increment of electricity. In particular, Planning stressed the "dangerously inflexible" position created for future energy planners by the rapid exploitation of New Zealand's most accessible energy resources.\(^1\) Officials were also reminded of the government's policy on the most desirable pattern of resource use. This policy is set out in the official publication, *Goals and Guidelines*:

"Decisions based on gaining short term benefits can have serious adverse consequences in the longer term. If we wish to avoid these we must ensure that a long term view is taken in evaluating projects involving the consumption of energy resources, giving preference to the use of renewable resources."

The heavy emphasis on new coal-fired generation was seen by Planning as being a substantial deviation from this policy.\(^2\)

Other criticisms raised by Planning focussed on features of the contract so far negotiated with the smelter proposals. The paper argued that the principle of a flat rate contract price was not in New Zealand's best interests. Since electricity during the surplus period costs New Zealand very little, the tariff should be designed to reward those smelting operations which run more in the surplus period than after it. Planning maintained that a graduated contract price, that is, a price beginning low and rising over the contract period to average the same as the constant rate scheme, would provide an incentive for smelters to make good use of the surplus.\(^3\)

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A second objection pertained to the length of the contract period. Planning believed that contracting to supply electricity to smelters at a constant real price for 25 years placed unreasonable faith in the planners' ability to forecast long term energy prices. Accordingly, the paper suggested that an unconditional right of renegotiation after 15 years would provide "the minimum safeguard needed to avoid another Comalso conflict".¹

A second major source of risk was identified in the scheme to price electricity so that the overall investment in smelters and electricity generation would give a ten percent rate of return to the nation. The form of concession was declared "fundamentally unsound" because it would invite "presentation bias" in the cost and efficiency estimates supplied to officials. It seemed naive to Planning to commit the government to long-term energy supply contracts at below cost prices simply on the strength of how a venture claims it would perform. Only performance-related incentives would counter this tendency to presentation bias. In the case of smelters where the desired objective is maximum net foreign exchange earnings, the appropriate concession would be export incentives related to the actual net foreign exchange generated year by year. Planning recognised that the discount offered for the inclusion of Caster II was partially performance-related; its main objection was over the wisdom of the original 0.4 cents/kwh rebate. This could only be justified if the smelter's costs were kept to its original estimates and if the world aluminium price did not fall below the assumed long-term base price - both matters beyond the power of government to influence.²

These remarks are repeated here because they are intrinsically interesting and illustrate a new perspective on the EII investigation; however, they were not uniformly significant for the development of events. The criticisms relating to the tariff


² Ibid., p. 2.
structure and the negotiation of the concession would anger
Trade and Industry but they were easily rebuffed as being
illegitimate. After all, the Ministry of Energy was represented
on the negotiating team and it had, therefore, consented to all
the negotiated arrangements.\textsuperscript{1} Although these criticisms sank
without trace the remarks alleging a premature commitment to
massive coal development had considerable impact. Datson was
particularly irate. Until this point Trade and Industry had
assumed that a large part of the generation of the extra
5000 GWh would be fed by Maui gas. The suggestion that the
5000 GWh package might have to be reduced or recosted to
accommodate this unexpected need for large amounts of coal
placed the negotiating team in a very difficult position.
Datson complained that having relied on the advice of the
Ministry of Energy on energy matters negotiations had proceeded
to the point where officials were almost ready to sign a draft
memorandum of understanding with FASG. Now it seemed that they
might be faced with either renegotiating the agreements made
so far or even breaking off negotiations with all greenfield
smelter proponents.\textsuperscript{2,3}

In fact, no-one really knew what the effect of these unanticip-
pated coal requirements would be. Planning's paper does not
actually say what the cost of the 5000 GWh would now be nor
that the coal cannot be supplied. It is likely that Datson
may have overreacted to express his frustration at the
contradictory advice coming out of the Ministry of Energy.
At this time Trade and Industry had little idea of the
confused state which electricity planning was in. In retro-
spect greater understanding is possible although many of
the details remain indistinct.

\textsuperscript{1} Ministry of Energy report to Minister, "Energy Planning
Implications of Proposals for Electricity Intensive

\textsuperscript{2} Ibid., p.5.

\textsuperscript{3} G.M. Datson (Trade and Industry internal memorandum),
6 March, 1980.
6.2 The Organisational Context

Before discussing the reallocation of gas and the circumstances which surrounded Planning Division's paper of 6 March, it will be helpful to examine the nature of the relationship which existed between NZE and Planning and their respective roles.

It is significant that in presenting its independent report to the minister Planning was able to bypass the Secretary of Energy, Mr Duncan. The practice of divisions sending reports directly to the minister was not without precedent, indeed, NZE frequently reported to the Minister in this way on matters which did not warrant the attention of the Secretary. However, in this instance, Planning's report criticised work done within the ministry and policies which had been accepted within the ministry. Also, Planning was conscious that, in intruding on the smelter investigations, the division was defying earlier advice from Duncan to stay out. At least, this was the perception held by some officials in Planning; Mr Duncan denies ever telling Planning to keep away from the smelter issue. It is clear, nevertheless, that Duncan had reservations about the approach taken by Planning to the issue. Although he recognised the validity of many of the points raised in the report, Duncan felt that officials in Planning had, by this stage, developed a "philosophical" objection to the smelter and this coloured their judgment on the issue. Duncan saw this opposition to the smelter as an infringement of a prerogative most properly held by the government. In his view, the Ministry of Energy's

1 Interview: K. McCool.
2 Interviews: J. Boshier and D. Craig (both Planning Division).
3 Interview: W. Duncan.
4 Interview: W. Duncan.
job is to try to supply energy for whatever uses the government should decide. If problems with gas deliverability jeopardised existing plans then the ministry should seek out other ways of supplying the 5000 GWh. Naturally, Electricity Division was best equipped for this task.\footnote{Interview: W. Duncan.}

One of the main features of the department reflected in this incident is the considerable autonomy held by each division. A partial explanation for this decentralisation may lie in the Secretary's approach to management. Officials from other departments refer to Duncan's relaxed, casual style and his unwillingness to impose on the activities of each of the divisions. This hesitation to interfere is also seen as being related to Duncan's earlier career as an engineer in the NZED since, it is suggested, he holds a particular sympathy for the expertise in that division and, accordingly, a sympathy for its demands for independence.

This impression would appear to be confirmed by Duncan's personal view that each division should focus its attention on a particular energy sector. Electricity Division's role is to supply electricity to the country. In this capacity the Division has acquired an engineering and commercial orientation which separates it somewhat from the other bureaucratic tasks carried out in the ministry. Duncan looks forward to a time when the Electricity Division may be organised as an independent public corporation instead of submerged within the public service. In the meantime, the ministry should not be organised so as to prevent this independence in the future. Planning's role is seen as centering on the field of petrochemical applications for gas. Nevertheless, this separation of tasks should not prevent the co-ordination of the various energy forms. With the production of the first consolidated energy plan in 1980 Planning acquired a major role in the reconciliation
of the various sector plans. Planning Division, therefore, has a unique position from which to obtain an overview of energy planning. This would be impaired if planners immersed themselves in too much technical detail or concentrated on one field to the detriment of others. Electricity planning presents this danger because it provides a lot of data and planners are attracted to it as a fruitful field for analysis. 1

Although Duncan must be attributed some role in maintaining the degree of autonomy enjoyed by the divisions it is likely that broader historical and organisational factors have played a more important role, at least, in creating this situation. Of particular relevance here is the recent establishment of the Ministry of Energy through the amalgamation of a number of smaller departments. Each division might be expected to retain a spirit of independence and to jealously defend the bureaucratic territory over which it previously had almost exclusive dominion. Before turning to an example of this behaviour some further distinguishing characteristics of Electricity and Planning Division (the main protagonists for the present purpose of this exposition) should be highlighted.

NZE has a long history in the development of New Zealand's hydro, thermal and geothermal resources of which it is understandably proud. New Zealand's landscape has been greatly altered by these projects which stand as monuments to the engineering expertise residing in the division. However, one senses that NZE's pride in its achievement has a rather possessive aspect. Although a necessarily impressionistic observation, it seems that the engineers believe that only they fully understand the workings of the electricity supply system and outsiders should not presume to interfere. This independent frame of mind is reinforced by the division's commercial

1 Interview: W. Duncan.
orientation. NZE has its market to consider, in particular, the Electricity Supply Authorities. Hence, unlike many other government departments which see their responsibility as being toward the national interest, NZE is also conscious of its responsibility to consumers. These attitudes to the production and sale of electricity combine to produce an orientation which falls somewhere between private enterprise, on the one hand, and public service on the other. It may be suggested that these attitudes also provide a potential for conflict with other divisions and departments.

It occasionally seems that other departments are rather insensitive to this difference in responsibilities and that there is a tendency to ascribe any misunderstandings which might arise in this context to another, quite easily identifiable source of differentiation. Compared with Trade and Industry, Treasury, or Planning Division, Electricity Division contains a disproportionate number of engineers. Even the personnel in the planning, economic studies or commercial sectors tend to have engineering backgrounds. This aspect is often pointed to by officials as a potential barrier to good communication, put simply, economists generally find it easier to relate to other economists than to engineers. To some extent the different outlook held by engineers can be reduced to a "can do" mentality and it is not too whimsical to suggest that whereas the economist's first reaction to a proposal might be "can we afford it?", the engineer is likely to ask, "can we build it?". Perhaps one of the problems with these simplistic characterisations is that they are too readily applicable - the singlemindedness or insensitivity of the opposition is a facile but tempting explanation for the origins of some disagreement - and they may, in fact, obscure real conflicts of interest. This caveat will need to be borne in mind when analysing such disagreements. Nevertheless, it remains interesting to note the way specialisation of tasks creates value differences between organisational groups. Educational background, to the
extent that it can be distinguished from specialisation, may be treated as a secondary source of differentiation serving to compound these value differences.

The example of Planning Division further illustrates this point. Created along with the new ministry, Planning Division initially contained Ian Dick as an Assistant Secretary and two other officials. The personnel recruited subsequently have tended to be economists and to be relatively young, frequently fresh from university. As a small new division seeking to introduce some of the theoretical concerns of planners into the operational thinking of the suppliers of coal and electricity it has naturally developed a personality and interest different from other divisions in the Ministry of Energy. The differences are probably reinforced by the location of the Planning and Policy divisions in an office block separate from the offices of either NZE or Mines.

Unsurprisingly, the fledgling Planning Division occupied a relatively low position in the bureaucratic "pecking order". However, as the organisational activities of the new ministry have become more integrated to deal with the inter-relationships between the various energy forms, Planning has gradually assumed a role in the co-ordination of energy planning. The year 1980 was particularly significant in this respect since for the first time the Ministry of Energy would produce a single document comprising a co-ordinated plan for each energy sector. Under this scheme the work of the CRPR and PPC would continue much as in previous years, although without the involvement of Treasury or Statistics (the involvement of the MOWD and ESAs would be maintained). Planning Division would monitor the details of forecasting and planning carried out in the electricity sector and in the other sectors of gas, coal, and liquid fuels. The division would also play a major role in reconciling resource conflicts between sectors before consolidating sector reports in an overall plan. The whole
exercise would involve a number of rounds of amendments to the sector forecasts during which co-ordination meetings would be held hosted by Planning with participation from each sector agency.  

Work related to the 1980 Energy Plan was begun in late 1979, and it was well underway by the time of Planning's paper of 6 March. Unfortunately, this paper is hardly indicative of successful co-ordination in its criticisms of the massive expansion of coal-fired generation and in its admitted failure to consult with NZE. As the paper noted: "there has not been sufficient time to formally consult with the Divisions and agree on a joint paper".  

This comment disguises the differences existing between the two divisions at this time. Over the last few months NZE had displayed increasing support for the smelter. In these circumstances, it would have been apparent to officials within Planning who were strongly opposed to the smelter that any genuine effort to consult with NZE might involve a considerable period of time before a consensus was achieved on the electricity planning issues relevant to the supply of a smelter. Also, Planning was aware that its criticisms of NZE's work might aggravate resentment already felt in that division after the imposition of gas constraints. Planning


had recently notified NZE that the amount of gas allocated for use in thermal power stations would have to be reduced to make sufficient gas available for other uses recommended by the LFTB.\textsuperscript{1} A decline in gas availability over a period of a decade beginning in 1985 would reduce the daily deliverability to the two wholly gas-fired stations, New Plymouth and Stratford, from 205 terrajoules/day to 74 TJ/d. By 1995 there would be sufficient gas for Stratford alone and New Plymouth would need to be closed or converted to an alternative fuel.\textsuperscript{2} In these circumstances, officials in NZE must have felt that criticism of their resort to coal added insult to injury. To better appreciate the conflict between these two divisions over the issue of gas availability, it may be helpful to set events against the background described above. The important factors in this respect are the encroachment on NZE's independence necessitated by Planning's central role in the Energy Plan exercise and the peculiar characteristics of each division which are relevant to the extent that they promote distinctive goals.

6.3 Gas Allocation Problems: Communication Failure or Politics?

The reduction in gas allocated to thermal generation was not originally anticipated by the LFTB or Planning as necessary for the development of liquid fuels projects. However, by about November 1979 it had been discovered that the LFTBs analysis did not adequately take account of the load factor of NZE's demand. The LFTB had allocated gas on the basis of the quantities each user was expected to consume annually and had assumed that the rate of delivery would correspond to the mean daily consumption. This assumption overlooked

\begin{itemize}
\end{itemize}
NZE's uneven rate of consumption and the consequent need for a delivery capacity capable of meeting the peak loads on the generating system. The problems arose because the deliverability required to meet NZE's peak loads together with the loads of the other relatively continuous load users exceeded the capacity of the Maui platform. NZE was now in a competitive situation and faced with having to pay for more gas than it would actually use in order to ensure that sufficient deliverability was reserved to meet peak demands.

Whether NZE could in fact pay for sufficient gas to run New Plymouth and Stratford was discussed within Planning Division in late 1979. The issue was complicated by other difficulties such as the similar problems with the Natural Gas Corporation's (NGC) offtakes for reticulation, the disclosure of lower deliverability from Maui A than expected, and the largely theoretical difficulties associated with calculating the opportunity cost of gas.

This latter was proving a difficult problem and although results were available in 1979, it would continue to trouble officials in Planning until well into 1980. In the mean time it was decided to treat NZE as the lowest priority user. The exact reasons for this decision are unknown; the issue does not appear to have given rise to any documentary summary of the analysis, such as it was. As one Planning Division memorandum subsequently described the decision:

"there was simply a consensus that electricity generation was a lower value use of the gas than had previously been assumed".2

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2 J. Boshier, (Planning Division memorandum to Secretary) "Supply of Natural Gas to Power Stations", 6 June, 1980, p.2.
It is a point of contention between NZE and Planning as to the timing and manner of NZE's notification of gas constraints. This point gained much of its significance from the impact that delays in incorporating gas constraints in electricity costings had on the smelter negotiations. Between the dates of November 1979, when gas constraints were discovered, and 22 April 1980, when GEC approved a recosted electricity package, there is plenty of scope for retrospective exaggeration of delays. Talking to officials one can easily get a superficial impression of events since the whole episode tends to be explained in terms of "poor communication". Although clearly the case, this poor communication also requires explanation.

NZE officials at both the managerial and working levels had been aware of Planning's work following the discovery of the deliverability problems. Geoff Robinson, Chief Engineer (Development), in discussion with Planning officials in late 1979, accepted that NZE was a lower value use than previously thought.\(^1\) It is likely that both Hewlett and Pearce were also aware of gas constraints at this time. Hewlett had been involved in early LFTB work on NZE's gas requirements and he accompanied Robinson in meetings with Planning officials where deliverability problems were discussed. However, he claims that while new gas-fired stations were seen as uneconomic,

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1 J. Boshier, "Supply of Natural Gas to Power Stations", 6 June, 1980, p.2. Confirmed by Robinson in an interview. However, Robinson claims that although "NZE were aware of various proposals for the use of gas ... NZE didn't think that anyone would prevent NZE getting fuel for existing stations". (The Chief Engineer (Development) presided over much of the work done in NZE relevant to the Energy Plan. Beneath him Stan Wong supervised the planning section which was essentially responsible for drawing up power plans and was headed by Mike Hewlett, and the economic studies section which was responsible for costing these plans and was headed by Dick Pearce.)
there was never any doubt about New Plymouth and Stratford.\textsuperscript{1} Pearce was frequently involved in interdepartmental meetings in late 1979 to discuss costings for the recently established 5,000 GWh case. John Boshier, a director in Planning Division, claims to have been alarmed to learn at one such meeting that Pearce was still assuming gas to be available to New Plymouth and Stratford. Boshier communicated his concern to Rob Laking but it seems that little specific action was taken.\textsuperscript{2} It is apparent from this discussion that NZE officials were aware gas supplies would be constrained. However, the situation was too confused at this stage for any adjustments to be made to existing power plans. The onus was really on Planning Division to produce a definitive statement of gas allocations.

Planning produced a preliminary assessment which was sent to NZE on 18 January.\textsuperscript{3} This was subsequently revised and Mr. G. Robinson claims that for some time after the situation was still somewhat confused.\textsuperscript{4} Nevertheless, shortly after this notification, Pearce was able to design a power plan including more coal-based generation to compensate for the lost gas.\textsuperscript{5} It was these efforts which were later criticised by Planning claiming that the "massive commitment to coal development is premature". Pearce assumed the availability of coal on the basis of a brief enquiry of Mines Division.

\begin{itemize}
  \item \textsuperscript{1} Interview: M. Hewlett.
  \item \textsuperscript{2} Interview: J. Boshier.
  \item \textsuperscript{3} J. Boshier, "Supply of Natural Gas to Power Stations", 6 June, 1980, p.2. (The gas allocations were listed in the memorandum "Annual Energy Plan 1980: Assumptions and Terms of Reference", 18 January, 1980.)
  \item \textsuperscript{4} Interview: G.H. Robinson.
  \item \textsuperscript{5} Interview: D. Pearce.
\end{itemize}
The adequacy of this preliminary assessment in Pearce's opinion appears to have been partly based on his own view of the feasibility of such a large buildup, as he put it, "I did not look on the need to develop mines as a major exercise".  

Even if the coal buildup could be assumed to be feasible, the question remains as to why the gas constraints were not officially included in a recosted power plan until the end of March. Planning's explanation for this delay is in terms of possible disruption caused by NZE's internal personnel changes and absences.  

However, it is likely that other factors also had a bearing. NZE's reluctance to alter costings which it had already approved for use by the negotiating team is apparent in later events, as will be seen. It may be that NZE hesitated to alter its costings in February and March for the same reason.

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1 Interview: D. Pearce.

2 This appears to be Planning's "official" explanation for all the difficulties related to the reallocation of gas, particularly: NZE's indignation, the abrupt shift to coal, the delay in recosting. The specific personnel changes are included in a report to the Secretary of Energy in June: 

"... there have been breaks in the normal lines of communication in NZE caused by:
- transfer of the Chief Engineer (Development);
- absence of two key Development officers for the first few months of this year;
- appointment of a new Commercial Manager."

(Boshier, "Supply of Natural Gas to Power Stations", 6 June, 1980, p.3.)

The point at which the Chief Engineer (Development) relinquished his office is not clear but appears to have been about March/April. Hewlett and McCutcheon went overseas in January and returned about Easter. The new Commercial Manager had a "provisional" position September-December 1979 and was "acting" manager from December.
Other explanations may be related to NZE's confident belief that gas would not be withdrawn from existing power stations. The basis for this presumption is not clear, although, in one memorandum from NZE written by Stan Wong, reference is made to a prior undertaking to supply gas to New Plymouth and Stratford regardless of other developments. This, NZE maintained, was the import of a recommendation in the 1979 PPC report which stated that: "... consideration must be given to those power stations already built, such as New Plymouth and Stratford, which rely on gas as their primary fuel. It is important that gas be available to these power stations over their economic lifetimes". 1 Through their representative on the PPC, Ian Dick, Planning was claimed to be implicated in this policy. While this may be the effect, following a strict interpretation of the report, there is evidence that even at this early stage there were disagreements between the divisions over the uses to which the gas might be put. An early draft submitted by Dick to PPC proposed that, as the large gas uses being investigated by the LFTB came on stream, as much thermal generation as possible should be supplied by coal. 2 This policy was subsequently amended at the insistence of Treasury and NZE. 3 Furthermore, the requirement that gas should be made available to New Plymouth and Stratford "over their economic lifetimes" is a little ambiguous. It is curious that Wong should repeat this segment of the report unless, perhaps, his engineering background led him to interpret the phrase to refer to the station's expected period of efficient service. An economist, on the other hand, would terminate the economic life of a thermal station when attractive


3 Ibid., p.1.
alternative uses for fuel "out-bidded" the thermal station because power could be generated more cheaply from an alternative source. It may be, therefore, that the politic phraseology of the PPC's report gave a misleading assurance about the futures of New Plymouth and Stratford. In any case, it is apparent that NZE intended to resist reductions in supply to these two stations.

In these circumstances it is important to consider the feeling of bitterness and disbelief in NZE which followed the notification of gas constraints. Despite having been aware in 1979 of allocation difficulties, NZE seems to have been unprepared for reductions of such a magnitude as to eventually deprive the New Plymouth power station of gas. NZE's indignation was heightened by the feeling that Planning had shown little consideration for the difficulties that NZE faced.\footnote{Interview: G. Robinson.}

In these circumstances, NZE may not have been disposed to readily acquiesce to Planning's requirements.

Another explanation may possibly be found in tensions between Planning and NZE over divisional responsibilities. For example, NZE's complaint over the lack of consultation prior to the notification of constraints in January can be construed as questioning Planning's right to simply dictate certain assumptions. Clearly, the alternative, the requirement that Planning justify its actions and make them subject to criticism and amendment, constitutes a considerable invasion of Planning's sphere of responsibility. Although the issue was not put in such absolute terms at the time, there is clearly much room for disagreement over responsibilities. This potential for conflict must exist in all relationships between bureaucratic groups but is generally regulated by norms of proper conduct (naturally, these norms will vary according to circumstances: power differences, extent of contact, etc.). In this case these norms were in flux because of changes in the task structure brought on primarily by the Energy Plan.
The delay in incorporating the gas constraints in a recosted power package may also have had a tactical aspect. Put simply, if NZE waited and resisted the constraints, they might eventually be relieved without NZE having to suffer the embarrassment of a further recosting. The main weakness of this explanation lies in the fact that NZE does not appear to have done much to resist the new gas allocation. Only in late May did NZE officially attempt to gain a larger allocation when, as will be seen, different circumstances obtained.

6.4 Package and Price are Re-Assessed (for the Second Time)

Planning's dissatisfaction with the assumptions about coal availability were repeated in a further report to the Minister of Energy on 21 March.\(^1\) Once again it had not been possible to draw up a joint report with NZE. This report contained more detailed information than its predecessor and attempted to explain why previous assurances from NZE that 5,000 GWh could be supplied (the reference being to NZE's unpresuming but apparently influential memorandum of 29 November 1979) were no longer correct. In doing so, Planning dealt with the problems of gas and coal availability but also focussed attention on NZE's assumption that much expensive oil-fired generation might be necessary.\(^2\) This latter criticism of the need to burn large quantities of oil is rather ambiguous. Since the main thrust of the report was to question the availability of 5,000 GWh, Planning could have been implying that the security of supply of large quantities of oil could not be guaranteed in the future. Alternatively, references to the high cost of oil-fired generation could have been intended to imply that NZE's costing of the 5,000 GWh at 2.2 cents/kWh underestimated costs. If so, Planning was unable to say what effect this expensive oil burning would have on the average cost of generation merely noting that oil-fired generation might cost about 11 cents/kWh by 1980. Such remarks leave the impression that Planning did

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2 Ibid., p.6.
not have firm evidence to support its criticisms but was content to try and discredit current estimates from NZE on electricity price and availability.

Planning was possibly more justified in pointing out the uncertainty in coal availability and cost, particularly since this matter had not been properly researched by NZE. Officials in Planning did not share Pearce's partly intuitive assessment and were, in effect, calling for an official statement from Mines Division of its capacity to supply. Unfortunately, this call was not made very explicitly nor carried through with a formal approach to Mines Division.¹

The main effect of Planning's report was to precipitate a revision of the electricity cost estimates. The attention of other interested departments was now focussed on the power planning work as critical to the furtherance of the smelter investigations. NZE's management was also obliged to take

¹ Planning's report went on to suggest that, if coal was found to be available, then it would be necessary to consider as a short-term solution (recognising the lead-time of between ten and 14 years for the development of new stations) conversion of Marsden B (oil-fired) and New Plymouth to coal and the recommissioning of Meremere (a coal-fired station planned for closure in 1984).

Before the report was sent to the Minister a covering note was added by Mr Duncan. This note was more optimistic that ways could be found to supply 5,000 GWh without being so reliant on coal. These options included bringing forward the relatively small geothermal station at Ohaki by two years, accepting "some degree of oil burning", advancing Clutha and the lower Waitaki stations, and building a new coal-fired station in the North Island.

However, a superficial scrutiny reveals these options to be largely ineffective. Leaving aside the issues relating to the supply and cost of oil and coal, it is apparent that building a new thermal station or advancing the lower Waitaki stations was too distant to solve the immediate problem presented by gas constraints. The first Clutha station had already been advanced to the early commissioning date of 1989.
a closer interest in Pearce's calculations. On 28 March NZE released a revised estimate of power costs on the basis of the best available assumptions including the most recent estimate of gas availability. The paper advised that in the short time available for the re-costing, it had not been possible to fully discuss the plan with other divisions. Assuming that sufficient coal could be supplied to meet Huntly's demand in the early 1980's, and accepting the need for substantial oil burning at New Plymouth in dry years from 1980, the paper concluded that the new long-run marginal cost of electricity was 2.41 cents/kWh costed at a 10 percent discount rate. The paper compared this cost with the 2.2 cents/kWh currently used in negotiations and observed that, if 2.2 cents/kWh was retained as the basic offer price, the rate of return would drop to about 7.5 percent.²

Changing the electricity costing at this point in the negotiations was an embarrassing task for NZE and one undertaken reluctantly. Indeed, one might speculate that a longer delay might have occurred had Planning not intervened so decisively. It is understandable, therefore, that with the release of the new costing figure NZE should seek to mitigate the figure's impact by making a case for the retention of the existing price to smelters of 2.2 cents/kWh.

1 Pearce incorporated the gas constraints in the electricity costings as well as the later revisions to those allocations. The effect of these revisions, together with frequent changes in other assumptions, was to constantly vary the costings that Pearce was producing. Because of the variability of the results and the complexity of the work which Pearce was doing almost singlehandedly, Geoff Robinson allowed two officials who were closely involved in the investigations from other departments, Bruce Carrie of Trade and Industry, and Peter McKenzie of Treasury, to look over Pearce's methodology. After doing so, both officials expressed their satisfaction with the kind of approach being used. (Interview: G. Robinson.)

To retain this price the Government would either have to accept a reduction in the package size or a rate of return lower than the 10 percent official minimum. In a paper drafted by Stan Wong on 3 April, NZE recommended this latter course. The division's acceptance of a low rate of return is quite consistent with its declared dissatisfaction with the 10 percent discount rate. 1 Naturally, the division would have been loathe to recommend a reduction in the package size after previous assurances to Ministers about the availability of the 5,000 GWh increment. Even so, Wong's paper does cite some important advantages of what was generally accepted as the main alternative option: limiting the package size to 2,000 GWh. In particular, because the long-run

1 Although NZE was prepared to accept that 2.2 cents/kWh gave an adequate return on resources, the division was concerned about the effect of this price in combination with the discount for national benefits on its revenues. If the current offer price to FASG were accepted, NZE's revenue would be 1.4 cents/kWh compared with costs now estimated at 2.4 cents/kWh.

In a memorandum dated 2 April NZE argued that some of the difference should be funded from a source other than Vote: Energy. A principal concern was financial. In accord with the Electricity Act tariffs must be set to at least cover the costs of supply. Although in the early years of a concessional tariff the revenue would exceed the cost of supply, in later years rising costs would create a deficit. Some of the deficit would be balanced by the initial surplus but when this was no longer possible NZE proposed that the deficit should be funded by some other Vote such as Vote: National or Regional Development. NZE also argued that as a matter of equity the discounts based on national benefits should not be borne by electricity consumers alone.

The immediate reaction of Treasury and Trade and Industry to this request was that it could wait. For various reasons the deficits were not as serious as NZE made out and consideration of this problem could be left for some years if need be. The claim in equity was countered with the view that benefits to the nation paid for by electricity consumers were acceptable since, for practical purposes, both categories were much the same. Treasury and Trade and Industry were particularly concerned that funding the concession through a separate Vote would make the level of the concession public and might give the impression that the general taxpayer was subsidising the smelter.
incremental cost of supplying 2,000 GWh was only 1.75 cents/kWh, some attractive contracts could probably be negotiated with smaller EIs. Also, the economic return on these projects was less likely to be jeopardised by further changes in costing assumptions such as fuel price and load forecasts because of the low electricity costs overall and the comfortable margins between total electricity supply and demand.\textsuperscript{1}

NZE's advocacy of the need to accept a lower rate of return is one response to the critical point the smelter investigations had now reached. Apart from Treasury's rejection of this course of action, other departmental positions are difficult to discern at this time. A rather indecisive CEC paper dated 1 April gives some indication of officials' predicament. The paper was introduced with the observation that officials had reached a stage in their investigations "where an evaluation of the strategy with negotiations is required".\textsuperscript{2} No description was offered of any existing strategy but it was apparent that the main issues of concern were the size of the package which could be offered, in turn related to the cost of the package, and the question of whether priority should be given to certain industries.

NZE's reassessment of the costs of supplying 5,000 GWh had come at a time when there was a good prospect that agreement with FASG might be reached relatively quickly. The base price of 1.6 cents/KWh dropping to 1.4 cents/KWh on performance of Caster II had been agreed on. Now


\textsuperscript{2} CEC paper, "Proposed Electricity Intensive Industries", 1 April, 1980, p.1.
only the starting point for the escalation index, the 40 percent investment allowance and export incentives for the New Zealand partner were still outstanding. The paper noted that these points could be equivalent to a further drop in price of 0.3 cents/KWh.\(^1\) With negotiations with FASG at this advanced stage officials were obliged to examine their options while they still had the chance. Of the other EII proponents, Reynolds, Comalco, the two silicon carbide projects and AHI had made the most progress in discussions with officials. All these industries had been subject to national benefit analysis to some degree enabling officials to conclude that:

"the smaller projects - the two silicon carbide projects and the AHI glass project - offer by far the greatest national benefits. Of the aluminium smelters, Comalco's third potline offers greater national benefits than the other smelters because of pre-investment and its early commencement. The new smelters are similar to each other except insofar as they involve further downstream processing."\(^2\)

If an aluminium smelter could be accommodated in a concessional package along with some of the smaller industries then there would be little need to assign priorities. However, as the paper acknowledged, there were some areas of uncertainty relating to the supply of the 5,000 GWh package.\(^3\) Gas constraints had made it likely that the cost of the 5,000 GWh package would increase (no mention was made in the paper

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2 Ibid., p.3.
3 Ibid., p.2.
of NZE's preliminary estimate of 2.41 cents/kWh calculated on 28 March). The implications of a recosting for the offer price, package size and the rate of return were not elaborated. To some extent these issues could be avoided while work was still continuing in NZE on the reassessment of costs. The paper mentioned that firm results were expected in about two weeks.

An issue that was brought to the forefront concerned the large differences in cost between small and large concessional packages:

"Within the 5,000 GWh package the first 1,000 GWh is the cheapest to supply with successive increments becoming increasingly more expensive. If, as appears likely, the electricity will all have to be sold at about the same price, the national benefits of selling the first 1,000 GWh of electricity are considerably greater than selling the last 1,000 GWhs".1

The implication being that, if it were necessary to reduce the 5,000 GWh package, the corresponding reduction in the return on electricity would be of a relatively smaller

1 CEC paper, "Proposed Electricity Intensive Industries", 1 April, 1980, p.3.
magnitude. In light of this feature and the fact that the greatest benefits were provided by the smaller projects, the paper concluded that the sale of 2,000 – 3,000 GWh to projects other than a new two potline smelter, would provide the majority of the national benefits that could be obtained from the 5,000 GWh package. Officials considered that negotiations with Comalco for the third potline should proceed before any decision was made on whether or not to

1. No figures were supplied. Indeed, later consideration of this matter seems to have revealed some confusion in the minds of officials from different departments about the actual approach to costing that was being used. Confusion is, naturally enough, difficult to research. A Planning Division memorandum written a couple of weeks later suggests that, at one point at least, Treasury, Trade and Industry, and Planning had assumed that the 2.2 cents/kWh figure used in negotiations was the marginal cost of supplying the last kilowatt of the 5,000 GWh package. This marginal cost approach should be used because these officials believed that it would ensure that each individual project would return at least 10 percent. However, NZE which supplied the costing figures maintained that it was an average of the marginal costs of each kilowatt in the whole package. Hence, blocks of power up to 2,500 GWh (assuming a linear marginal cost curve) would bring a return greater than 10 percent but these would be balanced by the low return on blocks sold subsequently bringing the overall return on 5,000 GWh to 10 percent. Planning Division maintained that there was no economic justification for selling off blocks of power beyond 2,500 GWths.


Officials decided to adhere to NZE's approach thereby retaining the 5,000 GWh package. It is not clear exactly how this issue was resolved. Apparently Planning's analysis makes various assumptions which are open to dispute about the nature of the marginal costs of electricity generation. The consensus of opinion later turned to the view that there was not, in fact, much difference between the marginal cost and the average cost calculated by NZE.

(Interview: B. Carrie.)
proceed with negotiations for a new smelter. It was noted that Comalco's expansion could incorporate the casting of car components, potentially the most beneficial downstream processing that could be associated with aluminium smelting capacity. 1

Ministers referred the paper for the attention of Cabinet. In doing so it is possible that they were considering the Prime Minister's absence from the CEC meeting. Little comment is recorded in the Minutes of this meeting although Ministers did note that Comalco was preparing to submit a proposal for fourth and fifth potlines. The view was expressed that one of the other new smelter proposals should be selected instead to avoid a concentration of New Zealand aluminium production in the hands of Comalco. 2

Although there was little established policy on the strategy negotiators should take, the main thrust of the negotiations so far had been toward clinching a deal with FASG. This CEC meeting indicates that a shift in the combined views of officials may have taken place. To the extent that officials now favoured a smaller package, they were contemplating the exclusion of a new aluminium smelter. All seemed agreed that under present conditions a new smelter could only be included in a 5,000 GWh package. Of course, the significance of this shift in stance really depends on whether officials perceived a reduction in the package size to be necessary. At this stage no-one had suggested that 5,000 GWh could not be supplied. However,

1 CEC paper, "Proposed Electricity Intensive Industries, 1 April, 1980, p.4.
2 CEC Minutes, "Proposed Electricity Intensive Industries, 1 April, 1980, p.2."
disagreements were emerging as to the risks involved in supplying 5,000 GWh and the best way to incorporate the gas constraints. These differences, suppressed at the CEC meeting of 1 April, were soon forced into the open by the need to quickly reassess the cost of the 5,000 GWh package and report back to CEC.

6.5 Signs of Emerging Conflict

An early draft CEC paper was produced by NZE. It contained no new facts; the 5,000 GWh could still be supplied but at a cost of 2.4 cents/KWh. Nevertheless, the paper does reveal a closer correspondence of views between NZE and Planning Division. After NZE's rather tentative promotion of the low rate of return option, the Division now recommended that in order to retain a base negotiating price of 2.2 cents the overall package would have to be reduced to 3,500 GWh.¹ This was the same approach as was being promoted by Planning Division in a number of its papers being circulated within the ministry. In addition, NZE's draft noted some of the problems which had been of concern to Planning for some months. With the need to burn large quantities of oil, especially in the New Plymouth station, there was the possibility of very high oil fuel costs in a dry year, perhaps exceeding $100 million at some points.² Because the possibility of this high fuel cost had been taken into account in the costing calculations one must assume that the main risks involved in oil burning concerned the possibilities of shortages and sharp price rises on the international oil market. Another acknowledged problem-area was the difficulty in getting firm information on coal availability and cost. It now appeared that about

¹ Draft CEC paper, 9 April, 1980, p.2.
² Ibid., p.2.
3,000 GWh of the proposed 5,000 GWh block would need to be generated by burning coal. Unfortunately, neither NZE nor Planning had yet received any confirmation from Mines Division of the feasibility of this programme. In the meantime they assumed that the coal would be available.

The acceptance by NZE and Planning of the desirability of a 3,500 GWh package was prompted in each case by different considerations. NZE's main interest in highlighting the planning uncertainties appears to have been to justify a smaller package and the retention of the current offer price. Planning, on the other hand, does not in its memoranda stress the need to retain the base offer price of 2.2 cents. Instead this division emphasised the advantages of a small package, particularly the fact that it would provide the majority of benefits with minimal risk. Planning was also more likely to raise general planning issues. One area of concern was that the substantial move toward thermal generation would involve a reversal of the trend, initiated by the 1978 Power Plan, toward the use of renewable resources for power generation. The scope of Planning's analysis also tended to exceed energy development and to incorporate broader national development issues. These concerns are displayed in Planning's report of 6 March with its criticisms of contractual details and the economics of the whole project. They are also reflected in these remarks of John Boshier the director of Planning Division:

"Although Planning Division had been in favour of every other major project, for example, liquid fuels, the third potline, Planning was always opposed to the second smelter on every ground. The assumptions involved with the smelter were all wrong". 1

1 Interview: J. Boshier.
One can only speculate whether such objections to the smelter influenced Planning’s choice of package size.

Despite these apparent differences in their justification of a reduction in package size, Planning and NZE were not prevented from working a little more cohesively during this period. By mid-April these divisions were once more able to send a joint report to Ministers on the energy planning implications of EIIs. In the departmental view that was now emerging recommendations for a reduction of the package size were replaced with an emphasis on the need to resolve uncertainties involved in the 5,000 GWh package.

As other departments were made aware of these uncertainties Trade and Industry and the Prime Minister's Department began to take the view that the risks involved in supplying 5,000 GWh were not as serious as claimed by the Ministry of Energy. This developing conflict of views is evident in the promised report to CEC dealing with the reassessment of electricity costs. This report was presented to CEC on 22 April. Treasury had played an important role in fashioning this report so as to achieve a compromise solution, in effect, that negotiations should continue in parallel with work aimed at resolving the uncertainties in the power plan. This posture received the endorsement of the Ministry of Energy because, as Mr Falconer, the Deputy Secretary, observed in an internal memorandum, it avoided a debate in CEC:

"on the significance to be attached to these planning risks - a debate in which other departments and the Ministry would be at odds without the prospect of the Ministry ending up a clear winner at this stage". ¹

As it happens, a debate among officials was not avoided at the CEC meeting and, although inconclusive, it did intensify the disagreements between departments.

The CEC paper was, for the most part, a rather bland document which outlined the reasons for the reassessment of costs and presented the new costing of 2.4 cents/kWh. However, in one important section the paper does acknowledge that:

"In view of the uncertainty and risk associated with many of the factors involved in the exercise, many of which are quantifiable only to a limited extent, it may be the wish of Government ultimately to limit the package to reduce the risks of over-commitment to energy intensive industries. Although it is likely to be physically possible to supply up to 5,000 GWh the costs involved in a commitment to supply this size of package may exceed the benefit to the nation, depending on the prices which are ultimately negotiated. Officials are not, however, able to agree at this stage on the weighting that should be given to risks in determination of a final package size".

Until these matters could be settled officials would continue negotiations with the various proponents to a point short of settlement. In this way the costs, benefits, and risks involved in each package could be more accurately assessed.

A further point of interest is the paper's discussion of interruptibility. It was hoped that if an agreement allowing the interruption of supply to a smelter could be negotiated, then some of the worst-case supply scenarios, such as might eventuate in a dry year, could be avoided. The paper added that:

"The Electricity Division of the Ministry of Energy is analysing the implications of interruptibility as a matter of urgency".


Interruptibility is another rather mysterious issue where conflicting claims abound. It is unlikely that at this stage in the negotiations the issue was in fact being urgently followed up by NZE. It may be recalled that FASG had expressed an interest in interruptibility at the very beginning of the negotiations. At the time, NZE had undertaken to assess the value of interruptibility. Much of the technical work was assigned to one individual in the division but this person left the division in February or March at which point, it appears, the work was discontinued.\textsuperscript{1} On a number of occasions the negotiating team requested that NZE supply information enabling the negotiation of dry year interruptibility or oil burn cost sharing clauses. This information was never supplied.\textsuperscript{2} At some point, probably toward the end of April, Mr. Nixon, Assistant Secretary (NZE), called a meeting in NZE to discuss the issue. By one account, the top level officials present did not seem very keen on interruptibility although they thought that it was technically feasible.\textsuperscript{3} Later events will help clarify NZE's attitude to interruptibility and the reasons why it does not appear to have been investigated any more thoroughly. So long as the issue could be raised formally as, on this occasion, in a CEC paper, it could not be ignored.

In their discussion of the paper Ministers concentrated on the energy supply issues. The gas constraints and their effect on electricity generation were explained to Ministers. Officials added that these constraints might be alleviated if gas offtakes from the Kapuni field could be increased or if a second Maui platform were constructed. However, the latter possibility was dependent on considerations other than the needs of EIIs.

\textsuperscript{1} Interview: D. Pearce.

\textsuperscript{2} Interview: P. McKenzie.

\textsuperscript{3} CEC Minute, "Electricity Intensive Industries", 22 April, 1980, p.2.
Other issues provided Ministry of Energy officials with the opportunity to express the reservations which they had refrained from including in the paper. One area of risk concerned the possibility that an increase in overall electricity demand above the 'central' forecast could endanger the security of supply; this was seen as likely because of the contribution that energy investment would make to overall economic growth.\(^1\) An important risk associated with dry years lay in the uncertainty about the future price and availability of oil. However, it was acknowledged that interruptibility might alleviate this problem. The Prime Minister made a pertinent remark at this point when he deduced that the need to burn oil in a dry year had nothing to do with selling a 5,000 GWh package (at least, not in the long term) since oil-burning is merely a function of the generation system. If water is not to be spilled in a mean year, then in a dry year some fuel will have to be burnt in thermal stations to make up for the lack of water. If the marginal fuel happens to be oil, then oil will be burnt in dry years regardless of whether 5,000 GWh of electricity is sold or not.\(^2\) Furthermore, as Bruce Carrie reasoned in a paper written after the meeting, because expensive thermal generation in dry years is an inherent problem in the generation system, a load such as a smelter which can shut down in a dry year is actually a benefit to the system.\(^3\)

Perhaps the main area of uncertainty concerned the availability of coal. In a rather extraordinary remark, Bill Partel, the manager of Mines Division, declared that it was beyond the capability of State Coal Mines to supply sufficient coal to enable thermal stations to make up the difference between the forecast hydro surplus and a 5,000 GWh block. Furthermore, State Coal Mines would barely be able to supply the coal required for a 2,000 GWh block.\(^4\) It is not known whether any

3. Ibid.
other officials were prepared for Mr. Partel's statement. Certainly it came as a surprise to ministers. At the conclusion of the meeting ministers complained that there had clearly been a lack of co-ordination among officials. They therefore directed officials to liaise more closely and to keep ministers informed of developments. Ministers also agreed that negotiations should continue on the basis that the final package would depend on the final offers available and on the risks and uncertainties involved in the supply of electricity.¹

6.6 Counter-Attack: Trade and Industry Enters the Power Planning Debate

Departments other than the Ministry of Energy appear to have provided little input to the discussion at the CEC meeting. It may be that they hesitated to accentuate the obvious inter-departmental disagreements or that they were less prepared than the Ministry to discuss energy planning issues. Whatever was the case, their main reaction was left until after the meeting. A paper prepared by Bruce Carrie and circulated on 28 April expressed many of Trade and Industry's objections to the Ministry of Energy's arguments against the 5000 GWh option. This paper was later copied almost verbatim and delivered to the Prime Minister by David Young. It was also acknowledged by Treasury as containing many valid points. Carrie's initial objection was to the way the issue of gas constraints had been presented to Ministers. He believed that ministers may have received the impression that the gas constraints required a reduction in package size. In fact, their impact had been incorporated in the price rise to 2.4c/kWh; gas constraints were the reason for the reassessment, not something additional to it.² Having clarified this issue, Carrie proceeded to do what one might have expected of NZE some months previous: to dispute some of the more questionable assumptions underlying the new calculations of gas availability.

¹ CEC Minute, "Electricity Intensive Industries", 22 April, 1980, p.3.

Whereas the various petrochemical users of the gas had been allotted relatively fixed amounts of gas the NGC had received an increasing share of the total deliverability to enable it to meet the expected rise in demand for reticulation. Hence, as NGC's demand rose over the lifetime of the Maui field, a corresponding decline was registered in the supply of the least priority user, electricity. However, as Carrie pointed out, regardless of the merits of the NGC priority in this case, there was a need to closely scrutinise the forecasts in demand growth, particularly since the forecasts were supplied by the NGC itself. He added that any increase in the deliverability to NZE achieved by reducing the NGC's allocation, would serve to lower the 2.4c/kWh cost. A further reduction would be achieved if the assumption that Mobil's synthetic gasoline plant would be in full operation in 1984 was updated to include the best current estimate of between 1985-1987.¹ Along with the changed assumptions about the deliverability of the Maui field, Carrie noted that Kapuni gas had not been made available for electricity generation. Kapuni was currently committed to supplying NGC with 15 PJ of gas per year but had an annual deliverability of 60 PJ per year. Therefore, an extra 45 PJ per year - sufficient to generate approximately 4,800 GWh - could be drawn above the planned offtake. Although it was seen as undesirable to run the field at this rate continuously, Carrie saw no reason against using the field as a reserve to avoid having to burn oil in a dry year.² During the CEC meeting Dr. Walker of Planning Division had argued against the use of Kapuni for electricity generation. Walker had claimed that a portion of Kapuni gas had been set aside to allow for the loss of

² Ibid., p.2. (A dry year corresponds to a loss of about 3,000 GWh.)
deliverability from the Maui field should the Maui partners decide, as was their right, to begin the extraction of the valuable gas components LPG and ethane. This argument was rejected by Carrie who noted that of the 75 PJ/annum of Maui gas allocated for liquid fuels, 50 PJ were for Mobil, 15 PJ were for Methanol, 3 PJ for ammonia urea, leaving 7 PJ per annum, about sufficient to cover LPG and ethane extraction.1 Walker's argument was not used again to justify the exclusion of Kapuni gas from electricity generation.

Carrie could not be so categorical in dealing with Mines Division's claims about severe coal supply problems associated with the 5000 GWh package. As Carrie noted, "Mines Division with it worries about lead times for developing mines has only recently been brought into the argument, so there has been no time to investigate the whole issue". Nevertheless, a Treasury official responsible for dealing with Mines Division affairs had been able to make some preliminary investigations.

According to Derek Gill in an internal memorandum circulated on 30 April, the essence of Partel's analysis was that the maximum capacity of presently installed mines stood at 2.3 million tonnes per annum (m.t.p.a.) but with demand from New Zealand Steel expected to rise to 0.9 mtpa by 1984-86, and other markets constant at about 0.8 mtpa, then under a million tonnes per annum would remain for NZE's consumption.3 There appears to have been some uncertainty over NZE's projected demand levels, in part caused by the fluctuation in thermal requirements.


2 Ibid., p.3.

3 D. Gill (Treasury internal memorandum) "Coal Requirements for Electricity Intensive Industries", 30 April, 1980, p.2.
under different hydrological conditions. Nevertheless, treating 2.0 mtpa as a reasonable estimate of dry year requirements, a considerable shortfall in coal supplies was apparent. Gill's contribution was to point out that New Zealand Steel's coal requirements need not be supplied by State coal mines in the Huntly district as assumed but could be supplied by a partly private-owned mine at Maramarua. Then, if the non-electricity customers were supplied from the Huntly East mine, the remaining mines in the Huntly district would be available to NZE. This capacity was put at 2.2 mtpa assuming a faster rate of opencast exploitation than allowed for by Partel. According to Gill, Mines Division's tendency was to place restrictions on the extent of opencast mining in order to slow the depletion of this more accessible resource.  

6.7 Power Planning: Revision and Refutation

All these criticisms showed, at least, that by early May a number of major inconsistencies remained to be resolved before the Energy Plan could be finalised. Energy planning work was running behind schedule at this point but there was adequate scope for interaction between divisions to reconcile planning assumptions. The planning work had been organised in anticipation of such problems, although, perhaps not problems of this magnitude. A complication which could not be incorporated in the structure of this exercise was the need to supply accurate and urgently required electricity plans and costings before all the sector forecasts had been fully reconciled. The closest planners could get to this impossible requirement was piecemeal adjustments. Initially these involved the gas constraints with their implications for coal and oil use. Now it appeared that coal constraints would have to be worked through.

Carrie's paper, unlike Gill's, had been seen by Ministers as well as by officials of other departments. Therefore, the specific criticisms it raised had to be faced by the Ministry of Energy and either accepted or rejected. As the Ministry set about this task and the formulation of a new electricity plan, Treasury began to take a closer interest in electricity planning issues. Treasury's rights of access to the electricity planning process were not very well defined now that the CRPR and PPC had been replaced by the Electricity Sector Committees. By early May it was becoming apparent to Treasury officials that much information which they had previously received as a matter of course would now have to be actively searched out. In meetings with Planning Division Treasury officials endeavoured to acquire more information about the electricity plan and, in particular, information that would help clarify the issues brought to prominence by Carrie.¹

The problem of coal constraints was revealed to be less serious but more complex than Partel's initial assertion had indicated. Although sufficient coal could be supplied to sustain thermal generation at levels implied by a 5000 GWh package, there would be difficulties in building capacity up to that level in a short space of time. This build up could possibly be achieved by drawing on open cast reserves which have a greater potential for providing variation in output than underground mines. However, this action would restrict the ability of the coal production system to adjust to fluctuations in thermal generation due to variable hydrological conditions. In these circumstances, stockpiling and the importation of coal were seen as two options worthy of investigation.²

1 Interview: H. Fancy (Treasury).

Planning's reconsideration of the use of Kapuni gas raised the option of substituting a portion of the Maui gas used in petrochemicals with superior Kapuni gas thereby freeing up a greater part of Maui's deliverability for electricity generation. Alternatively, some measures could be taken to make Kapuni gas available in a dry year. The impression received in Treasury at this time was that Planning did not look favourably on the latter option. As Rob Laking observed to colleagues at the time, "Planning is probably biased against doing this, basically they don't want to see any significant quantity of gas being used for other than liquid fuels or reticulation".

Another issue being reconsidered by Planning at this time concerned the oil price assumptions for NZE. Carrie had dismissed apprehension about the possibility that large quantities of oil may need to be burnt in a dry year on the grounds that the cost of this oil had already been included in the 2.4c/kWh costing. Now Planning were thinking about adding a premium to cover spot prices, that is, the very high prices that are sometimes encountered on the international oil market during periods of shortage. In this way the risks involved in the importation of such a large amount of oil could to some extent be incorporated in the costing of the 5000 GWh package.

3 Ibid., p.2.
Work on these and other issues was proceeding very quickly because of the urgent need to get a revised power plan and costing estimate. By 15 May NZE had produced a paper outlining another power plan. This paper listed some changed assumptions but otherwise attempted to refute Carrie's criticism of the previous power plan.

One important change concerned the level of demand which the power plan had to meet. The Electricity Sector Forecasting Committee had recently met and it had produced forecasts which were significantly higher than the 1979 forecasts over the coming decade. The "central" forecasts differed by as much as 1,700 GWh in 1984/85 but were equal in 1990 and the 1980 forecast was lower thereafter.\(^1\) Another changed assumption concerned coal availability. After discussion between NZE, Mines and Planning, maximum availability figures had been produced which would help cover dry year thermal requirements in the long term but were insufficient over the coming decade. Gas constraints were accepted in the paper.\(^2\) Furthermore, no gas was assumed to be available from Kapuni: "... it would be quite wrong at this stage to hinge the strategy of meeting the requirements of energy intensive industries around the possible but uncertain supply of natural gas from Kapuni for power generation".\(^3\) One might conclude from this rather empty statement that NZE did not actually know why it could not have gas from Kapuni. Also, the division was possibly aware after an Energy Plan co-ordination meeting on 9 May that moves were afoot to grant NZE a portion of the available Kapuni gas. Later, on 23 May it was announced that NZE could have an average annual offtake


2 Ibid., p.2.

3 Ibid., p.2.
of 10 PJ for dry year firming purposes.¹ This gas could generate about 100 GWh per annum and was probably intended for the Stratford power station which has a capacity of about 100 GWh (based on a 60 percent load factor).

Despite this measure, the issue of the utilisation of Kapuni gas was still not resolved. The extent of the differences is illustrated by Carrie's claim that up to 45 PJ of Kapuni gas could be utilised for electricity generation. It may also be noted that NZE's paper of 15 May disputed the further claim that 4500 GWh could be generated from this 45 PJ of gas. NZE argued that this claim ignored the load factors of the generating plant.

This objection from NZE is only intelligible if it implies that Carrie had suggested that the whole of the 45 PJ should be fed into the one station, New Plymouth, which was being run at close to 100 percent load factor, well beyond the reasonable limit of 70 percent. In fact, Carrie's paper does not state which power stations would burn the gas and, as officials in NZE would have been well aware, there was plenty of gas burning capacity available. As well as New Plymouth, the Huntly and Stratford stations would also burn gas and the oil fired Marsden B station, although mothballed, could be converted to gas. Far from refuting Carrie's point, an argument such as this only served to diminish the credibility of NZE's power plan, particularly in the eyes of officials in Trade and Industry and the Prime Minister's Department.

The impression that NZE was not trying very hard to accommodate the 5,000 GWh package would no doubt have been reinforced by this statement in the paper on interruptibility: "A satisfactory agreement with the energy intensive industry

promoters for long-term interruption of power supplies would be extremely difficult to achieve. From the point of view of the smelter there would be serious repercussions in aluminium output, and grave social implications for the staff".  

This statement could be interpreted as saying that interruptibility disadvantages the company and could only be negotiated if further significant concessions were made.

While it was likely that the company would expect a lower power price in return for allowing NZE a limited right to interrupt power, NZE could not assume, without full analysis of the benefits, that the total benefit would be exactly compensated by the concession to the company. The need for a thorough investigation of the value of interruptibility is highlighted by another quotation from NZE's report: "... there is a body of opinion that fuel oil will become increasingly more difficult to obtain as well as more expensive. Any shortfalls in this direction would make it more difficult to meet mean year requirements with a 5000 GWh electricity intensive load, and extremely difficult to meet the load in most dry years".  

Clearly, if these risks were as serious as NZE maintained, then interruptibility could be of considerable value.

Two explanations for NZE's superficial treatment of interruptibility are raised by this discussion. Either NZE simply did not credit interruptibility with much value, or NZE believed that, by ignoring interruptibility, the smelter and, therefore, the 5,000 GWh case, would appear less attractive. This latter explanation is rejected by Mr. McCool who claims that it was NZE's view that any gains from interruptibility


2 Ibid.
would be balanced by further concession. However, Mr. McCool's remarks on this subject are a little ambiguous and at some point appear to suggest a third explanation for the failure to pursue interruptibility; "where there is considerable political enthusiasm to get a deal consummated officials can't push things such as interruptibility too strongly ... if the Minister says don't rock the boat then officials don't put up interruptibility etc.".¹ This comment allows the interpretation that the Minister may have opposed interruptibility or that the senior management in NZE anticipated the Ministers' reaction to interruptibility and therefore treated it as an unnecessary complication and an avoidable source of delay to the negotiation. It may be suggested that at this stage the third explanation seems the most relevant. The claim that interruptibility did not warrant investigation would seem unlikely given the advantages of interruptibility advanced above and the fact that other officials frequently requested a report on interruptibility.² Later, when NZE's opposition to the 5,000 GWh case becomes more definite, the second explanation may become more relevant.

¹ Interview: Mr. McCool.

² Even if NZE doubted the value of interruptibility the interest of other officials, and the negotiating team in particular, would seem to warrant a proper investigation. Officials in Planning Division saw considerable potential in interruptibility and were puzzled by NZE's attitude. On a number of occasions David Craig drafted letters requesting that NZE report on the value of interruptibility. These letters were forwarded to Mr. Falconer to sign and send to NZE but on each occasion they were rejected by Falconer on the basis of some minor flaw. Hence, Planning Division's concerns were never formally communicated although the exact reasons for this remain unclear. For his part Falconer maintains that he was always in favour of investigating interruptibility. Whether Falconer shared NZE's apparent reluctance to complicate the negotiations is not known. (Interviews: D. Craig, W. Falconer.)
NZE's paper of 15 May replied to each of Carrie's points but without adding much new information of any consequence. Only the assumptions relating to coal availability had been subject to major changes at this point. However, they were still too tentative for firm estimates of coal availability to be formally detailed. Perhaps because of this uncertainty the paper made no explicit statement of the ability of the revised power plan to meet the revised load forecasts. The cost of the plan was also left open. NZE concluded the paper with the recommendation that, under existing circumstances, the Government should "resist the proposal to complete an agreement for supply of electricity to a new greenfield smelter".¹ This statement appears to mark the first occasion on which NZE formally questioned the desirability of a new smelter.

6.8 Synthetic Gasoline vs Aluminium: A Suppressed Issue?
The changes in prospect for certain key planning assumptions made it clear that even if adequate margins between supply and demand could be maintained, a significant increase in costs would be incurred. It was probably this realisation combined with a determination to maintain the level of the costing already supplied by NZE which led Stan Wong to belatedly dispute the level of gas allocation. In a paper dated 23 May Wong criticised the gas allocation as having been taken "completely without regard to previous undertakings, and without any apparent attempt to preserve the economic viability of existing plant, thereby placing an unfair burden on electricity consumers".² Some of these criticisms have been discussed above. What is of interest here is the further claim, expressed officially for the first time, that the economic justification for the gas allocation had never been disclosed.


"It has been stated verbally that there are economic justifications for withholding gas from existing power stations but these have never been disclosed. At the least it would have been expected that such studies would have been made available to us.

At this point I am making a formal request to be shown these studies so that we can study them and, if appropriate, challenge the justification for depriving the Electricity Division of gas". 1

In addition Wong suggested for Planning's consideration a number of ways in which NZE's deliverability problem could be alleviated. These included making Kapuni gas available, limiting NGC, and diverting gas from petrochemical plants when it was needed by NZE. 2

This challenge to the justification for NZE's gas allocation could have been made months earlier. Instead, the allocation was accepted with some bitterness and only questioned when other fuel constraints came into play. One explanation for this delay may be that NZE was uncertain as to the basis for the allocation and as to how to begin to make a case for a larger allocation. As far as Planning was concerned, all that NZE needed to do was to calculate how much it could afford to pay for extra gas. If it should turn out that NZE could pay more than a higher value user (this higher-value user having been established by Planning's initial calculation of opportunity costs) then a good case would have been made for an increased allocation. However, as Planning claims:

1 S. Wong, "Supply of Natural Gas to Power Stations", 23 May, 1980, p.3.

2 Ibid.
"Over the last six months the Planning Division has repeatedly asked NZE (Development) to calculate the possible cost savings if NZE were to have an increased allocation of gas deliverability. This request has been either ignored or misunderstood".1

This claim is difficult to evaluate - it is not known how often or in what form this request was made. In any case, it could be that NZE found it impossible to make a case for a larger allocation on the basis of the figures supplied by Planning and therefore did not bother to reply.

Wong's paper makes no mention of what NZE's optimal level of gas consumption might be on the basis of opportunity costs apparently supplied by Planning. Instead, it seeks information which might enable NZE to question the opportunity costs themselves. This was a much more serious challenge and when Planning replied on 6 June the division declined to countenance any such move. Planning argued that

"detailed quantitative information on alternative uses of gas is not a necessary input for NZE's internal development planning". 2

Therefore, by requiring Planning to justify the Energy Plan assumptions it produced, NZE had overstepped its brief and infringed Planning's. Clearly, Planning perceived an important principle to be at stake here relating to the respective responsibilities of each division. This principle was not given much further content but, of course, one would not really expect divisional responsibilities to be very explicitly defined. Divisional relationships are too subtle for that, fluctuating along with the issues and personalities of the moment. Any precise statement of responsibilities would probably reflect a division's (or department's) anxiety to protect what it already had in the face of strong competition.


2 Ibid.
Despite Wong's request and Planning's rejection, there is evidence that a series of papers, beginning in 1979 and successively refining the calculation of gas opportunity costs, were in fact released by Planning. This emphasises the ambiguity in divisional responsibilities since Planning had clearly felt obliged to justify its calculations to some extent. It also tends to discredit NZE's handling of the gas constraint problem. Planning claims that these papers were delivered to NZE in April including two which dealt with the economics of diverting to NZE part or all of the gas from the Mobil plant (thought to be the least value petrochemical user of the gas).

These papers are not acknowledged in Wong's memorandum and Wong claims to have no idea how the opportunity costs were calculated. The possibilities that the papers were not in fact released or that they provided an inadequate basis for independent analysis are disproved to some extent by the presence of these papers in Treasury where they provoked an important internal debate. Another possibility is that NZE's management chose to disregard the papers, perhaps because the technicalities were not fully understood or because NZE felt its best case was simply to argue that the New Plymouth power station was a committed user of the gas. Frequently NZE emphasised the size of the investment which New Plymouth power station represented (some $400 million) and the fact that the design of the station had been specially changed so that it would burn Maui gas instead of coal. Planning dismissed this argument on economic grounds and yet, on occasion, justified the priority attached to petrochemical users in a similar way and with impunity.


2 Interview: S. Wong.
From Planning's point of view, the petrochemical plants were the committed users and a very strong case would have to be made before any gas could be diverted from them. As one Planning Division report stated in reference to the gas opportunity cost calculations:

"It should be noted that these Planning Division reports are analyses undertaken after the crucial decisions were taken at Cabinet level. They investigate the costs of changing the status quo as determined by these decisions".1

Clearly, in questioning the opportunity cost of gas NZE was threatening much more than Planning's sphere of responsibility. Even so, NZE could have done much more to try and get the gas it needed; the information on gas opportunity costs was available and it could have been utilised quite early on. The fact that Planning produced a number of papers suggests that there was much uncertainty in the area of gas opportunity costs. This uncertainty could have been exploited.

The debate in Treasury demonstrates that a critical examination of the papers could throw up some startling conclusions. It is not clear when this internal Treasury disagreement emerged although it appears to have centred on a Planning Division paper, "Mobil vs Electricity" dated 22 April 1980. This paper was concerned to assess the cost to the nation of decreasing in capacity or deferring the marginal liquid fuels project, Mobil gasoline. The results of this exercise would then represent the minimum price which a competing user would have to be prepared to pay for Mobil's gas. Grant Read who performed the analysis derived the value of the gas to Mobil from an estimate of the value of the plant's gasoline output (related to the world price of oil) minus the plant's capital and operating costs. Read

1 J. Boshier, "Supply of Natural Gas to Power Stations", 6 June, 1980, p.5.
calculated that if the Mobil plant were completely eliminated the cost to the nation over a 20 year period would have an NPV of $1,500 million. Read then estimated the maximum price which NZE would be prepared to pay for the same gas to see if it was a higher-value use. Assuming that NZE would pay a gas price up to but not in excess of the point where the cost of gas-fired generation equalled the cost of building a new hydro or coal-fired station (estimated to be about 3.5 cents/KWh), Read calculated that NZE could pay up to $1,100 million over the same 20 year period. This analysis clearly favoured Mobil. However, it contained a couple of questionable assumptions which were first pointed out by Peter McKenzie.

McKenzie's principal objection was to Read's assumption that if the Mobil plant were eliminated the gas would be used by NZE solely in the New Plymouth power station operating at a load factor of 70 percent. Of the 50 PJ per annum of gas which the Mobil plant might use only 39 PJ could be burnt in the New Plymouth station generating 3,500 GWh of electricity against a potential of 4,600 GWh. (Read may also have been concerned about NZE deliverability problems. This point will be dealt with later). McKenzie claimed that there was no reason why the extra 12 PJ could not be utilised in the other gas fired stations of Stratford, Huntly and Marsden B (if converted). The NPV of 4,600 GWh at 3.5 cents/KWh for 20 years approximates the value of the Mobil production.

Naturally, McKenzie's analysis was much more sophisticated than this. It was also more clearly in favour of NZE. However, without the benefit of his actual calculations, it

1  E.G. Read, "Mobil vs Electricity", 22 April, 1980, pp. 1-5.
2  Interview: P. McKenzie.
3  H. Fancy (Treasury internal memorandum), "Mobil vs Electricity", undated, p.2.
is not possible to say whether increasing the load factor of NZE's consumption alone made NZE a superior use. It may be that McKenzie's conclusions were dependent on further assumptions about the oil price forecasts on which the value of the Mobil gasoline output was based. In McKenzie's opinion these forecasts were far too high and they therefore inflated the benefits to be gained from substituting imported oil with Mobil gasoline.¹

Rob Laking and Howard Fancy disagreed that NZE was a higher-value user than Mobil. They maintained that NZE would have to consume gas at a variable rate inversely related to fluctuations in hydro generation. NZE would, therefore, have to pay for more gas than it actually used in order to reserve a maximum deliverability for dry year needs.² (Read may have had this feature of NZE's system in mind when he restricted gas burning to New Plymouth operating at the normal plant factor of 70 percent). If, for example, plant load factors were 50 percent (that is, the gas-fired power stations are assumed to run at half capacity under mean hydrological conditions) and the value of gas to Mobil is $2.00/GJ then, since NZE could only burn half of its gas deliverability, NZE would have to pay $4.00/GJ. It was contended that NZE could not compete with Mobil under these circumstances. McKenzie disagreed with this argument. His approach was to assess the value of a 50 PJ block of gas in alternative uses: a Mobil gasoline plant or an aluminium smelter. From this perspective the relevant fact for NZE is the cost of the whole block - not the cost per unit of gas - which can then be compared with the cost of generating 4,600 GWh from an alternative source. Since the date of the smelter's commissioning effectively spells the end of the period of electricity surplus this cost is the cost of new capacity, approximately 3.5 c/kWh.

This is an outline of the respective positions of Laking and Fancy, on the one hand, and McKenzie on the other as

¹ Interview: P. McKenzie.
² Interview: H. Fancy.
they have been presented some time after the debate. The actual arguments may have been somewhat different. Fortunately, some documentary evidence remains in a paper written by Fancy and addressed to both Laking and McKenzie which provides a second analysis of the value of gas to either Mobil or NZE. In this paper Fancy's approach is broadly consistent with McKenzie's. He treats Mobil and NZE as alternative uses of a 50 PJ block of gas thereby enabling the maximum value for the gas to NZE to be calculated as 4,600 GWh at 3.5 c/KWh.¹ This calculation gives an annual value for the gas of $161 million or 3.22/GJ. Fancy noted that for Maui gas to be worth 3.22/GJ to the Mobil plant the price of petrol would have to average $60/barrel, implying a price for crude oil of $4 /barrel, over the entire 22 year period. Whether these relatively high oil prices would be reached was a matter of conjecture. The Ministry of Energy had forecast crude oil prices to rise from $26/bbl in 1980 to $33/bbl in 1985, $36/bbl in 1995 and $39.50/bbl by 2010. However, more recently this scenario had been revised with the crude oil price per barrel increasing from $28 in 1986 to $46 in 1985, $53 in 1990 and $56 in 1995. Although the average price of oil cannot be derived from this forecast, it would probably be high enough to assure the Mobil plant's viability. Nevertheless, the large discrepancy between these two forecasts emphasises the extreme uncertainty involved in any such projections. Fancy's own belief was that the oil price would not rise as quickly as projected by the Ministry of Energy.²

As well as discussing the oil price Fancy also listed a number of other assumptions which were critical to the economics of the Mobil process. He noted that any escalation in capital and operating costs or a loss in plant efficiency would reduce the value of the gas to Mobil relative to NZE.

¹ This analysis produced an NPV of $1,412 million over 22 year period. It may be compared with $1,100 derived by Read assuming 3,500 GWh/year could be generated over a 20 year period at 3.6 c/KWh.

² H. Fancy, "Mobil vs Electricity", undated, pp. 1-6.
Fancy also questioned the extent of the premium assumed between crude oil and petrol. He believed that this premium might reduce over time to more closely reflect the costs of refining the crude oil.\footnote{H. Fancy, "Mobil vs Electricity", undated, p.7.}

Overall, the paper provides an objective survey of the main areas of uncertainty which officials should confront before making a decision on the best use of the gas. This uncertainty could not be ignored because, as Fancy concludes, "\cite{This} analysis shows that in terms of ability to command priority use of Maui gas the case is not at all clear cut in favour of Mobil".\footnote{Ibid., p.8.} The correspondence of views between Fancy and McKenzie revealed by this paper is curious given Fancy's claimed divergence and his subsequent support of Mobil as the priority use.

If Laking and Fancy agreed with McKenzie's technical arguments but declined to pursue the issues he had raised, it follows that they had reasons for supporting the Mobil plant separate from the economic considerations mentioned above. An important factor in this regard might be the political importance of a project which was being promoted as a means of relieving New Zealand's dependence on foreign oil producers. This feature and the fact that a great deal of planning had already gone into the project meant that the Government was substantially committed to proceeding. In this atmosphere one can imagine that a strong case would be needed to overturn the project and that officials might easily feel that there was little to be gained from pointing out areas of uncertainty.

Other reasons for supporting Mobil may have been the misgivings on the part of Laking about the economic merit of a smelter and his growing belief that the power planning risks did not justify the sale of 5,000 GWh. During much of the period discussed
so far, Treasury's attitude has appeared relatively neutral; in fact, it was probably more mixed and ambiguous than has been presented here. Laking had always had doubts about the economic value of a new smelter and he claims that he was confident until July that the smelter could be stopped.\(^1\) However, Treasury did not declare opposition to the smelter in the manner of Planning Division, nor did it fully share, at this stage, NZE's apprehension about the risks involved in supplying 5,000 GWh. Indeed, it is likely that the stance conveyed to other departments at the working level was quite the reverse since most of the negotiating and energy planning work was being carried out by Peter McKenzie (head of the industry section) who was strongly in favour of a smelter. Laking appears to have been more deeply involved during this period in the negotiations and studies related to the petrochemical industries. That this lack of direction in Treasury policy toward the smelter was noticed in other departments is indicated by these remarks of Boshier about attitudes towards the smelter at the time of Planning's intervention:

"At this point Treasury hadn't really made up its mind although Laking was worried. McKenzie was very much for the smelter and it was he who came to the meetings since Laking was not really involved at this stage."\(^2\)

During May, as the Energy Plan was being finalised and efforts were being made to resolve a number of important uncertainties, Laking, together with Howard Fancy, became more involved in this area and particularly in the investigation of electricity cost and availability. From this time McKenzie's responsibility was to concentrate on the negotiations.\(^3\) This point also marks

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1 Interview: R.G. Laking.

2 Interview: J. Boshier. (Boshier continued: "For a few months there were only a handful of opponents of the smelter and these were all in Planning. The official Ministry of Energy position was for the smelter - Falconer, Duncan.").

3 Interviews: Fancy, McKenzie.
the beginning of a shift in Treasury policy (at least, at an official level) as both Laking and Fancy took the view that the risks involved in a smelter and in the supply of such a large quantity of electricity were unacceptable. McKenzie, on the other hand, retained his more positive attitude toward the smelter, largely based, it would seem, on his belief that 5,000 GWh could be satisfactorily supplied. It may be doubted, then, whether this shift in official Treasury policy (elaborated in the next chapter) would have been so pronounced had not this particular reapportionment of responsibilities taken place.

The fact that Planning should release a paper entitled "Mobil vs Electricity" suggests that this division recognised that the matter of gas allocations was not as clear-cut as some of the earlier advice to NZE appeared to indicate. Nevertheless, Planning did not seek the urgent resolution of this issue. Instead, the research that was carried out seems to have been treated as part of an on-going refinement of planning assumptions. In part, the Division's complacency was allowable because the preliminary analysis favoured the Mobil process. However, the nature of the assumptions underlying the analysis and the low priority attached to the issue are suggestive of a bias toward the petrochemical industry and against the smelter that is consistent with previous stands taken by the division.

Neither Treasury nor Planning Division were disposed to make the gas allocations the subject of intensive interdepartmental investigation. On the other hand, such an investigation was in NZE's interest. NZE's paper of 23 May requesting information enabling the division to challenge the justification for gas constraint is a step in this direction. However, its impact was minimal. Planning's reaction, as discussed above, was simply to proscribe the request as
illegitimate. Wong claims that NZE "didn't have enough clout to alter the situation".\(^1\) However, the lost opportunities littering this whole episode suggest that "clout" is not necessarily a fixed quality but something which can be created and controlled.

Some of NZE's suggestions for alleviating the gas constraints, specifically, making Kapuni gas available and limiting NGC, were treated more sympathetically by Planning. However, it is difficult to attribute even this to NZE's demands since Planning had adjusted these assumptions before NZE's letter of 23 May. As discussed above, the dry year deliverability allowed from Kapuni was largely a response to Carrie's paper of 28 April. In fact, NZE had argued against the use of Kapuni gas in the paper of 15 May when the division was struggling to refute Carrie's criticisms. The suggestion that NGC could be restricted was another of Carrie's proposals only recently adopted by NZE. Unfortunately, in putting forward this proposal to Planning NZE neglected to acknowledge the measures that had already been taken in this area, perhaps because it was unaware of them. Hence, in reply, it was sufficient for Planning to outline the current allocation for reticulation which was lower than the mean requirement sought by NGC and had been held to a plateau from 1995. Planning added that these restrictions constituted an arbitrary decision in favour of NZE.\(^2\)

6.9 The Energy Plan Nears Completion

In the last two weeks of May, the Ministry of Energy began to draw together the Energy Plan work carried out in the divisions.

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1 Interview: S. Wong.

Because so many of the interrelationships among energy forms were embodied in electricity planning this sector was only now acquiring firm information on which to base a reliable power plan. On 16 May Mines Division had supplied NZE with its most detailed estimate yet of coal delivery rates. 'Minimum', 'mean', and 'maximum' figures were given for each year with the proviso that the 'maximum' figures only applied for one year at a time. If the 'maximum' was taken for one year, then there would have to be supply below the mean until the stripped coal in the open cast mines built up to the point where another 'maximum' year could be supplied. The forecast of supply did not include coal from Maramarua. Partel claimed that if New Zealand Steel got any coal from Maramarua it would make no difference to Mines Division's ability to supply NZE.

On 22 May, Planning Division presented NZE with a revised oil price projection which had, at least superficially, been discussed with Treasury at the beginning of the month. To minimise price and supply risks, the latest projections would be based on a 90 percent confidence level (that is, a relatively high oil price forecast was chosen which was estimated to have a 90 percent probability that it would not be exceeded) together with a premium of 5 and 15 percent for crude oil and distillate, respectively, to cover the risk of having to pay spot prices. This memorandum was followed by another on 23 May detailing final revisions to the Energy Plan assumptions. All assumptions relating to oil, gas and coal, were much as stated previously, although the possibility of importing Australian coal was accepted as a speculative planning assumption. This memorandum confirmed that deliverability from a second Maui platform could not be assumed in planning.

1 W. Partel (memorandum from Mines Division to NZE) "State coal Mines capacity to provide coal to NZE in the next fifteen years", 16 May, 1980.


3 B. Walker (memorandum from Planning Division to NZE) "Oil Price Projections", 22 May, 1980.

4 W. Duncan (memorandum to all divisions) "Final Revision to Planning Dossier", 23 May, 1980.
CHAPTER 7

POLARISATION
7.1 The Negotiations Resume

Negotiations with FASG were renewed in May. Representatives of Fletchers returned to New Zealand in late April following their visit to Europe during which the Alusuisse board of directors met in Zurich to discuss the smelter proposal. Soon after their return, Fletchers informally indicated that the consortium would make an offer close to officials' offer. On 15 May the consortium met with officials to discuss a document outlining "Proposed Heads of Agreement" presented by the consortium. Many details of this meeting, including the electricity price requested by FASG, are not known. However, it is likely that FASG raised its offer on the electricity price. Other unresolved issues included the base metal price for escalation. Officials stood by the July 1979 Alcan price of 64 cents per pound and the company continued to insist on a December 1979 price of 72 cents. Another persistent difference concerned Fletchers' demand for export incentives on aluminium products apart from the output of Caster II (under current law only Caster II output was eligible for export incentives). There was also the issue of High Priority Status and the concessions it involved.

Officials had been a little surprised to learn that after the discussions in Europe, Fletchers' share in the project had been increased to 50 percent. They explained to Fletchers at this meeting that the increased local involvement would not significantly increase the national benefit from the project. It seems that the extent of New Zealand participation in the project was never a major concern for officials. At the beginning of the negotiations officials had done some prompting to try and increase the New Zealand participation but this had been largely in an effort to improve the public

1 Trade and Industry report to Minister, "Electricity-Intensive Industries: Status Report, Week Ending 11 May, 1980", 20 May 1980, p.1. (The report noted that "... the consortium's latest offer is close to officials' offer.").

2 Notes of meeting, 15 May, 1980.
appearance of the company. The economic benefits of local participation were mixed and seen by Trade and Industry as making little difference overall.\(^1\) Other considerations included the possibility that a large aluminium producer like Alusuisse might, in conditions of slackening demand for aluminium, and falling prices, cut back production first in smelters in which it had a minor share. At some stage officials suggested this scenario to Fletchers as a cause for caution.\(^2\) Officials maintained that they played no part in the shift to 50 percent local participation.

By the time of the meeting held on 12 June, officials appeared to be on the verge of agreement with FASG. The issue of the base metal price for escalation had been finally settled. Both parties now accepted a metal price of 70 cents/lb which represented a compromise between officials' previous offer of 64 cents and the consortium's offer of 72 cents.\(^3\) Unfortunately it is not known how this agreement came about; whether, for example, concessions were required of the company.\(^4\) Officials' offer price was now 1.65 cents/kWh based on a rebate from the base electricity price, allowable once the consortium became committed to proceeding with Caster II. An additional performance-related rebate for Caster II was offered with the

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1 Interviews: Datson, Carrie.

2 Interview: P. McKenzie.


4 It is known that since the renewal of the negotiations, officials were uncertain how to deal with the metal price issue and did consider at one stage accepting a higher metal price in exchange for interruptibility. Of course, this option could not be pursued until the negotiators had received advice on the value of interruptibility. (Notes of meeting, 15 May, 180.)
maximum rebate being 0.2 cents/kWh. The consortium accepted this performance-related rebate but sought an electricity price of 1.55 cents/kWh. At one stage during the meeting on 12 June, an FASG spokesman offered to split the difference. However, agreement was not reached at this meeting and the important issues of the power price and Government incentive schemes were left for later meetings.

Like FASG, Comalco also resumed negotiations in May over its proposal for a third potline. However, in contrast to the negotiations with FASG, the negotiations with Comalco would settle the main points of a contract within a fortnight. Because of their concentrated nature, a little more is known about these negotiations.

Negotiations with Comalco had been suspended while the New Zealand Institute of Economic Research undertook the assessment of national benefits. Results of this exercise were handed to officials on 17 April enabling them to calculate an offer price for the electricity. On 21 April Mr. Datson presented an offer of 1.6 cents/kWh to the company. This price was discounted from the electricity cost of 2.4 cents/kWh (to be approved by CEC on 22 April). This offer did not include any

1 This electricity price of 1.65 cents may have been slightly lower than rebates from the new electricity cost of 2.4 cents would allow. This cost minus the 0.4 cents discount for smelter benefits, gives a base price of 2.0 cents. It will be recalled that in early March the company had been offered a base price of 1.8 cents (2.2 cents - 0.4 cents) with a minimum rebate for Caster II of 0.2 cents (giving an effective offer price of 1.6 cents) and a maximum rebate of 0.4 cents. On this basis the rebate for commitment of Caster II would now allow an offer price of 1.8 cents (i.e. 2.4 - 0.4 - 0.2 = 1.8). At the time of settlement with FASG in July, the rebate for commitment of Caster II had been increased to 0.3 cents. If this rebate was being used at this time, then an offer price of about 1.7 cents is allowable.

2 Notes of meeting, 12 June, 1980.
discount for downstream processing and Mr. Datson added: "In making this offer I am assuming that an automotive component foundry producing 12,000 tonnes per annum will be installed as an adjunct to the third potline."  

An escalation clause was suggested based entirely on the Alcan posted world price for aluminium.

Officials' offer was rejected by Comalco but arrangements were quickly made for a meeting with officials on 5 May to be followed on 6 May by a meeting with the Ministers of Energy and Trade and Industry. At the first meeting initial attention was given to the discount on the power price. The company argued that on the basis of the Institute's report, a price of 1.0 cents/kWh could be charged while still giving the Government a 10 percent rate of return. The company also questioned the validity of the 10 percent discount rate and some aspects of the Government's electricity costing. According to a file note on the meeting, officials in their reply explained that the Government did not mind a higher rate of return and that it had a number of competitive proposals to consider.  

Although the

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1 Letter from G. Datson to I.F. Borrie (Comalco, Australia), 21 April, 1980.

2 This downstream processing would be eligible for export incentives. I do not know what metal price was assumed in the calculation of the discount. The Institute in its published report of its analysis (T.K. McDonald and C.J. Ashley-Jones, The Tiwai Point Aluminium Smelter: The National Economic Benefits of an Expansion, Wellington: New Zealand Institute of Economic Research, 1980) used a base metal price of $1,600 per tonne. However, in their negotiations with FASG, officials had been using a metal price of $1,400 per tonne (64 cents per pound). The extent of the discount for national benefits was not a significant point of contention in the negotiations and does not appear to have been debated in terms of the metal price assumed. In part, the large discount for national benefit was brought about by the infrastructure already in place, and other investment, in anticipation of the expansion.

3 R. Milner, (Trade and Industry internal memo.) "Meetings with Borrie and Bennett of Comalco Ltd. to discuss the building of a third potline at Tiwai Point, May 1980", 9 June, 1980, p.1).
company had raised some important matters, one gains the impression that the discount for national benefits was discussed in an unusually light and amicable way. Following this initial exchange, much of the contentious at the meeting was focussed on the escalation provisions. At one point the company suggested an offer price of 1.2 cents but this was complicated by its linkage to disputed escalation indexes and base dates.¹

After this meeting the negotiating team met separately to reconsider its offer in light of a question raised by the company about its entitlement to a regional investment allowance. It appears that officials had earlier assumed the company's eligibility for this allowance but now discovered that it was not eligible, thereby enabling a further reduction of the power price to 1.5 cents/kWh. This figure could now be the new minimum offer. The following day Ministers met with Comalco. On this second day of the negotiations, an electricity price of 1.5 cents/kWh (base-dated to January 1980) was agreed.²

Following this rapid agreement on the electricity price, the main issue remaining to be settled was the nature of the escalation clause. However, four more meetings were required to settle this issue. The main point of disagreement concerned whether an escalator related to NZE's costs or overseas prices should be used. Comalco insisted initially that an escalator linked to rises in the bulk tariff, should be used.³ This proposal appears to have received a sympathetic response from Ministers during their meeting with the company on 6 May.⁴ However, officials believed that there were a number of pitfalls associated with an escalator which followed the costs of NZE. Furthermore, an overseas escalator was preferable to any New Zealand one since the project's return was largely in foreign

¹ R. Milner, "Meetings with Borrie and Bennett ...", 9 June, 1980, p.2.
² Ibid., pp. 2, 3.
³ Ibid., p.1.
exchange earnings and required that the escalator be nominated in a foreign currency. With a New Zealand escalator, any change in the exchange rate would affect the amount of foreign exchange earned by the project.  

In their negotiations with the company, officials pressed for an index which would be based on either the metal price or the United States Wholesale Price Index (W.P.I.) or both. However, progress appears to have been hampered somewhat by the company's belief that Ministers wanted an index based on NZE's costs. Hence, on 14 May, officials sought and gained the Prime Minister's approval for a compromise proposal of an escalator based on the New Zealand CPI (50 percent) and United States WPI (50 percent). However, by this stage the negotiations had probably advanced beyond the need for this compromise formula as agreement was finally reached on 15 May on an index based half on the world metal price and half on the WPI.

By 15 May agreement had been reached on the main points of a contract to supply electricity to a third potline at Tiwai Point. This contract may be seen as the triumph of the EII negotiations. The critical matter of the escalation clause was settled on a basis broadly in line with officials' initial negotiating position. The electricity price of 1.5 cents/kWh was also more than adequate since the cost of supply was actually considerably lower than the 2.4 cents/kWh used to derive the price. This was because the third potline would come on stream two years before the period over which the cost

1 G. Datson (Trade and Industry report to Minister) "Comalco negotiations", 12 May, 1980, pp. 1, 2.
2 R. Milner, "Meetings with Borrie and Bennett", 9 June, 1980, pp. 1-5.
4 R. Milner, "Meetings with Borrie and Bennett ...", 9 June, 1980, p. 5.
of the 5,000 GWh package was calculated and the potline would consequently make greater use of the surplus electricity (the full 5,000 GWh only became available in 1984). Also, the project had a contract period of 15 years compared with the 20 year basis of the electricity costing. As a result of these factors, the return on the project would be in excess of 10 percent.\textsuperscript{1} Unfortunately, officials could not contractually oblige Comalco to include downstream processing as this was dependent on Comalco reaching agreement with the Ford Motor Company to establish an automotive components casting plant at Tiwai Point. However, officials did obtain an assurance that Comalco would use its "best endeavours" to reach an agreement with Ford or, failing that, with some other company.\textsuperscript{2}

The good deal struck with Comalco in such a short space of time provides a sharp contrast with the labouring negotiations with FASG. A partial explanation for the difference is provided by Mr. Datson who points to the quality of the various negotiators. Whereas officials sometimes found themselves "going around in circles" with Fletchers and having to help out some of the smaller local companies, officials were "level-pegging" with Comalco and Alusuisse. These latter were seen as tough and experienced negotiators but ones with whom progress could be made. Mr. Datson also cites the Government's past contacts with Comalco suggesting that this relationship may have improved the understanding between the two negotiating parties.\textsuperscript{3}

Other factors are likely to have been at least as important. For example, trust and understanding may also have been promoted between the two parties through the employment by Comalco of an outside consultant to perform the cost-benefit analysis. This

\textsuperscript{1} CEC Paper, "Comalco: Third Potline Negotiations", 27 May, 1980, p.4.

\textsuperscript{2} Ibid., p.2.

\textsuperscript{3} Interview: G.M. Datson. .
may help explain the fact that the discount for national benefits was not debated very seriously and agreement on price was reached in a very short time. Perhaps the most important factor was that electricity was available at a price which would enable a satisfactory return for both parties. The Government was able to offer a discount of 0.9 cents/kWh and still make a return in excess of 10 percent because Comalco's 1,500 GWh was over-costed at 2.4 cents/kWh. It seems reasonable to assume that Comalco found 1.5 cents/kWh to be an internationally competitive price.

Finally, both parties were anxious to get the third potline on stream quickly. Although the company did not display immoderate eagerness, it did make occasional references to the market opportunities available in the short-term. Because much of the infrastructure was already in place at Tiwai Point, expansion could be undertaken very quickly, enabling production to start some two years before the start-up of some large Australian smelters and during a period where an aluminium shortage, and hence high prices, were predicted. For officials, the third potline was the first breakthrough in the protracted EII investigations and hence the first opportunity to show some concrete results to Ministers. The project was especially advantageous politically because it would get underway quickly, it would be environmentally uncontentious,

1 For example, M. Rayner (Comalco) in a letter to L.R. Adams-Schneider (the Minister of Trade and Industry) on 22 January, 1980: "Because of the events in 1976 and 1977 culminating in the Heads of Agreement in December 1977, we had not planned for an early addition of a third potline at the NZAS smelter. However, it now appears that there are market opportunities in 1982 which could make such an addition to smelting capacity practicable, if it could be in production early in that year." His mention of the even in 1975 and 1977 into the renegotiation of the contract with Comalco when the price of electricity to the Tiwai Point smelter was substantially increased.

and it would make early use of the electricity surplus. Another consideration, as was stressed later during a discussion of environmental impact assessment procedures, was that each month delayed in commissioning the third potline would cost the country approximately $2 million. The cost of delay would be particularly salient in a situation such as this where a project could be got underway soon and in a relatively straightforward fashion.

Officials sought approval from CEC for a draft Memorandum of Conditions of Supply on 27 May. Ministers were generally satisfied with the agreement and seem to have devoted much of their attention to the matter of how an environmental assessment would be conducted. Ministers also inquired as to how much of the surplus electricity would remain after 1,500 GWh was allocated to Comalco. According to the minutes of the meeting: "Officials indicated that the question of exactly how much surplus electricity was available had still not been resolved, although they pointed out that even if the block was as small as 2,000 GWh, it would be possible for two silicon carbide plants and maybe the AHI glass plant to proceed, in addition to the Comalco third potline expansion." CEC referred the paper to Cabinet which, on 3 June, directed officials to finalise the agreement for the supply of electricity.

1 D. Young (memo. to Prime Minister) "Comalco", 22 May, 1980.
3 Ibid., p.l.
4 These were the only small industries still in contention. Negotiations with Ceramco for a silicon carbide plant were held up at this point while the company conducted further research on the suitability of New Zealand silica and coal. The AHI project for glass manufacture was also delayed while the company worked out its electricity price and quantity requirements. Carborundum's silicon carbide project was close to being finalised but the company was yet to decide whether to site the plant in Australia or New Zealand. In mid-June Carborundum advised that it would not establish its plant in New Zealand.
Many officials in the Ministry of Energy were disturbed by the vigorous pace at which the negotiations were proceeding. They felt that little heed had been paid to the Ministry's warnings and that there was now a need to impress upon other departments the implications of recent changes in energy planning assumptions. Accordingly, as a new power plan incorporating the 5,000 GWh package was being finalised in early June, it was decided that the best way to communicate the risks and uncertainties involved in this plan would be through a 'presentation' hosted by the Ministry and attended by members of the negotiating team and other interested officials. It was also hoped that the clarity of the presentation together with opportunity for questions and discussion would enable officials from other departments to gain a better understanding of the complex problems the electricity planners faced.

The presentation was held on 13 June. After introductory remarks by Duncan and McCool, Wong proceeded to outline the main areas of uncertainty in power planning and the ability of the generating system under various assumptions to meet the forecast load growth plus the 5,000 GWh increment. The main areas of uncertainty concerned the Maui gas constraint effective from 1985, coal supply limitations, the basic load forecasts, and oil burning limitations. Wong outlined the assumptions which had been made in these areas. In the case of coal he noted that in a dry year Huntly could use 2.2 million tonnes but that the maximum deliverability could
not reach this level until 1988.\textsuperscript{1} An additional problem was that to enable the 'maximum' quantities to be produced during dry years Mines Division had advised that the 'mean' annual quantities would have to be produced. NZE would therefore have to use these annual quantities even though under mean hydrological conditions this requirement would involve burning coal instead of cheaper gas. Burning coal "out of merit order" would obviously increase the cost of the 5,000 GWh package.\textsuperscript{2}

A limit on oil burning was the most recent change to planning assumptions. NZE decided that 15 and 5 percent output factors should be placed on fuel oil and distillate stations,

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|}
\hline
Year & Minimum & Mean & Maximum \\
\hline
1983 & 560 & 800 & 1,100 \\
1984 & 650 & 1,100 & 1,550 \\
1985 & 800 & 1,400 & 1,900 \\
1986 & 800 & 1,600 & 2,100 \\
1987 & 850 & 1,650 & 2,150 \\
1988 & 1,050 & 1,850 & 2,350 \\
1989 & 1,400 & 2,000 & 2,500 \\
1990 & 1,550 & 2,150 & 2,650 \\
1991 & 1,750 & 2,350 & 2,850 \\
\hline
\end{tabular}
\caption{The capacity of State Coal Mines to provide coal to NZE is shown in the following table.}
\end{table}

Relevant to this rate of build-up is State Coal Mine's policy to aim for a production ratio of 2/3 underground to 1/3 opencast. This ratio compares with reserves which are 9/10 underground, 1/10 opencast.

respectively. Because of expected rises in oil prices and the possibility of occasional shortages, it was considered prudent to limit oil burning in this way so that the pattern of investment would shift to other forms of generating capacity. These output factors were accepted by the power planners as being rather arbitrary in that they were only approximations of the opportunity costs of inputs to the generating system. However, planning techniques were not sufficiently advanced to incorporate an opportunity cost framework. According to Hewlett, a power planner closely involved in the development of this measure, officials from other departments reacted angrily, claiming that he had deliberately reduced the output factors to limit the generating system's ability to meet the

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1. Previously plant factors for oil-fired stations had been about 30 percent. The effect on generating capacity may be judged from the following table:

<table>
<thead>
<tr>
<th>Station</th>
<th>Annual Plant Factor</th>
<th>Annual Generation (GWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marsden A</td>
<td>15%</td>
<td>320</td>
</tr>
<tr>
<td>Otahuhu</td>
<td>5%</td>
<td>123</td>
</tr>
<tr>
<td>Whirinaki</td>
<td>5%</td>
<td>96</td>
</tr>
<tr>
<td>New Plymouth (oil)15%</td>
<td></td>
<td>150/machine</td>
</tr>
</tbody>
</table>

These plant factors are averages. In practice oil-fired stations supply much peak load generation.

(NZE report to Minister, "Planning for Electricity Intensive Industries", 6 June, 1980, pp. 1, 2.)


3 Interview: M. Hewlett (NZE).
extra 5,000 GWh load. Without commenting directly on the justification or otherwise of this perception, it does seem strange that the ability to meet the 5,000 GWh case should be constrained by this measure when it was primarily intended to shift the pattern of future plant investment away from oil-fired plant. (This point is discussed more fully in a later section.) It may also be noted in passing that while the necessarily-approximate level at which plant factors were set may be acceptable, in combination with certain other approximate assumptions, it gives planning for system expansion an uncomfortably arbitrary appearance. For example, planning for system expansion is influenced by the de-rating of oil-fired plant which in turn reflects the high cost of oil. However, this oil cost is based on a conservative 90 percent confidence level. In addition, system expansion is based on dry year capacity with a 7 percent margin added to the load forecasts to provide for such contingencies as plant breakdowns, delays in commissioning new plant or higher-than-expected load forecasts. Considerations such as these may have influenced the thinking of those officials in Trade and Industry and the Prime Minister's Department who tended to be a little cynical about the basis for certain power planning assumptions.

After outlining the four most critical assumptions Wong proceeded to treat the uncertainty involved by developing a range of scenarios based on different load forecasts ('upper', 'central', 'lower') and cases of restricted (corresponding to the best current estimate of availability) or unrestricted supplies of oil, gas and coal. Using a slide projector Wong displayed graphs of the relationship between supply and demand in each scenario. One graph reproduced here as Figure 2 shows the ability of the system to meet the 'central' load plus 5,000 GWh where all fuel supplies are treated as restricted.

This graph shows that under normal planning requirements — dry year capacity and 7 percent margin on the 'central' forecast — there is the possibility of a shortfall between 1985 and 1992. Of course, what have been called "oil-burning restrictions" are in fact little more than nominal output factors for planning purposes; they would hardly be strictly adhered to if the nation was faced with a power shortage in a dry year and the oil was available and affordable. By assuming unrestricted oil burning the period of shortfall could be reduced to cover the years 1985 to 1989. However, the potential cost of this oil burning
could be very high, perhaps up to $178 million in 1987/88.\textsuperscript{1} No major new power stations could be built early enough to remove this shortfall. Although the commissioning of Ohaki in 1986/87 and Clyde and Luggate in 1988 would help to relieve the problem, the required planning standard is not met until the commissioning of two further stations, Queensbury and Gibbston in 1991/92. Claude Nixon who also addressed the meeting claimed that the construction programme was only just feasible. This programme required the commissioning of Clyde and Luggate by 1988 with work continuing on the three other Clutha stations and on a thermal and a geothermal station in the North Island. The main problem would be in finding sufficient skilled staff, particularly at a time when other large projects were being constructed. One likely solution lay in the employment of overseas consultants. Nixon concluded that the construction programme was feasible "provided extraordinary measures are taken in securing statutory clearances and assembling the necessary skilled workforce and all concerned ... adopt an energetic and imaginative approach".\textsuperscript{2}

No comparable statement of the feasibility of supplying the 5000 GWh increment was made in Wong's part of the presentation. Instead the major uncertainties were simply pointed out. This analysis contained little that was new, indeed some of the issues had been around for months. In any case, officials from other departments had been following all the developments in electricity planning with interest. Mr Datson summarised the views of at least his own department when he said "The presentation told us nothing we did not already know ".\textsuperscript{3}


\textsuperscript{2} Ibid., p.20.

\textsuperscript{3} Interview: Datson.
Fancy agreed; there were "no revelations" and the presentation was followed by only a little discussion among officials. Datson stressed the difficulty negotiators were placed in now that the electricity availability appeared uncertain. He requested a revised estimate of the cost of a 5000 GWh package recognising that the revised planning assumptions could raise the electricity price above the 2.4 cents/kWh currently assumed. Wong replied that a firm cost estimate would be available in about a week. When the meeting closed most officials believed that once the electricity costings were available, the next step would have to be a report to CEC.

7.3 The Last Electricity Costing

An accurate account of the way the costing work was handled is difficult to compose. The costing exercise is complex and the technology uncertain, some of the most basic concepts are not always used consistently. Also, officials in NZE are reluctant to discuss the costing exercise because, overall, it was not very successful. The technical problems meant that mistakes could easily be made and that the results were necessarily tentative. Also, as has already been seen, changes in basic assumptions can have a significant impact on the costing. Whereas officials in NZE tend to understate these problems, one receives the impression that officials in Trade and Industry and the Prime Minister's Department, are inclined to exaggerate the fallibility of the costings. Officials in these departments, understandably frustrated by the impact of costing shifts on their basic negotiating assumptions, claim that NZE was constantly changing its costing estimates. This claim may be an exaggeration of events which occurred in June and July. Nevertheless, it is likely that the costing exercise was in greater flux than is indicated by the few official figures discussed so far. For example, a number of officials have referred to a price of

1 Interview: H. Fancy.
2.0 cents/kWh as having gained some acceptance between the dates when 2.2 cents/kWh and 2.4 cents/kWh were officially sanctioned. A little more is known about the costing exercise begun in mid-June because it was the focus of considerable attention. Clearly, the figure NZE produced on this occasion would be the most crucial given that the negotiations with FASG and the work on the Energy plan were both well advanced.

Prior to this period, all prices were calculated by Dick Pearce and were based on the "wedge" method, alternatively titled, the "annuity" method. Essentially, this method involved calculating the cost of an extra 5,000 GWh load through two phases of supply. During the period of "surplus" electricity the only costs assigned to the 5,000 GWh load were those due to extra fuel burning. No portion of operation and maintenance costs on power stations was included because it was assumed that the additional loads would not cause additional costs in these areas. The "surplus" period ended with the need to construct new power stations in 1988.¹ In fact new capacity was needed before this date but for practical reasons could not be built soon enough. Hence, in 1988, a second period began of rising capital costs depicted as a "wedge".²

For various reasons Pearce began to believe that this methodology was unsatisfactory. On 16 June he produced another costing using what he termed the "difference between two power plans" method.³ This method involved drawing up two,


2 Although the Ohaki geothermal station had not yet received final Government approval to construct, and was intended for commissioning in 1986, this station was treated as a sunk cost (as were all existing stations) because it had been included in the 1979 Power Plan, that is, power planners intended to build the station by 1986, regardless of the 5,000 GWh load.

3 Interview: D. Pearce.
power plans, one designed to meet the extra industrial load and one not. Each of these power plans was then costed with the difference in cost representing the cost of the incremental load. By this stage officials were treating some 2,000 GWh of the 5,000 GWh package as having been committed: about 1,500 GWh to Comalco and a further 500 GWh to small industries. Hence, it was now necessary to determine the cost of an extra 3,000 GWh being the cost of electricity to a new smelter. The two power plans relevant in this situation were for the 5,000 GWh and 2,000 GWh cases. Pearce's first effort at costing these two plans produced a very low figure of about 1.7 cents/kWh. Believing this figure to be unrealistic he abandoned it but persevered with the methodology.

A couple of days later Pearce was asked by Wong to do another calculation using the wedge method and incorporating some new assumptions. The nature of these assumptions is unclear but they appear to have altered the definition of the transition point between the periods of "surplus" and system expansion - a major problem area in the wedge methodology. Pearce refused to do this calculation maintaining that the assumptions were unjustified. He believed that Wong had introduced the new assumption because its effect would be to raise the cost of power to the smelter. For some weeks Pearce had been of the opinion that NZE's management was "not trying very hard to carry (the smelter investigations) forward". He had noted opposition toward the smelter in discussions with these men and believed that it was reflected in their stance on specific issues such as interruptibility. Hence, relations between Pearce and Wong were strained before Wong's request. Pearce's refusal marked, as he put it, "the beginning of my demise".

1 Interview: D. Pearce.
The next important costing was done on 24 June by Mike Hewlett, the head of the power planning section, which was also under Wong's supervision. Using the wedge method, and taking into account all the latest fuel restrictions, Hewlett attempted to revise Pearce's previous calculations. He produced a cost of 2.9 cents/kWh for the 3,000 GWh increment and a cost of 2.71 cents/kWh for the whole 5,000 GWh. The reference date for these costings was January 1980. Hewlett noted that Pearce's calculation of 2.4 cents/kWh, based on July 1979 prices, could be expressed as 2.77 cents/kWh in January 1980 terms.\footnote{Letter from W. Duncan to G. Datson, "Electricity Intensive Industries: Review of Cost and Risk of Supply"; 24 June, 1980.}

These figures were officially released by Wong. It is interesting to note that in a brief accompanying statement, Wong felt obliged to raise the matter of interruptibility. Wong observed that in the New Zealand island type of climate it is not possible to predict with any certainty the timing and extent of inflows into the lake and river system. "Consequently", he claimed, "it would be difficult to determine with any certainty when supply to a smelter should be interrupted to save oil burning .... To be of value to the electricity power system an interruptible load would need to be disconnected on request with only a few weeks notice, and each period of interruption could range from several weeks to several months depending on subsequent weather conditions".\footnote{Ibid., p. 2.}

Again, NZE was making the presumption that interruptibility was not in the smelter's interests despite the company's own request that the matter be investigated. In any case, one would expect that the question of how much interruption of supply the smelter could stand was really something to be determined through negotiation. As to the suddenness of changes in hydrological conditions, this is not so abrupt that System Control engineers do not know when to increase the output of thermal power stations to compensate for the low hydro gener-
ation. One would expect that interruptibility would be negotiated for exceptional circumstances and not for just any deviation below mean hydro capacity. Seen in this light, Wong's statement tends to confirm the view that NZE had not, as yet, investigated the value of interruptibility and did not intend to do so.

Hewlett's costing had been very hurriedly done. It provoked further analysis in Treasury and Planning Division at least, but this was soon overtaken by a more advanced costing released on 10 July.¹ This costing was based on the "difference between two power plans method" which had been adopted by Wong and Hewlett in the interim and dubbed the "Discounted Cash Flow" method. By costing the 2,000 GWh and 5,000 GWh cases, Hewlett arrived at a cost for the incremental smelter load of 2.84 cents/kWh. The most significant adjustment Hewlett had made added 0.3 cents/kWh in the 5,000 GWh case for "margin infringement". This adjustment does not appear to have been solely Hewlett's invention but was also discussed beforehand in Planning Division (possibly originated there) and Howard Fancy was also critical of earlier costing work for "not comparing like with like".²

Fancy's point and the reason for the adjustment was that if a legitimate comparison was to be made between the two power plans both would have to maintain comparable levels of security. However, as had been made clear at the "presentation", no power plan could be designed that would cover normal demand plus 5000 GWh plus the 7 percent contingency margin over the years 1986 to 1991. To compensate for this margin encroachment Hewlett attempted to calculate the cost of supplying the needed electricity if the means were available. Hewlett noted that, "This is difficult to assess


² H. Fancy (Treasury internal memo.), "Electricity 2,000/5,000 GWh"; 8 July, 1980.
but various methods, such as storing extra oil or retaining Meremere and advancing Marsden B commissioning date, seem to indicate a cost of the order of 0.3 cents/kWh.¹

Wong released the figure of 2.84 cents/kWh as the official costing. Most interested officials in the Ministry endorsed the figure because it seemed to accord with their own estimates and expectations. Mr Duncan took the view that it was more realistic to treat the costing as falling into a range rather than as a specific figure. Duncan decided that the official costing should be in the range 2.5 – 3.0 cents/kWh.² He was thereby recognising the variability that could arise from possible changes in basic assumptions. Planning Division endorsed the new costing as "a reasonable lower bound given the prevailing optimism concerning lead times, build-up rates and statutory clearances".³ However, there was at least one important detractor within the Ministry.

Pearce had continued to do costing work in NZE and after Hewlett's 2.9 cents/kWh was announced on 24 June, Pearce produced a very low costing which he released from the division without Wong's consent. On 7 July Pearce did another calculation using the "difference" method, this time arriving at a cost of 2.47 cents/kWh for the smelter load.⁴

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² Interview: S. Wong.
³ Planning Division (report to Secretary), "Comment on NZE's paper of 10 July on 'Cost of Supply to New Smelter'"; 11 July, 1980, p.1. (The references here are to the lead times involved in power station construction and to the coal build-up rate. The division did comment in the report that fuel costs were understated because of the low opportunity cost of gas which NZE was using. Planning also believed that capital costs were understated because the capital costs for the crash construction programme involved in the 5,000 GWh case were the same as for a normal programme except for savings achieved through the payment of interest over a shorter period. Planning argued that the capital costs of the 'crash' programme should be higher than the normal programme or otherwise the 'crash' programme would itself...
Although using some different assumptions, his results are remarkably similar to Hewlett's once allowance is made for differences in the calculation of transmission costs and margin infringement. Hewlett assumed transmission costs to be 0.17 cents/kWh after averaging the cost to different potential smelter sites. Pearce assumed a cost of 0.1 cents/kWh for transmission to Aramoana. The other important difference was, as will be elaborated shortly, that Pearce made no adjustment for margin infringement.

Pearce believed that further work was required on the costing of 7 July. Shortly after, Pearce produced another figure in the range of about 2.6 cents/kWh but this, he believed, was probably too high. By this stage Pearce's responsibilities had been restricted by his superiors, apparently for releasing information without first obtaining Wong's consent. Pearce was allowed to continue costing work in a limited way but it seems that he continued to advise officials from other departments of results which he firmly believed to be correct but which had not been consented to by his superiors. Finally, Pearce was relieved of his position.

Most officials who dealt with Pearce, both inside and outside NZE, agree that he is a man of integrity. They interpret his actions as being motivated by an intense desire to establish the truth, at least as he saw it. Pearce's own testimony suggests that his main concern was to counter what he thought were a number of unjustifiable power planning assumptions. In his view, some senior officials in NZE had reached the conclusion over the previous couple of months that a new smelter was undesirable and that, the more unattractive that power supply arrangements could be made, the more likely it would be that the smelter would not proceed. Senior NZE officials, on the other hand, argue that they had some strong reservations about NZE's ability to supply a smelter but maintain that the best available assumptions were used in power planning and costing.

1 Interview: Pearce.
2 Interview: Wong.
Obviously, a matter such as this cannot profitably be pursued very far. Nevertheless, some of Pearce's specific objections are of interest if they expose inconsistencies within the analytical framework adopted by the power planners. Pearce rejected the 0.3 c/kWh loading for a shortfall in planning margins because, in his assessment, there was no shortfall. Hewlett's power plans had de-rated much thermal generating plant as a planning assumption designed to shift the balance of power station investment away from thermal power stations. Under this planning assumption, some existing oil-fired plant became redundant. However, because planners were not able to install sufficient new capacity to meet the load with oil-fired plant derated, and because this rating was nominal in the manner described above, one would expect this oil-fired plant to operate at the levels indicated in previous power plans if a dry year did, in fact, evantuate. Under these conditions, provided the cost analysis properly takes into account the cost of oil-firing in dry years together with their probability of occurrence, no cost loading is appropriate.¹

Naturally, this extra oil burning would have involved extra cost. However, Pearce maintained that it would be much less than the 0.3 c/kWh added by Hewlett.² The exact basis of Hewlett's calculations of the cost of margin infringement is unclear. No analysis of this appears to have been released to other officials. In an interview Hewlett commented that "the cost of comparable system security of 0.3 c/kWh can be derived by assuming that we could bring imaginary plant forward, to cover the shortfall". In his paper of 10 July, Hewlett refers to other methods for deriving the cost based on hypothetical schemes such as "storing extra oil or retaining Meremere and advancing the Marsden B commissioning date".

¹ Interview: Pearce.

² The 0.3 c/kWh adjustment was based on a 'shortfall' incurred in only six years but its associated cost had been spread over the whole 25 year period being costed. It should also be noted that any easing of oil-burning restrictions in the 5,000 GWh case should also be allowed in the 2,000 GWh case, possibly making that case cheaper too.
Pearce argued that any costing based on the cost of storing oil was excessive. In his opinion, since the oil price used in the calculations was based on a 90 percent confidence level and incorporated a loading for spot market purchase, the addition of a cost for storing oil for security purposes was double counting. Presumably the "hypothetical" option of retaining Meremere and advancing Marsden B, was mentioned because Hewlett wanted to point out that even if these actions could be taken, they would make little difference to the costing. Pearce maintained that these measures were not only possible but they also reduced the cost to the smelter. For Pearce, the claim that Meremere could be retained for a few years, or perhaps refurbished involving some additional cost, was important because, as Table 1 shows, oil fired capacity was not entirely sufficient to relieve the shortfall which would occur from 1986 to 1991. The deficiency in 1986 and 1987 could be more than covered by an extension of three years to the Meremere station's operation.

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<td>Shortfalls in planning margin (GWh)</td>
<td>2,530</td>
<td>2,717</td>
<td>1,361</td>
<td>1,521</td>
<td>1,144</td>
<td>1,352</td>
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<tr>
<td>Nominal reduction in oil-fired capacity (GWh)</td>
<td>1,835</td>
<td>1,835</td>
<td>2,055</td>
<td>2,799</td>
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Although extra coal-fired capacity could possibly be made available in these two critical years, there was still the problem of coal constraints. Pearce noted that one helpful option not included in Hewlett's calculations was the importation of coal from Australia. However, Pearce believed

1 Interview: D. Pearce.
2 Meremere was planned to be decommissioned in 1984.
3 D. Pearce (NZE internal memo.), "Margins in the Central + 5,000 GWh Expansion Plan"; 4 July, 1980.
that this was an expensive option and that the short-term supply difficulties could be better met by stockpiling. As discussed above, the coal supplies were constrained by the need to build up capacity but also by the inflexibility of this capacity. In wet and mean years NZE had to burn a certain minimum quantity of coal which was above its actual requirements. Maintaining this level of coal burning necessitated the suppression of some gas-fired generation which was considerably cheaper than the coal.¹ In one paper Pearce calculated that this "out of merit order" coal burning added an extra 0.23 c/kWh to the 3,000 GWh smelter load under wet hydrology conditions and 0.13 c/kWh under mean hydrology conditions.² Clearly, if the excess coal in wet and mean years was stockpiled instead of burnt, it could be used to supplement or meet dry year requirements enabling considerable cost savings to be achieved.

Stockpiling is an obvious, commonsensical solution to the problem of coal constraints. There is evidence that the idea was raised in Treasury soon after the problem of supply inflexibility was raised in early May. However, when Pearce raised the possibility of stockpiling with his colleagues in NZE at the beginning of July, no action was taken. The official explanation was that stockpiling was not feasible. The nature of Huntly coal was such that when stored in very large heaps, it presented the danger of spontaneous combustion.³ This appears to have been the prevailing understanding within Treasury, as well.⁴ Nevertheless, there are good reasons for doubting the validity of this information and it is surprising that the issue does not appear to have been very seriously examined by either Treasury or NZE.

¹ For much of the decade of the 1980s the opportunity cost of gas was assumed to be zero.
² D. Pearce (NZE internal memo.); "Coal Storage"; 3 July, 1980.
³ Interview: D. Pearce.
⁴ Interview: R.G. Laking.
A storage capacity of at least 500,000 tonnes would be required to cope with NZE's variable needs. The storage currently allowed for at the Huntly power station was 225,000 tonnes but this was only adequate where part of the station's generation would be gas-fired. 1 Already gas constraints had forced planners to allow for greater quantities of coal burning at Huntly and hence, storage. A layman considering this situation would no doubt be inclined to ask how 500,000 tonnes of coal could be so much more volatile than 200,000 - 300,000 tonnes. While he might be easily persuaded that the dangers were increased in the larger storage case, he could still be forgiven for thinking that the problems could be removed if more land was made available for storage. These doubts occurred to Pearce leading him to make enquiries of Mr G. R. McKenzie, NZE's principal generation engineer. McKenzie's view was that, if handled properly, there should be no problem with storing large amounts of coal. The main requirement would be extra land but this would probably be available near the mine head. Alternatively, extra land could be leased or bought. Of course, this does not constitute a conclusive case for the feasibility of coal storage. It does show that this issue is not very complex and might have been resolved with a little investigative effort. Hence, the failure to pursue the issue of coal storage casts doubt on the determination of Treasury and the Ministry of Energy to satisfactorily settle the power planning and costing work related to the smelter. 2

1 D. Pearce (NZE internal memo.); "Coal Storage"; 3 July, 1980.

2 After the decision to proceed with the smelter further investigation was made into coal storage. According to a newspaper article: "The Ministry of Energy is looking at the feasibility of creating a million tonne coal stockpile.... In dry years stockpiled coal could be used to boost generation from the station to compensate for low hydro lake levels .... Because of the risk of fire in large piles of coal, the stockpile would probably consist of a number of heaps of about 100,000 tonnes each with room between them for earthmoving equipment to manoeuvre" (Evening Post, 4 March 1981).
Overall, it can be seen that Pearce had four main objections to the way the power planning and costing work was being handled. These may be summarised as:

(a) the incorrect imposition of a loading of 0.3 c/kWh for margin infringement in the 5,000 GWh case;

(b) the failure to refurbish Meremere despite the shortfall;

(c) the excessive lead time allowed for the conversion of Marsden B to coal; and

(d) the failure to allow for coal storage to meet fluctuating thermal generating requirements.

All these points were promoted by Pearce within NZE in early July but they were either not accepted or deemed to make little difference to the costing.

Pearce's influence outside NZE at this time appears to have been minimal. Trade and Industry also refused to accept the costing of 2.84 cents/kWh but this department does not appear to have utilised Pearce's calculations. It could be argued that Pearce's actions provided evidence of internal disagreement which would have been damaging to NZE's credibility. Although this was very likely the effect, it would seem that the officials in Trade and Industry and the Prime Minister's Department were already very disenchanted with the work carried out in the Ministry of Energy. Officials had been left in no doubt as to Planning Division's opposition to the smelter and, as Datson recalls, "Gradually we began to notice a subtle change in NZE's attitude. Finally there was the presentation".¹ From this point NZE could also be

¹ Interview: G.H. Datson.
counted as an opponent of the smelter. Some bitterness was also aroused by the frequent costing adjustments and this appears to have been particularly damaging to NZE's credibility. In these circumstances Trade and Industry paid close attention to the power planning and costing work. Much of this department's information was gathered in a rather informal way through working party meetings, interviews with the officials responsible for specific subjects, and contacts between likeminded individuals. As a result of this kind of intensive investigation, officials from all departments appear to have become acquainted with most of the relevant information. The main differences arose in the interpretation of this information.

7.4 An Unbridgeable Rift: The Departments Present Their Cases

Trade and Industry's objections to the power plan will be dealt with later in a discussion of officials' reports to CEC. However, it may be noted here that this department's views on power planning uncertainties were well developed at least by the beginning of July, as it presented to the Secretary of Energy, on 8 July, a list of options which might be incorporated to reduce the cost of supplying electricity.¹ The first indication of Treasury's position following the revisions to the power planning work is contained in a report to the Prime Minister which was sent on 7 July. A draft 1980 Energy Plan was to be finalised in the next week and the Treasury report was designed to anticipate some of the issues that would develop relevant to the supply and costing of the 5,000 GWh package. These issues would need close attention because

¹ This communication is mentioned in a Planning Division report, "Comment on NZE's paper of 10 July, 1980, on 'Cost of Supply to New Smelter'"; 11 July, 1980. The options raised by Trade and Industry included "deferring methanol and/or Mobil; rapid depletion of Kapuni; gas from Maui B; maintaining supply from Glen Afton to Meremere; increased dry-year output factors on thermal stations". Planning commented: "We consider the extent to which NZE has already made use of these options is reasonable and defensible".
the near agreement between the Government and FASG meant that the negotiations were likely to come to a head just as the Energy Plan was being finalised.

Treasury's report focussed on a number of uncertainties involved in supplying the extra 5,000 GWh, to some extent repeating the warnings made by NZE at the presentation. For a period of six years NZE's normal planning margins were not met, increasing the risk of shortages or expensive oil burning. One matter of particular concern in this connection was the ambitious nature of the construction programme which would be required. Since there was no room for delays, any problems such as shortages of materials or manpower, industrial action, or delays in planning and legislative approvals, could result in NZE operating below normal planning margins for a longer period. This would increase the above-mentioned risks while any construction delay would almost certainly be associated with a real cost escalation.¹

The uncertainty over the feasibility of the construction programme was the most definite problem at this time, while the costing work was still underway. Some criticisms in the report relating to costing were shortly to be satisfied by NZE. However, one significant point which was not resolved concerns the cost of gas. Treasury claimed that NZE's use of a zero cost for gas seemed unreasonable in a situation where NZE was in competition with other potential users for the gas available. Therefore, the cost of gas might have to be revised, probably resulting in a higher cost for the 3,000 GWh package.² ³


2 It should be borne in mind that many of the changes that can be made to the power plan in the 5,000 GWh case (for example, alleviating fuel constraints) also apply to the 2,000 GWh case and may not, therefore, have a significant effect on the cost of the incremental 3,000 GWh.

3 In all probability, the closer scrutiny of these opportunity costs called for by Treasury was long overdue. Both Stan Wong and Geoff Robinson claimed to have "no idea" how the zero cost figure was derived. They were emphatic that the zero cost assumption was not NZE's but Planning's. One Planning official, on the other hand, explained the zero cost assumption this way: "NZE's assumption is that they do not need to buy the gas they just get a deliverability allocation". (Interview: D. Craig.)
The Treasury report also dealt with the main fuel constraint problems which had brought about the shortfall. It was acknowledged that a number of possible ways of easing the constraints existed, although these were still under investigation by officials. These options included: making more Kapuni gas available to NZE, increasing supplies of coal from either State or private coal mines, deferring a petrochemical plant or ethane extraction.1

The latter two options received little discussion in the report and there is no other evidence to indicate that either was being investigated very seriously. Ethane and liquid petroleum gas (lpg) are valuable gas components which Maui Development Limited is permitted by contract to extract from the gas flow. Because of this contractual right, a certain portion of the total deliverability corresponding to the proportion of ethane and lpg to the total gas content, could not be drawn on by the government. However, the company had not, as yet, decided to begin extraction and it had not invested in the expensive facilities which would be required. Therefore, the unanswered question was whether NZE could obtain the final portion of the Maui deliverability by paying the company a price for the gas sufficient to prevent it from proceeding with extraction.2, 3

Perhaps the main reason why this option had not been investigated was that, regardless of the outcome, officials might find that the political will to prevent or defer lpg and ethane extraction


2 This, of course, was a much more complex issue than has been presented here, not the least complication being the need to renegotiate relevant aspects of the contract.

3 Based on an interview with Peter McKenzie. McKenzie appears to have been a strong advocate of this option being investigated, at least within Treasury. However, compared with his views on the Mobil plant (outlined above), his views on ethane extraction were more tentative.
was lacking. Furthermore, any such investigations would take some time to complete. Certainly, there was little chance of any significant conclusions being reached in the one to two weeks that were available before officials returned the smelter issue and associated energy planning problems to CEC. In this context these options appear rather meaningless.

Although more progress could probably have been made in investigating the further utilisation of Kapuni gas and the expansion of coal production, the uncertainties relating to these options were also destined to remain unresolved in the report to CEC. It is not possible to say with any certainty whether Treasury investigated these options with due persistence and vigour. Naturally, the investigations would have been constrained by the shortage of time and the multitude of problems competing for attention. Also, it would seem that much of the difficulty in resolving these matters was, to some extent, attributable to the stance taken by particular divisions of the Ministry of Energy. In the case of Kapuni gas, the stated uncertainty surrounding its availability disguises the reluctance of the Planning and Policy divisions to allocate further gas to NZE. The arguments put forward by these divisions in this regard centered on the need to maintain a gas reserve as insurance against any disruptions to Maui deliverability. Also, the carbon dioxide content of Kapuni gas meant that it had particular value as a petrochemical feedstock.¹ Nevertheless, the fact remained that Kapuni had a much greater deliverability than was currently being drawn on and this meant that, to officials in favour of the smelter at least, the kind of conservationist arguments used by the Ministry were a little suspect.²

The investigation into the potential for expanding coal production was also hampered but not by contrary views as to the use of the resource. Rather, it would seem that Mines

² Interview: P. McKenzie.
Division was simply not as co-operative as it might have been, possibly out of a desire to minimise external interference in its operations. Without attempting a very comprehensive analysis, it may be suggested that this situation derives, to a large extent, from factors related to the division's position in the public service and to its internal structure. In the former regard, it may be noted that Mines Division shares much the same background as NZE in that both are commercially-oriented organisations, recently incorporated in the Ministry of Energy. One cost of the improved integration of energy policy enabled by the creation of the Ministry is the loss of valued independence in the sectoral agencies. If Mines Division does have a relatively defensive or introverted posture as a result, this tendency is probably reinforced by the division's internal structure, specifically, its centralisation. Officials in other departments describe the Assistant Secretary in charge of the division, Mr. Partel, as holding considerable control over the activities of the division and as being the only Mines official with all information at his disposal. Furthermore, Partel tends to release no more information than is necessary. For example, in his memorandum on the probable coal build-up rate, there is little discussion of the basis of the figures and Partel rejected out of hand the suggestion that private mines might supply extra coal. Officials anxious to assess the potential for coal-fired generation found they had little to go on. As one frustrated official commented, "It is very difficult to get a straight answer out of Mines".\(^1\), \(^2\)

1 Interview.

2 While this predicament may reflect the Division's defensiveness, it may also be evidence of the communication failures that can arise where tasks are specialised. An example of this is the difficulty Planning Division had in establishing an opportunity cost for coal. On 7 March Planning sent a memorandum to Mines giving an opportunity cost for coal which had been estimated on the basis of information supplied by Mines. On 3 April Partel replied that "none of these numbers should be used for electricity planning". He argued that the relevant cost was the price of Huntly coal and that "... for future planning this figure should be escalated according to the rate of inflation". It would seem that Partel preferred to base his planning on commercial rather than economic criteria. (D. Craig (Ministry of Energy internal memo.) "Cost/Quantity Interactions in the Energy Plan (Attachment B1 1980")
Overall, Treasury's report provided neither a firm statement of opposition or support for the sale of 3,000 GWh to a smelter. However, in its treatment of electricity supply issues it did constitute a warning. Government should resist reaching a settlement with any smelter proponent while the electricity package was still being recosted and a range of issues (largely related to the fuel constraints) remained to be investigated. Even if these matters could be resolved favourably for a smelter, there were other uncertainties which could not easily be incorporated in the electricity costing but which would necessarily have an adverse impact, in particular, the likelihood of delays in construction and cost escalation.

This Treasury report was sent to the Prime Minister on 7 July. Following the drafting of this report it transpired that on 8 July Mr. Muldoon was to meet with representatives of Fletchers. After the recent progress with negotiations, the company was disturbed by the reassessment of the electricity price underway in NZE and was looking for a firm indication that the FASG project would get the go-ahead.\(^1\) The prospect of this meeting induced Laking to send a second, briefer report on 7 July which was addressed more directly to the subject of the negotiations with FASG. This report noted that, although officials were still finalising the power plan, it was most unlikely that the cost of the 3,000 GWh increment would remain at the current negotiating base of 2.4 cents. Discounted for national benefits, this costing allowed an offer to FASG of 1.7 cents assuming that Caster II would be introduced. The current best estimate of the cost of producing the electricity was about 2.9 cents and on this basis the negotiating price should be about 2.2 cents. The report merely recommended that the Prime Minister note its contents.\(^2\)

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2. R.G. Laking, "Fletcher consortium aluminium smelter proposal", 7 July, 1980, p.2. (The costing of 2.9 cents had been calculated by Hewlett on 24 June.)
A third communication received by the Prime Minister on 7 July was from Hugh Fletcher. In preparation for the meeting to be held on the following day, Fletcher outlined the near agreement on price which had been reached in the negotiations on 12 June. He then referred to the reassessment of electricity costs which was underway in NZE and to another complication: the possibility that Alusuisse might locate its special casting technology in Australia. Fletcher noted that, "an increasing flow of Australian press reports plus private information available to us has lent weight to the seriousness of our partners pursuit of an Australian smelter location". ¹ According to Fletcher, this situation posed "a risk of losing the smelter unless a decision can be made on the question of power availability". ²

David Young was the only official present at the meeting between Fletchers and the Prime Minister held on 8 July. Young recalled that the Prime Minister conveyed to Fletchers his very positive attitude about their venture. He added that the company should act quickly if it wanted to secure the project. Young does not believe that the Australian situation would have influenced the Prime Minister because, as Young put it, "the Prime Minister had already made up his mind to take action". Negotiations had been underway for about nine months and Mr. Muldoon was anxious to get a conclusion. Although there were competitors for the remaining block of electricity, Young says that he was "only aware of the Prime Minister's concern to get one of the industries tied up". ³

Confident of the Prime Minister's support but conscious of the growing opposition among officials to the smelter, the company was no doubt easily persuaded of the need to act quickly.

1 Letter from H. Fletcher to Prime Minister, 7 July, 1980.
2 Ibid.
3 Interview: D. Young.
Another meeting was arranged for 15 July when further progress in the negotiations was expected. Immediately prior to this meeting both Treasury and Trade and Industry presented Ministers with reports advising them of the course that should be taken in the negotiations.\(^1\) The reports' recommendations were largely based on these departments' views of the cost and availability of the 3,000 GWh increment. Their sharply divergent nature shows that differences between these departments had hardened in the course of the investigations. Treasury's report asked Ministers to agree that the minimum price for settlement with FASG ought to be no less than 2.15 c/kWh.\(^2\) A settlement at a price of between 1.55 and 1.65 c/kWh would produce a return to New Zealand on the overall investment significantly below the return the Government normally required and therefore such a sale was not in the national interest.\(^3\) Trade and Industry recommended that Ministers agree that a price of 1.6 c/kWh would be acceptable for a settlement with FASG. Ministers were asked to note that "there are good reasons for believing that the 2.84 c/kWh cost for electricity is too high" and that "any outcome of the discussions with Fletchers this evening would be ad referendum to the CEC on 22 July 1980".\(^4,\) \(^5\)

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1. The reports were addressed to the Minister of Finance, the Minister of Energy, and the Minister of Trade and Industry.

2. This price of 2.15 c/kWh was derived from the cost of 2.84 c/kWh minus the discount for national benefits of 0.7 c/kWh.


5. These papers would shortly become the basis for a split report to CEC so their content will be discussed more fully in that context. This split report was a departure from the normal format of a combined report to CEC. In a telephone conversation held some time in July (it is not known exactly when) Laking and Clarke, the Secretary of Trade and Industry, agreed that their departments' positions were too far apart to be reconciled in a CEC paper.
It is apparent from Trade and Industry's recommendation that this department favoured a further drop in price from the current offer of 1.65 c/kWh to 1.6 c/kWh if this should be necessary to enable settlement. It may be that this was the position of the negotiating team as a whole. A number of meetings were held between Mr. Birch and the negotiating team before the meeting with the company on 15 July and, although no record of these meetings remains, it seems likely that they were used to decide whether the Government could make any further concessions. Birch's own view is revealed in a note he sent to the Prime Minister at this time. Birch recognised the feasibility of the power plan to be a major issue but added, "I personally can see no difficulty with this although it will mean an increase in the allocation of resources. The two hydro dams /Clyde and Luggate, which had been advanced to 1988/ will involve civil engineering forces that are currently underutilised. The MOWD are confident that the programme can be met although Treasury and Energy have expressed some doubts".\footnote{Letter from Mr. Birch to Mr. Muldoon, 16 July, 1980.} Mr. Birch also expressed his support for a reduction in the offer price to 1.6 cents/kWh although he noted a Treasury calculation that this price, reduced from the electricity cost of 2.84 cents/kWh, would only give an approximate rate of return of 6 percent. Birch commented, "This appears to be the major question to be considered by /CEC/; whether or not a 6 percent real rate of return is adequate. My own view is that we may have difficulty attracting significant developments in the South Island based on electricity which would give a better rate of return. Trade and Industry appear to share this view".\footnote{Ibid.} These two quotations suggest that Mr. Birch did not evaluate the project solely on the basis of the electricity price and associated rate of return. Rather, it is likely that he was also influenced by the employment benefits the project would
bring to the construction sector and the regional development benefits which might accrue from the project's location in the South Island.

If Mr. Birch's views set the tone for the Government's negotiating position, then it is likely that the outcome of the negotiating meeting held on 15 July, was a foregone conclusion. The meeting's attendance also indicates that both parties were prepared to do business. As well as Fletchers and the negotiating team, representatives of the Australian partners were also present, as were three Ministers, Mr. Birch, Mr. Adams-Schneider, and Mr. Quigley, the Associate Minister of Finance. Agreement was reached on a base price of 1.6 cents/kWh, subject to Government approval. This price included a rebate of 0.3 cents/kWh on commitment of Caster II. Subject to the performance of Caster II, a further rebate was payable down to a price of 1.45 cents/kWh. The agreement on price, together with other terms already established, meant that the basis for a contract was now largely settled.¹

On the Tuesday following this agreement on the electricity price, officials returned to CEC for the long-awaited decision on whether or not a concessional package of 3,000 GWh should be allotted to FASG. The reports sent to Ministers on

¹ One of the main terms already agreed, was for a contract term of 22½ years from the commencement date of the project. Escalation would be based entirely on the Alcan aluminium ingot price. The base of the index was US$1,550 January 1980. (By July 1980 the metal price had moved approximately 15%, yielding an electricity price of approximately 1.8 c/kWh.) Some important terms remaining to be finalised at this point included the take or pay obligation, export incentives, and investment allowances. The establishment of "floor" and "ceiling" prices was also under discussion. (CEC paper, "Electricity Intensive Industries (Annex A)"; 22 July, 1980.)
15 July now became the basis of a CEC paper with the views of Treasury and the Ministry of Energy expressed in the usual format but with separate reports from each of Trade and Industry and the Prime Minister’s Department included as appendices. While these papers show the four interested departments to be neatly divided - two in favour of the smelter and two against - it would be wrong to suppose that all officials endorsed the departmental line.

For the most part the personal opinions of officials correspond broadly with the official views of their respective departments. However, there is evidence of a small coterie having developed which cut across the inter-departmental cleavage. Four officials in particular - Bruce Carrie, David Young, Peter McKenzie and Dick Pearce - were in substantial agreement as to the feasibility of the power plan and the viability of the smelter. At the working level these officials probably made the most significant and sustained contribution to the smelter investigations carried out in their respective departments. Carrie had been almost continually involved in the EII negotiations where he worked closely with Geoff Datson. Carrie was also involved in the economic analysis of the various projects but as the problems with electricity supply gained prominence, his attention was increasingly diverted to these areas. Young's involvement dated from the beginning of the year when he began to take over from Ron Allan. Unlike the other officials, Young had no specific "expert" role and his tasks are less easy to define; Young's own description of his job is "to liaise closely between the Prime Minister and the government machine". However, it is clear from the accounts of other officials that he played a more positive role than this, particularly as a member of the negotiating team. Towards the end of the period under consideration here, Young, like Carrie, spent a considerable amount of time gathering information to try to resolve some of the outstanding power planning uncertainties. Two of his principal contacts were McKenzie and Pearce. They also had been involved in the negotiations at various times and both could be described as experts in the field of electricity
planning and costing. McKenzie had been associated with this work in Treasury for some time. Indeed, one gains the impression that it had become for him something of a personal interest or hobby. Although McKenzie was mainly involved in the negotiations from about May, he maintained a close interest in developments in power planning.

Frequently, these officials would have had cause to work together on the negotiating team or in working party meetings or simply because of a concern to investigate similar issues. The fact that they all tended to support the smelter meant that they could work co-operatively at times and assisted the exchange of information. It was this kind of concerted effort which enabled the case for the smelter to be built up contrary to the official position taken by the Ministry of Energy. The reports drawn up in mid July by Trade and Industry and the Prime Minister's Department (particularly the latter), were largely based on information gathered by these officials. Hence, despite the clear disagreements between departments, these reports contained a much greater inter-departmental input than was generally recognised at the time.¹

The emphasis placed by Treasury and Energy on the ambitious construction programme and consequent probability of delays does not appear to have prompted much comment, at least not in the reports, from either Trade and Industry or the Prime Minister's Department. Instead, these latter departments relied on a range of other uncertainties which they claimed were potentially favourable to the smelter. Another issue emphasised by Treasury and Energy but which does not appear to have been made a point of contention by Trade and Industry and the Prime Minister's Department, was the problem of the failure to meet normal supply margins. That is, while these departments certainly questioned the extent of the shortfall, they did not question the validity of the supply margins themselves. If NZE's planning criteria (dry year capacity

¹ Interviews.
and 7 percent margin on demand forecasts) were strictly adhered to, then 2,000 GWh would be the largest allowable package. These two pro-smelter departments appear to have been content to leave the matter of the suitability of these criteria to subjective perceptions of the risks involved. For example, in Datson's view the problem of a "shortfall" could be described as a "conjunction of bad circumstances";¹ the feasibility of the 5,000 GWh case was greatly enhanced if one was prepared to chance that a dry year, and such a contingency as a plant breakdown, would not coincide. A similar view was apparently held by Mr. Birch who is reported to have expressed the confident expectation that the critical years of 1986/87 would be wet years.²

Four important power planning assumptions attracted the attention of all departments. These were the demand forecasts and the assumptions relating to the three power station fuels: coal, gas and oil. The uncertainty in each of these areas provided considerable scope for some divergent conclusions to be reached.

Trade and Industry and the Prime Minister's Department both considered that the demand forecasts were too high. In the first place, they argued that it was incorrect to cost the smelter's incremental load assuming that 2,000 GWh had already been committed. So far, electricity had only been committed to Comalco's third potline which had a load of about 1,500 GWh. The remaining 500 GWh was an allowance for some of the small industries but these had not been committed and, as the Prime Minister's Department claimed, were unlikely to evenuate.³

1 Interview: G. Datson.

2 Interview: J. Boshier (opinion allegedly expressed at CEC meeting, 22 July 1980).

The main industries in question were Ceramco's silicon carbide plant with a demand of 400 GWh and AHI's proposal for glass manufacture which had a demand of approximately 100 GWh. All the other small industries had either dropped out of the negotiations or, as in the case of New Zealand Steel's ferrosilicon proposal, been deemed uneconomic. The likelihood of the remaining industries eventuating is difficult to determine. Nevertheless, regardless of the outcome, there would seem to be little justification in theory for including these industries at the margin of the 2,000 GWh package, particularly if, as a result, the sale of electricity to another large user, such as a smelter, was jeopardised.

A second point raised in connection with the forecasts concerned New Zealand Steel's probable level of demand. Allowance had been made in the base forecast for New Zealand Steel itself. Trade and Industry and the Prime Minister's Department claimed that New Zealand Steel could economically generate approximately one-third of its requirements, thereby reducing its demand on the national grid by about 360 GWh. A Treasury and Energy, on the other hand, pointed out that New Zealand Steel had announced no definite intention to proceed with co-generation of electricity. A pertinent point raised during the discussion at the CEC meeting was that the Government could offer incentives to New Zealand Steel to enable the company to generate its own electricity. Not counting the effect of any such subsidies, Trade and Industry calculated that a reduction in total demand of 860 GWh (500 GWh + 360 GWh) would reduce the price of the 3,000 GWh package by 0.15 cents/kWh.

1 Annex C, p.1.
Annex D, p.3.


Not content with this, however, Trade and Industry and the Prime Minister's Department also attempted to cast doubt on the growth rate of demand assumed in the forecasts. Young's report described the forecast annual growth rate of 2.1 percent (excluding the 5,000 GWh of electricity) as "optimistic". If the rate of growth fell to 1.5 percent per annum, then total demand in the critical 1986/87 year would be reduced by about 1,000 GWh. This might result in a further price reduction of about 0.15 cents/kWh. However, neither of the pro-smelter reports give any reason to expect a reduction in forecasts. There was, therefore, no reason to expect that the sensitivity of the power price to demand forecasts would necessarily work in favour of the smelter.

Young's report makes the strongest statement about the possibilities for increased coal-fired generation:

"... electricity generation from existing thermal stations has been restricted because of coal supply constraints from State Coal Mines. Instead it is possible that required coal could be supplied from private mines or by allowing private mines access to State Mines. Without coal supply constraints electricity generation can be increased from Huntly, Meremere and Marsden B by at least 2,500 GWh/annum."

1 Annex D, p.4.
3 Treasury and Energy noted that there were a range of "uncertainties" which could lower the base demand forecast. However, their report observed: "... the electricity requirements of forestry development are not very clear yet. If the most electricity intensive forestry development is chosen, then an additional 1,600 GWh p.a. over and above the 2,000 GWh already assumed in the forecast could be required by 1994/95. An example of an unanticipated demand is Paripari who recently mooted an expansion requiring 500 GWh. The level of demand could also be affected by the pricing policy adopted by the Government. On balance, officials believe that the forecasts made represent a reasonable forecast of expected demand". (CEC paper, "Electricity Intensive Industries", 22 July, 1980, p.6.)
4 Annex D, p.5.
Of course, bringing on extra capacity in the form of Meremere and Marsden B would, if feasible, involve considerable cost. The Treasury/Energy report gave a preliminary estimate of the cost of Marsden B's electricity as close to 3.5 cents/kWh. The cost of Meremere's electricity was estimated as 2.5 to 3 cents/kWh. 1, 2 Perhaps a more important issue than the availability of coal-fired power stations was the availability of the fuel. The Treasury/Energy report agreed that the possibility of increased supplies from private mines had not been investigated in detail and therefore could not be ruled out. However, this report also suggested that the main constraint on the rate of build-up in coal production was the rate at which a suitably trained mining workforce could be acquired. For this reason, a more rapid build-up in the mining industry as a whole might not be possible. The report added that the rate of build-up already contemplated was very strenuous and might well result in delays. The possibility of stockpiling was treated as an additional cost which had not been included in the electricity price calculations. 3 No mention was made of stockpiling as a means of absorbing the variability in NZE's demands nor of the possibility of importation of coal from Australia.

The assumptions relating to gas availability also came in for scrutiny but the claims and counterclaims were very inconclusive. Trade and Industry and the Prime Minister's Department made little of the possibility that one or more of the petrochemical projects - synthetic gasoline, methanol or ethane extraction - could be deferred for two or three years. It would have been


2 It may be noted that Meremere's cost is less than the cost of system expansion (about 3.5 c/kWh) apparently assumed by Hewlett in his calculation of the 0.3 cent adjustment for margin infringement.

an ambitious assignment indeed to make out a case that NZE could pay a gas price which would make these deferments worthwhile. The issue was simply too complex and too charged with political implications for that, at least, within the limited time that was available for any such investigations. Instead, these departments merely mentioned the idea and raised the possibility of delays occurring in the development of the projects.\footnote{Annex D, pp. 4, 5.} No mention was made in any report of the possibility of further constraints being placed on the growth of NGC's allocation.

The main argument for increased gas allocation to NZE is clearly stated in Young's report: "Since in the 1990s additional Maui gas is likely to be available when Maui B is constructed, it would seem to be reasonable to allocate Kapuni gas at the rate of, say, 25-30 PJ/annum during the period, say, 1987 to 1990-92 relying on Maui B (or coal) thereafter. This would increase the generation by 1,500-2,000 GWh/annum during these years from under-utilised stations such as New Plymouth and Otahuhu."\footnote{Annex D, p.4.} It may have been a little unfair for Young to treat the construction of a second Maui platform as a certainty since, officially at least, no commitment had been made. Energy planners had earlier decreed that plans should not assume the construction of Maui B, nor should they "trigger" it.\footnote{Ministry of Energy, "Final Revision to Planning Dossier", 23 May, 1980, p.1.} \footnote{Nevertheless, one detects in many statements related to this matter, a general assumption that Maui B would, in fact, be built. The Treasury/Energy rejoinder is an example of this. "... it may be argued that the construction of Maui B will increase the availability of gas to NZE. The cost of Maui B is estimated to be of the order of $700m and this cost would need to be reflected in the gas price. Further, it cannot be assumed when Maui B is built that electricity would offer the best use of the gas." (CEC paper, "Electricity Intensive Industries", 22 July, 1980, p.5.)}
Of course, the use of Kapuni gas (beyond the 10 PJ/year allocated for dry years use) did not necessarily have to be made contingent on the construction of a second Maui platform. The Treasury/Energy report had very little to say about the potential for further use of Kapuni gas. This issue was apparently still under investigation.  

A final criticism of the power plan made in both the pro-smelter reports referred to the under-utilisation of existing oil-fired capacity. 2 In reply, the Treasury/Energy report stated that extra oil burning might allow for some delay in the construction programme but would not lead to a lower cost of electricity. 3 No reference was made to the effect oil burning might have on the cost adjustment for the shortfall from planning margins. Nor was there any discussion of the conservative assumptions underlying oil cost forecasts.

In summary, it can be seen that the reports by both groups of officials sought to highlight those planning uncertainties which tended to favour their case. Treasury and Energy maintained that the planning uncertainties could well lead to a higher supply cost than the 2.84 cents/kWh calculated by the Ministry. The critical areas of uncertainty included the high probability of delays to the construction programme; cost escalation in real terms; delays in coal build-up; the cost of stockpiling coal; higher electricity demand than forecast; and the fact that the economic worth of gas used in the calculation might be too low. The report noted that the main factor that could lead to a lower cost of supply would be the greater availability of low priced gas. 4 The most important

4 Ibid p. 5
point about all these hazards was that they were not adequately reflected in the return on the project. Treasury had calculated that if settlement was reached with FASG on an electricity price of around 1.6 cents/kWh, the return to the nation would be approximately 6 percent. This return was substantially below the 10 percent return which the Government normally requires on its investments. At a return of 10 percent or higher, the risks attached to the power programme might well be acceptable. Hence, Treasury and Energy urged that the minimum price to the smelter should be 2.15 cents/kWh based on a maximum rebate for national benefits of 0.7 cents/kWh.  

Trade and Industry and the Prime Minister's Department argued that the most significant planning uncertainties pointed to the cost of electricity being lower than 2.84 cents/kWh and, accordingly, to a rate of return above 6 percent. These uncertainties included the possibility that demand could be lower than forecast; New Zealand Steel might generate some of its own electricity; smaller industries were incorrectly or prematurely included in the forecasts; Maui B could be built; further Kapuni gas could be utilised; some petrochemical industries might be deferred, delayed, downsized or abandoned; extra coal might be supplied from private mines. Furthermore, there was more capacity available to utilise any extra fuel than was indicated in the power plan. As Young's report pointed out:

"Huntly is underutilised by approximately 400 GWh and 300 GWh/annum in 1986 and 1987 respectively; New Plymouth by 220 GWh/annum in 1988 increasing to 870 GWh/annum in 1991, and Otahuhu and Whirinaki are underutilised by 110 and 864 GWh/annum respectively throughout." 2

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2 Annex D, p.4.
Meremere could be reconditioned at a cost of $14 million (1977 estimate), to provide an additional 1,000 GWh and Marsden B could be converted to coal in three to four years to provide another 1,000 GWh.\(^1\) Overall, the operating system was under-utilised by 4,500-5,300 GWh/annum from 1986 to 1991.\(^2\) Young claimed that if fuel could be supplied to these stations, or if demand could be reduced, then cost reductions of the following magnitude might be achieved:\(^3,4\)

<table>
<thead>
<tr>
<th>Adjustment (GWh/annum)</th>
<th>Cost Reduction (cents/kWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,000</td>
<td>0.45</td>
</tr>
<tr>
<td>2,000</td>
<td>0.65</td>
</tr>
<tr>
<td>3,000</td>
<td>0.80</td>
</tr>
</tbody>
</table>

Young's paper concluded that there was ample scope for an Electricity Plan to be adopted which would enable the rate of return on the FASC project to exceed 10 percent.

Trade and Industry, on the other hand, made the more modest claim that the rate of return was likely to be higher than the 6 percent calculated by Treasury. The exact return did not really matter for, as Trade and Industry argued, a return of 6 percent would itself "represent an acceptable return on a project of this size".\(^5\)

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2. Ibid., p.3.
3. Annex D, p.3.
4. It may be noted that there is a considerable discrepancy between the 0.45 cents reduction for a 1,000 GWh adjustment mentioned in Young's paper, and the 0.15 cents estimated by Trade and Industry for a similar adjustment. This discrepancy cannot be resolved here, although it may be observed that Trade and Industry's reduction seems modest given that a 1,000 GWh adjustment would substantially remove the need for the 0.3 cent allowance for margin infringement incurred in the years 1986 to 1991.
5. Annex C, p.3.
Little justification was provided for the acceptability of this return. For example, it was not explained why investment criteria should be relaxed for "a project of this size". Trade and Industry's view was that 10 percent was an arbitrary figure which had not been adequately justified by Treasury. However, the department did recognise one advantage of retaining a benchmark figure, in that it provided a common basis for the comparative assessment of various projects competing for New Zealand resources. The report commented:

"This may well be a valid exercise if we can be shown what other project or projects are competing for the $500 million involved in the extra 3,000 GWh package. No such projects are apparent, given that we have already taken the decision to commit resources to other large resources such as methanol. Certainly no other industrial projects of this magnitude can be foreseen." 1

This is a key argument in the smelter debate. Treasury's main justification for the 10 percent discount rate was that it provided a check on the Government's use of resources which might be utilised more productively in the private sector. By disputing whether the government was, in the current economic conditions, competing for resources with the private sector, Trade and Industry had once again questioned the validity of the government's main criterion for project evaluation. This approach sought to transform the discount rate issue into the essentially empirical question of whether projects bringing a higher return than the smelter would be displaced.

However, the burden of proof does not seem to have fallen so heavily on Trade and Industry, which was largely content to assert that no such projects could be foreseen, as on Treasury which was obliged to identify competitive projects. Treasury's reaction to this challenge was to argue that it wasn't the government's job in a mixed economy to identify a comprehensive national investment programme. Since future investment opportunities could not be predicted, the government should not preclude investment in profitable projects in the future by investing in a low return project now. 2

1 Annex C, p.3.

2 Interview: R.G. Laking. (This Treasury position was not presented in any official papers during the period under consideration. It was probably given its firmest articulation at the CEC meeting of 22 July, 1980.)
In making an issue of the discount rate, Trade and Industry opened a second front of attack on the position taken by Treasury and Energy. Effectively, Trade and Industry had to persuade Ministers either that the electricity planning uncertainties favoured the smelter, or that a rate of return as low as 6 percent would be acceptable. Treasury and Energy had to refute both arguments. However, the impression is created by the discussion at the CEC meeting of 22 July that, through the introduction of this latter issue, it was no longer essential for Ministers to decide on a reasonable power plan. Obviously, there were a large number of countervailing risks and uncertainties; the important question was whether a rate of return as low as 6 percent would be acceptable. The advantage of treating the issues in this way was that they were simplified and Ministers would find it easier to make an immediate decision. If Ministers had to base their decision on their evaluation of the planning uncertainties, they might have felt obliged to defer a decision while officials continued their investigations and reconciled their differences on what were, after all, fairly straightforward technical problems.

The discount rate issue was itself presented in a simplistic form since Trade and Industry evidently saw little need to examine the discount rate in terms of its underlying theoretical principles. If it were true that Treasury's argument (that government-sponsored projects have an opportunity cost which is the returns lost on displaced private sector projects) was irrelevant in this instance, then on what basis was the discount rate to be set? Was any positive return adequate? The earlier debate over the discount rate held in late 1979 would seem to indicate that Trade and Industry believed a figure in the range of 4-6 percent to be a reasonable discount rate. However, on this occasion the 6 percent discount rate wasn't defended as a general policy. It is possible that Trade and Industry's handling of this issue was complicated by
its linkage with the smelter. One gains the impression that instead of the discount rate policy being formulated independently and then being used to evaluate the smelter, the smelter was being used to justify the rate of return. While political arguments might justify this stance, it is an unacceptable inversion of the normal process of project evaluation. A sound discount rate should be established first. Once this has been done, a specific project can be assessed with the main criterion being the Net Present Value (NPV) produced. A project with a negative NPV can still be defended if it can be proved that the project brings more benefits than have been neatly summed within the cost-benefit analysis.

Of course, any important project effects which have not been included in the cost-benefit analysis should be mentioned, regardless of the outcome of the analysis. The only report which made an effort in this direction was Young's, which mentioned some extra items under the heading, "Other Benefits". These are repeated here:

"It is planned to site the smelter in the southern half of the South Island, probably Dunedin. The additional electricity demand will enable the rate of electricity station development to return to the rate of the 1960s, again primarily in the South Island. In both cases, this will provide additional employment opportunities with, in the case of the smelter, the possibility that additional downstream processing will also be attracted to New Zealand." 1

Apart from this passage, nearly all discussion of the cost-benefit analysis in the reports was focussed on the electricity price, with two other items receiving attention from Trade and Industry and the Prime Minister's Department. Both these departments emphasised the possibility of greater benefits than assumed in the analysis arising from Caster II or from escalation of the metal price. With regard to Caster II, it was noted that the profits from the smelter and Caster II...

1 Annex C, p.2; Annex D, p.6.
operations assumed in the analysis, allowed a discount of 0.7 cents for national benefits. However, FASG had claimed that because Caster II was a new technology and unique to this part of the world, it would generate extraordinary profits. If the consortium's price and cost estimates were to be accepted, then a discount of 1.0 cents/kWh would be justified. These departments were also agreed that the escalation formula was more likely to enhance than undermine the agreed price and the associated rate of return. Trade and Industry provided a concise survey of the market prospects for aluminium:

"Consultants have advised officials that the price of aluminium will remain high in real terms until 1985, due to a supply shortage. However, large scale expansions of the industry are likely to come into production by then. These expansions are taking place at sources of cheaper electric power (Australasia, South America, Middle East). It is likely, however, that there has been a real price shift due to a real increase in the cost of electric power to smelters.

This large scale expansion could lead to an over supply in the late 1980s, but long term demand looks healthy in the transport and packaging industries."  

Two remaining issues in the debate between officials over the smelter deserve mention. One concerns Trade and Industry's criticism that by pricing separately the 3000 GWh package the Ministry of Energy had ignored a CEC directive to set an average price for the whole of the 5000 GWh package. At the CEC meeting on 27 November 1979 officials had outlined to ministers three main package options. One option was for the sale of a 2000 GWh package with an average long term contract price of 2.0 cents/kWh. A second option was to

1 Annex C, p.2; Annex D, p.6.
3 Ibid., p.2.
4 Annex C, p.2.
increase the package to 5,000 GWh with an average price of 2.52 cents/kWh. A third option involved selling 5,000 GWh in a "split package" with 2,000 GWh priced at 2.0 cents/kWh and a further 3,000 GWh priced at 2.86 cents/kWh.¹

Ministers decided to make 5,000 GWh available and chose the second option rather than the third option, possibly in the belief that an average price would assist the sale of the whole block. All negotiations were conducted on the basis of this decision. When agreement was reached with Comalco in May 1980 for the sale of 1,500 GWh, the contract price of 1.5 cents/kWh was based on the average cost of the 5,000 GWh package, that is, for 2.4 cents/kWh discounted by 0.9 cents/kWh for national benefits. However, when the Ministry of Energy reassessed the cost of electricity for supply to a greenfield smelter, 2,000 GWh was treated as committed and the price to the smelter was based on the higher cost, 3,000 GWh package. Treasury and Energy's departure from the official pricing policy was justified by economic theory, specifically, by the commonsense requirement that when production of a commodity is increased, the cost of producing and selling an additional unit should not be greater than the additional revenue received for it, if profits are to be maximised. Since the incremental cost of the marginal indivisible unit of production (3,000 GWh) was 2.83 cents, this figure set the minimum price.

Trade and Industry's criticism of the use of this principle was, ostensibly, that by using it officials had overruled the CEC decision. However, it is clear that if the approach required by CEC had been maintained, the base price of electricity for a smelter would have been lowered with a consequent increase in the rate of return calculated on the FASG project.\(^1\) This allows the interpretation that Trade and Industry may have been using the CEC ruling to obscure an economic principle in a situation where the department had little regard for the Ministry of Energy's costing of the 3,000 GWh increment because that costing was based on a 10 percent discount rate.\(^2\)

A final matter of concern to officials related to the treatment of those competing smelter proposals which were still active. By this stage, there were just two: the Reynolds/Challenge proposal and the Comalco proposal for fourth and fifth potlines. This latter project had made little progress since it was first advanced. No formal detailed proposal had been received by officials so negotiations had not even commenced. The importance

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1. Since the official cost of this incremental load (2.84 cents/kWh) approximates the cost of the 3,000 GWh portion of the "split package" calculated in November 1979 (2.86 cents/kWh), one could assume that the average cost of the whole 5,000 GWh package incorporating the revised planning assumptions could be in the region of 2.5 cents/kWh.

The Trade and Industry report did explicitly note that if earlier negotiations had been carried out on the basis of a separate 2,000 GWh package, then the lower prices which could have been offered might have enabled some of the smaller industries to proceed.

2. Put another way, Trade and Industry was arguing, in effect, that the extra profits from the sale of electricity to Comalco should be used to reduce the price to the FASG smelter enabling that project to proceed. From Treasury and Energy's point of view, it made no sense to claim that making a profit on Comalco justifies making a loss on FASG. Trade and Industry disputed whether a 6 percent return was a loss.
attached to this proposal by officials is difficult to determine. One viewpoint is that Comalco were never very serious about developing fourth and fifth potlines. Seen in this light the proposal may have been designed as a tactic to disrupt progress in negotiations with other smelter proponents. An alternative viewpoint is taken by Mr. Datson who maintains that the "fourth and fifth potlines were always a prospect".\(^1\) Negotiations were pursued separately on the third potline because the advanced state of this project's analysis and its smaller electricity requirements meant that agreement might be reached fairly quickly. As more information became available about the proposal for fourth and fifth potlines, officials on the negotiating team developed the view that the downstream processing intended for the extra two potlines could also accompany the third potline leaving little of substance to associate with a new smelter.\(^2\)

In this situation, because of the critical importance of downstream processing for any proposals competitiveness, Comalco's proposal must have seemed less attractive than the proposals of FASG or Reynolds. Another consideration was that, by proceeding with either of these latter two companies, Comalco's monopoly position in the New Zealand aluminium industry could be removed.\(^3\) Finally, it was apparent to all officials that, if negotiations with Comalco over fourth and fifth potlines were to commence, a delay of some months might occur before agreement was reached. Hence, by mid July the Comalco proposal was probably seen by all concerned as the weakest contender.

Delays might also result if negotiations were pursued with the Reynolds/Challenge consortium. After the exploratory meetings held in March all negotiations had been conducted

\(^1\) Interview: G. Datson.


\(^3\) Interview: G. Datson
by telex making serious progress difficult. By July negotiations still had not commenced in earnest and officials in Trade and Industry urged the New Zealand partner, Challenge Corporation, to submit a detailed proposal on which a cost-benefit analysis could be conducted. Challenge hastily responded, their proposal being received by officials on 16 July. Unfortunately, insufficient information was provided for a cost-benefit analysis to be carried out immediately. Nevertheless, a preliminary assessment suggested that the project could be very competitive with the FASG proposal. The actual price offer (1.7 cents/kWh) was similar to FASG's. The downstream processing of automotive components and can manufacture did not involve as much metal as the Caster II process but was likely to have value for other areas of the economy. Half of the project would be New Zealand-owned and it would employ 1,510 people compared with the 1,100 estimated by FASG.\footnote{CEC paper, 'Electricity Intensive Industries (Appendix E)', 22 July, 1980.}

A most pertinent point of comparison and, of course, one which officials had been aware of since the initial meetings with Reynolds, was the smaller production capacity of the smelter (140,000 tpa) and associated electricity requirement (2,100 GWh). The obvious advantages of a relatively smaller electricity requirement, in particular, the reduction of electricity generation costs and the mitigation of many power planning risks, had led officials to inquire if the FASG project could be downsized. Fletchers responded that the company had considered a 150,000 tpa smelter but had rejected it because of the "impracticality" of adding Caster II.\footnote{Letter from O. Lockerbie (Fletchers) to D. Young, 9 July, 1980.} It was also apparent that any electricity cost reductions achieved through downsizing the smelter might be offset by the lower national benefit rebates which would result from the reduced output.
The importance attached by officials to the Reynolds/Challenge proposal is difficult to determine. There appears to have been no concerted effort by any group of officials to advance this proposal in favour of the FASC proposal or even as an alternative worthy of equal consideration. To some extent this may be attributable to the proposal's late arrival and the absence of any results from a cost-benefit analysis. Also, officials had little reason to expect that the Reynolds/Challenge smelter would produce markedly superior national benefits than the FASC smelter. It is likely, therefore, that most attention remained focussed on the FASC proposal, recognising that if this proposal was rejected by Ministers, or if further investigation of the planning uncertainties was required, then the Reynolds/Challenge proposal would become more important. While this may have been the prevailing attitude, it is still apparent that the electricity planning advantages of the Reynolds/Challenge proposal could have been used to help justify a rejection of FASC or a deferral of the decision. Instead, such promotion as the Reynolds/Challenge proposal did receive, came from Trade and Industry. This department presented, for comparative purposes, the main details of the proposal that were available. Also, it was this department which had urged Challenge to quickly present its proposal. These activities are properly Trade and Industry's responsibility but they also allow the interpretation that the department was concerned to establish a fallback position: essentially, if FASC was rejected, then a 2,000 GWh smelter would be better than none at all. It should be added that these motives were not shared by the Prime Minister's Department. David Young argued strongly against persevering with Reynolds. In his report Young contended that:

"Discussions have now been in progress with FASC since September 1979 (10 months ago) and the overseas partners have advised that a decision by the Government is now urgent since they must soon determine whether to site a new smelter in New Zealand, Australia, or elsewhere. Since there is likely to be
a considerable delay before any other proposal is agreed and since there is no evidence that the other proposals will yield a better agreement, it is the view of the Prime Minister's Department that a decision should be taken on the FASG proposal without delay." 1

This survey of the main arguments which officials placed before ministers at the CEC meeting on 22 July is now complete. Essentially, it could be said that ministers had to take their argumentation through three stages. Firstly, and most basically, they had to decide whether there was sufficient electricity available to supply a new smelter and what risks they were prepared to take in assuming the availability of 3000 GWh. Secondly, they had to decide whether the cost of the electricity and, correspondingly, the rate of return on the whole project, had been accurately estimated bearing in mind the planning uncertainties and the assumptions made by NZE. Thirdly, they had to decide whether the rate of return (whatever they believed it to be) was adequate. It is apparent that with a sequential decision of this nature the problems and uncertainties encountered at each stage multiplied the difficulty. The reports supplied by officials settled few issues for ministers. In fact, each department generally emphasised those uncertainties which assisted that department's case.

The Treasury/Energy report made the strongest show of objectivity since it had the format of a normal CEC report and endeavoured to reply to a number of power planning criticisms. Trade and Industry's report, on the other hand, was originally intended to advise the three ministers who met with the company on 15 July. The criticisms of the power plan contained in this report were briefly listed with

1 Annex D, p. 2.
no attempt being made to acknowledge other points of view or reconcile differences with the position taken by Treasury and Energy. The Prime Minister's Department report elaborated and extended these criticisms of the power plan to produce a statement of the electricity generation that could be achieved under the most favourable assumptions. David Young acknowledges the lack of objectivity in this report but insists this approach was necessary to counter the one-sided claims made in the Treasury/Energy report.

"The Prime Minister's Department report was not an objective exercise. It was biassed toward picking holes in other departments' work. However, these questions were put to the Ministry of Energy over a number of weeks and no satisfactory response was received. NZE did have adequate notice of what issues would be questioned but NZE never met them in any of its papers ... NZE was not seeking to prepare an optimum plan - not necessarily deliberately - but NZE didn't answer our criticisms." 1

7.5 Ministers Decide

By all accounts the CEC meeting held on 22 July was dominated by the Prime Minister. In the initial discussion which centered on the power plan, Young's report proved a valuable debating tool. The Prime Minister questioned the Ministry of Energy on its decision not to allow for the reconditioning of Meremere. Apparently, Mr. Muldoon didn't receive a very convincing answer. In his opinion, the expenditure of some $24 million required to recondition Meremere made it a cheap option. Mr. Muldoon then introduced a range of issues relating to such matters as the de-rating of plant, planning margins and dry year probability, turning the discussion into something of a grilling for Stan Wong who took the brunt of the assault on the Ministry of Energy. This part of the

1 Interview: D. Young.
(Young handed the report to the Prime Minister on Friday 18 July. Shortly before the CEC meeting on 22 July, Young asked Mr. Muldoon if he had any comments to make on the paper. Mr. Muldoon replied that he thought the paper was "brilliant". At the time, Young recalls, he wasn't sure if the Prime Minister was joking or not.)
discussion appears to have been rather confused and inconclusive with the Prime Minister giving the impression that he was more interested in scoring debating points than in resolving the power planning issues. As one official recalled, "the Prime Minister sought to exploit any debating error that any official made". Mr. Wong's efforts to explain why the power plan couldn't be rearranged were easily disparaged by the Prime Minister. Among the more substantial criticisms directed by the Prime Minister at the Ministry of Energy was the claim that the Ministry had not taken account of the additional gas which would be available with the construction of the Maui B platform. Evidently Mr. Muldoon was confident that a second platform would be built and that electricity generation would be a viable use of the additional gas. Mr. Muldoon also questioned the failure of the Ministry to take account of the possibility that additional natural gas might be discovered over the next decade.¹

Officials outlined for Ministers a number of other power planning assumptions and the uncertainties they involved. The possibility of New Zealand Steel generating its own electricity received some attention. Ministers took the view that the Government could influence the company, perhaps through subsidies, to produce some of its own electricity requirements.² The potential for increasing coal production was also discussed but apparently not resolved. Some other power planning issues were aired and perhaps clarified for Ministers but there is little evidence as to the substance of their discussion leading one to assume that it was also rather inconclusive.

Despite Mr. Muldoon's objections to the basis of the costing of 2.84 cents, the crucial matters of the availability and cost of the 3,000 GWh package do not appear to have been handled very decisively by the Committee. The minutes of the

¹ Paragraph based on H. Fancy, "Notes of CEC Meeting, 22 July, 1980". (Points corroborated by interviews and some by CEC minutes.)

meeting summarise the discussion of the power plan in this way:

"If the Government were prepared to accept the risk of a safety margin of less than 7 percent in electricity generation, while at the same time trying to optimise the generation of electricity through various means, then the rate of return could well prove to be significantly higher than 6 percent, through a lowering of electricity generation costs." 1

This statement suggests that the Government was prepared to risk that sufficient electricity could be made available to a smelter, the main uncertainty was the cost of this electricity. However, the nature of the arguments about the rate of return meant that this figure (and, hence, the electricity cost) did not have to be established with any precision. As Mr. Clark (the Secretary of Trade and Industry) argued, the project had to be compared with the return on competing projects; since there were no alternative investments available, the return provided by the smelter was adequate. Mr. Muldoon agreed. He commented that, even if there was no room for optimisation of the power plan, the project still offered a certain and secure return when the alternative was to do nothing.2 This argument and its logical extension are encapsulated in the following passage from the minutes of the CEC meeting:


"The purpose of the internal rate of return criterion was so that a variety of proposals could be ranked; however, the only alternative to the FASG proposal was to do nothing, with the consequent wastage of a natural resource. Thus any positive rate of return was desirable." 1,2

It is not clear whether Mr. Clark or Mr. Muldoon did actually advocate "any positive rate of return"; at least, it can be said that this policy was not excluded by their argument.

Treasury then repeated its position that approval of the FASG proposal on its current basis would preclude the resources involved yielding a higher rate of return in other investments. The minutes of the meeting continue:

"Through its economic policies, the Government was trying to ensure that the New Zealand economy emerged quickly from a cycle of low growth and high unemployment. To do this, it needed to ensure that investment occurred in areas yielding high returns. While the other electricity intensive proposals did not match the scale of the FASG project, other large proposals might well emerge in the near future." 3

1 CEC minutes, "Electricity Intensive Industries"; 22 July, 1980, p.3.

2 It is not clear what the phrase "wastage of a natural resource" refers to. A number of officials who attended the CEC meeting recall a comment by the Prime Minister to the effect that every drop of water that runs to the sea and doesn't go through a power station, is a waste to the economy. Allowing for the rhetorical use of language, it may be that the Prime Minister and the CEC minute were referring to a possible wastage of surplus hydro-electric power. In fact, any surplus hydro-electric power had already been taken up by the Comalco expansion and there was barely enough thermal generation to supply a new smelter when it came on stream. In any case, the project had to be assessed on the return on the extra resources required to utilise any "natural resources".

It was also pointed out that in the last two years the Government had already succeeded in identifying a large investment programme. Major projects included a methanol plant, a synthetic gasoline plant, the Comalco third potline, and expansion of New Zealand Steel and the Marsden Point refinery. Mr. Bolger (the Minister of Labour) added in this context that two out of three Rural Bank loans were being turned down for lack of funds.\(^4\) Returning again to the minutes of the meeting:

"... the Government was at present, because of lack of finance, rejecting projects in the rural sector which yielded rates of return greater than 10%. In relation to this particular point, however, it was stated from within the Committee that the FASG project would be financed entirely from overseas, these loans being repaid through the overseas exchange earnings of the project itself. Therefore, it would not be competing with other New Zealand projects for the limited finance available within the country." 1

This represents a second attack on the 10 percent criterion. Since foreign capital was, for practical purposes, unlimited, its cost was the interest rate of 3 percent in real terms. Hence, for an overseas-financed project to be worthwhile, it only had to produce a rate of return of 3 percent.

How persuasive this argument was for Ministers is not clear; the minutes summarise the discount rate argument by repeating the observation that:

"There was no satisfactory alternative to the FASG proposal; if it did not proceed, a valuable natural resource might well go to waste." 2

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1 CEC minutes, "Electricity Intensive Industries"; 22 July, 1980, p.4.

2 Ibid., p.4.
This argument was evidently the main justification for the view that the Government should proceed with FASG's proposal. However, a final decision was not made at CEC and officials' recommendations were referred to Cabinet. This may reflect the importance of the decision but another consideration may have been the existence of divisions among Ministers. The minutes of the meeting refer to, "some reservations within the Committee". Some officials who had been present at the meeting and noted these differences of opinion, speculated that if a vote had been taken at CEC, the final result might have been quite different.

A special Cabinet meeting was called and held that same evening. The next morning, 23 July, officials learned that the Government had decided to proceed with FASG's proposal and had accepted the terms which had been agreed in the negotiations so far. On that same day, it was announced to the press that, subject to the contract being finalised, the Government had decided to make 3,000 GWh available to FASG at a concessional rate. The Government was now committed publicly to establishing a second aluminium smelter in New Zealand.
CHAPTER 8

ANALYSIS AND DISCUSSION
8.1 Introduction

The fundamental requirements for rational decision-making have been discussed by Diesing in terms of two processes; "differentiation" and "unification". The investigation of complex problems demands differentiation, that is, the consideration of a wide variety of facts and values in order to anticipate all consequences of a decision. Because these investigations will generate a range of alternatives, many of them contradictory, the organisations must also be capable of unification, the delicate resolution of the problem in a manner which is acceptable to all participants. The processes are often mutually defeating. The obvious method of achieving differentiation, such as ensuring receptivity to different idealogues or points of view and an even distribution of power to enable a fair hearing for all, are directly countered by the requirements of unification, such as common ideology and centralised power.

In these circumstances the challenge for the decision-maker is to achieve an optimal balance between these requirements. Rationality may also be advanced by the introduction of less potent sources of justification such as mutual understanding or norms of toleration and trust but these will also be strained by ideological diversity which may easily harden to produce polarised faction. The potential for improving the rationality of decision-making in relation to the EII investigations will be considered in this chapter. To begin with, however, the evidence of this study will be used to provide some generalisations about the determinants and character of differentiation and unification.

8.2 Differentiation: Some Determinants of Participant Activation

Differentiation is most obvious where different facts, values and action alternatives are exposed in the context of some dispute. Because of a research bias toward conflict situations it will be necessary in this section to restrict the explanation of differentiation to a discussion of the activation of new participants with new demands to make on the decision outcome. One important category of determinants of participant activation relates to the patterns of attention focus in the organisation. Unless the attention of organisational sub-groups is directed at a problem relevant to their interests and the goals of these potential participants are thereby evoked, no meaningful participation is likely to follow. A second category of determinants is associated with another obvious prerequisite for participation, the prior existence or deliberate creation of the opportunity to participate. Another interesting factor is uncertainty which predisposes the organisation to internal conflict but which will be dealt with here mainly in terms of the opportunity it provides for sub-groups to obtain entry to a decision process.

The first task is to describe some important ways in which the attention focus is shifted. One obvious factor is decision time which may be related to differentiation through the fact that over time new events inside and outside the organisation bring new issues to prominence thereby evoking different goals. The longer a decision proceeds the wider will be the attention focused on the decision. Examples of events evoking goals can be found throughout this study. One interesting instance is provided by the power planning exercise in 1978 where attention was focused on planning problems by the failure in power forecasting and these problems were subject to three main definitions of the situation, each "carried"
by a different participant. The view that a substantial departure from existing plans was required was put most forcefully by Treasury. This department was mainly concerned to ensure that further wasteful over-investment was prevented, an aim which required considerable retrenchment in terms of existing plans. The Ministry of Energy, on the other hand, resisted retrenchment emphasising its costs. In the final report to ministers the Ministry advocated a "continuation" option which would provide energy in excess of forecast requirements but which was justified by avoiding such ills as the unemployment of construction work forces. There was little recognition by the Ministry of the prospects for EIIs which might also have justified continuation of work on the Clutha scheme. Instead, this option was pursued by another participant, the Department of Trade and Industry, which perceived more clearly than any of the others the opportunity provided by the electricity surplus for the promotion of industrial development.

A relationship between decision time and patterns of increasing activation of participants is most clearly discernable during 1980 with the linkage of work on EIIs with the energy planning exercise. This situation could partly be explained by the cumulative effect of new experiences focused attention. However, since there do not appear to have been many significant external stimuli during this period it would seem that the prevailing process is for the continual extension of analysis, solving problems and uncovering new ones and thereby encroaching on more and more policy fields and associated sub-groups interests. Of similar effect to the expansion of analysis over time is a situation where analysis is focused on complex problems with wide implications. This situation may be imposed on planners or it may arise
through planners own actions where large solutions are sought for problems but these do not terminate the decision process, instead spawning further problems. This predicament is described by Wildavsky's "Law of Large Solutions":

"For each additional program that interacts with each other, an exponential increase in consequences follows. These consequences moreover, affect a broader range of different programs, which, in turn, affect others, so that the connection between original cause and effect is attenuated. One program affects so many others that prediction becomes more important and its prospects more perilous, because effects spread to entire realms of policy."¹

Solutions to problems inevitably have unforeseen consequences so large solutions are to be avoided if the policy-maker wishes to minimise the risk of unexpected adverse consequences or merely to simplify decision-making in future. The EII investigations grew out of the problem of surplus resources, the wide ramifications of which were multiplied by the interdependence of the different energy sectors. Despite the size of the problem a relatively small solution was available in the "minimum investment" option. However, the decision was taken instead to continue with an energy future involving more resources than were required under current plans. It seems likely that this choice greatly complicated energy planning in the subsequent years.

¹ Wildavsky, op. cit., p.65
and was indirectly responsible for the quandry planners found themselves in in 1980. The commitment to a new aluminium smelter also followed from this decision although this policy was not anticipated in 1978.

Another factor related to activation is organisational slack. A significant feature of events in 1979 is the fragmented nature of energy planning - the petrochemical investigations, the EII investigations, the power planning exercise - and the uncoordinated pursuit of sectoral goals in these areas. This situation may be partly explained by the mechanism of sequential attention to goals which postulates that some goals relevant to problems may not be evoked, perhaps because the relevance is not obvious, or simply because the attention of potential participants cannot be directed everywhere at once. Support for this explanation would have to be sought in evidence of uncertainty and the complicated nature of the investigation. However, it must be acknowledged that it is difficult to make a clear association between these kinds of factors and sequential attention to goals. Of apparently greater significance is the variable termed organisational slack, which has been defined as resources in excess of demands. It has been hypothesised that in situations of high slack an organisation will be able to satisfy conflicting demands and that high slack will also help buffer inconsistent demands which have been satisfied sequentially. Despite the existence of disparate goals, the results of the energy planning exercise in 1979 do not appear to have been seriously contested by any department. This absence of conflict is likely to have been facilitated by the slack resources embodied in the surplus energy. Hence, Trade and Industry was
able to obtain a competitive tariff and a concessional package large enough to accommodate any industries currently in prospect. Because the cost of the surplus electricity was so low, the fears of Treasury and NZE about subsidising new EIIs could be considerably eased. Also, this concession did not affect gas demand enough to interfere with the petrochemical projects. The concessional package was linked to the timing of the Clutha development but conflict here was largely avoided by the prior determination of this latter issue on the unrelated considerations of construction workforce planning.

Given this relationship between organisational slack and conflict, much of what follows the decision in August 1979 to approve the concession can be explained in terms of a reduction of slack. For example, the conflict between Trade and Industry and Treasury during the reassessment of the concession in October and November 1979 was prompted by increased demands on the surplus resources available. Although the 5000GWh case was thought to be feasible, a tariff related to the cost of this electricity was thought unlikely to be commercially acceptable. Slack resources could not accommodate this new policy so attention was turned to the most vulnerable areas in the existing distribution of resources. Initially the discount rate became an issue and this was followed by other disagreements in the course of the negotiations. As the feasibility of the 5000 GWh package came into question in 1980, slack was further depleted and more participants became actively involved in pressing their demands.

So far the discussion has centered on some of the factors affecting one prerequisite for activation, the focusing of attention on critical problems. It is now necessary to consider a second category of factors which affect the opportunity for participation.
One obvious determinant of the opportunity for participation is the task structure, the established set of responsibilities directing the activities of each department and the sections within. Illustration of the effect of this factor can be found in the period in 1980 which saw the linkage of the EII investigations with energy planning. The expansion of participation in the EII investigations that occurred at this time is to some extent the predictable outcome of routines pertaining to the departmental and divisional responsibilities for the conduct of the energy planning exercise. Hence, Mines Division association with EII s can be partly attributed to that division's formal and active role within energy planning. Similarly, Treasury's increased participation can be partly explained by that department's responsibility to scrutinise the Energy Plan.

It may seem short-sighted to treat routines which determine access to decisions as having the character of obligations for all participants when, in fact, many routines will have been established through past conflicts and will themselves be the embodiment of power relations. However, it is difficult to describe these power relations without evidence of one agent actually constructing a routine causing another agent to do what it would not otherwise do. It is not enough, for example, to attribute power merely on the basis that one party appears to benefit through the operation of some routine. In this discussion, the exercise of power will be sought in competitive situations where potential participants vie for access and it may be distinguished from those situations where participation is circumscribed by established routines.

Since power may be used to enable participation it is important to investigate the opportunity for the
exercise of power. In chapter one it was suggested that it is the ability to cope with uncertainty which confers power. This ability appears to be an important concomitant of activation. It may be illustrated initially by a brief analysis of the conflict over the discount rate which occurred in late 1979.

In part, this conflict, which was primarily between Treasury and Trade and Industry, can be explained by the history of past conflict over this issue. That is, the discount rate was a long standing source of disagreement and any debate over it was likely to produce conflict since the issue would be overlaid on existing and well-defined cleavages. It is also relevant that the issue had only recently been exposed in the course of the investigation into New Zealand Steel's project. Although the history of past conflict partly explains the persistence of the issue it is also necessary to consider the uncertainty involved. The discount rate is the subject of considerable controversy among economists, both academic and professional. Since there is no way of categorically advancing a correct discount rate, different positions can be taken with equal claims to objectivity. In these circumstances divergent points of view are likely to develop. The interesting point about this debate, however, is that is was really subsidiary to the dispute over the level of the concessional tariff for the 5000 GWh package. Trade and Industry, as the main opponent of the 2.5 cent/KWh costing, appears to have exploited the uncertainty over the discount rate in order to undermine a crucial assumption in the costing. Although uncertainty existed in other key areas, Trade and Industry appears to have been less able to cope with it. For example, Trade and Industry was unable to provide much support for its claim that the 2.5c tariff would not attract any offers from industry proponents. Similarly, the opportunity existed to cope with uncertainty about the planning assumptions and costing methodology
on which the 5000 GWh package was based. However, the technicalities of costing electricity were probably not well understood within Trade and Industry at this time (certainly, not as well understood as they were later) and NZE was trusted to perform the costing competently. The uncertainty over the discount rate, by contrast, was relatively easy to cope with, not because Trade and Industry had the expertise to resolve the issue (no-one appears to have that) but because any serious stand could not easily be refuted. In this situation Trade and Industry could not expect to change the discount rate. Nevertheless, the tactic was partly successful because the pressure applied appears to have extracted a concession from Treasury to the effect that a discount from the tariff could be offered for national benefits.

The pattern of increasing activation of officials in the EII investigation in 1980 also demonstrates the ability to cope with uncertainty to be an important resource in securing participation. Decision expansion was given its initial impetus with the intervention of Planning division with its fears that coal supplies might not be adequate to cover the shortfall in thermal generation resulting from the revised gas allocation. As it happened, the advice of the reduction in gas deliverability proved to be as surprising and disturbing to officials in Trade and Industry as Planning's claims about coal supply problems. Hence, some major areas of uncertainty had been uncovered which would significantly affect the course of the investigation. The major questions now were whether the coal supplies were feasible and what effect the coal build-up would have on the electricity costing and whether the gas constraints could be relaxed.
On the resolution of these questions hinged the crucial matters of the package size and price. One would expect that the energy planners within the Ministry of Energy would have been in a strong position to cope with the uncertainty in these areas and could be said, therefore, to have placed Trade and Industry in a dependent position. The manner in which this power relation developed will be discussed further shortly. For the moment it is necessary to examine further how Planning forced entry to the investigations since it would appear to be a distortion to say that Planning created the uncertainty surrounding fuel constraints; surely the uncertainty derived from an objective problem of source availability.

While it is true that the problem existed prior to Planning's intervention and would have inevitably been encountered at some stage, it is still significant that Planning, by virtue of its specialist expertise, was able to identify the problem and so secure for itself a measure of participation in the investigations. Furthermore, through its ability to cope with uncertainty in the area, the problem of fuel constraints could be cast in a light that was advantageous to the division. This may be illustrated firstly by the fact that the pseudo-certainty which existed prior to Planning's intervention was to a large extent managed by Planning and NZE. The Ministry of Energy's assurances in late 1979 about the feasibility of the 5000 GWh concession reveal in retrospect considerable uncertainty absorption, particularly with regard to the matter of gas allocations. Planning's behaviour in this regard is probably best explained by professional pride inhibiting the disclosure of mistakes. NZE, on the other hand, appears to have proceeded as though the New Plymouth power station had not been deprived of gas as a tactic to enable its original allocation to be restored in the future. Planning's ability to conceal uncertainty in this area is also evident in the fact that the gas constraints could be imposed on NZE with minimal justification being supplied. In the course of the energy planning
exercise further analysis was performed confirming the initial allocation but even these results were open to dispute as Treasury analysis of the synthetic gasoline proposal showed.

That revealing uncertainty is also a form of coping with uncertainty is demonstrated by Planning's revelation in early March. On this occasion the uncertainty about fuel constraints was released at a time when the issue would cause little embarrassment to Planning but considerable embarrassment to the division's opponents on the negotiating team, particularly NZE and Trade and Industry. Furthermore, Planning emphasised only those uncertainties which favoured its stance of opposition to a smelter and with which the division could cope. It is also interesting to note how the division tended to exaggerate the severity of the problem faced by planners, for example, by making extremely pessimistic predictions about coal requirements and future oil prices. One would expect this tactic to be useful in attracting attention to the problem of fuel constraints as well as in increasing the perceived dependence of other departments on the Ministry of Energy. This tactic requires the ability to cope with uncertainty since any sensational claim, to be effective, must be plausible to its audience.

Although the power derived from the ability to cope with uncertainty secures participation, it is not easily utilised to advance demands unrelated to the power-giving uncertainty. For example, Planning's call for changes in basic negotiating terms was easily ignored by the negotiators since it had no real legitimacy and did not expose uncertainty which might jeopardise the concession. Planning also had difficulty in substantiating its reservations about the availability of an extra 5000 GWh.
In part, this was due to Planning's dependence on NZE for planning and costing the 5000 GWh package and on Mines Division for information about coal availability. Although NZE and Planning began to work more cohesively in late March and April, NZE's reluctance to change the electricity costings was an important reason why it was not until 28 April before a recosted package could be approved by CEC. This CEC meeting also appears to have provided the first airing for Mines Division's revised estimates of coal availability. The ability of this division to cope with uncertainty in this area enabled participation in the EII investigations, for instead of coal supply rates being largely assumed by the power planners, they now had to be approved by Mines Division. It is interesting to note that Mines Division, like Planning, appears to have tried to enhance its role in the EII investigations by initially exaggerating the extent of the problem faced. This tactic can however, be counter-productive, as one consequence of Partel's rather sensational assertion that State Coal Mines could barely supply an extra 2000 GWh was to provoke investigation of this claim by other departments.

A second important reason for the inability of Planning, and indeed, the Ministry as a whole to make a convincing case against the 5000 GWh package draws on that important qualifier of power, the concept of substitutability. As the investigations gathered pace, officials from Trade and Industry, Treasury and the Prime Minister's department began to take a close interest in energy planning, some becoming very well versed in the problems and technology of this field. Hence, the ability to cope with the uncertainty surrounding energy planning spread, creating critics and defenders of the Energy Plan in these other departments. These other departments were activated because they perceived their own interests to be at stake. It is significant that these departments
did not cope with uncertainty by removing it but rather sought to highlight risks favourable to their respective goals. This approach was only possible if a good measure of uncertainty about the various issues was sustained. In this way, these departments were able to erode the monopoly position held by the Ministry of Energy with respect to power planning. Of course, this intervention could never have been achieved without a considerable amount of work having been done on the Energy Plan already. The situation may be seen; Therefore, as a variant of Crozier's idea of the self-defeating nature of expert power; although the energy planners did not remove uncertainty they did establish assumptions and techniques which were accessible to experts in other fields. Hence, whereas removing uncertainty eventually leads to the redundancy of the expert, it would seem that an important risk entailed by the skilful maintenance of uncertainty is the substitution of one expert by another.

In addition to routines and the resources of power, two other factors, here termed decision time and work load, will be considered as determinants of the opportunity for participant activation. As a variable, time, or the duration of the decision process, holds an awkward place in the behavioural model. Following the emphasis placed by March and Simon on cognitive processes, one would expect that, the longer a decision continued, the more search, analysis, and evaluation that could be conducted and, consequently, the more satisfactory would be the final outcome. However, as mentioned above, the evidence of this study would seem to indicate a contrary process: the longer a decision continues, the more differentiation that occurs and, consequently, the more complicated and difficult the decision can become. A second
explanation for this apparent link between decision time and increasing differentiation may be that, with time, the opportunities for participation are multiplied. For example, it is likely that over time new routines regulating participation obligations will be introduced. The 1980 Energy Plan exercise provides such an instance and one can imagine that, if energy planning had continued as in previous years, the EII investigations in 1980 might have been relieved of some departmental intervention. Another explanation may be that, over time, new sources of uncertainty will develop, providing new opportunities to secure participation and to press demands.

Load is another variable affecting the opportunity for participation. Load may be thought of as referring to the pressure of work and number of commitments of a participant. It is interesting because it is likely to bear a close relation to the amount of attention that a participant can devote to any given activity. Hence, it may be supposed that high-load participants will be reluctant to participate in a decision process unless it can be shown to be a priority, perhaps because of formal obligations to participate or strong interests in the decision. Load is a difficult variable to measure but it can possibly be applied to explain the activation of high-level officials, especially within Treasury since officials in that department are burdened by a wide range of investigative commitments. Although Treasury was involved in the EII investigations and was represented on the negotiating team during the early months of 1980, it was not until May that the director of the Industry Division within Treasury took a personal interest in the investigations and so began to establish an official departmental position of opposition to a new aluminium smelter. Prior to this the director had been most intensively involved in issues relating to the petrochemical industry which took priority over the EII investigations. However, as these latter investigations together with
the energy planning exercise came to a close, the participation of high-level officials within Treasury became essential to direct departmental policy.

These events suggest a further variable related to differentiation – the perceived proximity to the completion of the decision process. As a decision process approaches its culmination, more participants are likely to be activated before they lose their opportunity altogether. This observation provides the rationale for the imposition of deadlines. Hence, further support for it can be found, for example, in the threatened use by the negotiating team of deadlines for the submission of industry proposals where the negotiator's aim was to maximise the number of competing proposals. Of course, it is only meaningful to talk about deadlines or the proximity to decision completion and their relationship with participant activation within a short time frame. In the long term these factors are likely to restrict differentiation. For example, the institutionalised deadline for the submission of the power plan to parliament appears to have been an important factor reducing the range and depth of the options considered during the 1978 power planning exercise.
8.3 The Methods of Unification

Differentiation and unification are not separate processes but exist in a state of tension throughout the decision. To the extent that the kinds of factors mentioned in the previous section act to promote differentiation, they are likely to inhibit unification and vice versa. Hence, it is unnecessary to examine the determinants of unification and this section will concentrate instead on the types of unification and the circumstances in which they were applied. Of particular interest are situations such as the culmination of the EII investigations in July 1980 where unification failed since officials' recommendations to ministers were sharply polarised. This failure may be viewed in terms of the conventional requirements that officials' reports to CEC be consensual but it will also be apparent that irreconcilable advice makes choosing the best policy very difficult.

March and Simon have identified four basic decision processes which they call problem-solving, persuasion, bargaining and politics. In problem-solving the participants have similar goals and are able to work out an agreed course of action by a fairly mechanical process of prediction and computation. Difficulties encountered in problem-solving are likely to be mainly due to the technical complexity of the problem or to a scarcity of relevant information. Where participants disagree on how to solve the problem at hand they may resort to persuasion to eliminate the differences. Persuasion mainly involves justifying through acceptable proof the merits of an alternative, or whatever, and is, therefore, largely concerned with matters of fact rather than value judgements. Indeed, arguments can only be "proved" with respect to commonly held criteria. In bargaining, on the other hand, it is assumed that participants do not share general goals
so that for an agreed course of action to be taken a compromise between goals will be necessary. This will involve negotiations as each side tries to preserve its goal by making the smallest concession possible. The fourth decision type, for which the broad term "politics" would seem rather inappropriate, involves the wielding of power and the formation of coalitions in pursuit of particularistic goals. Politics may be used as a preliminary to bargaining, serving to increase the strength of participants relative to their opponents.¹

Problem-solving situations appear to be characterised by minimal differentiation and tend, therefore, to generate low quality solutions to problems. The best examples of problem solving are associated with energy planning. The problem of how much electricity was available and at what cost which dominated the investigations in 1979 was largely a computational matter and was left to NZE to resolve. The results of this exercise were very slow in coming and the final decision on the availability of 2000 GWh merely confirmed earlier estimates. NZE was very hesitant in releasing its costing estimate and here the reason appears less to be uncertainty than the reservations held by the division about concessional rates to large users. In late 1979 when NZE's attitude to EII's was much more sympathetic, the division hastily affirmed the availability of 5000 GWh even though gas was at that time being re-allocate away from thermal generation. Only later with the differentiation enabled by the Energy Plan would this problem be exposed. Similarly, NZE neglected in early 1980 to investigate thoroughly the feasibility of the coal build-up necessary for an extra 5000 GWh.

¹ March and Simon, op. cit., pp 129-131
This failure might have been avoided if Mines Division had been brought into the investigations earlier or even if the need for the shift to coal had been announced to other interested groups. The Energy Plan provides other examples of this kind as differentiation uncovers the narrowness of perspective that frequently occurs where responsibility for dealing with a problem is held by one participant. Planning Division's decision to treat thermal generation as the lowest priority user of gas and its somewhat arbitrary decision to restrict the availability of Kapuni gas should be seen in this light. Similarly, Mines Division's estimates of coal availability deserved fuller consideration. In the case of Kapuni gas and coal availability estimates, some concessions were made following the scrutiny of other departments. However both Planning and Mines were fairly successful in monopolising the ability to cope with the uncertainty in these areas.

This pattern is perhaps surprising given that the problem-solving style is characteristic of bureaucracy and bureaucracy, as Diesing argues, represents an important adaptation to the conflict between unification and differentiation. This is because the hierarchic organisation allows for considerable diversity at the lower levels but, instead of provoking conflict, these differences are mediated at successively higher levels until the apex is reached which is concerned to maintain the general goals of the organisation.¹ This model assumes that the leadership can promote differentiation through the restrained use of its formal authority. What it does not take into account is the extent to which all parts of the organisation can be dependent on a specialist sub-unit. Although the organisational leadership can use its power to determine the overall goals of the organisation, policies cannot simply be deduced from these goals.
If preferences are to be translated into action they must be proved possible. This task, involving the discovery of alternatives and the investigation of their feasibility, requires much specialist expertise. The application of this expertise will not necessarily change preferences but it is likely to change decisions, especially where expert claims are perceived to have a high degree of probability of coming true. It follows that the power necessary for unification in problem-solving can be commanded by specialised sub-groups and is by no means necessarily in the hands of the higher levels of the organisation.

One might expect the technique of persuasion, through which is obtained majority judgement on an issue, to be a common decision style. Only may argue that, with a sufficiently refined research focus the situation which have been described here as indicative of problem-solving may, in fact reveal occasions where the combined judgement of individual officials working in a specialised sub-group has been necessary. However, in this study, where the research focus is mainly on the activities of organisational sub-groups, judgement situations are mainly to be sought in the interaction of different groups of experts and here it would appear that persuasion rarely obtains unification. The only significant situations involving persuasion appear to be in the process of coalition formation (which is not, of course, equivalent to complete unification). For example, despite the existence of many uncertain facts about the availability and cost of the 5000 GWh package, Treasury and the Ministry of Energy were able to produce a joint report for CEC in July 1980 while Trade and Industry and the Prime Minister's Department took a quite different view. It is likely that Treasury and Energy were able to reach a common position on the planning uncertainties because of their shared opposition to the sale of electricity to a new smelter, but
also because, through unity, greater leverage could be exerted in pursuit of their goals. The coalition formed by Trade and Industry and the Prime Minister's Department exhibits less agreement on the planning issues. However, it is interesting to note how the case for the smelter was constructed through the inquiries of a few like-minded officials who, despite their different specialist backgrounds, were able to reach a fairly unified judgement of the planning uncertainties.

Under persuasion values are held in common and it is largely facts that are in dispute. In a bargaining situation, on the other hand, values are disputed while matters of fact are largely agreed since bargaining is made easier if participants are confident that a similar view of outcomes is held by their opponents. The attention given to values in this latter decision process seems uncharacteristic of events in this study since departmental goals are rarely stated.

This behaviour may be seen as a form of uncertainty avoidance since participants will be reluctant to commit themselves to particular objectives in an uncertain and changing situation. It may also avoid controversy or prevent other participants from organising opposition to a proposed course of action. A critical opportunity for the formation of objectives and investigation strategy may be identified in early 1979 following the Prime Minister's directive to find ways of utilising the surplus. However, inter-departmental differences were not resolved at this time, possible because of uncertainty about the feasibility of EII s in terms of energy, economic and political considerations but also because the avoidance of conflict at this time meant that departments remained free to pursue their respective
goals in the areas in which they were most interested. As discussed, these conflicting goals were buffered for some time due to the extent of slack resources.

Bargaining is also reduced by the bureaucratic structure based on specialised problem-solving units where the formal responsibility for making value judgements resides in the executive of elected politicians. Advice to ministers has to be justified by arguments of a technical nature which are related to existing policy objectives. Nevertheless, it may be that much bargaining does occur, concealed within an apparent situation of decision by judgement. The meetings of the CRPR in 1978 and 1979 offer some illustration of this since the meetings' deliberations were couched in technical arguments about the determinants of future power demand but disagreements over the demand forecasts were aligned with internal cleavages of interest and the final decision represented an intermediate estimate suggesting a compromise solution. Similarly, the timing of the Clyde power station can be seen as a compromise between opposing departmental goals relating to the maintenance of construction workforces, on the one hand, and the efficient use of resources in meeting electricity demand, on the other. In these cases there is sufficient leeway in the range of possible solutions to allow compromise. However, sometimes participants will be presented with an "all or nothing" situation which can only be resolved by compromise if it is agreed that "winner" on the disputed issue is a "loser" on another issue of mutual concern.

This situation may be observed in the debate over the discount rate during late 1979 since any departure from the 10 percent discount rate was unacceptable to Treasury and a compromise could only be achieved by a concession on a second issue, in this case on the matter of discounts from the electricity tariff. It would appear that "all or nothing" situations can occur in a number of ways. Firstly, there is the
possibility, exemplified above, that the preference scales of participants will not overlap. Secondly, there is the possibility that a compromise alternative will not be available for practical reasons. Thirdly, it may be that participants will be influenced by scientific norms to treat factual statements as either true or false and, therefore, not amenable to compromise. This normative perspective is likely to leave value-laden preferences relative and negotiable, especially in the context of a democratic constitution which encourages toleration.

These three situations may be resolved by the above mentioned technique of bargaining on separate issues. However, failing that, they may predispose the organisation to polarisation. In considering the polarisation in departmental advice which took place in June and July 1980 it is interesting to note the absence of any practical alternative to the options of proceeding or not proceeding with a new smelter. A smaller smelter such as that proposed by Reynolds offered some scope for compromise between the apparent goals of maintaining security of supply and the benchmark rate of return, on the one hand, and the goals of industrial development, on the other hand. However, the Government's demands for urgency meant that this option was not really available.

Another feature of this period is the extent to which values are defocalised but remain significant through their incorporation in supposedly factual statements. The July reports are ostensibly concerned with factual statements about the feasibility and cost of the 5000 GWh case but the consistent divergence between the two groups of departments on all major planning assumptions indicates fundamentally opposed perspectives. Of course, it should not be assumed that these biases were imposed
equally by departments for and against the smelter, nor that the operative values were, in fact, related to the smelter. The most important difficulty lies in determining whether these biases arose out of processes of selective perception of information or instead reflect a more deliberately self-interested distortion. Unfortunately, space does not permit the investigation of these questions and they cannot, in any case, be resolved very conclusively. It should be noted, however, that the Prime Minister's Department did not endeavour to present a balanced case and was content to list only those planning uncertainties which improved the feasibility of the 5000 GWh case. This kind of coping with uncertainty was largely justified by these departments as a way of countering biases in the Treasury/Energy position. It partly reflects, therefore, the distrust which develops when values infuse factual statements. Since the dominant and legitimate modes of decision-making - problem-solving and persuasion - could not resolve this situation, the result was polarisation.

This process can also be traced by considering CBA which is another factor tending to circumscribe bargaining. CBA enables experts to determine what is in the national interest independently of the political system which relies on the complex interaction of interest group and electoral demands, government and bureaucratic interests. This is achieved by using the evidence of economic exchanges to systematically map the structure of individual preferences. Once values are defined by a monetary yardstick, decision-making becomes a matter of computation and there should be no place for bargaining since organisational goals are irrelevant to CBA. However, while irrelevant, these goals can still have a significant impact as is made clear by the July reports. Denied a forum by CBA, these organisational goals are driven deeper into the analysis shaping the basic assumptions. Once
values become embedded in "facts" in this way, CBA, as a supposedly scientific and objective exercise, may breakdown with the emergence of polarised groups since it relies on computation and judgement as the only legitimate style.

Once in this polarised situation participants strive for unification through the technique of "politics" (narrowly construed). This is apparent from the July reports to the extent that both groups of officials attempted to impose their demands by coping with uncertainty. Hence, the decision is again characterised by problem-solving except that in a polarised situation it is undertaken by more than one specialised group. A second feature of this situation, again evident in July, is the formation of coalitions to give extra leverage to departmental demands. It may be that the weight of numbers enhances credibility and is itself persuasive but it is also likely that the coalition is effective because the combined investigative effort improves the ability to cope with uncertainty.
8.4 Rationality in Critical Phases of the Decision.

In the preceding sections some behavioural attributes of the two prerequisites of rationality, differentiation and unification, have been elaborated. It will now be useful to examine more directly the phases of the policy investigations in order to identify some critical points where the rationality of the decision was impaired by inappropriate differentiation or unification. Four main examples will be dealt with; two dealing broadly with the establishment of objectives and the remaining two with the phases of search and evaluation.

Differentiation should enable the exposure of all important interests related to an issue. It could be argued that energy planning in 1978 did not achieve adequate differentiation because the investigations were largely dominated by the Ministry of Energy. Furthermore, although other points of view were expressed, these were not adequately unified in the final advice to ministers which was, in fact, polarised by two options - "continuation" and "minimum investment". It is likely that the main explanation for this polarisation derives from tactical considerations. Because the Ministry of Energy was confident that the Government favoured the continuation of the Clutha scheme on schedule, there was little reason for this department to make concessions to Treasury. As a result of these factors a narrow range of values were embodied in the advice to ministers. This situation was aggravated by the tendency of ministers to exploit the uncertainty of officials in order to pursue an option to which the Government was already predisposed. To the extent that the choice of the continuation option was justified by ministers by the prospect of new EIIs being found, this decision is very disturbing in its implications.
This is because the Government, having committed itself to producing surplus electricity primarily to avoid the ills of retrenchment, is able in the future to sell surplus electricity very cheaply because the generating capacity used in supplying a new industry is then a sunk cost. It is possible, then, that industrial development could be promoted by an energy policy which is not itself justified in terms of meeting the needs of industry but by other factors such as regional development, the maintenance of construction workforces, etc. These latter kinds of items tend to be intangible and politically sensitive so that they are not readily amenable to analysis or comparable with the essentially economic benefits which flow from industrial development. Nevertheless, some analysis is called for otherwise these intangible benefits may become a pretext for wastefully subsidising industry.

Greater differentiation of goals is evident during the EII investigations in 1979. However, as has been discussed above, this differentiation was not put to good effect as planning was concentrated in sectors and was not adequately co-ordinated. This suggests inadequate unification at the outset of the investigations. This unification could presumably have been supplied by a high-level inter-departmental committee. Such a committee could not be expected to agree on the goals for the following investigations since this would probably precipitate conflict and pre-judge the results of the investigations and the attitude of ministers. Furthermore, firm agreement on the objectives of policy poses the risk of premature commitment to a policy since the search process is likely to terminate with the first satisfactory alternative. Instead of agreement on goals, such a high level committee should be concerned to
obtain a common commitment to analysis. This would initially involve the identification of critical areas of uncertainty and would be followed by the apportionment of responsibilities and the continuing coordination of the investigations. In 1979 few areas of uncertainty related to EIIIs were identified for investigation and there was little continuing coordination.

The failure to address critical areas of uncertainty in early 1979 meant that, as the search for EIIIs got underway towards the end of that year, there were no firm criteria on which to base the negotiating strategy. Important areas of uncertainty included the level of a commercially competitive tariff and future metal prices. These uncertainties became the basis for much conflict within the negotiating team and meant that important contractual terms such as the level and nature of discounts were partly determined by the character of the bargaining process within the committee. It is also a feature of the negotiations that the considerable uncertainty involved is aggravated by external pressures. This is most obvious in the negotiating tactics adopted by the industry proponents. Ministers were a second external source of pressure with their frequent demands for urgency. It may be that the impatience of ministers encouraged industry threats to withdraw their proposals unless further concessions were quickly made by the negotiating team.

The tendency for uncertainty, and especially uncertainty aggravated by external pressures, to promote conflict provides some justification for unification in the early phase of negotiations. This might involve the employment of consultants to advise on such matters as tariffs, product prices, and suitable industries. A minimum negotiating position could also be formulated.
together with policy on the important question of how much risk the Government should bear. Once clear terms of reference have been set for the negotiations, the negotiators should be able to act in a fairly unified fashion and it may even be possible to dispense with the interdepartmental team structure in favour of a single negotiator or small full-time group.

The final critical point in the investigations to be discussed here concerns the evaluation of the smelter proposal. Evaluation was primarily carried out through the technique of CBA. This meant that costs and benefits were measured in terms of their resource value to the nation. An important benefit of the project was the foreign exchange earnings, the resource value of which was reflected in the 10 percent premium placed on foreign exchange. Because of the large range of important items which could be measured by CBA in terms of a single scale of values, the main issues in evaluating the FASG smelter proposal turned on the uncertainties regarding some key costing assumptions and on the question of what constituted an acceptable rate of return. In particular, the critical assumption of the electricity cost was the focus of much of the differentiation which occurred in the last months of the investigations. This has already been extensively discussed and the main concerns here are the unregulated nature of this differentiation and its narrow focus.

The considerable attention given by officials to the power planning assumptions was warranted but, because other important items were neglected, this priority must be seriously questioned. One neglected item is the environmental effects of the smelter. This item may be used to illustrate some of the issues relevant to extending CBA. Although procedure to handle the assessment of environmental impact follows the Government's approval of a project, it is likely that a more comprehensive evaluation may be achieved if all relevant parties are acquainted with some details of
the project's impact before the approval to proceed is given. This is especially desirable in the case of a very large industry such as an aluminium smelter which may cause considerable damage to the animal and plant life and scenic quality of a locality. Assuming that empirical studies have given reasonable clarity to the nature of these effects, the main problem becomes one of valuation. Complex valuation techniques exist which might make these effects measurable in economic terms and so capable of incorporation within CBA. However, the expertise may not exist to perform this analysis and, even if a technical solution is possible, experts will not necessarily agree on the weight to be given to this most uncertain and value-laden item.

Because difficulties with quantification increase as the analysis is extended to encompass more and more externalities (such as environmental effects), there is the further problem that the final result of the CBA will become increasingly indeterminate. If the analysis is to be limited to avoid this tendency, the decision-makers must have a clear understanding of the relevance of the information supplied by CBA to the decision. This is likely if ministers use CBA, as in the smelter decision, as a kind of extended financial analysis which measures the contribution of a project to economic growth. Ministers may be inclined to limit analysis in this way so that they obtain expert advice on economic matters without ceding their responsibility to judge overall welfare. This attitude may also combine a belief that environmental externalities are properly treated as intangible, any monetary representation being meaningless or arbitrary, especially in a political context of public controversy and deeply antagonistic interests groups. Of course, a "narrow"
CBA may also reflect a widespread belief among decision-makers that environmental externalities make a low contribution to welfare, at least, relative to industrial development. This view is partly supported by the fact that, excluded from the CBA, environmental effects were not included in a category of intangible effects either. Alternatively, since there were no intangible effects of any kind mentioned in the July reports it may be that the bias is not against values intrinsic to the excluded items but rather derives from a professional bias toward economic analysis. Certainly, it is easy to see that CBA provides a powerful rationale for decision-making in its precise and objective measurement and its unique competence to decide the allocation of resources between competing claims. Nevertheless, if the boundary of the analysis is not to be set by the economic system then a supplementary methodology should be employed capable of dealing with other significant project effects.

This supplementary methodology is difficult to describe but it is apparent that it will require an authoritative specification of goals to enable the evaluation of a range of important externalities. A particular area of concern apparent in these events is the neglect of the macro-economic implications of a new smelter. For example, there was little mention of the possible inflationary effect of the project, especially in combination with other large-scale investments. Indeed, the coincidence of a number of large projects might give rise to competition for certain resources such as manpower. High wage rates in the construction sector might also accelerate inflation by prompting higher wage demands in other sectors. A further area of concern is the large amount of overseas borrowing that the smelter would require. Together with the borrowing for the rest of the
Government's plans for investment in large scale industries this might lead to a decline in New Zealand's credit rating or a decline in New Zealand's exchange rate probably leading to a rise in the real cost of borrowing. Other difficulties may arise if the imports required for the large-scale investment programme should place a strain on the balance of payments and so necessitate a reduction in the general level of economic activity. Many of these kinds of impacts are rather speculative, not least because they will be affected by future Government policy. Nevertheless some effort should be made to plan the implementation of the smelter in a macro-economic context. This would help anticipate difficulties and it would also supply useful information for project evaluation.

If the dependence on CBA as the mainstay of project evaluation is to be reduced then it is necessary to design the decision process to accommodate the increased differentiation that would inevitably result. That is, if the diverse range of values and facts involved in an extended analysis are to be used, there must exist a potent form of unification. One partial solution might again be the establishment of a permanent high-level interdepartmental committee to oversee the investigations. As a representative body which is slightly removed from the problem-solving activities of the lower levels, this committee might provide a valuable structure within which bargaining could take place. This committee might also be capable of taking an overview of the investigations enabling the process of differentiation to be controlled and not merely subject to the manner in which problems focus attention and create opportunities for participation. An understanding of the kinds of variables which affect differentiation and of the types of unification appropriate in different circumstances should assist in the management of the decision process.
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