

# **Environmental Management Accounting in a University**

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## **Abstract**

**Purpose:** Investigates the feasibility of introducing environmental management accounting (EMA) at the University of Canterbury, New Zealand.

**Design/methodology/approach:** Utilises an exploratory case study, including interviews with senior staff and an analysis of University reports and plans.

**Findings:** Related sustainability activities have been implemented on a small scale, take a long time to become established, and are driven by a few concerned staff. Some aspects of environmental performance, such as electricity consumption, waste removal, fuel consumption and air travel miles, are measured and recorded, suggesting that the EMA information is systematically generated. However, EMA data are not reported on or compared to goals or targets. Interviewees, however, favoured the idea of EMA to communicate environmental performance, provide targets for comparison and enable better long-term decisions.

**Practical implications:** There is significant potential for developing EMA at the University of Canterbury, but the concept is not well understood and therefore is unlikely to be an organising concept for systems development. EMA is a useful starting point for the University's purported, but unrealised, commitment to sustainability reporting. Existing information systems could produce EMA information, but codes would have to be disaggregated and more software would be needed.

**Originality/value:** Provides a rare empirical illustration of the practicability of introducing EMA in a University setting.

**Keywords:** Environmental management accounting; EMA; university; information systems; sustainability reporting; environmental management.

**Classification:** Case study.

## **1 Introduction**

This paper presents research which attempts to explore the practicability of implementing environmental management accounting (EMA) at the University of Canterbury (UC). We take as our starting point Bennett and James' (1998, p. 33) definition of EMA as "the generation, analysis and use of financial and non-financial information in order to optimise corporate environmental and economic performance and achieve sustainable business".

The study was motivated by a request from the Director of Finance and Deputy Chief Financial Officer at UC, who was concerned that the University was 'wasting' money and resources, and wanted to know if there were environmental accounting or eco-efficiency methods UC could use to measure and recognise their environmental impacts so they could identify problem areas. A related development was that UC had recently created a sustainability network that aimed "to develop a series of detailed plans for pursuing socio-ecological sustainability in key strategic areas of the University" (UC, 2006, p. 6). In this context, EMA suggested itself as a useful step towards UC being able to demonstrate accountability for the environmental sustainability of its own operations. Accordingly, this study explored the feasibility of introducing EMA as a potentially useful accounting tool to aid UC's measurement of environmental impacts and to enable the identification of problem areas for attention.

In the context of tertiary education organisations, the Higher Education Partnership for Sustainability argues that "the higher education sector now has the opportunity to build on existing experience and develop new practice in this emerging field"(HEPS, 2003, p. 3). EMA was pioneered in the business sector, but its use has not been widely explored in the public services or university context. This paper therefore sets out to contribute an empirical illustration of the practicability of using EMA beyond the business context.

The structure of the paper is as follows. A review of the literature on EMA leads into the research question and an explanation of the research method used. The findings are reported and discussed, leading to conclusions about the viability of implementation of an EMA system at UC.

## **2 Literature review**

As its name indicates, EMA mirrors the generally accepted aims of management accounting in organisations; that is, it provides information on environmental impacts through incorporating environmental consideration into such functions as costing, capital budgeting, performance measurement and decision making. EMA gives rise to new categories of costs. For example, the generation and management of environmental impacts are recognised as giving rise to environmental costs, including both the costs of compliance (e.g., costs of systems to prevent emissions and minimise waste) and the costs of non-compliance (e.g., cleaning up spills, energy and water usage, emissions, fines)

(Lee, 2005). (In this study, the Director of Finance and Deputy Chief Financial Officer had seemingly intuited that the University was incurring, but not identifying and managing, non-compliance costs.) Similarly, 'life cycle costing' is advocated as a means of recognising and managing after sales costs, such as costs of disposal of waste and restoration of the environment (Epstein, 1996; Kokubu and Nakajima, 2004; Finnveden and Moberg, 2005). EMA therefore argues for re-framing some conventional management accounting techniques. Capital budgets, for example, could include environmental information in costs of projects under consideration, such as energy usage, licences, site cleanup and returning the environment to its prior state (Boer et al., 1998; Ditz et al., 1998). Using EMA, both financial and non-financial measures of environmental effects could be reported to management and used in decision making (Burritt et al., 2002). Decisions using environmental information may be normal decisions of the organisation, such as product pricing or product mix decisions, or may be environment-related, such as decisions about waste management and pollution prevention (Shields et al., 1998).

Although Bartolomeo et al. (2000) claim that the financial benefits of introducing EMA do not usually justify major changes and are therefore better achieved by integrating environment into existing change programmes, other authors have suggested innovations in management accounting that could be adapted to EMA. For example, both internal and external costs related to environmental impacts could be included in EMA information (Jasch, 2003; Greene, 1998); activity based costing, classifying activities by whether they are required for compliance, preventive, or voluntary, could be used for capital budgeting decisions (Rimer, 2000); the quality costing model could measure environment-related prevention, detection, internal failure and external failure costs (Hansen and Mowen, 2005); or the balanced scorecard could include environmental data or even a whole perspective for environmental measures (Figge et al., 2002; van der Woerd and van den Brink, 2004; Schaltegger and Wagner, 2006).

Although the literature has explored a range of applications and possibilities for EMA, we argue that there remains considerable scope for determining the practicability of EMA in various organisational settings. Much of the early research on EMA was carried out in manufacturing plants (e.g., Ditz et al., 1998; Shields et al., 1998; Haveman and Foecke, 1998; Boer et al., 1998). Some of the firms were already determining and using environmental cost information (see, e.g., Ditz et al., 1998; Shields et al., 1998; Lee, 2005). For others, some or all environmental costs could not be separated from the current accounting system, or only a few obvious environmental costs, such as waste, pollution and water use, were being measured and used (e.g., Bartolomeo et al., 2000). Kokubu and Nakajima (2004) found that just over 10% of Japanese firms surveyed were partially using environmental information in capital appraisal and life cycle costing.

Turning to the public services sector, although there is a significant related published literature on environmental reporting (i.e., external reporting on the environment) and the use of environmental management systems in public

sector organizations and state-owned organisations, there is however a dearth of studies which indicate what is happening inside organisations in terms of the use of EMA information.

As examples of evidence of environmental reporting in the public services, Ball and Bebbington (2008) note that many national, regional and local governments internationally produce 'state of the environment' reports (Ministry for the Environment, 2007; Department for Environment, Water, Heritage and the Arts, 2006, Scottish Environmental Protection Agency, 2006) which demonstrate key trends in ecological ecosystem functioning. At a different level, UK national government is encouraging environmental reporting in core government departments, which are required to report on environmental 'housekeeping' issues, including waste, energy use and procurement (see CIPFA, 2005; NAO, 2005). In a different setting, Füssel and Georg (2000) discuss the institutionalisation of "green accounting" in a public hospital in Denmark, where the "account" is an environmental report with many measures, financial and non-financial.

This wider literature also indicates that factors influencing the uptake and development of environmental management systems and environmental reporting range from the strength of political processes in local authorities (Bowerman and Hutchinson, 1998) to the sensitivity of operations (Frost and Seamer, 2002), the need to achieve cost savings and greater efficiency (Pawar and Risetto, 2001) to internal management systems (Frost and Seamer, 2002) and the internal organisational context (Adams and McNicholas, 2007). Furthermore, Ball and Grubnic (2007) refer to the role of key organisations such as Friends of the Earth, the Local Government Management Board, the Local Government Association and the Audit Commission in encouraging both sets of reporting through the issue of guidance. An important development, too, has been the development of the Global Reporting Initiative sector supplement for public agencies' (GRI, 2005) which advances the triple bottom line reporting concept as a vehicle to assess operational economic, environmental and social impacts of government agencies.

As an exception to the dearth of studies on EMA, Bouma (1998) details how environmental costs have been calculated for noise reduction by a Dutch railway company and for the environmental impact of government building design, construction and maintenance. Bowerman and Hutchinson (1998) and Burritt and Welch (1997) indicate that a lack of knowledge of EMA, or disincentives to develop EMA may be evident in public service organisations. Bowerman and Hutchinson (1998) found that there was a lack of available accounting techniques to assist taking environmental considerations into account in local government capital-budgeting decisions. Burritt and Welch (1997) examined the environmental disclosures of Commonwealth (national government) entities in Australia, and found that under the commercial orientation of the public sector reforms, there was a tendency for a dampening effect on environmental disclosures per se, and a concentration on 'easier to manage' environmental

issues. In short, an enduring performance measurement focus in the public sector (Lapsley, 2008) may provide a more salient focus than the development of EMA for decision-making.

Prior studies of environmental accounting in universities have similarly tended to focus on environmental reporting as opposed to EMA. A number of studies have indicated the use of ecological footprint analysis, a tool that estimates the resource consumption and waste assimilation requirements of a defined human population or economy in terms of a corresponding productive land area (Rees and Wackernagel, 1996). A study by Venetoulis (2001) found that the ecological footprint of the University of Redlands was approximately 40 times the area of their campus. A similar study by Flint (2001) found the University of Newcastle had an ecological footprint appropriately 26 times the area of their campus. Both studies were found to be beneficial by the universities studied as it was possible to determine where the ecological impacts were occurring.

To summarise, whilst there is a growing interest in research into social, environmental and sustainability accounting in the public services (Ball and Grubnic, 2007; Ball and Bebbington, 2008) the question as to what is happening inside organisations in the public sector, including tertiary education organisations remains an issue that warrants further investigation (Ball, 2005).

### **3 Method**

Environmental management accounting was identified by the Director of Finance at UC as a win-win management 'solution'. It seemed to us that this pragmatic concept of EMA echoed Bartolomeo et al.'s (2000) understanding that the introduction of EMA does not usually justify major organizational changes, and can be better achieved by integrating the environment into existing programmes. This led to the development of a straightforward research question: What is the feasibility of introducing EMA at the University?

The research approach follows an exploratory case study method. In order to gauge potential commitment of the University and its senior employees to EMA, ten semi-structured interviews were conducted with key staff across both administrative and academic departments (see Table 1 for list of interviewees). A snowballing sample technique (Denscombe, 1997) was used to identify senior staff with an interest in and understanding of environmental and sustainability issues as they impact on the organisation. The snowballing technique worked effectively, producing fourteen potential respondents; ultimately ten participants were chosen because of their seniority and experience of the issues being discussed.

**Table 1: Interviewees**

<b>Position</b>	<b>Department</b>
Senior, academic	College of Business and Economics
Senior, academic	College of Business and Economics
Senior, academic	College of Education
Senior, administrative	College of Education
Senior, academic	College of Engineering
Senior, academic	College of Science
Senior, administrative, academic	College of Science
Senior, academic	College of Science
Senior, administrative	College of Science
Administrative	Facilities Management

In order to determine the university's current position in terms of environmental sustainability, interview questions identified sustainability initiatives planned or already undertaken by the university. Then, in order to determine the potential for the use of EMA, information was elicited on the university's current sustainability measures and indicators, staff expectations and the capability of the existing information systems.

As interviewees' time was limited due to the demands of their positions, steps were taken to ensure the efficient use of the time available (for example, having a pre-prepared interview guide, recording interviews and taking a consistent approach to questioning). The interviews were conducted at the workplace (office) of each of the participants for their convenience, over a period of five weeks. A general definition of EMA was provided to the interviewees prior to the interview to ensure they were clear about what was being discussed. The definition provided, following Burritt et al's (2002) framework, was:

*Environmental Management Accounting includes monetary measures of environmentally induced economic impacts of the entity (such as expenditure on cleaner production or the cost of fines) and physical measures of impacts of entity related activities on the environment (such as energy per unit of production) within the entity's annual reports.*

Reports and plans produced by the university and the university's website were also analyzed to gain a fuller understanding of the organization's commitments and information systems in the context of developing EMA. Documents included reports or plans that UC has produced, and were recommended (or given) by interviewees (see Table 2).

**Table 2: Documents Analysed**

UC Sustainability Plan 2006-2008
University of Canterbury Profile 2007-2009
UC Statement of Service Performance as at 30 June 2007
UC Draft Transport Plan 2007-2009
UC Asset Management Plan March 2006
University of Canterbury Charter 2003-2010

## **4 Findings**

### **4.1 Current sustainability initiatives**

Many interviewees felt that the way in which the university could have the most impact would be in education. The university plans that sustainability be included in at least one course in each degree programme, so that nearly every student graduating will have some understanding of what sustainability is. More and more departments are including modules or whole courses on sustainability, and research on the topic is feeding into these courses.

It will be changing generations of thinking, 12,900 students currently – if we can get every one of those understanding something about sustainability, just imagine the impact of that every year (Senior administrative academic).

We [UC] are getting heavily involved in terms of the curriculum and schooling, developing education for sustainability courses and assessment.....Sustainability in education is important because we [society] have a lack of training in our workforce in terms of people who can actually support moving towards sustainability. Universities have a role in ensuring there is a talent pipeline in the future coming through Universities with skill in this [sustainability] area to not only help business but to also re-orientate local government and community programmes towards sustainable practice (Senior academic).

The university is also concerned about current unsustainable means of transport, both in getting students and staff to and from the university and for academics travelling to overseas conferences. Some initiatives have been put in place:

As a department we have just bought two departmental bicycles as our corporate vehicles.....that people can use to get around campus (Senior academic 3).

[UC has] car pooling arrangements, new paths and better lit paths for people that are walking, secure bike stands, brochures about the walkways within the University safety areas, improved security by putting security on Segways [electricity-powered personal transportation devices] so they can be there quickly (Senior administrative).



Heating the university is another unsustainable activity, with the major heating source being a coal boiler. Electricity consumption for lighting and computer use is another problem area.

You have just got to look at areas that stay lit up because people forget or do not think to switch off lights; computer screens that just sit there all night rather than switching off the screen; water pumps running all day and all night for urinals and so on. (Senior administrative).

Until recently, paper was the only waste recycled. However, a pilot recycling project with waste bins for plastic, glass, paper and landfill waste has been introduced campus-wide.

Sustainability activities to date tend to be on a small scale, take a long time to become established, and are driven by a few concerned staff. Sustainability at the university is in its infancy. However, mid-way through 2007 the university created a sustainability network which has the potential to drive and encourage sustainable actions and initiatives. There is now a sustainability advocate, a pro-vice chancellor responsible for sustainability and champions of sustainability in all academic colleges and in Facilities Management. The City and Regional Councils also have some involvement.

## **4.2 Current indicators and measures**

Only one of the interviewees knew of any environmental measures currently being used. There is metering on all the main campus buildings, measuring water and electricity consumption by building. Electricity consumption is reported on the university website, with plans to add water consumption and carbon emissions in the near future. The university runs transport surveys every four years. Records are kept on the amount of petrol and diesel used by the university's vehicle fleet. and total air travel miles are obtained from the university's preferred travel agent.

However, the interviewee added that "there is not currently a reporting mechanism ... to the University [administration]". No interviewees in senior administrative positions had seen any reports on environmental aspects, nor was sustainability discussed at budget and University Council meetings. Some measures relating to electricity consumption and waste removal were included in a monthly financial report, but after a couple of months they were removed. Interviewees felt that there was no point in measuring without related goals or targets.

I know the University is currently looking at trying to establish what the carbon footprint is for the University and that's interesting but what are you going to do with it? We already know the areas we could reduce consumption of electricity and water but we're not doing it so what difference is establishing what your carbon footprint is (Senior administrative).

### **4.3 Staff expectations**

Interviewees were very much in favour of a measurement and reporting system such as EMA if it included long-term goals and targets to attain. They considered that, if such a system was imbedded in the university and its activities, it would influence people's thinking about sustainability and enable better decisions.

We could monitor and set targets. We could set targets now but we don't know whether they're being attained or not. ... The other thing it will do, of course, is it galvanises people's thoughts a bit (Senior administrative academic).

... the goal is sustainability – are we on track or not? ... If you start reporting on it then we're all going to get somewhat more conscious of what we are doing (Senior administrative academic).

### **4.4 Information systems**

Interviewees felt that the existing information systems could easily be adapted to produce EMA information. At present some codes contain several pieces of information; for example, "waste disposal" includes "everything from rubbish bags to landfill ... traditional waste to recycling – all goes under that code". Therefore, codes would have to be disaggregated, and more software would be needed. This finding is consistent with the literature that suggests that environmental costs are often hidden in overheads, or allocated somewhat arbitrarily (CIMA, 2002). However, the existing information systems appear to have the basic structure needed and could be adapted to identify costs associated with environmental impacts.

## **5 Conclusion**

The discussions with interviewees indicate that there is potential for the introduction of EMA at the University of Canterbury. The university already measures many non-financial aspects related to sustainability, such as water, electricity, carbon emissions, waste, and transport. Interviewees felt that the existing information could be adapted to report on more financial and non-financial measures of sustainability.

The focus on sustainability issues is in its infancy at the university. However, it is growing in importance with the recent introduction of a sustainability network as a key driver. Few environmental measures are reported currently, and they are not compared with any goals or targets. There also appears to be a communication gap, with senior administrators not being aware of measurement currently being carried out.

We conclude that there is significant potential for developing EMA at the University of Canterbury, but that the concept is not generally well understood and therefore is unlikely to be an organising concept for systems development.

We also identify EMA as a useful starting point for the University's purported, but unrealised, commitment to sustainability reporting.

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