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Council approaches to implementing sustainability - a case of re-arranging deck chairs on the Titanic?

Abstract

Australian councils are unacceptably slow and ineffective in their implementation of sustainability, judging by a review of the literature and from personal experience in local government. The purpose of this study is to investigate the ways councils go about implementing sustainability as this may hold the key to their ineffectiveness. In the absence of any other study or technique, I developed a model for assessing a council's approach to implementing sustainability. The model was developed using the Ecological Footprint as the primary sustainability assessment tool, and it was designed to assess a council's approach to implementing sustainability in terms of three key aspects: 1) the behaviours the council targets for change; 2) the behavioural change methods the council uses; and 3) the clarity and holistic nature of the council's approach. The model was then applied to three councils in NSW that had been recently commended for their implementation of sustainability. The model gives a score for effectiveness out of 20; the three councils' scores were 6, 4.5 and 2. The main reason for these low scores was that the councils failed to address the behaviours and lifestyle characteristics of their residents that are having the greatest negative impact on the Earth's ecological processes. Furthermore, the councils failed to prioritise their actions, and they favoured behavioural change methodologies that are not generally successful at instigating pro-environmental behavioural change. The major implication of these findings is that the ways councils currently go about implementing sustainability need to be further investigated, and possibly overhauled, because they are essentially ineffective.

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School of Social Sciences, Media and Communication

*Council Approaches to
Implementing Sustainability –
A Case of Re-arranging Deck Chairs
on the Titanic?*

Honours thesis submitted in partial fulfilment of the requirements for the
award of the degree

Bachelor of Arts (Honours) from

University of Wollongong

by

Carmel Dunn, BA, Grad. Dip. (Environmental Science)

School of Social Sciences, Media and Communication

2008

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Professor Ian Lowe for inspiring hope that we can still kick this thing.

Declaration

I certify that this thesis is entirely my own work except where I have given full documented references to the work of others, and that the material contained in this thesis has not been submitted for formal assessment in any formal course, and the word length, excluding appendices, is about 20,000 words.

Carmel Dunn on the 14th May 2008

Table of Contents

Chapter 1: Introduction	1
1.1 Overview of the study	
1.2 The need for effective implementation of sustainability	
1.3 Focus on local government and subsequent literature review	
1.4 Definition of sustainability and the scope of the study	
 <i>Part A: A model for assessing council approaches to implementing sustainability</i>	
Chapter 2: A broad description of the model	11
2.1 Overview of the model	
2.2 The development of the model	
2.3 Criticisms of the Ecological Footprint and subsequent adaptations to model	
Chapter 3: First element of the model – Behaviours targeted for change	19
3.1 Basis of the first element of the model	
3.2 Methodology used in determining prioritised list of behaviours	
3.3 Key behaviours identified using the Ecological Footprint Calculator (EFC)	
3.4 Transposing the EFC results into the first element of the model	
Chapter 4: Second element of the model – Methods used to change behaviours	28
4.1 Overview of the second element of the model	
4.2 Rationale behind allocation of points in the second element	
Chapter 5: Third element of the model – Clarity and holistic nature of approach	34
5.1 Overview of the third element of the model	
5.2 Rationale behind allocation of points in the third element	

Part B: An investigation of NSW council approaches to implementing sustainability

Chapter 6: Description of the investigation into NSW council approaches	39
6.1 Overview of the investigation	
6.2 Councils of NSW implementing sustainability	
6.3 Councils selected for investigation	
6.4 Methodology used in the investigation and its limitations	
Chapter 7: Summary of three council approaches to implementing sustainability	45
7.1 Summary of the councils' principal sustainability documents	
7.2 Summary of the behavioural change methodologies used by councils	

Part C: Results and Discussion

Chapter 8: Results from applying the model to the council approaches	51
Chapter 9: A discussion of the results.	54
9.1 The study and the model as influences on the results	
9.2 Ineffective planning	
9.3 Definitions of sustainability	
9.4 The pervasiveness of economic issues and consumption	
Chapter 10: Conclusion	63
10.1 The aims of the study and how they were achieved	
10.2 The results of the study	
10.3 The implications of the findings	
10.4 Summary of the study	
References	71
Appendices	81
Appendix A: Calculations for the 'Ecological Footprint - Home Calculator'	
Appendix B: Analysis sheet used in examining the councils' approaches	

Chapter 1: Introduction

1.1 Overview of the study

The voyage of the Titanic is an apt analogy when considering the issue of sustainability. The world community, like the Titanic, is headed full-steam towards serious calamity, with climate change and resource depletion just two of the gargantuan troubles we face. To date, conventional efforts to implement sustainability have not met with much success (see Section 1.2). This raises a question: are we re-arranging deck chairs on the Titanic? That is, are we spending time and effort focusing on trivial and superficial things when only immediate and pertinent change towards sustainability will avert the impending disaster? This study aims to answer this question by investigating local government approaches to implementing sustainability.

More specifically, this study aims to examine and assess the ways three New South Wales (NSW) councils go about instigating pro-environment behavioural change in their residents. The study focuses on local governments because they play a key role in implementing sustainability in Australia (see Section 1.3). Despite the importance of local governments in implementing sustainability, however, the existing literature on the subject is meagre and mainly focuses on the barriers councils come up against when attempting to implementing sustainability (see Section 1.3). No study, as yet, has endeavoured to investigate the overall *approaches* councils take in implementing sustainability in Australia.

In this study, I develop an original theoretical model for assessing a council's approach to implementing sustainability. The model is used as a benchmark with which to compare the three council approaches examined in this study. Given the limited time and resources of the study, the model emerged as the most appropriate and comprehensive way of assessing a council's approach to implementing sustainability. The scope of the study is more clearly outlined in Section 1.4.

There are three parts to this thesis: Part A (Chapters 2-5) describes and evaluates the theoretical model I created; Part B (Chapters 6-7) examines the three NSW council

approaches chosen for analysis; Part C (Chapters 8-9) presents and discusses the results of applying the model to the selected councils of the study. As a substantial part of the model uses the Ecological Footprint as its basis for assessing sustainability, Section A also contains a critical assessment of the Ecological Footprint.

The three councils examined in this study are among the few councils in NSW which are actually taking the trouble to address the issue of sustainability (see Section 6.2), and should, therefore, be acknowledged for their efforts. However, the model does not give leniency to councils simply because they are attempting to implement sustainability. Consequently, the seemingly harsh results presented in Chapter 8 should not be interpreted as a condemnation of the three councils examined in this study, but rather should be read as an urgent call for all councils to re-examine their current approaches to implementing sustainability. After all, the need for Australian local governments to *effectively* implement sustainability is paramount.

1.2 The need for effective implementation of sustainability

There is a general consensus that the world is in serious danger because of the “unprecedented environmental change at global and regional levels” (UNEP, 2007: 4). One potentially cataclysmic problem is climate change. According to the Intergovernmental Panel on Climate Change (IPCC) there is no doubt that the world’s climate is warming, most likely due to anthropological greenhouse gas emissions (2007a: 5). This event poses a major threat because “unmitigated climate change would, in the long term, be likely to exceed the capacity of natural, managed and human systems to adapt” (IPCC, 2007b: 20). Similarly, the *Stern Review* states that “the scientific evidence is now overwhelming: climate change is a serious global threat, and it demands an urgent global response” (2006: vi).

The issue of climate change is not the only major environmental concern: resource depletion, through excessive consumption, is a serious problem also. The *Living Planet Report 2006* maintains that humanity is currently consuming resources faster than the Earth can renew them, to the extent that the world’s bio-capacity was exceeded by 25% in 2003. In fact, annual consumption of resources has been overshooting the earth’s

capacity to renew those resources since the 1980s (WWF *et al.*, 2006). Furthermore, despite the many warnings about the negative environmental impacts of increased consumption (UN, 1993; Murphy & Cohen, 2001; Lowe, 2005; Beder, 2006), in Australia, total energy consumption, water consumption, and waste production has actually increased over the last 5 years (Beeton *et al.*, 2006).

The effects of resource depletion and climate change could be devastating on humankind. As UNEP points out, dependence on the environment “is critical for both development and human well-being”; furthermore, “environmental change can affect people’s security, health, social relations and material needs” (2007: 4). For example, it is expected that glaciers and snow cover will decline as a result of global warming, affecting the melt-water supplies of more than one-sixth of the world’s population (IPCC 2007b). Also, the world’s food stocks are potentially under threat having seen a decline in the populations of terrestrial, marine, and freshwater vertebrate species by 29% from 1970 to 2003 (WWF *et al.*, 2006). Additionally, as climate change continues, the health status of millions of people will be affected through the increase of diarrhoeal diseases, cardio-respiratory diseases (from more ground-level ozone), and infectious diseases spread by vectors. Furthermore, industries and settlements on coastal and river flood plains will be extremely vulnerable to rising sea levels (IPCC 2007b).

It is becoming increasingly obvious that immediate action is needed to avert the looming environmental and social catastrophes – as the United Nations puts it, “humanity stands at a defining moment in history” (UN 1993: 1.1). In Australia, the call to action, which was trumpeted loudly at the 1992 Earth Summit, has not been ignored. Over the last decade, there has been an increase in expenditure on the environment by all levels of government (Beeton *et al.*, 2006). In addition, at local government levels in NSW, with which this study is concerned, many councils have participated in the Local Agenda 21 programme and/or have formulated sustainability plans for their communities. Furthermore, 56 councils in NSW are currently active participants in Cities for Climate Protection (CCP), which is a nation-wide programme that has been responsible for a reduction in greenhouse gas emissions of 8.8 million tonnes over its 10-year life (Department of Environment and Water Resources, 2007).

Yet despite all this expenditure and activity by local government in NSW, the “overall resource use in NSW on a per capita basis is high, compared to other developed countries, and continues to grow” (Department of Environment and Conservation, 2006: Ch. 1). Furthermore, in some areas that have seemingly seen significant progress towards sustainability, closer examination reveals a different story. For example, local kerbside recycling collections now service 87% of households in Australia, which has contributed to an astounding 99% of Australian households recycling and/or reusing their waste (ABS, 2006d). Despite this significant success in recycling however, the overall amount of waste going to landfill in the Sydney metropolitan area increased by 31% over the 10 years between 1993-2003 (ABS, 2006b).

The continued deterioration of the world’s environment, despite the efforts being made, suggests that either not enough pro-environmental actions are being taken, or the actions taken are insufficiently effective. This study aims to investigate the latter of these two alternatives in three NSW councils. The study focuses on councils because local governments, as shown in the following section, have important functions in the quest for sustainability.

1.3 Focus on local government and subsequent literature review

Nowadays, it is no longer contested whether local governments have a key role to play in implementing sustainability (Brown, 1997). *Agenda 21* (which was the document resulting from the 1992 Earth Summit) involves local authorities in approximately two-thirds of the 2509 actions it identifies (Mercer and Jotkowitz, 2000). Furthermore, Wild River (2006b) has calculated that local government environmental expenditure in Australia comprises over half the total government expenditure on the environment across the three tiers of government. Yet local government accounts for only 6% of total Australian government expenditure.

Some writers even go so far as to say that local governments play the central role in implementing sustainability. Newman (1998) argues that the role of local governments in sustainability initiatives such as ecological urban renewal and green accounting “is critical” to the success of these initiatives. Similarly, Glass states unequivocally, “local

governments are the key to sustainability, for they plan and control the very elements at stake—development, resource use, waste, energy consumption, partial regulations concerning production and land use control” (2002: 97).

Yet despite this acknowledged importance of local government (LG) in implementing sustainability, there is a comparative dearth of studies regarding this issue in Australia. Wild River notes the scarcity of academic literature on this subject, and says that her research “makes a case for fundamental research to better understand LGs and their work from the inside” (2006a: 719). The importance of local government in implementing sustainability, together with the scarcity of studies about sustainability and local governments in Australia, formed the main impetus for this study to focus on local governments in NSW.

The limited literature regarding the implementation of sustainability at local government levels in Australia can generally be grouped into three categories. The first category contains studies and literature that describe and assess local government’s uptake and progress towards implementing sustainability (Whittaker, 1997; Mercer and Jotkowitz, 2000; Wild River, 2006b). Most of these studies centre on Local Agenda 21 (LA21), which is a worldwide sustainability initiative aimed at local authorities that was developed in response to *Agenda 21*. The general impression of these studies is that Australian local governments are slow in their up-take of LA21 and their consequent progress towards sustainability is questionable. However, this view is not universal: Wild River states, “many local governments are environmental leaders, initiating programmes above and beyond the statutory requirements” (2006b: 28), and that local government “responds to environmental and other issues...are positive and proactive” (2006b: 30).

The second category of academic literature on local government and sustainability is essentially an extension of the first category. As the first category, for the most part, establishes that progress towards implementing sustainability is slow in Australian local governments, the second category contains literature which attempts to explain why this is so. The second category, then, contains studies and investigations into the barriers against the effective implementation of sustainability by local governments. These studies have tended to be case studies of selected local governments. For example,

Mercer and Jotkowitz (2000) looked at the 10 'leading-edge' local governments in Victoria, whereas Pini *et al.* (2007) focused on 15 rural councils Australia-wide. The barriers identified in these different studies are generally consistent with the findings about barriers for all local governments – both nationally and internationally – found in the broader literature (Pini *et al.* 2007). A simple summary of the factors inhibiting local governments from engaging in environmental sustainability can be found in Pini *et al.*, where 20 identified barriers were grouped into 4 key themes of “capacity, commitment, co-ordination and community” (2007: 161).

The third general category of literature regarding local government and sustainability is much smaller. This category contains studies that investigate the successful implementation of sustainability initiatives at local government levels in Australia. Wild River, for example, investigated 34 Australian local governments in order to “improve our understanding of LG attempts to deliver beneficial environmental outcomes” (2006a: 720). Other studies in this category look at tools or processes that have been successful in promoting sustainability in local governments. One such study was an examination of “communities of practice”, a concept found to be a useful tool in promoting organisational change towards sustainability in Sutherland Shire Council (Keen *et al.*, 2006).

My study falls into the third category of research because it seeks to analyse the approaches of councils already implementing sustainability. There are two reasons why my study focuses on council efforts already underway. Firstly, a council using an ineffective approach to implementing sustainability generates the same outcome as it would if it were unable to surmount the barriers to sustainability – both result in sustainability not being attained. As the bulk of the literature deals with barriers to implementing sustainability in councils, I thought it worthwhile to study current approaches to sustainability as this is just as important. Secondly, councils already trying to implement sustainability may benefit from a discourse on alternative approaches, which is something currently lacking in the literature. It is important for councils already attempting to implement sustainability to use effective approaches because failed attempts could arouse disappointment and cynicism in a council's staff and community, which may impede future attempts to implement sustainability that are more effective.

This study, then, seeks to broaden the discourse on effective ways of implementing sustainability at local government levels in Australia. It does this by examining and assessing the approaches of three NSW councils who were commended in 2007 for their implementation of sustainability (see Section 6.3). However, due to limited time and resources, boundaries had to be set around the study to ensure its usefulness. These boundaries are described in the next section, which begins with a dialogue on the definitions of sustainability.

1.4 Definition of sustainability and the scope of the study

In the literature pertaining to sustainability and local governments, the term ‘sustainability’ is often used synonymously with the term ‘ecologically sustainable development’, or more simply ‘sustainable development’. The origins and natures of these terms, however, are different (Beder, 1996), and their differences have important relevance to a council’s approach to implementing sustainability (this point is discussed in much more detail in Section 9.3). Additionally, there are many official definitions of sustainability and sustainable development. Nevertheless, in this study only the Australian Government’s definition of sustainability is used, which defines sustainability as:

using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased (1992: Pt 1).

This definition has been chosen because it is well known in Australia and, more importantly, it does not compartmentalise sustainability into three elements (see the discussion in Section 9.3 for the importance of this point). Incidentally, this definition is also the only one common to all three of the council sustainability documents examined in this study.

The above definition of sustainability has also been used to draw clear boundaries around the scope of this study. Essentially, the definition describes sustainability in terms of two outcomes:

1. Increasing or improving quality of life, and
2. Maintaining or protecting the ecological processes upon which life depends.

Unfortunately, it is beyond the scope of this study to address both these outcomes, and so the study has been limited to only examining council approaches as they apply to maintaining the Earth's ecological processes. Consequently, throughout the thesis, when I use the term 'sustainability' I am referring to the part of sustainability which deals with maintaining ecological processes.

This focus on only one part of overall sustainability, however, does not lessen the implications of the results of the study because, as Monfreda, *et al.* say, "[f]or sustainability, we need to achieve both ecological health as well as social well-being, and achieving one at the expense of the other is inherently unsustainable" (2004: 244). Therefore, a council that is not effective at maintaining ecological health is simply not effective at implementing sustainability, regardless of its efforts towards improving quality of life, and *visa versa*. Therefore, although this study only focuses on one part of overall sustainability, it still gives an accurate indication of whether a council's approach to implementing sustainability is effective. A council cannot be sustainable if it fails in maintaining the ecological processes upon which all life depends.

Another boundary in the scope of this study is that it investigates only three NSW councils. It would require a much bigger study to investigate all the councils in NSW currently attempting to implement sustainability. The councils selected for this study were chosen because they were commended in the NSW Local Government and Shires Associations' 2007 Local Sustainability Award.

One final clarification regarding the scope and terminology of this study: throughout this thesis, when I refer to 'implementing sustainability', I am specifically talking about instigating pro-environmental behavioural change in *residential* communities. Initiating behavioural change in businesses and industries would require different approaches from those used for domestic residents. Examining these different approaches and developing other models to assess their effectiveness is outside the scope of this study.

In general terms, the purpose of this study is to investigate council approaches to implementing sustainability. In more specific terms, the purpose of this study is to develop and use an original model to examine and assess three NSW council approaches to instigating pro-environmental behavioural change in their residential communities. The first step in the investigation is the development of the model; this is described in the next chapter.

Part A:

***A Model for Assessing Council Approaches
to Implementing Sustainability***

Chapter 2:

A Broad Description of the Model

The theoretical model described over the next three chapters has been created as an expedient way to assess a council's approach to implementing sustainability. Given the limited scope of the study, other methods of assessing a council's approach – such as collecting and analysing base-line sustainability data before and after a specific approach is used – were not employed. In this study, the model is used as a benchmark against which the effectiveness of a council's approach to implementing sustainability is gauged. The model is fairly simple and basic; Section 9.1 discusses the benefits of further research to develop a more intricate and elaborate model.

2.1 Overview of the model

The model has three key elements that are the mechanisms for assessing a council's approach to implementing sustainability. The three elements of assessment are:

- 1) The behaviours/lifestyle characteristics that councils have targeted for change
- 2) The methods councils use to instigate pro-environmental behavioural change
- 3) The clarity and holistic nature of the approach

The model produces a score for effectiveness out of 20, with almost two-thirds (65%) of the score coming from the first, and most important element. The reason for this is that no matter how well a council implements an approach, and no matter how clear and holistic the approach is, unless the approach focuses on the biggest and most significant threats to sustainability, then it is essentially like re-arranging deck chairs on the Titanic. Consequently, the scoring of the model reflects my conviction that the first element of the model, which assesses what a council targets for change, is twice as important as the second and third elements put together.

A detailed description of the development and nature of each element of the model can be found in Chapters 3-5. The remainder of this chapter, however, presents an

explanation of the assumptions used in the development of the model, and a critique of the Ecological Footprint that was the basis for the first element of the model.

2.2 The development of the model

In a review of the appropriate literature, I was unable to discover any existing model, technique or study that attempts to assess a council's *approach* to implementing sustainability. There are a number of sustainability tools, such as Triple Bottom Line Reporting (TBL), Life-Cycle Analysis and Environmental Impact Assessment, which are useful in assessing the sustainability of separate council actions, products and/or procedures. However, these tools are inadequate for assessing the overall *approach* a council takes to implementing sustainability. For example, all three of the tools mentioned above could be used to assess the sustainability of purchasing a street-sweeper to help reduce water pollution in a council area. However, none of these tools questions whether buying a million dollar truck is the best way to deal with water pollution, nor do they question whether the issue of water pollution should be getting so much of the council's limited sustainability budget.

The model, then, does not assess a council in terms of the number or creativeness of the council's sustainability activities; nor does it consider the number or types of tools (such as TBL) used by the councils in assessing the sustainability of their actions. Rather, the model primarily assesses *what* issues the councils have elected to tackle in terms of how important these issues are for sustainability. A council's 'approach' to implementing sustainability, then, is considered to be what actions the council has elected to take, and the methods the council uses for executing these actions.

In order to assess a council's choice of focus issues and actions, it was necessary to establish a list of key issues prioritised in order of importance for sustainability. More specifically, and using the negative side of this, it was necessary to develop a list of residential behaviours and lifestyle characteristics prioritised in order of greatest ecological harm. With this list, it was possible to see whether councils were focusing on key sustainability issues, that is, whether they were targeting the issues that are causing the greatest ecological harm.

The list of behaviours and lifestyle characteristics needed for the model was developed using the Ecological Footprint (EF) technique. This technique was the only sustainability assessment tool I could find that produced a scientifically based list of behaviours and lifestyle characteristics that could be prioritised in order of greatest ecological harm. In addition, being so widely known and used, the EF technique has a number of advanced EF calculators publicly available for use on the internet. I was able to use one of these calculators to calculate the EF of the average NSW resident by putting information regarding NSW households into the calculator (see Appendix A). From these calculations, I was able to develop a list of behaviours and lifestyle characteristics prioritised in order of greatest ecological harm.

Essentially, an Ecological Footprint is a measurement that quantifies how much biologically productive land and water area is used by a person (or population) to produce the resources that person consumes in a year and to absorb the waste that person produces (Wackernagel *et al.*, 2004). Throughout the Earth, there are different types of land and water that have differing productivity levels, so the EF translates these differences, using yield and world-average productivity statistics, into a single unit of measurement called global hectares (Global Footprint Network, 2007). A person's Ecological Footprint, then, is the number of global hectares that person uses in a single year to maintain his or her lifestyle. This figure can then be used to determine whether a person (or population) is sustainable by comparing the figure to the number of global hectares currently available in the world per person.

According to the *Living Planet Report 2006*, the world can currently sustain an Ecological Footprint of 1.8 per person, which means that every person in the world could consume the biological resources produced from 1.8 global hectares each, and the Earth would still be able to maintain its ecological processes indefinitely. At the moment, however, the actual world average EF is 2.2, which means that the world's population is effectively living beyond its means. What is more, Australians currently have an EF of 6.6, three times more than the world average and almost four times higher than what is sustainable (WWF *et al.*, 2006).

The details regarding how the EF technique has been used to develop the first element of the model is explained in Chapter 3. However, because I have assigned 65% of the model's score to the first element, and as this element is based entirely on the EF technique, a critique of the EF is given in the next section of this chapter. Also, as explained in the next section, many relevant criticisms of the EF technique were addressed in the development of the model.

2.3 Criticisms of the EF and subsequent adaptations to the model

According to Lenzen & Murray (2003), one of the main criticisms of the Ecological Footprint (EF) is that it oversimplifies the “complex task of measuring sustainability of consumption” (2003: 5). McManus & Haughton, too, are concerned “about the tendency inherent in a universalizing tool to reduce issues to over-simplistic readings of problems, and from this, their solutions.” (2006: 126). The concern is that the complex issue of sustainability is reduced to a single measure, and in the reduction process, important aspects of sustainability fall out of the spotlight and are neglected. For example, van Kooten and Bulte highlight the absence of soil erosion from the EF and say, “one would expect a land-based measure of sustainability to be able to say something about this important topic” (2000: 387).

The EF, however, was never intended to be a universalising tool. Wackernagel, the co-creator of the EF, states unequivocally “we do not propose the Footprint as the unified indicator of sustainability” (1999: 317). Furthermore, the Global Footprint Network (GFN) states that “the Ecological Footprint does not attempt to capture every aspect of sustainability”, and it warns against the creation of a single indicator of sustainability as this would require “combining such disparate information” that it would produce results that were difficult to interpret and useless for decision making (GFN, 2007: Q&A page). The EF, then, has been designed only to “determine whether, and by what order of magnitude, human consumption is currently exceeding the biosphere's regenerative capacity” (Wackernagel, 1999: 317). As Monfreda *et al.* (2004) point out, other aspects of sustainability, such as social well-being and institutional capacity, need to be tracked using different measures.

For the purposes of this study, the concern that the EF neglects other aspects of sustainability, such as social well-being, is not applicable. As already mentioned in Section 1.4, this study has been restricted to the aspect of sustainability that deals with maintaining ecological processes. This is what the EF is solely concerned with..

Admittedly, and as acknowledged by proponents of the EF (Wackernagel, 1999; Monfreda *et al.*, 2004), the EF does not cover all aspects of ‘environmental sustainability’ either. There are aspects of sustaining ecological processes, such as localised impacts on the environment, which are not addressed in the EF. It was a simple matter, however, to address this limitation in the model. In the third element of the model, councils are awarded points if they address the other ecological issues that are not dealt with by the EF (see Chapter 5). These issues include biodiversity, adequate water supply and management, release of toxic materials that cannot be assimilated by nature, and the assessment and management of local environmental impacts.

Notwithstanding this, however, the bulk of the points assigned by the model are still concerned primarily with the issue of human demand on biological resources, which is what the EF measures. The model focuses on this because “[m]anaging natural capital is at the heart of sustainability” (Wackernagel *et al.*, 2004: 271). Furthermore, *Agenda 21* warns, “the major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries” (UN 1993: 4.3). Therefore, it is apt that the greater part of the model is essentially about the issue of consumption.

Another concern in the literature is that the EF makes a very poor land-use planning tool for ecologically sustainable development “because it does not reveal where impacts really occur, what the nature and severity of these impacts are” (Lenzen & Murray, 2003: 5). In addition, McManus and Haughton argue, “a smaller footprint does not necessarily mean less impact qualitatively, if the impact is in a high-value ecological area” (2006: 119-120). They give an example of putting a road straight through a sensitive wetland area: the road would have a smaller EF than a longer road around the perimeter of the area, but it would also have far greater negative impact on the environment.

This concern regarding the lack of qualification of impacts in the EF, however, is not pertinent to this study. The EF is not being used in this study to comment on the impacts of specific council actions or to assess a council's land-use planning policies. For this study, the EF is only being used to rank behaviours and lifestyle characteristics of NSW residents in terms of ecological harm.

The restricted application of the EF in this study also means that the discussion in the literature about “the problem of boundary definition for comparing Ecological Footprint ‘scores’” (McManus & Haughton 2006: 121) is avoided. Although the Footprints for Australian and NSW residents are mentioned in this thesis, it is not to compare them, but rather to check that the calculations I have made in the development of the first element are generally consistent with other EF findings (see Chapter 3). Furthermore, the EF is not used in the model to create an exact EF reading for NSW households. The only comparison that takes place in the model is when the Footprints of individual behaviours of NSW residents are weighed against each other.

The remaining criticisms of the EF are mostly to do with the accounting methodologies used by the EF for things like world-average productivity, yield factors and carbon sequestration. With regard to carbon sequestration, for example, the EF technique calculates anthropogenic carbon dioxide (CO₂) emissions; it then subtracts the CO₂ absorbed by the oceans, which is about a third of total emissions; finally, the remaining CO₂ waste is converted to an equivalent land area of forest which would be required to absorb the carbon dioxide (Monfreda *et al.*, 2004). Interestingly, especially when considering the warnings of the IPCC on climate change, van Kooten and Bulte criticise this method of carbon sequestration because, firstly, it is based on the presumption “that climate change leads to unsustainable outcomes” (2000: 387), and secondly “that society will never accept the high costs of terrestrial-based CO₂ strategies” (2000: 388).

The proponents of the EF, however, stress that the Footprint's method of accounting for CO₂ assimilation “does not suggest that CO₂ sequestration is the solution to climate change” (Monfreda *et al.*, 2004: 238). The EF endeavours to account for natural capital and in so doing theoretically translates the biosphere's waste assimilation capacity into biologically productive hectares (Wackernagel, *et al.*, 2004). As Monfreda *et al.* point out, this method of carbon sequestration “illustrates how much larger the world would

need to be in order to cope with anthropogenic CO₂. In doing so, it demonstrates the necessity of CO₂ reduction schemes” (2004: 238).

Furthermore, the accounting methods of the EF have been designed to ensure that, if anything, the EF gives an *under*-estimation of human demand on the biosphere “by consistently choosing the most conservative data sources available and eliminating double-counting” (Wackernagel, 1999: 317). This assertion certainly seems true considering the results of Lenzen and Murray’s study (2001) in which they created a hybrid EF for Australia. In their study they modified the EF technique in a number of ways: they took into account all anthropogenic greenhouse gases (not just CO₂); they qualified yield factors and productivity levels by factoring in figures relating to land disturbance in Australia (something not included in the original EF due to lack of data for this on a global scale); and they used input-output analysis which is a macroeconomic technique that accounts for all layers of production and structural paths of a product, not just the first layer (Lenzen & Murray, 2003). The results of this study showed that “Australia’s ecological footprint is about 13.6 hectares per capita (ha/cap), which is considerably larger than results obtained in previous studies” (Lenzen & Murray, 2001:229). As already mentioned, the *Living Planet Report 2006* calculates Australia’s Footprint to be 6.6.

This disparity of EF calculations for Australia does not detract from the usefulness and effectiveness of the EF technique. Both the above calculations show that Australians are currently consuming far more biological resources than the Earth can regenerate on a per capita basis. Moreover, the abovementioned disparity suggests that the more detailed the calculations of an EF, the more alarming the results. In any case, as already mentioned, this study is not concerned with obtaining an absolute and exact EF calculation for NSW households. Rather, the EF technique is being used in this study solely to establish the Footprints of various behaviours of NSW residents, which can then be ranked in order of greatest ecological impact.

Overall, both the supporters and the critics of the Ecological Footprint acknowledge that the EF has been a successful and useful educational tool (Van Kooten and Bulte, 2000; Lenzen and Murray, 2003; McManus and Haughton 2006) and one that “is an excellent way of promoting policy debate” (McManus and Haughton 2006:118). For the purposes

of this study, the EF is an appropriate and valid technique. Precisely how the EF technique is used to formulate the first element of the model is explained in the next chapter.

Chapter 3: First Element of the Model – Behaviours Targeted for Change

As already mentioned, the Ecological Footprint (EF) technique has been used in this study as the basis for the first element of the model. The first element deals with what behaviours residents most need to change with regard to sustainability. In this chapter, I first describe the EF calculator used to determine the lifestyle characteristics most in need of targeting by councils. Next, I present the list of behaviours and lifestyle characteristics in order of their EF magnitudes. The final section of the chapter describes how these results were transposed into the first element of the model.

3.1 The basis of the first element of the model

The most recent and available official Ecological Footprint of NSW residents that I could find was in the *NSW State of the Environment 2006*. This EF was for 2001, based on 1998 figures (DECC, 2006), and it lacked any detail regarding the configuration of the NSW resident's Footprint. Consequently, in the absence of detailed and recent data, I used the EPA Victoria's 'Ecological Footprint – Home Calculator' (HC) to calculate the EF of NSW households. The HC is a Footprint calculator which was developed in 2003 by a number of prominent organisations, and then "updated and enhanced in 2006 by the National Centre for Sustainability at Swinburne University (Victoria, Australia) and the Centre for Design at RMIT University" (EPA Victoria, 2008: EF Calculators page).

The HC, and not other EF calculators available on the internet, was used in this study for three reasons. Firstly, the HC is an Australian calculator, which is extremely important as EF calculations are based on National Accounts (GFN and University of Sydney, 2005). Using an EF calculator designed for another country would produce inaccurate results regarding Australian households. Secondly, the HC is the most detailed Australian calculator of personal Footprints available on the internet, breaking down the EF into many different behaviours and lifestyle characteristics. Lastly, a

technical background paper outlining the assumptions and calculations of the HC is available at the EPA Victoria website.

The HC is a hybrid EF calculator which uses the “two recognised approaches to accounting flows...both process analysis data and input-output (I-O) data from the Australian Bureau of Statistics” (EPA Victoria, 2005: 4). The HC also differs from the original EF technique regarding carbon sequestration calculations and the classification of fish and seafood as meat. However, despite these differences, “[t]here is reasonable agreement between the household calculator, which aims to account for total consumption per capita, and the results of the Wackernagel Footprint calculation for Australia in the *Living Planet Report 2002*” (EPA Victoria, 2005: 21).

3.2 Methodology used in determining prioritised list of behaviours

The HC uses 28 questions to produce a list of the 47 behaviours and lifestyle characteristics and their corresponding Footprints. In order to calculate the EF for NSW residents, I answered each of the 28 questions using statistics about NSW households. For example, the first question of the HC, “What is the floor area of your home (inside)?” was answered using two studies done by the Australian Bureau of Statistics; I calculated the average floor space of NSW homes from these studies and put this figure into the HC. Appendix A contains a detailed record of the calculations, workings, assumptions and references that went into determining the NSW household averages needed to answer all the HC questions.

This method of calculating the EF for NSW households is not without its limitations. Rarely could I find information that answered the HC questions directly, which meant that the data was obtained from different sources, often having different study years and goals. Nevertheless, wherever possible I tried to make the data sources consistent with each other. For example, one question in the HC asks how much money was spent on fuel each month and what the price of fuel was. As the information relating to fuel expenditure of NSW households came from the most recent *Household Expenditure Survey* done in 2003-2004 (ABS, 2005d), I therefore found and used the average fuel price for the June Quarter of 2004 (ABS, 2005f).

Another limitation of using this methodology is that not all of the questions could be answered with information pertaining to NSW households. In some cases, Australian data was used and assumptions about NSW households were made based on the percentage of NSW residents in Australia. In other cases, where neither NSW nor Australian averages were available, I used the most relevant data I could find. For example, to answer the question in the HC related to bin volumes, I used information obtained from a waste audit of Canberra; and to answer the question relating the *number* of recycled items (all information found related to weight or volume of recyclables), I was forced to conduct my own waste audit of 7 NSW households. Of course, this limited recycling audit cannot be considered a true indication of NSW household recycling habits; however, it provided information upon which to make an educated guess in the absence of any other data.

Despite these limitations, the majority of the data used in the calculations relates to NSW households in the last 5 years, which gives the data a consistency and a certain level of integrity. Needless to say, the methodology used does not provide an exact EF calculation for NSW households – that would require a proper, commissioned report. However, as already mentioned, the EF technique is not being used in this study to get an exact and up-to-date EF reading for NSW households, but to obtain a list of behaviours that can be ranked according to the greatest ecological harm. Furthermore, the methodology *did* produce a reasonable and comparable estimation of a NSW household EF, as is shown in the next section.

3.3 Key behaviours identified using the Ecological Footprint calculator

Using the methodology described above, the average NSW household has an Ecological Footprint of 14.7, which averages out to 5.7 per person. Although slightly lower than other assessments, this result is an acceptable estimate as it is in keeping with EF calculations made in other studies. The NSW Footprint was 5.6 per person in 1996 and 5.9 per person in 2001 (DECC, 2006). The Australian EF is currently 6.6 per person (WWF *et al.*, 2006).

The HC divides the Ecological Footprint result into 7 broad categories and 47 categories that are more specific. Tables 3.1 and 3.2 summarise the results of the EF calculations for NSW households (the difference between the two totals is due to the rounding of figures). Table 3.1 displays the seven broad categories with their corresponding EF, and shows that the categories of food and housing are the biggest contributors to the average NSW household EF.

Table 3.1: The EF of NSW households broken down into seven broad categories

Broad Categories	Detailed Categories	EF Contribution (in gha)
Your House	The size of your home; occupation of grounds and site	3.4609
Energy & Water Use	Electricity, green electricity, gas, water and firewood in the home	2.0667
Food	Meat, dairy, fruit, veg, oils, flours, bakery, confection other food, alcoholic and non-alcoholic drinks	5.5521
Travel	Vehicle use, fuel, public transport, taxis, flights	2.0715
Furniture and Appliances	Fridge/freezers, dishwashers, washing machines, clothes dryers, T.V.s, video/stereo/dvd/cd players, computers	0.5326
Consumable Products	Tobacco, textiles, clothing, footwear, leather, paper products	1.1154
Recycling & Waste	Waste generation, plastic and glass bottles, cartons, newspapers, boxes, steel and aluminium cans	-0.0676
Total		14.731

Table 3.2 on the following page shows all 47 behaviours/lifestyle characteristics identified in the HC. Because each lifestyle aspect comes with a corresponding EF, I was able to list the aspects according to their contributions to the EF (from highest to lowest). Some of the figures listed in the tables are negative, which means that the corresponding behaviour actually reduces the overall EF, rather than increases it. However, these negative figures have been included in the body of the list, rather than at the end, to show the extent to which various behaviours affect the EF, regardless of whether it is a negative or positive effect. Table 3.2 shows that the top three behaviours/lifestyle characteristics are significantly higher than all the others listed.

Table 3.2: Residential behaviours/lifestyle characteristics and their Ecological Footprints

Rank	Detailed Categories	Contributions (in gha)
1	The size of your home	3.3891
2	Meat & meat products including seafood	3.2657
3	Electricity use in the home	2.0925
4	Fuel bill (petrol/diesel consumption)	0.7974
5	Clothing	0.6571
6	Aeroplanes - domestic	0.4634
7	Aeroplanes - international	0.4273
8	Beer	0.371
9	'Other' category of food products	0.3552
10	Fruit and vegetable products	0.3339
11	Vehicle use	0.3267
12	Flour and cereal foods	0.2804
14	Bakery products	0.2533
15	Dairy products	0.1829
16	Soft drinks and other non-alcoholic drinks	0.1786
17	Video/DVD player/stereo/CD player(s)	0.1767
18	Paper products	0.1564
19	Footwear	0.1406
20	Confectionery	0.1278
21	Computer(s)	0.1242
22	Wine and spirits	0.1211
23	T.V.(s)	0.1098
24	Textile products	0.1088
25	Oils and fats	0.0816
26	Occupation of grounds	0.0718
27	Waste generation	-0.0624
28	Fridge/freezer(s)	0.0564
29	Supply of 'green' electricity consumption	-0.0481
30	Tobacco products	0.0475
31	Washing machine(s)	0.0404
32	Use of public transport	0.0374
33	Clothes dryer(s)	0.0248
34	Occupation of site	0.0216
35	Taxis	0.019
36	Dishwasher(s)	0.0181
37	Gas use in the home	0.0133
38	Glass bottles and jars - waste/recycling	-0.0083
39	Water use in the home	0.0067
40	Leather and leather products	0.0048
41	Boxes and other paper - waste/recycling	0.0028
42	Newspapers - waste/recycling	0.0025
43	Firewood used for heating	0.0021
44	Aluminium cans - waste/recycling	-0.0015
45	Plastic bottles - waste recycling	-0.0008
46	Cartons (milk and juice) - waste/recycling	0.0003
47	Steel cans waste/recycling	-0.0001
	TOTAL	14.7698

3.4 Transposing EF results into the first element of the model

As already mentioned, the first element of the model assesses a council's approach to implementing sustainability in terms of what issues a council targets for change based on the level of detriment those issues have on ecological processes. Councils can be awarded up to 13 out of 20 points for the first element of the model providing they focus on the key issues, that is, the behaviours and lifestyle characteristics that are most in need of change. The key behaviours nominated for change by the model are the top 11 behaviours and lifestyle characteristics with the biggest Footprints as articulated in Section 3.3. I have combined the categories of 'fuel bill' and 'vehicle use' as these are generally treated as one issue by local governments.

The points in the first element of the model are allocated in two ways according to 'key focus issues' and 'priority actions'. These different allocations are closely related and are discussed further in the following pages. The points are allocated somewhat arbitrarily within each of the elements. As already mentioned in Section 2.1, the model's scoring system was designed to reflect the importance of the first element compared to the other two elements, so the allocation of points *within* each of the elements is of secondary importance. Furthermore, the model was designed with a score out of 20 to make it easier to conceptualise. This limits how the points are allocated within the elements because using anything other than one or half a point would make the scoring system too intricate and complicated. However, within these confines, I have tried to align the points in the first element as closely to the EF list shown in Table 3.2 as I could. Table 3.3 shows the content and scoring system for the first element.

Table 3.3: The first element of the model

Key Focus Issue	Points	Priority Actions	Points
1. The size of residential homes	1	Decrease floor space, increase occupants or house longevity	1
2. Meat eating habits (including fish)	1	Increase vegetarianism	1
3. Electricity use in the home	1	Buy 100% green power	0.5
4. Vehicle use / fuel consumption	0.5	Any action to reduce vehicle or fuel use	0.5
5. Clothing	0.5	Any action to reduce new clothing	0.5
6. Air travel – domestic	0.5	Any action to reduce air travel	0.5
7. Air travel – international	0.5	Any action to reduce air travel	0.5
8. Beer	0.5	Home-brew or decrease wastage	0.5
9. ‘Other’ category of food products	0.5	Decrease wastage	0.5
10. Fruit and vegetable products	0.5	Increase home-grown; decrease wastage	0.5
11. General resource reduction or actions regarding 3+ issues from 12-47 on EF list			0.5

The allocation of points for the ‘key focus issues’ has been aligned with the results of the EF calculations shown in Section 3.3. The top three issues in the model are given twice as many points as the issues ranked 4-10 because they have more than twice the Ecological Footprint of the other issues. Councils can also score half a point outside the top ten key issues if they mention resource reduction generally, or if they have actions addressing three or more issues mentioned in the EF list that are outside the top ten issues.

The second way the model awards points in the first element is if councils prioritise certain actions within a key focus issue. These ‘priority actions’ are separate and singular actions which can significantly reduce the EF by themselves. Not all of the key issues in the model have recognisable priority actions, in which case, the council is awarded points if it takes any action within the nominated key issue.

The importance of priority actions, and their subsequent inclusion in the model, can best be explained by looking at the key issue of ‘electricity use in the home’. Imagine there are 10 people who each use 100KwH of electricity a fortnight, producing a 100kg of greenhouse gases each. Let’s say that a council manages, through whatever methods, to get each of these 10 people to change two of their electricity-use behaviours – ranging from pulling fridges out from the wall and turning off TV standbys, to installing fluorescent globes or solar hot water heaters. Let’s also say that these changes in behaviour resulted in a 10% reduction of electricity use for each person – which represents a drop in 10 kg of greenhouse gases per person. That would mean 20 behavioural changes took place to reduce greenhouse gases by 100kg. However, if the council used the priority action of getting people to buy 100% green power, it would only have to get one person to change this one behaviour and it would still see a 100kg reduction of greenhouse gases. Changing one behaviour of a single person is simpler, cheaper and far easier than changing 20 behaviours of 10 different people. Therefore, priority actions have been included in the model because they greatly improve the effectiveness of a council’s implementation of sustainability.

For a council to be awarded points for a priority action, the council must have made an obvious attempt to make the priority action an actual priority. Such attempts would include ranking the action first on the council’s action list, or noticeably spending more time and effort on the action compared with other actions, or having the action as the only one under that particular key issue. Simply listing the priority action as one of a number of actions the council intends to take will not result in the council being awarded points for priority actions. Also, in the parts of the model where there is more than one priority action listed, the council will be awarded points if it prioritises *any* of these priority actions; it does not have to address them all.

One final point of clarification regarding priority actions is in relation to the key issues that deal with food. A reduction in the consumption of food products, such as fruit and vegetables, may reduce a person’s EF, but it may also reduce a person’s health and well-being, which would not be sustainable. Consequently, reducing consumption of food products has not been included as a priority action in the model. However, a study on wasteful consumption in Australia (Hamilton *et al.*, 2005), which looked at

“consumer spending on goods and services that are not subsequently consumed” (2005: vii), found that in 2004 Australians threw out \$2.9 billion worth of unconsumed fresh food. In fact, the authors of the study found that the total spent on all unconsumed food products in 2004 (\$5.3 billion) was more than 13 times the amount that Australian households donated to overseas aid agencies. Consequently, the priority action of ‘decrease wastage’ has been included in the model, and this stands for any actions that a council takes to encourage people to buy only the food products that they will actually consume.

In sum, the first element of the model assesses a council’s approach to implementing sustainability based on the key residential behaviours the council has targeted for change, and the priority actions it undertakes. In contrast to *what* a council targets for change, the second element of the model, described in the next chapter, looks at *how* a council attempts to implement that change.

Chapter 4: Second Element of the Model – Methods Used to Change Behaviours

4.1 Overview of the second element of the model

The second element of the model deals exclusively with what methods of behavioural change councils utilise in their approach to implementing sustainability. Broadly speaking there are two means of instigating behavioural change: encouraging change and enforcing change. Within each of these broad classifications, there are a number of different methods available to bring about behavioural change. The model makes use of five methods: three can be broadly classified as encouraging change, and two can be seen as enforcing change. The allocation of points in the second element attempts to mirror how effective each of these five methods are at changing behaviours. However, as there are only a total of 3.5 points in the second element, the allocation of points is, again, restricted and somewhat arbitrary.

Below is a brief description of each of the five methods of behavioural change utilised by the model. This description is followed by a summary of the second element, and then the rationale behind the allocation of its points.

Information/Education Provision

This method attempts to change behaviour by informing or educating residents about their current environmentally destructive behaviour and/or the benefits of an alternative, desirable behaviour. The information can be presented using many different forms and media such as pamphlets, radio/television/newspaper advertising or articles, seminars, presentations or expos. Additionally, the information can be designed to cater for the whole community or tailored to specific groups of residents. Examples of information/education methods used by local governments in Australia include cinema advertising to encourage domestic recycling, a quarterly newsletter about sustainable living, or a ‘Green House Design’ brochure for anyone inquiring about building a house in the council area.

Facilities/Programmes Provision

This method attempts to change behaviour by providing residents with the necessary equipment, facilities or opportunity to change their behaviours. Examples of facilities provision to encourage pro-environmental behaviour change in local governments include bike paths to encourage cycling to work, kerb-side collections to encourage recycling, free bus services to reduce private vehicle use, and public street bins to reduce littering.

Financial and other incentives

This method attempts to change behaviour by giving residents a personal incentive to change from their current environmentally destructive behaviour. Perhaps the most commonly recognised and utilised incentive is the financial incentive, which involves either rewarding residents financially when they change to a better behaviour, or punishing them financially for maintaining the undesirable behaviour. Examples of this method of behavioural change used at local government levels include volume-based waste collection charges which both reward and punish people financially for recycling or not, a 'Best Kept Street' competition which rewards residents with kudos, and parking meters which provide a financial disincentive for driving into town.

Legislation

This method attempts to enforce behavioural change by enacting legislation that permits or prohibits certain behaviours. According to Jackson (2005: 122) this method is "an avenue that Government has been reluctant to pursue", particularly in the area of sustainable consumption. The effectiveness of the legislation at changing behaviours often depends on the severity of the punishment incorporated into the legislation, along with the resources the government puts aside for the monitoring and enforcement of the law.

In Australia, among the three tiers of government, local governments have only limited power to legally regulate behaviours. Chapter 7 of the *NSW Local Government Act 1993* (the Act) sets out the major regulatory functions of NSW councils and stipulates what activities can be regulated by councils. Fortunately, the Act requires councils to

“have regard to the principles of ecologically sustainable development in carrying out their responsibilities” (7e). Furthermore, councils are not restricted to regulating only those activities outlined in the Act, but can also regulate other activities in accordance with other acts such as the *Protection of the Environment Operations Act 1997* and the *Environmental Planning and Assessment Act 1979*. Nevertheless, councils are limited to only two means of regulation: giving their approval, and by ordering a person to do, or stop doing, something. Regulating by other means, such as issuing licences, is not allowed under the Act. Furthermore, councils are restricted by the Act as to what level and sort of penalties they can bestow for offences to their regulations.

It is not within the scope of this study to examine all the regulatory capabilities of NSW councils in relation to general or specific pro-environmental behaviours. For the purposes of the model, suffice it to say that local councils in NSW have some, albeit limited, capacity for changing behaviours through regulation. Nevertheless, what is particularly relevant is that a few of the behaviours identified in the first element of the model come under the regulatory jurisdiction of local government.

Elimination of Choice

This method attempts to change behaviour by greatly restricting, or eliminating, the choice of behaviours people have on offer. It works on the premise that people will change their behaviour to a more desirable one if they have no other choice but to do so. Examples of the use of this method in local governments include encouraging people to walk rather than drive in the centre of town by building a pedestrian mall; discouraging the dumping of household rubbish in public bins by removing all street bins; and reducing the speed or volume of traffic on a street by putting in traffic-slowing devices or turning the street into a dead-end.

The ways these five methods of changing behaviours have been incorporated into the model are as follows:

- 1. Education/information provision** – 0.5 points given if 10% or more of the actions in a council’s approach use this method
- 2. Facilities provision** – 0.5 points given if 10% or more of the actions in a council’s approach use this method

3. Financial and other incentives – 1 point given if 10% or more of the actions in a council’s approach use this method

4. Legislation and elimination of choice – 1 point given if 10% or more of the actions in a council’s approach use either or both of these methods

5. A combination of all five methods – 0.5 points given if each of the above five methods is used at least once in a council’s approach to implementing sustainability.

The model awards points for the use of the methods beyond a certain level (10%). This is because a certain level of use of a method shows that the method is an intentional part of a council’s approach to implementing sustainability, and not just a method used by chance or caprice. The level of use of a method has been arbitrarily set at 10% in the model. This figure was considered high enough to show an intentional use of a method, but low enough not to preclude a score for methods that cannot be used often.

4.2 Rationale behind allocation of points in the second element

According to Jackson (2005: iii), “[c]hanging behaviours – and in particular motivating more sustainable behaviours – is far from straightforward”. He explains that it is very difficult to change people’s behaviours because of “the wide variety of different factors that influence behaviours and choices” (2005:3). He goes on to argue that there is no single, universal behavioural theory or model that could be used to build all behavioural change policies on, because “[h]uman motivations are so multi-faceted” (2005: 6). Consequently, the model in this study incorporates the use of five different methods of behavioural change, and it further acknowledges a council’s use of all five methods.

Educating and informing residents is one of the two main methods that governments currently use in their attempts to implement sustainability (Murphy and Cohen, 2001; Jackson, 2005). This has certainly been confirmed by the results of this study (see Section 7.2), whereby the councils examined use this method more often than any other method articulated in the model. Unfortunately, however, research shows that the method of educating and informing people as a means of implementing sustainability is

not effective (Hobson, 2001; Cohen, 2001). As Jackson puts it, “[t]he history of information and advertising campaigns to promote sustainable behavioural change is littered with failures” (2005: 121). Consequently, the model awards only half a point to councils for the noticeable use of this method as a means of behavioural change.

The provision of facilities by councils is a method steeped in the rational choice theory of behaviour. Rational choice theory is based on the idea that “human behaviour is a continual process of making deliberative choices between distinct courses of action” and that we “choose the one that offers the highest expected net benefit or lowest expected net cost to us” (Jackson, 2005: 29). By providing facilities that reduce the “net cost to us” in terms of time and effort, councils hope to tip the balance in favour of more environmentally friendly behaviour. However, like the rational choice theory upon which it is based, providing facilities with the expectation of changing behaviour is highly problematic. People don’t change their behaviour simply because they have the opportunity or facilities to do so – behavioural change is subject to many other things like “personal motivation, collective practice, peer pressure, habit, subjective norm, and social context” (Jackson, 2005: 4). Consequently, the model awards only half a point to councils for noticeably using facilities provision to bring about behavioural change.

The use of financial instruments is another commonly used method of attempting to instigate pro-environmental behavioural change, and one that is sometimes disparaged in the literature because of its close connection with rational choice theory of behaviour. Cohen, for example, says, “the current emphasis on informational campaigns and fiscal instruments is unlikely to promote unambiguous movement towards ‘sustainability’” (2001: 33). Nevertheless, studies have shown that economic cost is a primary issue when people are considering pro-environmental behaviours (Jackson, 2005); so economic instruments may prove worthwhile in changing behaviour. Besides, in the model this method is not restricted to economic incentives alone but includes other incentives, such as kudos, that draw on alternative theories of behaviour rather than rational choice theory. Therefore, the model awards a full point for the noticeable use of the method of giving incentives to encourage behavioural change.

The use of legislation and the elimination of choice – both a means of *enforcing* rather than *encouraging* behavioural change – are considered important within the model

because, as Cohen says, “it is not at all clear that the public cares enough about protecting ecological integrity, or that individuals left to their own devices will make environmentally appropriate consumption decisions” (2001: 34). In the model these two methods have been combined because of the restricted regulatory capabilities of local governments in NSW, and because it would be impossible to eliminate choice from many lifestyle characteristics and behaviours. Nevertheless, as both these methods are generally very successful at changing behaviours, the model awards a full point to councils who noticeably use these two methods, separately or in combination, in their approaches to implementing sustainability.

Overall, the objective of the second element of the model is to assess a council’s approach to implementing sustainability in terms of the behavioural change methods the council utilises in its approach, and the effectiveness of these methods. Notwithstanding, the second element is worth only 3.5 out of 20 points because it, like the third element described in the next chapter, does not have the same calibre of importance as the first element.

Chapter 5: Third Element of the Model – Clarity and Holistic Nature of the Approach

5.1 Overview of the third element of the model

The third element of the model aims to assess a council's approach to implementing sustainability in terms of two things: the clarity of the approach, and its holistic nature. The third element is worth a total of 3.5 points, with a maximum of 1.5 points being awarded for how clear and logical the approach is, and a maximum of 2 points awarded for how comprehensive the approach is. Again, the allocation of points within each element of the model is fairly arbitrary; the importance of the scoring system lies in the proportion of points between the elements rather than within them.

With regard to the clarity of the approach, a council is assessed on two things: (1) whether its approach is clearly based on fundamental planning precepts and (2) how well the council communicates its approach in its principal sustainability document. With regard to the holistic nature of the approach, the council is assessed on whether it addresses the ecological sustainability issues not covered in the first element of the model: biodiversity, toxin release, water supply and local impacts.

The breakdown of the third element of the model is as follows:

1. All five of the following planning precepts addressed in the approach – 1 point
 - where the council wants to go with regard to sustainability
 - why it wants to go there
 - what is its starting point
 - what the community thinks is its starting point
 - how the council intends to get from where it is to where it wants to go.
2. Communication of the approach is clear, concise and easily understood – 0.5 points
3. Mention of goals/actions/strategies relating to biodiversity – 0.5 points

4. Mention of goals/actions/strategies for reducing toxin release (that is, release of compounds that nature cannot assimilate) – 0.5 points
5. Mention of goals/actions/strategies relating to water supply/management – 0.5 points
6. Mention of systems/strategies for assessing and/or managing the local environmental impacts of activities – 0.5 points

5.2 Rationale behind allocation of points in the third element

More than half the points of the third element are conferred with regard to the holistic nature of the council's approach to implementing sustainability. As already mentioned, the first element of the model was designed using the Ecological Footprint – a technique that, although invaluable and appropriate in the development of the model, does not address all issues of ecological sustainability. Consequently, part of the third element awards points to councils that address the issues not covered in the Ecological Footprint technique, namely biodiversity, toxicity, water supply and local environmental impacts.

The allocation of only two points for these four issues, compared to the 13 points for just the one issue in the first element, can be easily justified. The issue of human demand on biological resources, which is what the first element deals with, is of primary importance for sustainability. Monfreda *et al.* consider the “protection of natural capital, including its ability to renew or regenerate itself...a core aspect of sustainability” (2004: 231). In addition, there is a consensus in the literature that ever-increasing consumption and production (that is, human demand on biological resources) constitutes the biggest threat to the Earth's ecological processes (UN, 1993; Murphy & Cohen, 2001; Lowe, 2005; Beder, 2006).

Furthermore, the content of the first element has significant impact on the four issues contained in the third element. For example, consumption of biological resources greatly affects biodiversity because the loss of habitat is one of the main threats to biodiversity. Similarly, the release of toxic materials into the biosphere is a result of the consumption and production of certain products. Additionally, the consumption of water has great bearing on a council's ability to maintain an adequate water supply for its

community. Consequently, the third element of the model awards points to councils for incorporating all the issues of ecological sustainability, but the design of the scoring system still reflects the level of importance these various issues have with regard to the overall maintenance of ecological processes.

The other significant allocation of points in the third element is for the inclusion of fundamental planning principles in the council's approach to implementing sustainability. The importance of the fundamental planning precepts articulated in the model is best understood by comparing a council's movement towards sustainability with a journey. To successfully reach a destination, travellers must know where they want to go, why they want to go there, where they are now, and how they intend to get from here to there. The absence of any of these precepts in the journey plan will greatly jeopardise the success and outcome of the journey, just as the absence of these precepts in a council's approach will jeopardise the success and effectiveness of that approach. For example, failure to determine a starting point, which is a common fault in government planning, can jeopardise the intended outcome of the journey: let's say travellers planning to visit Canberra propose to get there by driving roughly 200km south-west. This is an excellent plan for Wollongong residents, but if the travellers lived in Perth, this plan would sink them into the Indian Ocean. The 'how to get there' part of the plan can only be resolved once the starting point is known. This is an essential part of a council's plan for implementing sustainability too: to be effective a council needs to establish a starting point – in both real and the community's perceived terms. A metropolitan council area populated by shift workers, for example, will have different sustainability issues at different intensities than a rural council populated by organic farmers. The councils of these different communities need to identify the different sustainability issues they face, if they are to develop an effective approach to implementing sustainability. Thus, the model assesses a council on its inclusion of essential planning precepts.

The smallest allocation of points in the third element of the model relates to the clarity of the approach. More specifically, the council is assessed on the degree to which it communicates its approach in a clear, concise and easily understood manner. Implementing sustainability in councils involves many people, so communicating the

approach clearly is very important. Consequently, the model awards half a point for the clarity of the approach.

To summarise, in the absence of any other model or technique, I created the model described in Part A to assess a council's approach to implementing sustainability. The three elements of the model together with its scoring system reflect the idea that what a council chooses to target for change in its approach to implementing sustainability has great influence on the effectiveness of its approach. The difficulties and limitations in applying the model to the documented approaches of three NSW councils are discussed in Part B (the next two chapters).

Part B:

***An Examination of NSW Council
Approaches to Implementing Sustainability***

Chapter 6: Description of the Investigation into NSW Council Approaches

The aim of this study is to examine and assess NSW council approaches to implementing sustainability. In order to achieve this, the first step was to create the assessment model described in Part A. The next step was to determine what *are* NSW council approaches to implementing sustainability so that they could be assessed using the model. Part B of the thesis deals with this second step: this chapter describes how the investigation into NSW council approaches was undertaken, and Chapter 7 gives a summary of three NSW council approaches to implementing sustainability.

6.1 Overview of the investigation

There are numerous ways of determining a council's approach to implementing sustainability. One way would be to interview staff and councillors, while another way would be to review all council documentation, past and present. Given the restraints of this study, I conducted an in-depth analysis of the council's principal sustainability document as the means of determining the council's approach to implementing sustainability. In this study, the principal sustainability documents of three NSW councils were examined.

The three councils chosen for investigation were selected because they were named in the 2007 Local Sustainability Award given by the Local Government & Shires Associations of NSW. Two of the councils won the Award and the other council was highly recommended. There were actually five councils named in the 2007 Local Sustainability Award, but two of these councils lacked an over-arching, publicly available sustainability document that could be analysed – one council was in the process of writing an overall sustainability plan and the other council used its strategic plan as the basis for its sustainability initiatives.

The rest of this chapter describes how the investigation of the three chosen council approaches was undertaken. Section 6.2 puts the investigation into the broader context of sustainability implementation throughout NSW local government. Section 6.3 gives a description of the three councils chosen for the investigation. Finally, Section 6.4 describes the methodology used in the investigation of the council approaches, along with the considerations and limitations of assessing the approaches using the model.

6.2 Councils of NSW implementing sustainability

There are 152 councils listed on the NSW Department of Local Government website (Department of Local Government, 2008). I investigated the websites of 23 of these councils to ascertain what percentage of councils in NSW have a publicly available, documented approach to implementing sustainability (mainly in the form of sustainability plans or strategies). The 23 councils were impartially selected according to whichever council was listed first under each letter of the alphabet.

In compliance with the NSW *Local Government Act 1993*, all 23 councils had a management plan ranging between 1-5 years, with a 1-year plan being the most common. Also, in line with the same legislation, all but one council had some form of a social or community plan, and 83% of the councils had a State of the Environment Report.

Strategic plans (usually 5 to 20 years) are not a statutory requirement in NSW, so it was not surprising to find that only 43% of those councils surveyed had strategic plans or were in the process of writing them. All but one of these strategic plans addressed what are commonly considered the three elements of sustainability – the community, the environment and the economy (the only strategic plan not to mention all three of these aspects left out the environmental component). Only three of the 23 councils surveyed (13%) had written a distinctive, over-arching sustainability document or environmental management plan (strategic plans were not counted as sustainability documents unless they mentioned sustainability in the title).

6.3. Councils selected for investigation

As mentioned in Section 6.1, the three councils investigated were the winning/highly recommended councils of the 2007 Local Sustainability Award. The three councils, along with their principal sustainability documents, are as follows (in alphabetical order):

Clarence Valley Council – Overall winner of the NSW 2007 Local Sustainability Award. The principal sustainability document analysed was *Our Lifestyle, Our Heritage, Our Future: Our Sustainability Framework* (Clarence Valley Council, 2006).

Clarence Valley Council was formed in 2004 with an amalgamation of four councils on the northern NSW coast. Clarence Valley Council covers an area of 10,440 km² and has a population of 49,422, with Grafton the major town in the council (Clarence Valley Council, 2008). The choice of a sustainability document to analyse for Clarence Valley was easy to make, as *Our Sustainability Framework* was the only major sustainability document available on the Clarence Valley website at the time of the investigation.

Kempsey Shire Council – Highly recommended in the NSW 2007 Local Sustainability Award. The principal sustainability document analysed was *Kempsey Shire Ecologically Sustainable Development Strategy* (Kempsey Shire Council, 2007).

Kempsey Shire Council is a council on the mid-north coast region of NSW; nestled into the Macleay Valley, its major town centre is Kempsey. The council has a land area of 3,381 km² and a population of 28,000 (Kempsey Shire Council, 2008). Kempsey Shire's *Ecologically Sustainable Development Strategy* was the obvious document to be analysed for this study.

North Sydney Council – Winner of Category C of the NSW 2007 Local Sustainability Award. The principal sustainability document analysed was *Towards Sustainability Plan* (North Sydney Council, 2004).

North Sydney Council is located on the northern side of Sydney Harbour; it covers only 10 km² but has a population of 62,402 (North Sydney Council, 2008). Of the various sustainability documents on the North Sydney Council's website, *Towards*

Sustainability Plan was the one that best described North Sydney's overall approach to implementing sustainability.

6.4 Methodology used in the investigation and its limitations

The principal sustainability documents of the three councils (from henceforth the 'plans') were first examined in terms of their clarity. In accordance with the model, the plans were assessed in terms of how clear, concise and easily understood they were. To do this, the visions and broad goals of the plans were scrutinised together with the length and structure of the document, to determine whether the plans were clear and concise. Then, the way the concept of sustainability was presented – its definitions and descriptions – was scrutinised to determine whether the plans were easy to understand.

Of course, this methodology of determining the clarity of a council's approach is subjective, as the term 'clarity' will always be influenced by the assumptions of the assessor. Nevertheless, some form of assessment had to be made and this method proved sufficiently effectual, albeit subjective. Assessing the plans in relation to the five fundamental planning precepts articulated in the model, on the other hand, was a lot less subjective. Either the plans included all five planning precepts, or they did not. There was no ambiguity in recognising the planning precepts within the plans.

The next step in analysing the plans involved examining and classifying the goals and actions in the plans. This was done for two reasons: firstly, the actions relating to quality of life needed to be separated from the actions pertaining to maintaining ecological processes because, as already mentioned, this study is limited to investigating the latter. Secondly, the actions needed to be examined to determine whether the councils were taking actions in the areas stipulated by the model.

The main difficulty in counting and classifying the actions was that some actions were exceedingly hard to classify. For example, it was difficult to classify a number of actions under the 'Traffic and Transport' section of North Sydney's plan because it was not clear whether the actions were primarily aimed at reducing fuel consumption and therefore maintaining ecological processes, or primarily aimed at reducing traffic and

congestion and thus improving quality of life. In cases such as this, the actions were put in a 'General Sustainability' category, rather than the 'Ecological Processes' or the 'Quality of Life' categories. Also, in Kempsey Shire's plan there were a few actions that were not noticeably associated with either improving quality of life or maintaining ecological processes, so these were put into a 'Non-sustainability Actions' category (see Section 7.1 for more details about this point).

The most significant consideration with regard to this methodology is that the classification process is subjective. I created the categories, and then interpreted and classified the actions based on my experience and understanding of sustainability. A different assessor with a different experience and understanding of sustainability may have used different categories and made different interpretations of the actions. For example, I classified actions relating to contaminated sites into the 'pollution' category rather than the 'waste' category, despite the fact that such actions tended to be in the 'waste' sections of the plans themselves. The various categories I used in classifying the actions can be found in Appendix B.

However, it should be pointed out that the classifying of actions was done to produce a general, overall impression, rather than a strict account, of what the councils' main focuses were with regard to sustainability. The analysis of the actions was necessary only to ascertain whether there were any actions pertaining to the key focus issues outlined in the first and third elements of the model, and to quantify the methodologies councils used in changing residential behaviour (for the second element of the model).

In general, it was an easy task to identify actions corresponding to the first and third elements of the model. Nevertheless, when I was uncertain, or the actions unclear, the overall impression given by the plan was taken into account. For example, North Sydney's plan did not include an action of 'reduce electricity use in the home', which was a key issue nominated in the model. However, North Sydney's plan dedicated a whole page to giving tips on how to reduce electricity use in the home, and it also had an action to "Implement the Greenhouse Action Plan" which, I assumed, contained an action to reduce electricity use in the home. Therefore, despite the lack of a specific action relating to electricity use in the home, North Sydney was awarded points for addressing this issue. On the other hand, although North Sydney's plan included a

number of actions for buying green power for council operations, the plan did not give the impression that the council considered buying green power the top priority in its quest to reduce greenhouse gases. Consequently, although North Sydney was awarded points for addressing the issue of electricity use in the home, it was not given points for the corresponding priority action relating to the purchase of green power. Nevertheless, overall, identifying actions that related to the first and third elements of the model was an easy task.

In contrast, classifying actions according to what behavioural change methods they used (the second element of the model) was far from straightforward. The chief difficulty here was due to the vagueness of many actions. For example, the action to ‘promote bicycle use’ does not specify whether it will be achieved by telling people about the benefits of cycling, or by building bike-paths or by increasing the cost of metered parking in town. Consequently, there were four other groupings – besides the five behavioural change methods articulated in the model – used to categorise all the actions in the plans. Again, the categories I used in classifying the actions according to behavioural change methodologies can be found in Appendix B.

A summary of the results from the above investigation is given in the next chapter. After that, Chapter 8 presents the results of using the model to assess the council approaches.

Chapter 7: Summary of Three Council Approaches to Implementing Sustainability

7.1 Summary of the councils' principal sustainability documents

Using the methodology described in Chapter 6, the principal sustainability documents (the plans) of three NSW councils – Clarence Valley, Kempsey Shire and North Sydney – were examined. This chapter presents a summary of the findings from this analysis, with Table 7.1 on page 47 providing an overview of the plans.

As shown in Table 7.1, the titles and visions of the plans reveal that sustainability is the primary concern of the plans. In addition, the plans are quite substantial in size (71 pages or more), yet none of them contains all the five planning precepts flagged by the model. Table 7.1 also shows that Clarence Valley and Kempsey Shire councils have only five broad categories of sustainability implementation, whereas North Sydney has 11. The number of actions listed in the plans, however, is quite similar – with 291 and 280 actions (only two plans contained actions). It is interesting that no two councils gave similar prominence to the different aspects of sustainability: Clarence Valley clearly favoured goals relating to quality of life, North Sydney favoured actions pertaining to ecological processes, while Kempsey Shire had an even mix of actions for improving quality of life and protecting ecological processes.

It should be noted that the different percentages of actions in Kempsey Shire's plan do not add up to 100% in the table. This is because 10% of the actions in Kempsey Shire's plan were not, in my opinion, sustainability actions because they were not noticeably concerned with either improving quality of life or maintaining ecological processes. For example, a number of actions involved road maintenance and improvement. The two main behavioural consequences of building better roads are that people drive more often and more quickly. Not only do both these behaviours increase fuel consumption and thus negatively affect ecological processes, they also increase the risk of car accidents, which negatively affect quality of life. Consequently, actions relating to road building or maintenance were not counted as sustainability actions unless they specifically related

to road safety. The other actions in Kempsey Shire's plan that were not considered sustainability actions were mostly related to business and industrial development and tourism. These appeared to be actions promoting economic development for its own sake rather than to increase quality of life. A more detailed discussion regarding economics and sustainability can be found in Chapter 9.

Table 7.1 also highlights the number of actions or goals related to the important issue of consumption of resources. The table displays the number of actions that specifically mention a reduction in consumption, followed by the number of actions (in brackets) which *imply* a reduction of resource consumption. An example of an implied resource reduction action is "Continue to participate in ICLEI Cities for Climate Protection" (North Sydney Council, 2004: 48), which is an action associated with a reduction in greenhouse gases, which in turn implies a reduction in energy consumption.

Lastly, Table 7.1 shows the three key issues that had the most actions in each of the plans. It should be pointed out that only the quantity of the actions, not the quality of them, was taken into account. This means that actions requiring a lot of time and effort were counted just the same as actions requiring little time and effort. Also, with regard to actions concerning greenhouse gas emissions, these actions were classified under the topic of consumption rather than pollution or waste. As you can see, biodiversity was Kempsey Shire's main focus for ecological sustainability, while North Sydney's main focus was the issue of consumption. Clarence Valley's plan did not contain any actions and, therefore, no means to determine a focus based on number of actions. Pollution was the only key focus issue common to the Kempsey Shire and North Sydney plans. The issue of pollution incorporated actions relating to air and water pollution as well as litter and contaminated sites.

Table 7.1: Overview of the principal sustainability documents of the councils.

Council	Clarence Valley	Kempsey Shire	North Sydney
Name of Document	Our Lifestyle Our Heritage Our Future : Our Sustainability Framework	Kempsey Shire Ecologically Sustainable Development Strategy	Towards Sustainability Plan
Year	2006	2007	2004
Number of pages	71	100	75
Planning rudiments (5)	3	4	4
Vision	A sustainable Clarence Valley	The beauty of the natural environment and the country and coastal lifestyles in the Kempsey Shire will be both preserved and enhanced for the benefit of current and future generations by providing for the environmental, social and economic aspirations of its communities.	For North Sydney to be a vibrant and liveable place, which is environmentally, economically and socially sustainable
Number of broad categories	5	5	11
No. of goals	15	35	12
No. of actions	-	291	280
% of actions/goals for quality of life	60%	37%	26%
% of actions/goals for ecological processes	27%	36%	59%
% of actions/goals for general sustainability	13%	17%	15%
Consumption actions/goals specified (implied)	1 (1)	6 (11)	13 (32)
Ecological issues with most actions (number of actions in brackets)	-	1. Biodiversity (20) 2. Pollution - excluding greenhouse gas actions (18) 3. Water supply/management (14)	1. Consumption - including greenhouse gas actions (32) 2. Waste & recycling (25) 3. Pollution -excl. greenhse gas (18)

7.2 Summary of behavioural change methodologies used by councils

Table 7.2 on the following page presents a summary of the investigation into what behavioural change methods the councils use in their approach to implementing sustainability. The table shows the different methods of instigating behavioural change (in the left-hand column) against how often these methods were used by the councils (the percentages are not of the total number of actions but of the totals from the two different aspects of sustainability). The percentages given in the table should be regarded as a general guide rather than an exact account because, as discussed in Section 6.4, classification of the actions according to behavioural change methods was not always an easy or straightforward task.

There are four categories included in Table 7.2, which are not part of the model as they are groups of actions that are not aimed at changing the behaviour of residents. The category ‘Management Techniques’, for example, includes council actions such as investigating, monitoring, identifying, mapping, researching and developing council guidelines, plans and policies. Nevertheless, it was necessary to classify all the actions in the plans in some way so that the percentages of the actions relating to the five behavioural change methods articulated in the model could be determined. Clarence Valley’s plan did not contain actions or goals that could be analysed in terms of behavioural change methodologies.

Table 7.2: Classification of council actions according to behavioural change methods.

Method of implementing change	Clarence Valley	Kempsey Shire		North Sydney	
		Quality of Life	Ecological Processes	Quality of Life	Ecological Processes
Education/ Information / Awareness	-	3.5%	11.8%	12.7%	16.5%
Provide facilities / programmes / events etc.	-	14.0%	8.4%	23.9%	14.7%
Incentives - financial and others	-	0.8%	2.5%	0	1.8%
Legislation/enforcement/compliance/DA approvals	-	0	2.4%	0	6.8%
Elimination of choice	-	0	1.7%	1.4%	0.6%
Management Techniques - investigate, plan, map etc	-	32.5%	27.7%	22.5%	27.1%
Incorporate in council plans /policies/procedures etc.	-	17.5%	21.0%	25.4%	17.6%
Collaborate / convene / support	-	14.0%	3.4%	9.9%	7.6%
Not specified	-	17.5%	20.2%	5.6%	8.2%

Table 7.2 shows that, overall, the actions listed in the plans were most commonly management actions or those connected with existing council plans and procedures. The table also shows that all five of the behavioural change methods included in the model (the first five methods listed in the table) were used by both Kempsey Shire and North Sydney councils. With regard to these five methods, both councils preferred to use the method of ‘facilities provision’ for actions relating to quality of life issues, and both councils used ‘education’ as the primary method of dealing with ecological issues. Both councils made it over the 10% threshold stipulated in the model for their use of the education method, but only North Sydney council used other methods of behavioural change noticeably.

In sum, the examination of the three councils’ plans provided a good indication of the councils’ approaches to implementing sustainability. The next step in the study, described in the next chapter, was to assess the council approaches using the model.

Part C:

Results and Discussion

Chapter 8: Results from Applying the Model to the Councils' Approaches

The model described in Part A was designed to assess the three council approaches to implementing sustainability described in Part B. This first chapter of Part C presents the results of this assessment; Chapter 9 then follows with a discussion of the results.

Table 8.1 below shows each council's score for the various aspects of the model, with the final score out of 20 given at the bottom. The column on the left side of the table lists the different aspects of the model, and shows (in brackets) the total number of points that could be scored for each single aspect.

Table 8.1: The effectiveness of the councils' approaches in implementing sustainability

ASPECTS OF THE MODEL (number in brackets indicate total possible points for each aspect)	Clarence Valley	Kempsey Shire	North Sydney
1st Element - Behaviours targeted for change (a total of 13 out of 20 points)			
Key issues targeted (7)	0.5	0.5	1.5
Priority actions prioritised (6)	0	0.5	0.5
2nd Element - Methods used to instigate behavioural change (a total of 3.5 out of 20 points)			
Education/information (0.5)	-	0.5	0.5
Facilities/programmes provision (0.5)	-	0	0.5
Incentives (1)	-	0	0
Legislation / Elimination of choice (1)	-	0	0
Combination of all 5 methods (0.5)	-	0.5	0.5
3rd Element - Clarity and holistic nature of approach (a total of 3.5 out of 20 points)			
Clear, concise, easily understood (0.5)	0	0.5	0.5
Planning fundamentals - all 5 (1)	0	0	0
Biodiversity mentioned (0.5)	0.5	0.5	0.5
Toxin release mentioned (0.5)	0	0.5	0.5
Water supply mentioned (0.5)	0.5	0.5	0.5
Impact assessment mentioned (0.5)	0.5	0.5	0.5
Total (20)	2	4.5	6

The first and most obvious feature of the results is the low scores. These results were manifest because the councils failed to target most of the issues that, according to the model, are causing the biggest threat to the Earth's ecological processes. North Sydney was the only council to target more than one of the top ten issues (it targeted two). Furthermore, none of the councils had a goal or action pertaining to what the model classified as the two worst lifestyle characteristics: the size of residents' homes and their meat-eating habits.

It might be argued that the model is not realistic because NSW councils have little legal jurisdiction over the ten issues identified in the first element of the model. However, councils have just as much official influence over electricity use in the home as they do over meat-eating habits and air travel, so why did the councils have actions in their plans to address electricity and vehicle use and not have actions for the other eight lifestyle characteristics? Furthermore, the most unsustainable lifestyle characteristics in NSW according to the model – the size of people's houses – is one of the few lifestyle characteristics over which councils have the primary legal jurisdiction. Yet no council addressed this issue in their plans.

Another reason for the councils' low scores was their failure to prioritise their actions according to which actions would be the most effective at protecting ecological processes. No council made discernable priorities of the actions nominated by the model. In fact, despite there being upward of 280 actions listed in each of the plans that contained actions, no council put their goals or actions in order of importance, and only Kempsey Shire Council qualified its actions by classifying them high to low priority.

Two other aspects of the model noticeably contributed to the poor scores of the councils. The first of these was that no council used either the 'incentive' method or the 'legislation/elimination of choice' method of changing behaviours to the extent stipulated in the model (10%). The second aspect was that not all five fundamental planning precepts stipulated by the model were included in any of the councils' approaches. The planning precept consistently absent was that of establishing a starting point. The lack of proper planning and its effects is discussed in more detail in the next chapter.

It should be noted that Clarence Valley's sustainability document did not contain any actions that could be analysed, and thus it could not score any points for the second element of the model. This council's goals, however, were sufficient for the application of the first and third elements of the model. It could be argued that because of this absence of actions in Clarence Valley's principal sustainability document, the council's approach to implementing sustainability should not be assessed using the same model as the other plans. However, the model's aim was to assess a council's approach to implementing sustainability, and as Clarence Valley's document was a description of its approach, the model was justifiably applied.

Moreover, Clarence Valley's document implied the intention of writing a further 'Sustainability Action Plan' (Clarence Valley, 2006: 22), yet Clarence Valley's document was of a similar size to the other plans examined in this study. The question elicited from this circumstance, then, is why it took Clarence Valley more than 70 pages to describe an approach that lacked any specific details regarding implementation. Consequently, I argue that the extremely low score of Clarence Valley is not the fault of the model or of circumstances relating to the lack of actions in the Clarence Valley plan, but is due to the vague and sketchy approach Clarence Valley describes in its principal sustainability document. A vague approach lacking details of implementation is not an effective approach for implementing sustainability, and the model score consequently reflects this.

The only component of the model that gave the councils a satisfactory score was in the third element and dealt with the holistic nature of the approaches. This indicates that the councils did not focus on one sustainability issue to the exclusion of others. However, the good scoring for the third element compared to the poor scoring for the first element also indicates that the councils may be working hard on numerous sustainability issues, but they have failed to address the most important ones. In fact, the results indicate that at least three NSW councils are essentially rearranging deck chairs on the Titanic with regard to sustainability. Why NSW councils appear to be focusing on non-essential issues, in the face of looming ecological disaster, is discussed in the next chapter.

Chapter 9:

A Discussion of the Results

The results presented in Chapter 8 seem to suggest that NSW councils are indeed rearranging deck chairs on the Titanic with regard to sustainability – meaning they are focusing on trivial and unimportant issues while the biggest threats to sustainability go unchecked. This interpretation of the results, however, raises a number of considerations that are discussed in this chapter. The first is that the model itself is a significant influence on the results. The second is that the councils' lack of proper planning may be a possible reason for the poor results. Next, definitions of sustainability are discussed to highlight why councils may be prone to focusing on non-priority sustainability issues. Lastly, the issue of consumption is discussed, as it is a central theme in the model and consequently influences the results.

9.1 The study and the model as influences on the results

Although the model described in Part A has been logically developed and based on a widely accepted and well-developed tool for assessing sustainability (the Ecological Footprint), its design still has great bearing on the results presented in Chapter 8. Another model based on a different tool for assessing sustainability may have produced different results. However, one of the reasons the Ecological Footprint (EF) was used in the first place was because it was able to produce a list of lifestyle characteristics in order of greatest ecological harm. This, in turn, could be used to determine whether councils focused on the most important ecological issues in their implementation of sustainability. It is questionable whether other sustainability assessment tools, such as Triple Bottom Line Reporting, would be able to prioritise sustainability issues according to their comparative urgency and importance. Nevertheless, it would be worthwhile to develop other models of assessment, or elaborate on this model, using alternative sustainability assessment tools. After all, the purpose of this study was not to develop a model but to assess council approaches to implementing sustainability. Therefore, further research in developing alternative models would help promote

discussion about this very important issue.

A second consideration that may have bearing on the results is that only three councils were analysed in this study. Although the councils chosen have been recently commended for their implementation of sustainability, it cannot be assumed that these councils are typical of other NSW councils. Furthermore, the study was limited to analysing only the principal sustainability document of each council; a review of additional documentation could possibly influence the ultimate findings of the study. Therefore, further research and testing of this model on other NSW councils using other methodologies (such as examining all council documents or interviewing council staff) would assist in authenticating the results of the study.

In the absence of further research, however, the results from this study indicate that at least three councils in NSW are ineffective in their approaches to implementing sustainability. In the process of examining the council plans, I uncovered a number of possible reasons why the councils seem to be ineffective. The first of these reasons concerns the absence of proper planning in the development of the council approaches to implementing sustainability.

9.2 Ineffective planning

As described in Chapter 5, councils were awarded one point if their plans contained all five planning precepts articulated in the model. These five planning fundamentals were:

- where the council wants to go with regard to sustainability
- why it wants to go there
- what is its starting point
- what the community thinks is its starting point
- how the council intends to get from where it is to where it wants to go.

No council scored full marks for this part of the model because all the councils failed to establish a starting point in their plans. An objective assessment of where a council is in regard to sustainability is essential for the development of an effective approach – just like knowing the starting point is essential for getting to a selected destination. A

traveller's plan to reach Canberra will be greatly affected by whether the traveller starts from Wollongong or Alice Springs or London. In a similar way, a council's plan for implementing sustainability will be greatly dependant on its current level of sustainability and the nature of its community. Without determining these things first, a council's approach to implementing sustainability is likely to be ineffective – as the results of this study seem to suggest.

All three councils did attempt, to some degree, to ascertain their community's perception of their current sustainability. This is a very important aspect to implementing sustainability effectively because people's *perceptions* of where they are, probably have as much influence on their behaviours as where they *actually* are. For example, people in Wollongong wanting to reach Canberra would resist all efforts to move 200km south-west if these people were convinced they were currently in Hobart.

Nevertheless, using a community's perception of sustainability as the basis for a council's approach to implementing sustainability is like asking the Tin Man for compass directions: it is ineffective because the accuracy of people's responses is influenced by who and what they are. For example, in North Sydney's plan, residents nominated waste as being the sustainability issue of the highest priority. However, using the Ecological Footprint as described in Section 3.3, waste generation ranked 27th on the prioritised list of issues. Similarly, the Ecological Footprint ranked 'the size of houses' as the issue causing greatest ecological harm, but this issue did not even rate a mention by North Sydney residents in their assessment of sustainability issues.

The failure of the three councils to objectively assess their current sustainability status before developing their approaches to implementing sustainability is, in my opinion, one of the main reasons why the councils scored so badly in the model. Had they conducted a sustainability audit using an assessment tool, such as the Ecological Footprint, they would have identified and prioritised many of the key issues specified by the model. Perhaps this omission is due to councils considering their *State of the Environment Report* to be the same thing as a sustainability assessment of their community. In which case, it is the council's definition and concept of sustainability that may be responsible for their low scoring in the model.

9.3 Definitions of sustainability

There are many official definitions of sustainability and sustainable development (these two terms are often used interchangeably throughout the literature). The most commonly quoted definition is from the Brundtland Report *Our Common Future*, which defines sustainable development as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 1987: 43). In the light of the discussion that has taken place in the last two decades, however, Brundtland’s definition now appears somewhat vague and ambiguous.

More recent attempts to define sustainability often incorporate and highlight three distinct components of sustainability: social, economic and environmental. The United Nations, for example, sees “economic development, social development and environmental protection as interdependent and mutually reinforcing pillars of sustainable development” (2007: 2). Similarly, the ACT government says sustainability “is about providing for people, protecting our place and creating prosperity – now and into the future” (2003: 10). A recent trend is to include a fourth element of sustainability – governance – as can be seen by the *Triple Bottom Line Plus One* concept developed by RMIT University (RMIT University, 2008).

In all three council plans examined in this study, sustainability was in some way described in terms of its social, environmental and economic components. Clarence Valley Council named five key elements of sustainability – ecology, economy, society, human habitat and governance – and developed its goals accordingly. Similarly, Kempsey Shire Council designed its approach around environmental sustainability, social sustainability and economic sustainability. In contrast, North Sydney Council only really made reference to the different elements of sustainability in its vision – a vision, incidentally, which was developed for another North Sydney document eight years prior to its inclusion in the *Towards Sustainability Plan*.

Defining sustainability in terms of its three (or four) elements becomes problematic because sustainability is more than a sum of its parts – it is a synergy of them.

Sustainability is like the colour lilac, which is made up of three colours but is distinctly different from any of these colours; presenting the three colours of red, white and blue may get people thinking of flags and patriotism, but it does little to engender an understanding of the colour lilac. In a similar way, defining sustainability in terms of its social, environmental and economic components does not engender a true appreciation of sustainability. Kempsey Council acknowledged this by saying that “for many years economic, environmental and social goals have been pursued in isolation from one another.... [i]ndeed, it is becoming obvious that these issues cannot be separated” (Kempsey Shire Council, 2007: 8). Ironically, however, Kempsey Shire’s plan went on to deal with social, environmental and economic issues very much separately.

One of the main problems of compartmentalising sustainability into three components is that some important issues are neglected because they are neither primarily social, environmental nor economic. The issue of consumption, for example, can be seen as environmental because it is a major cause of the world’s environmental problems, yet it is also a social behaviour as well as the keystone of the economic system in a consumer society (see Section 9.4). Issues like this, which cannot be easily classified as either social, environmental or economic issues, are often neglected because they do not distinctly belong to one of the components of sustainability. For example, thinking about the environmental component of sustainability in terms of land, atmosphere and water (or other categories outlined in State of the Environment Reports) makes it difficult to think about consumption as an environmental issue.

This compartmentalising of sustainability into different elements seems to have had some influence on the councils’ scores in the model. All three councils compartmentalised sustainability to some extent, and all three councils scored poorly because they failed to address key sustainability issues. Furthermore, North Sydney Council, which did not segregate sustainability into social, environmental and economic components but rather had 11 broad categories that blurred the distinctions between these components, had the highest score of the three councils.

Another major problem in defining sustainability in terms of three or four elements is that councils tend to develop their actions under three or four separate umbrellas. These actions then become difficult to prioritise and are sometimes in conflict with one

another. Tourism, for example, may inject cash into the local economy, but it also increases pressure on the environment by increasing solid and liquid waste. Furthermore, money spent on tourist facilities (such as a tourist centre) means less money available for facilities for locals (such as a community centre). Thus, an economic action to increase tourism may be in conflict with an environmental action to decrease waste or a social action to improve facilities for locals.

This potential conflict between actions under the different components of sustainability is exacerbated even further when it comes to prioritising the actions in terms of importance. People have very different views on whether environmental, social or economic issues are the most important. Even so, the necessity of prioritising issues and actions in terms of importance is one of the key ideas behind the development of the model, and the absence of prioritising in the council plans is one of the reasons for the councils' poor scoring in the model.

The various problems of compartmentalising sustainability into three elements are why this study has used only the Australian government's definition of sustainability (see Section 1.4). This definition abstains from defining sustainability in terms of its components and instead defines it in terms of two outcomes: increasing quality of life and maintaining ecological processes. It is interesting that this definition of sustainability was the only definition common to all three of the plans analysed in this study, yet none of the councils proceeded to design their approach around the two outcomes specified in this definition. It is my opinion that the councils would have scored better in the model had they designed their approaches to implementing sustainability in line with the Australian government's definition of sustainability.

Another advantage of defining sustainability in terms of two outcomes rather than three components is that the prominence of economic development is relegated to being just one of the many issues regarding quality of life. Wackernagel reasons that the "economy is not the goal in itself. It is a tool for organizing satisfying human lives, and economic growth is most likely no longer the determining factor in reaching that goal" (1999: 318). Furthermore, Beder argues that "the fundamental goals and assumptions underlying economics-based policies are at odds with the environmental and social principles concerned communities and governments around the world are seeking to

achieve” (2006: 275). The question of whether councils are prepared to relegate economic issues and to challenge the omnipotence of consumption is deliberated in the next and final point of discussion.

9.4 The pervasiveness of economic issues and consumption

The final point of discussion regarding the poor scores of the councils in the model airs the possibility that councils, intentionally or inadvertently, neglect key issues and actions in their approaches because it allows them to avoid challenging the dominant societal paradigms of economic growth and consumption.

According to Beder, the concept of ‘sustainable development’ (as distinct from sustainability) has been popular since it arose during the second wave of environmentalism in the late 1980’s because it “accommodates economic growth, business interests, and the free market, and therefore does not threaten the power structure of modern industrial societies” (1996: xii). Beder is not alone in thinking that modern approaches to sustainability do not challenge the dominant economic paradigm. Cohen contends that the current ineffective government programmes to promote sustainability, namely informational campaigns and economic instruments, are used to “enable the state to avoid confronting the essential contradictions between stewardship and economic growth” (2001: 33).

If Cohen’s assertion that governments focus on ineffective programmes to avoid confronting the real issue is true, this could explain why the councils scored so poorly in the model. A major part of the model deals with the issue of consumption because “the major cause of the continued deterioration of the global environment is the unsustainable pattern of consumption and production, particularly in industrialized countries” (UN 1993: 4.3). Yet out of all the hundreds of goals, objectives and actions contained in the three sustainability plans examined, very few dealt with the issue of reducing consumption. In North Sydney’s sustainability plan, only 12% of all its actions were in some way related to the issue of consumption, while less than 7% of Clarence Valley’s goals addressed the issue of consumption. Only 2% of Kempsey Shire’s actions related to consumption, which means that in Kempsey Shire’s plan there were

five times as many actions that were not, in my assessment, sustainability actions than there were actions relating to the biggest threat to sustainability.

Perhaps it is naïve to expect that councils in a consumer society will willingly address the issue of excessive consumption in their communities. After all, challenging the dominant tenet of consumption in a consumer society would not be an easy task.

Few would disagree that Australia is a consumer society, although according to Fine and Leopold, “precise and meaningful definitions of consumer society are extremely hard to come by; they are as rare as the use of the term is common” (1993: 62). The basic premise of a consumer society is that the society is “organised around the concept and practice of consumption” (Edwards, 2000: 167). Bauman maintains that we are in a consumer society because consumerism has become “the principal propelling and operating force of society” (2007: 28). Similarly, Goodman and Cohen contend ours is a consumer culture because “consumption...has entered into the warp and woof of the fabric of modern life” (2004: 4).

One of the characteristics of a consumer society is that consumption is not only an economic activity undertaken for practical or utilitarian reasons, but also a cultural practice (Edwards, 2000) which is “inextricably linked to personal and collective identity” (Jackson, 2005: 13). Furthermore, in a consumer society not only products, but also all aspects of everyday life, are consumed – aspects such as education, health care, politics, the news and even religion (Baudrillard, 1970). Goodman and Cohen give a good example of how consumer society has changed conventional views of politics in that politicians are now marketed like products (political TV advertising expenditure in the USA went from \$12 million in 1970 to \$600 million in 2000), and “people think they should be able to buy good government rather than creating and participating in it” (2004: 41).

This pervasiveness of consumption may explain why councils do not address the issue of consumption in any meaningful way in their plans and thus do not score well in the model. They may consider the issue of limiting consumption to be just too big and too hard an undertaking. Alternatively, they may deliberately or inadvertently ignore the

issue of consumption because it is inextricably connected with the economy and may not be in their short-term interests to address it.

In a consumer society, “consumption is...the economy’s driving force, and the ordinary consumer, rather than the producer, is seen as the central figure in the economic system” (Goodman and Cohen, 2004: 28). This means that if consumption levels drop in a consumer society, the economic viability of the society is threatened. There have been a number of examples in which governments or politicians have intervened to stimulate consumption as a means to protect the economy. For example, when the monetary markets in the USA were jeopardised by the terrorist attacks of September 11, 2001, President Bush lobbied Americans to increase their consumption levels and promoted this increased consumption as his fellow Americans’ patriotic duty (Goodman and Cohen, 2004: 29).

In addition to promoting consumption, governments have also been known to actively oppose the idea of limiting consumption. A good example of this was in the lead-up to the 1992 Earth Summit when many developed nations lobbied to have the chapter on consumption diminished or omitted from *Agenda 21* (Miller, 1995; Cohen, 2001). Therefore, it is not inconceivable for the three councils in this study to intentionally or unconsciously avoid dealing with the issue of consumption, as dealing with it may be too hard or not politically expedient.

However, the model results by themselves do not reveal whether the poor scores of the councils are due to the avoidance of the issue of consumption or whether it is the fault of the councils’ lack of proper planning or their working definitions of sustainability. Nevertheless, whatever the reason, the results of this study still indicate that at least three NSW council approaches to implementing sustainability are ineffective.

Chapter 10: Conclusion

The aim of this study was to examine and assess three NSW council approaches to implementing ecological sustainability using an original model developed for this task. This final chapter firstly summarises how this aim was achieved, and then it presents a summary of the findings of the study. Next in the chapter, the implications of the study are discussed and lastly everything is drawn together in a final summary.

10.1 The aims of the study and how they were achieved

The main impetus for this study came from the realisation that despite the urgent need for change, the efforts of Australian local governments to implement sustainability are doing very little to avert or mitigate the looming environmental crisis. This realisation resulted from personal experience acquired while working toward sustainability in local government, as well as from a review of the appropriate literature. The scanty literature on the subject of sustainability and local governments mainly identifies the barriers councils come up against in their attempts to implement sustainability. Prior to undertaking this investigation, no study had examined a council's *approach* to implementing sustainability as a possible reason for its ineffectiveness. Yet, in my opinion, *what* a council chooses to focus on, and *how*, are of paramount importance in effectively implementing sustainability.

Consequently, this study was designed to investigate local government approaches to implementing sustainability. As it was an initial investigation into a large area, the study was limited to examining only ecological sustainability and three NSW councils. In addition, only the issues pertaining to residents, and not businesses or industries, were examined. More specifically, then, the study was designed to examine and assess three NSW council approaches to instigating pro-environmental behavioural change in their domestic residents.

The study endeavoured to answer three key questions:

- 1) Do councils target the most ecologically problematic behaviours and lifestyle

characteristics in their approaches to implementing sustainability?

2) Do councils use the most effective methods of behavioural change in their approaches?

3) Are council approaches to implementing sustainability clear and holistic in nature?

In order to answer these questions, I developed a theoretical model with three elements corresponding to the three questions. The model is original out of necessity because no other model, technique or study could be found which attempted to assess council approaches to implementing sustainability. I do not claim that the model is the best or the only way to assess a council's approach to implementing sustainability. It was what I was able to develop and apply within the time and resource constraints of the study.

In the study, the model was used to assess a council's approach to implementing sustainability. Of course, the design and construct of the model are influenced by my background in the social and behavioural sciences. With this in mind, Part A gives a detailed description of the methodology behind the construction of the model to ensure the model's transparency and to reveal its assumptions and limitations. The model is relatively simple and basic, but it was developed clearly and logically enough to provide a useful assessment of a council's approach to implementing sustainability. It would be worthwhile to conduct further research to broaden this model or to develop other models of assessment that would advance the discourse in this very important subject concerning council approaches to implementing sustainability.

In line with the three questions mentioned above, the first element of the model established what *are* the most ecologically problematic behaviours and lifestyle characteristics of council residents. The Ecological Footprint, which is a widely accepted and well-developed sustainability assessment tool, was used to devise a list of behaviours and lifestyle characteristics of NSW residents in order of greatest ecological harm. This list was then transposed into the first element of the model and used as a benchmark with which to compare the residential behaviours councils currently target for change. The second element of the model focused on the methods councils used to instigate behavioural change; the third element assessed the councils' approaches in terms of clarity and their holistic nature.

The model was designed with a scoring system out of 20 to make it easier to comprehend and to reflect the idea that *what* a council targets for change is twice as important as *how* it goes about implementing that change. Consequently, the model awards 13 out of 20 points for the first element, which focuses on *what* actions councils are taking in their approaches to implementing sustainability, while the second and third elements award only 3.5 points each for *how* the councils go about taking those actions.

Once the model had been developed, the next step in the study was to select three councils and to assess their approaches to implementing sustainability using the model. The three NSW councils selected were Clarence Valley Council, Kempsey Shire Council and North Sydney Council; these councils were chosen because they were named in the 2007 Local Sustainability Award given by the Local Government and Shires Associations of NSW. Part B of the thesis describes the methodology used (and the results) in determining these councils' approaches to implementing sustainability. Essentially, the approaches were ascertained by analysing the principal sustainability document of each council and scrutinising the number and type of goals and actions it contained.

The final step in the study was to use the model described in Part A to assess the three council approaches presented in Part B. The results of this assessment were presented and discussed in Part C of the thesis. A summary of these results is presented in the next section of this chapter.

10.2 The results of the study

As already mentioned, the model produced a score for effectiveness out of 20. The most significant and obvious aspect of the results was that all three councils received low scores. North Sydney Council had the highest score with 6 out of 20, followed by Kempsey Shire Council with 4.5 and Clarence Valley Council with 2. These low scores essentially indicate that, according to the model, all three council approaches to implementing sustainability are ineffectual.

The main reason why the councils' scores were so low was that they failed to address the residential behaviours and lifestyle characteristics that are having the greatest negative impact on the Earth's ecological processes. The councils also failed to prioritise their actions according to which actions would have the greatest positive effect. To a lesser extent, the poor scores were due to councils favouring behavioural change methodologies that are not generally successful at promoting pro-environmental behavioural change.

The only area in which the councils scored well was regarding the holistic nature of their approaches (contained in the third element of the model). In this aspect at least, the councils acted satisfactorily by not focusing on one or two sustainability issues to the exclusion of all other issues. However, the satisfactory score in the third element compared to the poor score in the first element of the model shows that although the councils addressed a number of different sustainability issues in their approaches to implementing sustainability, they failed to tackle the most important ones.

Overall, the results of the study indicate that at least three NSW council approaches to implementing sustainability are largely ineffective (councils, too, that have been recently commended for their implementation of sustainability). Further research to confirm or counter the findings of this study is urgently needed because the findings, if correct, have very serious implications.

10.3 The implications of the findings

In Section 1.2 of this thesis, I attempted to impart the tremendous seriousness of the world's current environmental crisis and the extreme urgency with which we must act to avert, or at least mitigate, this crisis. Lowe tries to impart the same enormity of the situation by saying that many scientists, himself included, "see our civilisation unwittingly stepping in front of an ecological lorry that is likely to flatten us" (2005: 17). We need to make enormous and significant changes to the way most people live if we are to forestall the looming environmental and social catastrophe.

Yet the findings of this study suggest that the efforts being made by NSW councils to avert the environmental crisis are essentially ineffectual – mainly because they do not attempt to change the residential lifestyle characteristics having the biggest negative impact on the environment. Essentially, this means that the time, money and resources councils currently spend on implementing sustainability are, for the most part, being wasted on non-priority issues.

Other implications from the study relate to how councils *design* their approaches to implementing sustainability. In Chapter 9, I discussed the importance of proper planning prior to the development of council approaches, as well as the consequences of using different definitions of sustainability. Both these issues have far-reaching implications for the effective implementation of sustainability at local government levels. However, further research needs to be undertaken to examine these issues and their implications.

On a more practical level, the findings of this study – especially the results presented in Section 3.3, which list lifestyle characteristics in order of the most ecologically destructive – have many implications for the day-to-day implementation of sustainability by NSW councils. For example, many councils have a Waste Education Officer, or something similar, whose role is to reduce waste going to landfill. However, from the findings of this study it seems it would be more appropriate to employ a Housing Officer whose role it is to reduce house sizes in the community or increase house occupancy levels; or to employ a Consumption Officer whose role it is to decrease the consumption of meat, electricity, fuel, clothing and air travel in the community. The findings of this study even have implications for the *actions* of a Waste Officer, if Waste Officer there must be in a council. Generally, the most commonly used method to reduce waste going to landfill is to promote recycling and composting. However, the findings of this study seem to suggest that a better way of reducing waste to landfill would be to address the issue of wasteful consumption of food which saw \$5.3 billion of unused food being thrown out by Australians in 2004 (Hamilton *et. al.*, 2005).

In addition to the roles of council sustainability employees, the findings of this study have implications for how local governments spend their limited sustainability budgets.

The findings seem to suggest that councils would help mitigate the environmental crisis better if they subsidised home-brew kits rather than worm farms and compost bins. Alternatively, running vegetarian cooking classes may be a better use of council resources than running green technology expos and fairs.

There are many, varied, general and practical implications related to the findings of this study – enough, perhaps, to spawn a number of separate studies. I have touched on only a few implications here because, before the implications can be acted upon, it is necessary first to conduct further research to validate and advance the findings of this study. Local governments in Australia have a very important role to play in instigating pro-environmental behavioural change; more research is desperately needed to raise the profile and the level of the discourse on this very important subject.

10.4 Summary of the study

This study was undertaken because it appeared, from a review of the literature and from personal experience, that Australian councils are unacceptably slow and ineffective in their implementation of sustainability. In the absence of any other study, I investigated council *approaches* to implementing sustainability by developing an original model for assessing council approaches and then applying it to three councils. The model was developed using the Ecological Footprint as the primary assessment tool, and it was based on the idea that an effective approach to implementing sustainability is greatly dependent on what residential behaviours councils target for change. The model was then applied to three councils in NSW that had been recently commended for their implementation of sustainability.

The study found that all three council approaches to implementing sustainability were mostly ineffective. This was due to a number of reasons: the councils' failure to target the behaviours most in need of change in their communities; the councils' failure to prioritise their actions; and, to a lesser extent, the councils' failure to use more successful behavioural change methodologies. The discussion contained in the study proposed a number of possible reasons for the councils' poor scores. These included the model itself as an influence on the results; the lack of proper planning in the

development of the council approaches; the definitions of sustainability around which the councils developed their approaches; and a reluctance by the councils to address the pervasive cultural phenomenon of consumption.

The major implication of these findings is that the ways councils currently go about implementing sustainability need to be further investigated, and possibly overhauled, because they are essentially ineffective. Responding effectively to the looming environmental crisis “is now a matter of urgency; nothing less than the survival of civilisation is at stake” (Lowe, 2005: 16).

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and

Appendices

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Appendix A:

Calculations of NSW household averages for use in the EPA

Victoria's 'Ecological Footprint – Home Calculator'

Appendix A contains a detailed record of the calculations, workings, assumptions and references that went into determining the NSW household averages needed to answer the questions from the EPA Victoria's "Ecological Footprint – Home Calculator" (HC). With these answers, I was able to calculate an estimate of the NSW household Ecological Footprint using the HC (which is an Ecological Footprint calculator publicly available on the internet). The resulting estimate of the Ecological Footprint of NSW households is contained in Chapter 3 of this thesis.

The 28 questions of the HC are recorded below. Each question is answered using the best available information regarding NSW households at the time of writing in January 2008.

1. What is the floor area of your home (inside) ?

Information relating to floor area in NSW (ABS, 2005a: Table 19.9) is as follows:

23 years ago, the average floor area of new houses in NSW was 159.3m²

14 years ago, the average floor area of new houses in NSW was 191.4m²

5 years ago, the average floor area of new houses in NSW was 244.9m²

Based on the information relating to the age of dwellings in NSW (ABS, 1999:19-21), the following calculations have been made:

Approximately 18.2% of the dwellings in NSW are nine or fewer years old, therefore approximately 18.2% of the dwellings in NSW have a floor area of 244.9m².

Approximately 19.6% of the dwellings in NSW are 10-19 years old, therefore approximately 19.6% of the dwellings in NSW have a floor area of 191.4m².

Approximately 62.2% of the dwellings in NSW are 20 or more years old, therefore approximately 62.2% of the dwellings in NSW have a floor area of 159.3m².

Note: This information is based on a 9-year-old report on the age of dwellings in NSW. However, the data has not been adjusted (such as adding 9 years to the age of the dwelling stock) because it is assumed that the basic percentages relating to the age of dwellings in NSW have not changed over the last 9 years.

Therefore, the average floor space of residential dwellings in NSW is an estimated 181.2 m².

2. How many levels or storeys is your house or apartment building?

In NSW in 2003-04, the number of occupied private dwellings was approximately 2,865,900. Of these, 73% were a separate house, 10.4% were semidetached, and 15.8% were flats (ABS, 2005b: State Spreadsheet).

There is limited information relating to the number of storeys of Australian or NSW dwellings. The following calculations are mostly based on figures relating to building approvals for new residential dwellings in Australia in 2004-05 (ABS, 2006a: Table 19.9)

In Australia, 69% of flats and apartments are four storeys or more. Therefore, it is estimated that 15.8% of dwellings in NSW have an average of four storeys. In Australia, the average number of storeys for semidetached, row/terrace or townhouses is 1.53. Therefore, it is estimated that 10.4% of dwellings in NSW have 1.53 storeys. No figures could be found relating to the number of storeys of separate dwellings in NSW or Australia. Therefore, in the absence of any real figures relating even remotely to the number of storeys of separate dwellings, I estimate that 80% of separate dwellings in NSW are single storey. Therefore, 73% of dwellings in NSW have an average of 1.2 storeys.

Therefore, overall, it is estimated that the average number of storeys for NSW residential dwellings is 1.7.

3a) Do you have information about any green design features of your home?

No

4. What is the ground area occupied by your house or apartment building?

As "most Australians live in separate houses on their own block of land" (ABS, 2005c: Supply of Housing page), and as, in absence of proper data, I have estimated that the majority of separate houses in NSW are single storey. Therefore, the total ground area of the average house in NSW is the same figure as the average floor area of NSW residences.

Therefore, the estimated average ground area occupied by NSW houses is 181.2 m² (please refer to question 1 for methodology involved in obtaining this figure)

5. What is the area of your backyard, driveway, garden etc. (outside)?

Information relating to site areas of houses in Australia (ABS, 2004b: 1) is as follows:

14 years ago, average site area of new houses in Australian capital cities was 802 m²
4 years ago, the average site area of new houses in Australian capital cities was 735 m²
Therefore, based on the information relating to the age of dwellings in NSW (ABS, 1999: 19-21), the following calculations have been made:

Approximately 28.1% of the dwellings in NSW are 14 or fewer years old, therefore approximately 28.1% of the dwellings in NSW have a site area of 735m².

Approximately 71.9% of the dwellings in NSW are 15 or more years old, therefore approximately 71.9% of the dwellings in NSW have a site area of 802m².

Therefore, it is estimated that the average site area of NSW dwellings is 783.2 m².

Subtracting, then, the size of the house from the site area, the outside area is 602 m²

Note: I believe this is a conservative estimate as it is based on figures of the average site areas for Australian capital cities only, whose site areas, I would imagine, are generally smaller than their rural counterparts.

6. What is the life expectancy of your house or apartment building in years?

80% of the dwellings in NSW are less than 50 years old (ABS, 1999:19-21).

Therefore, in the absence of more detailed data, it is assumed that the life expectancy of the average house in NSW is 50 years.

7. How many people live in your house?

2.6 (ABS, 2005b: State Spreadsheet)

8. How much electricity does your household use per month?

KwH/month

After an extensive search of the ABS, ABARE, many NSW and Commonwealth government departments and offices, and various electricity providers, I was unable to find data relating to the amount (rather than the percentage or end-use) of electricity used in NSW households. Nevertheless, information pertaining to household expenditure on electricity can be extrapolated from household expenditure figures to determine an estimate of the number of kWh of electricity consumed by NSW households.

In 2003-04, NSW households spent an average of \$16.75 a week on electricity (ABS, 2005d: Table 5), which translates into \$72.58 a month (it is assumed that this figure includes the supply charge as well as the cost of electricity). The average charge for electricity to residential properties in the EnergyAustralia and Integral Energy Network Areas in NSW before July 2007 was \$11.76 / month (EnergyAustralia, 2007).

Therefore, subtracting the service charge from the monthly expenditure, the amount spent on the electricity itself was \$60.82 per month per household. The average cost of electricity per kWh in the same network areas was 12.74925 cents per kWh for the first 1750 kWh per quarter (I will assume that most households stayed under this threshold).

Therefore, it is estimated that NSW households use approximately 477.1 kWh of electricity per month.

Note: I believe that this figure is an underestimate of current consumption rates as it is based on 4-5 year old data and a lot has changed in 5 years. For instance, the number of NSW households with computers has increased from 52% in 2000 to 67% in 2005 (ABS, 2006c: Table 2.1). Also, in a personal communication on 23/1/08, Mary O'Neill from the NSW Department of Environment and Climate Change estimated that the average household in NSW used approximately 9,000 kWh of energy each year (this estimate is based on the information that NSW households produce an average of 9 tonnes of greenhouse gases a year). This estimate places the total *energy* consumption of NSW households at approximately 750 kWh/month. Electricity use is expected to contribute to 82% of the residential sector's greenhouse gas emissions by 2010 (Sustainable Solutions, 1998), so this means according to Mary O'Neill's estimate, electricity consumption in NSW households is currently about 615 kWh per month.

9. If you have green power enter it as a percentage of total supply?

In 2005-06, total electricity generation in NSW was 270.2 PJ. In the same year, the amount of renewable electricity generation in NSW was 19.5 PJ. (ABS, 2007: Sheet 13). Therefore green power represented 7.2% of the total electricity supply for the whole of NSW.

In the quarter ending 31st December 2005, domestic green power sales represented 32% of all green power sales in Australia for that quarter (Greenpower, 2006). Assuming that this percentage for the December quarter is indicative of the domestic green power sales percentage for the whole of 2005-06, then the use of green power in NSW households is 32% of 7.2%.

Therefore, it is estimated that NSW households have an average of 2.3% green power.

10. How much natural gas does your household use per month?

MJ/month

Again after an extensive search, I was unable to locate information pertaining to the *amount* of gas consumed by NSW households. However, using NSW household expenditure data (ABS, 2005d: Table 5), I have calculated the following:

In 2003-04, NSW households spent an average of \$3.65 a week on gas (combined total

for both mains and bottled gas), which translates to \$15.82 a month (ABS, 2005d: Table 5), and it is assumed that this figure includes supply charges as well as the cost of the gas. The average charge for supplying mains gas to residential properties in NSW Alinta Gas AGN Networks before July 2007 was \$14.66 / month (EnergyAustralia, 2007). Therefore, subtracting the service charge from the monthly expenditure, the amount spent on the gas itself was \$1.16 per month per household. The average cost of gas per MJ in the same network area was 1.6027 cents per MJ for the first 5,500 MJ per quarter (I have assumed that most households stayed under this threshold).

Therefore, it is estimated that the amount of gas consumed by NSW households is an average of 72.4 MJ a month.

11. How much water does your household use per month? litres/month

Residential use of water in NSW is 84 kL per capita per year (ABS, 2007a: Summary Table). As there are an average of 2.6 persons per household in NSW (ABS, 2005b: State Spreadsheet), this means that the average household use of water is 218.4 kL per year or 18,200 litres per month.

12. How much firewood does your household use per month? Kg/month

Similar to Questions 8 & 10, I was unable to find information relating to the *amount* (in terms of kilograms) of firewood consumed by NSW households. However, in 2003-04, NSW households spent an average of \$0.36 a week on firewood, which translates to \$1.56 a month (ABS, 2005d: Table 5).

“Firewood price shows considerable variation from \$80 to \$200/t depending on whether it’s delivered, its quality and the local market” (Murdoch University, 2006: RISE webpage). Using the average of these extremes – \$140/tonne – as the assumed price of firewood this translates to a cost of 14 cents per kilogram for firewood. With NSW households spending \$1.56 a month on firewood, this converts to 11.1 kilograms of wood consumed each month.

Therefore, it is estimated that NSW households consume 11.1 kgs of wood each month.

13. How many of the following items does your household use?

a) Fridge/freezer(s)	1.34*
b) Dishwasher(s)	0.43*
c) Washing machine(s)	0.96*
d) Clothes dryers(s)	0.59*
e) T.V.(s)	2.3 ^
f) Video/DVD player/stereo/CD players	3.7^
g) Computer(s)	1.3^

* Figures are a NSW household average (ABS, 2005e: 64)

^ Figures are an Australia-wide household average (Katos & Hoye, 2005: 2)

14. Please estimate expenditure on the following food products. \$/month

a) Meat and meat products including fish	\$24.40/week i.e. \$105.73/month
b) Dairy products	\$11.05/week i.e. \$47.88/month
c) Fruit and vegetable products	\$21.74/week i.e. \$94.21/month
d) Oils and fats	\$1.45/week i.e. \$6.28/month
e) Flour and cereal foods	\$3.83/week i.e. \$16.60/month
f) Bakery products	\$12.59/week i.e. \$54.56/month
g) Confectionery	\$9.75/week i.e. \$42.25/month
h) Other food products -	\$8.82/week i.e. \$38.22/month.
i) Soft drinks and other non-alcoholic beverages	\$12.16/week i.e. \$52.69/month
j) Beer	\$9.18/week i.e. \$39.78/month
k) Wine and spirits	\$10.90/week i.e. \$47.23/month

Note: The amount spent on meals out/fast food is \$47.79/week i.e. \$207.09/month.

However, this figure is not included in these calculations because it would be part of the restaurants' EF.

All the above figures are the average for NSW households (ABS, 2005d: Table 5).

15a) Do people in your home travel by car or motorbike/scooter?

Yes. In Australia, 90% of households have at least one registered vehicle, while 51% of households have two or more vehicles (ABS, 2006b: 47).

b) Which of the following information do you have:

b1) How much the household spends on fuel; This information is used or

b2) How far people in the household travel by car/motorbike

c1) Total amount spent on fuel for household (\$/month)

*\$31.70/week i.e. \$137.37/month

d) Vehicle type (small, large SUV etc): small[^]

No. of vehicles : 1.46⁺

Percentage of household use: 88%^{**}

Fuel type: petrol^{^^}

Price of fuel per litre : 95 cents/litre⁺⁺

Percentage of travel with more than driver: 51%^{^*}

* Figures for NSW households (ABS, 2005d:Table 5)

[^]In 2005, 329,650 private (not government or commercial) passenger motor vehicles sold in Australia (Department of Industry, Tourism and Resources, 2005: 22). Of these, the most common type of vehicles sold were small/ light vehicle (66%), with medium vehicles accounting for 9%, large vehicles making 8%, and other vehicles such as people movers, SUVs, prestige and luxury making up the remaining 17%.

⁺In 2006 the number of registered motor vehicles kept at private dwellings in NSW was 3,855,200, while the total number of dwellings was 2,637,200 (ABS, 2006b: 51).

Therefore, the average number of vehicles per household in NSW is calculated to be 1.46.

^{**} Assuming that vehicles registered using pensioner concession are vehicles used for private use, then the total number of vehicles in NSW registered for private usage in the year ending 30 June 2006 was 4,001,332 (Roads and Traffic Authority, 2007: 2). This represents 80.5% of all vehicles registered in NSW in that year. Assuming that the percentage of *all* vehicles registered for private use is the same as the percentage of *motor* vehicles registered for private use, then the number of motor vehicles registered

for private use in NSW in 2006 was 3,408,403. Given that the number of registered motor vehicles kept in NSW dwellings in 2006 was 3,855,200 (ABS, 2006b: 51), then it is surmised that 88% of the vehicles in NSW dwellings are for private use.

Consequently, it is estimated that the percentage of household use of the motor vehicles in NSW households is 88%.

^{^^} 98.5% of all the passenger vehicles registered in NSW in the year ending 30 June 2006 were petrol vehicles (Roads and Traffic Authority, 2007: 6)

⁺⁺ In the quarter ending June 2004 (the last quarter of the household expenditure survey), the average price of petrol in 8 Australian cities was 95c/litre (ABS, 2005f: 5)

^{^*} The average vehicle occupancy per trip in 2005 for the Sydney, Newcastle and Illawarra Statistical Divisions was 1.44 on a weekday and 1.70 on a weekend day (Transport Data Centre, 2007: 23). This averages to 1.51 on any given day during the week. Therefore, in 51% of cases the driver has a passenger.

16. How many return trips are made by public transport each month?

The following calculations have been made using information extrapolated from the *2005 Household Travel Survey Summary Report* (Transport Data Centre, 2007) which surveyed the Sydney, Newcastle and Illawarra Statistical Divisions.

Public transport trips - weekday 1,756,000 (i.e. per working week- 8,780,000)

Public transport trips - weekend day 593,000 (I.e. per weekend - 1,186,000),

Therefore, public transport trips per week = 9,966,000

In the absence of information relating to return trips, I will simply divide the total number of public transport trips per week by 2 to calculate the number of return trips. Therefore, return trips equal 4,983,000 per week (a) for the study area. Population in study area = 4,255,000(b). $a/b = 1.17$ return trips per week per person or 5.07 return trips per month per person.

Given that there are 2.6 people per household in NSW (ABS, 2005b: State Spreadsheet), then each household makes an estimated 13.2 return trips per month on public transport.

17. How many trips are made by taxi each month? No. of return trips.

The following calculations have been made using information extrapolated from the *2005 Household Travel Survey Summary Report* (Transport Data Centre, 2007) which surveyed the Sydney, Newcastle and Illawarra Statistical Divisions.

Taxi trips - weekday - 115,000 (i.e. per working week - 575,000)

Taxi trips - weekend day - 101,000 (i.e. per weekend - 202,000),

Therefore, taxi trips per week = 777,000

In the absence of information relating to return trips, I will simply divide the total number of taxi trips per week by 2 to calculate the number of return trips. Therefore return trips equal 388,500 per week (a) for the study area. Population in study = 4,255,000(b)

$a/b = 0.09$ return trips per week per person

or 0.39 return trips per month per person.

Given that there are 2.6 people per household in NSW (ABS, 2005b: State Spreadsheet), then each NSW household makes an average of 1.0 return trips per month.

18. How many kilometres do people in your household travel by airplane each month?

a) International flights? Km/month

In the absence of figures for revenue passenger kilometres (RPKs) on international flights (RPKs are determined by multiplying the number of fee paying passengers by the distance of the flight), I had to work out my own rough calculations to determine how far the average NSW person flies internationally per month. These calculations have been extrapolated from a number of sources namely *Australian Transport Statistics* (BTRE, 2007:16-17), *Travel by Australians - 2007* (Tourism Research Australia, 2007: 22) and *Australian Air Distances* (BTRE, 2008). The calculations are as follows:

Destination	No. of Aussies	No.* of NSWalers	City [^]	Distance to city	Return trip (km)	Passenger km for NSW	Av. km travelled by NSW person
New Zealand	831,734	276,801	Auckland	2164	4328	1,197,995,053	177
Europe (excl. UK)	488,000	162,406	Paris	16960	33920	5,508,825,088	814
USA	437,283	145,528	L.A.	12066	24132	3,511,876,445	519
UK	408,800	136,049	London	17037	34074	4,635,721,359	685
Thailand	246,396	82,001	Bangkok	7544	15088	1,237,224,884	183
Indonesia	241,811	80,475	Jakarta	5493	10986	884,095,063	131
China	239,839	79,818	Beijing	8955	17910	1,429,547,888	211
Singapore	20,369	6,779	Singapore	6298	12596	85,385,805	13
Fiji	199,900	66,527	Suva	3245	6490	431,758,413	64
Hong Kong	190,504	63,400	Hong Kong	7373	14746	934,892,436	138
Malaysia	163,833	54,524	Kuala Lumpur	6629	13258	722,874,186	107
Canada	64,717	21,538	Seattle	12475	24950	537,368,549	79
Other Asian ports	546,000	181,709	Ho Chi Minh	6845	13690	2,487,593,472	368
Other destinations	563,584	187,561	Port Moresby	2751	5502	1,031,959,275	152
Total	4,642,770	1,545,114					3,640

* I was unable to find information relating to the number of NSW people travelling overseas, so this figure is calculated based on the percentage of NSW people in the Australian population – 33.28% (ABS, 2007b: Table 5.4)

[^]The information on Australians travelling overseas referred only to countries as destinations rather than specific city destinations (which was needed to determine distance from Sydney airport). Therefore I chose the city destination that I thought was the most appropriate. Most chosen cities were the biggest for that country. For European and non-specific Asian destinations I chose cities that seemed central and well known to that continent. Los Angeles and Port Moresby were chosen for their comparative closeness to Sydney, thus erring on the side of conservative estimates. Seattle was chosen because no air distances could be found for Canada, and Seattle was the closest major city destination to Vancouver.

The workings of the calculations are as follows:

NSWalers x return trip = passenger kilometres for NSW (a)

(a) divided by the number of NSWalers = the average kilometres travelled by NSW people on international flights for 2007.

So there were an estimated 3,640 international kilometres travelled by people in NSW

in 2007, the household (2.6 persons) average of kilometres travelled was 9464 km per year, which equals 788.7 km per month.

b) Domestic flights? Km/month

In 2005 there were 43,339,350,000 domestic revenue passenger kilometres travelled for the whole of Australia. As NSW constitutes 33.28% of the Australian population it is calculated that people from NSW collectively travelled 14,423,335,680 km on domestic flights. This means that the average distance travelled by residents of NSW is an estimated 2,130kms a year.

Therefore, NSW households (with 2.6 people each) travel 5540km each year, which constitutes 461.5 km per month.

Note: This figure may include international visitors flying within Australia (the data used did not specify), so it may be an over-estimate of domestic flight kilometres travelled by NSW households.

How much do you spend on consumable products each month?

19. Tobacco products? \$/month

\$11.65/week, which is \$50.48/month.

This figure is the average for NSW households (ABS, 2005d: Table 5).

20. Textile products? \$/month

That is, blankets, household linen, & household furnishings (excl. ornamental furnishings)

\$5.35/week, which is \$23.18/month

This figure is the average for NSW households (ABS, 2005d: Table 5).

21. Clothing products? \$/month

\$29.82/week, which is \$129.22/month

This figure is the average for NSW households (ABS, 2005d: Table 5).

22. Footwear products? \$/month

\$6.38/week, which is \$27.65/month

This figure is the average for NSW households (ABS, 2005d: Table 5).

23. Leather and leather products? \$/month

In the absence of information on leather products consumption in Australia, the following was used:

\$1.57 a week was spent on travel goods, handbags, umbrellas, wallets and related items. As wallets and handbags are often made out of leather, I made an extremely rough estimate that approximately \$0.63 (40% of above figure) is spent on leather goods each week, which corresponds to \$2.72 a month. This figure is the average for NSW households (ABS, 2005d: Table 5).

24. Paper products, newspapers and books? \$/month

\$8.18/week, which is \$35.45/month

This figure is the average for NSW households (ABS, 2005d: Table 5).

25. What is your garbage composition? (%)

a) Food waste	17%*
b) Garden waste	30%*
c) Paper waste	23%
d) Metals	5%
e) Plastic waste	4%
f) Other materials	21%

The above percentages are based on averages for Australian households (ABS, 2006d: 7). I reduced the 'Other materials' by 2% to ensure that the rounded numbers added up to 100%

* The ABS figures (ABS, 2006d: 7) only gave a combined percentage for food and garden waste. The breakdown of food and garden waste used here is based on a domestic waste audit conducted by the Blue Mountains City Council (BMCC, 2006)

26. How full are your garbage bins after a week? (%)

71.1%

In the absence of figures relating to average bin volumes in NSW or Australia, this figure is derived from bin volumes of single dwellings in Canberra (A Prince Consulting, 2004) which are:

Weekly rubbish collection - bin 68.4% full (a).

Fortnightly recycling collection - bin 73.8% full (b)

Workings : $(a + b)/2 = 71.1\%$

Note: After a week, the fortnightly recycling bin would be only 36.9% full. However, in the following question the weekly volume of bins is needed, so the 240-litre recycling bin collected fortnightly is essentially a 120-litre bin each week. This weekly 120-litre recycling bin would be 73.8% full and, hence the answer to this question.

27. Please enter the total volume (in litres) of all bins put out for kerbside collection.

260 litres are put out each week for collection.

In the absence of figures relating to average bin volumes in NSW or Australia, this figure is derived from bin volumes of single dwellings in Canberra (which corresponds with the answer to Question 26). The data relating to the Canberra rubbish collections for single dwellings (A Prince Consulting, 2004) is as follows:

140 litre bin for garbage - collected weekly (a)

240 litre bin for recyclables - collected fortnightly (b)

Workings : $a + (b/2) = 260$ litres/week

Note: In my experience, the bin volumes from Canberra are similar to NSW bin volumes - with a 240-litre bin fortnightly collection of recyclables and an 80-140 litre bin weekly collection of rubbish. Only the data relating to single dwellings in Canberra was used because it appears that there is a different collection system for apartments and flats in Canberra compared to NSW.

28. Enter the number of recyclables put out for recycling each week

- a) Plastic bottles 6
- b) Cartons (milk and juice) 2.1
- c) Newspapers 5.7
- d) Boxes (cardboard) and other paper products (no. of cardboard boxes) 9.4
- e) Steel cans 2.3
- f) Aluminium cans 0.5
- g) Glass bottles and jars 4.7

All the information that I found relating to household recyclables was given in terms of weight and volume of recyclables and not in terms of number of items. Consequently, in the absence of any local, state or federal information relating to number of recyclable items per household, I conducted my own waste audit of 7 NSW dwellings. The results of this audit are given below, with the final figures being scaled up to represent a household of 2.6 people, which is the average of NSW dwellings. Of course, the sample size and representation of this audit were extremely limited, but it was enough to provide an approximation upon which to answer the last question of the EF Home Calculator.

The table below shows the number of items recycled each week by 7 dwellings.

Dwelling Type & Location	Number of people	Plastic Bottles	Carton	News-papers	Boxes / other papers	Steel cans	Aluminium cans	Glass bottles
4 units / Wollongong	5	10	8	8	21	5	1	7
House / Penrose	3	8	2	0	2	2	0	5
House / Willoughby	3	6	1	10	10	1	1	7
House / The Entrance	2	6	0	11	14	4	0	5
Total	13	30	11	29	47	12	2	24
Average per person	1	2.3	0.8	2.2	3.6	0.9	0.2	1.8

ACTIONS : Focus and number of actions:

	Provide facilities/ programs /events	Assist groups / Battlers	Participation / Access	Harmony / Diversity	Heritage	Cultural /community events	Health / aged care	Safety / Emergency / crime prevention	Education / info / training	Built environment / aesthetics	Managmt - techniqs	Other
Quality of life actions												
	Consumption / gge	Bio diversity	Toxicity	Pollution air,water, cont.sites etc.	Impacts - developmt	Impacts-land mgmt & water	Waste & recycling	Green products	Protectn / rehab / restoratn	Water supply/ mgmt	Managmt - techniqs / training	Other
Ecological processes actions												
	Effluent	Educaton /awareness / training	Consult / Discuss	Investigte / research	Planning / strategy	Monitoring / review	Sustable. culture	Reporting / assessmt. tools / cncl docs	Traffic mgmt / Public transport	Provide facilities/ programs /events	Managmt - techniqs	Other
General Sust. actions												

METHODS : Methods used for achieving actions:

Method of implementing change	General sustainability actions	Quality of life actions	Ecological processes actions
Education/ Information / Awareness			
Provide facilities / programs / events etc.			
Incentives - financial and other			
Legislation/enforcement/compliance/DA approvals			
Elimination of choice			
Management Techniques - investigate, plan, map etc			
Incorporate in council plans /policies/procedures etc.			
Collaborate / convene / support			
Not specified			
Total			