GETTING THE MESSAGE ACROSS: EVALUATING ENERGY EFFICIENCY INFORMATION CAMPAIGNS IN NEW ZEALAND

Presented in Partial Fulfilment
of the Requirements for the
Degree of Master of Philosophy
(Resource and Environmental Planning)

At

Massey University

By

Vivienne Rosemary Heslop

1995

ABSTRACT

The New Zealand government, state owned enterprises and private organisations have been active, in the past and currently, in promoting energy efficiency and energy conservation through information provision campaigns. However, with a few exceptions, there has been a failure to evaluate the effectiveness of the programmes, and therefore assess whether the programmes have worked. Given the resources that are committed to the development and implementation of these information campaigns, it is important to assess how effective they are. Evaluation of these campaigns can help determine the most appropriate approaches that should be taken in the future, and helps to improve existing campaigns. Evaluation also has an important role to play in terms of accountability within the organisations that operate these information campaigns.

A general evaluation process was designed in this research for the evaluation of two selected energy efficiency information campaigns. The evaluation process was designed after thorough reviews of past evaluations of similar campaigns, both in New Zealand and internationally, and from an extensive review of the theoretical and applied literature on programme evaluation.

Home energy audit programmes were selected as the energy efficiency information campaigns to be evaluated, with the Energy Efficiency Assessment Plan operated by Southpower, and the Home Energy Rating Options programme being operated by CentralPower being chosen as the two case studies.

The results indicate that the programmes evaluated do indeed work; however, analysis suggests that these programmes may be less effective than their potential. From the selected case studies a number of recommendations were developed to improve the effectiveness of the programmes, with a review of the methodology highlighting the limitations of the study. Finally, consideration was given to the role that programme evaluation has in the development, implementation and operation of energy efficiency information campaigns in the future, and its usefulness in assessing the effectiveness of energy efficiency information campaigns in New Zealand.

ACKNOWLEDGEMENTS

My foremost gratitude must go to my thesis supervisor, Dr Murray Patterson, for his support and encouragement during my two years in the Department of Planning at Massey University, and, most importantly, for obtaining funding for my thesis!

I would also like to express my sincere thanks to the staff of the Department of Planning, in particular Dr Jenny Dixon for the cold beers and whisky at the end of a tedious day of writing, and for encouragement and support during the writing up phase of my thesis.

Thanks must also be given to the Energy Efficiency and Conservation Authority for their financial assistance, and for the support of personnel within the organisation.

Many thanks to Southpower and CentralPower who agreed to an independent evaluation of their respective home energy audit programmes.

Lastly, but by no means least, I extend my sincerest gratitude to my parents, Murray and Jennifer, for their support and encouragement during my four years at Massey University. But I could sense the relief when my they found out that I was finally going back into the workforce again after completing my masters!

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE
THE RESEARCH PROBLEM

1.0 INTRODUCTION

In New Zealand, information provision campaigns have been widely used by the government to effect energy efficiency improvements since the early 1980s. These campaigns were originally developed in response to the oil crises of the 1970s, and were aimed mainly at changing people's pattern of energy use in the transportation sector. These early campaigns were focused on restricting consumers use of energy (energy conservation) as opposed to energy efficiency. Later campaigns have been developed to address other issues such as global warming, with the focus being more on energy efficiency than energy conservation. In more recent times energy efficiency has entered the energy arena as a legitimate alternative to additional generation capacity.

Energy efficiency means using less energy to deliver the same service, and is made possible by a new device or practice which allows the same job to be done with less (Terry 1991). The concept of energy efficiency has gained prominence recently because of its central role role in the reduction of carbon dioxide, the dominant greenhouse gas, and because the costs of energy efficiency technology are declining and therefore making energy efficiency improvements more economic.

While many government agencies, state owned enterprises, and other private organisations, such as local power companies, offer an array of energy efficiency and conservation programmes, most have failed to evaluate the effectiveness of the programmes. At a time when accountability is an important part of the operation of organisations and government agencies, it is essential that the use of resources, both financial and time, for such information campaigns is justified. This is the role of programme evaluation.

To date, some effort has been put into evaluating the effectiveness and efficiency of the use of information campaigns, with the evaluation of the Energy Conservation Loans Scheme and the Energy Advisory Service by Synergy Applied Research Limited (1986), for the New Zealand Energy Research and Development Committee. In addition to the effort in New Zealand, there has been a large amount of work done internationally on evaluating such energy efficiency information campaigns. This body of international literature provides an invaluable source of information for the development of an evaluation process for the New Zealand situation, as well as giving guidance on the development of recommendations for improving the energy efficiency information campaigns.

The objective of this thesis is to develop an evaluation approach for evaluating the effectiveness of two energy efficiency information campaigns being run by local power companies in New Zealand - the Energy Efficiency Assessment Plan (EEAP) being offered by Southpower, and the Home Energy Rating Options (HERO) programme being offered by CentralPower. The evaluation approach is developed from an analysis of the literature on programme evaluation, and by analysing past evaluations of energy efficiency information campaigns, both nationally and internationally. From the evaluation of EEAP and HERO recommendations are given on how to improve their effectiveness, followed by a discussion on the limitations of this research, and the future of programme evaluation in assessing the effectiveness of energy efficiency information campaigns in New Zealand.

1.1 Research Aim, Objectives and Methods

The overall aim of this research is to evaluate the effectiveness of selected energy efficiency information campaigns in New Zealand. From this overall aim a number of specific research objectives have been developed, along with methods for reaching the objectives. The research aim, objectives and methods all tie in to form the basis of this research, as indicated in Figure 1.0.

Initially the research will involve the development of an understanding of the theoretical and practical aspects of programme evaluation generally, with the focus then being on the use of evaluation for assessing the effectiveness of energy efficiency information campaigns specifically. To achieve both of these objectives extensive literature reviews will be conducted on programme evaluation, and the evaluation of energy efficiency information campaigns both nationally and internationally. From these reviews a working methodology will be developed and applied to assess the effectiveness of selected energy efficiency information campaigns in New Zealand. The results of the evaluations will be analysed to determine the effectiveness of the selected case studies, and a review of the methodology will provide useful information on the limitations of this research. This information, and other obtained from the literature will then be used to discuss the future of programme evaluation in assessing the effectiveness of energy efficiency information campaigns in New Zealand.

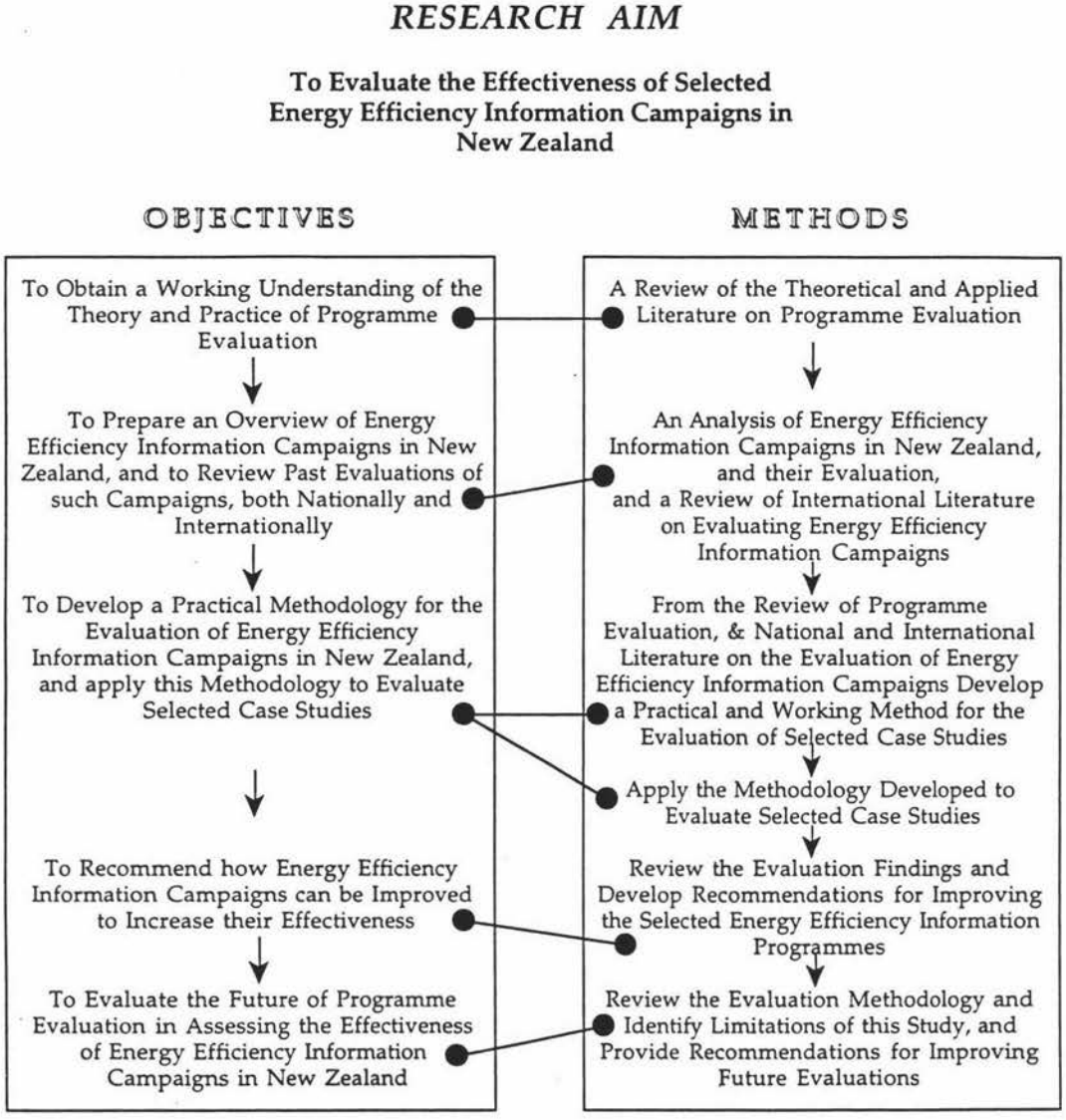

FIGURE 1.0 The Research Aim, Objectives and Methods

1.2 LIMITS OF THE RESEARCH

Energy efficiency information campaigns have been run for all sectors in the New Zealand economy. To try and assess the effectiveness of these campaigns over all sectors would be beyond the resources of this thesis. Therefore it was decided to focus on the domestic sector only, which is currently responsible for 13% of energy use in New Zealand (EECA 1994b). Similarly, it is beyond this thesis to evaluate all information campaigns currently being run for the domestic sector, so a decision was made to evaluate home energy audit programmes being operated by local power companies. From this decision, two home energy audit programmes were selected for evaluation - the Energy Efficiency Assessment Plan (EEAP)

operated by Southpower, and the Home Energy Rating Options programme (HERO) operated by CentralPower.

1.3 AGENCY SUPPORT AND INTERESTS

This thesis has been carried out in conjunction with the Energy Efficiency and Conservation Authority (EECA). The information on the effectiveness of energy efficiency information campaigns was commissioned by EECA, with the long-term goal of incorporating programme evaluation into all programmes being operated by EECA. The conditions of the sponsorship allowed for independence in designing the study, and free publication of the results of this research. Southpower and CentralPower agreed to the conduct of an independent evaluation of their home energy audit programmes, as well as giving access to names and addresses of programme participants. Staff provided support in the form of information on the development, promotion and operation of the two programmes (EEAP and HERO).

1.3 THE STRUCTURE OF THE STUDY

Chapter Two initially provides an overview of the energy scene in New Zealand. It then examines the need for energy efficiency with the subsequent development of energy efficiency policy instruments, including information campaigns, and introduces the role that programme has in assessing the effectiveness of these campaigns. Chapter Three explores the literature on programme evaluation, and identifies its usefulness for this research.

In Chapter Four consideration is given to the effort that New Zealand has put into energy efficiency information campaigns in the past, and what future campaigns may involve. Previous programme evaluations in New Zealand are then profiled, followed by an analysis of international experience in the field of evaluating energy efficiency information campaigns. From these previous three chapters, the methodology for the evaluation of the selected case studies is developed in Chapter Five.

Chapter's Six and Seven focus on applying this methodology to investigate the effectiveness of the two selected case studies - the Energy Efficiency Assessment Plan (EEAP) and the Home Energy Rating Options (HERO) Programme. Chapter Six involves the analysis of EEAP, while HERO is analysed in Chapter Seven.

The final chapter, Chapter Eight, aims to bring together information from all the preceeding chapters in order to examine the future of programme evaluation in determining the effectiveness of energy efficiency information campaigns in New Zealand. This chapter also considers the limitations to this research.

CHAPTER TWO

SETTING THE SCENE

2.0 THE ENERGY SCENE IN NEW ZEALAND

Similar to the experience of other developed countries, the initial oil shock of 1973 stimulated a number of changes, mainly institutional, in New Zealand. These changes clearly reflected the growing perception of the importance of energy to continued economic growth and the maintenance of a high standard of living (Lonergan 1990). In 1974, New Zealand became a member of the International Energy Agency (IEA), and established the New Zealand Energy Research and Development Committee (NZERDC) to undertake research in all aspects of energy. The Ministry of Energy was formally established in 1978, with 1979 seeing the first energy strategy being released. Also in 1978 the Liquid Fuels Trust Board (LFTB) was established, with the function of encouraging and financing any projects aimed at reducing the use of imported petroleum in the transportation sector.

The election of a Labour Government in 1984 saw a more 'market oriented' approach being taken to energy policy, and it was decided to dissolve the integrated framework established almost a decade before. Early in the programme of social and economic reforms, profound changes to the energy sector were heralded. As early as 1985 it had become eminently clear that the centralised policy and planning apparatus constructed through the 1970s and early 1980s was to be overturned by a new market led sector (Cocklin 1993). One of the first obvious signs of the reform was the declared downgrading of the policy and planning function of the Ministry of Energy, leading to the eventual disestablishment of the organisation in 1989. Abolished about the same time were the NZERDC (1987) and the LFTB. The restructuring has continued into the 1990s with the specific focus on increasing competition in the wholesale electricity sector and the reform of the retail electricity sector. The generation of electricity has been fully deregulated, and the separation of electricity transmission from Electricity Corporation of New Zealand's (ECNZ) generating function is now complete. Reform of the retail electricity and gas markets has been achieved through the energy sector reform process, with existing supply authorities being corporatised. The supply authorities have also lost their territorial franchises, on the grounds that this will promote competition in the retail markets.

One of the key aims of the Government's energy policy is to ensure that energy is provided to achieve long term economic efficiency (Luxton 1992), and that this is done whilst ensuring environmental impacts are considered

when energy options are being examined. The Government's energy policy is made up of four main components:

1. The promotion and facilitation of competition in the energy markets - this is hoped to be achieved through deregulation and reform of energy markets.

2. The correcting of market deficiencies - this is one of the governments main roles in a market led sector. The government recognises that unless these deficiencies are corrected then economic efficiency will not be achieved. The access to energy efficiency information has been identified as one of the market deficiencies.

3. The forecasting of energy supply and demand - forecasts are needed for the continuing development and analysis of a government's energy policy, and it is important that market participants do have access to comprehensive information on future scenarios.

4. The provision of energy security - this is one of the reasons why the government is examining ways for improved forecasting and providing indicative planning in the energy sector. Again, it is important that the efficient use of fossil fuels is encouraged. Through membership of the International Energy Agency, New Zealand is able to be part of contingency planning if international disruptions to energy supply occur again (Luxton 1992).

As can be seen from these components of the energy policy, the New Zealand government is continuing to develop a market led approach to energy planning. However, these reforms to the energy sector have not been without some criticisms.

Over the past few years the government has virtually abandoned reporting on the energy sector and withdrawn most support for energy research and development. It is likely that unless the government assumes responsibility for information on the sector, then one of the conditions for competition (freely available information) will be undermined. Energy research is now estimated to account for only about 2.3% of all research funds (from both public and private sources), and this despite the fact that funding of research and development is widely regarded to be essential to effective long-term energy management and to ensuring stable economic growth based on the implementation of improved energy technology (Cocklin 1993).

These factors and others have made New Zealand one of the worst performers, in terms of energy use, in the Organisation for Economic Cooperation and Development (OECD). Figure 2.0 gives a stylised representation of the energy intensity trend of New Zealand compared to other OECD countries. New Zealand's increase in energy consumption had

been almost 50 percent in less than 20 years (Young 1991). It is not surprising that energy conservation in New Zealand has not appeared to alter the trend of increasing per capita energy consumption or affect the energy-GDP ratio in any manner. New Zealand has one of the weakest energy conservation programmes of any developed country, and in the past even the Ministry of Energy has admitted that, 'energy conservation policies have lacked consistent goals or programmes' (Lonergan 1990).

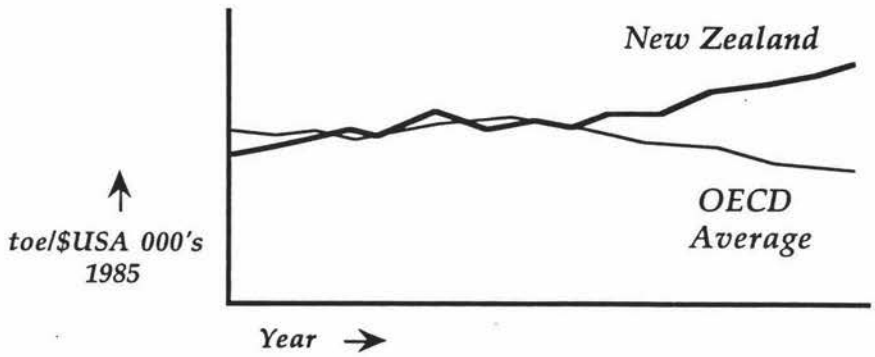

FIGURE 2.0 Energy Intensity Trends
(Source: Patterson and Wadsworth 1993)

This increase in energy intensity over the period 1960 to 1990 was mainly influenced by the changing structure of the New Zealand economy. The start-up of the petrochemical projects (synfuels, methanol, ammonia-urea), part of "Think Big", led to a 20% increase in New Zealand's energy intensity over the period 1979 to 1990 (Patterson and Wadsworth 1993). According to Patterson and Wadsworth (op cit), without the petrochemical projects, both the rate of increase and level of New Zealand's energy intensity would have been more in line with the OECD average.

According to some (Bertram 1991), since the 1970s, the signals received by energy users have pointed away from energy conservation. Energy prices have not risen relative to other prices, so there has been no price incentive to conserve. There has also been little official support for conservation programmes and virtually no state-funded research and development into conservation. At the same time "Think Big's" emphasis on energy supply seems to have created a sense of security that was not felt in other OECD countries, where the political instability of the Middle East encouraged consumers to work towards reducing their overall energy dependence (Bertram 1991).

The New Zealand government has recently instigated a number of measures which are aimed at improving our record for inefficient use of energy, and to bridge the information gap which is seen by many to be the cause for our poor energy consumption record. Among these measures was the formation of the Energy Efficiency and Conservation Authority (EECA)

in 1992, and the Wholesale Electricity Market Development Group (WEMDG) in 1993.

EECA has been established with a mandate to act as an advocate for energy efficiency in New Zealand. The EECA is an independent government agency charged with determining and implementing practical measures for achieving greater energy efficiency in New Zealand (EECA 1994a). Inherent in this function is the provision of information for consumers, from both national and local initiatives. With the formation of EECA, the New Zealand government can be seen as finally bridging the gap which has existed within New Zealand regarding the dispersion of energy conservation and efficiency information to consumers.

With the establishment of WEMDG the government proposes an electricity market that ensures that, consistent with sustainable development, wholesale electricity is delivered at the lowest cost to the economy as a whole (Lee 1994). One of the desired outcomes of the process is to provide opportunities comparable to those available to investors in hydro and thermal generation for investors in energy efficiency and conservation. The WEDMG believes that the draft market proposal contains a number of suggestions to encourage investment in efficiency and conservation and provides a basis for an appropriate, sustainable, and cost-effective uptake of energy efficiency and conservation. This is another sign of the government's hands-off approach to energy planning and policy, with the market making the 'right' decisions.

One of the issues which is not clear in the draft market proposal is what is meant by sustainable development, and sustainability. The WEMDG document is sending contradictory signals by the suggestion that it can deliver electricity at the lowest cost to the economy, while at the same time ensuring this is consistent with sustainable development. The concept of sustainable development is as yet not well defined within the New Zealand legal system, but even a basis interpretation of sustainable development would suggest that it is not necessarily consistent with the idea of lowest cost to the economy. The draft market proposal also identifies this issue of sustainability in regards to the uptake of energy efficiency and conservation. The lack of explanation within the document would suggest that WEMDG believes that the market is going to deliver sustainability and sustainable development, however how can the market be expected to deliver something which is yet to defined.

It has been established in this discussion that New Zealand has a poor history for energy efficiency and conservation relative to other OECD countries, but more consideration needs to be given to why energy efficiency is an important policy option for New Zealand.

2.1 WHY ENERGY EFFICIENCY?

One of the major conclusions which can be drawn about the future of global energy consumption is that there will be increasing pressure on available energy resources (International Energy Agency (IEA) 1992a). Increasing the efficiency of energy use is the most effective way to ensure that the depletion of non-renewable energy resources is managed in a sustainable way, and allows time for renewable options to be fully developed. The continued use of energy resources in an unsustainable manner also has serious implications for management of the environmental impacts of energy use, such as global warming, acid rain and pollution, therefore energy efficiency has a role to play in minimising these adverse environmental impacts. "Sustainable tomorrows mean transitions today" (Euston 1990, p251). One of the major transitions to be made is in the area of energy efficiency and conservation.

The advantages of energy efficiency and conservation strategies have been documented on numerous occasions, with the IEA (1992a) identifying the following the main advantages of adopting energy efficient practices and technology:

- energy conservation will extend the availability of energy resources that are depletable
- with a return to tightening energy markets, energy conservation will delay and lessen its impact
- energy conservation reduces the environmental consequences of energy production and use in a way which is consistent with energy policy objectives
- investment in energy conservation at the margin provides a better return than investment in energy supply
- investment in energy conservation can often be undertaken in small increments and is therefore flexible at a time when the energy outlook is uncertain (IEA 1992a).

There are, however, a number of obstacles to ensuring that energy efficiency is developed to its full potential.

2.1.1 THE OBSTACLES TO ENERGY EFFICIENCY

There is a growing appreciation of the role that improvements in energy efficiency can play in bridging the gap between energy supply and demand. At the same time, there is an increasing realisation that these improvements are not penetrating society as rapidly as possible (Reddy 1991). According to Terry (1991) it is not enough that the savings methods are technically reliable and economic, they must also be able to the consumer in a way that meets a host of other requirements. A number of obstacles are common to saving any form on energy, and can be considered under the following main categories, as identified by the OECD (1991):

- ***Information-related obstacles*** - those which give distorted, biased or confusing signals (price and other types of information) to the energy user and which in turn affect the entire energy efficiency cycle (including technology development, service, industries, etc)
- ***Structural obstacles*** - the capital stock and structures that have been developed after long periods of distorted, biased, or confusing signals (including energy price signals)
- ***Technical obstacles*** - to ensure continuing improvements in energy efficiency there is a need to ensure that both existing technologies reach the market and that research and development for new technologies is adequate to ensure a new generation of energy-efficiency technologies
- ***Motivational/marketing obstacles*** - even providing the best possible signals can help motivate the consumer but does not mean the consumer will change his or her behaviour to undertake energy efficiency actions
- ***Institutional obstacles*** - there are two basic types of institutional obstacles: 1) those which affect the development, design and implementation of policies specifically meant for improving energy efficiency; and 2) those which have no apparent relationship with energy efficiency - such as interministerial coordination - but affect its improvement nonetheless. Both types of institutional obstacles in turn affect the other categories of obstacles, thus creating a vicious circle
- ***Political obstacles*** - there are obstacles for government decision-makers at the political level in ensuring that energy efficiency receives the sustained, unbiased attention that it needs to be effective (OECD 1991).

In addition to these obstacles New Zealand has some institutional and contractual barriers (Terry 1991, Electricity Corporation of New Zealand Limited 1992, and Harris et al 1993). First, there is the agreement governing extraction of gas from the Maui field. The contract specifies annual quantities of gas which must be paid for by the buyer, regardless of whether the gas is actually used. The effect of the relative abundance of gas, and the contract, is that the marginal bulk consumer - the Electricity Corporation of New Zealand (ECNZ) - obtains relatively cheap gas. This make gas-fired generation cheaper than it would otherwise be, and thus promotes the inefficient use of gas to generate power, rather than for greater direct use. There is also the contract that Comalco holds for cheap power, which reduces the incentive for energy efficiency at the Tiwai aluminium smelter (Terry 1991).

Another barrier is the monopolistic conditions in the New Zealand energy sector, particularly in the supply of electricity and gas. The Energy Sector Reform Process aims to reduce the monopoly in the transmission and generation of energy, with the generation and transmission functions of

ECNZ having recently been separated. Important to reducing this monopoly is the corporatisation of electrical supply companies in New Zealand under the Energy Companies Act 1992. At present ECNZ generates approximately 95% of New Zealand's electricity, but there are now opportunities for electrical supply companies to generate their own electricity and transmit it through the grid transmission system.

The lack of comprehensive information and independent monitoring of energy flows in the economy is another recognised barrier. This type of information would allow better analysis of demands and prices to target energy efficiency potentials (Terry 1991).

New Zealand has another more obvious barrier to meeting potential energy savings, and this is the low prices that New Zealander's pay for their energy. A recent study by Schnipper et al (1985) found that across a number of OECD countries, price explained 80% of energy consumpation behaviour.

However, the main obstacle to realising the potential for energy efficiency is often identified as being educating the vast numbers of individual energy consumers, whose actions hold the key to many of the potential gains, and then providing them with the capital to take advantage of more efficient technologies. Accurate, straightforward information that includes energy prices, investment requirements and possible energy savings is necessary to enable energy users to invest properly in energy saving technologies and to overcome market barriers (IEA 1991).

2.1.2 INFORMATION OBSTACLES

The consumer is often both lacking information and overloaded with information (OECD 1991). Difficulties also arise from provision of incorrect information. The range of information-related obstacles include:

- *Energy Pricing*
  There is some concern that energy pricing is not yet giving the adequate signals to consumers that will act as incentives to undertake investments in energy efficiency.
- *Lack of Information*
  Consumers sometimes have poor or incorrect information which leads to misguided decisions. The OECD (1991) have identified the following different types of information as being important:
  - information on why to save energy or improve efficiency
  - information on the environmental impacts of energy-using equipment
  - information about techniques to save energy
  - information on the energy-using characteristics of consumer products
  - information on the costs of using energy-dependent equipment
  - comparative information for purchasing decisions
  - information on the design of energy-efficiency technologies and systems

- *Quality and Origin of Information*
  While there is often information available, sometimes different pieces of information compete or conflict with each other. This can lead to confusion on the part of the consumer. There is also the concern that many energy users have a low level of understanding of the concepts of energy efficiency. Hence they do not understand the information they receive.
- *Invisibility of Energy Usage, Energy Efficiency and Environmental Impact*
  Many consumers view energy in terms of services provided rather than physical energy. Also because of billing information, it is difficult for the consumer to see what energy-use relates to which activity.
- *Limited Choice*
  There may be a lack of customer choice in terms of products and energy suppliers.
- *Lack of Confidence*
  Consumers are often sceptical about new technology.
- *Transparency in the Decision-making Process*
  One of the major information-related obstacles is the decision-making process of all categories of energy users both in terms of understanding what criteria consumers use and in giving them information that allows for better comparisons.
  (OECD 1991)

Given that all of these obstacles, information and other, exist and have been identified on numerous occasions the response by various organisations, such as the OECD, the IEA and EECA, has been to develop a number of policy instruments designed to overcome these barriers.

2.2 ENERGY EFFICIENCY POLICY INSTRUMENTS

It is assumed that the market will respond more quickly and effectively to many economic problems than can government policy and regulation, but market forces cannot always integrate the long lead times necessary to carry out energy supply and demand options (IEA 1991). In developing and applying energy conservation policies to meet this gap and to overcome some of the other obstacles to realising the full potential of energy efficiency, a number of policy instruments have been adopted to support the improvements in energy efficiency. These instruments include:

1. Economic Instruments, such as pricing and taxing
2. Information Programmes
3. Financial Incentives
4. Regulations and Standards
5. Research and Development
6. The Exemplary Role of Governments

7. Policy Integration

Pricing is considered one of the most important policy instruments to send the "right" signal to energy users and suppliers and to technology manufacturers and suppliers. The first step governments can take to remove market distortions working against energy efficiency is therefore to allow prices to reflect the long-term cost of supply, including distribution and external costs (IEA 1991, OECD 1991). Taxes and levies can also be applied by governments to influence energy demand through market signals. It is generally agreed by International Energy Agency (IEA) countries that proper weight should be given to energy policy objectives in tax policies and that energy prices should internalise, as far as possible, certain externalities such as the environmental costs of energy production and use - the "polluter pays" principle (IEA 1991).

Information programmes help the energy user to understand more about their energy use and ways to implement measures which can reduce their energy use. They are important in their own right to create awareness, motivate consumer action and educate consumers, decision-makers and those who provide energy services, but also complement all the other policy instruments and are essential to their effectiveness (IEA 1992b). Information measures taken by governments can be broadly categorised as labelling, information campaigns, auditing, targeting or monitoring.

Financial incentives, to organisations and the public, apply to any measure that is designed to influence an investment decision and to improve the attractiveness of energy efficiency investments, and includes grants and subsidies, tax incentives, and loans.

Regulations refer to controlling or directing conservation actions through government rules or restrictions. Standards are efficiency levels established by governments for appliances, buildings or passenger cars. Many regulations and standards, in IEA countries, have been directed towards residential/commercial buildings, and most have been mandatory. They require minimum thermal efficiencies for new housing by prescribing either particular materials/techniques or levels of performance, heating system efficiencies, individual metering according to energy consumption in multi-occupancy buildings, boiler maintenance requirements and restrictions on air-conditioning. Many countries also have regulations for appliance labelling, fuel economy standards for passenger cars, fuel economy information, and energy managers and management systems (IEA 1992b).

Research and development programmes are very valuable in developing new technologies, improving confidence in technologies, and increasing the choice of technologies.

Governments' efforts to stimulate energy efficiency in areas for which they are responsible, such as public buildings, can in principle be grouped in all categories previously described. They can range from information

campaigns to increase civil servants' energy awareness or to control temperature in public buildings, to direct financial support (IEA1991). In this way the government is leading by example.

Information campaigns are generally considered more successful than other forms of energy conservation investments such as financial measures, and regulatory measures, especially in view of the adoption and effectiveness of legislative and financial measures (Hildebrandt and Joerges 1987).

Rather than these policy instruments working independently of one another, often they are integrated, combining the use of two or more in an approach to addressing the issue of energy efficiency. The basis for policy integration is the premise that it is important to minimise the different signals that consumers are receiving. As has been identified previously, New Zealander's pay less for their energy than other OECD countries. Given this it may be difficult for the consumer to see the need for energy efficiency in terms of economic reasons. Yet the consumer is subject to information programmes which suggest that it is possible to save money by uptaking certain energy efficient technology, such as energy efficient light bulbs, which are often seen as being expensive and having relatively long pay back periods. In this example there is a need to combine economic instruments with information programmes to ensure that energy efficiency technology is being provided at a cost which reflects the long term cost of supply. This information then needs to be passed onto the consumer in a way in which he can understand and therefore see the benefits of the uptake of such technology.

The New Zealand Government is seeking an acceleration of the uptake of energy efficiency for economic and environmental reasons, and has charged EECA with spearheading the development of a wide-ranging mix of effective and innovative policies in the form of a long-term integrated strategy (EECA 1993a). As part of the development of this strategy a range of potential measures were subject to intensive scrutiny. What the Government hopes to achieve was the development of a strategy which capitalises on the numerous unexploited opportunities to accelerate the uptake of energy efficiency technologies and practices in New Zealand. In development this strategy it was also realised that improvements in energy efficiency can be made in all sectors of everyday economic and social activity and generate very good returns on investment (EECA 1994a).

Some of the measures to be implemented as part of EECA's integrated strategy include:

- extension of work being done to improve energy efficiency standards in the building code
- partnerships between EECA and industry, schools and hospitals to improve energy use in these sectors

- implementation of a "Best Practice" programme to assist industry to improve energy management techniques
- extension of a programme to improve energy efficiency of domestic appliances
- development of minimum energy performance standards for a range of domestic and industrial technologies, including hot water cylinders and electric motors
- a project to improve the collection and evaluation of data about energy use and the potential for savings (EECA 1994a).

The integrated strategy is designed in part to inform and motivate consumers about what they can do to improve energy efficiency, with a key element of this being the provision of information in the form of campaigns and programmes.

2.3 A Definition of Information Campaigns

Information covers a broad range of written and audio-visual materials that are purposely designed and issues to encourage energy efficiency behaviour. These may include brochures, fliers in utility bills, billboards and signs, workshops, television and radio advertisements, hot-lines, interpersonal communications, or even monetary awards, to name just a few. In addition to these multiple types of communication based chiefly on differing modes of delivery, there are alternative conceptual approaches to providing information which typically relate to the broad spectrum of message content, channel of communication, format of the information, frequency, and source (Collins et al 1984). Collins (op cit) have identified eight basic strategies of information:

1. Provide factual information
2. Make persuasive appeals
3. Make repetitive prompts or reminders
4. Influence perceptions about attributes
5. Elicit commitment and goal-setting
6. Arouse fears
7. Provide incentives
8. Use models to portray behaviour

The first strategy provides descriptive information about such things as a conservation device or procedure, its cost, how to install or use it, potential energy savings, and its availability. The second strategy typically plays on using commonly held norms and values to influence people's beliefs. The third strategy rests on the assumption that repeated information induces learning and will result in more permanent behavioural change. The fourth strategy is to reinforce or change perceptions of the characteristics of a conservation practice based on the notion that the attributes influence adoption, such as 'insulation is easy to install'. The fifth strategy attempts to make people internalise a drive to achieve conservation by helping them

set goals or make commitments, particularly when these are done publicly. The sixth strategy relies on fear appeals and attempts to frighten people into action, such 'if we do not conserve our children will suffer'. The seventh strategy identified involves using rewards such a monetary incentives as information to demonstrate that conservation saves money. Finally, using role models, such as celebrities, to demonstrate behaviour communicates information about the social acceptability of conservation (Collins op cit).

These strategies are not exhaustive. However they serve to illustrate that information covers a broad range of activities, different messages, and channels.

These basic strategies have been reflected in the definition of Energy Information Programmes that was developed during some recent work carried out by the Australian and New Zealand Management Energy Committee (ANZMEC) (1994) on the effectiveness of Australian energy efficiency information programmes. They identify three general types of Energy Information Programmes:

- *General Information Programmes*
  These programmes usually target all consumers and attempt to influence behaviour through a generalised mailing or media advertising. For such programmes it is not clear who has been exposed to the programme message, much less what, if any, action they have taken because of it.
- *Targeted Information/Audit Programmes*
  These include energy audit programmes as well as some types of weatherisation programmes, where efficiency measures are recommended on an individual basis, participants are known, and the consumer comes in direct, personal contact with programme personnel.
- *Audit/Incentive Programmes*
  These programmes combine individualised information (specific audit for each home) with the opportunity to receive incentives for implementing recommended measures. Participants are known, the participant has direct contact with programme personnel, and implementation of measures for which incentives are offered is generally known.

In addition to those identified by ANZMEC, EECA has identified some other types of Energy Information Campaigns in the New Zealand situation (Frank Pool, pers comm):

- *Demonstration Programme*

  This involves the demonstration of commercialised services. EECA act as independent evaluator of energy efficiency technologies, and endorse suitable products. This type of

information campaign is very product/supplier oriented. Participants are known, but the consumer who purchases the product does not come in direct contact with demonstration programme personnel.

- *Seminars*

  Seminars on energy efficiency and energy efficiency technologies are self-selecting, therefore programme participants are known to programme personnel. For these types of information programmes it is assumed that participants have some interest in energy efficiency as they pay to participate.

- *Generic Campaigns*

  In addition to the general information campaigns mentioned above, this form of information campaign involves advertising and information dissemination in trade and industry journals and publications.

These general types of energy efficiency information programmes have been developed into more specific types of campaigns. Table 2.0 provides a summary of these more specific information campaigns, identified by the IEA, the OECD and EECA, along with information on the audience they are targeting, and the obstacles that they have been designed to deal with.

TABLE 2.0 Summary of Energy Efficiency Information Programmes

PROGRAMME	TARGET AUDIENCE	OBSTACLES DEALT WITH
Publicity Campaigns	• can be general public or targeted audiences	• lack of information • lack of motivation • complacency or ignorance
Residential Energy Audits	• residents - often single-family dwellings	• invisibility of energy use • lack of technical and economic information • lack of awareness • need to cost-effectively upgrade older structures
Industrial Energy Audits	• all types of industrial energy users, in all subsectors and at all levels of management	• lack of technical and economic information • lack of awareness • invisibility of energy use • need to make clear the decision-making process • need to cost-effectively upgrade older structures

Training Workshops and Seminars	• energy users • managers, technical staff and equipment operators • consultants and other intermediaries • energy supply industry • equipment suppliers	• lack of both technical and general information • lack of confidence in technology
Technical Material	• energy users: technical staff, equipment operators • consultants and other intermediaries	• lack of technical information • lack of confidence in technology • lack of information on financial cost-effectiveness
"How-to" Books, Brochures, etc	• energy users in all sectors • consultants • energy suppliers	• lack of awareness • lack of technical information • lack of confidence in technology • poor motivation and marketing
Demonstrations	• energy users • consultants • engineering firms • energy suppliers • manufacturers	• lack of confidence in technologies • reduce initial costs • problems with technology development • poor motivation/ marketing
Technology Fairs and Exhibitions	• energy users • consultants • engineering firms • energy suppliers • manufacturers	• lack of skills and information of service industry • lack of information • poor motivation and marketing
Trade Magazines and Newsletters	• energy users • consultants • engineering firms • energy suppliers • manufacturers • policy advisers and makers	• lack of skills and information of service industry and larger energy users • lack of information • poor motivation and marketing
Conferences	• energy users • consultants • engineering firms • energy suppliers • manufacturers • policy advisers and makers	• lack of skills and awareness by the service industry and energy users • lack of information • poor motivation and marketing
Energy Management Monitoring and Control Systems	• energy users • consultants • engineering firms • energy suppliers • manufacturers	• invisibility of energy use and efficiency improvements • need to make clear the decision-making process • lack of awareness
Appliance Labelling	• energy users • retailers • manufacturers • energy suppliers	• invisibility of energy use and efficiency • lack of information • motivation and marketing

Equipment (and Vehicle) Labelling	• energy users • retailers • manufacturers • energy suppliers	• invisibility of energy use and efficiency • lack of information • poor motivation and marketing
Home Rating/Labelling Systems	• energy users • builders • real estate agents • energy suppliers	• invisibility of energy use • lack of information • poor motivation and marketing • poor quality of building stock
Awards	• energy users • builders • service companies • equipment suppliers	• poor motivation and marketing

Given the diverse and wide ranging nature of these programmes a lot of resources, both time and financial, have gone into the development and implementation of these information campaigns. It is therefore important to assess how effective these campaigns have been in order to determine the most appropriate approaches that should be taken in developing information programmes/campaigns in the future, and to help improve existing programmes.

2.4 THE EFFECTIVENESS OF INFORMATION CAMPAIGNS

In order to develop a comprehensive energy efficiency strategy it is necessary to analyse the effectiveness of existing policies and programmes to see how effective they have been at improving energy efficiency. The effectiveness of information programmes can be judged by two main criteria - their success in increasing awareness of the need for energy conservation and their success in producing results (IEA 1992b).

While many utilities and government agencies have offered an array of conservation programmes, most have failed to systematically evaluate the effectiveness and economic desirability of the programmes (Hartman 1984). As a result, they do not know if their conservation programmes really work. By 1981 there was a growing interest in evaluating conservation and energy programmes. People wanted to know if a programme worked (Dennis 1988), and if attitude and implementation of energy efficient actions could be contributed to a specific conservation programme (Frey 1984).

The need for timely and relevant feedback from evaluations of these programmes is more important now than ever, with the government and government agencies being required to be more accountable for their actions and programmes.

2.4.1 THE ROLE OF PROGRAMME EVALUATION

Increasingly, more and more attention is being focused on evaluation of energy efficiency information campaigns, with the increased attention yielding valuable information in the costs, timing, market segments, load-shape effects, and other characteristics of utility demand-side management programmes (Hirst 1990). The evaluation of these information campaigns draws largely on the methods and experience from the social sciences, and in particular programme evaluation. Evaluation in the social sciences has been developing for many years, with methods evolving to meet new problems and situations, including the need to evaluate programmes. A review of this literature highlights the role that programme evaluation has to play in policy formulation and programme improvement, and the increasing awareness of the need for evaluation within the new environment of accountability. Chapter Three explores this is more detail.

2.4.2 PAST EXPERIENCE

The evaluation of energy efficiency information campaigns has a long and varied past, with differing degrees of effort being put into evaluations at the international and national level. Organisations in the United States of America have long been involved in evaluating the effectiveness of their Demand-Side Management programmes, which are mainly implemented by the utilities. Other countries have also designed and carried out evaluations of their energy efficiency information campaigns, including Germany, France and Sweden (these evaluations are further discussed in Chapter Four). However, the level of commitment shown internationally to the evaluation of these information campaigns has not been reflected in New Zealand.

New Zealand has a relatively poor record for assessing the effectiveness of various energy efficiency information campaigns. One of the only documented evaluations is a study of the effectiveness of the promotion of energy conservation in the industrial and commercial sectors of the New Zealand economy in 1986, with specific reference to the government's Energy Conservation Loans Scheme and the Energy Advisory Service (Synergy Applied Research Limited 1986).

This research recognises that programme evaluation has an important role to play in determining the effectiveness of energy efficiency information campaigns, and also recognises the importance of such evaluations for qualifying future expenditure on such campaigns, and for the design of these campaigns. Chapter Three discusses the evaluation of these campaigns more fully, both internationally and nationally, and suggests implications for the evaluation of energy efficiency information campaigns.

CHAPTER THREE

PROGRAMME EVALUATION: FROM THEORY TO PRACTICE

3.0 PROGRAMME EVALUATION- THE BASIC ISSUES

The review and evaluation of existing programmes has become an integral part of management in government. Evaluations of the worth and the effects of programmes and interventions have developed as part of government policy and public administration in most Western democratic societies (Hellstern 1991). This is mainly due to an increased need for relevant and objective information on programme results in order to improve policy decisions. There is also a growing need for accountability in government departments (Boston et al 1991, Hellstern 1991, O'Faircheallaigh and Ryan 1992, Treasury Board of Canada 1981) and the role that evaluation plays in ensuring that timely and relevant information is used in policy formulation. According to Programme Evaluation Branch of the Canadian government, the benefits of programme evaluation are many - "its wider implementation will lead to a better understanding of the achievements of programmes, thereby enhancing the ability of the government - departments, central agencies and the Cabinet - to allocate resources in a more effective manner" (Treasury Board of Canada 1981 p4).

Evaluation processes provide information useful for policy formulation and programme improvement (Wholey 1985). The local and central government reforms of the 1980s has made the relationship between programme evaluation and public policy a major concern of evaluators, policy analysts, and public officials in New Zealand. Public sector reforms have been designed to allow governments to produce goods and services more efficiently (at least possible cost) and effectively (so as to achieve desired outcomes) (Boston et al 1988). Evaluators can help identify, document, and clarify the most important objectives of a programme, documenting or helping develop agreed-on measures of success which can then be used in communicating policy directions and managing results. Through close interaction with policy makers and programme managers, evaluators can help decision makers to focus on achievable objectives and to specify their needs for information on the results of programme activities.

The literature's main function is in setting the theoretical, methodological, and practical foundations for evaluation. The purpose of this introductory discussion is to set up an understanding of the environment in which programme evaluation operates.

3.0.1 WHY EVALUATE?

The aim of programme evaluation is to determine the extent to which the anticipated objectives of a programme are attained. The objectives of the programme are stated in terms of performances or goals, with goals indicating a desirable but not necessarily attainable state of affairs, and performance stating the programme's anticipated benefits in terms of the results sought (Nutt 1982).

Pietrzak et al (1990) provide a useful overview of why resources should be put into programme evaluation:

- A well planned effort to evaluate a programme will provide crucial information for decision-making. The results can identify a programme's strengths as well as the weaknesses needing to be corrected
- Funding authorities often require some analysis of the programme's efficiency and effectiveness
- Given numerous theories and ideologies about programmes, a carefully implemented evaluation can move an argument from a discussion of opinions to a review of the evidence
- Programmes will be less vulnerable to criticisms of "throwing money" at a problem in the hope that a solution will emerge if empirical evidence that documents service impacts is available.

Such responses reinforce the need for accountability in government departments, and illustrate the usefulness of the evaluation of programmes in the policy process. Programme evaluation is most easily understood with reference to a number of basic issues

3.0.2 THE BASIC PROGRAMME EVALUATION ISSUES

In May 1981 the Canadian Treasury Board released a publication titled "Guide on the Program Evaluation Function" with the basic premise being that "program evaluation in federal departments and agencies should involve the systematic gathering of verifiable information on a program and demonstrable evidence on its results and cost-effectiveness. Its purpose should be to periodically produce credible, timely, useful and objective findings on programmes appropriate for resource allocation, programme improvement and accountability" (p3). The resulting policy focussed on evaluation of programmes rather than the evaluation of systems and procedures which they considered to be better examined in internal audits. From this work a number of basic programme evaluation issues were identified -

• Programme Rationale	Does the programme make sense?
• Impacts and Effects	What has happened as a result of the programme?

- Objectives Achievement — Has the programme achieved what was expected?
- Alternatives — Are there better ways of achieving the results?

These basic issues define programme evaluation, and can serve as a general guide to the kinds of questions which should be considered in the evaluation of a programme. More specific questions which fall into these four classes are listed in Table 3.0.

TABLE 3.0 Basic Programme Evaluation Issues
(Source: Canada Treasury Board 1981)

CLASSES OF EVALUATION ISSUES	BASIC EVALUATION QUESTIONS
PROGRAMME RATIONALE (Does the programme make sense?)	To what extent are the objectives and mandate of the programme relevant? Are the activities and outputs of the programme consistent with its mandate and plausibly linked to the attainment of the objectives and the intended impacts and effects?
IMPACTS AND EFFECTS (What has happened as a result of the programme?)	What impacts and effects, both intended and unintended, resulted from carrying out the programme? In what manner and to what extent does the program complement, duplicate, overlap or work at cross-purposes with other programmes?
OBJECTIVES ACHIEVEMENT (Has the programme achieved what was expected?)	In what manner and to what extent were appropriate programme objectives achieved as a result of the programme?
ALTERNATIVES (Are the better ways of achieving the results?)	Are there more cost-effective alternative programmes which might achieve the objectives and intended impacts and effects? Are there more cost-effective ways of delivering the existing programme?

In order to fully understand how these basic evaluation issues can be incorporated in the programme evaluation process it is important to see the connection between the functions and attributes of evaluation and these basic programme evaluation issues.

3.0.3 THE FUNCTIONS AND ATTRIBUTES OF EVALUATION

The first two functions of evaluation, the summative and the formative, were originally identified by Scriven (1967), who suggested there should be some distinction between the two different evaluation *purposes* (Patton 1982). Summative evaluations are done for the purpose of making

judgments about the basic worth of a programme, and formative evaluations are aimed at programme improvement. Summative evaluations *tend* to focus on outcomes (though not necessarily to the exclusion of evaluating implementation), and formative evaluations *tend* to focus on programme processes (though not necessarily to the exclusion of measuring outcomes). According to Patton (1982) and Guba and Lincoln (1981) popular usage of these terms has led to confusion. It is easy to be misled into believing that merit evaluations are formative and worth evaluations are summative, when in fact the dimensions of merit/worth and of formative/summative are 'orthogonal' (Guba and Lincoln 1981). The practical implications of these observations is that evaluators must be quite careful to ensure that there are shared meanings for terms in a particular situation and context (Patton 1982).

Nevo (1986) identified a third function of evaluation - the psychological or socio-political function. This function is bought about by the reasoning that in many cases evaluation is not serving any formative purposes nor is it being used for accountability or other summative purposes. However, it is being used to increase awareness of special activities, motivate desired behaviour of those being evaluated, or promote public relations. The fourth function of evaluation, also identified by Nevo (1986) is its use for the exercise of authority - in formal organisations it is the privilege of the superior to evaluate his or her subordinates and not vice versa.

In summary, evaluation can serve many functions: (a) the formative function for improvement; (b) the summative function for selection, for certification, for accountability; (c) the psychological or socio-political function for motivation and to increase awareness; and (d) the administrative function to exercise authority.

Identifying what are the functions and attributes of an evaluation of a specific programme will help focus the basic evaluation issues. It will also help in the selection of the most appropriate approach to the evaluation.

3.0.4 APPROACHES TO EVALUATION

Chelimsky (1985) identifies six types of routinely conducted approaches to programme evaluation -

1. Front-end Analysis
   This approach involves evaluative work that is typically done before deciding to move ahead with a new programme.
2. Evaluability Assessment
   This approach is retrospective in-so-far as accountability or policy execution questions are involved, or prospective, when the questions relate to policy formulation.
3. Process Evaluation

Process evaluation addresses policy execution issues, but also helps effectiveness evaluations to answer accountability questions as well. This approach is always retrospective.

4. Effectiveness or impact evaluation
   An Effectiveness evaluation seeks to find out how well a programme has been working. In order to do this it is necessary to be able to show that changes observed are, in fact, the result of the programme, rather than that of other factors or forces.
   Effectiveness or impact evaluation's are also always retrospective.
5. Programme and Problem Monitoring
   Its function is to inform on problem characteristics, or to track programme or problem progress, and is a continuous process.
6. Meta-evaluation or evaluation synthesis
   This is a form of evaluation that re-analyses findings from one or a number of existing evaluations to determine what has been learned about a policy or programme.

The applications of programme evaluation in the literature extend over a wide variety of evaluation types and activities. For the purposes of this research the focus is on ex-post evaluation, whereby a program is considered retrospectively. According to the definitions provided by Chelimsky (1985), both process and impact/effectiveness evaluations would be most appropriate for this research.

3.0.5 WHO EXPECTS WHAT?

Expectations for the evaluation generally vary with a person's position in the system. Policy makers need the kind of information that will help them address the broad issues, such as; Should the programme be continued or dropped?; Should more money be allocated to this programme or others? In general, they want information on the overall effectiveness of the programme. The directors of the program want to know not only how well their programme is achieving the desired ends, but also which general strategies are more or less successful, which are achieving results most efficiently, which features of the programme are essential and which can be changed or dropped. The direct-service staff, who deal with the individuals and small groups, are concerned with the practical day-to-day concerns about techniques (Weiss 1972).

As Weiss suggests, this list does not exhaust those "with a possible oar in evaluation" (1972 p14). Others who play a part in evaluation include the funders of evaluation research who may have an interest in adding to the pool of knowledge in the field; the public as taxpayers who are concerned that their money is wisely and efficiently spent; and, the consumer of services who may be interested in community participation or community control of programmes and institutions (Weiss 1972).

3.0.6 THE ROLE OF THE EVALUATOR

In Utilization-Focused Evaluation Patton (1986) described the evaluators role as "active-reactive-adaptive" in working with decision makers and information users to focus evaluation questions and make method decisions. The active-reactive-adaptive evaluator works with decision makers to design an evaluation that includes any and all data that will help shed light on evaluation questions, given constraints of resources and time. Patton (op cit) also recognises that the ideal of the active-reactive-adaptive evaluator being methodologically flexible, sophisticated and able to use a variety of methods to study any particular evaluation question runs headlong into the realities of the evaluation world - limited resources, political considerations, and the narrowness of disciplinary training available to most evaluators (Patton op cit).

Other roles of the evaluator include being a facilitator, where the evaluator can identify and clarify information needs, on the one hand, and, on the other, communicate findings to address those needs (Werge and Haag 1989). It has been noted that in domestic and international situations alike, "program managers and evaluators frequently say that they feel like strangers in a strange land, were each party seems to be speaking a language unintelligible to the other" (Werge and Haag 1989 p49).

The evaluator also has an important role to play in giving feedback to programme personnel, after the evaluation has been conducted. Two approaches to information feedback have been identified - the traditional directive, data- and expertise-based role, and the non-directive and facilitatory approach. Joyce (1989) suggests that the non-directive strategy motivates programme personnel to improve their own performance and its impact. The use of a non-directive approach may have its strengths in that it has identified that the results of the evaluation may have impacts on programme personnel with respect to motivation. In suggesting this 'new' role for the evaluator, Joyce (op cit) suggests that there is an unreconcilable difference between the summative and the formative approach to evaluation. Joyce (op cit) sees the summative evaluator as a judge, while the formative evaluator is a change consultant.

The evaluator therefore has a number of ideals to live up to - the ability to be "active-reactive-adaptive", the ability to effectively provide feedback to programme personnel, and must also be able to be a facilitator in evaluation situations.

The role of the evaluator can be nicely summed up with a comment made by the Canada Treasury Board (1981 p54) -

> *"They must be creative in deciding how to carry out the study,*
> *must be able to pin-point the main evaluation issues*
> *and must be able to quickly develop a credible understanding*
> *of what the program is supposed to be doing"*

3.0.7 THE POLITICS OF PROGRAMME EVALUATION

Whether evaluation findings are implemented or not is often determined by what is politically acceptable at the time, and as such, political issues are receiving more attention in the evaluation decision-making process (Patton 1982). As argued by Cronbach and Associates (1980) - "A theory of evaluation must be as much a theory of political interaction as it is a theory of how to determine facts" (Thesis Number 11 p 3). Weiss (1987) identified three major ways in which political considerations intrude into programme evaluation -

- The policies and programmes with which evaluation deals are the creatures of political decisions
- Because evaluation is undertaken in order to feed into decision making, its reports enter the political arena
- Evaluation itself has a political stance

House (1990) in a recent discussion on the methodology of evaluation outlined two major problems that he considers are currently confronting evaluation practice -

- Evaluation is being used more and more as an instrument of control and accountability by increasingly centralised and hierarchical governmental authorities
- The extensive movement of evaluation activities inside bureaucracies means that evaluation activities are removed from public and peer scrutiny and increasingly subject to the pressures that exist within those organisations

These problems are inherently political in nature, and given that these problems exist it is necessary for the evaluator to be aware of them and to deal with them within the evaluation framework. As Weiss (1987) stated, knowing that political constraints and resistances exist is not a reason for abandoning evaluation research - it is a precondition for useable evaluation research.

3.1 HISTORICAL OVERVIEW

The history of formal evaluation is longer than is generally recognised, with the concept of evaluating individuals and programme's being evident as early as 2000 BC, with personnel selection in China (Shadish 1991, Worthen 1973). Evidence of what could be labelled "evaluation activity' was quite sparse until the 1950s, with the exception being the evaluation associated with the Eight Year Study conducted by Ralph Tyler during the 1930s (Berk 1981, Deshler 1984b, Shadish 1991, Worthen 1973). The Eight Year Study made use of a wide variety of tests, scales, inventories, questionnaires, check lists, pupil logs, and other measures in each of thirty high schools to gather

information about the achievement of curricular objectives. Tyler's evaluation approach had a great influence on the planning of evaluation studies for the next thirty years (Worthen 1973).

Large scale evaluation really came to the fore following World War II. During this time large scale programmes were designed to meet needs for urban development and housing, technological and cultural education, occupational training, and preventive health activities. Expenditures on programmes at both the national and international levels were very large and consequently were accompanied by demands for "knowledge of results" (Rossi 1989). The whole concept of "accountability" became important, not just for reasons associated with the financial outlay for such programmes, but also for political, managerial, and intellectual concerns (Shadish 1991). Interest was shown in assuring that the projects were implemented in ways which were consistent with the policy intent of the Government of the time. Managers needed data on programme implementation so they could manage programmes better and respond to varied information requests from Government. And social critics saw some social programmes as having problems, and in order to discuss the process of solving social problems that undergirded the design of these programmes, they needed information on such aspects as on how well programmes were doing, and data on why successes and failures occurred (Shadish 1991).

The early knowledge base of evaluation, and the early efforts to build programme evaluation as a discipline, saw existing methods and theories being drawn upon, and resulted in scientific research methods being greatly emphasised (Chen 1990, Shadish 1991). Originally evaluations were conceptualised as the provision of scientifically based knowledge for social reform, replacing the trial and error learning process of political ad-hoc experiments by systematic, controlled experimentations (Hellstern 1991). To use controlled experiments to gain policy-relevant knowledge was a radical break with traditional policy-making and the seminal work by Campbell and Stanley (1963) must be considered as a major social research innovation (Hellstern 1991).

The 'command and control' assumption underlying the experimental based reform model came under attack as it seemed not to fit the realities of institutional decision-making in modern societies. The field of evaluation saw the increasing advocacy for the use of qualitative approaches (Cronbach 1980, Guba and Lincoln 1981, Patton 1978, Patton 1980). The source of dissatisfaction for the revisionists seems to be the inability of the traditional methods to handle emergent problems in dynamic settings (Smith 1981). The traditional perspectives also tended to be limited in scope, and didn't allow for dealing with more than a narrow range of issues (Chen 1990).

As we move to the end of the century, experiences from numerous evaluations are accumulating and have led to a radical different shape of the field and theoretical progress in guiding evaluations (Alkin 1990, Cronbach

1980). In the 1990s pressures from the public added to the beginning transformation of evaluations to a more forward-looking, risk assessing, and dialogue-oriented tool, attempting to contribute to raise public awareness of socially conditioned risks and assure ethically and responsive actions (Hellstern 1991, Palumbo 1988).

The role that a historical analysis of programme evaluation has is to ensure that evaluators are aware of the historical aspects as well as the contemporary issues associated with their emerging profession, so they will not repeat mistakes of the past, and will sustain and build on past successes (Madaus et al 1983b).

3.1.1 THE CHANGING PERSPECTIVES OF PROGRAMME EVALUATION

The rise of different approaches and models is best understood as a dynamic process, visible in successive debates about the core concepts of evaluation. These debates reflect how the role of evaluations has changed from determining whether goals have been met, to how this information can be incorporated into the decision making and policy making process - therefore a more utilisation-focused approach has emerged. There is also more consideration of information that may be useful for programme improvement, rather than just considering information that would either credit or discredit a particular programme.

In order to illustrate the emergence of the successive debates about the core concepts of evaluation Hellstern (1991) has prepared a history of evaluation debates. According to Hellstern (1991) each debate helped to clarify some elements and redefined the boundaries and basic core of evaluation.

The first debate has led to the differentiation of evaluation research activities to fit it to the instrumental requirements of different programmes stages (outcome versus formative evaluation). The second one (experimental versus natural inquiries) challenged the methodological fit of the experimental design as leading paradigms to the needs of the policy fields. The resulting multiplicity of approaches, techniques and synthesising needs (meta-evaluation) pointed to the need for theory-based conceptualisations of evaluation (causal modelling versus pattern mapping) (Hellstern 1991). (See Table 3.1).

Despite continuing disagreements on fundamental principles and concepts and role of evaluators, each debate helped to synthesise new techniques and new principles, promoted the division of work among evaluators, and fertilised the maturation and actual conduct of evaluation research (Hellstern 1991).

TABLE 3.1 The History of Evaluation Debates
(Source: Hellstern 1991, p283)

DEBATE ONE

Central Focus	Basic Issues	Dominating Approaches	Methodol. Criteria	Basic Aims	Evaluation Use
Programme Stage	Formative vs. Outcome	Testing Quasi-Experimental Designs	Internal Validity (Adequacy, Efficiency, Effectiveness Cost Benefit)	Truth Rationality Manipulable Variable Quantitative Orientation	Instrumental Technical

DEBATE TWO

Central Focus	Basic Issues	Dominating Approaches	Methodol. Criteria	Basic Aims	Evaluation Use
Method Oriented	Natural (open) vs. (closed) Experimental Designs	Natural inquiry Client-oriented Stakeholder Situative Responsive	Construct validity (Utility Feasibility Propriety Accuracy Transferabil.	Under-standing Contextual Emergent Holistic Qualitative	Embedded En-lightenment

DEBATE THREE

Central Focus	Basic Issues	Dominating Approaches	Methodol. Criteria	Basic Aims	Evaluation Use
Theory-Guided	Causal Modelling vs. Pattern Matching	Structural Equative Cognitive Mapping Policy Domain Theories Meta-evaluation	Generaliz. Adequacy Inclusiveness Equitableness Democratic Involvement	Interactive Theory-based Multi-method	Mediator Negotiator

In order to more fully explore the emergence of these debates it is necessary to consider the theoretical aspects of their development, and an understanding of the theoretical underpinnings will also help the evaluator more accurately choose the evaluation approach which is appropriate.

3.2 THEORY AS THE BASIS FOR GUIDING PRACTICE

Theory is a frame of reference that helps humans to understand their world and to function in it

HUEY-TSYH CHEN
(1990 p3)

As expounded by Chen, theory is a "supposition of system of ideas explaining something, especially one based on general principles independent of the facts, phenomena etc to be explained" (Sykes 1982). Theory provides not only guidelines for analysing a phenomenon but also a scheme for understanding the significance of research findings (Chen 1990). The ideal evaluation theory would describe and justify why certain evaluation practices lead to particular kinds of results across situations that evaluators confront. It would (a) clarify the activities, processes, and goals of evaluation; (b) explicate relationships among evaluative activities and the processes and goals they facilitate; and (c) empirically test propositions to identify and address those that conflict with research or other critically appraised knowledge about evaluation (Shadish et al 1991).

Action and practice tend to precede theory development in any discipline - programme evaluation falls within this trend. A number of authors in their writings have identified the lack of theory as one of the major failings of evaluation in the past (Chen 1990, Lipsey 1986, Patton 1980, Shadish et al 1991). According to Shadish et al (1991) there is an imbalance in evaluation between the great attention to methods and the small attention to theoretical issues that guide method choice. Tyler, as far back as 1967, identified the need for theories to evolve to keep up with the accelerating development of evaluation -

> *"The accelerating development of research in the area of educational evaluation has created a collection of concepts, facts, generalisations, and research instruments and methods that represent many inconsistencies and contradictions because new problems, new conditions, and new assumptions are introduced without reviewing the changes they create in the relevance and logic of the older structure" (Tyler 1967, p 13)* [emphasis added]

In the past there has been a tendency for programme evaluation to be a largely atheoretical activity with treatments being represented as black box processes (Chen 1990, Lipsey et al 1986). Such "black box" approaches are characterised by a primary focus on the overall relationship between the inputs and outputs, and as such may fail to identify the underlying causal mechanisms that generate the treatment effects. As Cook and Shadish (1987) see it, programme evaluation has progressed, in the last twenty years, from applying the simple input/output, or black-box, model of evaluation to moving "inside" the box to try to understand what goes on in the programme. This view reinforces the three debates as described by Hellstern (1991) in the discussion on the history of evaluation debates. Hellstern (1991) illustrated the emergence of successive debates about the core concepts of evaluation, splitting the debates into three, paralleling the progression of programme evaluation theory.

Evaluation theory tells us when, where, and why some methods should be applied, ways different methods can be combined, types of questions answered better or less well by a particular methods, and benefits to be

expected from some methods as opposed to others (Chen 1990). Shadish et al (1991) note that "without its unique theories, programme evaluation would be just a set of loosely conglomerated researchers with principal allegiances to diverse disciplines, seeking to apply social science methods to studying social programs".

The theory of evaluation includes a vast array of decisions about the shape, conduct, and effects of an evaluation. To inform evaluators about choosing methods, it needs to discuss philosophy of sciences, public policy, value theory, and theory of use. Inherent in the developing of a theory base is accepting the different approaches to evaluation - use of the scientific paradigm through to the more naturalistic approaches - and recognising the ideologies that make up the paradigms (Shadish et al 1991).

The two most dominant paradigms which have emerged as the most widely used for the conduct of an evaluation are the scientific and the naturalistic. Definitions provided by Guba and Lincoln (1981) are -

- "A scientific paradigm, relying on experimentation as a fundamental technique, which views truth as confirmable; that is, truth is an hypothesis that has been confirmed by an actual experiment. The hypotheses are derived by deduction from an *a priori* theory; when enough hypotheses deriving from a particular theory have been verified, the theory itself is believed to have validity. Physics is a typical example." (p55)
- "A naturalistic paradigm, relying on field study as a fundamental technique, which views truth as ineluctable, that is, as ultimately inescapable. Sufficient immersion in and experience with a phenomenological field yields inevitable conclusions about what it important, dynamic, and pervasive in that field. Ethnography is a typical instance." (p55)

In general we have been conditioned to think of research as a process that uses an instrument, involves a large number of people, and is analyzed by reducing the data to numbers (Glesne and Peshkin 1992). This is reflected in the scientific paradigm which has been the traditional method of the 'hard' sciences and the life sciences. The latter is an emergent paradigm that has begun seriously to challenge that orthodoxy (Guba and Lincoln 1981).

Each of the two dominant paradigms are based on a set of assumptions or underlying theory, and a discussion of these is necessary in order to make valid method choices.

3.2.1 PREDISPOSITIONS OF THE DIFFERENT INQUIRY MODES

The different assumptions about the nature of the world affect not only the approach or research methods used, but also the purpose of the research and the roles of the researcher (Glesne and Peshkin 1992).

Quantitative researchers seek explanations and predictions that will generalize to other persons and places. Careful sampling strategies and experimental designs are aspects of quantitative methods aimed at producing generalizable results. Scientific inquiry discovers variables and describes their relationships, primarily for purposes of prediction and control, and the scientific inquirer tends to view the phenomena with which they deal as existing in and discoverable in the real world and fragmentable into discrete or independent subsystems that can be dealt with a few variables at a time, so that the inquirer can converge upon the truth (Guba and Lincoln 1981). In quantitative research, the researcher's role is to observe and measure, and care is taken to keep the researcher from 'contaminating' the data through personal involvement with the research subjects. The scientific paradigm assumes that the inquirer will have no effect on the phenomenon being studied and, equally important, that the phenomenon will have no effect on the inquirer (Guba and Lincoln 1981). Research objectivity is of the utmost concern (Glesne and Peshkin 1992). The scientific paradigm is often seen as positivist, where only recognizable phenomena and positive facts are supported and there is a rejection of metaphysics and theism.

Positivists assume that phenomena are best understood by objective observations or measurements that produce empirically verifiable relationships among phenomena. The ultimate goal of this form of theorizing is to develop universal laws of human behaviour and societal functioning (Glesne and Peshkin 1992).

The ***qualitative*** researchers deal with multiple, socially constructed realities or 'qualities' that are complex and indivisible into discrete variables (Guba and Lincoln 1981, Glesne and Peshkin 1992). They regard their research task as coming to understand and interpret how the various participants in a social setting construct the world around them. To make their interpretations, the researchers must gain access to the multiple perspectives of the participants. Their study designs, therefore, generally focus on in-depth, long-term interaction with relevant people in one or several sites. The research becomes the main research instrument as he or she observes, asks questions, and interacts with research participants. For these reasons the naturalistic paradigm is often referred to as interpretivist, where one expounds the meaning of words, writings and observations etc, and makes meaning out of them (Glesne and Peshkin 1992). The naturalistic inquirer believes that no data is objective, and as such it is important to determine the perceptions of the "data collector" and the effect of those perceptions on the developing information (Guba and Lincoln 1981).

Interpretivists see the goal of theorizing as providing understanding of direct "lived experience". Originating in phenomenology, "lived experience" emphasizes that experience is not just cognitive, but also includes emotions. Interpretive scholars consider that every situation is

novel, emergent, and filled with multiple, often conflicting meanings and interpretations. The interpretivist attempts to capture the core of these meanings and contradictions (Glesne and Peshkin 1992).

This holistic-inductive paradigm of naturalistic inquiry derives most directly from the ethnographic and field study traditions in anthropology and sociology. An integrated theme running through these traditions is the fundamental notion of *verstehen* (Patton 1980a). *Verstehen* is based on the assumption that the social sciences needs methods different from those used in the natural sciences, because human beings are different from plants and nuclear particles. The *verstehen* tradition stresses -

- understanding that focuses in the meaning of human behaviour
- the context of social interaction
- an empathetic understanding based on subjective states and behaviours
- human capacity to know and understand others through introspection and reflection from detailed description and observation (Patton 1980a)

According to Guba and Lincoln (1981) both quantitative and qualitative techniques can be used in support of either the scientific or naturalistic paradigms. They believe that it "would surely be a gross error to equate quantitative methods with the scientific paradigm and qualitative methods with the naturalistic paradigm" (p64). It would also not be wise to declare allegiance to either the quantitative-scientific-summative methodology or a qualitative-naturalistic-descriptive methodology, and a better approach may be to seek the best method or set of methods for answering a particular evaluation questions, rather than assuming one method is best for all purposes" (Nevo 1986 p22).

Chen (1990) believes that the development of a systematic body of concepts and theories in programme evaluation will be a slow and time-consuming process, but it will hopefully result in guiding evaluation practitioners in making better choices among trade-offs and in dealing with practical problems, but can also make programme evaluation a more mature practical science that has its own unique and systematic body of concepts and theories.

3.3 METHODOLOGICAL ASPECTS OF PROGRAMME EVALUATION

The conduct of evaluations doesn't involve routine repetitive tasks. There are no detailed step-by-step procedures to be carried out in each case, but only general principles to be considered. In evaluation studies the issues addressed, and the approaches used may be quite different from study to study. The implications for evaluators is that they must be able to work without well-established systems, procedures and standards having been

previously developed (Treasury Board of Canada 1981). What this means for the evaluator is that they must be creative in deciding how to carry out the study, must be able to pin-point the main evaluation issues, and must be able to quickly develop a credible understanding of what the programme is supposed to be doing.

The evaluation literature contains many examples of the different methodologies useful in evaluation but, according to Smith (1981), excessive reliance on a given methodology can breed professional conformity which discourages innovative and unconventional approaches - a conformity wherein efforts, though deemed rigorous, remain unproductive. Patton expresses the view that the "problem is that the ideal of evaluators being methodologically flexible, sophisticated, and able to use a variety of methods to study any particular question runs headlong into the realities of the evaluation world" (1980b p219). Smith sees that our goal, as evaluators, should be "optimum matches between methodology; the purpose of an individual study, and the nature of the phenomena being studied - not the superiority of a single overarching methodology, nor methodological diversity for its own sake" (Smith 1981 p28-29).

The approach to evaluation taken in this research is to consider programme evaluation as a process. When considered as such, programme evaluation can be undertaken is a systematic way, which is more useful when reviewing the evaluation approach, and for suggesting ways of improving the process.

3.3.1 THE PROCESS OF PROGRAMME EVALUATION

Four sets of authors in particular have attempted to document the evaluation process. The first two to be discussed have developed their process around a more 'scientific' base, reflecting, perhaps, the thinking of the time when they were developed. The other two which have been selected for this discussion have developed less 'methodologically biased' programme evaluation processes, allowing for more choice of research methodology which can be adapted for each evaluation situation.

3.3.1.1 Process Example One

Nay et al (1976) describe the approach to be taken to evaluation as being made up of five steps:

> STEP I. MODELLING OF THE DECISION-MAKING SYSTEM
> This step is carried out to specify the evaluation information required by the relevant decision-making processes. This step involves the criteria necessary to determine how much information and what type of information should be purchased.

STEP II. MODELLING OF THE PROGRAMME ACTIVITIES
This step is carried out to provide a measurement and analytical framework for evaluation design work. In this step, the evaluator documents agreement among relevant managers on measurable objectives and testable assumptions.

STEP III. DEVELOPMENT OF EVALUATION DESIGNS
The results of this step are described as: (a) specification of measurements and comparisons to be made to test hypotheses, and (b) specification of the estimated cost and expected value of each proposed evaluation design.

STEP IV. SELECTION OF APPROPRIATE EVALUATION DESIGNS
This step represents the process of deciding which information to collect based on the criteria established in Step I, the models in Step II, and the designs in Step III.

STEP V. SCHEDULING OF DATA COLLECTION AND ANALYSES
This step develops the operational plan for the scheduling of data collection and analyses.

Suggestions for evaluation design include controlled experimentation to test assumptions. What this approach fails to recognise is that in a number of evaluation situations it is not possible to conduct controlled experiments given that participants are often self-selecting into the programmes. Although it does appear to have some methodological biases, it does give a good representation of the different steps that are involved in an evaluation. This process ends with the scheduling of data collection and analyses, and doesn't go further to consider how recommendations could be presented or how such recommendations could be incorporated into the decision-making framework. It does however include a review of relevant literature which may give the evaluator some ideas as to how to tackle some these issues.

3.3.1.2 Process Example Two

Whatever the source of the proposal to evaluate, evaluators need to address a number of issues and make certain decisions before the collection of data begins, according to Posavac and Carey (1980). In order to achieve this, the authors have identified the steps to be taken in planning an evaluation:

STEP I. IDENTIFY RELEVANT PEOPLE
This step involves identifying those who have a serious interest in the programme. Programme personnel are first to be considered - it will help learn as much about the background, interest, attitudes, and reputation of the programme director as is possible, and it will also help to learn about the relationship between the programme director and other programme personnel so that they can be dealt with more effectively during the planning meetings to be described below. It is

will also help to establish the decision-making framework within the organisation responsible for the programme.

STEP II. ARRANGE PRELIMINARY MEETINGS

Before a final decision is make to undertake an evaluation and before the writing of a detailed proposal, it is advisable to meet with relevant people to gather background information on five questions: (1) Who wants the evaluation? (2) What type of evaluation is desired? (3) Why do they want it? (4) When do they want it? (5) What resources are available?

STEP III. DECIDE WHETHER THE EVALUATION SHOULD BE DONE

Evaluators ought not to accept a project for which they are not enthusiastic or in which they do not believe. Their attitude will make it difficult to do professional work. The main consideration is to make a conscious decision and not merely to drift into the project because it is there.

STEP IV. EXAMINE THE LITERATURE

While reading the articles, evaluators should keep these key questions in mind: Has any evaluation been done on this type of programme? What designs are used for evaluation of this type of programme? Were new measures developed? How reliable and valid were the measures? What type of statistical analysis was used? Was it appropriate? What issues were not addressed or investigated?6

STEP V. DETERMINE THE METHODOLOGY

After the review of literature has been made, the evaluators are ready to make some methodological decisions regarding the strategy and design, the population and sampling procedures, the control or comparison groups, operational measures, data collection, and statistical analysis.

STEP VI. PRESENT A WRITTEN PROPOSAL

The overall purpose is to be certain that the evaluators and programme personnel agree on the nature and goals of a programme, the type of the desired evaluation, the operational measures of the programme goals, and on the readiness of the programme for evaluation.

This process appears to be oriented towards the use of quantitative methods, with the preference being to collecting data which is able to be statistically analysed using such methods as multiple-regression and analysis of covariance. This is little scope within this to consider the analysis of data which is more qualitative in nature and is unable to be statistically analysed. This model also stops short of actually conducting the evaluation, and the consideration of the evaluation findings and how these might be incorporated into the decision-making framework. The 'terms of reference'

developed in Step Six are useful for making clear to the programme managers the underlying assumptions made in the choice of evaluation design, and also to clarify issues that may have been raised in the course of the initial meetings with programme personnel.

3.3.1.3 Process Example Three

According to Stufflebeam (1973), evaluation design is the preparation of a set of decision situations for implementation toward the achievement of specified objectives. This definition says that you must (1) identify the objectives to be achieved through implementation of the design, (2) need to identify and define the decision situations in the procedure for achieving the evaluation objectives, and (3) for each identified decision situation the evaluator needs to make a choice among the available alternatives.

In an attempt to illustrate the types of decision situations that an evaluator may face and to enable evaluators to approach problems of evaluation design is a systematic manner, Stufflebeam has designed a logical structure for evaluation design.

A. FOCUSSING THE EVALUATION
1. Identify the major level(s) of decision-making to be served
2. For each level of decision-making, project the decision situations to be served and describe each one in terms of its locus, focus, criticality, timing, and composition of alternatives
3. Define criteria for each decision situation by specifying variables for measurement and standards for use in the judgment of alternatives
4. Define policies within which the evaluator must operate

B. COLLECTION OF INFORMATION
1. Specify the source of the information to be collected
2. Specify the instruments and methods for collecting the needed information
3. Specify the sampling procedure to be employed
4. Specify the conditions and schedule for information collection

C. ORGANISATION OF INFORMATION
1. Provide a format for the information which is collected
2. Designate a means for performing the analysis

D. ANALYSIS OF INFORMATION
1. Select the analytical procedures to be employed
2. Designate a means for performing the analysis

E. REPORTING THE INFORMATION
1. Define the audiences for the evaluation reports
2. Specify means for providing information to the audience

3. Specify the format for evaluation reports and/or reporting sessions
4. Schedule the reporting of information

F. ADMINISTRATION OF THE EVALUATION
1. Summarise the evaluation schedule
2. Define staff and resource requirements and plans for meeting these requirements
3. Specify means for meeting policy requirements for conduct of the evaluation
4. Evaluate the potential of the evaluation design for providing information which is valid, reliable, credible, timely, and pervasive
5. Specify and schedule means for periodic updating of the evaluation design
6. Provide a budget for the total evaluation programme

This process is more methodologically flexible than the two previous approaches by being more general in its discussion of data collection in Step. It also recognises the need to become familiar with the decision-making framework of the organisation whose programme is being evaluated. As with the two previous processes, it stops short of the actual conducting of the evaluation, and consideration of how conclusions and recommendations are to be incorporated into decision-making. An interesting part of this Stufflebeam's process is that it incorporates the provision to update the evaluation design periodically. This recognises that the programme environment may have changed since the evaluation design was developed, and allows the design to be updated on the basis of new findings from the conduct of similar evaluations.

3.3.1.4 Process Example Four

The Treasury Board of Canada (1981) provide a complete and concise discussion on the conduct of programme evaluations. They view the evaluation process as comprising of three phases:

- pre-evaluation planning (evaluation assessment)
- conducting and reporting on the evaluation study; and
- decision-making based on findings and recommendations

Figure 3.0 illustrates a representative evaluation process. The figure indicates that in the area of implementing decisions, the programme evaluation function merges with the regular programme management function. At this point other management information is brought to bear on decisions taken as a result of the evaluation study. According to the authors of the Guide, at least part of the reason for non-use of evaluation studies has been a lack of adequate consideration before commencing the study of what is needed, what can be done and what shall be done. The

Guide aims at avoiding such pitfalls by strongly encouraging an adequate planning phase - termed evaluation assessment - for all evaluation studies.

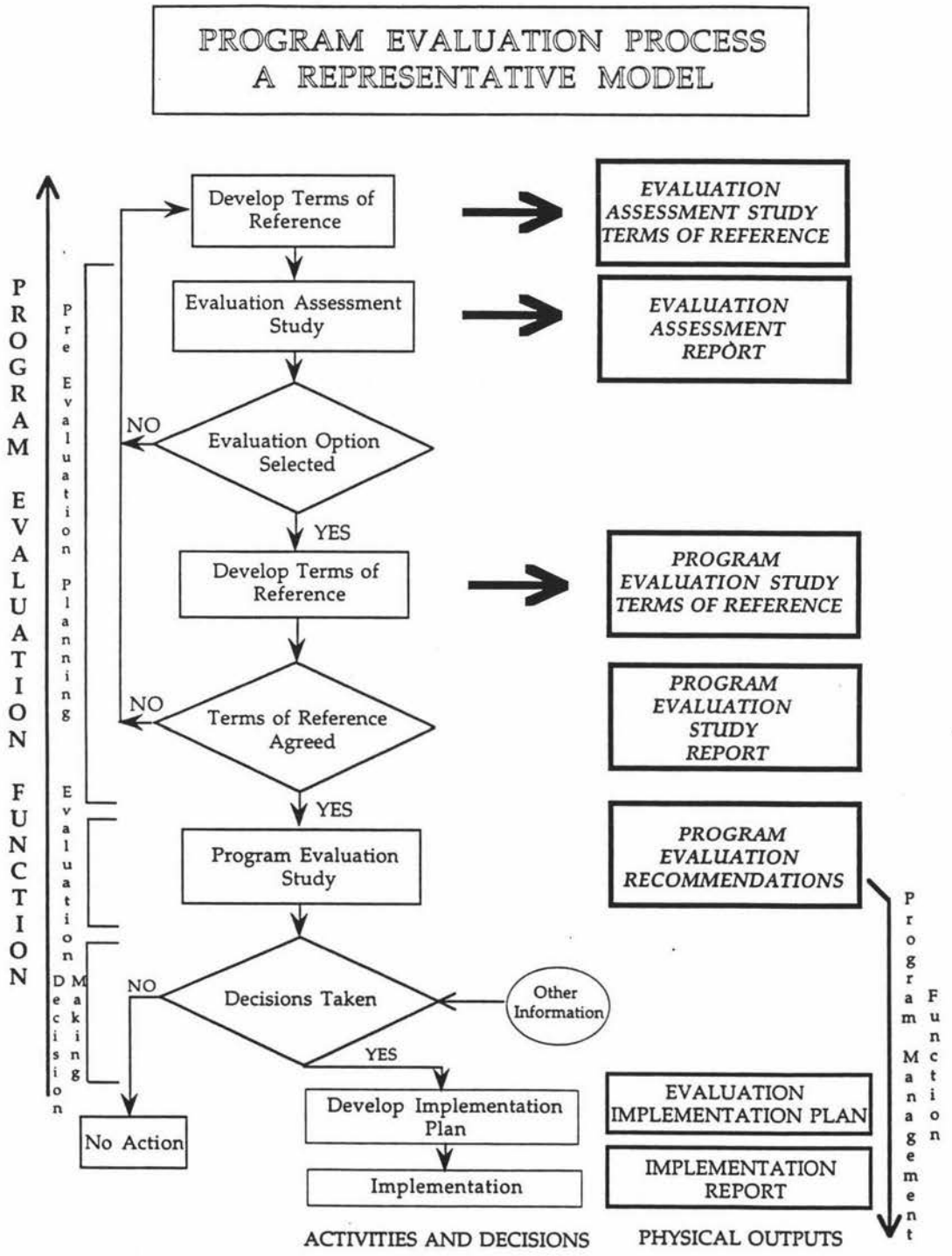

FIGURE 3.0 Program Evaluation Process - A Representative Model (Source: Treasury Board of Canada 1981, p61)

There are four main outputs from this programme evaluation process - Evaluation Assessment Study, Evaluation Study Terms of Reference, Programme Evaluation Study, and Evaluation Reporting.

EVALUATION ASSESSMENT STUDY

An evaluation assessment study involves identification of the programme-specific evaluation issues to be considered in the assessment and an analysis of the nature and extent to which these evaluation issues can and, perhaps should, be examined in the subsequent evaluation study. Consideration is given here to the basic evaluation issues outlined in previous discussion -

Programme Rationale
Impacts and Effects
Objectives Achievement
Alternatives

EVALUATION STUDY TERMS OF REFERENCE

Terms of reference provide formal record of agreement between client and the evaluator's as to what will be done, and they give specific detail as to what is expected in the study.

PROGRAMME EVALUATION STUDY

This is where is data are collected, the analysis is carried out, and the conclusions and recommendations are formulated. There are a wide range of approaches and techniques available to carry out evaluation study. All are aimed at measuring not only the impacts and effects which have taken place, but also at gathering reliable and credible evidence that Impacts and Effects took place because of programme and not because of some other set of conditions or factors.

EVALUATION REPORTING

For both the evaluation assessment and the evaluation phases of a programme evaluation, a final report is essential. This records of what was done and what was found and should be both credible and useful. If should present findings in a balanced and complete manner, identifying assumptions underlying the study and outlining the constraints under which the study was undertaken. It is important in reporting the evaluation findings to distinguish between evidence, conclusions and recommendations as well as between factual conclusions, judgments and opinions. Evaluation reports should justify their selection of information and evidence and its relationship to the report's conclusions and make their assumptions explicit.

TAKING DECISIONS BASED ON PROGRAMME EVALUATIONS

The final phase of evaluation involves the taking of decisions based on the evaluation study. It is imperative that adequate procedures be in place to ensure that appropriate follow-up actions are taken for any decisions reached up to this stage. This part of the evaluation process is a function of Programme Management rather than being a function of Programme Evaluation, as shown in Figure 3.0.

This Programme Evaluation Process, developed by the Treasury Board of Canada, Programme Evaluation Branch, is the most comprehensive of the

processes reviewed here. Most importantly the authors believe evaluation should not be viewed as a scientific exercise aimed at trying to produce definitive conclusions but rather aimed at producing objective but not necessarily conclusive evidence. The relevant criteria for selecting among evaluation methods should be that credible, objective and timely information is produced which is appropriate for decision-making and management. What may be lost to scientific authoritativeness can be gained in areas of relevance, timeliness and acceptance of findings by decision-makers, with the loss of objectivity. The process also clearly defines how the evaluation findings are to be incorporated into the decision-making framework, and involves a programme management function into the process.

In designing an evaluation approach it is therefore very important to prepare a plan of the steps involved in the evaluation, and the evaluation conducted in this research will draw facets from each of the process described here.

Important also to the programme evaluation process described is the need to determine how the data is to be collected. Evaluations generally draw on the methods of the sciences and social sciences. However, in doing this it is important that the evaluator understands how evaluation differs from research. Evaluation research - often called programme evaluation - refers to a research purpose rather than a specific research method (Babbie 1989) and is commonly understood to mean the assessment of the effectiveness of social programmes that were designed as tentative solutions to existing social problems (Smith 1981). Important aspects is understanding the difference between evaluation and research include:

- Evaluation is decision-driven instead of hypothesis driven. Evaluation generally deals with a more targeted group that research.
- Utilisation is a prime criterion of the evaluation process. The value of an evaluation lies in its usefulness in the decision-making process.
- Policy choice is nearly always made on the basis of incomplete information. The intent of evaluation is to reduce the uncertainty, and to provide an information-rich decision-making environment.

These differences help to highlight the caution evaluators must use when borrowing its methods from research.

The methodology used in an evaluation involves the decision on what type of approach will be taken, the sampling technique to be used, the data collection approach, and finally, the analysis and interpretation of the data. There is an extensive body of literature which discusses the research

methods in much more detail, and it is not within the scope of this discussion to consider these issues any further.

3.4 TOWARDS INTEGRATION - FACT OR FANTASY?

The issues of selecting methods is seen by some as being no longer one of the dominant paradigm versus the alternative paradigm, of experimental designs with quantitative measurement versus holistic-inductive designs based on qualitative measurement (Chen 1990, Deshler 1984b, Patton 1978, Smith and Cantley 1984). Patton (1978) proposes that the debate and competition between paradigms is being replaced by a new paradigm - a paradigm of choices. The paradigm of choices recognises that different methods are appropriate for different situations (Patton 1978). The debate has therefore shifted from the a strong allegiance to importance of each paradigm and its approach to evaluation, to acknowledgment of both approaches, and their strengths and weaknesses.

In the past there appeared to be a distinct polarisation between evaluators who adhered to either the scientific or naturalistic paradigm. However, evaluators are starting to accept the benefits of a paradigm which may conflict with their own ideologies, and are beginning to advocate the use of an integrated approach. As Chen stated " because each method, or even multiple methods, involve its own strengths and weaknesses, there realistically is no one best method for evaluation that can universally apply to every evaluation situation" (Chen 1990, p27). Even more important to the argument of integration is that "becoming more familiar with the many possibilities and alternatives may make it possible for evaluators to make informed choices concerning models and approaches to fit the decision situations of very diverse practices in the field of continuing education (Deshler 1984b, p3)

This concept of integration was recognised as early as the 1970s with work done by Campbell. Campbell suggested that the knowledge of any detail is context-dependent and qualitative knowing of "wholes and patterns" provides the context necessary for interpreting quantitative data (Campbell, quoted in House 1977). Campbell believes that qualitative knowledge has been neglected in favour of quantitative methods, and would prefer to see qualitative and quantitative methods used together to cross-validate one another. Quantitative methods, he believes, can provide insights that the qualitative do not, and since all knowing is essentially comparative, he thinks qualitative techniques like case studies could be improved by experimental design considerations, which he could not see as being part of quantitative methodology.

Triangulation is often seen as the practical approach to using both quantitative and qualitative strategies. It is the process of using more than one source to confirm information. Four basic types of triangulation exist:

1. Data Triangulation - the use of a variety of data sources in a study
2. Investigator Triangulation - the use of several different researchers or evaluators
3. Theory Triangulation - the use of multiple perspectives to interpret a single set of data
4. Methodological Triangulation - the use of multiple methods to study a single problem or programme

Such triangulation ensures that the result is not dependent on the peculiar characteristics of a single measure or of a measurement method (Krathwohl 1993).

3.5 UTILISATION OF EVALUATION RESULTS

One purpose of programme evaluation is to improve knowledge in a particular area. However, another equally important purpose, is to bring information to bear on political decisions of many different types (Chelimsky 1987). This idea is supported by a classic statement of the ultimate purpose of evaluation offered by Weiss:

> *The basic rationale for evaluation is that it provides information for action. Its primary justification is that it contributes to the rationalisation of decision making. Although it can serve such other functions as knowledge-building and theory-testing, unless it gains serious hearing when program decisions are made, it fails in its major purpose.* (Weiss 1966, quoted in Alkin et al 1979, p14)

In order for the results of program evaluations to be utilised, one of the things that is needed is for the evaluations to be designed around the user's specific information needs (Chelimsky 1987, Patton 1986), and also for the evaluator to take an active role in moving from research data to interpretation of the results in a policy context (Weiss 1972).

The utilisation based approach to programme evaluation is aimed at increasing the likelihood that an evaluation's impact will be substantial, meaningful, and relevant. As Patton (1986) sees it the "potential for enhancing use lies less in its capability for rationalising decision making than in its capacity to empower the users of evaluation information" (p39). The need for consideration of the utilisation of evaluation findings has been clearly identified is the sections leading up to this discussion. The Treasury Board of Canada (1981) in their Programme Evaluation Process made a point of identifying how the programme evaluation function leads into the programme management function, and how consideration of how the evaluation findings are to be incorporated into the decision-making and

policy framework is essential to ensure full utilisation of conclusions and recommendations from the programme evaluation.

The main step in ensuring that the programme evaluation will have a utilisation focus is to identify the primary intended users of the evaluation. The people who can benefit from a evaluation are generally referred to as stakeholders, being people who have a vested interest in evaluation findings. There are generally multiple stakeholders, including program funders, staff, administrators, clients, and others with a direct, or even indirect, interest in program effectiveness. With the purpose of utilisation-focused evaluation being to answer stakeholders' questions, it is necessary to clearly and explicitly identify primary stakeholders so that their questions can be determined, and therefore, answered through evaluation (Patton 1986).

Without adequate consideration being given to the utilisation aspect of programme evaluation, then programme evaluation as a whole will fail to meet its objectives.

Chapter Four continues on from this general discussion on programme evaluation, to consider how evaluation has been used in determining the effectiveness of energy efficiency information campaigns, both in New Zealand and internationally.

CHAPTER FOUR

ENERGY EFFICIENCY INFORMATION CAMPAIGNS: THEIR FORM AND EVALUATION

4.0 ENERGY EFFICIENCY AND CONSERVATION INFORMATION CAMPAIGNS IN NEW ZEALAND: PAST EFFORTS AND FUTURE DIRECTIONS

Since the oil shocks of the early 1970s and 1980s New Zealand Government and industry have launched information campaigns aimed at reducing New Zealand's consumption of energy. The majority of these information campaigns were in the form of reactive mechanisms to some external factors. The most major of these external factors were the decision in October 1973 of member nations of OPEC to limit their production of crude oil, and the reduction in oil production from Iran early in 1979. As a result New Zealand developed a number of policy measures for Energy Conservation and Use from 1974-1980. Publicity was an integral part of the Government's overall effort to encourage energy conservation, and the use of indigenous energy in place of imported oil (Ministry of Energy 1980). Therefore New Zealand's response was to promote energy conservation and efficiency, along with promoting the use of indigenous resources.

The majority of these early programmes were aimed at decreasing New Zealand's reliance on overseas oil resources, and were therefore focused on the transportation sector. In addition to this, the motivation for the majority of these programmes were designed at cutting energy use (energy conservation), rather than using the energy more wisely (energy efficiency).

Following the decision in October 1973 of member nations of the Oil Producing and Exporting Countries (OPEC) to limit their production of crude oil the New Zealand government instituted the following policy measures:

- a 80kph maximum speed limit for cars, buses, light trucks and to 70kph for heavy trucks and school buses
- a ban on weekend petrol sales after noon on Saturday
- restrictions on the sale of diesel and fuel oils to 1973 levels
- control of aviation fuel
- a limitation of oil-fired electricity generation
- restriction on the sale of 'comfort heating' fuels to 93 percent of 1973 levels
- restrictions on the sale of bitumen to 95 percent of 1973 levels

During this time industrial consumers were also encouraged to give serious consideration to substituting coal and natural gas for oil. Largely through public cooperation and the oil conservation measures in 1974, combined with price increase, the consumption of petroleum products during the year was held to an increase of only 1.5 percent over 1973 levels. This is compared with an expected increase of 11 percent (Ministry of Energy 1980).

Following the second oil crisis of 1979, New Zealand attempted to balance supply and demand by reducing oil demand by seven percent. To achieve this the Government implemented the following measures, from the period 1974-1980:

- weekend ban on petrol sales from 7pm on Friday to 6am on Monday was introduced on 26 February 1979. This restriction was relaxed on 1 December 1979 to allow sales up to 12 noon on Saturday, and then lifted completely in August 1980.
- the 80kph open road speed limit stringently enforced
- a carless day scheme introduced on 30 July 1979 whereby each car owner selected one day of the week as a carless day. This scheme was suspended on 12 May 1980 but will be retained as a standby measure.
- allocation of the following products were in force:
  - oil for comfort heating 70-80 percent of 1978 levels
  - fuel - all international bunkering of ships and aircraft is subject to constraint
- administrative actions in the area of fuel switching progressed to minimise the adverse effect of the oil supply problems

In addition to these short-term policy measures, the government instigated a number of long-term policy measures. One of these was the release of an Energy Plan in 1980 with conservation being recognised as constituting a "low risk, usually decentralised, alternative to increased energy supply". Also, a comprehensive energy pricing policy was introduced in 1977. The policy was aimed at being a strong inducement to the use of alternatives to oil, to the conservation of all energy reserves, and to their most efficient use. And, as previously mentioned, a publicity campaign was an integral part of the Government's overall effort to encourage energy conservation. The publicity campaign was required to:

- encourage the more effective use of energy and the replacement of oil by indigenous sources of energy
- explain how energy can be used more effectively
- point out the benefits both to the individual or firm and to the country, of conservation and substitution
- inform the public of the incentives and information services available

A series of audiovisual presentations were produced because of the encouraging response experienced from personal contact. A Conservation Office travelled to most centres in New Zealand speaking at seminars and presenting the audio-visuals, with feedback from this hoping to add to the fund of information on which further possible energy conservation measures will be based.

The 1978/79 publicity programme was aimed initially at the business community, with greater emphasis being placed on the transport sector later in the year. This was partly a seasonal factor (insulation is advocated in the autumn, safe and economical driving round the holiday period) but also reflects the changing priorities in the energy field.

Particular emphasis was given the conservation of transport fuels in the 1979/80 year and this is continuing in 1980/81. According to the Ministry of Energy (1980), any savings in this field would be extremely valuable, but overseas experience has shown that they are extremely difficult to achieve without a comprehensive publicity campaign.

The following table (Table 4.0) provides a few examples of the types of energy conservation measure implemented for the various sectors in the 1974-80 period.

TABLE 4.0 Examples of Energy Conservation Measures

RESIDENTIAL A Home Insulation Loan Scheme was introduced in May 1975 which provides for interest-free advances to be made to householders for the purchase and installation of insulation in their homes. The scheme was administered through local electrical supply authorities and gas undertakings. Interest-free loans were also available to landlords for the insulation of rental accommodation. The Ministry of Energy states that they were continually monitoring the success of the home insulation scheme, and it desired penetration is not being achieved, further measure would be implemented (Ministry of Energy 1980). Evidence of this monitoring programme was not found in the Ministry of Commerce archives although it may exist.
COMMERCIAL The concept of energy use specifications for all new commercial and industrial buildings over a certain minimum size was introduced in 1978. The specifications gave formal recognition to the necessity to specify the energy use characteristic of these types of buildings and would act as a definition of the energy performance of the building involved.

TRANSPORT
Incentives for conversions to Liquified Petroleum Gas (LPG) by business vehicles; immediate write-off for tax purposes of the cost of converting a business vehicle; a 25 percent grant on LPG tanks with the balance of expenditure being an immediate tax write-off.
A large amount of effort was put into the idea of carpooling. A grant was given to finance a car-pooling scheme in Auckland. Encouragement and assistance was offered to local authorities to establish carpooling scheme. And the Ministry of Energy made available information and help to organisations considering vanpooling for employee's transport to and from work.

INDUSTRIAL
An Energy Advisory Service was established in 1976 to assist industry in achieving energy savings. The service provided expert advice to industry on energy use and conservation opportunities. At the request of the company, the Service made an assessment of energy use, pointing out where energy losses are prevalent, and suggesting ways of eliminating or reducing these losses.

PUBLIC SECTOR
An accelerated programme for the installation of thermal insulation in Government buildings was announced in 1978. The programme called for the insulation of the ceilings of all Government-owned houses by 1983.

This tables of measures is by no means exhaustive, but demonstrates the variety of programmes developed during the 1970s, and the sectors they targeted. In addition to programmes developed for specific sectors in the economy, a number of more general initiatives were developed by the Ministry of Energy in the 1980s, and implemented by the Energy Management Directorate of the Ministry of Energy in the 1980s (Ministry of Energy 198_a). These initiatives ranged from campaigns directed at the road transport industry to increase the efficiency of diesel use, energy education programmes for primary and secondary schools, a programme aimed at increasing tractor operating efficiency, the demonstration of solar energy to promote an energy efficient building stock, establishment of the Energy Conservation Loans Scheme and the Energy Advisory Service, and various public relations and marketing exercise to inform decision-makers about New Zealands cleanest lowest cost energy resource - energy management.

The progression of energy efficiency strategies from the 1970s through to the 1980s shows the development of programmes from purely reactionary mechanisms to future oriented proactive strategies. As a means of developing this proactive stance further the New Zealand Government set up the Energy Efficiency and Conservation Authority (EECA). The Authority, which reports directly to the Minister of Energy, was established in October 1992, with a brief to develop and implement strategies to improve efficiencies in energy use throughout all sectors of New Zealand activities.

As has already been discussed the government has moved from the old centralised approach to a market-led approach. Part of this move has been for the New Zealand government to charge EECA with promoting the conservation of energy resources in New Zealand. Conservation in this context means managing energy resources to ensure that their productivity is increased through energy efficiency practices and technology. It will also require economic, social and environmental considerations to be taken into account (Creech 1993). In practice this will require the Authority to develop, implement and promote strategies for energy efficiency and conservation. EECA is seen as the most clearly recognisable expression of the Government's commitment to efficient energy use.

Since the establishment of EECA, a number of strategies for improving energy efficiency have been implemented. Some of these strategies are continuations and extensions of those developed by previous organisations in New Zealand, and some of the strategies are new initiatives. These Government measures to improve energy efficiency, rather then being a set of independent actions, are part of an integrated strategy for the period 1994-1997 (EECA 1994a). The strategy is designed to inform and motivate consumers about what they can do to improve energy efficiency. Other key elements include the development of minimum standards relating to energy use in commercial and residential buildings, domestic appliances and commercial and industrial equipment; assistance with commercial development of energy efficient technologies, and the evaluation of data on opportunities to make savings and how well these are being achieved (EECA 1994a). Of the measures outlined in the strategy, EECA has already begun work on several of these, and will phase in the rest over the next three years. Many will be undertaken in partnership with one of more energy suppliers and consumers.

An important of the Integrated Strategy is the inclusion of a project to improve the collection and evaluation of data about energy use and the potential for savings. Data collection, evaluation and monitoring will assist in measuring trends in energy savings and will identify how future strategies should best be developed. This represents the Government's commitment to securing an energy efficient future, but unless this monitoring programme is combined with a programme evaluation function its full potential will not be realised.

This is, however, a positive move on behalf of the Government, who on previous occasions have identified the need for more information on energy use and the effectiveness of energy efficiency information programmes, and this move also highlights the importance of programme evaluation within the policy arena. At this point it is necessary to consider what efforts have been made at evaluating these information programmes in the past.

4.1 ENERGY EFFICIENCY INFORMATION CAMPAIGNS: THEIR EVALUATION

New Zealand's record of programme evaluation of energy efficiency information campaigns is weak, given the range of policy measures and programmes that the Government has implemented over the past two decades. In the early 1980s there is evidence in the Ministry of Energy archives of work being done on developing an energy conservation monitoring programme, with the overall objective being to provide information useful in designing and monitoring a campaign to promote energy saving in New Zealand business. Findings from this draft report suggest a need for an improved flow of information from an integrated source, publicity for individuals responsible for energy saving schemes to provide personal motivation, education programmes, and more information on methods to improve energy use (198_b).

The majority of work that has been done in this area in New Zealand centres on Market Research on consumers' attitudes and opinions. This information is most useful in the development of information programmes, as it helps the programme designers target the right group of people with the type of information they need to change their behaviours to reflect their attitudes. Attitudinal surveys can provide data about how much the public knows about energy, actions the public apparently wants or is willing to accept, the reasons for such desires, and how strongly they are held. There is regular identification in documents and correspondence that information about consumer attitudes and opinions will promote better campaigns, therefore the uptake of energy efficiency information (Ministry of Commerce Archives 19__). Information on consumer attitudes and opinion was also identified as being useful for the Ministry of Energy in terms of its wider responsibility for policy documents. The task for conservation programme evaluators is to develop questionnaires which can refine such general attitudes to much more specific attitudes which are relevant to individual programmes (Collins et al 1984).

One of the few evaluations of a programmes performance that has been carried out in New Zealand, is some research by Synergy Applied Research Limited, for the NZERDC in 1986.

4.1.1 EVALUATION OF THE ENERGY CONSERVATION LOANS SCHEME AND THE ENERGY ADVISORY SERVICE

The objectives of this study, conducted by Synergy Applied Research Limited in 1986, were to assess the effectiveness of the promotion of energy conservation in the industrial and commercial sectors of the New Zealand economy, and more specifically, to evaluate the effectiveness of the government's Energy Conservation Loans Scheme (ECLS) and the Energy Advisory Service (EAS) as methods of promoting conservation. The institutional environment was examined to delineate the relationships and

interactions between the organisations and persons involved or affected by the programmes, and thus identify the strengths and weaknesses of the mechanisms in achieving stated energy conservation objectives.

The ECLS and EAS were two government incentive programmes implemented by the Ministry of Energy to encourage and facilitate the use of energy efficiency measures in industry and commerce, and thus attain significant levels of national energy savings.

More specifically, the ECLS was established to promote capital expenditure on energy saving equipment by the commercial and industrial sector. The scheme was designed to utilise the facilities and reputation of the Development Finance Corporation to provide firms and organisations with a clearly defined and accessible package of competitively based loan finance. And the EAS was established to approach energy conservation from a wider perspective, providing businesses with technical advice on a broad range of energy equipment replacement, from simple good housekeeping techniques to equipment replacement and fuel substitution. The service utilised the engineering and technical skills of the now disestablished Ministry of Works and Development.

The principal objective of the review was to assess the effectiveness of the two programmes in their promotion of energy conservation within industrial and commercial sectors of the economy by surveying users and potential users of the programmes, as well as manufacturers and distributors of energy conservation equipment (Synergy Applied Research Limited 1986). More specific objectives are outlined in the following table (Table 4.1), along with the methodology and analysis.

TABLE 4.1 The ECLS and EAS evaluation approach

OBJECTIVES	METHODOLOGY	ANALYSIS
1. To assess how the Loans Scheme and Advisory Service have been promoted by public and private institutions since the inception of the programme. 2. To assess the effectiveness of such promotional activities 3. To evaluate the motivation of organisations to use or not to use the Loans Scheme and/or Advisory Service 4. To identify ways to improve the market penetration of these programmes and of energy conservation programmes in general.	The effectiveness was assessed through: 1. Interviews of key participants in all aspects of the programme 2. Surveys of organisations that used the ECLS and/or EAS, a control group of businesses which had not use either programme, and manufacturers and distributors of energy conservation equipment 3. Analysis of institutional interactions. policy formulation and market penetration strategies	The effectiveness was assessed in quantitative and qualitative terms. Firstly the economic efficiency of the two programmes was evaluated with reference to the costs and estimated savings derived from their operation over an almost two year period. Secondly, both programmes were also evaluated in terms of some wider national benefits.

The surveys were the principal source of information for the review. They comprised questionnaires which were designed to determine users' experience and level of satisfaction with the Energy Conservation Loans Scheme and Energy Advisory Service, and to identify the decision-making processes underlying energy conservation investments and activities in the commercial and industrial sectors of the economy. The Control Group was surveyed to facilitate a comparison between the relevant behaviour and attitudes of firms and organisations who have used the incentive programmes and those who have not. And energy conservation equipment manufacturers and distributors were surveyed to determine the level of awareness of the ECLS by manufacturers and distributors, and to identify any perceived impediments associated with the promotion and implementation of the Scheme.

The recommendations from this review fell into three broad categories, which are summarised in the Table 4.2.

TABLE 4.2 Recommendations from the Evaluation of the ECLS and EAS

RECOMMENDATIONS FOR IMPROVEMENTS TO OVERALL STRATEGIES
Government energy conservation strategists should recognise that conservation is a concept as much as it is a product, and as such it should be approached from a marketing perspective in its promotion, educating consumers that it is in their interest to 'purchase' this particular product.
Government encouragement of energy conservation may be better implemented through the establishment of an organisation which could research, develop and promote energy conservation, particularly in energy technology and management. Such an organisation should have clearly defined role within the reformed government energy structure, and would have a salient public profile, and would accrue a core grouping of expertise with which to liaise with both private businesses and the Ministry of Energy to develop appropriate energy conservation strategies. This body would fulfill a unique but crucial role in its encouragement of energy conservation in the new corporate environment.
Relevant bodies involved with the programmes to review promotion strategies in comparison to the nature of their target markets and the resources with which they have to implement new promotion techniques and to meet any subsequent rise in programme use.
The survey revealed a substantial lack of knowledge about the two programmes by firms which manufacturer or supply energy conservation equipment. This is clearly a large untapped source of informal promotion for the programmes, and should be much better utilised through such information dissemination methods as mentioned above.

SPECIFIC RECOMMENDATIONS FOR PROMOTION

- Date of publication should be featured on all information and publicity material released in connection with the programmes. This will assist distributors and consumers of the relevance of information contained therein.
- An award system based on some form of voluntary target achievement programme might be a supplementary means of publicising the programmes and promoting energy conservation.
- Convenience was the primary reason cited by survey respondents in their use of the Loans Scheme, in preference to finding other sources of finance.
- Loans Scheme promotion should also emphasise the package finance aspect of the scheme.
- Published information about the EAS should include some clarification about its role, particularly the technical and time constraints on which it operates in respect of investigations.

RECOMMENDATIONS FOR ADMINISTRATION AND COORDINATION

It is important that the two programmes, which are designed to encourage energy conservation in the industrial and commerce sectors, maintain an ongoing dialogue with all groups and interests connected with these sectors. Such communication is essential in facilitating an awareness by programme administrators of the problems and opportunities for energy conservation in the private sector. It also assists in the continued promotion of the programmes throughout industry and commerce.

More comprehensive information on loan application enquiries and refusals should be maintained, as such information is not presently held by the Ministry of Energy. This information is of importance in monitoring aspects of the scheme's market penetration.

This review was intended to be carried out in two stages, the first of which is the study just reviewed. The second stage was to involve the detailed study of representative organisations in their implementation (or otherwise) of energy conservation measures inspired by the EAS and/or ECLS, quantifying the energy savings actually achieved by these organisations, evaluating the economic effects generated by these savings, and extrapolating these economic effects to the national context. The second stage was to be undertaken subsequent to the public and government review of the findings of the first stage. There is no evidence of this second stage being carried out by Synergy Applied Research or any other organisation. This could be a result of a number of things, including political unease about the findings of the first review, or the changing of circumstances to such an extent as to make the second stage of the review redundant. No guess will be made here as to the motivations behind the decision to terminate the study.

This review of the evaluation of the Energy Conservation Loans Scheme and the Energy Advisory Service, conducted by Synergy Applied Research Limited (1986) provides some useful recommendations that are likely to apply in the current situation. Some of the recommendations were, however, specific to the two programmes evaluated, and made particular reference to the Ministry of Energy which no longer exists. When considering an evaluation of energy efficiency information campaigns it

serves no purpose to ignore past evaluations, as they may provide insights into evaluation process and methodology, as well as providing evaluation results which may be compared with a more recent evaluation. It is to this end that such a large amount of space has been given to this evaluation, as it the only evaluation of its kind to be conducted in New Zealand.

4.2 Past Efforts At The Evaluation Of Energy Efficiency Information Campaigns: An International Perspective

During the past fifteen years, utilities and government agencies, in the United States of America and elsewhere, have undertaken extensive promotional programmes to communicate to consumers the need for conservation, and the role the individual can play in minimising energy waste (Frey 1984). The major implementer of these informational campaigns are the utilities responsible for providing energy services to their customers, with various government initiatives making up the remainder of the programmes. The implementation of measures at the local level, such as utilities, has long been recognised as the most effective way of promoting energy efficiency and conservation within the community (Hildebrandt and Joerges 1987, Monnier 1987, van der Linden and van Eijk 1987). More and more utilities are using information programmes to obtain low-cost energy and capacity resources, to save money for customers, to improve relations with customers, to reduce financial risk to shareholders, to improve environmental quality, and to enhance their economic competitiveness and that of their customers. However, failure to carefully evaluate these programmes may keep the investment in these campaigns from reaching their full potential.

Increasingly, more and more attention is being focused on evaluation of these programmes, with this increased attention to evaluation yielding valuable information on the costs, timing, market segments, load-shape effects, and other characteristics of utility demand-side management programmes. Careful evaluations can transform guesses, estimates, numbers, and data into useful information on the costs, performance, and operations of utility information programmes. The end result of such evaluations will be a balanced mix of supply and demand resources that satisfies customer energy-service-needs at reasonable cost, with attention to environmental factors, and in ways that are publicly acceptable (Hirst 1990). Since the early 1980s a significant amount of research and work has been done overseas on measuring the performance and effectiveness of these programmes, and identifying the keys to successful information programmes.

A search of the literature indicates that USA has been the most active country with regards to programme evaluation of energy conservation

information campaigns, with large amounts of resources being put into the promotion and evaluation of these campaigns. USA is not the only country however, with countries such as France, Germany and the United Kingdom being involved in such evaluations. It is the purpose of this discussion to review some efforts that other countries have put into the evaluation of the effectiveness of these information campaigns, with each countries efforts being reviewed independently. The evaluations chosen for review are similar in design to the programmes to be evaluated in this thesis. That is, programmes implemented at the local level, for the domestic sector, including some home audit programmes. The review will provide useful information in terms of evaluation methodology, as well as providing summaries and conclusions of evaluations of information programmes which may help in the interpretation of the results from this research, as well as providing useful comparisons in terms of evaluation findings for similar types of programmes in New Zealand.

4.2.1 FRANCE

Selection of programmes for this evaluation were that they should be organised at the local level, have individual consumers as their target, be participative in character and, finally, be considered exemplary in wider national context (Monnier 1987).

The three programmes that were evaluated differed in a number of aspects, including ambitiousness. The first was a programme delivering a series of promotional events targeted at a variety of specialist groups in Veynes. The second was an exhibition at an annual trade exhibition and fair at La Rochelle, with a number of free services being offered, including a simplified energy audit, technical advice on the solutions proposed, financial aid, and help with the administrative paperwork. The objectives of the third programme evaluated was to carry out energy audits in all public and private buildings and to follow this through by persuading all property owners in Conflans to make the necessary improvements.

The main points of the evaluation are outlined in Table 4.3.

TABLE 4.3 The Evaluation Approach of French Example

OBJECTIVES	METHODOLOGY	ANALYSIS	OBSERVATIONS
To consider the effectiveness of programmes organised at the local level. To assess whether this effectiveness was related to the level at which the programme was implemented.	Ten semi-structured interviews with local public administrators, tradespeople, leaders of local organisations, supplemented by documentary information.	Defined the main elements of the structure of the actors, and the modes of operation within the structure.	The effectiveness of the structure depends on the key person's commitment to the programme and relationships with the other key actors.

	A questionnaire was distributed to participants and non-participants comprising sections on general attitudes to energy conservation, detailed description of conservation actions taken in the home, attitudes to the programme, description of the dwelling and household.	A method of qualitative analysis of the quantitative data gathered was chosen. Interpretations were based on a process of analysing corresponding factors, which enabled multiple correlations to be drawn.	The households which carried out the greatest number of actions were those who said they had already envisaged doing a large proportion of the recommended improvements before the audit was carried out ('free riders'). The findings tended to show that the influence of the audit was certainly important, but limited.

A number of recommendations relating to the programmes organisation, and the programmes design were given. Concerning the programmes organisations there are some factors which may contribute to the smooth running of the programmes:

- there is need for a mediating system to help in the resolution of inevitable conflicts which arise between participating organisations
- if the programme is organised at the local level, these needs to be close links with central administrative bodies to provide the greatest degree of stability
- the more informal links that exist between those responsible for each organisation, the more the flexible the system will be

Concerning programme design, some practical lessons were learnt from the evaluations:

- locally organised programmes make it possible to reach a broader social spectrum than those organised nationally
- in order to reach the 'difficult' social groups, props which are familiar to them must be used and programme adapted to the special nature of these props
- the presentation should try to overcome the abstract nature of the idea of energy conservation by the use of material and visual aids such as infra-red pictures
- too much emphasis on an 'effect of persuasion; can lead to the programme being rejected be dominated social groups
- householders, and especially their wives, must be listened to in order to win them over, and they will only accept an expert report which confirms their preconceptions (Monnier 1987).

4.2.2 GERMANY

The evaluation study examined here compared the structures, dynamics and impacts of four community-level energy conservation advisory programmes 'competing' within the same municipality (Hildebrandt and Joerges 1987). Relevant information is summarised in Table 4.4.

Programme success for these evaluations was measured as a sequence of 'hierarchical effects', using data indicating progressive penetration of a programme from mere acquaintance on the part of the prospective users to satisfaction with services rendered.

TABLE 4.4 The Evaluation Approach of German Example

OBJECTIVES	METHODOLOGY	ANALYSIS	OBSERVATIONS
To link analyses of programme structure with analyses of programme use.	A sample group and comparison group were selected, matched on the criteria of ownership, housing type and family size.	The clienteles of the programmes were compared with regard to a series of contextual factors assumed to chape energy consumption behaviours and responses to conservation programmes, including personal context factors, and structural context factors.	Generally, conservation programmes of the type studied here cater to the requirements of upper-middle class households, particularly the highly educated, financially secure in the middle stages of the life-cycle.
To analyse the personal and structural factors generally facilitating or impeding energy conservation actions.	In-depth structured interviews were carried out with key personnel of the agencies implementing the four programmes, along with an analysis of available documentation.	Programme users and non-users were compared with regard to the factors mentioned above and a number of additional variables thought to be associated with programme uptake.	The overall level of penetration of local programme remains unsatisfactory.
		The four programme were compared on the basis of organisational evolution and structure, organisational attributes considered important to programme success, and overall programme effects at three levels of client penetration.	All services had an unsatisfactory record with respect to passive and socio-economically disadvantaged segments of the population who tend to be progressively lost to public programmes as one moves from awareness to action.

The six indicators chosen by the researchers (Hildebrandt and Joerges 1981) for a comparison of programme-specific impacts is shown in Figure 4.0.

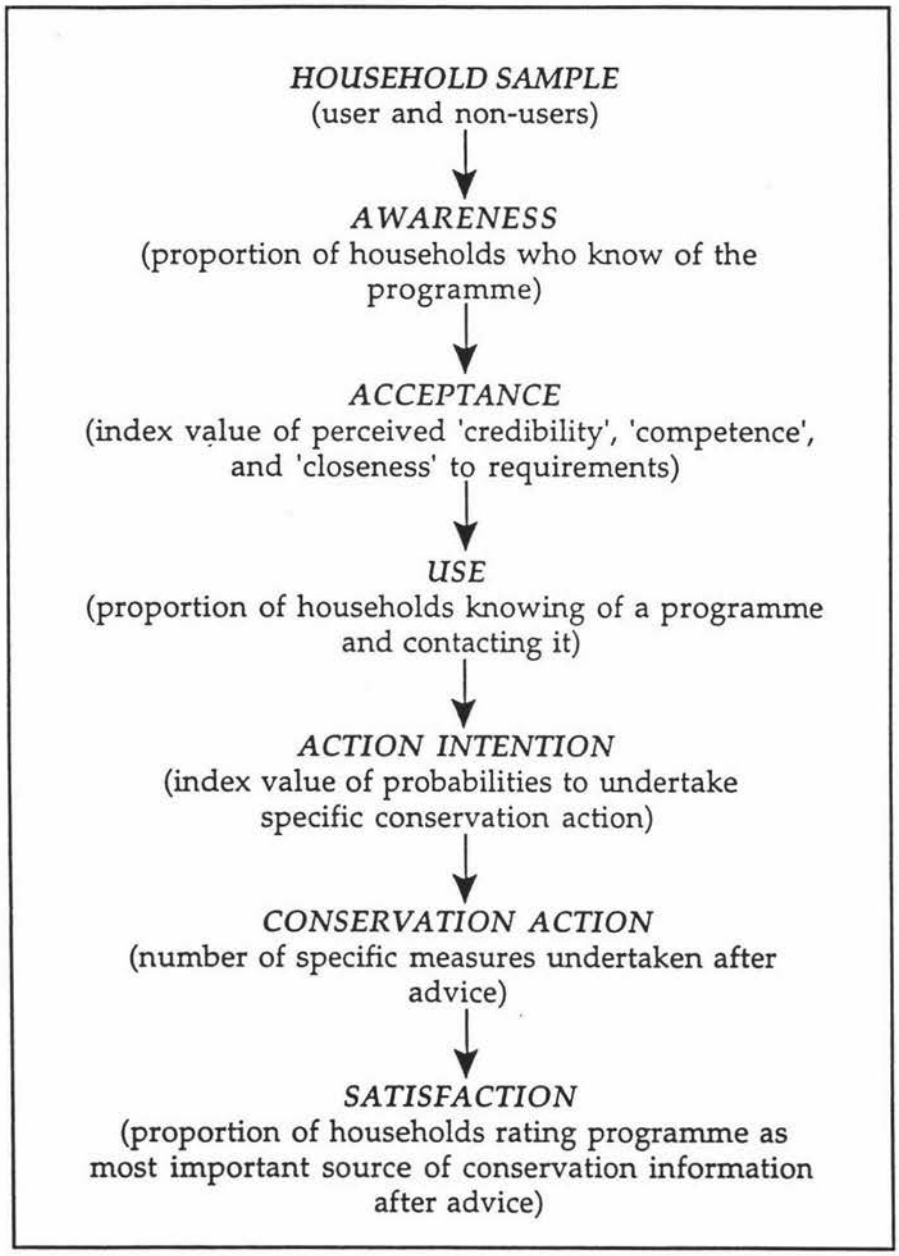

FIGURE 4.0 Sequence hierarchy of programme impacts
(Source: Hildebrandt and Joerges 1987 p122)

The relative success of each programme was therefore ranked against those indicators of programme awareness and acceptance (programme knowers, programme awareness, programme acceptance) and indicators of programme use (programme use, action intention, conservation actions, satisfaction).

Other indicators of programme success include likelihood of taking energy conservation measures, conservation actions taken before and after programme use, likelihood of taking small, medium and large conservation measures, and finally, the importance and helpfulness of advice received. For each programme this index of satisfaction was based on the proportion of households judging its advice most useful against a range of other advice sources.

4.2.3 NETHERLANDS

The programme chosen for this evaluation study was an insulation project. It was a local programme which was directed at tenants. The financial aspects of the programme were tailored to the needs of low income consumers and tried to overcome the economic barriers for tenants to adopt insulation measures (van der Linden and van Eijk 1987). Table 4.5 outlines the evaluation approach.

TABLE 4.5 The Evaluation Approach of Dutch Example

OBJECTIVES	METHODOLOGY	ANALYSIS	OBSERVATIONS
To assess the effectiveness of the insulation project by examining the decision-making process of the householder, as wall as the personal, household and structural contexts.	Interviews with persons involved in the implementation of the programme, and with participating organisations, along with an analysis of the programme documentation. Survey of residents to explore the decision-making process of tenants. Natural gas consumption figures of households were gathered to examine the change in energy consumption after the adoption of insulation measures.	A decision-making process was selected with steps including problem recognition, awareness, perceptions and attitudes, and adoption-decision. This decision-making process was considered with reference to the variables which the researchers believed may affect it, such as the insulation programme, and combined to form a model of the adoption process.	The relatively poor penetration of programmes at the national level can be substantially increased by programmes operating at the local level. The adoption process is a decision of the household as a whole. Social contacts in the community played an important role in creating programme awareness.

The most important considerations concerning adoption and non-adoption appeared to be the expected savings on the energy bill, the improved comfort/better housing quality, and the additional rent sum charged (van der Linden and van Eijk, 1987).

An important finding in terms of organisational structure was that the process of programme development needs appropriate organisational structures, and this requires high levels of organisational competence and

substantial involvement and perseverance on the part of the initiators (van der Linden and van Eijk, 1987).

4.2.4 SWEDEN

The most important energy conservation programmes for buildings in Sweden are nationwide, established by the national government and implemented at the local level by municipalities. This study focused on the municipal implementation and on the effects on the property owners and tenants of the loans and grants system and the advisory programme. Table 4.6 outlines the evaluation approach.

TABLE 4.6 The Evaluation Approach of Swedish Example

OBJECTIVES	METHODOLOGY	ANALYSIS	OBSERVATIONS
To assess the real penetration of the government programmes, and to get a picture of the extent to which actions have been taken completely independently of these programmes.	Assessed the differences between participants and non-participants through a random survey of house owners. The survey included details of household characteristics, conservation measures taken and reasons for taking them, and savings achieved.	One of the approaches to assess the programme impacts was to compare programme penetrations with the actual frequency of conservation actions.	Information on energy conservation is effective only if these are economic incentives for the receiver to take action. Those taking advantage of loans/grants are better off than those who do not.

One of the more important recommendations in terms of the organisation of the programme is that the advisers' modus operandi may need to be changed to a more active, 'field oriented' approach including 'follow-ups' and evaluation. More use of existing connections such as associations of property managers and home-owners might be more effective. Reaching those who today are passive should be a central objective (Klingberg 1987).

4.2.5 UNITED KINGDOM

Systematic assessment of the achievements of energy conservation programmes in terms of their contributions on the one hand, to national energy conservation policy, and on the other, to improvements in the local economy is seen to be of importance to researchers in the United Kingdom (Gaskell 1987, Sheldrick and Macgill 1988).

Projects undertaken by Neighbourhood Energy Action (NEA), an organisation financially supported by the Department of Energy, set up to provide support, advice, information and training for existing projects and to stimulate the creation of new schemes, were the projects chosen for this evaluation (Gaskell 1987). As with previous sections one of these studies will be highlighted in this discussion. Table 4.7 outlines the evaluation approach.

TABLE 4.7 The Evaluation Approach of United Kingdom Example

OBJECTIVES	METHDOLOGY	ANALYSIS	OBSERVATIONS
To make a detailed evaluation of both the projects themselves and the impact they have has on their clients.	The evaluations involved three stages: a postal survey of all projects known to NEA, an indepth study of five selected projects, and a comparison sample of non-clients of these five projects.	The following criteria were chosen to assess the postal responses: penetration into the community, knowledge of its services and reasons for participation, and services carried out for clients. The following criteria were chosen to assess the organisation of the projects: awareness of the project in the wider community, the quality of the work, the project's credibility with clients. The comparison analysis involved investigating clients' awareness, knowledge and participation in projects.	Social networks are important elements in the innovations process. The findings confirmed the greater effectiveness of local as against central policy instruments. In terms of energy related innovations, slow take up may be due more to programme characteristics than to the characteristics of consumers themselves. More effort should be given to targeting less socially integrated households.

This research also suggested that the minimum requirements for the voluntary sector energy programme to develop and make a substantial contribution to national energy efficiency policy are (Gaskell 1987):

- Retaining a strong commitment to energy efficiency work rather treating it as a convenient vehicle for job creation
- Providing comprehensive insulation and energy advice services to clients
- Encouraging local authorities, social security departments and the fuel boards to take an active role in support of local schemes
- Strengthening the management of projects, by both training courses and the availability of fund
- Providing longer term and more adequate funding to the schemes so that they are viable in terms of operating costs independent of other sources
- Expanding the role of the central co-ordinating body to include regional offices and more resources to promote training and monitoring schemes

4.2.6 UNITED STATES OF AMERICA

The evaluation under review here describes an evaluation of a household energy conservation programme that was designed around a set of neighbourhood-based activities in Seattle and tested in a field experiment (Olsen and Cluett 1982). The evaluation approach is summarised in Table 4.8.

TABLE 4.8 The Evaluation Approach of the United States Example

OBJECTIVES	METHDOLOGY	ANALYSIS	OBSERVATIONS
The evaluation sought to discover if exposure to programme activities altered people's attitudes toward the energy situation, prompted them to take conservation actions, and led to a reduction in energy consumption.	Data was gathered from participating households at three points in time: baseline survey, intermediate interview and questionnaire, and final interview and energy consumption data.	Attitudes toward the energy problem and energy conservation, and other relevant information were compared at the three points in the data collection. Also energy consumption data was examined to see whether there was any noticeable change in energy consumption after involvement in the programme.	There was little diffusion of interest in energy conservation through informal discussion. Energy consumption was reduced. Programme exposure did not cause people to become more concerned about the energy problem.

Another interesting observation were the two factors most frequently mentioned as reasons for taking energy conservation actions were (1) desire to contribute to solving the energy problem, and (2) concern over rising energy prices.

In sum, the Seattle City Light Neighbourhood Energy Conservation Programme, demonstrated that a voluntary approach to energy conservation can be moderately effective if goes beyond mere exhortation by providing consumers with suggestions for specific actions they can take to reduce their household energy consumption, and if it reaches consumers through personal contacts such as block workshops and home energy checks (Olsen and Cluett 1982).

The international evaluations profiled here, along with a number of other evaluations reviewed, provide recommendations which may be useful when developing recommendations for the case studies in this thesis. Therefore, fuller consideration will be given to these recommendations when each case study is being discussed.

4.3 THE IMPLICATIONS OF PAST EVALUATIONS FOR FUTURE EVALUATIONS OF ENERGY EFFICIENCY INFORMATION CAMPAIGNS

The state of the art of energy programme evaluation has experienced rapid changes over the course of the past few years, especially in North America, where large monetary incentives sometimes have been available to utilities that could provide rigorous evidence that the costs of demand management programmes have been outweighed by the value of the energy that has not had to be generated by the utility (ANZMEC 1994). From these types of evaluations a number of characteristics of successful programmes has begun to emerge - such as, providing individualised information to consumers, providing feedback to participants once they have taken actions, and providing some type of recognition for consumers who have succeeded in reducing their energy usage. While certain methodologies have proven successful in the evaluation of specific programmes, these methods are still being refined and their cost effectiveness ascertained. It is against this backdrop that the implications for conducting information programme evaluation research must be viewed.

The large amount of research that has been done by evaluators in the international and national context has led to a number of useful and implementable recommendations with respect to future evaluation. These recommendations are particularly useful for this research, and include suggestions on the evaluation process, the evaluation approach, and the critical issues in evaluating information programmes.

4.3.1 THE EVALUATION PROCESS

In line with the discussion on the importance of the evaluation process in Chapter Two, evaluators in the energy conservation sphere have also done work on developing a process specifically for the evaluation of Demand-Side Management (DSM) programmes. One such process comes from Hirst (1990), who believes that the activities associated with an evaluation are straightforward. First, the purposes of the programme and the objectives of the evaluation need to be clearly identified. If, for example, the programme is just getting started, the evaluation will probably focus on programme process. An impact evaluation at this point would be premature. If, on the other hand, the programme is about to be implemented systemwide and is expected to contribute substantial energy or capacity resources, then an impact evaluation is appropriate.

Implementation of an evaluation includes selection of samples of customers, utility employees, and vendors to interview about the programme, and development and testing of the questions to ask them. Other data sources, such as utility billing records, local weather data, and programme records are identified and collected at this stage. The objectives of the programme and its evaluation will suggest what types of data are

most important. These data then need to be merged, checked for errors, and analysed relative to the purposes of the evaluation.

Finally, evaluation results are prepared. This involves a review of the results with programme staff and management, then results are presented to the utility as a whole. People from the various departments meet to discuss evaluation findings and recommendations, and when these recommendations have been accepted by the group they are collected in an action plan, which specifies what changes will be made to the programme and what group is responsible for each change.

This sequence of activities can be illustrated as follows (source: Hirst 1990, p4) (Table 4.9):

TABLE 4.9 The General Evaluation Approach

PLAN EVALUATION
- Identify programme goal
- Determine purposes of evaluation, questions to address
- Identify evaluation resources (budget, staff, time, and data needs)

IMPLEMENT EVALUATION
- Define populations to sample
- Collect data (programme records, customer surveys, interviews with programme staff)
- Analyse data

PRESENT EVALUATION RESULTS
- Review results with programme staff
- Report results to utility executives
- Prepare final report and briefings
- Act on evaluation findings

This evaluation process has components in common with the evaluation process's reviewed in Chapter Three, and aspects of each are useful in developing an evaluation process for this research. This evaluation process will be discussed in Chapter Five.

4.3.2 THE EVALUATION APPROACH

All the evaluations that have been reviewed use the same basic approach to the evaluation of the energy conservation information campaigns. The evaluation consists of two types - the Process Evaluation and the Impact Evaluation. As already been discussed, process evaluations examine programme operations to identify how well the programme is implemented and to suggest ways to improve programme delivery, and impact evaluations examine the effects of the programme, by providing

information on such things as programme participation, take-up of information, programme penetration, and energy savings attributable to the information programme.

The process evaluation typically involves in-depth interviews with, and/or survey's of, key personnel from the programme, people from other organisations with an interest in the programme, manufacturers of energy conservation equipment, and a study of all the programme documentation.

The impact evaluation can involve a number of different aspects including a general population survey, interviews/surveys with people who have been involved with in the programme, interviews/surveys with people who have not been involved in the programme, and an analysis of energy consumption data for consumers involved in the programme. A summary of these different aspects is provided in Table 4.10

Each impact evaluation will require a different data collection approach. For example, analysis of a certain programme may require surveying programme participants and non-participants a different stages of implementation of the programme, along with an analysis of energy savings over the same period of time. In the case of another evaluation, it may not be possible to gather baseline information as the programme was implemented before an evaluation strategy was developed. This may make it difficult to assess energy savings based on energy consumption data, so self-reported data from programme participants and non-participants may have to be used to determine energy savings.

The design of these evaluations may or may not be truly experimental. Often, because the participants self-select themselves into the programme, then a truly random sample cannot be achieved. When this is the case evaluators try to select a control group which is very similar in demographics and energy consumption to the sample group. This is often called quasi-experimentation, and is an acceptable substitute for the true experimental approach.

TABLE 4.10 Different Data Collection Approaches for an Impact Evaluation

1. A general population survey. This information can be used to determine such things as programme penetration, programme awareness, programme participation
2. Interviews/surveys of people who have been involved in the programme, with the sample of people often coming from the general population survey. This information is useful in determining such things as motivation for becoming involved in the programme, the conservation actions taken since being involved with the programme, satisfaction with the service, and is useful in building up a picture of the type of people becoming involved in the programme so future programme planning can target those not currently being exposed/involved.
3. Interviews/surveys of people who have not been involved in the programme, with the sample of people often coming from the general population survey. This information is useful in determining such things as why they chose not to become involved in the programme, obstacles to programme participation, problems with the type of information being used, and is useful in building up a picture of the type of people who chose not to become involved in the programme, so future planning can target these people more effectively.
4. An analysis of the energy consumption data for the consumers involved in the programme to see whether the energy conservation programme has had any effect on the energy consuming behaviour of the programme participants.

Given the nature of the impact evaluations and the information programmes themselves, there are a number of considerations, derived from the literature, which must be taken into account when estimating the impacts of the energy information programmes.

4.3.3 CONSIDERATIONS IN EVALUATING INFORMATION PROGRAMMES

One of the most difficult aspects of energy information programmes is the problem of establishing attribution - were the observed changes really caused by the information programme? Consumers may receive information from other sources promoting the same action/behaviour that the programme being evaluated is attempting to influence. The problem is intensified when the impact one is trying to attribute to the programme is a change in attitude (ANZMEC 1994a). In this case the importance of a viable baseline or control group is obvious. However, this is virtually impossible for many general information campaigns, where (1) all consumers are targeted for the programme information, (2) it is unclear which consumers received the message, (3) there are many exogenous variables that could have caused the targeted action of change in behaviour, and (4) there may be no control market available or the cost of collecting data from one is prohibitive (ANZMEC 1994a). These problems are lessened when the

programme is more targeted and more specific. This issue is a problem for the case studies chosen for this research also. However, it is hoped to minimise the problem of establishing attribution by selecting a control group from within the same consumer base as that of programme participants. With an evaluation such as that undertaken in this research, where the evaluation takes place after implementation of the programme, it is difficult to gather accurate baseline information. It is necessary, therefore, to rely on information provided by the respondents. This reinforces the need to integrate evaluation in the early stages of programme development and implementation.

Behavioural measures and attitudinal measures present special problems for evaluation. It is possible to measure changes in attitude over time against promotional activity and, in some cases, in the behaviour which the publicity is seeking to influence. It is equally important to distinguish between research returns which identify intentions to act in a particular way and actual behaviour (OECD/IEA 1978). There may a presumption that those who say they intend to insulate are more likely to do so, but the fact that they do so is not established. It has been noted often that if programme participants are responsible for self-reporting energy conservation behaviour for the purpose of evaluating the information programme, it will generally be biased and lead to inflated levels of savings (Collins et al 1984). Consumer attitudes, especially with regard to topics as innocuous as energy efficiency, should be measured through batteries of questions designed to test the magnitude of the attitude as well as the implications for action it has for the individual consumer (ANZMEC 1984a). There is some evidence that behavioural adjustments to conserve in response to information, price, and other action is not permanent, but decline over time. Thus evaluations need to account for the duration of effects, which may endure or disappear due to other intervening factors extraneous to the information programme. Regular follow-ups help to assess this duration of effects, and to assess whether attitudes have been adapted into behaviour (Collins et al 1984). As was mentioned above, it was necessary for this research to rely on self-reported data from respondents. In future evaluations it would be more appropriate to gather baseline information, and to track more effectively any changes in energy efficiency behaviour of participants over a 12 month period, to correspond with the collection of energy consumption data.

Linkage of the programme baseline to programme goals is critical. That is, is the programme baseline against which the programme impact is to be measured a level of energy usage? consumer attitudes? consumer energy-use behaviours? Ideally, the information programme will have been based on a baseline study of some sort, which established standard practice with regard to the targeted programme effect. If not, the evaluation will need to estimate a baseline. If the programme impact is one of energy savings, it may be possible to estimate the baseline using pre-programme billing data. If the impact has to do with behaviours or attitudes, the baseline cannot

really be reconstructed and participant self-reports of prior behaviours and attitudes will have to suffice, unless a similar study population not exposed to the programme can be found and used as a surrogate pre-programme state of affairs. Without a reliable baseline, first-year impacts will have to be considered tentative. For programmes with known participants, such as energy audit programmes, late participants can sometimes serve as the control for early participants (ANZMEC 1994a). This did not apply to this research as the programmes had been operating for less than a year at the time of evaluation, however it would be useful to consider the use of late participants as control groups in future evaluations which do not have baseline information.

Given that a lot of participants in energy conservation information programmes are self-selecting there is the problem of self-selection bias. Reviews of past evaluations has suggested that this may not be as significant as suggested. One would expect that non-random sampling would encourage self-selection - that is, volunteers to participate in the study may be more inclined to save energy than the general population due to same factors that caused them to volunteer. This could result in sample populations with a greater commitment to conserve than for the population in general and lead to overly optimistic results. The researcher's who noted this, Collins et al (1984), suggest that more work needs to be done on the extent to which bias is introduced by non-random sampling in evaluation of information programmes and the effect of biases on savings calculations. It was beyond this research to consider the problem of self-selection bias with the case studies assessed.

Collins et al (1984) did an extensive study evaluating past efforts at the evaluation of energy efficiency information campaigns, and from this study developed some practical lessons for conducting future evaluations (Table 4.11).

TABLE 4.11 Some Practical Lessons for Future Evaluations

- Self-reported behaviour will likely always lead to an overestimated of actual savings. If possible, self-reports should not be used until a better grasp of the relationship between reports and actual consumption is established. Ideally, evaluation should measure actual use and reported actions to begin to establish their correlation.
- Evaluations should attempt to do follow-ups of the effects of information over time. Such information is essential in measuring long-term savings.
- It does not appear that evaluations need complex quasi-experimental research designs. It appears that the use of a single control group is sufficient and necessary to capture programme effects. Without a control, savings are likely to be over-estimated.
- Evaluations do not necessarily require random sampling of populations unless their sole purpose is to generalise findings. In fact, in many cases, non-random samples may be more desirable if the purpose of the research is to study specific types of energy users. The lack of randomly selected participants does not seem to affect levels of savings measured. This could be attributed to self-selection and non-response biases operating in both random and non-random sampling procedures.

These recommendations and others mentioned in this chapter provide useful guidance in developing a working evaluation methodology to assess the effectiveness of the two case studies chosen for this research.

CHAPTER FIVE

THE EVALUATION APPROACH

5.0 THE EVALUATION PROCESS

The initial stages of the evaluation involved designing an evaluation process. The process used in this evaluation of the effectiveness of energy efficiency information campaigns in New Zealand was derived from a combination of the approaches taken by the Treasury Board of Canada (1981) and Hirst (1990), with other components being taken from the other evaluation processes described in Chapter Three. The evaluation process is illustrated in a flow diagram (Figure 5.0).

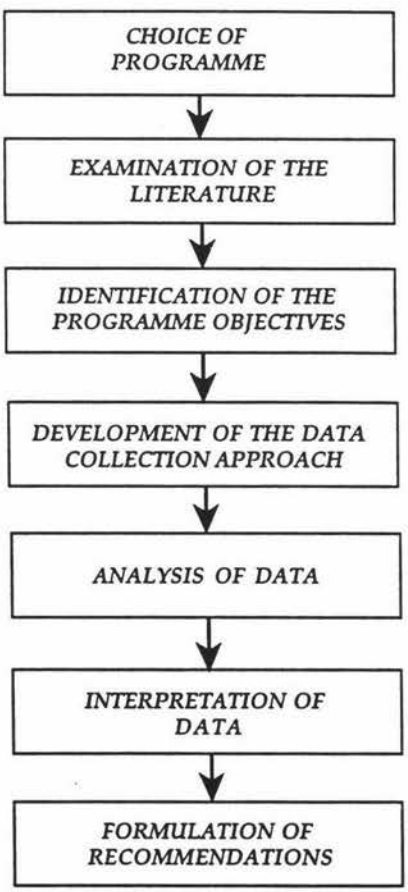

FIGURE 5.0 The Evaluation Process of this Research

The evaluation process is made up of seven different steps, each leading on from the previous, and within each step are a number of components (Table 5.0).

TABLE 5.0 The Components of the Evaluation Approach

1. CHOICE OF PROGRAMME(S) The first stage of the evaluation involved selecting the programme(s) to be evaluated. Once the programmes had been decided upon it was then necessary to contact the organisation responsible for the programme to get approval to carry out the evaluation.
2. EXAMINATION OF THE LITERATURE Before carrying out an evaluation it was necessary to consider whether an evaluation of the programme has been undertaken previously, and to consider past evaluations of similar programmes. Consideration of past evaluations involved searches of both national and international literature, with a review of these evaluations presented in Chapter Four.
3. IDENTIFICATION OF PROGRAMME OBJECTIVES The objectives of the programme were determined by consultation with personnel involved in the programmes. They provided a list of objectives of the programmes, as well as an indication of what information would be useful for them from an evaluation, and also identified some criteria that could be used to determine the effectiveness of the programme in meeting its objectives.
4. DEVELOPMENT OF THE DATA COLLECTION APPROACH Given the objectives of the programmes, and methodological approach of previous evaluations of similar programmes, it was then possible to develop a data collection approach capable of gathering the information needed to determine the effectiveness of the programmes. This data collection approach involved both a Impact Evaluation and a Process Evaluation.
5. ANALYSIS OF DATA When designing the data collection approach it was necessary to consider the data that would be generated and how that data would be analysed. The data that was collected by the surveys was coded, entered into the computer using MG-Editor, and then statistically analysed using the f-test and t-test in the Minitab programme. The the information from the interviews was transcribed, and analysed using the emergent theme process.
6. INTERPRETATION OF DATA Interpretation of the data involved incorporating the results from both the surveys and interviews, and the process evaluation and impact evaluation. Combining these different data collection approaches, and two evaluation approaches led to the formation of some useful recommendation on how the programmes could be improved, and also demonstrated to programme personnel the areas where the programme was working well.

7. FORMULATION OF RECOMMENDATIONS
The recommendations related not only to the programmes themselves, but also to the conduct of future evaluations of energy efficiency information campaigns. These recommendations came from the evaluations of both the EEAP and HERO programmes and from the literature on evaluations of similar programmes, both nationally and internationally.

The following discussion focuses on each step separately and provides a detailed analysis of what each step involves.

5.1 THE CHOICE OF PROGRAMMES

The domestic sector is currently responsible for 13% of energy use in New Zealand (EECA 1994b), and it is seen as the most difficult of all the sectors in the economy to target with energy efficiency information. In light of the new deregulated electricity market, many local power companies are developing information packages for their domestic customers. The purpose of these local power company information campaigns are varied, including wanting to increase their public profile and to show their commitment to improving customer service, as well as improving consumer knowledge of energy efficiency and options for increasing the energy efficiency around the home. Some are also marketing energy efficiency as a means for consumers to improve their lifestyle and comfort levels whilst maintaining or reducing expenditure on energy.

One of the types of information campaigns that has been implemented by a number of local power companies is the residential home energy audits. These campaigns are aimed at dealing with a number of obstacles, including the lack of technical and economic information available for the consumer, and the lack of awareness of energy efficiency and what can be done to improve the use of energy.

The energy audits generally involve an assessment of the energy use in the home by a trained assessor, and preparation of a report outlining areas where improvements can be made in energy usage in the home. The customer is given a number of recommendations for improving energy efficiency within the home.

A number of local power companies are currently offering such home audits for their customers, and these information campaigns were chosen to be evaluated for this research. The two home energy audits programme that were used as the case studies for this research are the Home Energy Ratings Options (HERO) Programme being operated by CentralPower, and the Energy Efficiency Assessment Plan (EEAP) Programme that is being run by Southpower. A discussion of these two programmes is provided in Chapters Six and Seven, respectively.

The development of the evaluation methodology for these two programmes involved extensive review of the literature on programme evaluation, and, more specifically, past evaluations of energy efficiency information programmes in New Zealand and overseas. A study of literature on the evaluation of home energy audit indicated that no such evaluations have been conducted in the past in New Zealand. However, the review of the international literature examined a number of evaluations of similar programmes. The review's of this literature are presented in Chapters Three and Four so there will be no further discussion at this point.

5.2 IDENTIFICATION OF PROGRAMME OBJECTIVES

Identification of the programmes objectives allowed the development of criteria for assessing the effectiveness of the programme. Ultimately, a programme has been successful if it has met with its objectives.

For this evaluation the programme objectives for both EEAP and HERO were determined by surveying programme staff at Southpower and CentralPower respectively. After a decision had been made to evaluate these two programmes, staff at Southpower and CentralPower were contacted regarding their willingness to have their programme's evaluated. Following consent on behalf of the power companies, survey's were sent to the contact within the organisation and distributed by that person to all staff who were involved with the programmes. Table 5.1 provides a list of those within each organisation who completed the survey's. The adviser's within Southpower are those who are responsible for conducting the energy audit of the participant's home, and within CentralPower it is the assesser who carries out the similar task. Due to the relative short time that HERO has been in operation within CentralPower, the number's involved in the programme were small. Since the conduct of these organisational survey's a manager has been appointed within CentralPower, responsible for the HERO programme and others operated by CentralPower.

TABLE 5.1 Organisational Survey Respondents

SOUTHPOWER	CENTRALPOWER
• Programme designer and advisor • Advisor • Design and engineering manager • Programme developer and promoter • Programme developer and marketer • Advisor	• Assessor • Assessor • Commercial manager

The objectives of each programme identified in these organisational surveys are discussed in Chapters Six and Seven.

5.3 DATA COLLECTION APPROACH

The data collection approach was based on the aspects discussed in Section 4.3.2, with the two components of the evaluation, process and impact, also being taken from this review.

5.3.1 THE PROCESS EVALUATION

The first aspect of an evaluation is a process evaluation. As discussed previously, the process evaluation examines programme operations to identify how well the programme is implemented and to suggest ways to improve programme delivery.

Discussions with programme personnel at both Southpower and CentralPower after the decision was made to conduct a process evaluation indicated that this evaluation would be very limited. This is mainly due to the fact that at the time of the evaluation, both of the programmes had not been operating for long, therefore it was not appropriate to interview people from other organisations with an interest in the programme, or to interview manufacturers of energy efficiency equipment. The programmes had not been operational for enough time to determine the flow-on effect of the programmes in increasing sales of energy efficiency equipment, or to assess the impact of the programme on associated tradespeople and organisations. It was impossible also, to study programme documentation as this was not extensive nor well organised at the time.

The process evaluation for the HERO programme was not seen as appropriate at this stage in the development and operation of the programme. The Home Energy Rating Options (HERO) programme was developed by the Electricity Corporation of New Zealand (ECNZ) and franchised to local power companies. The view of CentralPower is that the HERO is a skeletal programme on which they intend to add and expand in the future. They don't believe that the HERO programme as a stand-alone programme would that effective, and that it is necessary to develop other aspects of the programme, such the financial aspect and trade-allies, and combine it with other information campaigns in order for the programme to be more complete, and therefore more effective. The impact evaluation of the HERO will be used to determine whether or not the HERO programme has been effective in terms of the impact, but unfortunately it will not be possible to combine these results with those from the process evaluation to provide some overall suggestions for improving the effectiveness of the programme. The exclusion of a process evaluation from the evaluation of the effectiveness of the HERO programme means that a comprehensive evaluation is not possible, but it is hoped that the impact

evaluation will still provide some useful guidance to CentralPower on how to improve the HERO programme as it stands at the time of the evaluation.

With respect to the evaluation of the Energy Efficiency Assessment Plan (EEAP) operated by Southpower, a process evaluation is possible, however it will be on a smaller scale than was discussed in Section 4.3.2. The EEAP has been in operation for a longer period of time than HERO, with more established implementation procedures. The process evaluation for this case study will involve interviews with programme personnel only, in particular those involved directly with the development and operation of the programme. As was mentioned previously, given that the programme has not been in operation for long it is not appropriate to interview people from other organisations with an interest in the programme, or to interview manufacturers of energy efficient equipment. At this stage it would not be possible to determine flow-on effects as a result of the programme, such as an increase in the purchase of specific energy efficient technology. This effects are also difficult to determine given that no base-line studies were conducted prior to the implementation of the programme. It is recognised that Southpower have and are continuing to develop a base of tradespeople and build connections with community organisations, but it is not possible within the evaluation to consider such connections are their effects fully.

The information from the process evaluation of the Energy Efficiency Assessment Plan (EEAP) is documented within this research as it was given in the interview. It is not necessary to conduct a complex data analysis of this information as it is used mainly to describe the development, operation, and promotion of the programme, with recommendations being developed from this information.

5.3.2 THE IMPACT EVALUATION

The effort put into the impact evaluation was the most significant in the evaluations in this research. A number of aspects were taken from Section 4.3.2, and these are outlined below:

1. Surveys of people who had been involved in the programme.
2. Surveys of people who had not been involved in the programme, with the sample coming from the general population.
3. Interviews with programme participants.

The sample population for the programme participants came from a list of people who had had an audit prepared for their home, with everyone being sent a mail survey. The sample population for those who had not been involved in the programme came from the consumer base of the power company, with 10 streets being selected randomly, and 10 surveys being distributed to each street (100 distributed in total). The sample population for the interviews with programme participants came from a random

selection of respondents who indicated a willingness to be interviewed, with five people being interviewed from each programme.

The survey's were similar for both participants and non-participants, with some sections of the survey being identical to both sample groups. These are discussed below in Table 5.2, with reference to the purpose of the questions. Examples of the surveys, for both participants and non-participants, are included in Appendices 1.0 and 2.0, respectively.

TABLE 5.2 General Components of the Surveys for both Participants and Non-participants

Demographic Details Information collected here included details of age, gender, and marital status of respondents, along with occupation and highest level of education of respondent. A question was also included on the number of occupants in the home, including ages of children. The purpose of this section was to build up a profile of both participants and non-participants, and to try and assess whether the lifecycle stage, income and education of the respondents could explain participation or non-participation in the programme.
Structural Information Information collected in this section included whether the respondents owned or rented their home, the age of home and how long they had been living in the home, and details of the insulation of the home. The purpose of this section was to see how information relating to the home itself could explain programme participation or non-participation.
Environmental Values and Attitudes In this section respondents were presented with a number of statements relating to the environment and had indicate how they felt about these issues on a scale from strongly disagree to strongly agree. The purpose of this section was to determine how environmental values and attitudes affected the decision to participate or not participate in the programme.
Energy Values and Attitudes This section was similar to the previous in that it presented the respondents with a number of statements relating to energy issues, and they had to indicate how they felt about these issues on a scale from strongly disagree to strongly agree. The purpose of this section was to determine how environmental values and attitudes affected the decision to participate or not participate in the programme.
Energy Behaviour The respondents were presented with a number of energy efficiency actions, such as turning off lights, and had to indicate how often they would perform these actions in their home. Responses were on a scale from never to frequently. This information was useful in assessing the energy efficiency behaviour of respondents.

These general sections were used also not only to help explain programme participation or non-participation, but were also used as predictors to help

explain outcome variables. This will be discussed in more detail in Section 5.4.

In addition to this general information, the survey's included sections on the energy efficiency behaviour of respondents. These sections varied for programme participants and non-participants, so each will be discussed separately in Tables 5.3 and 5.4 respectively.

TABLE 5.3 Survey Questions for Participants Only

The Information Programmes Respondents were asked how they first found out about the programme, and why they got an audit prepared for their home. This information was useful in determining the most effective forms of advertising and promotion, and was used to determine the motivations of programme participants.
Energy Behaviour Respondents had to list what energy efficiency actions they took in the twelve months before the audit, what energy efficiency actions they intend to take as a result of the audit over the next twelve, and what energy efficiency actions they would have taken in the next twelve months without the audit. This information helped determine which energy efficiency actions have induced by the programme, and consequently resulted in an estimation of marginal actions.

TABLE 5.4 Questions for Non-participants Only

Information Programmes Respondents were presented with a number of questions on awareness of energy efficiency information programmes being run by their local power company, and then more specifically, on awareness the programme being evaluated. If they had heard of the programme, then were then asked how they first found out about it, whether they had tried to get more information about it, and whether they were considering getting an audit prepared for their home. In addition to this they asked how much they would expect to pay for the service. This information was used to determine programme penetration, and was useful in determining the most effective promotion and advertising strategies.
Energy Behaviour Respondents were questioned on their energy efficiency actions in the last twelve months, and the energy efficiency actions they were anticipating carrying out in the next twelve months. This information was useful as a predictor for programme participation.

The response rate for the surveys, both participants and non-participants, was determined by considering the number of survey's sent out compared with the number of survey's returned.

The second part of the data collection for the impact evaluation involves the interviewing of programme participants. These were randomly chosen from those who returned the surveys, with five people being interviewed for each programme. The interviews were nonschedule standardized

interviews, or unstructured schedule interviews, as defined by Denzin (1989). The "nonschedule standardized interviewer works with a list of information required from each respondent" (Denzin 1989, p105). With these interviews certain types of information are desired from all respondents but the particular phrasing of questions and their order are redefined to fit the characteristics of each respondent. A number of issues were discussed, including their definition of energy efficiency, the motivations for becoming involved in the programme, which of the recommendations they intended to uptake first and why they chose these recommendations, along with a general discussion on how satisfied they were with the programme and any suggestions they had for improving the programme.

As was discussed in Section 3.2.1 the task of this type of qualitative research is to come to an understanding of the participants and their understandings with relation to the evaluation. Qualitative research is concerned with individuals' own accounts of their attitudes, motivation and behaviour. The information obtained from the interviews was used in conjunction with the data from the surveys to analyse the results, as is discussed in the next section. The information obtained from the interviews was useful in terms of the process evaluation, as well as the impact evaluation, in the case of the Energy Efficiency Assessment Plan (EEAP).

5.4 ANALYSIS OF THE DATA

Data analysis is an invariable aspect of all types of research. "Data analysis is the effort of researchers to manage and make sense of their data, to transform it from its acquired form - at which point it is perhaps more accurately called "information" - into a form that communicates the promise of a study's findings " (Glesne and Peshkin 1992, p145). In the research all aspects of the data analysis, both survey and interview information, was used in determining the effectiveness of the programmes evaluated.

There were four of aspects in the analysis of the data, including description of the data, the analysis of programme outcome variables, the analysis of the interviews, and other effectiveness criteria. Prior to the analysis the surveys were coded and the information entered into the computer using MG-Editor, and the interviews were transcribed. The following discussion involves the consideration of the four different aspects of the data analysis.

5.4.1 THE DESCRIPTION OF THE DATA

The data which had been loaded in the computer using MG-Editor was analysed using the SAS programme for distribution and frequency of responses. This aspect of the data analysis involved describing the data for programme participants and non-participants. After the data had been

described and patterns determined for participants and non-participants individually, they were compared, noting any apparently significant differences between the two groups. The aim of describing the data is to build a profile of programme participants, which may be used to explain programme participation. This descriptive data was then used in conjunction with data from the statistical analyses, described in the next section (Section 5.4.2), with the significance of these findings used to support the description of the difference between programme participants and non-participants.

5.4.2 THE ANALYSIS OF PROGRAMME OUTCOME VARIABLES

The analysis of programme outcome variables involved using the f-test and the t-test within the Minitab programme to test the significance of the outcome variables compared with the predictor variables. A significant observation was taken to be where p was less or equal to 0.05 ie $p<=0.05$.

Initially, this analysis involved the selection of programme outcome variables and predictor variables, with the consequent determination of the significance of predictor versus outcome variables using either the t-test or the f-test. The outcome variables are discussed in Table 5.5.

TABLE 5.5 The Outcome Variables

1. **The Intention to Act.** That is, how much the respondents intended to spend on energy efficiency actions in the next twelve months.
2. **Marginal Actions.** That is, how much participants intend to spend on energy efficiency actions in the next twelve as a result of programme participation compared to what they intended to spend on energy efficiency actions in the next twelve months anyway.
3. **Programme Penetration.** That is, whether consumers were aware of the programme.

The intention to act was taken from a description of energy efficiency actions that respondents intended to carry out in their home in the next twelve months. A monetary value was then given to each of these actions, based on the average current market value of each action. These individual actions were then totalled for each respondent to determine the intention to act. This information was then entered into the data files for each programme using the MG-Editor programme.

The marginal actions are those energy efficiency actions that the programme participants intended to carry out in the next twelve months regardless of participation in the programme, versus those energy efficiency actions that they intend to carry out in the next twelve months as a direct result of programme participation. To do this a monetary value was then given to each of these actions, based on the average current market value of each

action. They were then totalled for each set of actions, that is, actions as a result of the programme, and actions to be taken anyway. Marginal actions were then determined by subtracting actions in the next twelve months without participation in the programme from actions in the next twelve months as a result of participation in the programme. This information was then entered into the data files for each programme using the MG-Editor programme.

Programme penetration was adapted for this current evaluation from the sequence hierarchy of programme impacts by Hildebrandt and Joerges, outlined in Section 3.2.2. This adapted hierarchy of programme penetration is presented in Figure 5.1. In order to determine programme penetration the respondents of programme non-participants to the questions on programme awareness were analysed.

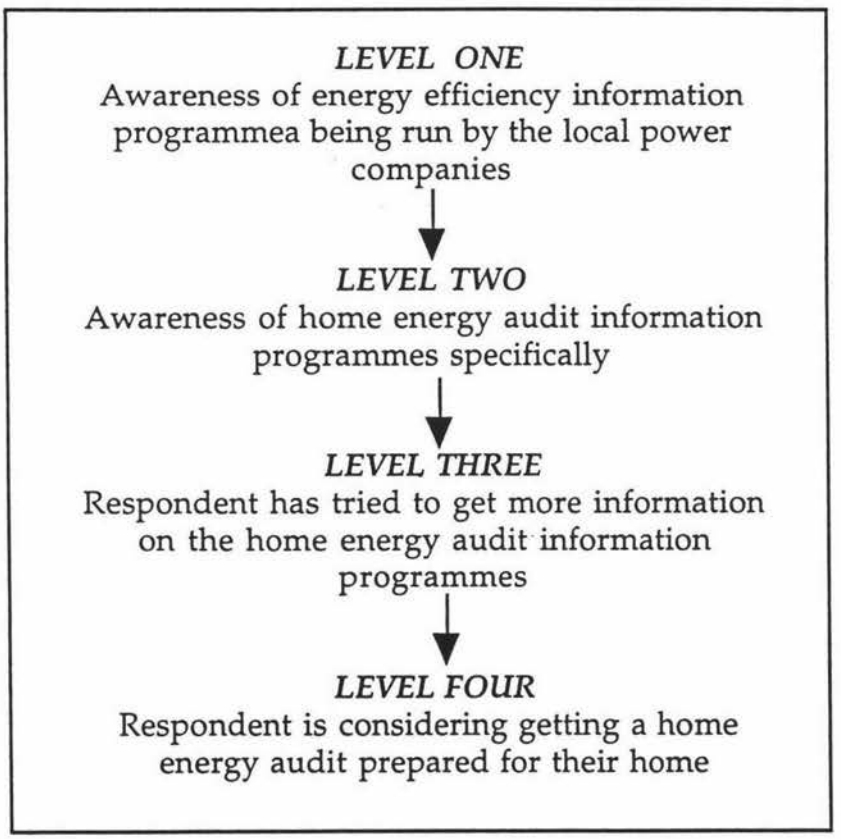

FIGURE 5.1 An Outline of Programme Penetration

The predictor variables chosen for this analysis are discussed in Table 5.6.

TABLE 5.6 The Predictor Variables

1. The demographic details of respondents
2. Whether the respondent rented or owned the home
3. The environmental values and attitudes of respondents
4. The values and attitudes of respondents to energy issues
5. Current energy efficiency behaviour

The demographic details of the respondents come from the first section of the survey. The type of details that was collected has been outlined in Table 5.2. Table 5.2 also contains the information collected with regards to the structural information collected, along with an outline of the section on environmental values and attitudes, and the values and attitudes of respondents to energy issues section. Whether the respondent owned or rented their home was the only structural information to be used in the analysis. It was decided that the questions relating to insulation in the home would be dependent on whether or not the insulation was in the home prior to the respondents moving in, and as this information was not collected in the survey could not be considered here. It is however mentioned in the description of participants and non-participants. More detailed information on the specific questions in the survey are contained in Appendices 1.0 and 2.0. The current energy behaviour was determined by the energy efficiency actions taken by respondents over the last twelve months. A monetary value was then given to each of these actions, based on the average current market value of each action. These individual actions were then totalled for each respondent to determine the current energy efficiency behaviour of respondents.

The relationship between the outcome and predictor variables, and participation and non-participation in the programme is illustrated in Figure 5.2.

What this diagrams illustrates is how the predictor variables may explain the decision to participate in the programme or not to participate in the programme. The outcome variables are different depending on whether the respondents was a programme participant or non-participant. The outcome variables for programme participants are the intention to act and marginal actions, while the outcome variables for programme non-participants are the intention to act and programme penetration. The surveys were used to gather the information relating to the predictor variables and outcome variables, and to determine programme participation or non-participation. The nonschedule standardized interviews were used to help determine why the programme participants chose to become involved with the programme, and to explore the consumer's behaviour and attitudes further.

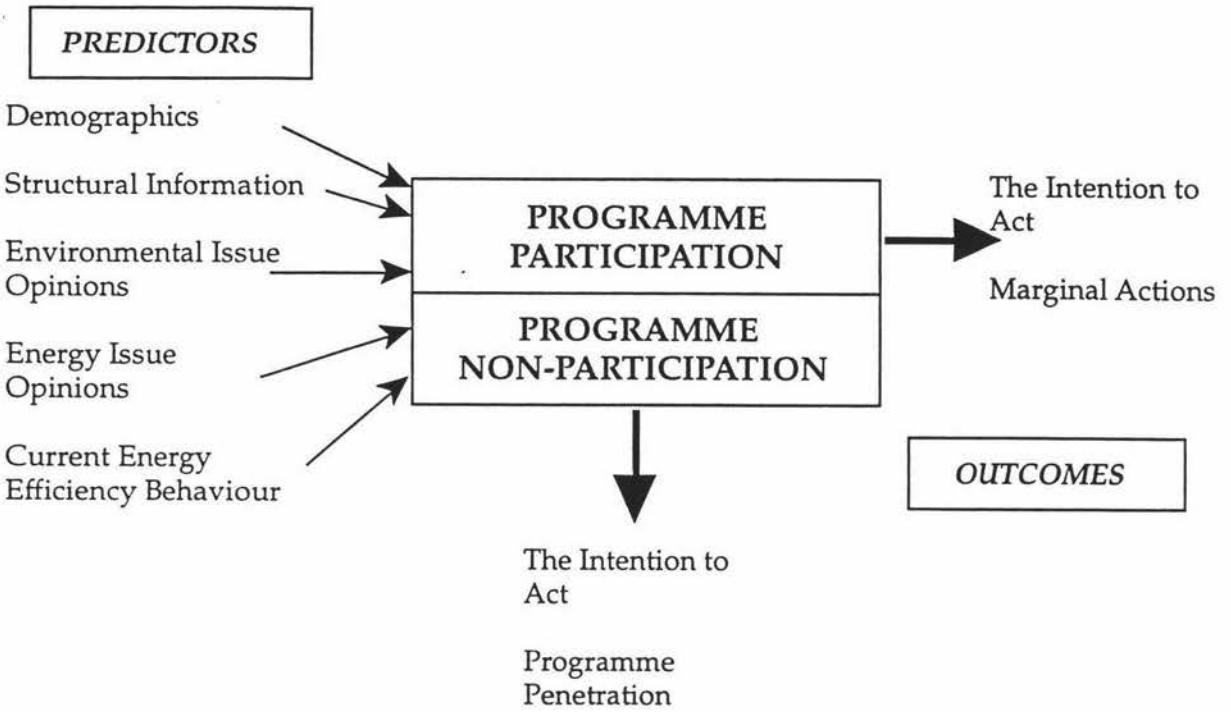

FIGURE 5.1 The Relationship Between Predictor and Outcome Variables

5.4.3 THE INTERVIEWS

Although qualitative research is about people as the central unit of account, it is not about particular individuals per se, rather reports focus on the various patterns of attitudes and related behaviour that emerge from the interviews (Hakim 1987). The analysis of the qualitative data collected in the nonschedule standardised interviews is therefore one of determining emergent themes.

It is important to note at this stage that data analysis and data collection occur simultaneously in qualitative research (Minichiello et al 1990). Unlike quantitative research were the data is collected and coded, qualitative research lacks a similar division of labour between data collection, coding and analysis. The ongoing analysis that takes place in qualitative research require that the researcher develop an eye for detecting the conceptual issues while the data is collected (Minichiello et al 1990). Data collected during interviewing includes the material the researcher has collected through talking to people. People's accounts as presented in the transcript file are sentences about beliefs, feelings and state of affairs as they see them. For the

data to become meaningful it is necessary to identify common themes which link issues together, this is commonly known as emergent themes, and this is the method used to analyse the data collected in the interviews of programme participants.

In the determination of emergent themes each of the transcripts were thoroughly read with the emergent themes in each transcript being noted. These emergent themes were then compared for each of the transcripts to determine whether these themes were common across all those programme participants interviewed. It is the information from an analysis of emergent themes which is used in this research to try and explain programme participation.

5.4.4 OTHER EFFECTIVENESS CRITERIA

Four other criteria for the assessment of the programme's effectiveness, and these are outlined in Table 5.7.

TABLE 5.7 Other Effectiveness Criteria

Criteria One The actions induced in the next twelve months because of participation in the programme compared with the actions which would have been carried out in the next twelve months if the participants had not been involved in the programme. • This analysis involved averaging the data from the analysis of marginal actions in Section 5.4.2 for each programme.
Criteria Two The motivations for the participants becoming involved in the programme compared with the motivations the programme hoped to induce. • This analysis drew on information from the interviews of programme staff, and the information on motivation from the surveys of programme participants.
Criteria Three Satisfaction with EEAP. • This analysis drew on information from the interviews of programme participants.
Criteria Four The penetration of the programme into the consumer base. • This analysis involved collating the data on programme awareness from the surveys of non-participants and presenting it in a flow diagram to illustrate programme penetration. This programme penetration has been outlined in Figure 5.1.

Analysis of Criteria One involved placing a monetary value on each energy efficiency action over the next twelve months as a result of programme participation and for actions in the next twelve months if the participant had not become involved with the programme, based on the average current market value of each action. They were then totalled for each set of actions, that is, actions as a result of the programme, and actions to be taken

anyway. These marginal actions were then determined by subtracting actions in the next twelve months without participation in the programme from actions in the next twelve months as a result of participation in the programme. This information was then averaged for each programme, for participants and non-participants and compared.

Criteria Two drew on the information from the interviews of programme participants to determine the motivations of programme participants. These motivations were then compared with the motivations that the programme intended to induce, which were determined from the surveys of programme personnel discussed in Section 5.2.

Similarly, Criteria Three drew on information from the interviews with programme participants, with Criteria Four building on the analysis of programme penetration in Section 5.4.2. Programme penetration was considered as a set of sequential steps as illustrated in Figure 5.1, with percentages in each level being determined for each programme.

5.5 RECOMMENDATIONS

The recommendations resulted from a consideration of all those factors mentioned in the analysis of the data, with additional recommendations being drawn from the international and national literature on the evaluation of energy efficiency information campaigns.

CHAPTER SIX

SOUTHPOWER CASE STUDY: ENERGY EFFICIENCY ASSESSMENT PLAN

6.0 THE ENERGY EFFICIENCY ASSESSMENT PLAN (EEAP)

Southpower offers a range of energy efficiency information programmes from general pamphlets offering advice on how to save money and energy in the home, through to more specific programmes such as the Energy Efficiency Assessment Plan (EEAP). Southpower also has a number of energy adviser's who provide home heating advice, hot water services, and home energy assessments to the domestic customer.

The Energy Efficiency Assessment Plan (EEAP) was developed by Southpower staff, with six months being spent on designing the programme and implementing the resulting EEAP. Since the inception of the programme it has further evolved and developed and a number of changes have been made to the original design. These changes include developing trade connections with builders and plumbers, and working in partnership with them in providing a service to the customer in terms of recommending people to do the work for them. They are also involved in endorsing products.

The Energy Efficiency Assessment Plan involves a Southpower energy advisor making a thorough examination of the home, including all types of energy not just electricity. A comprehensive report is then prepared outlining the problem areas in the home and recommendations on the best and most cost effective solutions. The layout of the report includes a summary of findings and observations, and two types of recommendations. First, the primary recommendations which outline actions which can be undertaken for a modest amount or should be taken immediately because of safety considerations. The second are secondary recommendations which are aimed at assisting in the planning of future improvements to the home in terms of energy efficiency. Useful also is a graph showing the energy consumption of the home over the last 12 months. This is when compared against a similar graph prepared 12 months after having the home energy audit. Supplementary to the written recommendations are tables containing technical information collected during the course of the energy audit.

Consumers are often cautious of the motivation of power companies in promoting energy efficiency. Some believe that it is not in the interests of the power company to get people to use their energy more efficiently, as

more sales means more profits. Southpower were therefore questioned on their motivation for becoming involved in promoting energy efficiency. They indicated that they have a large network of lines to upkeep, and if they can be more involved in demand-side management then they can delay the time when the network has to be upgraded, and minimise repairs to the network. A longer term objective is that they can delay the need for more generation capacity. Another motivation could be the need to become customer focussed and to provide good service to the consumer, given that in the future it may be possible for the consumer to purchase off any power company. A less positive motivation could be that if the local power companies are seen to be concerned with energy efficiency, then the government will not have to take a more heavy-handed approach to energy efficiency.

It should be noted at this stage that at the time EEAP was evaluated some major changes were going on within Southpower with regards to their Energy Advisory and Energy Efficiency Services. The programme was to be reduced in price, and eventually offered free to consumers, and the organisation was considering purchasing the Home Energy Rating Options (HERO), being offered to them by the Electricity Corporation of New Zealand (ECNZ). If a decision was made to purchase HERO, Southpower were planning to continue to operate the EEAP service to consumers as part of their energy efficiency service, but offer the HERO programme also. It was unclear how the structure of the programme was to be altered, if at all, and was not clear at this stage whether it would be necessary to operate both programmes. The majority of recommendations will therefore be based on the evaluation of the Energy Efficiency Assessment Plan prior to these proposed changes, but when consideration is given to future development of EEAP some recommendations will be targeted at the proposed new role of EEAP.

6.1 THE PROGRAMME'S OBJECTIVES

The objective's of the Energy Efficiency Assessment Plan were determined by surveying all those at Southpower who were involved in the development, implementation and management of the programme, as discussed in Section 5.2. Determination of these objectives provides a clearer picture of the goals of the programme, and provides a basis for determining the effectiveness of the programme. The objectives are outlined in Table 6.0.

TABLE 6.0 The Objectives of the Energy Efficiency Assessment Plan

- to facilitate and increase sales of energy efficient products and technologies from Southpower and its associated tradespeople
- to give Southpower a profile in the area of energy efficiency
- to increase customer awareness of energy efficiency
- to promote Southpower as being environmentally aware
- to save the customer energy
- to implement energy efficiency measures
- to introduce and encourage energy efficiency
- to help customers save money of their power accounts
- to provide simply cost-effective recommendations that can be easily undertaken and understood by customers
- to provide long-term recommendations that will save energy and increase comfort and living standards
- to provide the customer with a plan to facilitate budgeting and renovations
- to make customers aware of simple improvements that can make their home energy efficient and in turn reduce energy costs

As the programme has evolved since its introduction, objectives have evolved and changed also. Initially the focus was on increasing sales of energy efficiency technology from Southpower's retail outlets, but the focus has become more involved in improving customer relations and increasing customer awareness of energy efficiency.

6.2 THE PROCESS EVALUATION

6.2.1 THE DEVELOPMENT OF EEAP

The Energy Efficiency Assessment Plan was developed as part of a package of programmes in the Energy Advisory service of Southpower. No particular effort was put into promoting the programme as a stand alone package, but rather it was promoted as part of a range of packages promoting energy efficiency. The programme is specifically aimed at the middle to higher socio-economic classes, and designed to give fuel neutral advice.

The programme was developed within Southpower with some consultation with tradespeople, builders etc. This outside consultation did not go so far as to conduct market research onto whether there was a need for such a programme within the Southpower customer base, but was rather developed in response to other similar programmes being developed elsewhere, such as the Home Energy Rating Options (HERO) programme by ECNZ.

Discussions with some of the staff involved with the Energy Efficiency Assessment Plan lead to some confusion about the intent of the assessment. Some believed that the plan involved assessing the people and the energy activities in their home, whilst others believed the assessment considered the energy efficiency of the home irrespective of the occupants. It is

important that is clear what the purpose of the assessment is. Consumers receiving misinformation as to the purpose of the assessment may be disappointed with the results of the assessment, and therefore the uptake of the recommendations, if what they expected is not what they got. For example, a consumer may get an EEAP conducted to find out which of their personal energy actions are inefficient and need some adjustment, rather advice on how to improve the energy efficiency of, say, their hot water cylinder.

6.2.2 THE PROMOTION OF EEAP

Initially the promotional effort associated with the Energy Efficiency Assessment Plan (EEAP) consisted of advertisements in newspapers. According to Southpower staff interest generated after advertising in this way was low. Southpower then designed fliers promoting the programme and dropped them into letter boxes in the area. They decided that this method did not create much interest either, so they then started promoting the programme at shopping centres and such places by using demonstration displays. Once again it was felt that response to this form of advertising was low, so Southpower then decided to combine all three approaches into a more integrated strategy of promotion. It is difficult to assess the effectiveness of the promotion of the EEAP at this stage, and will be dealt with in more detail in the impact evaluation.

6.2.3 THE OPERATION OF EEAP

Southpower is currently building up a number of connections the operation of EEAP. These connections include building up its base of tradespeople, and is involved in endorsing the products that certain tradespeople have to offer if it meets with certain criteria set down by Southpower. Another connection which Southpower believes will be useful is maintaining contact with community organisations. The ultimate aim of this connection is to help promote energy efficiency within the lower socio-economic classes. The development of a connection with a financial service is another aspect currently being developed by Southpower, and they hope to expand on the idea that better financial packages can be arranged for homes that are more energy efficient.

Southpower also offers a financial package to people who wish to install major energy efficiency technology, such as insulation. A range of interest free deals are offered ranging from 12 to 26 months interest free. What this means for the consumer is that they are able to spend, for example, $1000 on insulation that would result in an energy saving of $500 a year. If Southpower then offer 24 months interest free terms on purchase of the insulation, the consumer recoups all costs within two years without loosing money in the form of interest payments.

Follow-up on completed audits is another part of the programme which has developed since the implementation of EEAP. Originally no follow-up was conducted once the programme participant had received the written audit report in the mail. Now the sending out of the audit report is accompanied by a follow-up phone call approximately three weeks after dispatch of the audit, and then sometimes the follow-up also includes a phone call after approximately six months. The need for a follow-up also came out of the interviews with programme participants, with the following comment being made:

"My only reservation of the whole thing was that they didn't hand on [the recommendations] to the sales division of Southpower. I would have expected we would then have got a note saying here are some air seals, here is a wrapper for your cylinder...any of the things that were covered in the report...and they cost so and so and they are available from our sales division...I felt Southpower didn't do themselves justice..."
(Respondent Four, EEAP Participant)

The follow-ups could take several forms. The initial follow-up should take place a couple of weeks after the audit has been sent to the household. This follow-up would ensure that the participant has received the audit, and is clear of the recommendations contained in the audit and one about six months after the audit. At this time it may also be possible for suggestions to be given as to tradespeople and retail outlets to help the participant carry out the recommendations. The second follow-up would be useful to remind people about the audit, and may provide a means of jogging people's memories as to recommendations which have not been implemented. Lastly, the programme participants should be provided with an analysis of energy savings twelve months after having the audit performed on their home. This would involve comparing energy use twelve months prior to the audit, and twelve months after the audit. This follow-up at twelve months would also be useful in determining what energy efficiency actions the participants have actually implemented as a result of the audit. This would help remove the error of self-reported data, discussed in Chapter Four, and would be a more useful indicator than intended actions, as has been used in these case studies.

6.2.4 Recommendations for Improving the Process

6.2.4.1 The Promotion of EEAP

There is a need for the financial aspects of the programme to be developed further and better publicised. It may be that Southpower wish to keep this operation low key to minimise cost to them, but in order to appeal to groups of people in the lower socio-economic groups it is necessary for them to be aware of such schemes, and to be able to easily understand the concept of 'pay back' periods and other associated concepts. The concept of 'pay back' period is often difficult to understand, and may result in some major misunderstandings if not explained and promoted well. There may be some

mis-understanding with regards to making $500 in energy savings for example. People may wrongly assume that this money saving will mean a $500 pay out to them - this aspect of the concept will need to be explained clearly and concisely. With the likelihood of EEAP being offered free to consumers, the development of the financial packages will hopefully mean people in the lower-socioeconomic classes, who can least afford energy efficiency but are often most in need of it, can afford to make improvements.

If Southpower are going to implement the HERO programme, which involves assessing the energy efficiency rating of the house irrespective of the occupants, then it may be appropriate for EEAP to be developed and operated as a programme which gives people more help with actions they take in their home. It would be useful for EEAP to also consider the construction and insulation in the home, but it would be useful for people to be aware of their energy usage and how to improve this. It may be difficult to assess the energy efficiency of people, but often it is just helpful hints that people require, and not detailed technical analysis. Possibly EEAP could become a more informal assessment, with auditors spending some time with the customer when conducting the survey, to find out their specific concerns. Then, once the report has been prepared, the auditor could present it to the consumer in person and discuss the recommendations. This idea of more one-on-one contact with the customer is discussed later in this chapter, with participants in EEAP making such suggestions during the interviews.

6.2.4.2 The Operation of EEAP

Southpower should be more aggressive in suggestions for tradespeople to contact to carry out the recommendations in the audit. They should provide the programme participants with a list of people with whom Southpower has trade connections, and whose products they endorse. Suggestions for tradespeople should accompany the audit report, but should not be included in the report. Southpower don't want to be seem to be pushing products, but if suggestions accompany the report rather than be a part of it, then this non-aggressive stance is maintained. Customers often need some suggestions about what products would be most appropriate, and if suggestions are included with the audit then have a choice about whether to purchase the products suggested by Southpower. Southpower also often are able to purchase products at a bulk rate and can they pass these savings onto the consumer. The inclusion of such products with the audit will mean savings to the consumer, and help with consumer relations. Associated with this is the need for Southpower to promote the standards by which they accept a product to be endorsed by them. For example, Southpower may only endorse home insulation that has a guarantee of ten years.

The use of endorsed tradespeople also helps to assess the uptake of recommendations from the audit. Upon purchase of the product or technology the organisation should determine whether the choice of product was the result of having an EEAP prepared for their home. In addition, Southpower needs to develop their trade connections and expand the base of tradespeople they can use to carry out the recommendations in the audits.

Some participants suggested, when interviewed, that it would be useful if the audit contained some indication as to the prices of the some of the technology they were recommending.

"the survey was very well done, it identified all the things we wanted it to identify, it gave a list of things to buy in order to improve it, but it didn't tell us how much we could buy it for..."
(Respondent Four, EEAP Participant)

This gives Southpower another chance to mention the services they provide, and those of their connected tradespeople. Possibly Southpower could also list the prices suggested by organisations independent to them to show the range of prices available to the consumer. The financial package could also be given a further promotion here.

6.2.4.3 Future Development of EEAP

Consideration needs to be given here with regards to the possible implementation of the HERO scheme by Southpower. For the sake of this discussion it will be assumed that Southpower has decided to go ahead with the implementation of HERO in Southpower's distribution area, and the EEAP will still be run, but will be offered free and may be targeted to a difference audience.

The follow-up aspect of the programme needs to be developed further, with the target of becoming more planned. These follow-ups allow Southpower to assess how effective their recommendations have been, and give staff an opportunity to make further suggestions as to purchasing decisions for the consumer. Such a follow-up enhances customer relations, and would be useful from an evaluation aspect.

Currently the Energy Efficiency Assessment Plan (EEAP) is targeted at the middle to higher socio-economic classes. However, with the introduction of HERO this target group will be serviced by the HERO programme. Therefore, it is possible that the EEAP will be used to target lower socio-economic classes. Given that the service is likely to be offered free people who already consider themselves energy efficient may also consider getting an energy audit of their home.

If this were to be the role of EEAP in the future then consideration needs to be given to whether the programme in its current form will provide

information useful to the group(s) it will be targeting. Southpower needs to do some market research into the requirements of the group(s) of people they intend to target. They need to consider the barriers to the uptake of offers such as EEAP, and also need to consider the decision-making process within the household to see how they could design the promotion and marketing of the programme to tap into these decision-making processes.

Given that suspicion from consumers is often associated with a Power Company, such as Southpower, promoting energy efficiency, there needs to be some form of generic information campaigns to make people aware of the motivations of Southpower, and to then stress the need for energy efficiency. It may be possible that it should be the role of some national organisation to promote energy efficiency, such as the Energy Efficiency and Conservation Authority who have already run such a campaign. But if Southpower want to improve customer awareness and customer service then it is necessary that they too make their motivations clear to the consumer base. It takes times for attitudes to change, but if some effort is put into changing these attitudes then it is likely that such campaigns will be more successful in future. No one type of information campaign can be effective, but rather must be part of an integrated strategy for the promotion of energy efficiency.

Given the possible change in the role of EEAP with Southpower, now is the perfect opportunity to conduct the necessary groundwork to ensure that the 'new' programme is developed as best as possible. This may involve some changes to the promotion of the programme, changes to the presentation of the report, with the inclusion of more verbal recommendations as the audit is being conducted, improvements to the promotion of the financial aspects of the programme, and development of a more substantive base of connections, such as community groups and real estate organisations. This base of connections would also be useful for the operation of HERO. There is also an opportunity to build a programme evaluation function into the operation and management of the programme.

6.2.4.4 A Summary of Recommendations

A summary of recommendations for improving the process aspects of the Energy Efficiency Assessment Plan is shown in Table 6.1.

TABLE 6.1 A Summary of Recommendations for Improving the Process of EEAP

- Develop and highlight the financial aspects in the promotion and marketing of the EEAP
- Consider giving advice in the audit based on the energy efficiency actions of the occupants of the home, and not just the home itself
- Be more aggressive in suggesting tradespeople to carry out recommendations and promoting the Southpower retail outlet as a supplier of energy efficiency products and technology
- Prices of energy efficiency products recommended in the audit should be included in the audit report. This would help people in making a decision on whether to purchase and who from, and could also be used to promote the services of Southpower andassociated tradespeople
- If a decision is made to purchase a franchise for the Home Energy Ratings Options programme then consideration should be given to developing the EEAP programme to include the needs of people in the lower socio-economic classes.
- Similarly, if the programme is to be altered there is an ideal opportunity to incorporate some form of evaluation into the process
- A more effective follow-up process needs to be developed. Such a follow-up would ensure that satisfaction with the service could be determined, and that advice could be given to participants on tradespeople and retail outlets. This follow-up should consist of three phases: two weeks after sending the audit, six months after the audit, and one year after the audit
- A more effective follow-up would also help determine the actual energy efficiency actions implemented as a result of the programme. This would allow a more accurate determination of the effectiveness of the programme based on induced actions

6.3 THE IMPACT EVALUATION

6.3.1 A DESCRIPTION OF SURVEY RESPONDENTS

The information collected in the survey's was analysed in terms of frequency distribution and it is this information which is used here to provide a profile of programme participants and non-participants.

6.3.1.1 Programme Participants

Of the 55 surveys distributed to people who had an Energy Efficiency Assessment Plan prepared for their household, 31 returned the surveys (56% response rate). The demographic profile of respondents is summarised in Table 6.2.

TABLE 6.2 Demographic Profile of EEAP Participants

- 63.3% of respondents were male, and 83.3% were married
- The age of respondents was evenly spread from 18 through to 65 or over
- The composition of most households (70%) was from one to three occupants, with 73% of the respondents being in the top three of the Elley-Irving socio-economic index, and 42% of the second occupant of the household being in the same grouping
- 60% of respondents has some form of tertiary education, including polytechnic and university study, but is interesting to note here that 33.3% of respondents had either no school qualifications, or at a school certificate level

In addition to these observations, the majority of respondents owned their own home. Only one of the respondents rented the home on which they had the energy audit prepared. Details of other information related to the structure of the homes of respondents is summarised in Table 6.3.

TABLE 6.3 Structural Information on EEAP Participants Homes

- 43.3% of respondents had only been living in their homes for five years or less
- There was no pattern in the age of the home, with there being an even spread of ages from 2 years to 100 years
- 86.2% of homes were constructed of wood or brick, which is typical of most homes in New Zealand
- 67.9% of respondents do not have insulation in the walls of their homes, compared with 86.7% who do have insulation in their ceilings
- 38.5% of respondents made the decision to insulation their home

It is difficult to analyse the significance of insulation in the home, when it is not possible to determine whether this insulation was in the home before the audit, or was installed as a result of the audit. Similarly, the reason for respondents not making the decision to insulate their home may be that it was in the home when they purchased it, making the significance of this difficult to analyse also. Insulation in the home will also depend on when the home was built, and what the building regulations were at the time.

A number of questions to determine the environmental values and attitudes of the respondents were included in the survey, with the summarised findings presented in Table 6.4.

TABLE 6.4 The Environmental Values and Attitudes of EEAP Participants

- 80% of respondents agree that New Zealand should develop its own energy resources to their fullest potential, believe that individuals can make difference in reducing air pollution, and the same number of respondents also agree that renewable sources of energy should be developed
- Over 85% of respondents (86.7%) strongly disagree that global warming is only a problem for future generations
- Respondents were less sure of whether New Zealand has abundant energy resources with 41.4% being uncertain
- Opinion was varied about whether the rights of endangered species should be put ahead of employment with opinion ranging from 30% disagreeing and 26.7% agreeing
- The majority of respondents (89.6%) believe New Zealand is affected by global environmental issues, and over 50% of respondents (53.4%) believe that New Zealand has abundant rivers available for hydroelectricity development in the future
- Nearly 50% of respondents (46.6%) believe that New Zealand should fully use its coal resources for energy production

Interpretation of this data leads to some interesting observations. First, respondents have no firm opinion on the abundancy of energy resources in New Zealand, suggesting that motivation for having the EEAP may not be concern over our energy future. To back up this observation is that over half of the participants believe New Zealand has abundant rivers for hydroelectricity development and that we should fully utilise New Zealand's coal resources for energy production. Conflicting with this is that nearly all respondents believe that New Zealand is affected by global environmental issues, such as global warming, which is believed to be the result of the emission of greenhouse gases. Nearly all respondents also agree that global warming is not a problem for future generations only. It is possible that respondents are not aware of the connection with energy use and global warming, or that they are concerned about certain environmental issues but that this concern is not the primary motivator for becoming involved in the programme. This would back up the previous observations.

Over a quarter of respondents (25.8%) first found out about the Energy Efficiency Assessment Plan from a suggestion by Southpower staff, with 19.4% citing other sources than those listed in the survey, such as approaching Southpower to see whether they did this sort of home energy audit (Table 6.5).

TABLE 6.5 The Sources of Original Contact with EEAP

12.9%	• Information that came with power account
9.7%	• At a community group talk
9.7%	• Through the Southpower advisory service
3.2%	• In a brochure delivered to your mailbox
25.8%	• Suggested to you by Southpower staff
12.9%	• In the Southpower energy efficient shop
6.5%	• On CTV
0%	• On the radio
0%	• In the newspaper
19.4%	• Other, including seeking information from Southpower directly

From these results it is clear that radio and newspaper advertising is not a very effective way of promoting the programme. Some respondents indicated that they first found out about the programme at a display at a shopping mall. This seems to be an effective way of bringing people's attention to Southpower and there commitment to energy efficiency. In this environment people feel comfortable asking for information - they can remain anonymous and are less likely to feel pressured to become involved in something they are unsure about. The suggestions by Southpower staff, indicated by a number of respondents as being their original source of contact with EEAP, may result from contact with staff at these satellite sites, or at Southpower itself.

Respondents were also questioned on their values and attitudes towards energy issues more specifically. The findings are summarised in Table 6.6.

TABLE 6.6 The Values and Attitudes of EEAP Participants to Energy Issues

- Opinion is varied on whether New Zealand has a good record for energy efficiency and conservation, with 37.9% disagreeing and 41.1% agreeing
- Over 50% of respondents (53.3%) agree that New Zealand will face energy shortages in the next 20 years
- 93.3% of respondents feel strongly that energy conservation is not a waste of time, with a similar number (96.8%) believing more should be done to educate people on how to use energy efficiently
- 77.4% of respondents believe that the New Zealand government should be responsible for promoting energy efficiency and conservation, and all respondents feel strongly that the local power companies should actively promote energy efficiency and conservation
- Over 65% of respondents (67.7%) believe there should be financial incentives to help people save energy

The belief that New Zealand may face energy shortages in the next 20 years may explain the opinions expressed by respondents with regards to the need

to develop our own energy resources, such as coal. However, this conflicts with the observation that New Zealand has abundant rivers available for hydroelectricity development, and makes it difficult to determine the significance of such observations.

Seventy percent of respondents had carried out some energy efficiency actions in their home in the twelve months before they had an Energy Efficiency Assessment Plan performed on their home. At this stage in the analysis there was no breakdown on specific energy efficiency actions, rather just an indication of whether the respondent had carried out any actions in their home. Ninety three percent of respondents indicated that they have or intend to carry out some energy efficiency actions as a result of having the energy audit performed on their home, while only 43.3% indicated that they would have done so if they had not had the audit performed on their home. Ninety percent of respondents frequently turn off lights when not in use, and 73.3% of respondents heat only the room they are using.

Another variable which is useful in describing participants in EEAP is their understanding of energy efficiency. A comparison of participants and non-participants understanding of energy efficiency may have been useful as another criteria for determining the effectiveness of EEAP, but this information was not collected from non-participants. Therefore the information discussed here will just be used to help build a profile of programme participants. Table 6.7 provides an outline of responses to a question in the interviews on participants understanding of energy efficiency.

TABLE 6.7 EEAP Participants Understanding of Energy Efficiency

- "Getting the best possible use out of it and using forms which are more effective rather than [say] getting 30% of the potential"
  (Respondent One, EEAP Participant)
- "Utilising natural resources efficiently"
  (Respondent Two, EEAP Participant)
- "Like any definition of efficiency, it is getting the most...maximum output for input...not wasting it...especially non-renewable"
  (Respondent Three, EEAP Participant)
- "Conservation of energy...regarding supply versus demand"
  (Respondent Four, EEAP Participant)
- "Basically getting the most out of whatever it is you use...not wasting it"
  (Respondent Five, EEAP Participant)

Participants generally define energy efficiency as get the most from what energy you use. Some of these definitions also suggest that concern over our energy future may come into the decision to become more involved in energy efficiency by participating in the programme. For example, respondent three suggests that we should be using non-renewable resources more efficiently, and respondent two expresses the same concern for natural

resources in general. It is likely that these participants have some interest in our energy future, and are playing their part to secure it.

6.3.1.2 Non-participants

Of the 100 surveys randomly distributed to households in the Southpower area 62 were returned (62% response rate). An analysis of demographic details of respondents is summarised in Table 6.8.

TABLE 6.8 The Demographic Profile of Non-Participants in EEAP

- Nearly 60% of respondents were female (59.7%)
- Over 65% of respondents (69.3%) were between 25 and 54, with 71% of respondents being married
- The majority of respondents (82.3%) have up to four occupants living in their home
- 85.3% of respondents are in the 2-4 range on the Elley-Irving socio-economic index, with 50% of the second occupant of the house being in the same range
- Over 30% of respondents (31.7%) had no formal qualification, and 33.7% with some form of tertiary qualification

Details of information related to the structure of the homes of respondents is contained in Table 6.9.

TABLE 6.9 Structural Information of Non-participants Homes

- Nearly 60% of respondents (59.7%) had been living in their home for seven years or less, with the ages of these homes ranging from 1 to 105 years old
- The majority of homes were constructed of wood and brick, in line with the normal construction of homes in New Zealand
- Over half of the respondent's (53.3%) homes did not have insulation in the walls, with the majority of homes (98.3%) having insulation in the ceiling
- Of those homes with insulation 37.5% of respondents made the decision to insulate

As was mentioned previously, in the description of participants, it is difficult to assess the significance of whether the respondents home has insulation and whether the respondent made the decision to insulate.

The response's to the environmental values and attitudes questions are summarised in Table 6.10.

TABLE 6.10 The Environmental Values and Attitudes of Non-participants in the EEAP

- Over 80% of respondents felt strongly that New Zealand should develop its own energy resources to their fullest potential, with a similar number of respondents (91.8%) believing actions can make a difference in reducing air pollution
- 93.5% of respondents felt strongly about the issue of developing renewable sources of energy, with the issue of New Zealand's abundance of energy resources, drawing the range of responses with 27.9% agreeing and 27.9% disagreeing
- The majority of respondents (85.5%) disagreed that New Zealand is unaffected by global environmental issues, such as global warming, and a similar number of respondents (89.8%) believe that global warming is not only a problem for future generations
- There was a spread of responses to the issue of putting the rights of endangered species ahead of employment, with 40.7% disagreeing and 20.3% agreeing
- With regards to the issues of developing New Zealand's coal resources fully for energy production opinion was once again spread, with 31.7% disagreeing and 31.7% agreeing
- Over 40% of respondents agreed that New Zealand has abundant rivers available for hydroelectricity development in the future

Although non-participants believe that New Zealand should develop its own energy resources, they are unsure of which resources should be, or could be developed, such as coal and hydroelectricity. However, non-participants are almost in total agreement in their belief that renewable sources of energy should be developed.

Table 6.11 presents information on the awareness of respondents to the energy efficiency information programmes offered by Southpower.

TABLE 6.11 A Description of the Awareness of Respondents to EEAP

- Nearly 60% of respondents (59.68%) were aware of an information programme that was being run by Southpower, with 22.6% of respondents being aware of the EEAP specifically
- The majority of respondents (64.3%) heard about the EEAP through information which came with the power account
- Only 28.6% of those who had heard about EEAP had tried to get more information about the programme, and 23.08% were considering getting an EEAP performed on their home
- With regards to willingness to pay for the service, over 50% said they were only prepared to pay $50, the lowest amount listed in the survey, with another 30.8% stating in the survey that they believed such a service should be provided free

These results indicate that a nearly quarter of the Southpower consumers are aware of the EEAP, with just over a quarter of these trying to obtain some more information on the programme. Results here indicate that expense may be a barrier to programme participation, with over a third of respondents indicating that the service should be free.

Awareness of the Energy Efficiency Assessment Plan came from a number of sources, and these are summarised in Table 6.12.

TABLE 6.12 The Sources of Awareness of EEAP

64.3%	• Information that came with power account
0%	• At a community group talk
14.3%	• Through the Southpower advisory service
7.1%	• In a brochure delivered to your mailbox
0%	• Suggested to you by Southpower staff
0%	• In the Southpower energy efficient shop
0%	• On CTV
0%	• On the radio
0%	• In the newspaper
14.3%	• Other, including seeking information from Southpower directly

The most effective source of awareness of EEAP appears to be from information that came with the power account. As with EEAP participants, some non-participants indicated that they first became aware of the programme after seeing a display at a local shopping mall. As was discussed in section 6.3.1.2, such displays possibly provide an informal environment in which consumers feel more comfortable talking with Southpower staff, and less pressured into becoming involved.

A description of respondent's data relating to their values and opinions to energy issues is summarised in Table 6.13.

TABLE 6.13 The Values and Attitudes of Non-participants to Energy Issues

- Opinion was varied on whether New Zealand had a good record for energy efficiency and conservation, with 32.2.% agreeing and 30.5% disagreeing
- 61.3% of respondents agree that New Zealand will face energy shortages in the next 20 years, and 98.3% of respondents feeling strongly that energy conservation is not a waste of time
- 96.7% of respondents believe that more should be done to educate people on how to use energy efficiently, with 83.6% of respondents believing that the New Zealand government should be responsible for promoting energy efficiency and conservation, and 91.8% believing that the local power company should actively promote energy efficiency and conservation
- The majority of respondents (82%) also agreed that their should be financial incentives to help people save energy

Non-participants seem unsure in their attitudes to New Zealand's energy future. Opinion was divided on whether New Zealand has an abundance of energy resources, yet over 60% of respondents believe that New Zealand will face energy shortages in the next 20 years.

The description of energy efficiency actions is as for EEAP participants, with consideration here being given to energy efficiency actions in the last twelve months and the intended actions in the next twelve months (Table 6.14).

TABLE 6.14 The Energy Efficiency Behaviour of Non-participants

- 88.9% of respondents said that they had carried out some energy efficiency actions in their home in the last twelve months
- 38.9% of respondents indicated that they intended to carry out some energy efficiency actions in the next twelve months
- Most respondents indicated that they frequently turned off lights when not in use (88.5%), and heated only the room they were using (79.7%)

These results would suggest that non-participants consider themselves to be energy efficient around the home, and may help to explain why they are not becoming involved in the programme. If non-participants believe that they are actively involved in energy efficiency and doing what they can to improve their energy efficiency, then they are unlikely to seek advice on any further actions they could take. This would be especially true if they had less disposable income to spend on things such as a home energy audit. The descriptions of non-participants above tend to reinforce this point, with the majority of non-participants being a lower socio-economic class (Elley-Irving socio-economic index) than the majority of participants. They also tend to have lower levels of education, which may suggest that they believe they are doing the best they can in terms of energy efficiency, and are not aware of technological improvements to the potential for energy efficiency.

6.3.1.3 A Comparison of Respondents - Participants and Non-participants in EEAP

Gender is a good predictor of participation ($t=2.22; 2p<0.029$), with the majority of participants being male. However, surveys sent to participants were often addressed to both members of the household and it may be that the male chose to fill out the survey. This does not mean that the female was not involved in the decision to become involved with the programme, and in subsequent decisions regarding the uptake of recommendations in the audit report.

Whether or not the respondents owned the home on which the audit was prepared is a good predictor of participation ($t=2.00; 2p<0.071$), with respondents who own their own home more likely to become involved in the programme. This observation makes sense in that people who do not own their home are not likely to make improvements to the energy efficiency of the house when the length of time in the house is uncertain, and any structural changes can not be taken when they leave the house. They may possibly makes improvements to their own energy efficiency actions, such as turning off lights, and heating only one room, and possibly draught stopping, but are unlikely to make major structural changes, such as insulating the walls.

Non-participant's generally had more people living in the home and were lower on the Elley-Irving socio-economic index than participants. This indicates less disposable income available for such things as home energy audits. It is interesting to note that nearly a third of participants had no formal qualification, or at a school certificate level only. This may be explained by the age of participants, with nearly a third of respondents being over 55 years of age. However, education is a possible predictor of participation, with 60% of respondents having some form of tertiary qualification, compared with 31.7% of non-participants. This observation is backed up by the fact that those respondents with some form of tertiary qualification, in particular an undergraduate or postgraduate qualification, are more likely to become involved in EEAP ($f=4.19;p<0.002$).

Occupation is another good predictor of participation, with the those respondents in the top three rankings on the Elley-Irving socio-economic index being more likely to participate in EEAP ($f=3.26;p<0.003$). This finding backs up that just mentioned, in that participants are likely to have more disposable income available for investment in energy efficiency. The level of education may be directly related to the income level of respondents, but it may also suggest a predisposition to seek information. These results suggest that Southpower has been effective at getting their target audience involved in the programme - the middle to higher socio-economic classes.

The majority of both participants and non-participants had been in their homes for only a short period of time, up to seven years, with the ages of the homes ranging from 1 to 105 years old. Also, most participants owned the home in which they had the energy audit prepared. Nearly 87.1% of non-participants also owned their home. As people who own their own home are more likely to spend more on improving the energy efficiency of their home, then the similar number of home owners in both samples allow for comparisons to be made more accurately.

Opinions on environmental and energy issues also help to explain programme participation. Respondents who agree that New Zealand should develop its own energy resources to their fullest potential ($f=7.70;p<0.000$), and that actions by individuals can make a difference in reducing air pollution ($f=3.69;p<0.008$), are more likely to participate in EEAP. Similarly, those respondents who believe that renewable sources of energy should be developed ($f=3.13;p<0.048$) are more likely to participate in EEAP. Because participants are more likely to agree that actions by individuals can make a difference in reducing air pollution may imply that they participated in the programme over a concern for the pollution from energy generation and use. It may also imply a wider concern over environmental issues, however this observation is not supported by tests of statistical significance. Reviewing the description of participants and non-

participants to the selected environmental and energy issues included in the survey, suggested that non-participants were perhaps more strongly opinionated on issues relating to our energy resources, and their use and abundance, with a greater percentage of non-participants believing that New Zealand will face energy shortages in the next 20 years. These observations were not supported by tests of statistical significance, but may suggest that participation in the programme may be motivated by financial considerations as opposed to environmental concerns.

A similar number of participants and non-participants has carried out some energy efficiency actions in the last twelve months, with a much larger percentage of participants intending to carry out some energy efficiency actions in the next twelve months. Participants intend to spend significantly more on energy efficiency actions in the next twelve months ($f=8.28;p<0.000$). This would suggest that EEAP has been effective in increasing the number of intended energy efficiency actions over the next twelve months for programme participants.

Overall, EEAP participants are not a cross section of the general population, with the incomes, and higher education levels than non-participants. Also, programme participants generally intend to take more energy efficiency actions than do non-participants, most likely as a result of programme participation.

6.3.2 AN ANALYSIS OF PROGRAMME OUTCOME VARIABLES

The Minitab programme was used for the statistical analysis, with the use of the t-test and f-test. The outcome variables selected for analysis were as follows:

1. The intention to act.
2. The marginal energy efficiency actions induced by participation in the programme.
3. Penetration of the Energy Efficiency Assessment Plan.

A more detailed description of these outcome variables is found in Section 5.4.2. Care needs to be taken when using the intention to act as an outcome variable. This variable relies on self-reported intended actions, rather than actions that were actually implemented. Due to the time frame of this research it was not possible to track energy efficiency actions for the twelve months following participation in the audit, or to track the energy efficiency actions of the control group.

The predictor variables include the following, with a more detailed description of these predictor variables in Section 5.4.2:

1. Demographic details of respondents
2. Whether the home is owned or rented

3. The attitudes and opinions of respondents to selected environmental issues
4. The attitudes and opinions of respondents to selected energy issues
5. The current energy efficient behaviour of respondents

6.3.2.1 Marginal Actions as the Outcome Variable

Analysis of current energy efficient behaviour as the predictor variable showed that marginal actions are not dependent on the respondents current energy efficient behaviour ($f=0.25;p<0.986$). However, the level of education of participants was significant. Analysis showed that EEAP participants had higher levels of education, in particular postgraduate qualifications, spend significantly more on marginal actions ($f=3.46;p<0.016$). Participants with a postgraduate qualification as their highest level of education on average spend $2266.70 more on energy efficiency actions as a result of participating in the programme. This higher level of education could imply a better paid job or a predisposition to seek information and therefore being more aware of the options in terms of energy efficiency. However, the income of respondents (Elley-Irving socio-economic index) was not a predictor of marginal actions.

Participants who strongly believe that actions by individuals can make a difference in reducing air pollution spend significantly more on energy efficiency actions after participation than they would have without the programme ($f=2.98;p<0.049$). Those who strongly agree spend $1480.00 more on energy efficiency actions a result of the programme. This would suggest that a concern with environmental issues may be a motivation for people to become participants in EEAP. However, respondents who strongly agree that New Zealand has abundant energy resources spend significantly more on energy efficiency actions after participation than they would have with the programme ($f=3.47;p>0.022$). Those who strongly agree spend $2350.00 more on energy efficiency actions as a result of the programme, compared with $500.00 for those who strongly disagree that New Zealand has an abundance of energy resources. These results would suggest that participants are not becoming involved in the programme only because of a concern for the conservation of energy resources. This observation is backed by the fact that participants who strongly believe that New Zealand has abundant rivers for hydroelectricity development spend $4600.00 on energy efficiency actions, compared with the $294.40 being spent by those who disagree ($f=14.15;p<0.000$). This implies a secure energy future for New Zealand.

Conflicting with the above observations is that those who believe that New Zealand will face energy shortages ($f=3.95;p<0.013$) in the next twenty years spend more in energy efficiency actions ($2100.00) than participants who disagree ($500.00). Yet, analysis above suggested that those who believe that New Zealand has abundant energy resources spend more on energy

efficiency actions. The conflicting signals sent by this information makes it difficult to interpret this data.

A concern over New Zealand's past record for energy efficiency and conservation is a useful predictor of marginal actions ($f=11.37;p<0.000$). Participants who intend to spend significantly more on energy efficiency actions ($3150.00) believe that New Zealand does not have a good record for energy efficiency and conservation. This suggests that participants have a concern for energy efficiency, but a personal belief that they can do something to improve this record is not necessarily a motivator for programme participation.

6.3.2.2 The Intention to Act as the Outcome Variable

Those respondents with higher levels of education intend to spend more on energy efficiency actions over the next twelve months ($f=7.68;p<0.000$). The data suggests that respondents with a post-graduate qualification intend to spend significantly more in energy efficiency actions ($1900.00) than those with lower qualifications. If qualification level is an indicator of income, then it would be expected that income (Elley-Irving socio-economic index) would be a predictor also. This was the case, with those respondents in the highest two levels on the index intending to spend significantly more on energy efficiency actions ($f=3.46;p<0.002$) in the next twelve months. These results suggest that respondents with a greater disposable income have the finances available for investment in energy efficiency. These findings are across all respondents and do not separate participants and non-participants, however previous discussion has indicated that participants do have higher levels of qualifications and higher incomes judged by the Elley-Irving Socio-economic index.

6.3.2.3 Programme Penetration as the Outcome Variable

An analysis of all the predictors against penetration of the Energy Efficiency Assessment Plan as the outcome variable came up with no significant observations. This is possibly due to the fact that not many of the non-participants were aware of the EEAP programme, and therefore they was not enough data to carry out the operation. It is also possible that programme penetration is not dependent on the predictor variables, such as gender. This would suggest that programme penetration, and awareness of the programme, is evenly spread over the community.

6.3.3 An Analysis of the Effectiveness of the Energy Efficiency Assessment Plan

The effectiveness of the Energy Efficiency Assessment Plan resulted from analysis of a number of factors. These include an analysis of programme outcome variables, and from the additional criteria that were discussed in Chapter Five. Each of these will be discussed separately with the overall effectiveness being discussed in Section 6.3.3.3.

6.3.3.1 An Overview of Programme Outcome Variables

The most significant of the findings is that programme participants intend to spend significantly more on energy efficiency actions in the next twelve months ($f=8.28;p<0.000$). This suggests that EEAP has been successful in facilitating the purchase of energy efficiency technologies.

Another interesting finding in this analysis was that a predisposition to being involved in energy efficiency did not necessarily lead to involvement in EEAP. What this means is that respondents who have spent a significant on energy efficiency actions over the last twelve months, and are active in energy efficiency are more likely to become involved in the programme as they have an interest in energy efficiency. This hypothesis was not significant which may suggest that if respondents are already actively involved in energy efficiency they may not see the need to have an energy audit of their home because they believe they are already doing enough. This attitude of already doing enough is likely to be a common reason for not becoming involved in the programme, along with the financial constraints of programme participation. It would be useful to test this hypothesis in another study.

Demographics are very useful in explaining participation in the programme. Participants generally own the home on which the audit was performed, are in higher socio-economic groups, according to the Elley-Irving socio-economic index, and have higher levels of education.

It is difficult to assess how opinions to environmental and energy issues may affect participation in the programme, and energy efficiency actions of participants and non-participants. No clear pattern emerged from the analysis, with this suggesting that the motivations for involvement in the programme are not predominantly environmental.

Analysis suggests that non-participants, although unsure of energy efficiency actions to be taken in the next twelve months, consider themselves energy efficient already. This is shown by the fact that actions in the last twelve months were not significant in determining participation or non-participation. This may help to explain why these respondents did not become involved in EEAP.

6.3.3.2 An Analysis of Additional Effectiveness Criteria

In addition to the factors mentioned above, there a number of other criteria that can be used to determine the effectiveness of the EEAP. These criteria have been discussed in Chapter Five and include:

1. The actions induced in the next twelve months because of the programme compared with the actions which would have been carried out in the next twelve months if the participant had not been involved in the programme.

2. The motivations of the participants becoming involved with the programme compared with the motivations the programme intended to induce.
3. Satisfaction with EEAP.
4. The penetration of Southpower energy efficiency information programmes in the community, with specific reference to EEAP.

Criteria One

The energy efficiency actions that people had performed or intended to perform in their homes were listed, and then a value given to these actions based on the estimated current market price. The values of the actions was then totalled for each period of time questioned in the survey. A value for the average expenditure on energy efficient actions in the respondent's homes was then calculated for each period, with the results being presented in the following table (Table 6.15).

TABLE 6.15 A Comparison of Expenditure on Energy Efficiency Actions

	EEAP PARTICIPANTS	EEAP NON-PARTICIPANTS
Average per household over the last twelve months	$302.26	$355.97
Average per household over the next twelve months	$871.29	$42.58

This table shows that, in terms of financial expenditure on energy efficiency actions, EEAP appears to have had a major impact on programme participants. What is also interesting to note is that non-participants on average spent more per household over the past 12 months. This helps to explain why they may not have become participants in the programme - clearly they are already involved in energy efficiency around their home and may not feel there is a need for more advice on how to become more energy efficient. It is possible that this observation may result from a sampling error, and this observation is supported by the findings of the analysis of outcome variables. This analysis suggested that participation in EEAP lead to significantly more expenditure on energy efficiency actions over the next 12 months ($t=8.28;2p<0.000$).

Participation or non-participation as an outcome variable, with the energy efficiency action over the last twelve months was not seen as significant ($f=1.35;p<0.179$).

However, the programme has induced participants to become more sure of future actions, than non-participants. A more useful was to present this

data is to consider what programme participants would have spent in the next twelve if they had not had the EEAP performed on their home (Table 6.16).

TABLE 6.16 Marginal Difference of Expenditure With or Without EEAP

Average Expenditure Per Household in the Next 12 Months Induced by EEAP	Average Expenditure Per Household in the Next Months Without EEAP	Marginal Difference
$871.29	$390.00	$481.29

This table clearly indicates that the programme has induced double the expenditure on energy efficiency actions, suggesting that participants have become more involved in energy efficiency, and that the programme has helped people identify areas where they can improve on energy efficiency in their home. Therefore the EEAP has been very successful in meeting certain objectives such as increasing and facilitating the purchase of energy efficient products, implementing energy efficiency measures. This observation is backed up by the tests of statistical significance which indicated that programme participants intend to spend significantly more in energy efficiency actions in the next twelve months ($f=8.28; p<0.000$). From the survey and the results it is not possible to determine whether the programme has facilitated the purchase of products and technology from Southpower itself or some other retail or trade outlet. If it were possible to keep track of the programme participants purchasing practices it would be easier to evaluate the programme on the basis of this criteria.

Criteria Two

The motivations of participants for becoming involved in the programme were determined by questioning in the written survey and from the discussion in the interviews. The motivations for participation of the Energy Efficiency Assessment Plan were determined by surveying Southpower staff who were involved with the programme. Both sets of motivations are summarised in Table 6.17.

TABLE 6.17 A Comparison of Motivations for the EEAP

Motivations of EEAP Programme Participants	Motivations of the EEAP
• To help reduce excessive power bills • To increase the energy efficiency of the home • To learn more about energy efficiency	• To help the consumer save energy and therefore money • To increase awareness of energy efficiency among participants

The motivations can be grouped into two main areas: to save money and to become more energy efficient. It cannot be determined from these findings whether the motivation to become involved in EEAP was driven by financial or environmental factors, but it is clear that saving money is an important factor in the decision to get an audit prepared for the home.

It is evident from a comparison of motivations that participants are becoming involved in the EEAP for the same reasons that Southpower believe they should. This is indicative of an effective promotion and marketing strategy. It may be possible to capture a larger audience if environmental factors were also included in a marketing strategy. This may have an appeal to the group of consumers who are concerned about the environment, and are prepared to take measures to ensure that the environment is protected. Given the prominence of energy issues in the environmental debate, with concern over global warming for example, this may be an effective strategy to pursue.

Criteria Three

Satisfaction with the service was determined from the interviews with programme participants. Overall, the level of satisfaction with the Energy Efficiency Assessment Plan seems to be good. Participants indicate that the audit generally gave them what they expected. Some suggestions were made by participants on increasing customer satisfaction, but these suggestions were generally related to specific needs of participants. For example, Respondent One felt there should be more one on one contact when the audit was being conducted, and that recommendations would be more useful if advice was given when the home was being assessed. To some extent this would be possible, but some of the recommendations are only made after an analysis of the data collected. Other respondents indicated that informal recommendations were given at the time of the audit, and that these recommendations were very useful. It is likely that these informal recommendations resulted from discussion with the auditor at the time of the audit, and so it is up to each individual participant to gather these recommendations. This increased contact with the customer may depend on the auditor and how comfortable they are with such contact, and confident they are is giving advice on the spot. If the auditor was unsure about an issue raised it would be appropriate to suggest that some discussion was required with other staff at Southpower and the auditor could either include the findings in the written report, or report back to the participant in the person.

Another criticism of the EEAP was offered by Respondent Two. This criticism was based around what respondent two saw as the lack of technical information in the report. This participant wanted advice on the heating requirements of specific rooms in the home, and found that the auditor could not provide the information required. This criticism was balanced by

comments by respondent three, who felt that the audit provided useful information on the most effective forms of heating for a specific room.

Clearly these criticisms are more related to the individual and what their needs are, so it is difficult to transform these criticisms into suggestions for improvements. It should be noted that individual participants will have slightly different specific requirements, as opposed to the general motivations of programme participants. It would be useful to gather these criticisms during one of the follow-ups as it may be that some of these criticisms are similar to several participants, and something could be done to deal with them.

Respondent Five was very satisfied with the EEAP of the home, saying that it was "very much worth the $80" and "we were very happy with it". Further to this, the following comment was also made:

"Southpower do tend to address the concerns of the customer when they do the audit. They seem prepared to listen in most cases to the concerns of the participants and deal with them in the report. They also seem to give informal advice at the time of conducting the audit" (Respondent Five, EEAP Participant)

Respondent three found that the audit lived up to expectations. Further to this the respondent "expected advice and...wanted to know where if...was going to spend money whether it was worth it or not...it was good and I was pleased with it".

Overall, therefore, satisfaction with the service is high, with the criticism's made being very specific to the participant, rather than being a criticism of the programme as a whole.

In considering satisfaction, it is also useful to examine the idea that participant's are more likely to be satisfied and to uptake recommendations if these recommendations are what they expected. To determine this, the EEAP participants who were interviewed were questioned as to what they thought were the problems prior to the audit. Respondent Three suggested that "a lot of things I found I probably already knew talking to the guys...[but] it is nice to have it confirmed". This respondent was also very happy with the survey, as was indicated above, as was the following respondent. The survey "identified all the things we wanted it to identify" (Respondent Four), suggesting that the participant was aware of the problem areas prior to the audit, and the audit confirmed these problem areas. Respondent One thought that "they would say about lagging pipes and insulation in the ceiling", but it seems that these issues weren't dealt with, and this respondent also had some criticisms of the programme. This is a very coarse analysis of the idea of expected recommendations affecting satisfaction and uptake of recommendations, but does reinforce on the idea that the auditor should spend some time with participants prior to the audit

to identify their concerns, and then try to deal with them, and other problems, in the report.

Criteria Four

Four levels were used to assess the penetration and awareness of the EEAP in the community:

Level One	Awareness of any energy efficiency information programmes being run by Southpower
Level Two	Awareness of the Energy Efficiency Assessment Plan
Level Three	The respondent has tried to get more information on EEAP
Level Four	The respondent is considering getting an EEAP performed on their home

Percentage values shown indicate the percentage of those in the level above who have proceeded to the next level, with the hierarchy of programme penetration being presented in Table 6.18.

TABLE 6.18 The hierarchy of programme penetration

LEVEL ONE Aware of Energy Efficiency Programmes Run by Southpower
59.68%
LEVEL TWO Aware of EEAP
22.58%
LEVEL THREE Tried to get more Information on EEAP
28.57%
LEVEL FOUR Considering getting an EEAP performed on home
23.08%

This table shows that nearly a quarter of respondents had heard of the Energy Efficiency Assessment Plan, with nearly 30% of these people seeking more information on the programme. As a result, in terms of programme awareness, the EEAP has been relatively successful, and to go one step further, it can also be considered successful on the basis on programme penetration into the fourth level.

6.3.3.3 The Effectiveness of EEAP

EEAP has been effective in targeting the group of consumers it intended, the middle to higher socio-economic groups. However, it has been less effective in the penetration of the programme into its consumer base. Only a quarter of its consumer base were aware of EEAP, with no significant pattern in the variables which could explain this awareness. Southpower needs to improve this level of penetration. A factor which may affect the level of penetration is the cost of the audit. A number of respondents indicated that they thought the service should be free. Therefore, if Southpower do go ahead with planned changes, and make EEAP free to consumers, then it is likely that more people will try and get more information on EEAP, and consider getting one performed on their home.

Participants, on the whole, we very satisfied with EEAP, with satisfaction tending to lead to an uptake of recommendations. As was discussed previously, this satisfaction could be improved, thereby making the programme more effective, by discussing the participants concerns when conducting the survey. If the participant feels that their concerns have been dealt with adequately they are more likely to accept the other recommendations given in the audit.

In terms of motivation, EEAP has once more been successful. The participants are becoming involved in the programme for the same reasons as Southpower intended, with this suggesting that participants are more likely to get what they want out of the programme. For example, if a participant became involved in order to have personal energy actions examined then satisfaction would not be great, given that the programme audits the home rather than its occupants. This is likely to result in less uptake of recommendations.

The programme has been highly effective in inducing participants to spend significantly more on energy efficiency actions in the next twelve months than they would have if they had not had the audit prepared for their home. As had been discussed previously one has to be careful in analysing self-reported data. This is an intention to spend and not necessarily what they will actually spend in the next twelve months. This reinforces the need for a follow-up to determine what was actually spent, and to gather that data more effectively than relying on self-reported information. In order to meet the objectives of the programme better, it would be appropriate to determine whether the energy efficiency products and technology were purchased from Southpower or one its connected tradespeople. One of the objectives of EEAP is to increase and facilitate the purchase of energy efficiency products and technologies from Southpower and their connections. If Southpower want to determine this then they need to become more aggressive with providing suggestions as to where participants can purchase the products necessary to carry out the recommendations. If sales staff could determine if the sale resulted from EEAP then this could be determined. Useful also,

would be the follow-up after twelve months, as mentioned previously. This could help determine where the participant purchased the products and technology, and the person conducting the follow-up could also determine at this point why the participants chose the supplier they did, whether this is Southpower or not. It would also be useful to determine whether the financial package offered by Southpower was used in the purchase of equipment and products. This would help to determine how aware participants are of the package, and why the participant may have chosen not to use the financial package offered by Southpower.

6.3.5 A Summary of Recommendations

Contact with programme participants suggests that they are more likely to uptake the recommendations in the written report if they are in line with what they expected. What this suggests is that auditor's should spend some time with participants prior to conducting the audit, to ascertain what their concerns and to see whether these concerns can be dealt with in the audit. If is not possible to deal with the issues raised in this meeting then these concerns should be noted in the written audit with stating the reasons why they could not be dealt with.

Follow-up is another very important aspect of the programme. It would be useful in determining and increasing the effectiveness of the programme. Follow-ups would provide a memory jog on recommendations which have not been implemented, thereby possible increasing the uptake of recommendations, as well as providing Southpower staff the opportunity to push their products and technology. These recommendations are summarised in Table 6.19.

6.4 An Overview of Recommendations

The Energy Efficiency Assessment Plan (EEAP) was developed by Southpower to address a number of issues. First, Southpower wanted to give themselves a profile in the area of energy efficiency and to promote themselves as being environmentally aware. Secondly, they wanted to increase customer awareness of energy efficiency, and provide advice to the consumer on how they could improve their energy efficiency. And finally, they wanted to facilitate and increase the sales of energy efficient products and technology.

In order to fully evaluate the effectiveness of the programme it would have been necessary to consider all of these objectives, and to design criteria for assessing whether they were being met. However, it was not possible to deal with all these issues in this evaluation, as it is very difficult to establish attribution in a number of cases. For example, it is difficult to assess whether the programme itself has been responsible for increasing customers awareness of energy efficiency. In order to do this it is necessary to

determine all the sources from which they receive information on energy efficiency, and assess the role of EEAP as a source.

Other objectives can not be dealt with given the structure of the programme. As the programme is currently operated it is not possible to assess whether the programme is facilitating and increasing the purchase of energy efficient technology and products from Southpower and its associated tradespeople. To determine this in the future a follow-up needs to be conducted, and in conjunction with this, Southpower and its tradespeople need to determine whether purchases are motivated by participation in the programme. This would simply involve questioning customers at the time of purchase. The follow-up would involve contacting the participants at three points. First, the participants should be contacted two weeks after receiving the audit to assess whether the recommendations were clear, and at this stage could also provide suggestions as to people who could carry out the recommendations for them. It could also be assessed whether the participant has already implemented some of these recommendations, and where they purchased the products and technology. Second, a follow-up should be carried out at six months after the audit. This follow-up could act as a reminder of the audit and recommendations, and could be used to determine which have been implemented in the past six months. And lastly, the final follow-up would be twelve months after the audit, with the purpose being the same as the second follow-up.

These follow-ups also have a number of other purposes. They are useful in determining satisfaction with service, and could be used to get suggestions from participants on how to improve the programme.

With regards to the operation of the programme, Southpower needs to be more aggressive in suggesting tradespeople and retail outlets. The original report should contain examples of the prices of the products suggested in the recommendations, along with where these products could be purchased. To reinforce this, mention should also be given here to the financial packages offered by Southpower for the purchase of products and technologies from themselves or one of their connected tradespeople.

Overall, however, the Energy Efficiency Assessment Plan has been effective in terms of the criteria used in this evaluation. Most importantly, participation in EEAP has lead to significant energy efficient actions being undertaken around the home. Also, this evaluation has led to the development of a number of practical and implementable recommendations for improving the process and impact of the programme.

TABLE 6.19 A Summary of Recommendations for Improving the Impact of EEAP

- A well-planned follow-up needs to be developed. As was mentioned with reference to the process evaluation, the follow-ups would be useful in determining satisfaction with the service, energy efficiency actions implemented as a result of the audit, and to provide advice to programme participants on tradespeople and retail outlets to purchase energy efficiency products and technologies.
- In order to assess whether the participants have saved energy as a result of the programme, graphs of energy use twelve months before the audit, and twelve months after need to be prepared and contrasted. Twelve months is an appropriate length of time as it allows for seasonal fluctuations. These graphs would also be useful for determining the effectiveness of the programme.
- More contact between programme participants and the auditor. The auditor should spend time with participants prior to the audit to assess the participant's concerns with regard to energy use in their home. The auditor could address these issues at the time of interview or include them in the report.
- More work needs to be done to ensure that the penetration of the programme into the consumer base is improved. This may involve an improved promotion strategy, or could result from offering the service free. If the programme is to be offered free then the penetration of the programme should be assessed after this change has been implemented to assess whether this is the cause of the poor penetration. If not, then promotion needs to be improved.
- Currently the programme involves middle to higher socio-economic groups. If the programme is to be offered free, then this may allow people from the lower socio-economic groups to participate. If this does not result in the wider participant group then consideration needs to be given to other factors which may affect uptake of the programme, such as a belief on the part of non-participants that they are already energy efficient. If this were the case then the programme needs to be altered to appeal to these people. This may require some market research.
- It may be possible to extend the programme to cover the energy efficiency behaviour of the occupants, rather than just the home itself. This may be achieved by the preparation of some brochures offering handy hints to the consumer, and could be included in the written report.

CHAPTER SEVEN

CENTRALPOWER CASE STUDY: HOME ENERGY RATING OPTIONS PROGRAMME

7.0 THE HOME ENERGY RATING OPTIONS PROGRAMME

The Home Energy Rating Options Programme (HERO) is a home energy audit developed by the Electricity Corporation of New Zealand (ECNZ) and the Building Research Association of New Zealand (BRANZ). It was designed specifically for the domestic sector, and was based on similar systems operating in the United States of America and Australia. The audit itself involves trained home energy assessors visiting the participant's home and noting details of its, size, construction, insulation and heating systems. The programme is designed to be totally energy neutral, covering all energy forms including electricity, gas, coal, wood and solar.

Development of HERO involved more than twelve months of extensive trialing which included a pilot scheme conducted in Wanganui as a joint venture between ECNZ and the local power company, PowerCo. Development also involved consultation with key groups such as the Energy Efficiency and Conservation Authority, the Maruia Society, the Gas Association of New Zealand, and Ministry for the Environment. The technical details were developed and refined using the independent expertise of BRANZ.

A key component of the programme is the rating scheme, which was developed by BRANZ. This involves analysing the data collected in the audit using a computer package designed specifically for the task, and from these results awarding the house an overall star rating. This star rating is on a scale from one to ten stars, where 'one' would indicate an inefficient house and 'ten' a very energy efficient house.

Accompanying the star rating is a report which rates the major energy uses in the house, lists the options for upgrading and gives projections of expected savings following these upgrades. The analysis of the home does not involve assessing the energy actions of the occupants of the house, but rather just the house itself, irrespective of occupants. In this way the star rating remains with the house after the occupants leave, and it is hoped that the star rating will eventually aid the resale of the houses on which a HERO was been prepared.

In addition to the star rating, and recommendations to improve the energy efficiency of the audited homes, the audit report contains information brochures on energy efficiency. These brochures offer advice to the occupants of the home on how they can improve their energy efficiency actions in different rooms in the home. The combination of the written audit report and the information brochures provides a comprehensive package in terms of energy efficiency of the home and its occupants.

The HERO programme was implemented via a nationwide franchise network, with the programme being offered to all local power companies. If a power company chooses not to purchase the franchise then a power company which has purchased the franchise can offer the programme to the other power company's consumers.

CentralPower was one of the power companies who has chosen to purchase the franchise, and has been operating the HERO scheme for over six months. As with all franchise holders the team at CentralPower was specially trained to assess the energy use in homes using the HERO formula.

7.1 THE PROGRAMME'S OBJECTIVES

The objective's of the Home Energy Rating Options (HERO) programme were determined by surveying those at CentralPower who were involved with the programme. Section 5.2 discusses this process in more detail. Determination of these objectives provides a clearer picture of the goals of the programme, and provides a basis for determining the effectiveness of the programme. The objectives are outlined in Table 7.0.

TABLE 7.0 The Objectives of HERO

- To increase the awareness and profile of CentralPower in the community, and to maintain their customer base
- To promote energy efficiency
- To increase sales of energy efficient goods and services
- To promote energy efficiency
- To improve customer service
- To gain a better understanding of domestic customer usage patterns
- To ensure customer's are gaining the maximum benefit from their investment in energy ie to raise customer's comfort levels in their homes

7.2 THE PROCESS EVALUATION

As was discussed in Section 5.3.1, the process evaluation for the HERO programme was not seen as appropriate at this stage in the development and operation of the programme.

7.3 THE IMPACT EVALUATION

7.3.1 A DESCRIPTION OF SURVEY RESPONDENTS

The information collected in the surveys was analysed in terms of frequency distribution and it is this information which is used here to provide a profile of programme participants and non-participants.

7.3.1.1 Programme Participants

Of the 86 surveys distributed to people who had a Home Energy Rating Options assessment performed on their household, 42 returned their mail survey's (49% response rate). The demographic profile of respondents is summarised in Table 7.1.

TABLE 7.1 Demographic Profile of HERO Participants

- 64% of respondents were male, and 73.8% were married
- A third of respondents were in the 35-44 year age group (33%)
- The composition of most households was from two to three occupants (57%), with over 50% of respondents (54.8%) being in the top three of the Elley-Irving socio-economic index, and 58.8% of the second occupant of the household being in the same grouping
- Over 50% of respondents (52.4%) have some form of tertiary qualifications, with 31.8% of these being some form of post- graduate qualification. Under a fifth of respondents (16.7%) had no formal qualification

In addition to these observations, the majority of respondents own their own home. Detail of other information related to the structure of the homes of respondents is summarised in Table 7.2.

TABLE 7.2 Structural Information on HERO Participants Homes

- The length of time that respondents have been living in the home varied, but 54.8% have been in the home for less that 5 years
- The ages of the homes vary from 1 to 95 years old, with no distinguishable trend, with the predominant materials being brick or wood
- 50% of respondents do have insulation in their walls, with 78.6% having insulation in the ceiling. Over 50% of respondents (52.9%) made the decision to insulate themselves

As with the information from the Home Energy Rating Options programme results, it is difficult to analyse the significance of insulation in the homes. This is because it is not possible to determine whether this insulation was in the home before the audit, or was installed as a result of the audit. Similarly, the reason for respondents not making the decision to insulate their home may be that it was in the home when they purchased it, making the significance of this difficult to analyse also. Insulation in the home will

also depend in when the home was built, and what the building regulations were at the time.

A number of questions to determine the environmental values and attitudes of the respondent were included in the survey, with the summarised findings presented in Table 7.3.

TABLE 7.3 The Environmental Values and Attitudes of HERO Participants

- Nearly all respondents (92.9%) agree that New Zealand should develop its own energy resources to their fullest potential, with same number (92.9%) believing that renewable sources of energy should be developed
- The majority of respondents (97.6%) also believe that individual action can make a difference in reducing air pollution
- Respondents feel strongly (80%) that global warming is not only a problem for future generations, with the remaining 20% of respondents being split in their opinions
- 46.3% of respondents agree that New Zealand has an abundance of energy resources, with only 24.9% disagreeing
- Opinion was spread not the issue of whether the rights of endangered species should be put ahead of employment
- 81% of respondents did not believe that New Zealand was unaffected by global environmental issues
- Opinion on the abundance of rivers in New Zealand available for hydroelectricity development was also spread, with 40.5% disagreeing and 42.8% agreeing
- Similarly, 39% of respondents felt that New Zealand should not fully utilise its coal resources for energy production, and 41.4% believed we should

Some interesting points come out of these results. First, nearly half of the programme participants believe that New Zealand has an abundance of energy resources. This would suggest that people are participating in the programme for reasons other than a concern over the limited energy resources in New Zealand. Other concerns may be the effect of energy use on the environment, which is reflected in the concerns of participants for things such as global warming, and air pollution. And second, opinion is split over which of our energy resources we should be developing in the future, such as coal and hydroelectric. However, the majority of participants believed that renewable sources of energy should be developed.

The sources of initial information about HERO include information that came with the power account and from suggestions by CentralPower staff. The sources and corresponding numbers are presented in Table 7.4.

TABLE 7.4 Sources of Information about HERO

26.2%	• Information that came with power account
4.8%	• In CentralPower newsletter
4.8%	• A flier in the mailbox
4.8%	• Through a trade supplier
23.8%	• Suggested to you by CentralPower staff
11.9%	• In the newspaper
23.8%	• Other

Other sources of information include that the respondent was involved in the implementation of HERO at CentralPower and was interested in seeing how the audit was carried out, and other respondents were CentralPower board members and were also interested in seeing how the audit was conducted.

Respondents were also questions on their values and attitudes towards energy issues more specifically (Table 7.5).

TABLE 7.5 The Values and Attitudes of HERO Participants to Energy Issues

- Opinion varied on whether New Zealand had a good record for energy efficiency and conservation
- Respondents were more opinionated on whether New Zealand would face energy shortages in the next 20 years, with 61.9% agreeing
- The majority of respondents (97.6%) felt that energy conservation was not a waste of time, with all respondents believing that more should be done to educate people on energy efficiency
- 71.4% of respondents felt that the government should be responsible for promoting energy efficiency and conservation, while all respondents felt that the local power company should actively promote energy efficiency and conservation
- The majority of respondents (88.1%) felt that financial incentives should be provided to help people save energy

Programme participants felt very strongly about some of the energy issues given to them in the survey. It is interesting to note that the majority of respondents felt that New Zealand would face energy shortages in the next 20 years, yet nearly half of the respondents believed that New Zealand has an abundance of energy resources. This may suggest that respondents are more concerned about short term energy supply, than with longer term considerations. Also it is possible that participants believe that we have enough energy resources at present, but that we are likely to face shortages in the future if something is not done now, hence their participation in the programme.

The majority of respondents (71.4%) had carried out some form of energy efficiency action in their home in the last twelve months, with 76.2% intending to carry out some energy efficiency actions in the next twelve months. What this seems to suggest is an active involvement in energy

efficiency prior to becoming involved in the programme. Under half the respondents (40.5%) indicated that they would have carried out some energy efficiency actions in the next twelve months if they had not had the audit prepared for their home. What this implies is that the programme had induced significant action in terms of the intention to carry out some energy efficiency actions around the home. In terms of more general energy efficiency behaviour, 82.5% of respondents indicated that they frequently turn off the lights when they are not in the room, and similarly 67.5% of respondents indicated that they heat only the room they are using.

Another variable which is useful in describing participants in HERO is their understanding of energy efficiency. A comparison of participants and non-participants understanding of energy efficiency may have been useful as another criteria for determining the effectiveness of HERO, but this information was not collected from non-participants. Therefore the information discussed here will just be used to help build a profile of programme participants. Table 7.6 provides an outline of responses to a questions in the interviews on participants understanding of energy efficiency.

TABLE 7.6 HERO Participants Understanding of Energy Efficiency

- "It is getting dollar value I guess. As a consumer, getting value for the dollar"
  (Respondent One, HERO Participant)
- "Being able to get the most out of what resources you use without wasting...only finite amount of energy around with current technology...so need to make the most of it"
  (Respondent Two, HERO Participant)
- "To give ways and means of saving energy...saving money"
  (Respondent Three, HERO Participant)
- "Not wasting it...dollar saving"
  (Respondent Four, HERO Participant)

Participants generally tie the concept of energy efficiency with saving money. Only one of the participants considered the future of energy resources as being a reason to use energy more efficiently. This would suggest that, on the whole, participants are more concerned about the financial aspect of energy efficiency, than the environmental.

7.3.1.2 Non-participants

Of the 100 surveys randomly distributed in the CentralPower area 49 were returned, resulting in a 49% response rate. An analysis of demographic details of respondents is summarised in Table 7.7.

TABLE 7.7 The Demographic Profile of Non-Participants in HERO

- 76% of respondents were female, with the over half of the respondents (52.2%) being in the 25-44 age group
- Over 80% of respondents were married (64%)
- The number of occupants in the home varied from one to five with the majority being in the 2-4 range (72%)
- 66% of respondents were in the range of 3-4 on the Elley-Irving socio-economic index, with 38.4% of the second occupant of the home being in the same range
- Nearly half of the respondents (46%) had some form of tertiary qualification as their highest level of education, with 48% having either no formal qualification, or at the school certificate only

Details of information related to the structure of the homes of respondents is contained in Table 7.8.

TABLE 7.8 Structural Information of Non-Participants Homes

- Nearly three-quarters of respondents (74%) owned their own home
- The length of time in the home and the age of the home varied, but over one-fifth of respondents (20.4%) had only lived in the home for the last one year
- Most of the homes were constructed of either wood or brick (85.4%)
- Over 50% of respondents (52.3%) had insulation in the walls of their home, with 79.5% having insulation in the ceiling. Only 38.9% of respondents made the decision to insulate

As was mentioned previously it is difficult to assess the significance of whether the respondents home has insulation and whether the respondent made the decision to insulate.

The responses of the respondents to the environmental values and attitudes questions are summarised in Table 7.9.

TABLE 7.9 The Environmental Values and Attitudes of Non-Participants in HERO

- 86% of respondents believe that New Zealand should develop its own energy resources to their fullest potential, with nearly all respondents (92%) believing that renewable sources of energy should be developed
- 96% of respondents believe that individual action can make a difference in reducing air pollution
- Opinion is varied on whether New Zealand has abundant energy resources, with 28% disagreeing and 44% agreeing
- Similarly, opinion is varied on whether the rights of endangered species should be put ahead of employment, with 44.9% disagreeing and 18.4% agreeing
- 82% of respondents think that global warming is a problem not only for future generations, and 88% of respondents also believe that New Zealand is affected by global environmental issues, such as global warming
- Opinion is also varied on issues relating to meeting our future energy needs, such as whether New Zealand has an abundance of rivers available for hydroelectricity development, and the development of our coal resources for energy production

The majority of respondents believe that New Zealand should develop its own energy resources, but are unsure which of our energy resources should be developed, such as coal and hydroelectric. However, there were more clear in their belief that renewable sources of energy should be developed.

The following table (Table 7.10) presents information on the awareness of respondents to the energy efficiency information programmes being run by CentralPower, and more specifically the Home Energy Rating Options Programme.

TABLE 7.10 A Description of the Awareness of Respondents to HERO

- Under a third of respondents (30.6%) were aware of an energy efficiency information programme being run by CentralPower, with with same number of respondents being aware of HERO specifically
- The majority of respondents (40%) had heard of HERO from information that came with their power account
- None of those who had heard of HERO had tried to get more information on the programme
- 54.5% of respondents were only prepared to pay the minimum value stated in the survey ($50) for HERO, with a further 29.5% indicating on the survey that they would not pay for the service or that it should be offered free

These observations suggest that nearly a third of CentralPower consumers are aware of HERO. However, they have gone no further in trying to find out more about the programme, or are considering getting a HERO prepared for their home. Awareness of the Home Energy Rating Options programme came from a number of sources, and these are summarised in Table 7.11.

The most effective forms of promotion seem to be information that is contained with the consumers power account, and advertising in the newspaper.

TABLE 7.11 The Sources of Awareness of HERO

40.0%	• Information that came wit power account
13.3%	• In CentralPower newsletter
6.7%	• A flier in the mailbox
6.7%	• Through a trade supplier
0%	• Suggested to you by CentralPower staff
20.0%	• In the newspaper
13.3%	• Other

A description of respondent's data relating to their values and attitudes to energy issues is summarised in Table 7.12.

TABLE 7.12 The Values and Attitudes of Non-participants to Energy Issues

- A number of respondents (44%) were uncertain about New Zealand's record for energy efficiency and conservation, and also whether New Zealand would face energy shortages in the next 20 years (32%)
- The majority of respondents (93.8%) thought that energy conservation was not a waste of time, with 98.0% of respondents believing that more should be done to educate people on how to use energy more efficiently
- The majority of respondents (89.6%) think the government should be responsible for promoting energy efficiency and conservation, and that the lower power company should actively promote energy efficiency and conservation (89.8%)
- 90% of respondents think that there should be financial incentives to help people save energy

The uncertainty over whether New Zealand would face energy shortages in the next 20 years reflects the difference in opinion on whether New Zealand has abundant energy resources. This suggests that non-participants do not have well formed opinions over the future of energy resources in New Zealand.

The description of energy efficiency actions is as for HERO participants, with consideration here being given to energy efficiency actions in the last twelve months and the next twelve months (Table 7.13).

TABLE 7.13 The Energy Efficiency Behaviour of Non-participants

- Just over half of the respondents (58.7%) indicated that they carried out some energy actions in their home in the last twelve months, with just under half of the respondents (45.7%) indicating that they intend to carry out some energy efficiency actions in their home in the next twelve months
- The majority of respondents (85.7%) indicated that they frequently turn off lights when not in use, and 83.3% of respondents indicated that they only heat one room rather than the whole house

The energy efficiency actions are only general at this stage. A more detailed analysis of energy efficiency actions is provided later in this chapter.

7.3.1.3 A Comparison of Respondents - Participants and Non-participants in HERO

Demographic predictors were the most useful in comparing participants and non-participants. Significantly more males participated in HERO than females ($t=3.45; 2p<0.0009$). However, surveys were generally addressed to two occupants of the home, and it may be that the male member of the household chose to full in the survey. Therefore it cannot be assumed, given this finding, that males are more likely to participate in HERO.

More significant, however, is that people in the 35 to 65 or over age group are more likely to be involved in the programme ($f=10.43; p<0.000$). This is probably because people in these age brackets have a higher disposable

income, given that it is likely that they are no longer responsible for some many members of the household (children), and may have less financial commitments such as mortgages. Marital status is also a useful predictor, with significantly more married couples being involved in the programme ($f=3.21;p<0.011$). This observation supports the previous, suggesting a higher disposable income. This observation is once again supported by another predictor, with respondents in the 1 to 3 range on the Elley-Irving socio-economic index, more likely to become involved in the programme ($f=3.04;p<0.005$). This also suggests are higher disposable income.

The level of education of the respondents was also significant in terms of programme participation ($f=2.82;p<0.015$). Those respondents who had some form of tertiary qualification, including postgraduate, as their highest level of education were more likely to participate in the programme. However, there was also a significant number of respondents with university entrance as their highest level of education, who participated in the programme. This may be explained by the age spread of participants mentioned previously, with older participants likely to have less education based on the changing education system in previous decades. Going to university used to be the domain of few, with more vocational occupations dominating. Now a relatively high proportion of the population is choosing to attend university in order to secure employment.

In comparison, non-participants had, on average, more occupants in the home, which would suggest less disposable income. This is supported by the observation that the non-participants are lower on the Elley-Irving socio-economic index than programme participants. What this suggests is that non-participants have lower incomes, and combined with the larger number of occupants in the home would suggest less disposable income to spend on things such as home energy audits. A similar number of participants and non-participants had some form of tertiary qualification, but a significantly larger percent of participants has post-graduate qualifications.

Non-participants were more uncertain in their attitude to whether New Zealand has an abundant energy resources, with opinion varying, contrasted with participants, with nearly half believing that New Zealand has an abundance of energy resources. This suggests that participation in the programme may not result from a concern over the future of New Zealand's energy resources. However, this situation was reversed when questioned on whether New Zealand would face energy shortages in the next 20 years. The majority of participants agreed that we would, whilst non-participants were uncertain. What this suggests is that participants believe that we have enough energy resources at present, but that we are likely to face shortages in the future if something is not done now, hence their participation in the programme.

Another useful comparison is to consider the energy efficiency actions of participants and non-participants over the last twelve months and the next twelve months. Nearly half of non-participants indicated that they have carried out some energy efficiency actions in the last twelve months, and intend to carry some out in the next twelve months. This is compared with nearly three-quarters of participants who have carried out some energy efficiency actions over the past twelve months, and the similar number intending to carry out some energy efficiency actions in the next twelve months. This suggests that non-participants are already involved in energy efficiency, with the belief that they are already energy efficiency perhaps explaining non-participation. This finding was not significant in terms of the statistical analysis, however, participants do intend to spend significantly more one energy efficiency actions in the next twelve months ($f=2.01;p<0.029$). This suggests that the programme is effective in increasing the involvement of participants in energy efficiency, in particular expenditure on energy efficiency products and technology.

Overall, therefore, HERO participants are not a cross section of the general population, with higher incomes, and higher education levels than non-participants. Also, programme participants generally intend to take more energy efficiency actions than do non-participants, most likely as a result of programme participation.

7.3.2 AN ANALYSIS OF PROGRAMME OUTCOME VARIABLES

The Minitab programme was used for the statistical analysis, with the specific use of the t-test and f-test. The outcome variables selected for analysis were as follows:

1. The marginal energy efficiency actions induced by participation in the programme.
2. The intention to act.
3. Penetration of the Home Energy Rating Options Programme.

A more detailed description of these outcome variables is found in Section 5.4.2. Care needs to be taken when using the intention to act as an outcome variable. This variable relies on self-reported intended actions, rather than actions that were actually implemented. Due to the time frame of this research it was not possible to track energy efficiency actions for the twelve months following participation in the audit, or to track the energy efficiency actions if the control group.

The predictor variables include the following, with a more detailed description of these predictor variables in Section 5.4.2:

1. Demographic details of respondents
2. Whether the home is owned or rented
3. The attitudes and opinions of respondents to selected environmental issues

4. The attitudes and opinions of respondents to selected energy issues
5. The current energy efficient behaviour of respondents

7.3.2.1 Marginal Actions as the Outcome Variable

Gender is the only predictor of the marginal energy efficiency actions induced by the programme ($t=2.14;p<0.042$). Males participants spend significantly more on energy efficiency actions than female participants. However, as was mentioned previously, survey's were often addressed to two members of the household and it may be that the male member chose to complete the survey, therefore this observation should not be used to imply that males are more likely to be involved in energy efficiency.

None of the other predictors were significant in terms of marginal actions and given this finding it is therefore difficult to explain marginal actions in terms of the other predictors chosen for this study.

7.3.2.2 The Intention to Act as the Outcome Variable

Ownership of the premises on which the energy audit was prepared is a useful predictor of intention to act ($t=3.62;p<0.0006$). This observation suggests that if the participant owns the home then they are more likely to be prepared to implement energy efficiency actions. Most likely this is because home owners are more prepared to invest capital in their home because they own it and are in the home for a a period of time of the their choosing. However, people who rent their homes are in the homes for a finite period of time, and are less likely to be prepared to invest capital in the home. Renters, if they choose to be more energy efficient, are more likely to carry out improvements in their own use of energy, such as turning off lights, and heating only one room, than insulating the walls.

There were a number of environmental and energy attitudes and opinions which were useful predictors of the intentions of respondents to implement energy efficiency actions in the next twelve months. Respondents who agreed that New Zealand has abundant energy resources intend to spend significantly more on energy efficiency actions in the next twelve months ($f=2.87;p<0.029$). In contrast respondents who agree the New Zealand will face energy shortages in the next 20 years intend to spend significantly more on energy efficiency actions than those who disagree ($f=3.00;p<0.036$). What this seems to suggest is that people see New Zealand as having abundant energy resources over the short term, with the longer term vision, say 20 years, suggesting a shortage in energy resources. Possibly people are spending more on energy efficiency actions now in order to extend the period of abundancy of energy resources, suggesting that expenditure on energy efficiency actions may result from some sort of concern for our energy future, rather than for purely financial reasons.

Another trend is that people who do not believe that New Zealand has a good record for energy efficiency and conservation intend to spend

significantly more on energy efficiency actions in the next twelve months ($f=3.05;p<0.034$). This may indicate that those who are concerned about out record for energy efficiency and more inclined to want to improve this by actively partaking in energy efficiency improvements around their home.

7.3.2.3 Penetration of HERO as the Outcome Variable

There were only a few predictors which were significant in explaining programme penetration as an outcome variable. Respondents who are uncertain whether New Zealand should develop its own energy resources to their fullest potential were more likely to have heard of HERO ($f=3.68;p<0.019$). This may indicate that those who are aware of HERO have more of a concern about the future of our energy resources, which has lead to a predisposition to notice and seek information on energy efficiency.

More difficult to interpret is the observation that respondents who are uncertain whether global warming is only a problem for future generations are more likely to have heard about HERO ($f=2.60;p<0.049$). This may be because respondents are unclear on what global warming is, and the implication of energy use for global warming.

The shortage of predictors of programme penetration is possibly due to the fact that not many of the non-participants were aware of the HERO programme, and therefore they was not enough data to carry out the operation. It is also possible that programme penetration is not dependent on the predictor variables, such as gender. This would suggest that programme penetration, and awareness of the programme, is evenly spread over the community.

7.3.3 An Analysis of the Effectiveness of the Home Energy Ratings Options Programme

7.3.3.1 An Overview of Programme Outcome Variables

The most significant findings is that programme participants intend to spend significantly more one energy efficiency actions over the next twelve months ($f=2.01;p<0.029$). This indicates that the programme has been successful in increasing the energy efficiency actions of programme participants. An analysis of programme outcome variables also reinforces the above assertion that HERO participants are not a cross section of the general population. Participants have higher incomes ($f=3.04;p<0.005$), indicated by the Elley-Irving socio-economic index rating of programme participants, and also have higher levels of education ($f=2.82;p<0.015$).

7.3.3.2 An Analysis of Additional Effectiveness Criteria

The success of the programme was determined using the criteria mentioned in Chapter Five and include:

1. The actions induced in the next twelve months because of the programme compared with the actions which would have been carried out in the next twelve months if the participant had not been involved in the programme
2. The motivations of the participants becoming involved with the programme compared with the motivations intended by the programme
3. Satisfaction with the HERO
4. The awareness level of CentralPower energy efficiency information programmes in the community, with specific reference to HERO

Criteria One

The energy efficiency actions that people had performed or intended to perform in their homes were listed, and then a value given to these actions based on the current market price. The values of the actions was then totalled for each period of time questioned in the survey. A value for the average expenditure on energy efficient actions in the respondents homes was then calculated for each period, with the results being presented in the following table (Table 7.14).

TABLE 7.14 A Comparison of Expenditure on Energy Efficiency Actions

	HERO PARTICIPANTS	HERO NON-PARTICIPANTS
Average per household over the last twelve months	$257.57	$200.00
Average per household over the next twelve months	$382.97	$122.62

Participation in HERO has lead to an almost 50% increase in expenditure on energy efficiency actions. This observation is supported by the findings of the analysis of outcome variables. This analysis suggested that participation in HERO lead to significantly more expenditure on energy efficiency actions over the next 12 months ($f=2.01; p<0.029$).

This table shows that, in terms of financial expenditure on energy efficiency actions, the HERO has had a major impact on programme participants. This is a useful way to illustrate the impact of the programme, but it is also useful to consider what programme participants would have spent in the next twelve if they had not had the HERO performed on their home (Table 7.15).

TABLE 7.15 Marginal Difference of Expenditure With or Without HERO

Average Expenditure Per Household in the Next 12 Months Induced by HERO	Average Expenditure Per Household in the Next Months Without HERO	Marginal Difference
$382.97	$123.51	$259.46

Participants indicated that they were intending to spend approximately a third on energy efficiency actions even without having the audit prepared for their home. However, analysis of these findings does show that the HERO programme did induce increased spending on energy efficiency technology and products, successfully meeting the specified criteria of programme success.

Criteria Two

The motivations of participants for becoming involved in the programme were determined by questioning in the written survey and from discussion in the interviews. The motivations for participation of the Home Energy Rating Options programme were determined by surveying CentralPower staff who were involved with the programme (discussed in Section 5.2). The motivations are summarised in Table 7.16.

TABLE 7.16 A Comparison of Motivations for HERO

Motivations of HERO Programme Participants	Motivations of HERO
• To find out about energy efficiency • To be more energy efficient • To find out the potential for energy saving • To save money on energy use	• To improve lifestyle and comfort levels of participants, while maintaining or lowering energy investment

The motivations of the programme differ from the motivations of the programme participants. A desire to improve the lifestyle and comfort levels of participants does not suggest that energy saving is a primary reason for involvement programme, rather that participants can maintain their current energy use but use it more wisely and use the saved energy for additional lifestyle improvements. For example, if a participant can make a saving on the cost of lighting for the home then they can use this energy saving in another aspect of the home such as improved heating. In this way the programme improves the lifestyle and comfort level of the participants.

Programme participants seem more interested in saving money on energy use than improving their lifestyle or comfort levels. This difference in motivation reflects in the satisfaction with the service, which is discussed

next. What this suggests is that the needs of the programme participants are not being met and the recommendations provided in the audit are not as extensive as they could be given that the participants are interested in saving money. This matter is further addressed in the discussion of Criteria Three.

Criteria Three

Satisfaction with the service was determined from the interviews with programme participants. The satisfaction varied between participants, with an expression of dis-satisfaction usually resulting from a failure to get what they expected.

"I was a little bit surprised that that was all these was...I thought they would talk about the heat loss from the windows...I thought somebody would have made measurements regarding heat loss...and thought [I] would get some recommendations regarding heat loss"
(Respondent One, HERO Participant)

This statement reflected the expectations of respondent one, and the following is an indication of satisfaction as a result:

"I was not particularly impressed by what we got...there was nothing that I didn't know"
(Respondent One, HERO Participant)

This attitude was also expressed by respondent three, who did not get what was expected:

"[I expected someone] to come through the house and say you can x amount of dollars by doing this and this...[I] I had in mind things that were not energy efficient"

"...not one thing that I had in mind did they come up with"
(Respondent Three)

Satisfaction of these participants seems to be directly related to what they expected from the programme. It would seem that satisfaction with the service, and the corresponding uptake of recommendations, is greater if the participant receives information that he expected. For example, in the case of HERO, Respondent One felt that there would some consideration given to the heat loss from the windows which ran around the top of all the rooms. Respondent One also expected advice on the best way to heat the room given this and other factors. The audit delivered none of what was expected. Respondent One also suggested that the audit "reinforced what I knew". The concern over heat loss was also an issue which Respondent Three considered to be important, and expected it to be covered in the audit report. Another concern of the Respondent Three was also placement of the hot water cylinder -

"[we] have one hot water cylinder and it is a long way from the places where it is used...CentralPower said they don't cover things like that...the auditors did not seem to know

a lot about energy efficiency...thought the power use of a computer depended on the memory of the PC..."
(Respondent Three, HERO Participant)

The expectations of the these participants do not seem out of line with what the programme suggests it will deliver. Concerns over the placement of the hot water cylinder and the heat loss of the house are not dependent on personal actions but are a characteristic of the home. These criticisms can be dealt with by increased contact between the auditor and the participant. Initially this contact would involve a discussion between the two, with the participants addressing the concerns they had about the energy use of the house. At this stage the auditor could indicate whether such issues would be dealt with in the audit so the participant was not disappointed when the report arrived. If the auditor is unsure of some of the issues which the participant raised then they should suggest that they get back to them, and take the opportunity to return to the office and discuss the issue with others to try and come up with a solution. If a solution is not available, then the participant could be informed of this, and CentralPower would improve the customer service, and hopefully, the satisfaction with the service.

The remainder of the HERO participants interviewed were very happy with what they received:

"[The] survey helped me pin point some areas where I could improve...didn't know what to expect...helpful little tips picked up..."
(Respondent Four, HERO Participant)

"Deliver what I expected and more...whole pile of information on how to save energy etc and where I was going wrong...what I can do to rectify the problem...average expense to rectify the problem and how long it wold take to recoup the expense...very happy with it"
(Respondent Two, HERO Participant)

Interesting to note is the response participants had to the pamphlets included in the audit, on how to save energy in different rooms in the house. These pamphlets address the concerns of energy use of the occupants of the house, while the audit deals with the house irrespective of occupant. This seems to be a good combination of information and addresses all the energy efficiency issues in the home.

Returning to the discussion in Criteria Three regarding the motivations the programme hopes to induce, recommendations provided seem to mainly involve installing energy efficient light bulbs and low flow showerheads. Respondents indicated in the interviews that these were the predominant recommendations. These recommendations will save money on energy use only slightly and often with long pay back periods, whilst the more major concerns over heat loss for example, and the subsequent major saving on energy expenditure, are not addressed. The reason for this should be explored further.

Criteria Four

Four levels were used to assess the penetration and awareness of the HERO programme in the community:

Level One	Awareness of any energy efficiency information programmes being run by CentralPower
Level Two	Awareness of the Home Energy Rating Options Programme
Level Three	The respondent has tried to get more information on HERO
Level Four	The respondent is considering getting an HERO performed on their home

Percentage values shown indicate the percentage of those in the level above who have proceeded to the next level, with the hierarchy of programme penetration being presented in Table 7.17.

TABLE 7.17 The hierarchy of programme penetration

LEVEL ONE Aware of Energy Efficiency Programmes Run by CentralPower
30.61%
LEVEL TWO Aware of HERO
30.61%
LEVEL THREE Tried to get more Information on HERO
0%
LEVEL FOUR Considering getting an HERO performed on home
7.14%

In terms of programme penetration HERO has not been very successful. Only a third of respondents had heard of the programme, with none of these respondents trying to get more information on HERO. To increase the

effectiveness of HERO the programme penetration needs to be improved, with this likely to involve more promotion of the programme.

6.3.3.3 The Effectiveness of HERO

HERO has been effective in targeting the group of consumers it intended, the middle to higher socio-economic groups. However, it has been less effective in the penetration of the programme into its consumer base. Only a third of its consumer base were aware of HERO, with none of those who were aware of the programme trying to get more information. This may be either because they feel that there was sufficient information provided in the initial contact with the programme, or that they are simply not interested. It would be useful to explore this further, as the structure of the question within the survey does not allow for clarification of this. Irrespective of this CentralPower needs to improve this level of penetration. A factor which may affect the level of penetration is the cost of the audit, with a number of respondents indicating that they thought the service should be free. Given this it is difficult to see how penetration of the programme could be improved unless the cost of the service could be lessened. The problem of programme penetration could be dealt with by exploring the decision-making processes of consumers further, and the connection between attitudes and behaviour.

Participants varied in their satisfaction with HERO. This satisfaction could be improved, thereby making the programme more effective, by discussing the participants concerns when conducting the survey. If the participant feels that their concerns have been dealt with adequately they are more likely to accept the other recommendations given in the audit.

In terms of motivation, HERO has not been been successful. The participants are not becoming involved in the programme for the same reasons as CentralPower indicate they should. This dissatisfaction is likely to lead to a lesser uptake of recommendation. Programme participants seem more interested in saving money on energy use, than on improving their lifestyle or comfort levels, with this difference in motivation likely to have an affect on satisfaction with the service, as participants are not necessarily getting what they expected.

The programme has been highly effective in inducing participants to spend significantly more on energy efficiency actions in the next twelve months than they would have if they had not had the audit prepared for their home. As had been discussed previously one has to be careful in analysing self-reported data. This is an intention to spend and not necessarily what they will actually spend in the next twelve months. This reinforces the need for a follow-up to determine what was actually spent, and to gather that data more effectively than relying on self-reported information. In order to meet the objectives of the programme better, it would be appropriate to determine whether the energy efficiency products and technology were purchased from

CentralPower or one its connected tradespeople. One of the objectives of HERO is to increase and facilitate the purchase of energy efficiency products and technologies from CentralPower and their connections. If CentralPower want to determine this then they need to become more aggressive with providing suggestions as to where participants can purchase the products necessary to carry out the recommendations. If sales staff could determine if the sale resulted from HERO then this could be determined. Useful also, would be the follow-up after twelve months, as mentioned previously. This could help determine where the participant purchased the products and technology, and the person conducting the follow-up could also determine at this point why the participants chose the supplier they did, whether this is CentralPower or not.

And finally, the programme is successful in providing a concise guide to programme participants on how to improve the energy efficiency of their homes, and how to improve their own energy efficiency actions. This is achieved by combining the written audit report, which deals with the house, and a series of informational brochures, which deal with the occupants of the house, and how they can improve their energy efficiency actions in different rooms in the home.

7.3.4 A Summary of Recommendations

In suggesting recommendations for improving the impact of HERO it should be stressed that due to the lack of a process evaluation it is difficult to assess whether the recommendations which deal with process issues are in place within CentralPower. Therefore, recommendations will be made purely on the results from the impact evaluation, and CentralPower can then consider them with reference to the process as it currently stands.

Contact with programme participants suggests that they are more likely to uptake the recommendations if they are in line with what they expected. What this means is that auditor's should spend some time with participants prior to conducting the audit, to ascertain what their concerns are and to see whether these concerns can be dealt with in the audit. If is not possible to deal with the issues raised in the meeting then these concerns should be noted in the written audit, stating the reasons why they could not be dealt with. This would also be useful for future occupants of the house.

In line with this recommendations, the motivations of the HERO programme needs to be considered. Clearly, at present these motivations are not in line with customer expectations, and there is a need to either make this motivation more clear to customers, or to alter this motivation to make it more in line with what the customer wants. As it stands, it is likely that satisfaction with the service will not reach its maximum until these gaps in motivation are dealt with.

Some consideration also needs to be given to the issue of programme penetration. There is obviously room for improvement in this aspect of the programme, with reasons for low programme penetration needing to be established. This will possibly require an analysis of the decision-making processes of consumers, and consideration of the link between behaviour and attitudes. It was not within the scope of this thesis to consider these issues in more detail, but the importance of these factors is noted.

Follow-up is another very important aspect of the programme. It would be useful in determining and increasing the effectiveness of the programme. Follow-ups would provide a memory jog on recommendations which have not been implemented, thereby possible increasing the uptake of recommendations, as well as providing CentralPower staff the opportunity to push their products and technology, and those of their associated tradespeople. The follow-up should consist of three facets. Firstly, programme participants should be contacted two or three weeks after the report has been sent to them to see whether they have any questions on the recommendations. An opportunity could also be taken to suggest retail outlets and tradespeople to carry out the recommendations. Second, participants should be contacted six months after the audit in order to give them a memory-jog in terms of the recommendations. This follow-up could also be used to determine the recommendations which have been implemented, and who the work was done by, and where the equipment was purchased. This would help trace whether the programme is resulting in increased sales from CentralPower and its associated tradespeople. The final follow-up should take place twelve months after the audit. This follow-up would include a graph of the customers energy use in the twelve months before the audit, and the twelve months after the audit, to illustrate any improvements made. And like the second follow-up, this follow-up could also be used to determine the recommendations which have been implemented, and who the work was done by, and where the equipment was purchased. This would help trace whether the programme is resulting in increased sales from CentralPower and its associated tradespeople. These follow-ups are a useful way for CentralPower to carry out a small self-evaluation of their programme. The follow-ups may come up with some useful suggestions on improving the programme, and help CentralPower in determining whether the programme has met the objectives of facilitating the sales of energy efficiency products and technology.

These recommendations are summarised in Table 7.18.

TABLE 7.18 A Summary of Recommendations for Improving the Impact of HERO

- A well-planned follow-up needs to be developed. The follow-ups would be useful in determining satisfaction with the service, energy efficiency actions implemented as a result of the audit, and to provide advice to programme participants on tradespeople and retail outlets to purchase energy efficiency products and technologies.
- In order to assess whether the participants have saved energy as a result of the programme, graphs of energy use twelve months before the audit, and twelve months after need to be prepared and contrasted. Twelve months is an appropriate length of time as it allows for seasonal fluctuations. These graphs would also be useful for determining the effectiveness of the programme.
- More contact between programme participants and the auditor. The auditor should spend time with participants prior to the audit to assess the participant's concerns with regard to energy use in their home. The auditor could address these issues at the time of interview or include them in the report.
- More work needs to be done to ensure that the penetration of the programme into the consumer base is improved. This is likely to involve a study of the decision-making processes of consumers, and a study of the link between attitudes and behaviour.
- Some consideration needs to be given to the gap between the motivations of the programme participants, and the motivations that the programme itself hopes to induce. As it currently stands there is a gap between these two which needs to be dealt with.

CHAPTER EIGHT

THE FUTURE OF PROGRAMME EVALUATION IN ASSESSING THE EFFECTIVENESS OF ENERGY EFFICIENCY INFORMATION CAMPAIGNS IN NEW ZEALAND

8.0 LIMITATIONS OF THIS RESEARCH

Part of demonstrating the trustworthiness of the evaluation findings is to realise the limitations of the research. Detailing the limitations helps others to understand the nature of the data and the findings. As this thesis has developed a number of limitations have been identified, with these limitations coming from both the reviews of the literature, and from the evaluations of the two home energy audit programmes. These limitations are useful in providing guidance for future evaluations.

The first of these limitations, is the limited role that the process evaluation played in the evaluation of the home energy audit programmes. Section 5.3.1 of this thesis discussed the process evaluation to be undertaken in this research. This discussion indicated that it was not appropriate at this stage in the development of the Home Energy Rating Options (HERO) programme within CentralPower to conduct a process evaluation. In the case of the Energy Efficiency Assessment Plan (EEAP) operated by Southpower, discussion indicated that a process evaluation could be conducted, but that it would of limited scope. However, given the limited scope of the process evaluation of EEAP some useful recommendations were developed to improve the process. Whilst this research chose to conduct limited process evaluations, the importance of conducting a thorough process evaluation is recognised. According to Schueler and Quaid (1992) process evaluations have traditionally operated in the shadow of impact evaluations. This has left a number of questions about programme operation unanswered, including:

- Which communications measures work best in a Demand Side Management (DSM) programme? How can coordination between parties delivering programmes be optimised? What are the optimal levels of staff training?
- What are the optimal levels of client contact and education? What are the short- and long-term effects of education in non low-income, non-residential applications?

- Should programmes focus resources on quality or volume? What are the trade-offs between comprehensive and incremental installation of measures over long-term relationships with clients?
- Which promotional strategies achieve the highest penetration? Which measures and programmes are best for various market segments?
  (Schueler and Quaid 1992)

These issues raised by Schueler and Quaid have significance in terms of the evaluations conducted in this research. The issues of level of client contact and education, promotional strategies, and programme penetration, were considered in the evaluation of the home energy audit programmes. It is clear that the integration of the impact and process evaluation's will lead to more thorough findings, and therefore recommendations.

A well done process evaluation also has implications for the interpretation of the impact evaluations. It may be that the programme penetration determined in the impact evaluation is affected by the measures which have been used to market the programme. It is likely that a well-focussed and thought out programme marketing effort will achieve higher levels of programme awareness and from this basic level of awareness it would be likely that programme participation could be increased. It is necessary for the evaluators to realise the connection between process and impact evaluations, and to put more effort into process evaluations than is currently being provided. For this research, process evaluations of the EEAP was undertaken in a limited form. In conducting process evaluations often programme documentation is hard to get hold of and there are often gaps in the documentation when it was available. Another possible problem is the lack of copies of all promotional literature for the programmes. This makes it difficult to determine just how the programme was being marketed. The implication of this is for the managers of the programmes to keep better track of programme documentation and to have comprehensive and complete files, including copies of all promotional literature. This will make the job of the evaluator much easier in the future.

One of the most difficult aspects of energy information programmes is the problem of establishing attribution - were the observed changes really caused by the information campaign? Consumers may receive information from other sources promoting the same action/behaviour that the programme being evaluated is attempting to influence. According to the ANZMEC (1994a), the problem is intensified when the impact one is trying to attribute to the programme is a change in attitude. Ideally, the information programme will have been based on a baseline study of some sort, which established standard practice with regard to the targeted programme effect. This was impossible in the evaluations conducted in this research, as the evaluation were carried out after implementation of the

programme. However, it was hoped that the inclusion of a control group would lessen the effect of establishing attribution, although it is hard to judge whether it has been effective.

Behavioural and attitudinal measures present special problems for evaluation (OECD/IEZ 1978). There is a growing realisation among evaluators of energy information programmes that it is necessary to integrate important behavioural variables into impact evaluations methodologies (Kushler et al 1992). In the early years of energy programme evaluation, there was a fair amount of social science research applied to the behavioural aspects of energy efficiency. Since the mid 1980s, however, there has been a heavy emphasis on impact evaluation and technical measurement and engineering methodologies. Although some have articulated the need to integrate behavioural research into energy evaluation and some very interesting behavioural research has continued, most emphasis has tended to centre on the technical/engineering aspects (Kushler et al 1992). The implications of this for future evaluations is to expect more focus to be on behavioural research, than relying on the traditional technical aspects. Social science (behavioural) research is central to a number of critical evaluation issues:

1. How does an energy efficiency programme affect people's behaviour?
   (Important for calculating net energy savings, self-selection bias, and free riders)
2. How do occupants/consumers use energy efficiency measures?
   (Important for determining baselines and persistence of savings, and for comparing measured and estimated savings)
3. How reliable is the information supplied by consumers?
   (Important for determining baselines and comparing measured and estimated savings)
4. How heterogeneous is behaviour?
   (Important for designing samples and determining baselines).
   (Kushler et al 1992).

These issues highlight the problem of self-reporting. There may be a presumption that those who say they intend to insulate are more likely to do so, but the fact that they do so is not established. This was a particular problem in this research, as the information gathered on energy efficiency actions in the last twelve months and next twelve months relied completely on self-reported behaviour. To help overcome this problem it is necessary to gather baseline information from programme participants and the control group, and to conduct regular follow-ups to assess the actual behaviour of programme participants. The importance on follow-ups has been highlighted on a number of occasions within this thesis. Better programme evaluation will be possible in the future if more concerted

efforts are made to collect key data before, during, and after programmes are run (Mills, 1991).

Important also, in terms of the attitudes and behaviour of programme participants is the need to consider the decision-making processes of consumers. This research did not go into any detail in considering this aspect of the energy efficiency information campaigns, but it is recognised that there is a need for this type of research and investigation to be included in evaluations in the future. Such research may help evaluators understand the process of programme penetration for example, with an understanding hopefully leading to an increase in programme penetration.

Self-selection bias is another problem which has been identified. However Collins et al (1984) suggest that this may not be as significant as originally thought. More work needs to be done on the extent to which self-selection bias is introduced by non-random sampling in evaluation of energy efficiency information programmes, and the effect of biases on savings calculations. However, it was not within the scope of this research to consider this, but it should be recognised as a potential limitation.

8.1 THE EVALUATION DESIGN

The evaluation of programmes in this research involved surveys of participants in the programmes and a random survey of non-participants, followed by nonschedule standardised interviews with programme participants, selected randomly. At the time this research was conducted 55 consumers had participated in Southpower's Energy Efficiency Assessment Plan, and 86 consumers had participated in CentralPower's Home Energy Ratings Options Programme. It was decided to randomly survey an equivalent number of non-participants in each of the power company areas involved in the programmes.

In future it may be appropriate to survey a greater number of non-participants given the relatively poor penetration rate of the programme in both Southpower's and CentralPower's consumer area. If a greater number of people were surveyed it may be possible to select a sample of people who have heard of the programme, but have decided to go no further with getting information about the programme, and interview them in order to determine the barriers to getting further information. From the surveys collected in Southpower most people who heard of the programme either cited lack of time or having sufficient knowledge of energy efficiency already as reasons that they hadn't tried to get further information. Another likely reason is the price of the programme, which may be a barrier to households with lower disposable incomes. These are just some likely reasons for not seeking further information, but if more people were surveyed other reasons may emerge. Interviewing these people may provide some useful

information as to how to more effectively remove barriers to obtaining information, and seeking advice. Interviewing these people may also help determine the decision-making processes of the households, and could be used to improve programme penetration.

Another problem associated with the evaluation in this research was the inability to consider changes in energy use associated with involvement in the programme. The evaluation was undertaken only a few months after both of the programmes had been implemented and insufficient time had passed to view participants billing data and assess whether there had been a change in energy use since having the audit performed on their homes. It has not been established as to what is the most appropriate length of time after the audit to consider changes in billing data. Some evaluators consider two years an appropriate length of time to view the billing data, but if the evaluator wanted to consider whether energy savings leveled off at some time after involvement in the programme, then a longer length of time would be needed. However, initially a twelve month period may be sufficient to view changes, given that this period of time covers all four seasons, and could therefore account for seasonal fluctuations. A shorter period of time than twelve months would not be appropriate.

8.2 THE PROGRAMMES AND THEIR EVALUATION: A SUMMARY OF GENERAL RECOMMENDATIONS

Overall, both the Home Energy Rating Options programme and the Energy Efficiency Assessment Plan have been successful. However, there is plenty of scope for improving the effectiveness of both of the programmes, with recommendations being formulated to ensure this potential is met.

The following is a summary of ***general recommendations in regard to promotion of the home energy audit programmes***:

- Information contained within power accounts appears to be the most effective form of bringing to consumers attention programmes run by Power Companies. However, some effort should be put into determining the most effective way of promoting these programmes. This could be achieved by consumer surveys conducted by either the power company or by a consumer survey organisation. This would make sure that the programmes were reaching those most likely to uptake the information, and was reaching them in a form which was most effective. Such information would also ensure that marketing resources were used most effectively, and the power company would more readily accountable to their customers, and, ultimately, their shareholders.

- An associated recommendation is to ensure that the information reaches those most likely to uptake the information. Customer research would once again be the answer to ensuring that the information campaigns are targeting at the right audience. This would ensure that the marketing and promotional efforts are more effective.

- Date of publication should appear on all information and publicity material released in connection with the programmes. This not only ensures more comprehensible programme documentation, but also makes the task of evaluation easier, in particular the process evaluation.

- In the promotion of the Home Energy Rating Options (HERO) programme it is important that the motivations that the programme hope to induce in programme participants are made clear to consumers. This will help increase the satisfaction of programme participants, by ensuring that people are participating for the 'right' reasons.

The following is a summary of ***general recommendations in regard to the operation of the home energy audit programmes,*** with the recommendations associated with the promotion applying equally here:

- There should be more contact between the programme participant and the home audit assessor before and during the audit. Increased contact would allow the needs of the participant to be determined, and consequently dealt with the in audit, or, if the needs are outside the scope of the programme, then this issue could be addressed early on so as to avoid the disappointment associated with the failure of the programme to meet the needs of the participant.

- Follow-ups should be carried out of those who have had an audit performed to determine satisfaction with the service, and to prompt people on the uptake of recommendations. This follow-up should take the form of phone calls or follow-up visits to the homes. These follow-ups are also useful in terms of determining actual actions of participants rather than intended actions as a result of the programme, and can be used to determine satisfaction or otherwise with the programme.

- All information associated with the programme should be organised in a comprehensive manner. This includes copies of all promotional literature and promotional efforts, with this organisations making it easier to conduct a process evaluation.

- The HERO programme provides a comprehensive service in terms of home energy efficiency advice by including brochures on

improving the energy efficiency of the homes occupants, as well as the written report which deals with the house only. Such an integrated approach should be developed for other home energy audit programmes.

The following is a summary of ***general recommendations in regard to future evaluations*** of energy efficiency information campaigns:

- It is important that future evaluations focus more on the process evaluation, rather than having a sole focus on the impact evaluation. As has been discussed, the process evaluation has a number of implications for the impact evaluation, and visa versa.
- Programme evaluation should be incorporated into the planning phases of the energy efficiency information programmes. This would allow for provision for changes to the programme based on the findings of the evaluation and would also mean that programme personnel would be more inclined to ensure that the recommendations from the evaluation were incorporated into the evaluation.
- It is important for impact evaluations that baseline information is collected prior to programme implementation. This information is useful when it is compared to information collected after implementation, and can result in some conclusions being drawn about the effectiveness of the programme that would not be possible if this information was unavailable.
- If programme evaluation is be incorporated into programme development and implementation it may be appropriate for one agency to be responsible for holding the information on evaluations of energy efficiency information programmes, and also be responsible for training people from the agencies who want to develop their own programme evaluation function. It is not within the scope of this research to suggest who this agency should be, but it maybe appropriate for the Energy Efficiency and Conservation Authority to be responsible for developing this concept further. They already hold some information on evaluations of energy efficiency information campaigns, and as they are an independent agency they would be seen to offer unbiased information to interested parties. In recommending this, it is noted that some evaluations may be commercially sensitive and it would not be appropriate to release the findings of the evaluations, however, advice and guidance on the conduct of evaluations could be provided by this central agency.

It is very important that in future consideration is given to incorporating programme evaluation into the early phases of a programme development

and programme implementation. As has been shown by this research, evaluations which take place after the programme has already been implemented are less effective in changing the operation of the programmes, and are also more difficult to assess given that baseline information is difficult to gather. This is due partly to the programme already being operated in a certain way and it is more difficult to change the operations of a programme after it has been implemented and run for some time before the evaluation takes place. Evaluation findings are more effective if consideration is given to how to incorporate them into the programme prior to implementation. This makes incorporation of evaluation findings more effective, and programme staff are more aware of the role that programme evaluation has in operation of the programme and are more prepared to implement the evaluation findings.

Also, if programme evaluation is considered early in the development of the programme it is easier to gather baseline information which can be used in later evaluations of the effectiveness of the information campaigns. This baseline information can then be compared to information gathered after the programme has been implemented, and conclusions can be drawn as to its effectiveness.

This thesis has shown that energy efficiency information campaigns have an important role in ensuring an energy efficient future for New Zealand, and has also demonstrated that evaluation of these information campaigns is an important part of this future. The ultimate aim of evaluation in the context of energy efficiency information campaigns is to ensure that the message is getting across.

APPENDIX 1.0

Example Survey for Programme Participants

SURVEY

This questionnaire is part of a study on assessing the effectiveness of your local power companies information campaigns.

It is hoped that all questions will be answered by all respondents. If, however, you are unable or unwilling to answer any questions, we are anxious that your replies to the others should remain unaffected. If there are some details that you cannot remember precisely please give estimates where you can do so with reasonable confidence, but otherwise leave blank.

This questionnaire should only take around 10 minutes of your time.

Remember that your answers will remain absolutely confidential and will not be associated with your identity at any stage.

These first few questions ask for some details of your demographics.

Please circle the appropriate response.

1.	Gender	**male**	**female**
2.	Age	18-24	
		25-34	
		35-44	
		45-54	
		55-64	
		65 or over	

3. Marital Status
   - Single
   - Married
   - Divorced
   - De Facto
   - Other (please specify)_____

4. How many people do you currently have living in your home?

   _____

5. Do you have any children? If yes, how many do you have and what are their ages?

   1. _____ 2. _____

   3. _____ 4. _____

   5. _____ 6. _____

6. If YES to question 5, which still live at home?

   _____

   _____

7. What is your occupation? If you are no longer working, what was the last position you held?

   _____

8. What is the occupation of others in the household?

   1. _____ 2. _____

   3. _____ 4. _____

   5. _____ 6. _____

9. What is the highest level of education that you have?

   _____

   _____

The following questions relate to the structure of your home.

10. Do you rent or own the home you are currently living in?

    _____

11. How long have you been living in your current home?

    _____

12. How old is the home you are currently living in?

    _____

13. What is your home constructed of (eg brick, hardiplank)?

    _____

    _____

14. Does your home have any insulation in the walls?

    _____

15. Does your home have any insulation in the ceiling?

    _____

16. If your home does have insulation, did you make the decision to insulate it, or was it in the home when you purchased it?

    _____

    _____

The following are a series of questions on your environmental values and attitudes. The responses to these questions are in terms of your personal opinion about the statement. Possible responses include

Strongly Disagree	**SD**
Disagree	**D**
Uncertain	**U**
Agree	**A**
Strongly Agree	**SA**

Please circle the appropriate response

17.	New Zealand should develop its own energy resources to their fullest potential	SD	D	U	A	SA
18.	Action by individuals can make a difference in reducing air pollution	SD	D	U	A	SA
19.	Renewable sources of energy, such as solar, should be developed	SD	D	U	A	SA
20.	Global warming is only a problem for future generations	SD	D	U	A	SA
21.	New Zealand has abundant energy resources	SD	D	U	A	SA
22.	The rights of endangered species should be put ahead of employment	SD	D	U	A	SA
23.	New Zealand is unaffected by global environmental issues, such as deforestation	SD	D	U	A	SA
24.	New Zealand has abundant rivers available for hydroelectricity development in the future	SD	D	U	A	SA
25.	New Zealand should fully use its coal resources for energy production	SD	D	U	A	SA

The following are a series of questions on information programmes run by your local electricity supplier.

26. How did you first find out about the Energy Efficiency Assessment Plan (EEAP)?

    A. Information that came with your power account
    B. At a Community Group Talk
    C. Through the Southpower Advisory Service
    D. In a brochure delivered to your mailbox
    E. Suggested to you be Southpower staff
    F. In the Southpower Energy Efficient Shop
    G. On CTV
    I. On the radio. If so, which station_____
    J. In the newspaper. If so, which one_____
    K. Other (please specify)_____

27. Why did you get an Energy Efficiency Assessment performed on your home?

    _____
    _____
    _____
    _____
    _____

The following are a series of questions on your values and attitudes towards energy issues. The responses to these questions are in terms of how you feel about the statement, with the range of responses being the same as questions 17-25

28.	New Zealand has a good record for energy efficiency and conservation	SD	D	U	A	SA
29.	New Zealand will face energy shortages in the next 20 years	SD	D	U	A	SA
30.	Energy conservation is a waste of time	SD	D	U	A	SA
31.	More should be done to educate people on how to use energy efficiently	SD	D	U	A	SA
32.	The New Zealand government should be responsible for promoting energy efficiency and conservation	SD	D	U	A	SA
33.	The Local Power Company should actively promote energy efficiency and conservation	SD	D	U	A	SA
34.	There should be financial incentives to help people save energy (for example, subsidies on house insulation)	SD	D	U	A	SA

The following are a few questions on your energy behaviour

35. What energy efficiency actions, if any, did you take before the Energy Efficiency Assessment was performed on your home? Please specify.

_____
_____
_____
_____

36. What energy efficiency actions, if any, are you considering taking as a result of the Energy Efficient Assessment, over the next twelve months? Please specify.

_____
_____
_____
_____

37. What energy efficiency actions, if any, would you have taken over the next twelve months if you **had not** had an Energy Efficiency Assessment performed on your home? Please specify.

_____

_____

_____

_____

38. What energy conservation practices do you use in your home, and how often would you do them? Please circle.

		Never	Sometimes	Frequently
A.	Turning off the lights when room is not in use	1	2	3
B.	Heating one room, rather than the whole house	1	2	3
C.	Turning down the temperature of the hot water cylinder	1	2	3
D.	Cold water washing of clothes	1	2	3
E.	Reminding children to turn off lights when they leave a room	1	2	3
	Other please specify			
	_____	1	2	3
	_____	1	2	3
	_____	1	2	3
	_____	1	2	3

As part of this research I am conducting up some follow-up interviews with some of the survey respondents. Would you be willing to participate in one of these interviews. If so, could I please have you name and address, and contact phone number.

Name: _____

Address: _____

Phone Number: _____

THANK YOU VERY MUCH FOR YOUR TIME

APPENDIX 2.0

Example of Random Survey for Non-participants

SURVEY

This questionnaire is part of a study on assessing the effectiveness of your local power companies information campaigns.

It is hoped that all questions will be answered by all respondents. If, however, you are unable or unwilling to answer any questions, we are anxious that your replies to the others should remain unaffected. If there are some details that you cannot remember precisely please give estimates where you can do so with reasonable confidence, but otherwise leave blank.

This questionnaire should only take around 10 minutes of your time.

Remember that your answers will remain absolutely confidential and will not be associated with your identity at any stage.

These first few questions ask for some details of your demographics.

Please circle the appropriate response.

1. Gender **male** **female**

2. Age 18-24
25-34
35-44
45-54
55-64
65 or over

3. Marital Status
   - Single
   - Married
   - Divorced
   - De Facto
   - Other (please specify)_____

4. How many people do you currently have living in your home?

   _____

5. Do you have any children? If yes, how many do you have and what are their ages?

   1. _____ 2. _____
   3. _____ 4. _____
   5. _____ 6. _____

6. If YES to question 5, how many still live at home?

   _____

   _____

7. What is your occupation? If you are no longer working, what was the last position you held?

   _____

8. What is the occupation of others in the household?

   1. _____ 2. _____
   3. _____ 4. _____
   5. _____ 6. _____

9. What is the highest level of education that you have?

   _____

   _____

The following questions relate to the structure of your home.

10. Do you rent or own the home you are currently living in?

    _____

11. How long have you been living in your current home?

    _____

12. How old is the home your are currently living in?

    _____

13. What is your home constructed of (eg brick, hardiplank)?

    _____

    _____

14. Does your home have any insulation in the walls?

    _____

15. Does your home have any insulation in the ceiling?

    _____

16. If your home does have insulation, did you make the decision to insulate it, or was it in the home when you purchased it?

    _____

    _____

The following are a series of questions on your environmental values and attitudes. The responses to these questions are in terms of your personal opinion about the statement. Possible responses include

Strongly Disagree	**SD**
Disagree	**D**
Uncertain	**U**
Agree	**A**
Strongly Agree	**SA**

Please circle the appropriate response

17.	New Zealand should develop its own energy resources to their fullest potential	SD	D	U	A	SA
18.	Action by individuals can make a difference in reducing air pollution	SD	D	U	A	SA
19.	Renewable sources of energy, such as solar, should be developed	SD	D	U	A	SA
20.	Global warming is only a problem for future generations	SD	D	U	A	SA
21.	New Zealand has abundant energy resources	SD	D	U	A	SA
22.	The rights of endangered species should be put ahead of employment	SD	D	U	A	SA
23.	New Zealand is unaffected by global environmental issues, such as deforestation	SD	D	U	A	SA
24.	New Zealand has abundant rivers available for hydroelectricity development in the future	SD	D	U	A	SA
25.	New Zealand should fully use its coal resources for energy production	SD	D	U	A	SA

The following are a series of questions on information programmes run by your local electricity supplier.

26. Are you aware of any energy efficiency information programmes currently being run by Southpower? If YES, what are they?

_____

_____

_____

_____

27. Are you aware of the Energy Efficiency Assessment Plan (EEAP)? If YES, go to question 28, if NO go to question 33.

_____

_____

28. How did you first find out about the EEAP programme?

A. Information that came with your power account
B. At a Community Group Talk
C. Through the Southpower Advisory Service
D. In a brochure delivered to your mailbox
E. Suggested to you be Southpower staff
F. In the Southpower Energy Efficient Shop
G. On CTV
I. On the radio. If so, which station_____
J. In the newspaper. If so, which one_____
K. Other (please specify)_____

29. Have you tried to get more information about the Energy Efficiency Assessment Plan? If YES, go to question 30, if NO go to question 32.

_____

_____

30. Where did you go for this information?

_____

_____

31. Are you considering getting an Energy Efficiency Assessment performed on your home? Why or Why not? **Go to Question 33.**

_____

_____

_____

_____

32. Why have you not tried to get more information about the Energy Efficiency Assessment Plan?

_____

_____

_____

_____

33. How much would you expect to pay for a service such as the Energy Efficiency Assessment Plan, which involves doing an energy audit on your home and suggesting ways to improve your energy use? Please circle appropriate response.

$110 $100 $90 $80 $70 $60 $50

The following are a series of questions on your values and attitudes towards energy issues. The responses to these questions are in terms of how you feel about the statement, with the range of responses being the same as questions 17-25

34.	New Zealand has a good record for energy efficiency and conservation	SD	D	U	A	SA
35.	New Zealand will face energy shortages in the next 20 years	SD	D	U	A	SA
36.	Energy conservation is a waste of time	SD	D	U	A	SA
37.	More should be done to educate people on how to use energy efficiently	SD	D	U	A	SA
38.	The New Zealand government should be responsible for promoting energy efficiency and conservation	SD	D	U	A	SA
39.	The Local Power Company should actively promote energy efficiency and conservation	SD	D	U	A	SA
40.	There should be financial incentives to help people save energy (for example, subsidies on house insulation)	SD	D	U	A	SA

The following are a few questions on your energy behaviour

41. What energy efficiency actions, if any, have you taken in the last twelve months? Please specify.

_____
_____
_____
_____

42. What energy efficiency actions, if any, are you considering taking in the next twelve months? Please specify.

_____
_____
_____
_____

43. What energy conservation practices do you use in your home, and how often would you do them? Please circle.

		Never	Sometimes	Frequently
A.	Turning off the lights when room is not in use	1	2	3
B.	Heating one room, rather than the whole house	1	2	3
C.	Turning down the temperature of the hot water cylinder	1	2	3
D.	Cold water washing of clothes	1	2	3
E.	Reminding children to turn off lights when they leave a room	1	2	3
	Other please specify			
	_____	1	2	3
	_____	1	2	3
	_____	1	2	3
	_____	1	2	3

As part of this research I am conducting up some follow-up interviews with some survey respondents. Would you be willing to participate in one of these interviews. If so, could I please have you name and address, and contact phone number.

Name: _____
Address: _____
Phone Number: _____

THANK YOU VERY MUCH FOR YOUR TIME

BIBLIOGRAPHY

ACEEE 1990
Program Evaluation. Volume 6, Proceedings from the ACEEE 1990 Summer Study on Energy Efficiency in Buildings.

Alkin M C 1990
Debates on Evaluation. Sage Publications.

Alkin M C, R Daillak and P White 1979
Using Evaluation: Does Evaluation Make a Difference? Sage Publications.

ANZMEC 1994a
Effectiveness of Australian Energy Efficiency Information Programs for the Domestic Sector. Volume 1. Draft Report. March.

ANZMEC 1994b
Effectiveness of Australian Energy Efficiency Information Programs for the Domestic Sector. Volume 2: Appendices. Draft Report. March.

Babbie E 1989
The Practice of Social Research. Wadsworth Publishing Company, Fifth Edition.

Baird R B 1985
The Role of Attitudinal Studies in Evaluating Energy Conservation Programs. In Past Efforts and Future Directions for Evaluating State Energy Conservation Programs, N E Collins et al. Prepared for US Department of Energy. Prepared by the Oak Ridge National Laboratory, April.

Barkdoll G L and J B Bell (eds) 1989
Evaluation and the Federal Decision Maker. In *New Directions for Program Evaluation*, Number 41, Spring.

Barnett R R 1986
An Economic Appraisal of Local Energy Conservation Schemes. In *Energy Policy*, pp425-436, October.

Berk R A 1981
Educational Evaluation Methodology: The State of the Art. John Hopkins University Press.

Berk R A and P H Rossi 1990
Thinking About Program Evaluation. Sage Publications.

Berry L G 1985
Residential Building Audit Programs. In Past Efforts and Future Directions for Evaluating State Energy Conservation Programs, N E Collins et al. Prepared for US Department of Energy. Prepared by the Oak Ridge National Laboratory, April.

Berry L 1993
A Review of the Market Penetration of US Residential and Commerical Demand-Side Management Programmes. In *Energy Policy*, pp53-67, January

Bertram G 1991
Six Steps to Energy Efficiency. In*Terra Nova*, pp23-25, February.

Bickman L R (ed) 1987a
Using Program Theory in Evaluation. In *New Directions for Program Evaluation*, Number 33, Spring.

Bickman L 1987b
The Functions of Program Theory. In *New Directions for Program Evaluation*, Number 33, pp 5-18, Spring.

Bickman L (ed) 1990
Advances in Program Theory. New Directions for Program Evaluation, Number 47, Fall.

Bickman L and K A Peterson 1990
Using Program Theory to Describe and Measure Programs. In *New Directions for Program Evaluation*, Number 47, pp 61- 72, Fall.

Boston J 1988
New Zealand. In*Australian Journal of Public Administration*, Volume 47(2), pp194-201.

Brown H W 1984
Formative Evaluation of Program Goals and Purposes. In *New Directions for Continuing Education*. New Directions for Continuing Education, Number 24, pp 31-38, December.

Brown M A 1993
The Effectiveness of Codes and Marketing in Promoting Energy-Efficient Home Construction. In *Energy Policy*, pp391-402, April.

Campbell D T and J C Stanley 1966
Experimental and Quasi-Experimental Designs for Research. Rand McNally and Company.

Carlson R H 1989
Evaluation and the Political Appointee. In *New Directions for Program Evaluation,* Number 41, pp 7-14, Spring.

Chelimsky E 1987
Linking Program Evaluation to User Needs. In The Politics of Program Evaluation, D J Palumbo. Sage Publications, pp 72-99.

Chen H-T 1990
Theory Driven Evaluations. Sage Publications.

Chen H-T and P H Rossi 1981
The Multi-goal, Theory-driven Approach to Evaluation: a Model Linking Basic and Applied Social Science. In *Evaluation Studies: Review Annual,* Volume 6, pp 38-54.

Cocklin C 1993
Anatomy of a Future Energy Crisis: Restructuring and the Energy Sector in New Zealand. In*Energy Policy*, pp881-891, August.

Collins C 1991
Energy Policy: Phoenix from the Think Big Ashes. In*Terra Nova*, pp17-19, February.

Collins N E et al 1985
Past Efforts and Future Directions for Evaluating State Energy Conservation Programs. Prepared for US Department of Energy. Prepared by the Oak Ridge National Laboratory, April.

Colmar Brunton Research 1990
Qualitative Investigation into the 'Energy Recall' Concept. Prepared for Electricity Supply Association. December.

Condelli L et al 1984
Improving Utility Conservation Programs, Outcomes, Interventions, and Evaluations. In *Energy*, Volume 9(6), pp485-494.

Conner R F and M Hendricks (eds) 1989
International Innovations in Evaluation Methodology. New Directions for Program Evaluation, Number 41, Summer.

Cook T D and D T Campbell 1979
Quasi-Experimentation: Design and Analysis Issues for Field Settings. Rand McNally College Publishing Company.

Cook T D, J Levinson-Rose and W E Pollard 1981
The Misutilization Of Evaluation Research: Some Pitfalls in Definition. In *Evaluation Studies: Review Annual,* Volume 6, pp 727-748.

Cook T D and W R Shadish 1987
Program Evaluation: The Worldly Science. In *Evaluation Studies: Review Annual,* Volume 12, pp 31-72.

Corday D S and M W Lipsey 1986
Evaluations Studies for 1986: Program Evaluation and Program Research. In *Evaluations Studies: Review Annual,* Volume 11, pp 17-44.

Corday D S and M W Lipsey (eds) 1986
Evaluation Studies: Review Annual, Volume 11. Sage Publications.

Creech W 1993
"We Have Moved a Long Way From the Old Centralised Government Approach..." In*Energy Management News,* Number 28, March.

Cronbach L J and Associates 1980
Toward Reform of Program Evaluation. Jossey-Bass.

Cronbach L J and Associates 1981
Our Ninety-Five Theses. In *Evaluation Studies: Review Annual,* Volume 6, pp 27-37.

Cronbach L J 1982
Designing Evaluations of Educational and Social Programs. Jossey-Bass.

Datta L 1994
Paradigm Wars: A Basis for Peaceful Coexistence and Beyond. In *New Directions for Program Evaluation,* Volume 61, pp53-70, Spring.

Dehar M, S Casswell and P Duignan 1993
Formative and Process Evaluation of Health Promotion and Disease Prevention Programs. In *Evaluation Review,* Volume 17(2), pp204-220, April.

Dennis M L and E J Soderstrom 1988
Application of Social Psychological and Evaluation Research: Lessons from Energy Information Programs. In*Evaluation and Program Planning,* Volume 11, pp 77-84.

Denzin N K 1989
The Research Act: A Theoretical Introduction to Sociological Research Methods. Prentice-Hall, New York.

Deshler D (ed) 1984a
Evaluation for Program Improvement. New Directions for Continuing Education, Number 24. Jossey-Bass, December.

Deshler D 1984b
An Alternative Approach to Evaluation in Continuing Education. In *New Directions for Continuing Education*, Number 24, pp 3-14, December.

Deshler D 1984c
Involving Program Constituencies in the Evaluation Process. In *New Directions for Continuing Education*, Number 24, pp 15-22, December.

EECA 1993a
Energy Wise News, Issue Number 31, September, p11.

EECA 1993b
Energy Wise News, Issue Number 31, September, pp4-5.

EECA 1994a
Energy Wise Update. Bulletin 5, July.

EECA 1994b
Energy Wise News, Isue Number 37, October, p4.

Electricity Corporation of New Zealand Limited 1992
The Developing Market for Energy Efficiency in New Zealand. A Discussion Paper, November.

Epstein I and Tripodi T 1977
Research Techniques for Program Planning, Monitoring, and Evaluation. Columbia University Press.

Euston A F 1990
A Sustainable Tomorrow Means Transitions Today. In Energy, Land, and Public Policy, edited by J B Cullingworth. Transaction Publishers, pp251-276.

Fitz-Gibbon C T and L L Morris 1987
How to Design a Program Evaluation. Sage Publications.

Fitzsimmons J 1990
Energy Efficiency: Ten Reasons Why The Market Will Not Deliver. In *New Zealand Engineering*, pp28-31, November 1.

Freeman H E and M A Solomon (eds) 1981
Evaluation Studies: Review Annual, Volume 6. Sage Publications.

Frey C J 1984
The Role of Communication Effects in Determining Response to Conservation Programs. In*Energy Systems and Policy*, Volume 8(4), pp369-394.

Gaskell G 1987
Local Insulation Projects for Disadvantaged Consumers in Britain. In Public Policies and Private Actions: A Multinational Study of Local Energy Conservation Schemes, G Gaskell and B Joerges(eds), Gower Publishing Company Ltd.

Gaskell G sand B Joerges 1987
Public Policies and Private Actions: A Multinational Study of Local Energy Conservation Schemes. Gower Publishing Company Ltd.

Glesne C and A Peshkin 1992
Becoming Qualitative Researchers: An Introduction. Longman.

Goeltz R and E Hirst 1986
Residential Retroft Measures in the Hood River Conservation Project: Recommendations, Installations, and Barriers. Oak Ridge National Laboratory, June.

Golemboski W J, N L Hughes and M J Kelleher 1992
DSM Evaluation at Niagara Mohawk: An Integrated Approach. In the Proceedings of the of the ACEEE 1992 Summer Study on Energy Efficiency in Buildings, Panel 7, Program Evaluation. American Council for an Energy-Efficient Economy, pp 7.71-7.73.

Guba E G and Y S Lincoln 1981
Effective Evaluation: Improving the Usefulness of Evaluation Results Through Responsive and Naturalistic Approaches. Jossey-Bass.

Guba E G and Y S Lincoln 1986
The Countenances of Fourth-Generation Evaluation: Description, Judgement, and Negotiation. In *Evaluation Studies: Review Annual,* Volume 11, pp 70-88.

Hakim C 1987
Research Design Strategies and Choice in the Design of Social Research. Allen and Unwin, London.

Harris G, S Gale, R Allan, C Lucas and M Merinkovich 1993
Promoting the Market for Energy Efficiency. A Report to the Officials Committee on Energy Policy, May.

Hartman R S 1988
Self-Selection in the Evaluation of Voluntary Energy Conservation Programs. In *Review of Economics and Statistics*, pp448-458.

Hartman R S 1986
Energy Conservation Programmes: The Analysis and Measurement of Their Effects. In *Energy Policy*, pp413-424, October

Hartman R S, J C O'Keefe and K A Jensen 1984
Measuring the Effects of Utility-Sponsored Conservation Programs: Do the Programs Work? In*Energy Systems and Policy*, Volume 8(3), pp213-236.

Hedrick T E 1994
The Quantitative-Qualitative Debate: Possibilities for Integration. In *New Directions for Program Evaluation*, Volume 61, pp45-52, Spring.

Hellstern G-M 1991
Generating Knowledge and Refining Experience: The Task of Evaluation. In *The Public Sector: Challenge for Coordination and Learning*, F-X Kaufmann (ed). Walter de Gruyter and Co.

Hildebrandt L and B Joerges 1987
Competing Energy Advisory Services in a German Town. In Public Policies and Private Actions: A Multinational Study of Local Energy Conservation Schemes, G Gaskell and B Joerges(eds), Gower Publishing Company Ltd.

Hirst E 1987
Electric Utility Energy Conservation and Load Management Programmes. In *Energy Policy*, pp103-108, February.

Hirst E 1989
Federal Roles to Realize National Energy-Efficiency Opportunities in the 1990s. Oak Ridge National Laboratory, October.

Hirst E 1990
Measuring Performance: Key to Successful Utility Demand-Side Management Programs. Oak Ridge National Laboratory.

Hirst E and R Goeltz 1985
Energy Savings One and Two Years after Participation in Minnesota Home Energy Audit and Retrofit Programs. Oak Ridge National Laboratory, January.

Hirst E and R Goeltz 1986
Dynamics of Participation and Supply of Services in the Hood River Conservation Project. Oak Ridge National Laboratory.

Hirst E, L Berry and J Soderstrom 1981
Review of Utility Home Energy Audit Programs. In *Energy*, Volume 6(7), pp621-630.

Hirst E, R Goeltz and D Trumble 1987
Electricity Use and Savings in the Hood River Conservation Project. Oak Ridge National Laboratory, April.

Hirst E, D White and R Goeltz 1984
Energy Savings due to the BPA Residential Weatherization Pilot Program Two Years After Participation. Oak Ridge National Laboratory, January.

Hirst E, R Goeltz, M Thornsjo and D Sundin 1985
Evaluation of Minnesota Utility Home Energy Audit and Retrofit Programs. In*Energy Systems and Policy*, Volume 9(2), pp171-195.

Holdren J P 1992
Energy Agenda For The 1990s. In The Energy-Environment Connection, edited by J M Hollander. Island Press, pp378-392.`

House E R 1977
The Logic of Evaluative Argument. CSE Monograph Series in Evaluation, Number 7.

House E R 1984
How We Think About Evaluation. In *Evaluation Studies: Review Annual*, Volume 9, pp 81-101.

House E R et al (eds) 1982
Evaluation Studies: Review Annual, Volume 7. Sage Publications.

House E R (ed) 1986a
New Directions In Educational Evaluation. The Falmer Press.

House E R 1986b
Introduction: Evaluation and Legitimacy. In *New Directions In Educational Evaluation*, The Falmer Press.

House E R 1990
Methodology and Justice. In *New Directions for Program Evaluation*, Number 45, pp 23-36, Spring.

House E R 1994
Integrating the Quantitative and Qualitative. In *New Directions for Program Evaluation*, Volume 61, pp13-22, Spring.

International Energy Agency 1989
Energy And The Environment: Policy Overview. OECD/IEA.

International Energy Agency 1991
Energy Efficiency And The Environment. OECD/IEA.

International Energy Agency 1992a
Global Energy: The Changing Outlook. OECD/IEA.

International Energy Agency 1992b
Energy Conservation in IEA Countries. OECD/IEA.

Issacs N 1991
Building In Energy Efficiency. In*Terra Nova*, pp20-22, October.

Joint Committee on Standards for Educational Evaluation 1981
Standards for Evaluations of Educational Programs, Projects, and Materials. McGraw-Hill.

Joyce L 1989
Giving Feedback in Formative Evaluation: A Nondirective Strategy. In *New Directions for Program Evaluation*, Number 42, pp 111-118, Summer.

Kammler P 1991
The Price of Power: Who Profits? In*Terrz Nova*, pp44-46, March.

Kaufmann F-X 1991
The Public Sector: Challenge for Coordination and Learning. Walter de Gruyter and Co.

Klingberg T 1987
Implementing Energy Policies in Swedish Municipalities. In Public Policies and Private Actions: A Multinational Study of Local Energy Conservation Schemes, G Gaskell and B Joerges(eds), Gower Publishing Company Ltd.

Knight A M 1992
Evaluation Design for a Community-Based Approach to Conservation in Espanola, Ontario. In the Proceedings of the ACEEE 1992 Summer Study on Energy Efficiency in Buildings, Panel 7, Program Evaluation. American Council for an Energy-Efficient Economy, pp 7.129-7.131.

Krathwohl D R 1993
Methods of Educational and Social Science Research: An Integrated Approach. Longman.

Kushler M, K Keating, J Schlegel and E Vine 1992
The Purpose, Practice, and Profession of DSM Evaluation: Current Trends, Future Challenges. In the Proceedings of the ACEEE 1992 Summer Study on Energy Efficiency in Buildings, Panel 7, Program Evaluation. American Council for an Energy-Efficient Economy, pp 7.1-7.25.

Lee J 1994
Accomodating the Principles of Sustainable Energy Development in the Proposed Wholesale Electricity Market. An address by WEDMG Project Director, to the Sustainable Energy Forum, April.

Lincoln Y S and E G Guba 1987
But Is It Rigorous? Trustworthiness and Authenticity in Naturalistic Evaluation. In *Evaluation Studies: Review Annual,* Volume 12, pp 425-436.

Lipsey M W, S Crosse, J Dunkle, J Pollard and G Stobart 1985
Evaluation: The State of the Art and the Sorry State of the Science. In *New Directions for Program Evaluation,* Number 27, pp 7-28, September.

Lishman J (ed) 1984
Evaluation: Second Edition. Research Highlights in Social Work 8. Jessica Kingsley Publishers.

Lonergan S C and C Cocklin 1990
In the Aftermath of the Energy Crisis: New Zealand's Energy Policy in the 1970s and 1980s. In*Energy Policy,* pp101-116, January/February.

Luxton J 1992
Opening Address at Energy Sector Reform Seminar. 18 March.

MacDonald B and J Sanger 1982
Just for the Record? Notes Towards a Theory of Interviewing in Evaluation. In *Evaluation Studies: Review Annual,* Volume 7, pp 175-198.

Madaus G F, M Scriven and D L Stufflebeam 1983a
Evaluation Models: Viewpoints on Educational and Human Services Evaluation. Kluwer-Nijhoff Publishing.

Madaus G F, D L Stufflebeam and M Scriven 1983b
Program Evaluation: A Historial Overview. In *Evaluation Models: Viewpoints on Educational and Human Services Evaluation.* Kluwer-Nijhoff Publishing, pp 3-22.

Mark M M 1990
From Program Theory to Tests of Program Theory. In *New Directions f or Program Evaluation*,Number 47, pp 37-52, Fall.

McDougall G H G and J R B Ritchie 1984
Consumer Energy Conservation Policy: An Analytical Approach. In *Energy Policy*, pp201-212, June.

McRae M R, T Henneberger and P Hanser 1992
Now That We've Got Their Attention: Guidelines for Producing Useful and Used Evaluations. In the Proceedings of the ACEEE 1992 Summer Study on Energy Efficiency in Buildings, Panel 7, Program Evaluation. American Council for an Energy-Efficient Economy, pp7.133-7.142.

Melhuish M 1991a
Clearing Up the Energy Mess. In*Terra Nova*, pp10-12, August.

Melhuish M 1991b
Southpower's Canny Savings Schemes. In*TerraNova*, pp23-33, October.

Miles M B and A M Huberman 1986
Drawing Valid Meaning from Qualitative Data: Toward a Shared Craft. In *Evaluation Studies: Review Annual*, Volume 11, pp 397-407.

Mills E 1991
Evaluation of European Lighting Programmes: Utilities Finance Energy Efficiency. In *Energy Policy*,. pp266-278, April.

Minichiello V, R Aroni, E Timewell and L Alexander 1990
In-Depth Interviewing: Researching People. Longman Cheshire, Australia.

Ministry of Commerce Archives 19__
Unpublished reports, documents and correspondence from the disestablished Ministry of Energy.

Ministry of Energy 1980
Policy Measures for Energy Conservation and Use 1974-1980. Unpublished report, October.

Ministry of Energy 198_a
Energy Management Activities in the Ministry of Energy. Unpublished Report.

Ministry of Energy 198_b
Energy Conservation Monitoring Programme: A Draft Report.

Monnier E 1987
An Evaluation of Local Programmes in France. In Public Policies and Private Actions: A Multinational Study of Local Energy Conservation Schemes, G Gaskell and B Joerges(eds), Gower Publishing Company Ltd.

Monnier E and H Mueller 1987
Policy Analysis: The 'Top-Down' Approach. In Public Policies and Private Actions: A Multinational Study of Local Energy Conservation Schemes, G Gaskell and B Joerges(eds), Gower Publishing Company Ltd.

National Renewable Energy Laboratory 1993
Compendium of Energy Efficiency and Conservation Programs and Projects in Asia Pacific Economic Cooperation (APEC) Member Countries. APEC Energy Project: Energy Efficiency and Conservation Theme. Prepared for the US Department of Energy. April.

Nay J N, J W Scanlon, R E Schmidt and J S Wholey 1976
If You Don't Care Where you Get To, Then It Doesn't Matter Which Way You Go. In The Evaluation of Social Programs, edited by C C Abt, Sage Publications, pp91-120.

Nevo D 1986
The Conceptualisation of Educational Evaluation: An Analytical Review of the Literature. In *New Directions In Educational Evaluation*, The Falmer Press, pp15-29, Summer.

Nevo D 1989
Expert Opinion in Program Evaluation. In *New Directions for Program Evaluation*, Number 42, pp85-96, Summer.

Nielsen L 1993
How to Get The Birds in the Bush Into Your Hand: Results from a Danish Research Project on Electricity Savings. In *Energy Policy*, pp1133-1144, November

Nutt P C 1982
Evaluation Concepts and Methods: Shaping Policy for the Health Administrator. Revised Edition. Spectrum Publications.

OECD 1991
Energy Efficiency and the Environment: A Guide to the Analysis and Removal of Obstacles. Environment Directorate, October.

OECD/IEA 1978
Experts' Meeting on Public Information/Education and Motivation. Standing Group on Long Term Co-operation - Sub-group on Energy Conservation. Chairman's Report. June.

O'Faircheallaigh and R Ryan 1992
Program Evaluation and Performance Monitoring: An Australian Perspective. The Macmillan Company of Australia Pty Ltd.

Olsen M E 1983
Public Acceptance of Consumer Energy Conservation Strategies. In *Journal of Economic Psychology*, 4, pp183-196.

Olsen M E and C Cluett 1982
Voluntary Energy Conservation Through Neighbourhood Programs: Design and Evaluation. In*Energy Systems and Policy*, Volume 6(2), pp161-192.

Olsen M E and V A Fonseca 1987
Consumer Responses to a Highly Subsidized Home Insulation Scheme in Eugene, Oregon, USA. In Public Policies and Private Actions: A Multinational Study of Local Energy Conservation Schemes, G Gaskell and B Joerges(eds), Gower Publishing Company Ltd.

Palumbo D J (ed) 1987
The Politics of Program Evaluation. Sage Yearbooks in Politics and Public Policy, Volume 15. Sage Publications.

Pate D 1991
SNAP to the Future. In*Terra Nova*, pp21-22, February .

Patterson M and C Wadsworth (1993)
Updating New Zealand's Energy Intensity Trends - What has Happened Since 1984 and Why. Prepared for the Energy Efficiency and Conservation Authority.

Patton M Q 1980a
Qualitative Evaluation Methods. Sage Publications.

Patton M Q 1980b
Making Method Choices. In *Evaluation and Program Planning*, Vol 3, pp 219-228.

Patton M Q 1981
Creative Evaluation. Sage Publications.

Patton M Q 1982
Practical Evaluation. Sage Publications.

Patton M Q 1986
Utilization-Focussed Evaluation. Second Edition, Sage Publications.

Patton M Q 1987
How to Use Qualitative Methods in Evaluation. Sage Publications.

Picado X 1989
Local Politics, Program Implementation, and Program Evaluation. In *New Directions for Program Evaluation,* Number 42, pp =31-38, Summer.

Pietrzak J et al 1980
Practical Program Evaluation: Examples from Child Abuse Prevention. Sage Publications.

Pool F 1994
Personal Communication. Energy Efficiency and Conservation Authority.

Posavac E J and R G Carey 1980
Program Evaluation: Methods and Case Studies. Prentice-Hall, Second Edition.

Randolph J 1984
Energy Conservation Programmes: A Review of State Initiatives in the USA. In *Energy Policy,* pp425-438, December.

Reddy A K N 1991
Barriers to Improvements in Energy Efficiency. *Energy Policy,* December, pp953-961.

Regens J L 1980
State Policy Responses to the Energy Issue: An Analysis of Innovation. In*Social Science Quarterly,* Volume 61(1), pp44-57, June.

Robb W L 1994
Evaluating Industrial R&D. In *Evaluation Review,* Volume 18(1), pp89-97, February.

Rossi P H and H E Freeman 1989
Evaluation: A Systematic Approach. Sage Publications, Fourth Edition.

Rossi P H and J D Wright 1986
Evaluation Research: An Assessment. In *Evaluation Studies: Review Annual,* Volume 11, pp 48-69.

Schnipper L, A Ketoff and A Kohane 1985
Explaining Residential Energy Use with International Bottom-up Comparisons. *Annual Review of Energy,* Volume 10, pp341-403.

Schueler V and M A Quaid 1992
Rethinking the Role of Process Evaluation in Demand Side Management (DSM) Resource Acquisition: An Assessment of Current Practice and Strategies for the Future. In the Proceedings of the ACEEE 1992 Summer Study on Energy Efficiency in Buildings, Panel 7, Program Evaluation. American Council for an Energy-Efficient Economy, pp7.207-7.214.

Scriven M 1967
The Methodology of Evaluation. In *Perspectives of Curriculum Evaluation.* AERA Monogragh Series on Curriculum Evaluation. Rand McNally and Company, pp39-83.

Scriven M 1986
New Frontiers of Evaluation. In *Evaluation Studies: Review Annual,* Volume 11, pp93-130.

Scriven M 1993
The Nature of Evaluation. In *New Directions for Program Evaluation,* Number 58, pp5-48, Summer.

Sechrest L and W H Yeaton 1982
Assessing the Effectiveness of Social Programs: Methodological and Conceptual Issues. In *Evaluation Studies: Review Annual,* Volume 7, pp151-166.

Shadish W R Jr 1987a
Sources of Evaluation Practice: Needs, Purposes, Questions, and Technology. In *Evaluation Studies: Review Annual,* Volume 12, pp520- 54.

Shadish W R Jr 1987b
Program Micro- and Macrotheories: A Guide for Social Change. In *New Directions for Program Evaluation,*Number 33, pp92-110, Spring.

Shadish W R Jr and C S Reichardt (eds) 1987c
Evaluation Studies: Review Annual, Volume 12. Sage Publications.

Shadish W R Jr and C S Reichardt 1987d
The Intellectual Foundations of Social Program Evaluation: The Development of Evaluation Theory. In *Evaluation Studies: Review Annual,* Volume 12, pp13-30.

Shadish W R Jr, T D Cook and L C Leviton 1991
Foundations of Program Evaluation: Theories of Practice. Sage Publications.

Sheldon J 1991
Sustainable Energy Paths. In*Terra Nova,* p16, February.

Sheldrick B and S Macgill 1988
Local Energy Conservation Initiatives in the UK. In *Energy Policy*, pp562-578, December.

Sirotnik K A (ed) 1990
Evaluation and Social Justice: Issues in Public Education. New Directions for Program Evaluation, Number 45, Spring.

Smith G and C Cantley 1984
Pluralistc Evaluation. In *Evaluation: Second Edition.* Research Highlights in Social Work 8. Jessica Kingsley Publishers.

Smith H W 1981
Strategies of Social Research: The Methodological Imagination. Prentice-Hall, Second Edition.

Smith N L 1981
Developing Evaluation Methods. In Metaphors for Evaluation, Nick L Smith (ed). New Perspectives in Evaluation, Volume 1. Sage Publications.

Sorenson J H 1985
Information and Energy-Conserving Behaviour. In Past Efforts and Future Directions for Evaluating State Energy Conservation Programs, N E Collins et al. Prepared for US Department of Energy. Prepared by the Oak Ridge National Laboratory, April.

Stern et al 1985
The Effectiveness of Incentives for Residential Energy Conservation. I n *Evaluation Review*, Volume 10(2), pp147-176, April.

Stromsdorfer E W and G Farkas (eds) 1980
Evaluation Studies: Review Annual, Volume 5. Sage Publications.

Stufflebeam D L and W J Webster 1983
An Analysis of Alternative Approaches to Evaluation. Kluwer-Nijhoff Publishing

Sykes J B (ed) 1982
The Concise Oxford Dictionary of Current English. Oxford University Press, Seventh Edition.

Synergy Applied Research Limited 1986
Review of the Energy Advisory Service and Energy Conservation Loans. Report prepared for the New Zealand Energy Research and Development Committee, December.

Terry S 1991
Making a Market for Energy Efficiency. New Zealand Planning Council, July.

Thompson R J 1989
Evaluator as Power Broker: Issues in the Maghreb. In *New Directions for Program Evaluation*,Number 42, pp39-48, Summer.

Treasury Board of Canada 1981
Guide on the Program Evaluation Function. Program Evaluation Branch, May.

Tyler R W 1967
Changing Concepts in Educational Evaluation. In *Perspectives of Curriculum Evaluation*. AERA Monograph Series on Curriculum Evaluation. Rand McNally and Company, pp13-18.

Tyler R, R Gagne and M Scriven 1967
Perspectives of Curriculum Evaluation. AERA Monograph Series on Curriculum Evaluation. Rand McNally and Company.

van der Linden J and T van Eijk 1987
A Community Insulation Programme for Tenants in the Netherlands. In Public Policies and Private Actions: A Multinational Study of Local Energy Conservation Schemes, G Gaskell and B Joerges(eds), Gower Publishing Company Ltd.

Weiss C H 1972
Evaluation Research: Methods of Assessing Program Effectiveness. Prentice-Hall.

Weiss C H 1982
Measuring the Use of Evaluation. In *Evaluation Studies: Review Annual*, Volume 7, pp129-145.

Weiss C H 1987
Where Politics and Evaluation Research Meet. In The Politics of Program Evaluation , D J Palumbo (ed). Sage Publications.

Wholey J S 1981
Using Evaluation to Improve Program Performance. In *Evaluation Studies: Review Annual*, Volume 6, pp55-69.

Wholey J S 1986
Managing for High Performance: The Role of Evaluation. In *Evaluation Studies: Review Annual*, Volume 11, pp194-204.

Wholey J S 1987
Evaluability Assessment: Developing Program Theory. In *New Directions for Program Evaluation*,Number 33, pp77-92, Spring.

Worthen B R and J R Sanders 1973
Educational Evaluation: Theory and Practice. Ohio : Charles A Jones Publishing Company.

Wye C G 1989
Increasing Client Involvement in Evaluation: A Team Approach. In *New Directions for Program Evaluation*, Number 41, pp35-48, Spring.

Yates S M and E Aronson 1983
A Social Psychological Perspective on Energy Conservation in Residential Buildings. In *American Psychologist*, pp435-444, April

Young D 1991
Unbridled Growth. Editorial, In*Terra Nova*, p4, February.

Young T R 1982
Sociology and Human Knowledge: Scientific vs Folk Methods. In *Evaluation Studies: Review Annual*, Volume 7, pp77-82.