

Sustainable Energy Fund Working Group

Final Report to the Treasurer and Minister for Energy

24 November 1995

The Honourable Michael Egan MP
Treasurer and Minister for Energy
Parliament House
Sydney NSW 2000

Dear Minister

I have pleasure in submitting to you the final report of the Sustainable Energy Fund Working Group.

David J Crossley (Dr)
Chair, Sustainable Energy Fund Working Group

24 November 1995

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Executive Summary

Introduction

One of the key components of the NSW Government's overall reforms to the NSW electricity industry is the establishment of a Sustainable Energy Fund (SEF).

The main role of the Sustainable Energy Fund is to intervene where market failure is raising barriers to the economically efficient utilisation and application of sustainable energy technologies.

The SEF is not intended to fund research activities, but rather to support those sustainable energy technologies:

- which are already commercialised, or are on a development and demonstration path leading to commercialisation;
- which would benefit from funding support; and
- the commercialisation of which would proceed very slowly or not at all in the absence of SEF funding.

The SEF will not seek to compete in markets where the operations of the private and utility sectors are likely to capture most of the market potential, but will facilitate business opportunities with these sectors through targeted programs of industry assistance and through equity participation, for example in joint ventures.

SEF Working Group

The Sustainable Energy Fund Working Group has been established to prepare recommendations on how the SEF should be established.

The Terms of Reference defined the main tasks of the SEF Working Group as being to make recommendations to the Minister on:

- the objectives of the SEF;
- the appropriate level and means of funding;
- priority areas for action;
- criteria for program selection and guidelines for project funding;
- the future administration of the SEF.

This document is the final report to the Minister by the SEF Working Group. It contains the Working Group's firm recommendations to the Minister on how the Sustainable Energy Fund should be established.

Public Consultation Process

The SEF Working Group commenced a public consultation process with a newspaper advertisement placed on 16 September 1995 seeking public comment on specific questions relating to the Sustainable Energy Fund. Fifty-five submissions were received and these were augmented in some cases by presentations and discussions with members of the Working Group.

SEF Mission

The SEF Working Group proposes the following as the Mission of the Sustainable Energy Fund:

Consistent with the principles of ecologically sustainable development, to reduce the level of greenhouse gas emissions and other adverse environmental impacts of energy use in NSW, and to increase economic efficiency, by facilitating: improved end-use energy efficiency; enhanced fuel substitution to more environmentally benign fuels; increased use of cogeneration; and accelerated development and commercial application of renewable energy technologies.

The Working Group has also proposed detailed Objectives for the SEF.

Administration of the SEF

Under the *Sustainable Energy Development Bill 1995*, the SEF will be administered by a statutory body representing the Crown to be known as the Sustainable Energy Development Authority (SEDA). The Authority will be a separate body with its own Executive Director reporting directly to the Minister.

The Working Group recommends that a business strategy for SEDA should be developed according to guidelines which acknowledge that:

- SEDA is an implementing agency not a policy development or regulatory body;
- SEDA should not compete with the private and utility sectors;
- there should be only a small number of SEDA staff whose main role will be project management;
- SEDA should set realistic and challenging annual targets to be achieved through its intervention activities;
- SEDA should carry out comprehensive monitoring, verification and evaluation of the results of its intervention activities.

In carrying out its activities, SEDA will need to establish procedures for delivering programs and projects. SEDA should be a proactive organisation which both initiates projects and actively seeks out funding proposals consistent with the objectives of the Sustainable Energy Fund. The Working Group recommends that SEDA should use a range of methods for program delivery, with an appropriate method being selected depending on the nature of the particular project.

Intervention Activities

The Working Group recommends that SEDA should promote and fund a wide range of intervention activities aimed at supporting the commercialisation of sustainable energy technologies. These activities should include:

- providing information, education and training;
- providing funding assistance for technology commercialisation;
- assisting sustainable energy technologies increase their market share through market transformation activities;
- providing assistance to sustainable energy industries.

Review of Existing Programs

The Working Group recommends that all existing government energy efficiency and renewable energy programs should continue at their present resource levels until after the establishment of SEDA. SEDA managers should then carry out a detailed review of existing programs using SEF priorities and selection criteria, including a review of projects funded by the State Energy Research and Development Fund (SERDF). Programs and projects which fall within the SEF priorities and selection criteria should then be transferred to SEDA.

The Working Group recommends that the future of the State Energy Research and Development Fund, in relation to the funding of projects remaining after projects have been transferred to the Sustainable Energy Fund, should be decided as an issue separate to the establishment of the SEF. In the event that SERDF is continued, overlap of functions and funding priorities between SERDF and the SEF should be minimised.

Sources of Funding

The Working Group has identified several options for funding sources for the Sustainable Energy Fund:

- the NSW Government Consolidated Fund;
- a levy on energy utility revenue;
- funds contributed by the gas industry under the *Energy Administration Act 1987*;
- current funding of certain existing Pacific Power programs;
- returns on investments made by SEDA;
- joint funding arrangements with other funding bodies.

The Working Group recommends that the principal source of funding for the SEF should be the NSW Government Consolidated Fund, with funds being provided as budgetary allocations through the established process of three year rolling funding.

The Working Group recommends that a levy on the electricity and/or gas industry should be kept under review with the possibility of using a levy as a funding source in the future.

The Working Group recommends that SEDA should be empowered, with the approval of the Minister and the Treasurer, to invest in commercial joint ventures with project proponents where these are in conformity with the Mission and Objectives of the Sustainable Energy Fund and where appropriate analysis of the investment risks has been carried out. All net monetary returns from these investments should be allocated to the SEF for use in funding SEF intervention activities.

Funding Allocation

The Working Group recommends that monies from the SEF should be allocated to four portfolio categories on the basis of a target proportion of the total funding available after allowing for the administrative costs of SEDA. The portfolio categories should be:

- energy efficiency and fuel substitution;
- cogeneration;
- renewable energy;
- core programs.

The Working Group recommends that SEDA managers should develop a methodology for deciding the proportional allocation between portfolio categories.

Level of Funding

The SEF Working Group commissioned three expert consultancy studies to provide additional advice on appropriate funding levels in the portfolio categories of energy efficiency and fuel substitution; cogeneration; and renewable energy technologies.

Based on the results of the consultancy studies, the Working Group recommends that a target annual level of funding for the Sustainable Energy Fund should be set at \$45 million (1995 dollars). This level of funding should cover the three portfolio categories of energy efficiency and fuel substitution, cogeneration and renewable energy plus expenditure on core programs and on the administrative expenses of the Sustainable Energy Development Authority.

The Working Group recommends that SEDA should develop its corporate plan on the basis of the following indicative expenditure profile (in 1995 dollars):

First full year (1996/97)	\$ 7 million
Second year (1997/98)	\$12 million
Third year (1998/99)	\$20 million
Fourth year (1999/2000)	\$30 million
Fifth year (2000/01) and subsequent years	\$45 million.

The Working Group recommends that annual funding levels for the Sustainable Energy Fund should be dependent on the performance of the Sustainable Energy Development Authority. Good performance should result in increases in funding. Poor performance should lead to analysis and rectification of the reasons for this poor performance with reductions in funding if the situation cannot be rectified.

Estimated CO₂ Emission Reductions

The Working Group estimated the carbon dioxide emission reductions which would be achieved by the funding levels in the indicative expenditure profile and an indicative allocation between portfolio categories. When programs initiated by the Sustainable Energy Development Authority are fully operational, the carbon dioxide emission reductions accumulated over a three year period total an estimated 2.7 million tonnes. Therefore, the Sustainable Energy Fund would exceed the NSW Government's target of reducing emissions of carbon dioxide by 2 million tonnes accumulated over a three year period.

The emission reductions achieved by SEDA projects will accumulate rapidly. By the end of the seventh year, assuming the \$45 million target expenditure figure is reached, the emission reduction achieved are estimated at 4.7 million tonnes of carbon dioxide per year. This is 2.7% of the total annual carbon dioxide emissions in NSW in 1990. This annual emission reduction will increase by an estimated 1.8 million tonnes for each year subsequent to the seventh year of operation of the SEF.

Selection Criteria for SEF Projects

The Working Group identified the following categories of selection criteria for various types of intervention activities:

- Pass/Fail Criteria which determine whether a particular activity is considered further for funding support. An example might be whether the intervention activity is cost-effective for society taking into account environmental as well as financial and economic cost;
- Ranking Criteria which establish a means of comparison between different intervention activities which have passed the pass/fail test. Examples might be the quantity of greenhouse gas emissions reduced by the activity, and the cost per unit of reduction;
- Other Considerations which are directed at measuring the effectiveness or likely success of each project. An example might be whether the activity will increase market opportunities for sustainable energy technologies.

Extension of the SEF to Other Energy Forms

The Working Group recommends that the Sustainable Energy Development Authority should investigate extending the Sustainable Energy Fund to other energy forms and systems, particularly gas and transport. When this investigation is completed, an additional funding allocation should be made to the SEF to cover these other energy forms and systems.

List of Recommendations

Mission and Objectives

Recommendation 1. *The Working Group recommends that the Mission and Objectives for the Sustainable Energy Fund should be as outlined in this report.*

Administration of the SEF

Recommendation 2. *The Working Group recommends that the business strategy for the Sustainable Energy Development Authority should be developed according to the following guidelines:*

- *that SEDA is an implementing agency not a policy development or regulatory body (though the Sustainable Energy Advisory Board does have a role to advise the Minister on relevant matters);*
- *that SEDA should not compete in markets where the operations of the private and utility sectors are likely to capture most of the market potential, but should facilitate business opportunities with the private and utility sectors through targeted programs of industry assistance and through equity participation, for example in joint ventures;*
- *that there should be only a small number of SEDA staff whose main role will be project management and that, where possible, administrative and program delivery functions should be contracted out;*
- *that SEDA should set realistic and challenging annual targets to be achieved through its intervention activities;*
- *that SEDA should carry out comprehensive monitoring, verification and evaluation of the results of its intervention activities to determine whether targets have been achieved.*

Recommendation 3. *The Working Group recommends that the Sustainable Energy Development Authority should use a range of methods for program delivery, with an appropriate method being selected depending on the nature of the particular project. These should include the effective use of trade allies in the private and public sector (ie consultants, contractors, equipment suppliers, utilities and others that have a financial interest in the program succeeding). SEDA staff should not work directly on program delivery, rather they should primarily function as project managers.*

Recommendation 4. *The Working Group recommends that SEDA management consider carefully the number and skills profile of staff engaged. The required skills profile of SEDA staff will change over time in response to changing circumstances and some skills may be better sourced through contracting in rather than maintaining permanent staff with these skills. The range of skills and experience required includes:*

- *experience in the development and commercialisation of technology;*
- *experience in the application of sustainable energy technologies and techniques;*
- *financial analysis skills including skills in investment risk analysis;*
- *experience in private sector entrepreneurial activities;*
- *marketing and promotional skills;*
- *experience in the environmental impacts of energy production and use;*
- *experience in the management of energy programs.*

Intervention Activities

Recommendation 5. *The Working Group recommends that monies from the Sustainable Energy Fund be used to achieve the Fund's Mission and Objectives by carrying out activities such as the following: providing information, education and training on sustainable energy technologies, techniques and practices; providing funding assistance for the commercialisation of sustainable energy technologies; assisting sustainable energy technologies increase their market share through market transformation activities; and providing assistance to sustainable energy industries.*

Review of Existing Programs

Recommendation 6. *The Working Group recommends that all existing government energy efficiency and renewable energy programs should continue at their present resource levels until after the establishment of the Sustainable Energy Development Authority. SEDA managers should then carry out a detailed review of existing programs using SEF priorities and selection criteria, including a review of projects funded by the State Energy Research and Development Fund (SERDF). Programs and projects which fall within the SEF priorities and selection criteria should then be transferred to SEDA.*

Recommendation 7. *The Working Group recommends that where energy efficiency and renewable energy programs have been developed and implemented by electricity utilities for primarily commercial reasons, and where the commercial drivers remain in place, these programs should be left with the utilities.*

Recommendation 8. *The Working Group recommends that, following the completion of the review of non-core businesses by Pacific Power, a further urgent review should be carried out of energy efficiency and renewable energy programs currently funded by Pacific Power. This review should determine:*

- *which programs should be continued;*
- *whether continuing programs should be retained in the generation sector, administered by the Sustainable Energy Development Authority, or administered by other agencies.*

Recommendation 9. *The Working Group recommends that the future of the State Energy Research and Development Fund, in relation to the funding of projects remaining after projects have been transferred to the Sustainable Energy Fund, should be decided as an issue separate to the establishment of the SEF. In the event that SERDF is continued, overlap of functions and funding priorities between SERDF and the SEF should be minimised.*

Sources of Funding

Recommendation 10. *The Working Group recommends that the principal source of funding for the Sustainable Energy Fund should be the NSW Government Consolidated Fund, with funds being provided as budgetary allocations through the established process of three year rolling funding.*

Recommendation 11. *The Working Group recommends that a levy on the electricity and/or gas industry should be kept under review with the possibility of using a levy as a funding source in the future.*

Recommendation 12. *The Working Group recommends that if the funding of any programs is transferred from the State Energy Research and Development Fund and/or Pacific Power to the Sustainable Energy Development Authority, then monies should be provided to the Sustainable Energy Fund on a revenue neutral basis to cover the funding of the transferred programs. This funding should be additional to other program and general funding provided to the SEF and it should be continued for the life of the transferred programs.*

Recommendation 13. *The Working Group recommends that the Sustainable Energy Development Authority should be empowered, with the approval of the Minister and the Treasurer, to invest in commercial joint ventures with project proponents where these are in conformity with the Mission and Objectives of the Sustainable Energy Fund and where appropriate analysis of the investment risks has been carried out. All net monetary returns from these investments should be allocated to the SEF for use in funding SEDA intervention activities.*

Recommendation 14. *The Working Group recommends that the Sustainable Energy Development Authority should, where appropriate, establish joint funding arrangements with other funding bodies such as the Energy Research and Development Corporation (ERDC), the Australian Electricity Supply Industry Research Board (AESIRB), energy utilities, and Commonwealth Government agencies.*

Funding Allocation

Recommendation 15. *The Working Group recommends that monies from the Sustainable Energy Fund should be allocated to four portfolio categories on the basis of a target proportion of the total funding available after allowing for the administrative costs of the Sustainable Energy Development Authority. The portfolio categories should be: energy efficiency and fuel substitution, cogeneration, renewable energy, and core programs.*

Recommendation 16. *The Working Group recommends that SEDA managers should develop a methodology for deciding the proportional allocation between portfolio categories.*

Level of Funding

Recommendation 17. *The Working Group recommends that a target annual level of funding for the Sustainable Energy Fund should be set at \$45 million (1995 dollars). This level of funding should cover the four portfolio categories of energy efficiency and fuel substitution, cogeneration, renewable energy and core programs plus expenditure on the administrative expenses of the Sustainable Energy Development Authority.*

Recommendation 18. *The Working Group recommends that SEDA should develop its corporate plan on the basis of the following indicative expenditure profile (in 1995 dollars):*

<i>First full year (1996/97)</i>	<i>\$ 7 million</i>
<i>Second year (1997/98)</i>	<i>\$12 million</i>
<i>Third year (1998/99)</i>	<i>\$20 million</i>
<i>Fourth year (1999/2000)</i>	<i>\$30 million</i>
<i>Fifth year (2000/01) and subsequent years</i>	<i>\$45 million.</i>

Recommendation 19. *The Working Group recommends that that SEDA should arrange for the external evaluation of various aspects of its performance as follows:*

- *after one full year of operation:*
- *the performance of SEDA with respect to identifying, planning and initiating projects;*
- *after three full years of operation:*
- *the performance of SEDA with respect to the actual impacts of its projects and activities on the NSW energy system and on greenhouse gas emissions reductions;*
- *the appropriateness of funding allocations to the different portfolio categories;*
- *after five full years of operation:*
- *the continuing need for means to meet the objectives for which the Sustainable Energy Fund was established;*
- *the continuing need for the Sustainable Energy Fund and Sustainable Energy Development Authority as appropriate means for meeting those objectives.*

Recommendation 20. *The Working Group recommends that annual funding levels for the Sustainable Energy Fund should be dependent on the performance of the Sustainable Energy Development Authority. Good performance should result in increases in funding. Poor performance should lead to analysis and rectification of the reasons for this poor performance with reductions in funding if the situation cannot be rectified.*

Selection Criteria for SEF Projects

Recommendation 21. *The Working Group recommends that a hierarchy of criteria be used by the Sustainable Energy Development Authority in selecting proposed projects for funding. Individual selection criteria should be developed and refined for each of the portfolio categories based on those identified in this report and a weighting factor developed for each criterion. The selection criteria should be reviewed on an annual basis to ensure that the criteria are effective in selecting projects with cost-effective measurable impacts.*

Extension of the SEF to other Energy Forms

Recommendation 22. *The Working Group recommends that the Sustainable Energy Development Authority should investigate extending the Sustainable Energy Fund to other energy forms and systems, particularly gas and transport. When this investigation is completed, an additional funding allocation should be made to the SEF to cover these other energy forms and systems.*

1. INTRODUCTION

The NSW Government announced its intention to introduce major reforms to the NSW electricity industry in its *Electricity Reform Statement*¹, released by the Treasurer and Minister for Energy in May 1995. One of the key components of the Government's overall reforms is the establishment of a Sustainable Energy Fund (SEF).

The main role of the Sustainable Energy Fund is to intervene where market failure is raising barriers to the economically efficient utilisation and application of sustainable energy technologies.

The SEF is not intended to fund research activities, but rather to support those sustainable energy technologies:

- which are already commercialised, or are on a development and demonstration path leading to commercialisation;
- which would benefit from funding support; and
- the commercialisation of which would proceed very slowly or not at all in the absence of SEF funding.

The SEF will not seek to compete in markets where the operations of the private and utility sectors are likely to meet most of the market potential, but will facilitate business opportunities with the private and utility sectors through targeted programs of industry assistance and through equity participation, for example in joint ventures.

¹ Hon Moichael Egan, 1995. *Electricity Reform Statement*. NSW Government, May.

2. SEF WORKING GROUP

A Sustainable Energy Fund Working Group was established to prepare recommendations to the Minister for Energy on how the SEF should be established. The Terms of Reference for the Working Group and a list of its members are attached as Appendices A and B.

The Terms of Reference defined the main tasks of the SEF Working Group as being to make recommendations to the Minister on:

- the objectives of the SEF;
- the appropriate level and means of funding;
- priority areas for action;
- criteria for program selection and guidelines for project funding;
- the future administration of the SEF.

The SEF Working Group submitted an interim report to the Minister on 22 September 1995. The interim report outlined the Working Group's thinking at that time on how the Sustainable Energy Fund should be established but did not include any recommendations.

This document is the final report to the Minister by the SEF Working Group. It contains the Working Group's firm recommendations to the Minister on how the Sustainable Energy Fund should be established.

3. PUBLIC CONSULTATION PROCESS

The SEF Working Group commenced a public consultation process with a newspaper advertisement placed on 16 September 1995 seeking public comment on the following issues:

- what sort of activities should be funded by the SEF?
- what level of funding should be made available to the SEF?
- what should be the priority areas for funding by the SEF?
- how should activities be selected for funding by the SEF?
- should the SEF be aimed at all sectors of the energy market or initially constrained in some way?

The Working Group invited written submissions from interested people to be received by 16 October 1995. Fifty-five submissions were received and these were augmented in some cases by presentations and discussions with members of the Working Group.

The Working Group found the public consultation process to be most useful and appreciated the thoughtful submissions which were made. Appendix C outlines the main issues raised in the submissions and shows how the views expressed have been considered for incorporation into the Working Group's recommendations.

4. POLICY BACKGROUND

4.1 State and National Greenhouse Policies

Governments have acknowledged the potentially significant impact of climate change resulting from an enhanced greenhouse effect. The *National Greenhouse Response Strategy* (NGRS), together with the *National Strategy for Ecologically Sustainable Development* endorsed by the Council of Australian Governments in December 1992, represent the current agreed State and Commonwealth greenhouse gas emissions policy and are the principal means by which Australia intends to meet its international obligations under the Framework Convention on Climate Change.

Under the NGRS, Governments agreed to the decision by Australia to adopt an interim planning target "*...to stabilise greenhouse gas emissions (not controlled by the Montreal Protocol on Substances that Deplete the Ozone Layer) based on 1988 levels, by the year 2000 and to reduce these emissions by 20 per cent by the year 2005...subject to Australia not implementing response measures that would have net adverse economic impacts nationally or on Australia's trade competitiveness, in the absence of similar action by major greenhouse producing countries.*"

The NGRS set key objectives in the energy area, including:

- minimising greenhouse gas emissions per unit of each type of energy supplied to end users;
- promoting alternative energy sources that have the potential to lower greenhouse gas emissions per unit of energy supplied;
- improving the energy efficiency of residential and commercial buildings, domestic appliances, and commercial and industrial equipment.

The NGRS initiated some national priority actions under these objectives, such as minimum energy performance standards for some major domestic appliances.

In March 1995, the Commonwealth Government announced a further package of measures, called 'Greenhouse 21C', including a White Paper on Sustainable Energy, a Cooperative Research Centre on renewable energy and a program of Cooperative Agreements with industry.

The Commonwealth Government launched its Greenhouse Challenge program to promote the abatement of greenhouse gas emissions in October 1995. Under this program, organisations are encouraged to sign voluntary Cooperative Agreements which commit them to undertake specific actions to reduce greenhouse gas emissions. The Sustainable Energy Fund may well be able to assist organisations to meet their commitments under these Agreements, provided that this fits with the corporate plan, program priorities and project selection criteria established by the SEF managers.

In New South Wales, most electricity produced is generated by the burning of black coal. Coal is a non-renewable resource and its combustion produces the greenhouse gas carbon dioxide (CO₂). As the generation of electricity in the State accounts for around 49% of the total emissions of CO₂, measures that reduce the greenhouse gas emissions associated with electricity and other energy use will positively affect NSW's overall position regarding the national and international targets.

The NSW Government has made a commitment to reduce CO₂ emissions by a total of two million tonnes accumulated over three years. This target and the Government's commitment was reconfirmed by the Minister when the *Electricity Reform Statement* was released.

The NSW Government is also contributing to the identification of opportunities for further 'no-regrets' actions to address Australia's international commitments and the actions identified in the National Greenhouse Response Strategy. These measures will be presented in November 1995 to the Inter-Governmental Committee for Ecologically Sustainable Development (ICESD).

² Commonwealth of Australia, 1992. *National Greenhouse Response Strategy*. Australian Government Publishing Service, Canberra, December.

³ Commonwealth of Australia, 1992. *National Strategy for Ecologically Sustainable Development*. Australian Government Publishing Service, Canberra, December.

⁴ Commonwealth of Australia, 1995. *Greenhouse 21C: A Plan of Action for A Sustainable Future*. Australian Government Publishing Service, Canberra, March.

⁵ Commonwealth of Australia, 1995. *Greenhouse Challenge*. Australian Government Publishing Service, Canberra, October.

4.2 Market Barriers

While the Commonwealth and State governments have set targets and objectives in the areas of greenhouse gas emissions, energy efficiency and renewable energy, there are a number of barriers to the introduction of these technologies. The most notable include:

- limited access to capital;
- the payback gap (or difference in discount rates) between utility supply-side investment and the customer's demand-side investment;
- the low priority of energy expenditure from the perspective of customers;
- split incentives (eg the landlord/tenant situation);
- a lack of information for customers especially about the costs and benefits of energy efficiency and renewable energy applications;
- information and transaction costs;
- the inability of utilities to recover the cost of investment in, or make a profit on, energy efficiency, usually due to regulatory failures;
- environmental costs (externalities) not included in prices.

In addition, barriers to the continuing development and commercial application of renewable energy technologies include:

- the electricity generation over-capacity situation in New South Wales;
- price regulation, such as low off-peak electricity tariffs, which discourages renewables and smaller scale cogeneration;
- the fact that applications of renewables will not be as cost-effective as conventional generating technologies, except in niche applications (unless externalities are included in prices) until opportunities are provided for economies of scale in production or operation of the technology.

While structural and pricing reforms will be important factors in overcoming past regulatory failures and improving technical efficiency in the electricity sector, the continuing existence of most of the above barriers will require additional mechanisms to ensure that the majority of cost-effective opportunities for sustainable energy technologies are taken up. The Sustainable Energy Fund is one of the mechanisms that will be used to reduce the barriers to these technologies.

4.3 Reform of the NSW Electricity Supply Industry

The NSW electricity supply industry currently operates within a highly regulated market. Structural reforms within NSW are aimed at positioning the NSW electricity industry for a competitive national wholesale market. The overriding objective of the electricity reforms is to establish a lightly regulated competitive market structure that drives productivity improvements and leads to efficient prices, thereby lowering the true costs of energy services and allowing an expansion in economic output and employment.

Key components of the national reform agenda include: the separation into individual businesses of the four operational functions of the electricity supply industry, namely generation, transmission, distribution and retail supply; the separation of natural monopoly elements of the electricity industry from the competitive sectors; and the separation of the operational and regulatory functions of the industry.

Strategic possibilities for competition in retail energy services and for competition in the wholesale energy market may change the nature and extent of economies of scale and economies

of scope in electricity distribution. The reforms will remove some, but not all, of the barriers to the adoption of environmentally superior demand management and supply technologies.

Two major reviews have been carried out by the NSW Government on the restructuring of the NSW electricity supply industry.

A Generation Review Group investigated the appropriate structure for the electricity generation sector in NSW and recommended that Pacific Power be disaggregated into two or three generating companies. The Government has announced that two generating companies will be established.

The second review by the Distribution Review Group recommended that the existing 25 Electricity Distributors be amalgamated into six new distribution businesses which will also be corporatised. The network and retail energy services components of the distribution businesses will be ring fenced within the new distribution companies. The Government Pricing Tribunal will oversee the operation of the franchise part of the retail energy services business and all of the operation of the network services of the new distribution companies. The Distribution Review Group further recommended that the corporate governance principles established for distribution businesses enable these businesses to provide a full range of energy services including gas supply and demand management. This recommendation provides the opportunity for the retail supply sector to make an enhanced range of energy services available to customers though, by itself, it does not guarantee this outcome. The Government has accepted these recommendations and they are currently being implemented

The electricity reform process will deliver savings in retail electricity prices from two main sources. Firstly, reductions in the wholesale price paid to generators and the introduction of competition in the generation sector are expected to deliver a lower wholesale price than the regulated price set by the Government Pricing Tribunal. Secondly, the savings from economies of scale arising from the amalgamations of the distribution businesses are estimated to be \$80 to \$130 million per annum. Further improvements in productivity over the next five years will also save up to \$100 million per annum by the end of that period.

The SEF Working Group notes that a reduction in electricity prices may add to the difficulty faced by energy businesses in marketing energy efficiency and renewable energy technologies. However, in addition to changes to the distribution business structures, other changes may occur over time, including a change in customers' perception of energy services. This may assist the marketing and application of energy efficiency and renewable energy technologies to customers in spite of reduced energy prices.

4.4 Role of Demand Management and Energy Efficiency in the Competitive Electricity Market

There has been substantial work carried out on identifying the opportunities for demand management and energy efficiency in the competitive electricity market in Australia.

A well-functioning competitive electricity market in southern and eastern Australia will enable customers to choose between electricity suppliers on the basis of the services they offer (including energy efficiency services) as well as price. Achieving true competition between demand-side and supply-side options will require action to encourage the establishment of a competitive energy services industry in Australia, including some collaboration between participants in the competitive electricity market. At the same time, enabling the monopoly electricity network

businesses to carry out energy efficiency programs will require some changes to the current regulatory structures.

The structural reform of the NSW electricity supply industry and the establishment of the Sustainable Energy Fund are complementary. Structural reform removes some of the old regulatory biases against energy efficiency and opens up the opportunity for electricity retailers to broaden their businesses into providing energy services. The SEF provides a specific stimulus to the energy efficiency and renewable energy industries which are needed for a true energy services market but which are still in their infancy.

Amalgamation and corporatisation of the NSW electricity distributors provides an opportunity for the incorporation into the new institutional arrangements of incentives for electricity distributors to broaden their retail supply businesses beyond the provision of electricity as a commodity. Indeed, some distributors are already re-orienting their retail supply businesses towards selling energy services and are becoming involved in providing their customers with energy efficiency and renewable energy solutions to their energy services needs.

One role of the Sustainable Energy Fund will be to encourage, facilitate and support this trend among electricity retailers and also to encourage electricity network businesses (both distribution and transmission) to consider energy efficiency and renewable energy options for cost-effectively deferring the need to augment their systems.

On a broader scale, the SEF will stimulate the development and establishment of viable and competitive businesses providing sustainable energy technologies and services by removing barriers and influencing demand. It is envisaged that these businesses will be established both within and outside the electricity supply industry. Once fully established, these energy services businesses will be able to compete on a more equal basis with businesses supplying electricity as a commodity.

5. Mission and Objectives

5.1 Mission

The Working Group proposes the following as the Mission of the Sustainable Energy Fund:

Consistent with the principles of ecologically sustainable development, to reduce the level of greenhouse gas emissions and other adverse environmental impacts of energy use in NSW, and to increase economic efficiency, by facilitating: improved end-use energy efficiency; enhanced fuel substitution to more environmentally benign fuels; increased use of cogeneration; and accelerated development and commercial application of renewable energy technologies.

5.2 Objectives

The Working Group proposes the following Objectives for the Sustainable Energy Fund:

- To facilitate reduced energy service costs and customer energy bills through cost-effective intervention to increase the commercial application of sustainable energy technologies and techniques.

- To reduce market barriers affecting those industries manufacturing, supplying, and installing sustainable energy technologies and services and to assist those industries to gain recognition and acceptance and to become commercially competitive.
- To contribute to the NSW Government's overall commitment to reduce carbon dioxide emissions by two million tonnes accumulated over a three year period.
- To promote the commercial application of sustainable energy technologies, services and practices through support activities such as information provision, education and training.
- To make recommendations to appropriate bodies and to the Government on issues relevant to achieving increased commercial application of sustainable energy technologies.

5.3 Recommendation

Recommendation 1. *The Working Group recommends that the Mission and Objectives for the Sustainable Energy Fund should be as outlined in this report.*

6. ADMINISTRATION OF THE SEF

6.1 Legislation

The Sustainable Energy Fund will be established under its own Act of Parliament. The *Sustainable Energy Development Bill 1995* was introduced into the NSW Parliament by the Government on 23 November 1995. The *Bill* is attached as Appendix D.

Under the *Sustainable Energy Development Bill*, the SEF will be administered by a statutory body representing the Crown to be known as the Sustainable Energy Development Authority (SEDA). The Authority will be a separate body with an advisory Board (Sustainable Energy Advisory Board) and its own Executive Director reporting directly to the Minister. The *Bill* also establishes the Sustainable Energy Fund to provide energy development assistance to persons engaged in the development, commercialisation, promotion and use of sustainable energy technology.

'Sustainable energy technology' is defined in the legislation to mean products, processes, practices and designs:

- (a) to improve efficiency in the use of energy;
- (b) to facilitate the production of energy from renewable resources;
- (c) to facilitate the production of energy in ways that minimise levels of greenhouse gas emissions and other adverse environmental impacts;
- (d) to enable energy-using activities to use forms of energy that minimise levels of greenhouse gas emissions and other adverse environmental impacts.

'Energy development assistance' is defined in the legislation as being information, education and training, loans, grants, subsidies and financial guarantees, and other assistance in connection with the development, commercialisation, promotion and use of sustainable energy technology.

The functions of the Sustainable Energy Development Authority are described in the legislation as being:

- (a) to investigate matters relating to the development, commercialisation, promotion and use of sustainable energy technology;
- (b) to engage in the development, commercialisation, promotion and use of sustainable energy technology;
- (c) to provide energy development assistance to persons engaged in the development, commercialisation, promotion and use of sustainable energy technology;
- (d) to advise other persons on matters relating to the development, commercialisation, promotion and use of sustainable energy technology.

The *Sustainable Energy Development Bill 1995* also:

- defines the objectives of the Sustainable Energy Development Authority in similar terms to those used in the Mission Statement for the Sustainable Energy Fund recommended in this report;
- states that SEDA is not intended to support fundamental research activities, but rather to support the development, commercialisation, promotion and use of sustainable energy technology, particularly in those areas where the development, commercialisation, promotion and use of that technology is impeded by lack of appropriate information or finance or other barriers;
- requires SEDA, in exercising its functions, to have primary regard to products, processes, practices and designs that are already commercialised or on a development and demonstration path that leads to commercialisation;
- states that SEDA will prepare a Corporate Plan and will seek public input into that process by means of a public consultation process;
- establishes that SEDA is to be headed by an Executive Director, may employ staff to administer the SEF or utilise staff from a government agency, may engage consultants, and may enter into an agreement with another body under which the other body is to provide services;
- allows for SEDA, with the approval of the Minister and the concurrence of the Treasurer, to enter into financial guarantees;
- allows for SEDA to form or participate in the formation of private companies and, with the approval of the Minister, subsidiary companies.

The Bill also provides for the Sustainable Energy Advisory Board to advise the Minister on relevant matters. The Board will be appointed by the Minister and will comprise of at least three and not more than seven members with appropriate qualifications or experience in relation to one or more of the following:

- (a) energy or energy related services;
- (b) consumer or community interests;
- (c) environmental protection;
- (d) financial management.

6.2 Business Strategy

The legislation makes clear the main parameters within which the Sustainable Energy Fund and its administrative agency the Sustainable Energy Development Authority will operate. However, a detailed business strategy for SEDA will need to be developed.

The Working Group recommends that the business strategy for SEDA should be developed according to the following guidelines:

- that SEDA is an implementing agency not a policy development or regulatory body (though the Sustainable Energy Advisory Board does have a role to advise the Minister on relevant matters);
- that SEDA should not compete in markets where the operations of the private and utility sectors are likely to capture most of the market potential, but should facilitate business opportunities with the private and utility sectors through targeted programs of industry assistance and through equity participation, for example in joint ventures;
- that there should be only a small number of SEDA staff whose main role will be project management and that, where possible, administrative and program delivery functions should be contracted out;
- that SEDA should set realistic and challenging annual targets to be achieved through its intervention activities;
- that SEDA should carry out comprehensive monitoring, verification and evaluation of the results of its intervention activities to determine whether targets have been achieved.

6.3 Program Delivery

In carrying out its activities, SEDA will need to establish procedures for delivering programs and projects. SEDA should be a proactive organisation which both initiates projects and actively seeks out funding proposals consistent with the objectives of the Sustainable Energy Fund.

The Working Group recommends that SEDA should use a range of methods for program delivery, with an appropriate method being selected depending on the nature of the particular project. These should include the effective use of trade allies in the private and public sector (ie consultants, contractors, equipment suppliers, utilities and others that have a financial interest in the program succeeding). SEDA staff should not work directly on program delivery, rather they should primarily function as project managers.

The types of program delivery mechanisms that could be used by SEDA include:

- contracting out the delivery of programs to other organisations;
- organising the marketing of programs by trade allies;
- using public calls to solicit applications from eligible parties for subsidies and rebates for purchase of energy efficiency equipment, and for studies, audits, plans, and training based on market research programs;
- establishing an auction process for selecting energy efficiency and renewable energy projects, with selection being on the basis of the relative cost-effectiveness of the expected reductions in greenhouse gas emissions;
- using a tendering process, eg this method could be used where SEDA had identified a particular demonstration project it wanted to promote;
- issuing invitations to particular parties to conduct targeted demonstration projects and case studies;

- establishing linkages with other Government programs, eg the Greenhouse Challenge, National Energy Management Program, Enterprise Energy Audit Scheme, and other activities which could provide linked marketing and services;
- arranging the provision of financial support or underwriting by a financial institution in association with SEDA.

6.4 Staffing

SEDA should minimise the proportion of funds expended on administration, and should maintain flexibility in its structure and administration procedures in order to respond to changes in the market place and the need to focus on particular barriers and gaps from time to time. Since SEDA will have the power to employ its own staff, it is important that SEDA management consider carefully the number and skills profile of staff engaged.

SEDA will need to maintain a core group of people to:

- identify opportunities for projects which conform to the SEF Mission, Objectives and project selection criteria;
- assess and evaluate funding proposals;
- project manage and administer funding of the various projects underway;
- carry out ongoing monitoring of projects, verification of project results, and evaluation of project outcomes against budgets.

To carry out these tasks, SEDA staff should have a range of skills and experience. The required skills profile of SEDA staff will change over time in response to changing circumstances and some skills may be better sourced through contracting in rather than maintaining permanent staff with these skills. The range of skills and experience required includes:

- experience in the development and commercialisation of technology;
- experience in the application of sustainable energy technologies and techniques;
- financial analysis skills including skills in investment risk analysis;
- experience in private sector entrepreneurial activities;
- marketing and promotional skills;
- experience in the environmental impacts of energy production and use;
- experience in the management of energy programs.

6.5 Role of the Advisory Board

While the advisory body established by the legislation is currently termed a 'Board', it is intended that it should function like an advisory council or committee rather than as a governance Board. The legislation specifies that the Board provides advice directly to the Minister. It is envisaged that the Board will also provide advice to the Sustainable Energy Development Authority through the Executive Director who will be expected to attend all Board meetings.

The Board will provide advice in relation to the development, commercialisation, promotion and use of sustainable energy technology and the provision of assistance to facilitate this. While the Board will provide advice on the SEDA draft corporate plan, it will be concerned with broad policy matters rather than with operational details. For example, the Board may well suggest priority areas for action and comment on whether a particular program design is likely to be effective, but it would not decide whether to fund particular projects.

6.6 Recommendations

Recommendation 2. The Working Group recommends that the business strategy for the Sustainable Energy Development Authority should be developed according to the following guidelines:

- that SEDA is an implementing agency not a policy development or regulatory body (though the Sustainable Energy Advisory Board does have a role to advise the Minister on relevant matters);
- that SEDA should not compete in markets where the operations of the private and utility sectors are likely to capture most of the market potential, but should facilitate business opportunities with the private and utility sectors through targeted programs of industry assistance and through equity participation, for example in joint ventures;
- that there should be only a small number of SEDA staff whose main role will be project management and that, where possible, administrative and program delivery functions should be contracted out;
- that SEDA should set realistic and challenging annual targets to be achieved through its intervention activities;
- that SEDA should carry out comprehensive monitoring, verification and evaluation of the results of its intervention activities to determine whether targets have been achieved.

Recommendation 3. The Working Group recommends that the Sustainable Energy Development Authority should use a range of methods for program delivery, with an appropriate method being selected depending on the nature of the particular project. These should include the effective use of trade allies in the private and public sector (ie consultants, contractors, equipment suppliers, utilities and others that have a financial interest in the program succeeding). SEDA staff should not work directly on program delivery, rather they should primarily function as project managers.

Recommendation 4. The Working Group recommends that SEDA management consider carefully the number and skills profile of staff engaged. The required skills profile of SEDA staff will change over time in response to changing circumstances and some skills may be better sourced through contracting in rather than maintaining permanent staff with these skills. The range of skills and experience required includes:

- experience in the development and commercialisation of technology;
- experience in the application of sustainable energy technologies and techniques;
- financial analysis skills including skills in investment risk analysis;
- experience in private sector entrepreneurial activities;
- marketing and promotional skills;
- experience in the environmental impacts of energy production and use;
- experience in the management of energy programs.

7. INTERVENTION ACTIVITIES

In determining what activities should be pursued by the Sustainable Energy Development Authority, the Working Group examined the operations of some other initiatives which are similar to the Sustainable Energy Fund. Descriptions of three of these other initiatives are presented in Appendix E.

The Working Group also considered submissions from the public consultation process which addressed the question of what activities should be funded by the SEF. A wide range of activities were proposed in the submissions. The Energy Research and Development Corporation proposed that activities to be funded by SEF over its first five years should be aimed at creating reliable markets for, and reducing the costs of, sustainable energy use and supply technologies and products. Orion Energy said that all energy production and use activities that can displace greenhouse gas emissions, are part of an industry Cooperative Action Program, and whose implementation is clearly hindered by barriers should be considered for facilitation (but not necessarily funding). The Rainbow Power Company Ltd suggested that priorities should include the encouragement of sustainable energy technologies through promotion, education, RAPAS schemes, energy cards and buy back incentives. The EcoDesign Foundation suggested that priority should be given to raising awareness and knowledge of renewable energy, passive solar design and energy efficiency and their inter-relation with the commercial sector at large. The Lighting Controls Association of Australia Ltd supported the concept of subsidies for seminars, promotions, education and training programs, not only for end users but for market intermediaries such as energy auditors, installation contractors and consultants.

The main role of SEDA will be to intervene where barriers or market failures are hindering the economically efficient utilisation and application of sustainable energy technologies. The Working Group recommends that the Sustainable Energy Fund should be used to promote and fund a wide range of intervention activities. Following are descriptions of the main types of intervention activities which the Working Group recommends should be carried out by SEDA. Some examples of specific intervention activities, categorised by market sector, are listed in Appendix F.

7.1 Information, Education and Training

These activities seek to influence consumers at key points in the decision making process relating to the purchase of appliances and equipment, and the design and purchase of dwellings and other buildings. The target audience for these activities comprises energy end-users and key intermediaries in the residential, commercial or industrial sectors. Proposed activities include:

- general information provision, including targeted information programs to end-users;
- promotions of sustainable energy technologies and techniques;
- promotion and support for energy labelling and minimum energy performance standards for appliances and equipment;
- energy audits of dwellings, and industrial and commercial premises and processes;
- promotion and support for improved energy metering and reporting of energy use in the commercial and industrial sectors;
- skills training for end-users;
- scholarships for participants in skills training;
- schools education curriculum development on energy efficiency and renewable energy.

7.2 Technology Commercialisation

Activities in this category will be directed at particular technologies or services which are proceeding towards commercialisation. The target audience for these activities comprises developers of technology and manufacturers. Proposed activities include:

- strategic investments in technologies approaching commercialisation, including a return on the investment for SEDA;
- financing guarantees, where SEDA or a third party acts as a guarantor to the provider of financing for technology commercialisation projects where financing would not have been provided without such a guarantee;
- technology procurement, where SEDA provides an incentive for manufacturers who develop technology to challenging specifications and organises buyers groups to purchase the technology;
- loan schemes for manufacturers wishing to commercialise technology;
- grant schemes for manufacturers wishing to commercialise technology;
- demonstration projects for technology which is close to commercialisation;
- green pricing of energy, where SEDA promotes schemes in which customers agree to pay a premium to purchase a proportion of their energy needs from sustainable sources.

7.3 Market Transformation

Activities in this category will be directed towards increasing the market penetration of newly commercialised technologies and services where increased penetration is being prevented by barriers and where intervention is cost-effective for society. The target audience for these activities will mainly comprise end-users, though a small percentage of activities may be directed towards retailers or other market intermediaries who market a particular product or service. Proposed activities include:

- bidding programs, where SEDA calls for competitive bids from end-users for funding to help offset the cost of implementing energy efficiency and renewable energy projects, and bids are selected by SEDA in order of cost-effectiveness;
- loan schemes/energy cards providing funds to end-users for the purchase of particular appliances and equipment;
- purchaser rebates, where purchasers of particular appliances and equipment are given rebates on the cost of their purchases;
- shared savings schemes, where SEDA assists with the funding of projects which lead to energy savings and the loan is repaid progressively out of the financial savings achieved;
- 'packaged solutions', where SEDA assists with the funding of integrated measures for industrial and commercial companies aimed at helping them to identify and implement energy efficiency and renewable energy projects.

7.4 Assistance to Sustainable Energy Industries

Activities in this category will be directed towards increasing the competitiveness of the energy efficiency and renewable energy industries. The target audience comprises firms in these industries and the personnel of these firms. Proposed activities include:

- 'start-up' assistance provided by SEDA for new businesses which are involved in the commercialisation of sustainable energy technologies;
- skills training for staff of businesses in sustainable energy industries;

- manufacturers incentive programs where SEDA provides assistance to both existing and new manufacturers of sustainable energy technologies.

7.5 Recommendation

Recommendation 5. The Working Group recommends that monies from the Sustainable Energy Fund be used to achieve the Fund's Mission and Objectives by carrying out activities such as the following: providing information, education and training on sustainable energy technologies, techniques and practices; providing funding assistance for the commercialisation of sustainable energy technologies; assisting sustainable energy technologies increase their market share through market transformation activities; and providing assistance to sustainable energy industries.

8. REVIEW OF EXISTING PROGRAMS

The SEF Working Group is not in a position to carry out a major review of all existing energy efficiency and renewable energy programs in NSW. However, the Working Group has come to some preliminary conclusions in relation to certain existing programs. In addition, the Working Group has recommended selection criteria to be used by Sustainable Energy Development Authority managers when reviewing existing programs, once SEDA is established. These criteria are described in section 13 below.

8.1 Energy Efficiency and Renewable Energy Programs

The Working Group recommends that all existing programs should continue at their present resource levels until after the establishment of SEDA. SEDA managers should then carry out a detailed review of existing programs using SEF priorities and selection criteria, including a review of projects funded by the State Energy Research and Development Fund (SERDF). Programs and projects which fall within the SEF priorities and selection criteria should then be transferred to SEDA.

The Working Group has also discussed whether all energy efficiency and renewable energy programs currently carried out by electricity utilities should be transferred to the SEDA. The important determinant of whether a particular program should be transferred is whether the program is best delivered by an electricity utility or by another organisation. Some energy efficiency and renewable energy programs have been developed and implemented by electricity utilities for primarily commercial reasons and, where the commercial drivers remain in place, these programs should be left with the utilities.

8.2 Pacific Power Programs

Some energy efficiency and renewable energy programs which are currently being funded by Pacific Power may not have an obvious home once Pacific Power is disaggregated. Energy efficiency and renewable energy programs are not necessarily part of the core business of generating electricity and therefore may be inappropriate for a generation business. Some of the programs which fall into this category are described below.

- *Pacific Solar Pty Ltd*: Substantial funding support is being provided by Pacific Power to the Centre for Photovoltaic Devices and Systems at the University of NSW. The Centre is leading the world in the development of thin film photovoltaic cells. Pacific Power formed Pacific Solar in February 1995 as a \$64 million joint venture company with Unisearch Ltd

to develop and commercialise low cost, high efficiency thin film photovoltaic cells. Pacific Power's contribution to this joint venture is \$45 million over 5 years.

- *Pacific Power Energy Services (PPES)*: PPES was originally established as the 'Electricity Technology Centre' in 1986 by the then Electricity Commission of NSW in association with the electricity distributors. The Centre was renamed the 'Electricity Technology Advisory Centre' in 1990 and 'Pacific Power Energy Services' in 1993. The original function of the Centre was to provide advice on energy technologies to end-use customers in the commercial and industrial sectors, with an emphasis on electrical technologies. Over the years, PPES and its predecessors have built up extensive expertise in the efficient use of energy technologies (not only electrical ones). PPES is now known as a relatively impartial source of advice on energy efficiency in the commercial and industrial sectors. Despite its involvement with electricity distributors, PPES has always been fully funded by Pacific Power. The current total annual budget for PPES is regarded by Pacific Power as commercially confidential.
- *Energy Efficient Research Centre Ltd (EERC)*: The Energy Efficient Research Centre was established in 1990 as a joint venture between Pacific Power and the University of Wollongong. The Centre carries out development and testing of energy efficient industrial power conversion technologies. In 1993/94, Pacific Power provided a grant of \$430,000 to the Energy Efficient Research Centre.

Pacific Power is currently carrying out its own review of the future of its non-core businesses and may seek to retain some or all of the energy efficiency and renewable energy programs in the generation sector. However, the Working Group believes that the potential of these programs to contribute to reducing greenhouse gas emissions must not be compromised. One way of maximising the programs' contributions to this objective would be to source their funding from the Sustainable Energy Fund once SEDA is established.

If it is proposed to source the funds from the SEF, the existing programs should be reviewed to determine whether they conform to the priorities and selection criteria which have been established for the SEF. Following the review, it may be necessary to discontinue some of the existing programs, and to modify others.

The Working Group recommends that, following the completion of the review of non-core businesses by Pacific Power, a further urgent review should be carried out of energy efficiency and renewable energy programs currently funded by Pacific Power. This review should determine:

- which programs should be continued;
- whether continuing programs should be retained in the generation sector, funded by the Sustainable Energy Fund, or funded from other sources; and
- where continuing programs should be administratively located.

8.3 SERDF

The *Energy Administration Act 1987* enables the NSW Government to provide funding for energy research, development and demonstration projects through the State Energy Research and Development Fund (SERDF) via a levy on the electricity and gas industries (though the levy on the electricity industry is not currently implemented).

At the outset, the Working Group specifically excluded research activities from the range of projects which might receive SEF funding. However, some projects currently funded by SERDF may be related to Sustainable Energy Fund objectives and fall within SEF selection criteria.

Therefore the Working Group recommends that current SERDF projects be included in the review of programs to be carried out by SEDA managers and relevant SERDF projects be transferred to the SEF.

The Working Group also recommends that the future of the State Energy Research and Development Fund, in relation to the funding of projects remaining after projects have been transferred to the Sustainable Energy Fund, should be decided as an issue separate to the establishment of the SEF. In the event that SERDF is continued, overlap of functions and funding priorities between SERDF and the SEF should be minimised.

8.4 Recommendations

Recommendation 6. *The Working Group recommends that all existing government energy efficiency and renewable energy programs should continue at their present resource levels until after the establishment of the Sustainable Energy Development Authority. SEDA managers should then carry out a detailed review of existing programs using SEF priorities and selection criteria, including a review of projects funded by the State Energy Research and Development Fund (SERDF). Programs and projects which fall within the SEF priorities and selection criteria should then be transferred to SEDA.*

Recommendation 7. *The Working Group recommends that where energy efficiency and renewable energy programs have been developed and implemented by electricity utilities for primarily commercial reasons, and where the commercial drivers remain in place, these programs should be left with the utilities.*

Recommendation 8. *The Working Group recommends that, following the completion of the review of non-core businesses by Pacific Power, a further urgent review should be carried out of energy efficiency and renewable energy programs currently funded by Pacific Power. This review should determine:*

- *which programs should be continued;*
- *whether continuing programs should be retained in the generation sector, administered by the Sustainable Energy Development Authority, or administered by other agencies.*

Recommendation 9. *The Working Group recommends that the future of the State Energy Research and Development Fund, in relation to the funding of projects remaining after projects have been transferred to the Sustainable Energy Fund, should be decided as an issue separate to the establishment of the SEF. In the event that SERDF is continued, overlap of functions and funding priorities between SERDF and the SEF should be minimised.*

9. SOURCES OF FUNDING

9.1 Options for Funding Sources

The Working Group has identified several options for funding sources for the Sustainable Energy Fund:

- the NSW Government Consolidated Fund;
- a levy on energy utility revenue;
- funds contributed by the gas industry under the *Energy Administration Act 1987*;

- current funding of certain existing Pacific Power programs;
- returns on investments made by SEDA;
- joint funding arrangements with other funding bodies.

The Working Group recognises that stability in relation to continuity of funding is the main requirement for the funding arrangements for the Sustainable Energy Fund. The majority of SEDA intervention activities will have time horizons extending over several years. Continuity of funding over the life of SEDA projects is essential to achieve confidence on the part of project proponents, end-use customers, and the other investors in joint projects.

The Working Group has therefore examined each of the identified funding sources to determine how stable they might be in relation to continuity of funding. The Working Group recognises that there can be no absolute guarantee of continuity of funding. However, an absolute guarantee is not particularly desirable since SEDA needs to be able to respond to changing circumstances and these changes may require alterations in the source and/or level of funding. Therefore, the Working Group is concerned to recommend funding sources which combine a reasonable degree of stability with the ability to respond to changing circumstances.

9.2 NSW Government Consolidated Fund

The Sustainable Energy Fund could be funded directly through the NSW Government Consolidated Fund with funds being provided as budgetary allocations through the established process of three year rolling funding. This method would be subject to policy decisions by the government of the day. However, the effects of any major changes in government policy which reduced the level of funding to the SEF would be ameliorated by the provision for three year rolling funding.

The Working Group generally favours the use of government budgetary allocations as the principal funding source for the SEF. Budgetary allocations provide a relatively stable funding mechanism which is responsive to changing conditions through government policy and the parliamentary process. Budgetary allocations would also be subject to auditing requirements.

9.3 Levy on Energy Utility Revenue

In 1990, the Commonwealth Government set up nine Ecologically Sustainable Development (ESD) Working Groups to consider the implementation of ESD principles in the most resource-intensive sectors of the national economy. The Working Groups reported to the Prime Minister in November 1991. One of the Working Groups was concerned with energy use and among its recommendations was:

"...that for an initial period of five years, a minimum amount equivalent to one per cent of utility revenue be spent on a range of least-cost demand-side options identified by the integrated least-cost planning process".

Since the publication of the ESD Working Group reports, various other policy studies have proposed a levy on the revenue of energy utilities as a mechanism for funding energy efficiency and renewable energy programs. Several submissions to the Working Group also proposed such a levy, including those from environmental groups, the Australian Consumers' Association and Dr David Mills. Other submissions argued against a levy, including those from the NSW Minerals Council. AGL Gas Companies stated that any levy should not duplicate (existing) levied charges on energy suppliers.

The SEF Working Group considered the possibility of a levy on energy utilities as a funding source for the Sustainable Energy Fund.

An argument in favour of such a levy is that it would be imposed directly on the energy supply industries which are a major source of greenhouse gas emissions. Also, a levy on utility revenue would not be subject to government budgetary restrictions.

However, if the SEF gained a major portion of its funding from such a levy, the energy supply industries would be likely to exert strong pressures to reduce the amount of the levy and to ensure that the funds are spent on programs directly related to the energy industry providing the funding. For example, the submission by AGL Gas Companies stated that funds levied on AGL should be substantially directed to encourage natural gas substitution for electricity from coal and petroleum fuels, support cogeneration and other forms of natural gas utilisation and energy efficient gas appliances. Such pressures would both threaten the stability of funding continuity and possibly bias the portfolio of SEF projects towards particular energy technologies.

Further, recent cases in the High Court of Australia have thrown doubt on the legal and constitutional ability of State Governments to impose levies on the revenue or profits of trading enterprises. On behalf of the SEF Working Group, the NSW Treasury sought a legal opinion on this issue from the NSW Crown Solicitor. This opinion supports the contention that imposing such a levy could be difficult for legal and constitutional reasons.

There is also an argument that the SEF Mission and Objectives are directed towards achieving a general social good (reduction in greenhouse gas emissions) and that therefore, funding should be derived from society as a whole through general tax revenue rather than singling out one sector of the economy.

Finally, the imposition of a levy could disadvantage NSW-based electricity utilities in the competitive electricity market if such a levy were imposed only in NSW.

⁷ Ecologically Sustainable Development Working Groups, 1991. Final Report - Executive Summaries. November, Australian Government Publishing Service, Canberra, p80..

⁸ ANZMEC IRP Management Committee, 1994. Least Cost Energy Services for Australia. April.
Ernst & Young, HRL Morrison and Co, SRC International, 1994. Overcoming Barriers to Electricity Utility Promotion of End-Use Energy Efficiency: A Report to the ESAA Demand Management and Energy Efficiency Committee. April (unpublished).
National Grid Management Council, 1994. Demand Management Opportunities in the Competitive Electricity Market. (2 volumes.) June.

For these reasons, the Working Group does not favour the imposition of a levy on the energy utilities as a source of funding for the Sustainable Energy Fund at this time. However, the Working Group recommends that this funding source be kept under review with the possibility of using a levy as a funding source in the future.

9.4 Gas Industry Funds

Under the *Energy Administration Act 1987*, the gas industry in NSW must pay a percentage of gas sales revenue to the Crown. These monies are currently used to fund the State Energy Research and Development Fund (SERDF).

The relationship between SERDF and the Sustainable Energy Fund was discussed in section 8 above where it was recommended that current SERDF projects be included in the review of programs to be carried out by SEDA managers and relevant SERDF projects be transferred to the SEF. The Working Group also recommended that the future of the State Energy Research and Development Fund, in relation to the funding of projects remaining after projects have been transferred to the Sustainable Energy Fund, should be decided as an issue separate to the establishment of the SEF.

The SEF Working Group has considered the possibility of using some or all of the monies contributed by the gas industry to fund the SEF. However, this is a specific example of a levy imposed on energy utilities and the Working Group does not favour this method of funding for the reasons outlined above.

However, if some projects are transferred from SERDF to the Sustainable Energy Development Authority, monies should be provided to the SEF on a revenue neutral basis to cover the funding of the transferred programs. This funding should be additional to other program and general funding provided to the SEF and it should be continued for the life of the transferred programs. This does not imply that the actual funding mechanism for SERDF (the levy on the gas industry) should be transferred to the SEF.

9.5 Pacific Power Funding

Following the disaggregation of Pacific Power, there may be no obvious home for certain programs which are in conformity with the Mission and Objectives of the Sustainable Energy Fund. This issue was discussed in section 8 above. If it is decided to transfer the funding of some or all of these programs to the Sustainable Energy Fund, monies should be provided to the SEF on the same basis as monies provided to fund transferred SERDF projects.

9.6 Returns on Investments

Because the Sustainable Energy Development Authority will be targeting technologies and services which are either already, or are close to being, commercially viable, there is an opportunity for the Sustainable Energy Fund to become partly self-funding over time. This could be achieved through establishing commercial joint ventures with project proponents where a share of the benefits is returned to SEDA.

The Working Group sees this as a potentially important source of funding, commencing once projects have had time to come to fruition several years after the establishment of SEDA. The commercial conditions covering the returns to the SEDA could be set up to ensure stable continuity of funding. Therefore, the Working Group recommends that SEDA should be empowered, with the approval of the Minister and the Treasurer, to invest in commercial joint ventures where these are in conformity with the Mission and Objectives of the SEF and where appropriate analysis of the investment risks has been carried out. All net monetary returns from these investments should be allocated to the SEF for use in funding SEF intervention activities.

9.7 Joint Funding

The Working Group has also identified the possibility of increasing the results achieved from application of SEF funds through joint funding arrangements with other funding bodies such as the Energy Research and Development Corporation (ERDC), the Australian Electricity Supply Industry Research Board (AESIRB), energy utilities, and Commonwealth Government agencies.

While strictly this is not a funding source since no additional funds will flow to the SEF, joint funding could have significant potential for leveraging increased results from existing SEF funding. Therefore, the Working Group believes that the SEDA should, where appropriate, establish joint funding arrangements with other funding bodies.

9.8 Recommendations

Recommendation 10. *The Working Group recommends that the principal source of funding for the Sustainable Energy Fund should be the NSW Government Consolidated Fund, with funds being provided as budgetary allocations through the established process of three year rolling funding.*

Recommendation 11. *The Working Group recommends that a levy on the electricity and/or gas industry should be kept under review with the possibility of using a levy as a funding source in the future.*

Recommendation 12. *The Working Group recommends that if the funding of any programs is transferred from the State Energy Research and Development Fund and/or Pacific Power to the Sustainable Energy Development Authority, then monies should be provided to the Sustainable Energy Fund on a revenue neutral basis to cover the funding of the transferred programs. This funding should be additional to other program and general funding provided to the SEF and it should be continued for the life of the transferred programs.*

Recommendation 13. *The Working Group recommends that the Sustainable Energy Development Authority should be empowered, with the approval of the Minister and the Treasurer, to invest in commercial joint ventures with project proponents where these are in conformity with the Mission and Objectives of the Sustainable Energy Fund and where appropriate analysis of the investment risks has been carried out. All net monetary returns from these investments should be allocated to the SEF for use in funding SEF intervention activities.*

Recommendation 14. *The Working Group recommends that the Sustainable Energy Development Authority should, where appropriate, establish joint funding arrangements with other funding bodies such as the Energy Research and Development Corporation (ERDC), the Australian Electricity Supply Industry Research Board (AESIRB), the energy utilities, and Commonwealth Government agencies.*

10. FUNDING ALLOCATION

Once the Sustainable Energy Development Authority is established, SEDA managers will take responsibility for determining funding priorities and deciding which projects should be funded.

Several submissions to the Working Group addressed the question of determining priorities between competing sustainable energy technologies. Pacific Power suggested that an assessment is needed of the range of available technologies in terms of carbon dioxide mitigation effectiveness, dollars needed to commercialise the technology, and likelihood of market uptake in order to determine a priority ranking. AGL Gas Companies indicated that priority areas for funding should be those that maximise greenhouse gas reduction strategies. In a combined submission, Friends of the Earth, Australian Conservation Foundation, the Total Environment Centre and the Nature Conservation Council of NSW stated that the SEF should invest in a

mixture of conservation focussed non-price demand management and enlargement of the market for renewable energy production.

The Working Group believes that it is important that SEDA strikes a balance between funding projects which can contribute towards the long-term goal of developing and commercialising sustainable energy technologies and funding projects that can achieve a short-term, demonstrable result in terms of greenhouse gas emission reduction, such as projects promoting increased energy efficiency. To assist with this process, the Working Group has developed an appropriate methodology for allocating funding.

10.1 Portfolio Funding

The Working Group recommends that this balance should be achieved through the adoption of a portfolio funding approach. This will involve identifying a small number of portfolio categories for classifying the projects proposed for funding. Funds will then be allocated to each of these portfolio categories on the basis of a target proportion of the total funding available after allowing for the administrative costs of SEDA. Within each of the portfolio categories, proposed projects would be ranked according to defined selection criteria which will be described in section 13 below.

Many submissions to the Working Group suggested that energy efficiency, fuel substitution, cogeneration and renewable energy be highly placed in funding priorities for the Sustainable Energy Fund. Therefore, the Working Group has identified four portfolio categories:

- Energy Efficiency and Fuel Substitution;
- Cogeneration;
- Renewable Energy;
- Core Programs.

Portfolio Category: Energy Efficiency and Fuel Substitution

Energy efficiency projects:

- target a specific sector of energy consumption (eg industrial, commercial, residential) or a specific technology (eg windows, refrigerators), process (eg industrial drying) or practice (eg lighting installation management);
- assist the more efficient delivery of energy services (ie less energy for the same service output or more service for the same energy input-but the former should be favoured).

Fuel substitution projects:

- result in the substitution of less carbon-intensive energy forms (eg natural gas) for more carbon-intensive energy forms (eg coal-generated electricity).

Portfolio Category: Cogeneration

Cogeneration projects:

- promote the use of fossil fuel to generate electricity (or motive power) and heat at the same time, such that the overall efficiency of fuel use is high (eg above 70%); or
- use non-toxic waste materials from agricultural or manufacturing processes for power generation and concurrent heat production.

Portfolio Category: Renewable Energy

Renewable energy projects:

- expand or strengthen the market for renewable energy technologies at the point of end-use or in the production of electricity or fuels (whether in stand-alone or grid-connected applications);
- help to develop renewable energy technologies, the enterprises which manufacture them and the services which support them.

Portfolio Category: Core Programs

Core programs:

- are essential to support projects in other portfolio categories (eg collection of appliance energy data, which can then be used for a large number of other projects);
- have the ability to increase significantly the efficiency and cost-effectiveness of groups of projects (eg advisory centres);
- are essential to maintain SEF effectiveness and capability (eg monitoring energy greenhouse gas emission trends and program impacts) or;
- are obligations at a State or Commonwealth level, (eg under the National Greenhouse Response Strategy, or participation in the development of Commonwealth-State programs).

10.2 Allocating Funding Between Portfolio Categories

Funds should be allocated to each of the four portfolio categories on the basis of a target proportion of the total funding available after allowing for the administrative costs of the SEF. The Working Group recommends that SEDA managers should develop a methodology for deciding the proportional allocation between portfolio categories.

To assist with this process, the Working Group suggests an indicative funding allocation for the first three year corporate plan in the form of a set of percentage ranges applied to each portfolio category. In developing this indicative funding allocation, the Working Group has considered the consultants' reports described in section 11 below which provide estimates of available funding opportunities and of the relative costs for reducing carbon dioxide emissions.

The Working Group's indicative funding allocation is:

Energy efficiency and fuel substitution	40 to 60%
Renewable energy technologies	25 to 35%
Cogeneration	5 to 15%
Core programs	5 to 15%.

10.3 Recommendation

Recommendation 15. *The Working Group recommends that monies from the Sustainable Energy Fund should be allocated to four portfolio categories on the basis of a target proportion of the total funding available after allowing for the administrative costs of the Sustainable Energy Development Authority. The portfolio categories should be: energy efficiency and fuel substitution, cogeneration, renewable energy, and core programs.*

Recommendation 16. *The Working Group recommends that SEDA managers should develop a methodology for deciding the proportional allocation between portfolio categories.*

11. LEVEL OF FUNDING

11.1 Continuity of funding

One of the questions which must be resolved in establishing the SEF is how much money will be needed to ensure its effectiveness. The key to attaining the SEF's objectives is to achieve sufficient increases in the existing usage levels of sustainable energy technologies to permanently reduce barriers so that the momentum of change eventually becomes self-sustaining.

In submissions to the Working Group, environmental groups and several participants in the renewable energy industry proposed levels of funding between \$50 million and \$200 million per annum. These recommendations were primarily aimed at achieving the Commonwealth/State interim planning target of a 20 percent reduction in greenhouse gas emissions from their 1988 level by the year 2005. These proposals deserve further assessment, particularly once the first few years of operation by the Sustainable Energy Development Authority demonstrate how rapidly it is feasible to expand SEDA's intervention activities.

The Working Group recognises that making an accurate judgement about funding levels is a complex matter and is subject to a number of variables depending on the range and nature of projects being funded. As noted in section 9 above, the Working Group is also aware of the importance of establishing continuity of funding for SEF. There needs to be a long term commitment to the SEF in order to establish public, participant and industry confidence.

The SEF Working Group has approached the issue of recommending appropriate levels of funding for the Sustainable Energy Fund by:

- collecting background information on:
- current NSW Government expenditure on sustainable energy activities;
- funding levels applied to similar initiatives to the Sustainable Energy Fund in other Australian States and overseas;
- commissioning three expert consultancy studies to provide additional advice on appropriate funding levels in the portfolio categories of:
- energy efficiency and fuel substitution;
- cogeneration;
- renewable energy technologies.

11.2 Background Information

The NSW Government, through the Department of Energy, is currently spending around \$4.7 million per annum on energy efficiency activities, research and development (through SERDF), information and publication services, greenhouse activities and a scheme promoting stand-alone systems for remote area power supply (the RAPAS scheme). Some of these program activities would meet criteria established for SEF funding.

This expenditure, together with indicative funding levels for similar initiatives to the Sustainable Energy Fund, are summarised in Table 1 and expressed on a per capita basis. The equivalent per capita annual funding levels scaled to the NSW population, total annual funding, and expenditure over 5 years are also listed in the Table.

Initiative	Annual expenditure early years	Five year expenditure at actual or projected rate	Population (1995)	Annual expenditure early years	Annual expenditure early years scaled to NSW population	Five year expenditure at actual or projected rate scaled to NSW population
	A\$ millions/year	A\$ millions	millions	A\$/capita	A\$ millions/year	A\$ millions
NSW Government: Current expenditure on energy efficiency and renewable energy activities			6.2	0.76	4.7	24
Australia: ESD Working Group on Energy Use recommendation of 1% of utility revenues			6.2(c)	7.58	47.0	250
Australia: Energy Research and Development Corporation	15	75	18	0.83	5.1	25.5
Victoria: SECV Demand Management Action Program	10	50	4.6	2.17	13.5	67
Queensland: Government Energy Efficiency and Alternative Energy Program	15	50(a)	3.2	4.68	29.0	97
New Zealand: Energy Efficiency and Conservation Authority	10.9	55	3.6	3.03	18.8	94
United Kingdom: Energy Saving Trust and other initiatives	130	870(b)	56.0	2.32	14.4	96
Thailand: Government energy efficiency program	69	1,070	60.0	1.15	7.1	111

(a) \$35M three year government program plus \$3M/yr program by electricity utilities.

(b) \$130M/yr plus assumed \$22M per year increase in renewables funding from Non-Fossil Fuel Obligation levy.

(c) NSW population only.

The scope of the initiatives is different in each case listed in Table 1, and it is possible that some activities which would come within the 'sustainable energy' ambit have been excluded. With the exception of the current NSW expenditure, the expenditures tabulated also *exclude* energy research and development activities of the kind funded in NSW by SERDF.

11.3 Energy Efficiency and Fuel Substitution Study

The energy efficiency and fuel substitution study was carried out by SRC International Pty Ltd who have recently completed several studies of the potential for energy efficiency and the costs involved in realising this potential for government and utility clients in NSW, Queensland, South Australia, New Zealand and the Philippines.

The study investigated the potential for projects to increase the existing levels of energy efficiency and fuel substitution in NSW in ways which are cost-effective to society and which would be unlikely to occur in the absence of the Sustainable Energy Fund. The study also investigated the appropriate level of funding which should be devoted to these projects over the next ten years given the current capacity to carry out such projects in NSW, and assuming a reasonable ramp up of this capacity over time.

The consultants estimated the maximum cost-effective potential for energy efficiency and fuel substitution in NSW using a set of 'average' estimates of the cost of energy efficiency measures by end-use which had been calculated by the National Institute of Economic and Industry Research (NIEIR) from a wide range of data sources. In estimating cost-effectiveness, NIEIR selected only measures which were capable of providing energy efficiency at or below the long run marginal cost of electricity which was estimated at 6¢/kWh. This is a fairly rigorous approach to estimating cost-effectiveness. Using this methodology may have led to a relatively high value for the average cost of reducing carbon dioxide emissions through energy efficiency and fuel substitution measures.

In estimating the levels of energy efficiency and fuel substitution which could be expected to occur in the absence of SEF funding, the consultants accounted for the impacts of a number of initiatives that are already in progress, including appliance labelling and minimum energy performance standards for certain types of energy-using equipment, the national Home Energy Rating Scheme, the Commonwealth Government's energy card, the voluntary Building Energy Code of Australia, and the voluntary Cooperative Agreements on greenhouse gas emission abatement to be initiated under the Commonwealth Government's Greenhouse Challenge program.

In particular, the consultants accepted Commonwealth Government claims that Cooperative Agreements will achieve total carbon dioxide emission reductions of 15 megatonnes accumulated throughout Australia by the year 2000 for an expenditure of \$9.7 million over four years. Based on historical experience, these claims seem extremely optimistic. Further, it is likely that SEF funding, together with funding from several other sources, will be used to assist organisations to meet their obligations under the Cooperative Agreements. To avoid double counting, the estimates used in this study for CO₂ emission reductions achieved by Cooperative Agreements should be significantly reduced.

The effect of the high estimates used by the consultants was to artificially limit the level of energy efficiency and fuel substitution available for capture by SEF funding, particularly in the commercial and industrial sectors. Reducing the Cooperative Agreements estimates to zero would approximately double the level of energy efficiency and fuel substitution available in NSW for capture by SEF funding. However, since the consultants found that the level of achievable energy

efficiency and fuel substitution was limited much more by the availability of investment funding than by the resource potential, the high estimates used by the consultants for CO₂ emission reductions attributed to Cooperative Agreements have no effect on their estimates of the level of energy efficiency and fuel substitution which could be achieved by the SEF.

While NIEIR provided an average cost for all measures that provide energy savings at or less than long-run marginal costs, these data could not be used as the costs to SEF of achieving energy efficiency and fuel substitution impacts. Initiatives that are already underway in the marketplace will attract end-users to the most cost-effective energy efficiency measures, a phenomenon known as 'cream skimming'. The measures remaining for capture by the SEF would therefore have a higher average cost. In addition, the SEF would not have to pay the full cost since it would be expected that SEF funding would leverage funding from other sources, such as end-users paying part of the capital cost of energy efficient equipment and appliances.

In estimating the costs to the SEF of achieving energy efficiency and fuel substitution impacts, SRC International accounted for both of these factors. Adjustment for the higher average cost that would be faced by the SEF was made by reducing the available potential at the cost levels estimated by NIEIR. Leverage of SEF funding was estimated by reference to the leverage achieved in the Demand Management Action Plan implemented by the former State Electricity Commission of Victoria (SECV). This ensured that the results were reflective of Australian market characteristics rather than those of other countries.

In framing their recommendations on the appropriate level of SEF funding for energy efficiency and fuel substitution, the consultants referred to the levels of funding applied in two similar initiatives, the New Zealand Energy Saver Fund and the SECV Demand Management Action Plan. The consultants concluded that, in the NSW context, an annual level of funding of \$25 million would be appropriate. This is a proportional level of funding to the New Zealand Energy Saver Fund, after adjusting for the differences in the size of the residential sector between NSW and New Zealand and the fact that the SEF is meant to address all sectors while the New Zealand initiative focuses only on the residential sector. The consultants regarded their proposed level of funding as conservative, given that the New Zealand initiative does not address fuel substitution and nor will it offer programs in the areas of training, technology commercialisation or assistance to sustainable energy industries.

An annual level of funding of \$25 million would capture after 10 years about 800 gigawatt-hours per annum of additional energy efficiency and fuel substitution. This is about 11% of the (artificially limited) annual cost-effective maximum resource potential for energy efficiency and fuel substitution available in NSW after 10 years.

Table 2 summarises the results of the study.

Table 2. CO ₂ Emission Reductions with SEF Funding of Energy Efficiency and Fuel Substitution Projects for Electricity and Gas End-Uses						
Sector	Maximum Annual Cost Effective Resource Potential for Energy Efficiency and Fuel Substitution in NSW	Annual Level of Energy Efficiency and Fuel Substitution Achievable through non-SEF measures after 10 Years	Additional Annual Level of Energy Efficiency and Fuel Substitution Achievable through Recommended SEF Funding after 10 years	Recommended Annual SEF Funding	Additional Annual Level of CO ₂ Emission Reduction Achievable through Recommended SEF Funding after 10 Years	Average Cost to the SEF of Additional Reductions in CO ₂ Emissions after 10 Years
	gigawatt-hours	gigawatt-hours	gigawatt-hours	\$ millions	kilotonnes	\$/tonne
Commercial and Industrial Sectors (ex commercial buildings)	12,200	6,400	500	9.3	455	21
Residential and Commercial Buildings	6,100	800	200	7.5	121	62
Household Equipment	5,500	300	100	8.2	116	71
Total	23,800	7,500	800	\$25	692	36

Source: SRC International Pty Ltd, 1995. *Appropriate Levels of Funding for Energy Efficiency and Fuel Substitution Projects in NSW*. Unpublished confidential report for the SEF Working Group.

11.4 Cogeneration Study

The cogeneration study was carried out by Martin Poole and Professor Rolf Prince who have previously carried out extensive work on the potential for cogeneration in NSW for the Department of Energy, Electricity Council of NSW and private sector clients.

The study investigated the potential for cogeneration projects (measured in terms of both capacity and delivered energy) that are likely to take place in NSW over the next 10 years, including the level of funding which could accelerate the penetration rate of cogeneration.

The maximum cost-effective potential for cogeneration in NSW was assessed using the results of previous studies, historical trends, comparisons with other industrialised nations, and the response to the NSW Cogeneration Demonstration Program. As a maximum, the consultants estimated that in the long term with Government support, 10 to 15% of all electricity capacity could be provided by cogeneration over the next 10 years. While this figure is high, it is in line with experience in the Netherlands and the United Kingdom (excluding district heating).

The study focussed on natural gas-fired cogeneration. It also discussed briefly the potential for cogeneration fired by fuels other than natural gas, such as biomass, refinery waste products, blast furnace gas, and high temperature exhausts from minerals processing, kilns and furnaces.

The study also showed that, while cogeneration has the potential to significantly reduce carbon dioxide emissions as compared with conventional heat and power generation, local emissions of nitrogen oxides (NO_x), methane (CH₄) and carbon monoxide (CO) are likely to be increased. This is an adverse environmental impact of cogeneration which will be significant in geographical areas, such as the Greater Metropolitan Area of Sydney, which at times already has high concentrations of these smog precursors. This may limit the potential for installation of cogeneration plant particularly in sub-regions where ozone targets are currently exceeded.

The consultants recommend that, based on previous experience with cogeneration promotion programs in NSW and the Netherlands, annual SEF funding of 10% of the total project cost (ie \$6.8-8.4 million) should be provided as early as possible in the project to assist with 'start up' costs. This is estimated to be sufficient to stimulate the installation of 250 to 400 megawatts of cogeneration plant (accumulated over the next 10 years) which would not otherwise be installed. This is 14% to 22% of the maximum cost-effective resource potential for cogeneration plant capacity in NSW. The consultants noted that there is expected to be a significant 'leverage' effect from SEF funding.

Table 3 summarises the results of the study.

Table 3. CO ₂ Emission Reductions with SEF Funding of Natural Gas-Fired Cogeneration Projects						
Cogeneration Plant Size	Maximum Cost Effective Resource Potential for Cogeneration in NSW	Additional Level of Installed Cogeneration Capacity Achievable through Recommended SEF Funding Accumulated Over 10 years	Additional Annual Level of Electricity Cogeneration Achievable through Recommended SEF Funding after 10 Years	Recommended Annual SEF Funding	Additional Annual Level of CO ₂ Emission Reduction Achievable through Recommended SEF Funding after 10 Years	Average Cost to the SEF of Additional Reductions in CO ₂ Emissions after 10 Years
	megawatts (electrical)	megawatts (electrical)	gigawatt-hours	\$ millions	kilotonnes	\$/tonne
50kW _e to 2MW _e	200	50-100	175-350	1.8-2.4	115-230	13
2 MW _e to 40 MW _e	600	200-300	1,300-2,000	5.0-6.0	930-1,400	5
> 40 MW _e	1,000	-	-	Nil	-	-
Total	1,800	250-400	1,475-2,350	6.8-8.4	1,045-1,630	6

Source: Poole, Martin and Prince, Rolf, 1995. *Appropriate Levels of Funding for Cogeneration Projects in NSW*. Unpublished confidential report for the SEF Working Group.

11.5 Renewable Energy Study

The renewable energy study was carried out by Colin Crawford-Smith of GreenPower Services Pty Ltd who has recently completed a number of studies of the technology status, economics and environmental consequences of renewable energy technologies in Australia.

The renewable energy study identified the potential for projects funded by the SEF to increase the existing levels of renewable energy applications in NSW, including the appropriate level of funding which should be directed to these projects.

The consultant estimated the maximum cost-effective potential for renewable energy in NSW using data obtained from a number of sources for the costs of electricity generated by various different renewable energy technologies.

First, the consultant estimated the additional value of cost-effective (to society) renewable energy resources in NSW at 5¢/kWh. This value takes into account environmental externalities, resource diversity and economic benefits.

Based on this value, the consultant assumed that the SEF was justified in subsidising electricity generated from renewable sources up to an additional value of 5¢/kWh. Different renewable technologies were then said to be cost-effective if they could supply electricity at a cost less than the price paid for the electricity they were replacing plus 5¢/kWh. For example, projects that operate in a centralised generation role will be cost-effective if they can supply electricity at less than the wholesale price plus 5¢/kWh. Projects that provide network benefits in a distributed generation role will be cost-effective if they can supply electricity at less than the wholesale price plus the value of the avoided network costs plus 5¢/kWh. Projects directly supplying retail customers, such as rooftop photovoltaic cells, will be cost-effective if they can supply electricity at less than the retail price plus 5¢/kWh.

The cost to the SEF of each cost-effective renewable technology was then estimated as the amount required to reduce the cost of electricity generated by the technology to the price of the electricity it was replacing. This methodology ensured that the maximum cost to the SEF for any cost-effective technology was 5¢/kWh. In some cases, the cost to the SEF would be significantly less.

The consultants used a different methodology for estimating the cost to the SEF of photovoltaic cell technology because of its high cost. This involved estimating the cost of accelerating predicted cost reductions and consequent annual sales for photovoltaic cells while maintaining the cost of generating electricity from the cells within the cost-effectiveness range established by the first methodology.

A weakness in these methodologies is that they do not take into account whether the SEF funding provided according to the methodology will be sufficient to encourage project proponents to actually install particular renewable energy technologies. Using these methodologies may have led to a relatively low value for the average cost of reducing carbon dioxide emissions through promoting renewable energy technologies.

The study investigated a wide range of renewable energy technologies and drew conclusions on the funding priorities for different technologies. These conclusions are summarised in Table 4.

In framing the recommendations on the appropriate level of SEF funding for renewable energy, the consultant estimated what level of funding would stimulate sufficient annual increases in the

level of application to establish a self sustaining market for each renewable energy technology recommended for funding. The consultant concluded that, an annual level of funding of \$15-20 million is appropriate. A funding level of \$15 million would stimulate the installation of about 160 megawatts (accumulated over the next 10 years) of renewable energy technology. This is about 3% of the maximum cost-effective resource potential for renewable energy generation capacity available in NSW.

Table 4. Funding Priority for Renewable Energy Technologies in NSW (in order of priority)	
Group 1: High Priority	1. Wind power (grid connected)
immediate assistance recommended	2. Biomass to electricity (using suitable fuels)
	3. Solar water heating
	4. Photovoltaics (in remote and grid applications)
Group 2: High Priority assistance in the future when technology available	5. Solar thermal (high temperature)
Group 3: Medium Priority	6. Micro hydro
low level of assistance	7. Small scale remote wind power
Group 4: Low Priority	8. Biomass to ethanol
assistance not recommended	9. Landfill gas
(individual projects to be	10. Biomass using unsuitable fuels (ie not sustainable)
considered on their merits)	11. Hydro power (large scale)

Source: Crawford-Smith, Colin, 1995. *Report on Appropriate Levels of Funding for Renewable Energy Projects in NSW*. GreenPower Services Pty Ltd, unpublished confidential report for the SEF Working Group.

Table 5 summarises the results of the study.

Table 5. CO ₂ Emission Reductions with SEF Funding of Renewable Energy Projects						
Renewable Energy Technology	Maximum Cost Effective Resource Potential for Renewable Energy in NSW	Additional Level of Installed Renewable Capacity Achievable through Recommended SEF Funding Accumulated Over 10 years	Additional Annual Level of Renewable Energy Generation Achievable through Recommended SEF Funding after 10 years	Recommended Annual SEF Funding	Additional Annual Level of CO ₂ Emission Reduction Achievable through Recommended SEF Funding after 10 Years	Average Cost to the SEF of Additional Reductions in CO ₂ Emissions after 10 Years
	megawatts	megawatts	gigawatt-hours	\$ millions	kilotonnes	\$/tonne
Wind Power	1,500	45	101	4.80	99	48
Biomass to Electricity	3,500	75	455	4.50	446	10
Solar Hot Water	108	18	138	3.00	135	22
Photovoltaics	33	23	40	2.55	39	65
Micro Hydro and Small Scale Wind Power	2	1	6	0.15	6	25
Land Fill Gas, Solar Thermal Electric and Hydro	150	-	-	Nil	-	-
Total	5,293	162	740	15.00	740	20 (average)

Source: Crawford-Smith, Colin, 1995. *Report on Appropriate Levels of Funding for Renewable Energy Projects in NSW*. GreenPower Services Pty Ltd, unpublished confidential report for the SEF Working Group.

11.6 Recommended Level of Funding

The consultants' reports showed that the potential for sustainable energy technologies and projects in NSW is so large and so little developed that the scope for cost-effective expenditures is very high.

The consultants' recommendations on the appropriate annual levels of funding by the SEF for projects in the three portfolio categories of energy efficiency and fuel substitution, cogeneration and renewable energy total \$47 million to \$54 million. The lower end of this range is

approximately equivalent to the one percent of the annual revenue of NSW energy utilities recommended by the ESD Working Group on Energy Use.

The Working Group's professional judgement is that lower range of the consultants' recommended annual level of expenditure is appropriate for the SEF. The Working Group therefore recommends that a target annual level of funding for the SEF should be set at \$45 million (1995 dollars). This level of funding should cover the four portfolio categories of energy efficiency and fuel substitution, cogeneration, renewable energy and core programs plus expenditure on the administrative expenses of the Sustainable Energy Development Authority.

11.7 Indicative Expenditure Profile

The target level of funding is intended to apply once SEDA has been fully established and the capacity to implement sustainable energy projects in NSW has been fully built up. Based on the experience of other funds of this kind, it would take 3 to 5 years for this to occur.

The practical rate of increase in SEF expenditure from its starting level to the target level of \$45 million per year depends on administrative factors and on the expenditure profile of different projects. Expenditure for many projects will be low in the first few years during development and pilot testing, but could then rise rapidly as programs and technologies are fully implemented and deployed. There should be some flexibility in the expenditure profile to accommodate the rate at which the administrative capability of SEDA develops and the rate at which projects are identified and implemented.

The Working Group recognises the need to propose an indicative expenditure profile. This will assist SEDA managers to formulate their corporate plan. Such a profile indicates to them the level of forward commitments for which they can aim. However, the indicative profile is not intended to guarantee a minimum level of funding for SEDA.

Proposing an indicative expenditure profile will also assist the NSW Government and Treasury, which will need to plan budget allocations for SEDA.

The Working Group proposes that the expenditure level for SEDA in the first year should be about \$7 million, which would be a modest real increase over the NSW Government's current funding level for energy efficiency and renewable energy activities, estimated at \$4.7 million per annum. Existing ongoing commitments for activities currently administered by the Department of Energy (with the exception of SERDF projects) which are consistent with the objectives of the Sustainable Energy Fund and meet the selection criteria will be funded from the \$7 million allocation.

The Working Group recommends that SEDA should develop its corporate plan on the basis of the following indicative expenditure profile (in 1995 dollars):

First full year (1996/97)	\$ 7 million
Second year (1997/98)	\$12 million
Third year (1998/99)	\$20 million
Fourth year (1999/2000)	\$30 million
Fifth year (2000/01) and subsequent years	\$45 million.

The management of SEDA should be able to bid for allocations from Consolidated Fund in line with the indicative expenditure profile, provided that all proposals are consistent with the objectives of the Sustainable Energy Fund and meet the selection criteria and that total expenditure remains within the profile. Given the nature of many SEF programs, the administration of SEDA will need to be able to make forward contracts for expenditures perhaps as long as five years out.

11.8 Performance Evaluation

It will be necessary to carry out regular performance evaluations to ensure that the funds provided to the Sustainable Energy Fund are being used effectively and efficiently to achieve the SEF Objectives. The Working Group recommends that SEDA should arrange for the external evaluation of various aspects of its performance as follows:

- after one full year of operation:
 - the performance of SEDA with respect to identifying, planning and initiating projects;
- after three full years of operation:
 - the performance of SEDA with respect to the actual impacts of its projects and activities on the NSW energy system and on greenhouse gas emissions reductions;
 - the appropriateness of funding allocations to the different portfolio categories;
- after five full years of operation:
 - the continuing need for means to meet the objectives for which the Sustainable Energy Fund was established;
 - the continuing need for the Sustainable Energy Fund and Sustainable Energy Development Authority as appropriate means for meeting those objectives.

While the indicative expenditure profile will provide some guidance to SEDA managers, actual budget allocations will depend both on SEDA's performance and on the administrative scheduling of projects. Poor performance or project commitments falling behind schedule should lead to analysis and rectification of the reasons for this with reductions in funding if the situation cannot be rectified.

11.9 Recommendations

Recommendation 17. *The Working Group recommends that a target annual level of funding for the Sustainable Energy Fund should be set at \$45 million (1995 dollars). This level of funding should cover the four portfolio categories of energy efficiency and fuel substitution, cogeneration, renewable energy and core programs plus expenditure on the administrative expenses of the Sustainable Energy Development Authority.*

Recommendation 18. *The Working Group recommends that SEDA should develop its corporate plan on the basis of the following indicative expenditure profile (in 1995 dollars):*

<i>First full year (1996/97)</i>	<i>\$ 7 million</i>
<i>Second year (1997/98)</i>	<i>\$12 million</i>
<i>Third year (1998/99)</i>	<i>\$20 million</i>
<i>Fourth year (1999/2000)</i>	<i>\$30 million</i>
<i>Fifth year (2000/01) and subsequent years</i>	<i>\$45 million.</i>

Recommendation 19. *The Working Group recommends that that SEDA should arrange for the external evaluation of various aspects of its performance as follows:*

- *after one full year of operation:*
- *the performance of SEDA with respect to identifying, planning and initiating projects;*
- *after three full years of operation:*
- *the performance of SEDA with respect to the actual impacts of its projects and activities on the NSW energy system and on greenhouse gas emissions reductions;*
- *the appropriateness of funding allocations to the different portfolio categories;*
- *after five full years of operation:*
- *the continuing need for means to meet the objectives for which the Sustainable Energy Fund was established;*
- *the continuing need for the Sustainable Energy Fund and Sustainable Energy Development Authority as appropriate means for meeting those objectives.*

Recommendation 20. *The Working Group recommends that annual funding levels for the Sustainable Energy Fund should be dependent on the performance of the Sustainable Energy Development Authority. Good performance should result in increases in funding. Poor performance should lead to analysis and rectification of the reasons for this poor performance with reductions in funding if the situation cannot be rectified. ([Back to contents page](#))*

12. ESTIMATED CO₂ EMISSION REDUCTIONS

From the recommendations concerning the indicative expenditure profile, it is possible to make rough estimates of the carbon dioxide emission reductions which would be achieved by this expenditure. In making these estimates, it is necessary to make a number of assumptions, including:

- that the funding levels specified in the indicative expenditure profile over the five year period are actually received and expended;
- that the funding allocation between portfolio categories is made using the mid-points of the percentage ranges in the indicative funding allocation presented in section 10 above;
- that the administrative costs of the Sustainable Energy Development Authority are 10% of the total funding;
- that core programs do not contribute directly to reducing carbon dioxide emissions;
- that the projects implemented by SEDA in each of the three remaining portfolio categories achieve carbon dioxide emission reductions at the average costs to the SEF for additional reductions estimated by the consultants;
- that the length of time between commissioning projects and achieving emission reductions will result in a time lag before emission reductions commence.

Table 6 presents the estimates of the annual carbon dioxide emission reductions over a five year period which would be achieved by the funding levels in the indicative expenditure profile and the indicative funding allocation between portfolio categories. Because of the time lag, emission reductions in the first two years are likely to be from the enhancement of existing programs. The emission reductions in the third and subsequent years are calculated on the basis of SEDA expenditure two years previously.

Table 6. Estimated CO ₂ Emission Reductions Resulting from the Funding Levels in the Indicative Expenditure Profile and the Indicative Allocation Between Portfolio Categories					
Portfolio Category	Cumulative Annual CO ₂ Emission Reductions Achieved (kilotonnes)				
	Year 1	Year 2	Year 3	Year 4	Year 5
Energy Efficiency and Fuel Substitution	30	60	90	240	490
Cogeneration	10	50	100	290	590
Renewable Energy	20	50	100	260	530
Total	60	160	290	790	1610

Source: SEF Working Group

Table 6 shows that when programs initiated by the Sustainable Energy Development Authority are fully operational, the carbon dioxide emission reductions accumulated over a three year period total an estimated 2.7 million tonnes. Therefore, the Sustainable Energy Fund would exceed the NSW Government's target of reducing emissions of carbon dioxide by 2 million tonnes accumulated over a three year period.

The emission reductions achieved by SEDA projects will accumulate rapidly. By the end of the seventh year, assuming the \$45 million target expenditure figure is reached, the emission reduction achieved are estimated at 4.7 million tonnes of carbon dioxide per year. This is 2.7% of the total annual carbon dioxide emissions in NSW in 1990. This annual emission reduction will increase by an estimated 1.8 million tonnes for each year subsequent to the seventh year of operation of the SEF.

13. SELECTION CRITERIA FOR SEF PROJECTS

Submissions to the Working Group proposed a range of criteria for selecting projects for funding by the Sustainable Energy Fund. South Eastern Renewable Energy said that projects must make a positive contribution to the promotion of energy efficiency, renewable energy use and technologies, and sustainable development; encourage strategic partnerships and NSW industry/export capability; and provide some return to the SEF. The Australian Consumers' Association suggested that activities be selected for funding based on their potential to promote renewable energy alternatives as well as acceptability to customers; specific criteria should include access for less privileged customers; focus on industries with the greatest potential for savings; and the optimal number of households reached at lowest cost. The Energy Research and Development Corporation suggested that the SEF should invest in those technologies and products which reduce energy intensity in NSW; are less carbon intensive than coal, diesel and petrol and are economically sensible; and those which utilise renewable energy sources for niche, near-economic applications.

The Working Group considered several approaches to identifying criteria by which proposed projects could be selected for funding. The Mission and Objectives of the Fund were used to identify a range of selection criteria which could be used, after which some grouping and prioritisation of criteria were agreed upon.

Four selection levels have been identified by the Working Group:

- **Initial screening**
- **Pass/Fail criteria**
- **Ranking criteria**
- **Other considerations**

Within each of these levels (with the exception of the initial screening) there are a range of selection criteria which are formatted to ask questions about the aims and objectives of the proposed programs. The benefit of these criteria is that they help to define and focus the evaluation of the individual projects. Proforma tables of selection criteria are presented in Appendix G.

There will be different selection criteria for each of the portfolio categories. For example, because of the different stages of development of the technologies involved, selecting renewable energy projects will require different criteria from selecting energy efficiency and fuel substitution projects. These differences are reflected in the criteria included in the tables in Appendix G.

The selection criteria are discussed below.

13.1 Initial Screening

The purpose of the initial screening is to categorise the proposed project into one of the four portfolio categories (ie energy efficiency, cogeneration, renewable energy or core programs).

13.2 Pass/Fail Criteria

The advantage of using a pass/fail 'test' is to quickly determine which proposed projects are suitable and which ones fail to meet fundamental selection criteria. Pass/fail criteria have to be

linked closely with the Mission and Objectives of the SEF; either the project will achieve one or more of the SEF Objectives or it will not.

As one of the aims in establishing the SEF is to overcome market barriers, this is seen as a key pass/fail criterion; will the proposed project overcome major barriers to the process or technology? Within each portfolio category, there will be slight variances in what is defined as the key market barrier. In some cases they are the same, for example availability of capital is seen as a major barrier to increased use of all sustainable technologies.

Some of the Pass/Fail criteria are discussed below.

1. Is the proposed project cost-effective to society?

The SEF should assess whether the project meets the criterion of 'no regrets' (ie those measures that have a net benefit, or at least no net cost, in addition to reducing greenhouse gas emissions). Regarding the energy efficiency portfolio category, a subset would be: *does the program result in cost-effective energy efficiency gains?* Implicit in this assessment is the quantification of environmental costs. While some work has been carried out in Australia on identifying externalities for the energy sector, this remains a contentious issue.

In general, projects which are not cost-effective should be rejected outright unless they provide significant other benefits such as stimulating the development of renewable energy industries. Those that are cost-effective should be evaluated with regard to their cost-effectiveness from the perspective of society. Higher 'scores' would be earned where the project achieves a higher degree of cost-effectiveness or social equity, in accordance with specific features of the project.

The United Kingdom Office of Electricity Regulation (OFFER) Standards of Performance require electricity distributors to carry out energy efficiency programs. OFFER uses as its main criterion for selecting projects for funding the benefits to customers must exceed the cost of the project.

2. Will the program overcome major barriers to the process or technology?

As the main objective of the Sustainable Energy Fund is to overcome barriers, this must be seen as a key pass/fail criteria. Common barriers to increased use of sustainable energy technologies were listed in section 4 above.

Where a proposed project addresses any of the common barriers, it would satisfy this pass/fail criteria. It may be appropriate to rank the barriers themselves. For cogeneration, for example, while the availability of capital may be perceived as a barrier, recent studies have indicated that economics are not a critical aspect of whether a company decides to install cogeneration. In many cases, proposals for cogeneration projects fail because of a lack of senior management commitment or lack of knowledge about the benefits of cogeneration.

Qualitative product characteristics, such as energy efficiency, are prone to problems of buyer uncertainty and information deficiency. An investigation by the Bureau of Industry Economics into energy labelling and standards found that although the current market share of high efficiency motors is about two per cent, the proportion of applications in which these could be profitably operated is many times this figure. The report found that energy savings of around \$39 million per annum in the manufacturing sector are being overlooked. While this figure applies to Australia, an appropriate percentage could be applied to potential opportunities in NSW.

There is a great deal of uncertainty in the area of renewable energy technologies and consequently there will be many barriers which a project proposal will be able to address. Projects which are aimed at eliminating *major* identified barriers would rank ahead of those that target only one recognisable barrier. Sustainable Energy Development Authority managers should decide whether the project will assist in overcoming barriers or whether the project as proposed has little or no impact on the barriers.

3. Does the program provide sufficient commercial benefit for a participant that it would be undertaken without SEF support?

In evaluating projects using this criterion, it is important to ensure that SEF funding is not provided to projects which would have proceeded anyway without such funding. While it will be difficult to ensure that there are no 'free riders', applying this criterion might include an assessment of how targeted funding could assist in increasing the uptake of a particular technology.

4. Is the technology feasible, or is there a high probability that the program will be successfully implemented?

Considerable effort has gone into developing renewable energy technologies, in particular photovoltaics and solar thermal research and development. While these technologies have benefited from support, there is now a compelling argument to assist these technologies further to establish a strong market. Different technologies are at different stages in achieving market acceptance and/or commercial application, for example landfill gas technology is already economic. All renewable technologies except solar thermal electric are commercially available and the low penetration of renewable technologies to date can be identified as a result of financial and institutional barriers.

The low uptake of energy efficiency measures can also be attributed to market failure. Improvements in energy efficiency respond to technological advances, policy directions and price-induced changes in consumer behaviour. There are a number of energy efficiency programs which have been in place long enough to observe their impacts; an example is appliance labelling. Extensions to these programs would have a high likelihood for success, but without the added assistance of SEF funding may take longer to reach the market. Consequently these types of programs would pass this pass/fail criterion.

5. Are there other significant adverse environmental impacts associated with the project?

While this criterion is especially relevant to those projects involving cogeneration and fuel substitution, it also has application to projects in other portfolio categories. As well as achieving a reduction in CO₂ emissions, gas-fired cogeneration also leads to an increase in emissions of nitrogen oxides (NO_x), methane (CH₄), and carbon monoxide (CO). In assessing whether or not to support a particular cogeneration proposal or a project which recommends switching to a different fuel type, the impact of other emissions would have to be assessed in addition to quantifying the impact on CO₂.

13.3 Ranking Criteria

Ranking criteria establish a means of comparison between different projects which have passed the pass/fail test. These criteria should be specific for each portfolio category, and should be based on measuring comparable parameters.

The recommended primary ranking criterion measures the quantity of greenhouse gas emissions reduced by the proposed project, and this is weighted against dollars spent. This eliminates the tendency to preferentially select large projects which would achieve the highest levels of greenhouse gas emissions reductions.

Where the proposed project is an information program, the key ranking criteria may be more appropriately targeted at determining the level of commitment by the proponent. One way to establish this might be whether the proponent (in the industrial or commercial sectors) has signed a voluntary Cooperative Agreement as part of the Commonwealth Government's Greenhouse Challenge program. By assessing a proponent's voluntary agreement, the Sustainable Energy Development Authority would be able to make an assessment about the commitment of the proponent to achieving reductions in greenhouse gas emissions. Information programs which formed part of a Cooperative Agreement would then rank above those programs which were isolated or with short-term goals.

Some other ranking criteria might include:

- the cost per unit of greenhouse gas reduction;
- costs per unit of energy savings;
- whether the program is an essential part of the energy management infrastructure;
- lead times to establishing an initial impact/ to establishing full impact;
- extent to which the major market or technology barrier is addressed;
- measurability of impacts;
- persistence of likely effects (will the induced effect persist once funding support or incentives are removed?).

The proforma Tables in Appendix G only illustrate the greenhouse gas reduction criteria as this is deemed to be the most significant deciding factor in assessing whether to support the project proposal.

13.4 Other Considerations

Other Consideration criteria are directed at measuring the effectiveness or likely success of each proposed project. These criteria are considered after the other selection criteria have been met and are meant to further clarify and define the value of competing project proposals. Because these criteria are aimed at highlighting specific benefits (or costs) of individual projects, there is not necessarily a high degree of overlap between the different portfolio categories.

Following are some of the questions which might be addressed by Other Considerations criteria.

1. How close is the process or technology to reaching market potential?

This criterion will establish whether the proposed project is on the threshold of technical feasibility or is close to the limit of its likely ultimate technical or market potential. There are some mature sustainable technologies which are unlikely to benefit from additional funding. Projects involving these technologies would most likely fail to increase their market share beyond what has already been achieved. However there are a lot of technologies which may not have had exposure to the market because of limited support and these should be targeted by the SEF.

2. Will the proposed project increase market opportunities for the process?

The primary factors to be considered in regard to this criterion are the degree to which the project:

- maximises the use of market forces;
- encourages private sector or utility involvement in the process;
- is consistent with the proposed reforms to the electricity supply industry or other energy markets; and
- increases skill levels of relevant participants.

The last factor is especially relevant for the renewable energy portfolio category.

3. Will the proposed project build on existing programs?

Where a project will build on or extend an existing effective program in any of the portfolio categories, this should be supported. This is obviously aimed at those programs which have already achieved a measure of success or penetration in the market, for example equipment energy labelling and standards. More effective energy labelling would probably help to increase the penetration of energy efficient equipment.

Building on existing programs should also entail a limited fiscal impact on the SEF as the resources for implementing the program are already in place. The project should therefore be able to achieve early results and satisfy some of the other selection criteria.

4. Will the proposed project increase market competitiveness of the technology?

Application of this criterion may involve some kind of market assessment by the proponent prior to seeking assistance from the SEF. If increased production of the technology brings down costs, and if these economies can be demonstrated, then it would be considered for support under this criterion.

13.5 Use of Selection Criteria

The criteria discussed above are meant to be indicative of the methodology which might be followed in selecting projects. In finalising the assessment, it is likely that many projects will not meet all the selection criteria. This should not mean that the project fails to be selected. Rather a weighting of individual criteria might be necessary, or an overall assessment of portfolio rankings against the total funding available.

13.6 Recommendations

Recommendation 21. The Working Group recommends that a hierarchy of criteria be used by the Sustainable Energy Development Authority in selecting proposed projects for funding. Individual selection criteria should be developed and refined for each of the portfolio categories based on those identified in this report and a weighting factor developed for each criterion. The selection criteria should be reviewed on an annual basis to ensure that the criteria are effective in selecting projects with cost-effective measurable impacts.

14. EXTENSION OF THE SEF TO OTHER ENERGY FORMS

At this stage, the SEF Working Group has been asked to consider how best to apply the Sustainable Energy Fund to the electricity supply industry. Therefore, the majority of the analysis in this report, especially in the consultancy studies, has been predominantly concerned with sustainable energy technologies aimed at generating or replacing electricity. However, it is envisaged that activities selected for funding will not be restricted only to those which relate to electricity. In some cases, it will be difficult to limit program impacts to one form of energy. The Working Group therefore recommends that the Sustainable Energy Development Authority should investigate extending the SEF to other energy forms and systems, particularly gas and transport. When this investigation is completed, an additional funding allocation should be made to the SEF to cover these other energy forms and systems.

Recommendation

Recommendation 22. The Working Group recommends that the Sustainable Energy Development Authority should investigate extending the Sustainable Energy Fund to other energy forms and systems, particularly gas and transport. When this investigation is completed, an additional funding allocation should be made to the SEF to cover these other energy forms and systems.

APPENDIX A

SUSTAINABLE ENERGY FUND WORKING GROUP TERMS OF REFERENCE

BACKGROUND

The NSW Government will establish a Sustainable Energy Fund (SEF) to provide support and promotion of energy efficiency programs, and to further the development of renewable energy technologies.

The establishment of the SEF will be an important complement to the broader electricity industry reforms. The creation of the competitive electricity market will provide much greater opportunities for the commercial implementation of environmentally favourable supply and demand side options. However, in addition to these reforms the Government recognises that there will be a continuing need to ensure that energy efficiency programs and newly developing alternative technologies are adequately funded, in order to facilitate their development and delivery.

The SEF will be used to help create robust markets for green energy by supporting the cost effective, efficient and environmentally sound production and use of electricity.

TASKS OF THE WORKING GROUP

The Working Group is to prepare recommendations to the Minister for Energy covering:

A review of existing energy efficiency and conservation programs in NSW (both Government and industry), including the relevance of their objectives, the effectiveness in achieving those objectives, and levels of funding;

The size of the problem to be addressed by the SEF having regard to the structural reforms underway within the electricity industry and the environmental costs of electricity generation, distribution and consumption.

Based on the above, report on the following:

- The objectives of the Sustainable Energy Fund;
- The appropriate level and means of annual funding;
- Priority areas for action, with particular reference to energy efficiency and renewable energy technologies and the possible role of the SEF in relation to co-operative action agreements on abatement of greenhouse gas emissions;
- Criteria for program selection and guidelines for project funding;
- The future administration of the Sustainable Energy Fund.

TIMING

The Working Group is to prepare an interim report by mid September, including the identification of any legislative action required.

A final report and recommendations is to be prepared by the Working Group and submitted to the Minister for Energy by end December 1995.

APPENDIX B MEMBERSHIP OF the SEF WORKING GROUP

Dr David Crossley, Chair, SEF Working Group

Mr Jon Jutsen, Managing Director, Energetics Pty Ltd

Mr Peter Kinrade, Policy Analyst, Australian Conservation Foundation

Mr Michael Lambert, Secretary, NSW Treasury

Mr Phil Lee, Assistant Director, Department of Energy

Mr Michael Lester, Director Industry, Department of State Development

(alternate Mr Steve Hogan)

Mr Peter Stevens, Director, Policy and Planning, Environment Protection Authority

Mr Keith Tarlo, Climate Campaigner, Greenpeace Australia Ltd

(alternate Mr Mark Ellis)

Mr Alex Walker, Chief Executive, Prospect Electricity

(alternate Mr Con Calfas)

Dr George Wilkenfeld, George Wilkenfeld & Associates

Ms Margaret Sniffin, Electricity Reform Taskforce; Secretary, SEF Working Group

APPENDIX C

RESULTS OF THE PUBLIC CONSULTATION PROCESS

RESPONDENTS TO PUBLIC CONSULTATION ISSUES PAPER

Submissions in response to the Public Consultation Issues Paper were received from the following:-

AGL Gas Companies

Australian and New Zealand Solar Energy Society

Association of Liquidpaperboard Carton Manufacturers Inc

Australian Cogeneration Association

Australian Consumers' Association

Australian Energy Solutions

Biomass Energy Services & Technology Pty Ltd

Boyd, J. and R.A.

Building Owners & Managers Association of Australia Limited

Butler Solar Systems Pty Ltd (with Royal Melbourne Institute of Technology; Solarex Pty Ltd)

Core Energy

CSIRO Coal and Energy Technology

Deacons Graham & James

Ecodesign Foundation Incorporated

Energy Research and Development Corporation

Evans, D.

Environmental Employment Strategies Australia Ltd

Floyd, T.

Friends of the Earth - (with Australian Conservation Foundation; Nature Conservation Council of NSW; Total Environment Centre)

Future World

Hemming, D

Hunwick Consultants Pty Ltd

Khan, R.

Leichhardt Municipal Council

Lend Lease Property Services

Lighting Controls Association of Australia Limited

Liverpool City Council

Local Government and Shires Associations of NSW

Macquarie University, Climatic Impacts Centre

Mills, Dr. D.

MM Cables Division of Metal Manufactures Ltd

NorthPower

NSW Minerals Council

Orion Energy

Pacific Power

Pacific Solar Pty Limited

Peter Caldwell & Associates

Pollak, D.

Preferred Options (Asia Pacific) Pty Ltd

PV Pacific Solar A'asia

Rainbow Power Company Ltd

Robertson Environment Protection Society

Sligar and Associates Pty Ltd

Solar Energy Industries Association of Australia Inc

Southeastern Renewable Energy

Standards Australia

Sustainable Energy Industries Council of Australia (SEICA) Inc

Sydney Electricity

Sydney Water

Thermal Research Pty Ltd

TREElectric Pty Ltd

University of Newcastle

University of New South Wales (Prof. Morrison)

University of Technology Sydney (J. Greenland)

University of Technology Sydney (Dr. Olywoye)

PUBLIC CONSULTATION PROCESS

The Working Group's public consultation process sought public comment on the following issues:

- what sort of activities should be funded by the SEF?
- what level of funding should be made available to the SEF?
- what should be the priority areas for funding by the SEF?
- how should activities be selected for funding by the SEF?
- should the SEF be aimed at all sectors of the energy market or initially constrained in some way?

The Working Group found the public consultation process to be most useful and appreciated the thoughtful submissions that were made. The table below outlines the submissions received and shows how the views expressed have been considered for incorporation into the Working Group's recommendations.

<i>Submission</i>	<i>Response</i>
<p>What sort of activities should be funded by the SEF? Several submissions recommended supporting activities which would improve the competitive advantage of NSW-based businesses which are developing, manufacturing and/or marketing products or services which could have a benign impact internationally, in a sustainable energy context. General Groupings of recommendations follow.</p> <p><i>Energy Efficiency and End-use Activities</i> A market based program aimed at end users and their end use technology, designed to reverse increases in energy consumption and emitted pollution. Aim to foster the development of products, technologies and programmes which have practical and commercial merit, including those that enhance end-use efficiency. Incorporating energy efficiency in all new building stock since benefits accumulate for the life of the building. Promote the development of a model energy efficiency building code to be implemented by local councils. Subsidies to improve payback periods for energy efficient products, for end users and market intermediaries such as energy auditors, installation contractors and consultants. Support a mechanism to take up recommendations made through energy audits.</p>	<p>The SEF Working Group has recommended that monies from the Sustainable Energy Fund be used to achieve the SEF's Mission and Objectives by carrying out the following intervention activities:</p> <ul style="list-style-type: none">• providing information, education and training on sustainable energy technologies, techniques and practices;• providing funding assistance for the commercialisation of sustainable energy technologies;• assisting sustainable energy technologies increase their market share through market transformation activities;• providing assistance to sustainable energy industries.

Submission

Provide technical expertise to audit State Government capital expenditure for energy efficiency.

Home energy rating programs should attempt to bring local council initiatives together under the NatHERS system.

Create a testing facility for energy efficiency suppliers. This will enable suppliers to test and demonstrate the effectiveness or otherwise of various technologies prior to bringing them to market.

Direct initiatives towards the deepening of venture capital markets and assist with purchasing policies.

Establish an infrastructure based program aimed at industry and developers.

Renewable Energy Programs

Accelerate the introduction of renewable energy production technologies into the market by:

- strategic investments in technologies approaching commercialisation;
- investing with end-users in cogeneration/renewable technologies, loans to existing and near manufacturers of sustainable energy technologies;
- offering cash rebates for solar hot water systems.

SEF should support activities which assist with the marketing and promotion of renewable energy products and services, including the establishment of consortia having the ability to offer complete turnkey solutions for identified markets, eg., storage.

Key technologies must be developed, including capitalising on NSW's leading level of solar expertise in the international process.

Introduce and enlarge the market share for renewable energy technologies.

Increase incentives to energy supply utilities to encourage adoption of renewable energy options for grid substitution, replacement and support.

Subsidise a program to encourage grid connected PV on schools and public buildings.

Revitalise the RAPAS scheme immediately.

Avoid assistance for new retailers of renewable energy equipment, services or for government utilities as this would be to the detriment of existing small business.

Response

The SEF Working Group has recommended that a portfolio funding methodology should be used for the Sustainable Energy Fund. Four portfolio categories have been identified:

- energy efficiency and fuel substitution;
- renewable energy
- cogeneration
- core programs.

It is anticipated that funding will be allocated to these portfolio categories for use by SEF managers once the Sustainable Energy Fund has been established. A preliminary list of particular intervention activities which could be funded by the SEF is provided as Appendix F.

This list incorporates many of the activities suggested in the public submissions. Some other suggestions which are principally of a policy nature (eg revitalisation of the RAPAS scheme; mandating of cogeneration targets for the electricity supply industry) are outside the funding role of the Sustainable Energy Fund but can be considered by SEF managers as they develop policy proposals for consideration by the Minister. A few further suggestions (eg using the SEF to fund research) are outside the proposed funding/policy activities of the SEF.

Submission

Response

Cogeneration Activities

Mandate cogeneration targets for the electricity supply industry. Reduce charges, restrictive practices and associated barriers.

Provide grants/low interest loans to network businesses or others for cogeneration/renewables where their cost is not much higher than the cost of expanding the network.

Fuel Substitution Activities

Substitute natural gas for coal-fired electricity; substituting natural gas in combined cycle plants for coal-fired base load power generation.

Support alternative fuel vehicle trials and propose and develop a road transport fuel substitution policy for Government vehicles.

Discourage use of off-peak electricity for residential water heating in favour of less-polluting alternatives such as natural gas and gas boosted solar water heating.

Information and Core Activities

Undertake Government energy policy research (eg. examination of subsidies, tax provisions, loans, loan guarantees and greenhouse gas tax).

Develop an external social and environmental costs database with respect to conventional energy.

Development of managerial and technician training programmes for developing countries (where they are using or are going to use renewable energy products which are imported from NSW companies).

Support practical measures such as the use of rebates and grants, interest free loans, dissemination of information, education and demonstration programs.

Subsidies for seminars, promotions, education and training programs.

Develop labour market training courses through TAFE to enlarge the workforce skilled at energy auditing and marketing of energy efficiency.

Own or help finance Energy Centres in Sydney suburbs, the Illawarra and the Hunter that demonstrate to the public energy efficient appliances and renewable technologies.

Promotional material, training, purchaser finance and rebate schemes including RAPAS, data collection and incentive schemes to encourage use of interactive technologies

What level of funding should be made available to the SEF?

At least \$2 million per annum.

Not more than \$5 million per annum for 3 years with the whole program subject to review at three year intervals. There should be no duplication of activities by similar funds, such as SERDF, or duplication of any imposed levy requirement on energy suppliers.

A budget in the region of \$30 million annually should be suitable, initially funded from the State Budget, but with industry players on the receiving end of benefits, contributing an increasing proportion.

Funding level could be based on a percentage of the value of non renewable energy consumed in NSW each year. A level of around 1% in the first year is proposed which equates to around \$40 million.

The size of the SEF should be variable, at least \$20 million in the first year and peaking at around \$200 million per annum in 2005. Funding could be from a carbon based levy on electricity and gas utilities and applied to low pollution technology.

What should be the priority areas for funding by the

See pages 46 and 47.

The Working Group recommended setting a target level of annual funding for the SEF at \$45 million (1995 dollars) on a full year basis. This recommendation is intended as a target, with funding ramping up over a five year period from an initial base of \$7 million, with increases to the SEF budget to be linked to the successful performance of the Fund.

The Working Group recommended that the funding level for the SEF be built up as follows:

first year \$7 million
second year \$12 million
third year \$20 million
fourth year \$30 million
fifth and subsequent years \$45 million.

The Working Group recommended that a levy on the electricity and/or gas industry should be kept under review with the possibility of using a levy as additional source of funding for the Sustainable Energy Fund in the future.

The Working Group recommended that the principal source of funding for the SEF should be the NSW Government Consolidated Fund, with funds being provided as budgetary allocations through the established process of three year rolling funding.

SEF?

Objectives should be to:

- improve end use energy efficiency;
- accelerate market penetration of high efficiency end-use products through demand management programs;
- enhance fuel substitution to more environmentally benign fuels;
- increase the use of cogeneration; and
- accelerate development and commercial application of renewable energy technologies.

Activities Aimed at Strengthening the Market

Give broad priority to areas that will strengthen or encourage existing businesses, take consideration of historical commitment/effort to the implementation of sustainable technologies by businesses.

Electricity retailers have been identified as primary potential deliverers of energy efficiency, energy management and alternative energy products by many studies. Support for entry into such businesses, business development funding and venture capital should lead to sustainable long term development in businesses.

The Working Group recommended that monies from the Sustainable Energy Fund, exclusive of administration costs, should be allocated to the four portfolio categories as follows:

- Energy efficiency and fuel substitution
- Renewable energy
- Cogeneration
- Core programs

Submission

Response

Projects should have an inbuilt rate of return to the Fund.

Major areas for early action should be solar hot water heating, high efficiency lighting, thermal insulation and cogeneration.

Demand Management

SEF should support a mixture of conservation focussed non-price demand management and enlargement of the market for renewable energy production.

Subsidise demand management (DM) activities, particularly where the cost of DM is only slightly higher than supply side options. Genuine opportunities in this area have a relatively low take-up rate by energy consumers due to a short term focus on capital returns.

Fuel Substitution Activities

See page 49

Legislation should, as a first priority, facilitate the marketability of existing cost-effective low emissions technology. The charter of local government electricity and the private gas distribution authorities should be altered to offer and maintain fully life cycle amortised '6 star' end use energy efficiency equipment and solar equipment to domestic or commercial customers.

Funds levied on AGL should be substantially directed to encouraging natural gas substitution of coal generated electricity, and substitution for petroleum fuel, support cogeneration and other forms of natural gas utilisation and energy efficient gas appliances.

Natural gas substitution for electricity, particularly in household hot water use.

Support natural gas-fired cogeneration and private power generation enabling large efficiency benefits and CO₂ reductions.

Substitute natural gas for petroleum fuels, giving urban pollution and import substitution benefits.

Energy Management Activities

An extension to local Government and non-Government sectors of the NSW Government Energy Management Program.

Encourage energy efficient housing (in conjunction) with lending institutions as well as builders.

Energy labelling needs promotion and enforcement.

Minimum Energy Performance Standards (MEPS) should be applied to houses and appliances.

Submission

Response

Market Assistance Activities

Offsetting any net financial burden involved in the purchase by schools, hospitals and other Government agencies of, for example, propane-based refrigerators, electric vehicles, high-efficiency lighting, appliances, architectural modifications and high-efficiency motors.

Establishment of an Energy Efficiency/Renewable Energy Centre.

The great majority of SEF funds should be spent largely on direct market assistance of slightly uncompetitive (neglecting externalities) technology measures. It is clear that the direct market assistance approach stimulates the industry most strongly eg.,

- a short term plan of rebates eg \$500 cash back offer on solar heaters; and
- a long term plan of declining rebates given to dealers or distribution authorities prior to sale to the consumer.

Subsidising the purchase of products and services judged to be at a critical stage in their development cycle

Renewable Energy Technologies

Fund a monitoring program to assess, on an ongoing basis, the level of investment in renewable energy technologies as well as their application to ensure barriers, such as limited access to capital, are addressed.

Renewables are often not cost effective. The need to increase sales volume and reduce unit cost is a normal feature of entry by new or competing products into a mature market.

Funding support for renewables including green pricing (net billing) and leasing options.

Create an "Energy Choices" subsidised phone line which provides comparative information on prices, cost savings for energy efficient devices and appliances.

A long term plan of declining rebates could be given to generation authorities as a direct fuel subsidy.

Encourage grid connected renewable energy technologies.

Submission

Response

How should activities be selected for funding by the SEF?

Practical and, wherever possible, commercially viable outcomes are paramount.

Does the activity make good business sense for NSW (promise to lead, over the long term if not right away) to a net creation of jobs, a net inflow of capital investment, a net improvement in expertise, skills and education levels?

The criteria for suitable technologies should not be based on specific technologies, but on pollution performance. Support should be based on the average Global Warming Potential (GWP) pollution per unit of energy service in that market in that region.

Will the activity lead to a net advance in sustainable energy terms in a global context on the basis of:-

- cost of net greenhouse gas reductions (\$/tonne);
- size of potential greenhouse gas reduction;
- net reduction in energy use;
- true cost benefit analysis, incorporating environmental and social costs;
- proposed criteria;
- social, economic and environmental effects of proposed projects.

By assessing the contribution of the activity to the establishment of renewable energy systems.

Both direct and indirect, short and long term implications of proposed projects should be comprehensively considered.

Based on their potential to promote renewable energy alternatives as well as acceptability to consumers. Research consumer need and acceptability of the proposed activities. Provide access for less privileged consumers.

The Working Group recommended that a hierarchy of criteria be used by the SEF in selecting proposed projects for funding. One key criterion should involve an assessment of the relative cost-effectiveness of the greenhouse gas emissions reduction to be achieved by the project.

The Report also recommended that individual selection criteria be developed and refined for each of the portfolio classes and that a weighting factor be developed for each criterion.

An annual review of the selection criteria is also recommended to ensure that the criteria are effective in selecting projects with cost-effective measurable impacts.

Submission

Should the SEF be aimed at all sectors of the energy market or initially constrained in some way?

Sectors that use the largest quantities of energy and release the largest quantities of greenhouse gas and other emissions, should be the SEF target areas for action, ie., electricity, coal, petroleum fuels and natural gas.

Funding should cover major sectors of the energy market, such as transport. Initially focus on electricity supply and usage.

Initially aim at the development and international promotion of the State's renewables industry, and assisting the adoption of sustainable energy products such as electric vehicles and propane refrigerators.

The existing renewable and sustainable energy industries deserve the strongest support - over and above larger utility based industries.

Funds will be required for research and development, but they will be at a much lower level than for market assistance. R&D funding is required in NSW whether via a continued SERDF or as a part of the SEF.

Other Issues

Fund administrators should liaise closely with practical, experienced industry representatives such as utility representatives and renewable industry associations.

It is important that the Working Group or any subsequent advisory fund have equitable representation from the NSW energy industries including the gas and renewable energy industries.

Response

The SEF Working Group recommended that the Sustainable Energy Development Corporation should investigate extending the Sustainable Energy Fund to other energy forms, particularly gas and transport fuels. When this investigation is completed, an additional funding allocation should be made to the SEF to cover these other energy forms.

The Working Group decided that SEF should not be used to fund research activities, but will support those sustainable energy technologies, services and practices which are already commercialised, or on a development and demonstration path leading to commercialisation.

The legislation establishing the Sustainable Energy Fund includes provision for an Advisory Board with qualifications and experience in:

- energy or energy related services;
- consumer or community interests;
- environmental protection;
- financial management.

APPENDIX D *Sustainable Energy Development Bill 1995*

This Bill has been enacted. For a copy of the Sustainable Energy Development Act 1995, please refer to the following internet site.

http://www.austlii.edu.au/au/legis/nsw/consol_act

Click on [Act Name Search], then enter the name of the specific Act.

APPENDIX E

OTHER INITIATIVES SIMILAR TO THE SUSTAINABLE ENERGY FUND

1. Energy Research and Development Corporation (ERDC)

The Energy Research and Development Corporation (ERDC) is a Commonwealth Government agency which was established in 1990 following passage of the *Primary Industries and Energy Research and Development Act 1989*. ERDC reports directly to the Minister for Primary Industries and Energy.

ERDC has a staff of 14 and an annual budget of about \$1 million for administrative expenses. The budget for program expenditure is about \$14 million.

ERDC considers its business to be that of a specialist development bank which provides initial capital for innovation in energy supply and use. The Corporation's charter covers the full innovation process and supports research across the concept to delivery continuum. ERDC exists to respond to industry needs, to facilitate more effective innovation, and to provide more responsive and accountable management of the Government's investment in innovation.

The primary role of ERDC is its research investment program. The core skill of ERDC, through its Board and staff, is managing investment of initial capital in innovation and research. All new projects are considered for their potential to have a measurable return to the Australian economy, the community and/or ERDC.

ERDC involves itself in market and business planning studies, facilitating alliances between industry and research resources, promotion of innovative practices, investing in innovation projects and managing those investments. ERDC primarily invest in projects from the proof principle stage to first product launch.

ERDC's research investment program is divided into four programs:

- electricity;
- gas and liquid fuels;
- renewable energy sources and systems;
- planned energy use.

Each program is managed by a Research Investment Manager responsible for applications from submissions through evaluation and contracting stages, management of ERDC's investment in those projects, and working with industry targeted by the program area.

It is understood that projects come to ERDC informally, sometimes as spin-offs from other projects. ERDC does not use public calls except in particular circumstances where the Minister may wish to target a particular area for development. In assessing whether to support a project proposal, ERDC considers six criteria and asks will the project:

1. increase the development of competitive Australian industries?
2. increase the efficiency of energy use?
3. increase the diversity of energy supply?
4. reduce adverse environmental impacts?

5. reduce energy requirements?
6. reduce energy costs?

A number of other evaluation criteria is also used to determine whether the project should be supported, but in particular ERDC asks what is the benefit of having the project succeed, and can a business be made out of it? ERDC therefore looks for some demonstration that the proponent is prepared to invest in the development of the project proposal.

The ERDC Board consists of an independent chairperson, six directors nominated by a selection committee on the basis of their experience and qualifications, a government director, and a managing director (appointed by the Board). The performance of ERDC's functions and exercise of ERDC's powers are enacted through the Board.

Proposals are evaluated by a panel which includes at least two external evaluators and the managing director of the Board. In most instances the panel would include other Board members as well.

2. NEW ZEALAND ENERGY EFFICIENCY AND CONSERVATION AUTHORITY (EECA)

The Energy Efficiency and Conservation Authority (EECA) was created in late 1992 as an independent Government agency charged with determining and implementing practical measures for achieving greater energy efficiency in New Zealand. The Authority is governed by a Board of six which are appointed by the Minister for Energy. The Minister is able to instruct EECA through the Board; he is also able to remove the Board if necessary.

The Authority has a staff of 40 and an annual budget of \$NZ2 million for administrative expenses. The budget for program expenditure is \$NZ10.2 million.

The following functions are specified in the Authority's terms of reference:

- to develop, implement and promote strategies for energy conservation;
- to advise the Government and the New Zealand energy industry on matters relating to the development, implementation and promotion of those conservation strategies; and
- to monitor known energy sources, their use, and the investigation of potential sources and applications, together with the economic, social, and environmental impacts, in both the short and long term.

The Authority has five branches - Policy Development; Energy Services; Communications and Marketing; Programs and Partnerships; and Finance and Administration. The Energy Services Branch 'fills the holes in the market' and periodically refocusses its attention. It is concerned with being effective, especially where activities are not being adopted by the marketplace. Once the market is capable of taking over and handling these activities, EECA withdraws.

The Authority was established under the premise that even if perfect competition existed, there would still be a role for Government. An example cited is Government's role in regulation and gathering information on energy end-use and efficiency which would not necessarily happen in the competitive market. By establishing EECA, the New Zealand Government has demonstrated its long term commitment to increased energy efficiency.

One of the key initiatives in the 1994/95 Business Plan was the launch and establishment of the Energy-Wise Companies Campaign. The campaign is a partnership between Government, energy

suppliers and private businesses, and is aimed at improving the use of energy resources. The campaign involves a voluntary commitment by participating companies to improve energy management by setting energy savings targets, reviewing performance and reporting on actions taken. The campaign is provided with practical information, advisory and secretariat support from EECA and has been endorsed by the Minister for Energy.

EECA currently manages around 50 programs grouped into the following broad categories:

- Standards and labelling programs;
- Domestic programs, for example efficient appliances and water heating efficiency measures;
- Commercial and industrial programs which includes the Energy-Wise campaign;
- Transport driver education programs;
- Renewable energy planning and facilitation programs;
- Monitoring and analysis programs which are core programs such as database development and energy statistics reviews;
- Partnerships programs with industry, government, schools and hospitals;
- Energy services programs, for example energy audit management, technology demonstrations and voluntary CO₂ industry agreements;
- Policy and strategic planning programs which include climate change issues;
- Marketing and communications programs including publications, seminars, marketing and information services;
- General programs including administration and staff training.

One of EECA's initial goals was to establish its credibility with the marketplace and the community. To improve its performance and the delivery of successful programs, EECA underwent a major reorientation during its first full year of operation. The mix and design of programs were re-gearred to achieving specific communications objectives, technical activities were re-aligned towards supporting the Government's Energy Efficiency Leadership Program, attention was directed to expanding the market for energy services and building industry skills and quality standards, and an effort was made to focus EECA's resources towards strategic cost-effective gains in energy efficiency.

The New Zealand Government substantially increased the allocation of funding to EECA prior to the 1994/95 budget, demonstrating the Government's commitment to energy efficiency and providing EECA with a stable financial basis with which to develop programs with multi-year time frames.

3. United Kingdom Energy Saving Trust

The Energy Saving Trust is a private non profit-making company set up in 1992 by the United Kingdom Government, British Gas, and the 14 British Public Electricity Suppliers (distributors). It has a Board of 10 people, including representatives from the electricity distributors and from British Gas; the Trust's constitution ensures that independent Directors will always be in the majority.

The Trust has a staff of 22 and expenditure in 1994/95 on administrative expenses was £1.6 million. From April 1996, the Trust's annual budget for program costs will be £25 million. In addition, the electricity distributors provide £1 per franchise customer per year for expenditure on energy efficiency programs.

The Trust's objective, as set out in its mission statement is *"the efficient use of all forms of energy in the UK, leading to an overall reduction in total energy consumption and its consequential environmental impact"*. In order to achieve this goal, the Trust develops, facilitates, directs and manages new programs to promote the efficient use of energy by domestic and small business consumers.

The Trust was part of the commitment made by the UK Prime Minister at the Rio Earth Summit to return UK carbon dioxide emissions to 1990 levels by the end of the century. It was envisaged that the Trust would achieve this primarily by identifying, promoting and directing energy efficiency schemes.

The Trust prepared a two-year corporate business plan in April 1994. This proposed expenditure on energy efficiency subsidies, to be raised via a levy on gas and electricity bills. This would have formed the start of a seven year program designed to provide 25% of the carbon dioxide savings that the Government thought at the time would be required to meet its international commitments.

Since then, there have been three key changes:

- it has become clear that the level of funds from gas and electricity customers required to fund the subsidy schemes proposed by the Trust will not materialise in the short term due to a reluctance, particularly by the current gas regulator, to mandate levies on customer bills;
- the UK Government has announced that it is confident of meeting its commitment under the Climate Change Convention and it now expects to exceed it with emissions of CO₂ significantly below 1990 levels by the year 2000;
- the UK Government has taken legal powers which will enable it to contribute to the running costs of the Trust, and intends to make available up to £25 million per annum as a contribution to program costs from 1996 until gas and electricity markets are fully liberalised.

The Trust has revised its plans, in the light of these changes, to develop its role as an effective catalyst for change. It intends to develop new and innovative ideas which will promote the efficient use of energy at a time of increasing competition in the UK gas and electricity industries, but without the need for indefinite subsidies.

For the most part, until recently, the Trust has not directly incurred program expenditure. Instead, the Trust has devised and managed programs which have then been implemented by other bodies, mainly the electricity distributors and British Gas.

The Trust assists the Office of Electricity Regulation (OFFER) in implementing the electricity Standards of Performance on energy efficiency which came into effect in April 1994. The Standards require each electricity distributor to levy the equivalent of £1 per franchise customer per year for expenditure on energy efficiency. The Standards provide a framework under which the electricity distributors can select projects to provide energy efficiency benefits to franchise customers, utilising the funds provided through the levy. The Standards, drawn up by OFFER and the Trust, stipulate an energy savings requirement for each distributor as well as the criteria under which programs can be implemented. The Trust advises OFFER on the methodology for assessing energy savings from expenditure under the Standards, is responsible for endorsing projects for OFFER's approval under the Standards, and for evaluating and monitoring of projects.

The Trust develops national schemes for implementation under the Standards, to which all electricity distributors contribute on a pro rata basis. The Trust also develops framework schemes which individual distributors may choose to implement in their franchise area. Distributors may also propose their own schemes for implementation under the Standards; these proposals are evaluated and endorsed by the Trust for approval by OFFER.

The Trust has developed two national schemes under the Standards to increase the purchase and use of compact fluorescent lamps by residential customers. Framework schemes which have been developed by the Trust include: a communal lighting improvement program; a schools energy efficiency program; a program to promote the use of high frequency commercial lighting; and a program to improve the efficiency of commercial refrigeration. In 1994/95, the Trust approved 62 regional projects proposed by individual distributors.

The Trust has also developed energy efficiency programs funded from a levy on gas bills mandated by the previous gas regulator. The Trust's first pilot scheme was a program to promote the use of gas condensing boilers in the residential sector. The Trust is also providing subsidies for residential cogeneration installations. This program is managed for the Trust by the Combined Heat and Power Association. The Trust plans other programs during 1995/96 financed by a gas levy, subject to approval by the current gas regulator. A residential loan finance scheme will provide loans for energy saving measures. The Trust also plans an equity release scheme to help provide pensioners with energy efficiency. The Trust will work with a building society to release a small part of the equity in the pensioner's home in the form of a loan for appropriate energy efficiency measures.

The Trust has established 33 Local Energy Advice Centres throughout the United Kingdom with financial support from the Department of Environment and a variety of local sources. The Trust manages the LEAC pilot project on behalf of the Department of Environment's Energy Efficiency Office. Each Centre is managed by a local organisation selected by the Trust through a tendering process. The Trust has engaged contractors to provide management advice to the local organisations and training to Centre staff. The Trust itself develops policy on how the LEAC pilot project should operate and provides overall management of the project. Government support is available until September 1996, after which it is currently intended that the Centres should become self-financing.

Other areas in which the Trust is active include:

- contributing to the development of national energy policy;
- communicating the benefits of energy efficiency through publications, conferences, exhibitions and the media;
- reviewing possible opportunities for the Trust to work on energy efficiency in the transport sector;
- exploring opportunities for the Trust to work with other players in the competitive fuel markets, especially with the newly-formed private sector gas distributors following the break-up of British Gas;
- developing residential sector product endorsement programs whereby energy saving products are given a common branding;
- working with local governments to improve energy efficiency in their local areas.

APPENDIX F preliminary list of intervention activities which could be funded by the SEF

As an initial goal, funding by the SEF could be directed at *building on existing programs*. This would have the advantage of relatively rapid implementation and could improve the effectiveness of existing programs. Following this initial take-up, funding could be directed towards *activities which have a high likelihood for success*. These intervention activities are characterised by relatively high levels of cost-effectiveness in terms of their level of impacts. Finally, programs aimed at *reducing the barriers to sustainable technologies and techniques which are already cost-effective but which aren't being implemented* could be supported. Often these barriers are related to a lack of information or a lack of up-front capital available for investment. Another common barrier is the fact that customers often place a very low priority on energy efficiency as their energy bills are generally a very small component of total costs.

The following are some examples of intervention activities which could be funded by the Sustainable Energy Fund. The examples are grouped into different market sectors.

Residential sector

- Increased promotional support for the residential appliance energy labelling program (gas and electric).
- A Home Energy Rating Scheme which would be aimed at saving the occupant costs over time by increasing the use of passive solar energy through orientation, shading, layout, and the materials of the dwelling. The Scheme would be based on the National Home Energy Rating Scheme (NatHERS) currently being developed and would provide occupants with information on how the energy efficiency of their homes could be increased.
- An extension of the Commonwealth Government Energy Card program, which is designed to assist intending solar water heater purchasers with rapid access to finance at sub-credit card interest rates, to all appliances having a nominated level of energy efficiency (eg five stars or more on the energy label scale). The SEF would review this program, focussing on identified problem areas of the Card.
- An extension to the wind-powered renewable energy project which is being developed at Fort Scratchly, Newcastle on Kooragang Island. The project will further develop small wind turbines for low wind regimes for possible future applications to RAPS systems.
- A home energy audit program which provides householders with advice on the most cost-effective means of saving energy, including insulation and weatherisation, low-flow shower fittings, and simple appliance repairs.
- A program aimed at encouraging home owners to switch from electric to gas water heating. The SRC International study estimated that it would be cost-effective to encourage the switch to gas water heating at the end of the existing useful life of electric water heaters. The study assumed the potential to switch out all existing electric water heaters over a ten year period.
- A program to provide prospective purchasers with specific information on the greenhouse gas impact of choosing electric, gas or renewable residential energy appliances, especially residential water heaters.
- A household energy/water efficiency program which would combine existing water and energy efficiency programs (eg energy labelling, water efficiency labelling, and the promotion of low-flow shower fittings).
- The development and demonstration of low cost domestic solar water heaters, renewable energy systems with particular emphasis on biomass and microhydro opportunities and new and alternative electricity generation technologies with emphasis on the use of waste products.

- High efficiency appliances. A program could be introduced to target the residential sector by providing a rebate to customers who purchased high efficiency appliances.
- Domestic Lighting Efficiency Scheme. Householders could receive a rebate for installing a maximum number of compact fluorescent lamps (CFLs) per year. CFLs use 20 percent of the electricity of an incandescent lamp for the same level of light output.

Commercial and Industrial sectors

- An extension to local government and non-government sectors of the NSW Government Energy Management Program, which is aimed at encouraging government agencies to identify and realise energy saving opportunities. A mechanism is required to support the take up of recommendations for identified opportunities, for example energy audits where despite identified savings, implementation of energy savings measures is low..
- An extension of the Cogeneration Demonstration Program which has been developed by the NSW Department of Energy, comprising a cogeneration facilitation package aimed at examining and overcoming a range of existing barriers and including on-going funding support for case study installations.
- An extension of the Commonwealth Government's Greenhouse Challenge voluntary agreements program through a packaged support program to assist small businesses to develop appropriate response measures, including training, energy metering and monitoring, and implementation incentives. Larger businesses generally have the resources to respond to the Commonwealth's program.
- An extension to the Building Energy Code of Australia (BECA) program. This program is being developed by the Commonwealth Department of Primary Industries and Energy on behalf of the Energy Management Task Force of ANZMEC. It is not expected to be implemented until 1996-97.
- An extension to the Energy Use Disclosure program. This project aims to provide energy use information to the purchase or lease of commercial buildings in order to allow informed market responses to the varying levels of energy consumption and running costs in buildings. The program is currently being managed by the Victorian government on behalf of the EMTF.
- A technology procurement program which establishes a special incentive fund for manufacturers to develop and market (in specified quantities) very high efficiency refrigerators and freezers, similar to the US 'Golden Carrot' program. There would be a long lead time before the benefits of such a program would appear, but the impact would be high and the program would be very visible.
- Support for energy metering and monitoring in the commercial and industrial sectors. This would be a key program to help business to manage energy waste.
- Subsidies for training, seminars, promotions and education programs aimed at raising awareness, including in-house training sessions on energy management for managerial and technical staff .
- An energy planning incentives program which provides funding to assist businesses to develop comprehensive long-term (3-5 year) energy plans.
- Programs to assist businesses in raising funds to implement energy management programs. Such programs need an initial stimulus to get them incorporated as part of normal business practices. Intervention activities funded by the SEF could include:
 - rebates for installation of sustainable energy technologies;
 - bidding programs in which customers competitively bid for funding to help offset the cost of implementing energy efficiency and renewable energy projects;
 - a 'packaged solutions' program, where the SEF assists with the funding of integrated measures for industrial and commercial companies aimed at helping them to identify and implement energy efficiency and renewable energy projects.

Portfolio Category 2: Renewable Energy

Possible Programs

Program Selection Criteria

Pass/Fail Criteria

Ranking Criteria

Other Considerations

Is there a high probability that the program or technology will be successfully implemented?

Will the program overcome major barriers to the process or technology?

Quantity of greenhouse gas emissions reduce per dollar spent on the program.

Level of commitment by proponent

How close is the process or technology to reaching market potential?

Are there significant adverse environmental impacts

Will the program increase market competitive-ness of renewable energy?

Is the project part of the proponent's business strategy?

Additional Program areas to be determined

Green pricing

Wind energy projects

Solar photovoltaics

Solar water heaters

Integrated energy systems

Solar thermal

Daylighting technologies

Portfolio Category 3: Cogeneration

Possible Programs

Program Selection Criteria

Pass/Fail Criteria

Are there other significant adverse environmental impacts associated with the project?

Will the program overcome major barriers to the process or technology?

Ranking Criteria

Quality of greenhouse gas emissions reduced per dollar spent on the program.

Level of commitment by proponent

Other Considerations

How close is the process or technology to reaching market potential?

Will the program increase market opportunities for market potential

Is the program cost-effective to society.

Is the project part of the proponents' business strategy?

Additional Program areas to be determined

Building projects commercial

Residential (flats) building projects

Small industrial plants

Commercial Plants

Conversion program of coalfired boilers

Portfolio Category 4: Core Programs

Possible Programs

Program Selection Criteria

Pass/Fail Criteria

Will the program improve efficiency of energy use?	Will the program overcome major barriers to the process or technology?
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Ranking Criteria

Level of commitment by proponent	Is the project part of the proponent's business strategy	Will the program increase end-user awareness?
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Other Considerations

Will the program improve energy planning.	Does the program avoid unnecessary legislation?
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Additional Program areas to be determined

Training

Home energy savings kits

Media promotions

Energy audits

Metering information

Info for school curriculums

Energy display homes

Energy advisory centres