



Department of Communications, Marine and Natural Resources
Roinn Cumarsáide, Mara agus Acmhainní Náúúrtha

Expenditure Review of the Sustainable Energy Priority of the ESIOP

Part 1: Context Statement

Part 2: Report

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Department of Communications, Marine and Natural Resources
Roinn Cumarsáide, Mara agus Acmhainní Náúúrtha

Part 1:

Context Statement for the Expenditure Review of the Sustainable Energy Priority of the ESIOP

Introduction

The establishment of a formal process for reviewing government expenditure was proposed in the Government publication, *Delivering Better Government* and introduced in 1997. The objectives of the Expenditure Review Initiative (ERI) are:

1. To analyse in a systematic manner what is being achieved by Exchequer spending: and,
2. To provide a basis on which more informed decisions can be made on priorities within and between programmes.

It moves the evaluation of public expenditure away from a focus on inputs (the traditional audit perspective) towards a focus on outcomes and effects (which is more consistent with the thrust of the *Strategic Management Initiative*).

The expenditure reviews are carried out by spending Departments, with input from the Department of Finance. The process is overseen by the Expenditure Review Central Steering Committee (ERCSC), chaired by the Secretary General, Department of Finance.

Sustainable Energy Priority

Energy Policy in Ireland and at a wider EU level focuses on three separate but closely linked strands – security of supply, the development of efficient, properly regulated, energy markets and the promotion and development of a sustainable energy future. The Sustainable Energy Priority of the Economic and Social Infrastructure Operational Programme (ESIOP), 2000-2006 aims to increase energy efficiency in various sectors of the economy and to encourage greater electricity generation from renewable sources. The priority is effectively divided in two parts – the Alternative Energy Measure and the Energy Conservation Measure. Both measures complement the three strands of overall energy policy.

There were significant difficulties in meeting the spend targets in the initial years. Implementation was largely the responsibility of the Irish Energy Centre which had responsibility for the much smaller scale predecessor OP. The role of IEC was assumed by the national sustainable energy authority, Sustainable Energy Ireland (SEI), which was set up under its own statute in June 2002 when it had the task of growing its staff and expertise and ramping up its capacity to deliver spending and results of the scale envisaged under the ESIOP. In the period since the review SEI has increased its delivery capacity and fully expended in annual allocations. Following the mid-term review of the programme, a reduction (and reallocation to other priorities) in the overall amount of funding of the sub-measure/priority was recommended to account for the early underspend.

Alternative Energy Measure

The Alternative Energy Measure, which in the main focuses on the provision and introduction of renewable and alternative energy sources and the provision of information and support services to both industry and the public, was established to support the delivery of the objective of significantly increasing the contribution of renewable energy sources with a working target of 500MWe in the period 2000-2005. As a measure, it endured particular difficulties in meeting overall spend targets. This in part was due to the moratorium imposed by the Commission for Energy Regulation (CER) on new connections to the national electricity grid and the issue of initial over budgeting for the measure which is discussed in the expenditure review itself. Responsibility for delivery of this element of the measure now lies with ESB Networks, under a series of contract with DCMNR.

Energy Conservation Measure

This measure was established to focus on intensified energy conservation and efficiency programmes and energy conservation research. Energy efficiency as a concept, while beneficial to the individual consumer, offers a greater benefit to the common good. Several of the programmes developed under the measure aim to address issues such as barriers to market entry and market failure. Despite initial problems achieving spend targets, full expenditure of the allocated budget was achieved for the year 2004. Sustainable Energy Ireland runs several programmes

under this measure, such as the Warmer Homes Scheme, House of Tomorrow and the Large Industry Energy Network, all of which are discussed in the review.

Findings of the Expenditure Review

The Expenditure Review makes a number of findings and recommendations. One significant finding is that there is a substantial argument to be made in favour of state assistance for mainstream deployment of sustainable energy technologies and that, to date, the distortionary effect on the economy has been minimal. The review also finds that in the main, the objectives and measures taken by SEI continue to warrant the use of public monies

More specific recommendations include carrying out a full cost benefit analysis of a programme, aimed directly at households, subsidising technologies such as Geothermal Heat Pumps, Boilers and Biomass heating units and investigating the possibility of grant aiding Combined Heat and Power (CHP) and/or Biomass projects specifically for community or institutional projects.

The recommendations on continued public investment in the sector have been implemented by the December 2005 Budget Speech of a five year €65 million programme of funding for renewable energy schemes covering domestic renewable energy heating installations, CHP and bio-mass. The elements of this programme are being progressively rolled out since early 2006.



Department of Communications, Marine and Natural Resources
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Part 2:

Expenditure Review of the Sustainable Energy Priority of the ESIOP

Final Report

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Executive Summary

This is an Expenditure Review of the Sustainable Energy Priority of the Economic and Social Infrastructure Operational Programme, 2000-2006 (ESIOP). This programme, part of the National Development Plan (NDP) is aimed at rectifying a series of infrastructural deficits across the economy, and follows on from a similar predecessor. The Sustainable Energy Priority is the smallest such component of the ESIOP in terms of expenditure and aims to increase energy efficiency in various sectors of the economy and to encourage greater electricity generation from renewable resources. The Irish Energy Centre (IEC) was initially charged with the discharge of many elements of this task. In 2002, the body gained statutory status, and a name change, to Sustainable Energy Ireland (SEI). This priority consists of two distinct measures, the Energy Conservation Measure and the Alternative Energy Measure.

The terms of reference for this report, as set by the Expenditure Review Steering Group within the Department of Communications, Marine and Natural Resources, are as follows:

This Expenditure Review of the Sustainable Energy Priority will:

1. Identify the objectives of the Priority
2. Examine the current validity of those objectives and their compatibility with the overall strategy of DCMNR.
3. Define the outputs associated with the Sustainable Energy Priority programme activity and identify the level and trend of those outputs.
4. Examine the extent that the programme's goals have been achieved, and comment on the *effectiveness* with which they have been achieved.
5. Identify the level and trend of costs and staffing resources associated with the Sustainable Energy Priority and thus comment on the *efficiency* with which it has achieved its objectives.
6. Evaluate the degree to which the objectives warrant the allocation of public funding on a current and ongoing basis and examine the scope for alternative policy or organisational approaches to achieving these objectives on a more efficient and/or effective basis (e.g. through international comparison).

7. Specify potential future performance indicators that might be used to better monitor the performance of the Sustainable Energy Priority.
8. Make recommendations in relation to efficiency, effectiveness and value for money insofar as this programme is concerned.

Conclusions

The case for a programme of measures to increase energy efficiency and assist the development of renewable energy resources has become stronger in the period since its inception, due to escalating energy costs and increasingly prevalent concerns over security of supply. Equally, the environmental ‘costs’ associated with carbon dioxide emissions add another important dimension to policy in this area and continue to strengthen the case for state involvement.

This Priority has clearly defined objectives, and established mechanisms and processes are in place to advance their delivery. These objectives remain entirely compatible with the objectives of DCMNR as laid out in the 1999 Green Paper on Sustainable Energy and the current Departmental Statement of Strategy. There have, however, been significant difficulties in reaching the allocated levels of spend. To a degree, the magnitude of the increase in funding over the previous programme has been responsible, as the Irish Energy Centre (or IEC) did not have the authority (until it became Sustainable Energy Ireland or SEI in 2002) or the institutional capacity to deliver on programme goals. At least part of the explanation for slow progress in meeting targets in this area is the fact that these measures were designed to operate in conjunction with a carbon tax. Without this ‘push’ factor, interest in some programmes has been less than may otherwise have been expected.

Following a reduction in allocation to the Priority as recommended in the mid term review of the ESIOP, spend in most programmes began to approach (and meet) programme targets. Delivery of physical targets also began to meet programme goals, although there remain some areas in which it seems unlikely that targets will be met, most notably in the Grid Upgrade Development Programme (GUDP). Perhaps more pertinent from a future policy perspective is the fact that private sector uptake and involvement in the various programmes run by SEI is increasing rapidly, and

substantial sums of private capital are being leveraged by SEI for investment in a variety of projects in the energy sector. Also, as shown by market research, awareness among consumers of the opportunities for financial savings afforded by greater energy efficiency is also growing.

From the comparison with Danish and Austrian policies in this regard, it appears that the objectives and methods used in Ireland in this case are generally in line with best international practice. Critically, both Denmark and Austria have adopted carbon taxes and use more substantial financial inducements to build renewable energy plants. The magnitude of payments aside, the fixed rate feed in tariff system as used in these countries, offers some advantages over the competitive process used in the AER programme, not least greater security of income for operators and (in theory) higher payments¹. This type of procedure would also facilitate greater access by smaller operators.

In terms of the energy efficiency and R&D sub measures, it seems that both of the countries studied have taken very similar approaches to that in Ireland (perhaps unsurprisingly given the role of EU Directives in shaping policy in this area). While both countries make significantly greater use of renewable energy resources than Ireland, this is mainly due to the fact that both Denmark and Austria began to invest in these long before Ireland. While it might be argued that progress could have been more rapid in Ireland had other methods been used, it must be pointed out that, starting from a relatively low base, considerable progress has been made (from 20MW of wind connected in 1997 to over 400MW in 2005, with a further 575MW with grid connection contracts agreed).

Critically, while spending on the Energy Conservation Measure is now be running at programmed levels, spending on the Alternative Energy Measure is still far below the original programme budget. . In total, approximately 6% of the funding allocated to this sub measure was spent in the period 2000-2004. It should be noted that there were a number of factors in place at various times during this period which seriously

¹ In June 2005, the Minister for Communications, Marine and Natural Resources announced that the AER replacement would indeed use such a procedure, involving a 'banded' approach similar to that used in Austria, with different prices used for different technologies.

restricted opportunities for spending, most notably a moratorium on further connections imposed by the energy regulator. Conversely, the amount of new generational capacity from renewable resources seems likely to meet (and possibly exceed) that required under the physical target indicators set out in the ESIOP. From this perspective, and as recognised in the mid term review, the amounts initially allocated were overly large. However, even after the reductions in allocation that followed the review, difficulties remained in spending according to profile. While the persistence of this problem obviously raises questions as to the capacity of the initial budgeting process, and the choice of mechanisms chosen to spend the available resources, a more fundamental difficulty remains. It is clear that there are major efficiency gains to be made in several sectors of the Irish economy, and there is public funding available to facilitate this. However, the body charged with delivering on this set of creditable goals has yet to reach the targets set it.

The fact that the pace of spending has accelerated is to be noted, but if further progress is to be made in encouraging future investment in renewable energy resources, this sub measure must be maintained and improved upon. Institutional and technical factors aside, it is clear, not least from the experiences of other countries, that there is substantial scope for additional energy provision from renewable sources. SEI continues to have a valuable contribution to make in this regard, particularly given both the administrative and technical knowledge it has obtained in recent years. However, as pointed out in chapter 5, the organisation requires further review to determine the precise internal institutional causes for this underspend. The provision of additional funding to this area in the 2006 budget further increases the responsibility to ensure that if there are institutional problems, they need to be identified and addressed immediately.

There are a number of possible alternative uses for funds under this sub measure. Among these is the use of SEI's existing contacts within industry to encourage the use of industrial Combined Heat and Power (CHP), or to specifically target the agricultural industry, through their representative groups if necessary, to encourage greater awareness of the opportunities offered by both wind and biological energy

resources². Critically, given the reliance of this state on imported energy resources, the dependence on particular types of energy (oil and gas) and the relative energy inefficiency of much of the housing stock, there is a strong case for further state intervention in domestic energy efficiency projects. This case is strengthened by the difficulties faced by SEI in spending its allocation, a position increasingly difficult to maintain in the context of rising energy costs and high rates of domestic house construction.

Conclusions and Recommendations

1. The objectives of the Priority remain valid, and continue to warrant the use of public monies. They are also entirely compatible with the strategy of DCMNR.

(See Chapter 3, Section 3.2)

2. The outputs of this programme are, for the most part, clear and quantifiable. The level and trend is towards greater levels of delivery on targets as the programme has proceeded. There were difficulties at the outset, at least partially due to capacity problems within SEI due to the severity of the ‘ramp up’ from the earlier Economic Infrastructure Operational Programme (EIOP-1994-1999) to ESIOP programmes. In recent years however, SEI has accumulated greater capacity for delivery, as evidenced by the advances in meeting physical target indicators.

(See Chapter 3, Section 3.3)

3. Inter institutional issues are a major barrier to the provision of more renewable sustainable energy capacity, and the effectiveness of SEI in this regard is hampered by the status and general role of the organisation (facilitative rather than enforcement). In this regard, and in the context of the recent Ministerial announcement and extant situation regarding funding, it seems logical that the Grid Upgrade Development Plan be run in future by the Commission for Energy Regulation (CER).

(See Chapter 4, Section 4.2)

² The Irish Farmers Association is already involved in a scheme to deliver lower cost energy to farmers from renewable sources (specifically Aertricity)

4. Given the difficulties experienced with developing renewable energy generation, and constraining spending on the Alternative Energy priority, there is a strong argument for clear regional guidelines on locations suitable for such developments, with specific regard to connections to the grid. This would involve the development of national guidelines for the construction of renewable energy plants, perhaps in conjunction with the strategic review of energy currently being conducted by DCMNR. These guidelines would then direct the GUDP.

(See Chapter 4, Section 4.2)

5. Given the difficulty in measuring the impact of many of SEI's programmes, particularly in the advertising/promotional area, a greater emphasis on market research to understand the effect these campaigns are having on energy use is advisable. It should also extend to the use of such research to measure awareness in specific energy intensive industries. This should result in the development, and use of, clearer objectives and targets for domestic energy efficiency for the SEI in the future.

(See Chapter 5, Section 5.2)

6. Many of the programmes run by SEI under the Conservation of Energy Sub Measure lack a meaningful indicator of success due to the nature of the area. The use of *energy intensity* as an index or indicator of success for the country as a whole and by sector bears further investigation. Another potential performance indicator that bears investigation is national awareness of energy efficiency issues.

(See Chapter 5, Section 5.3)

7. Given international experiences, greater consideration could be given to biomass, biogas and municipal waste as a source for CHP. Opportunities exist for cooperation with other Govt bodies, notably Teagasc and the Department of Agriculture and Food in this regard. Priority should be given to meeting the headline budgets in these areas.

(See Chapter 5, Section 5.2)

8. Given SEI's existing contacts with industry, opportunities exist for the promotion of industrial biomass, heating or CHP. This is used in industries that require large amounts of heat (such as petrochemical, food processing, wood and paper) and facilitates the sale of electricity to the grid. The announcement of a multi annual capital investment programme in renewable heat and fuel technologies will allow SEI to capitalise on these opportunities and programmes should be developed and rolled out as a matter of priority.

(See Chapter 5, Section 5.2)

9. The performance of SEI in relation to spending in the period involved bears closer investigation. This review should deal with internal and external factors such as human resource issues, the qualifications of staff. However, if, on closer examination, external factors or a lack of resources are indeed found to be primarily responsible for the lag in spending, there may be action required on the human resources issues.

(See Chapter 5, Section 5.1)

10. The proposed decentralisation of SEI to Dundalk poses a risk to the work of the organisation. In advance of exploring the relationship between output and resources (see previous recommendation), any staff turnover must be handled carefully to ensure that institutional knowledge is not lost. In particular, the knowledge management strategy underway within SEI (funded via DCMNR's "*Innovation Programme*") should be utilised to the fullest extent possible.

(See Chapter 5, Section 5.1)

11. There is a substantial argument to be made in favour of state assistance for mainstream deployment of sustainable energy technologies. Given the high number of housing units constructed every year, and the high cost of fuels, greater use of sustainable energy technologies would have substantial energy efficiency and import dependence benefits. The multi-annual funding package announced in Budget 2006, should allow for the deployment of a grants

scheme for individual householders and should be rolled out and monitored carefully in terms of impact and cost effectiveness.

(See Chapter 5, Section 5.2)

12. Greater emphasis should be placed on marketing and encouraging the use of the results of state funded R&D in this sector.

(See Chapter 5, Section 5.2)

Glossary of Terms

CER	Commission for Energy Regulation
CHP	Combined Heat and Power
CSF	Community Support Framework
DCMNR	Department of Communications, Marine and Natural Resources
EIOP	Economic Infrastructure Operational Programme
ESB	Electricity Supply Board
ESRI	Economic and Social Research Institute
ESIOP	Economic and Social Infrastructure Operational Programme
ERI	Expenditure Review Initiative
EU ETS	European Emissions Trading Scheme
GUDDP	Grid Upgrade Development Programme
MW	MegaWatt
NCCS	National Climate Change Strategy
NDP	National Development Programme
IEA	International Energy Agency
IEC	Irish Energy Centre
OECD	Organisation for Economic Cooperation and Development
PPA	Purchase Price Agreement
REIO	Renewable Energy Information Office
SEI	Sustainable Energy Ireland

Chapter 1

1.1 Background

This is an expenditure review of a number of programmes of expenditure under the Sustainable Energy Priority of the National Development Plan (NDP). These programmes are funded via the Economic and Social Infrastructure Operational Programme (ESIOP) of the NDP, established to run from 2000 to 2006. The Sustainable Energy Priority is part of a significant programme of investment in infrastructure in this State, made all the more pressing in this instance by external supply concerns and constraints placed upon emissions of so called greenhouse gases.

According to the ESIOP Executive Summary (2000), the principle objectives of the Sustainable Energy Priority are;

- Improved and intensified energy conservation and efficiency
- The provision of an increased proportion of energy from alternative sources

These objectives are to be met through two separate measures; the **Energy Conservation Measure** focusing on the development and implementation of an intensified energy conservation/efficiency programme and the **Alternative/Renewable Energy Measure** focusing on facilitating the provision and introduction of alternative energy sources. For the most part, these programmes are run through *Sustainable Energy Ireland* (SEI - formerly the Irish Energy Centre), an organisation under the auspices of DCMNR.

The fact that these Programmes are part of the ESIOP means that they are subject to the battery of evaluative and review tools common to all such projects. Accordingly, these measures have already been subject to substantial change since their inception, particularly on foot of the Mid-Term Review of the ESIOP (2003). This matter will be discussed in greater detail at a later stage in this review.

1.2 Expenditure Reviews

The Expenditure Review Initiative (ERI) owes its origins to a recommendation contained in 'Delivering Better Government' (1996). This recommendation was accepted by Government and commenced as the ERI in 1997 with the dual aims of understanding what is actually being achieved by expenditure and delivering a basis for more informed policy making. In essence, Expenditure Reviews are analyses of particular programmes of public spending with regard to their efficiency and effectiveness in meeting the goals set them. There is also a requirement to evaluate the appropriateness of the objectives set on programme inception and to provide recommendations for future delivery of services and projects.

As required by the Department of Finance guidelines for the review process, a departmental Steering Group has been established in DCMNR since the inception of the Department in its current form in 2002. The membership of this group is currently as follows:

Eamonn Molloy, Assistant Secretary

Una Ni GiollaChoille, Principal, Finance Division

Niall Kelly, Head of Internal Audit

Ann Walsh, Assistant Principal, Finance Division

Michael Smith, Administrative Officer, Finance Division (secretary)

1.3 Terms of Reference

Draft Terms of Reference were drawn up using the revised template circulated by the Expenditure Review Central Steering Committee (ERCSC) in July 2003, and approved by the Departmental Steering Group. These finalised terms of reference (TOR) are set out below:

This review of the Sustainable Energy Priority will:

1. Identify the objectives of the Priority
2. Examine the current validity of those objectives and their compatibility with the overall strategy of DCMNR.
3. Define the outputs associated with the Sustainable Energy Priority programme activity and identify the level and trend of those outputs.

4. Examine the extent that the programme's goals have been achieved, and comment on the *effectiveness* with which they have been achieved.
5. Identify the level and trend of costs and staffing resources associated with the Sustainable Energy Priority and thus comment on the *efficiency* with which it has achieved its objectives.
6. Evaluate the degree to which the objectives warrant the allocation of public funding on a current and ongoing basis and examine the scope for alternative policy or organisational approaches to achieving these objectives on a more efficient and/or effective basis (e.g. through international comparison).
7. Specify potential future performance indicators that might be used to better monitor the performance of the Sustainable Energy Priority.
8. Make recommendations in relation to efficiency, effectiveness and value for money insofar as this programme is concerned.

1.4 Methodology

This evaluation considers two measures contained within the Sustainable Energy Priority of the ESIOP. The first of these, the *Energy Conservation Measure*, covers spending on research and development and a built environment measure. The second of these, the *Alternative/Renewable Energy Measure*, focuses mainly on the provision of information and support services to industry and the public. The nature of the activities covered under the *Energy Conservation Measure* pose certain difficulties for this type of review. The conduct of an expenditure review in a sector where the main outputs are measured in terms of such apparently arcane measures as numbers of meetings held or number of design studies completed throws up some particular measurement problems. Similarly, many of the relationships between the actors involved are undoubtedly recursive, and depend, in practice, on the context involved (geographical, social and economic). Their rate of change through time may, or may not, be attributable to the activities of SEI. Determining a way to divine causality in this situation is of critical importance.

Added to these problems is the fact that the second measure, the *Alternative Energy Measure*, is fundamentally different. While it has a promotional aspect (through the Renewable Energy Information Office (REIO) in Bandon, Co Cork), it also has a role

in facilitating “the strategic reinforcement and upgrading of the electricity network³” in order to support government policy in this regard.

A critical element of this analysis is the evaluation of the degree of responsiveness between the promotion of sustainable energy targets and public responses to same. Indulging in a large scale and complex research exercise into changes in public attitudes would require time and resources (and would remain very difficult in any case given the lack of baseline data). Regardless of this, the results of such an exercise would also be difficult to translate into meaningful conclusions on the efficiency and effectiveness with which policy goals are being met. Equally, one of the main problems facing this review is the simple fact the much of the funding allocated was not spent. A generic review of expenditure will not provide any illumination for the reasons behind this. Given the nature of the programmes, with causality being sometimes difficult to imply, it is necessary to delve into the basis for the policies driving this spending in order to explain the difficulties experienced by SEI and other potential uses for public money in this sector.

In this context, the most productive mode of analysis was determined to be a holistic one, evaluating the state’s sustainable energy policy as a whole and relating this analysis to the contribution made by the Sustainable Energy Priority to the success, or otherwise, in meeting ESIOP targets. The adoption of such a potentially broad scope also opens up a number of other questions that have to be addressed in the conduct of such a review. Relevant national and EU policy goals also have to be considered, such as the extent to which the terms of the 1999 Green Paper on Sustainable Energy have been met and the effect of attempts to meet the requirements set out in the EU Renewables Directive (2001/77/EC).

Given the necessity to strike a balance between a worthwhile and cogent review of expenditure on one hand and the breadth of general policy considerations on the other, a practical mode of analysis has to be established. On this basis, the scope of the review includes analysis of the effectiveness (and efficiency) of other elements of the state’s sustainable energy policy to contextualise the work of the SEI. This involves an analysis of the overall progress made towards outline policy goals, including the

³ From ESIOP Executive Summary, 2000

success of the Alternative Energy Requirement (AER) programmes (to encourage the construction of renewable energy generation plant) in the context of the Sustainable Energy Sub Measure. Cognisance is also taken of recent developments in the sustainable energy field. For example, the contextual issues suggested by the December 2003 consultation document should also be brought into focus, along with the ongoing progress of the *Renewable Energy Development Group* (such as the recent announcement that the next market support mechanism for renewables will be based on a fixed feed-in tariff system).

The following methodology for this expenditure review is used. In order to both contextualise the discussion of the work of SEI and to ‘place’ the relevant spending programmes in their appropriate institutional and sectoral framework, the review considers the totality of state policy on encouraging sustainable generation and use of energy. The ultimate basis for the measurement of administrative efficiency and effectiveness will be the ESIOP criteria, in so far as possible (and by comparison with other similar organisations). The context generated from the overall evaluation will then be used to ascertain the appropriateness of the measures taken, their continuing validity and potential future performance indicators. Importantly, while this review deals explicitly with the programmes being run by SEI, it is not a dedicated review of that organisation. Therefore, while the effectiveness of these programmes and the efficiency with which they are being run by SEI are a central part of this review, the organisation itself is not the focus of the review.

Much of the data required for this study is contained in the various official publications emanating from the ESIOP/NDP process, along with publications of the SEI and Commission for Energy Regulation (CER). Additional data was gathered from international summaries and analyses, such as those published by the OECD and International Energy Agency (IEA). More detailed data were gathered through regular contact with the Sustainable and Renewable Energy divisions of DCMNR.

1.5 Structure of the Report

The Terms of Reference adopted for this report are both comprehensive and rigorous in their approach to the subject, covering all of the major areas required of an expenditure review. As a direct result of this they are somewhat broad in their range. Were these topics to be addressed sequentially or even on a thematic basis, the

Review would run the risk of becoming overly long and unnecessarily complex. Instead, and in the context of the discussion above, the following chapter outline is followed.

Chapter Outline

Chapter 1; Context, Terms of Reference and Focus of Review.

Chapter 2; Policy Environment and Context (1)

Chapter 3; Strategy, Rationale and Outline Achievements (2)(3)

Chapter 4; Process and Procedures; Achievements to date. (4)

Chapter 5; Effectiveness and Efficiency (5)(6) (7)(8)

The items of the Terms of Reference to be covered in each chapter are those in parentheses.

Chapter 2

2.1 Introduction

Like any other comparable programme of Government spending, the Sustainable Energy Priority of the ESIOP owes its genesis to a number of factors. Pressing among these was the requirement to reduce emissions of certain gasses due to increased international concerns about their role in encouraging global warming. Additionally, Ireland's dependence on imported energy has been a matter of concern, not least due to historical price volatility and the impacts of this on the Irish economy.

This chapter explains the context within which the ESIOP criteria were established, including previous policy initiatives in this area and the impact of international developments. The rationale for the form of government intervention used is also explored, as are the precise objectives by which these challenges are to be met. Before this however, the precise policy context has to be established by reference to the relevant EU and national legislation, along with any pertinent international agreements. The precise modalities of Departmental strategy are dealt with in Chapter 3, as are the ongoing relevance and validity of the objectives.

2.2 Policy Context

As in many areas of infrastructure provision in Ireland, rapidly growing demand for energy due to economic and demographic expansion has put pressure on existing supply mechanisms. The difficulties associated with meeting this growth in demand for energy products are compounded by the international movement towards a reduction in emissions (codified by the Kyoto protocol) and a volatile international market for energy. Internationally, there have been two separate but related approaches to these problems, one has been a drive for greater energy efficiency across different types of users, and the other has been an increased emphasis on renewable sources of energy. The means chosen in Ireland reflect this consensus.

The Green Paper on Sustainable Energy, published in 1999, established a framework for energy efficiency policies in Ireland. It highlighted the measures necessary to promote efficiency in all energy consuming sectors and set targets for the increase in renewable energy capacity. Specifically, it established Ireland's plans to increase electricity generation capacity from renewable sources by an additional 500 MW by

2005, with wind energy being the dominant technology used. This was expected to increase green energy production towards 12% of total generation and account for 10% of the required emissions reduction needed to meet Kyoto commitments. This target was increased with the outcome of negotiations on the Renewable Energy Directive (2001/77/EC) which increased Ireland's target for consumption of electricity from renewable energy sources to 13.2% of total electricity consumed nationally by 2010.

2.2.1 Legislation & Directives

This section deals with the most pertinent of the various pieces of legislation and EU Directives that influence current policy in the energy sector in Ireland. A brief discussion of these is necessary at this point because of the formative role these have had on several of the programmes of SEI. A more complete listing of the relevant legislation is contained in Appendix 3.

The Energy Rating of Buildings Directive (2002/91/EC) requires certification of the energy rating of residential and non-residential buildings. It is due to come into force in 2006, and DCMNR and The Department of Environment, Heritage and Local Government are currently developing an implementation plan for the transposition of the directive. The directive will require enhanced energy efficiency standards for new buildings, the certification of energy rating for all buildings offered for sale or rent along with an inspection scheme for climate control systems.

The EU Directive on the promotion of '*Renewable Energy Sourced – Electricity*' or '*RES-E*' (2001/77/EC) includes individual indicative targets for the increased consumption of RES-E in each member state. In the case of Ireland the indicative target is 13.2% by 2010.

The *Emissions Trading Directive* (2003/87/EC) establishes the European Emissions Trading Scheme (EU ETS), the world's first multi-national emissions trading scheme. The initial pilot phase began on January 1, 2005 and will run up to 2007. The second phase will incorporate the Kyoto Protocol commitment period and will run from 2008-2012. The scheme will initially only apply to those installations above a certain threshold and to emissions of CO₂, though other greenhouse gases and sectors may be

incorporated into the scheme at a later date. In Ireland this will cover all fossil fuel power generation stations and approximately 70% of CO₂ emissions from the industrial sector. It will follow a cap and trade approach with installations being allocated a set amount of allowances which they must either surrender at the end of the trading period or instead buy additional allowances on the market to cover their shortfall.

2.2.2 International Agreements

The primary international agreement that influences Government policy in the Energy sector is the Kyoto Treaty. The Kyoto Treaty was drawn up in Kyoto, Japan, in 1997 to implement the United Nations Framework Convention for Climate Change. It legally binds industrialised nations to reduce worldwide emissions of greenhouse gases by an average of 5.2% below their 1990 levels by the period 2008-2012. The withdrawal of the USA from the treaty in March 2001 considerably complicated its introduction. However, a compromise was reached four months later, with nearly 180 nations opting for a scaled-down version of the treaty. In autumn 2004, the Russian Federation agreed to ratify the treaty, thus bringing the number of acceding countries above the threshold required in the treaty and ensuring its viability.

Ireland ratified the Protocol in May 2002 and, as a result of the EU Burden Sharing Agreement, agreed to limit its greenhouse gas emissions to 13% above 1990 levels (to 60.74 Mt CO₂ equivalent). However, without action it is projected that net annual emissions will increase by up to 37.3% (to 73.794 Mt CO₂ equivalent) by 2010. As it stands, current emissions of greenhouse gases are 31% above 1990 levels.

There are mechanisms bound within the Treaty designed to penalise nations that remain unable to meet the targets outlined in the Treaty. These penalty clauses may include direct fines levied per Mt of CO₂ by which the nation exceeds its emissions levels.

The National Climate Change Strategy (NCCS), published in November 2000, sets out the Government's approach to ensure Ireland meets its Kyoto target over a ten year framework. The strategy identifies a range of sectoral and cross-sectoral measures aimed at achieving reductions in carbon emissions. The NCCS is currently

under review and this will include an update of the projections for greenhouse gas emissions, as well as a cost/benefit analysis of the actions and measures set out in the strategy. Nevertheless, it is clear that the restrictions imposed on Ireland by the Kyoto Treaty will continue to be a major influence on future policy developments in the Energy sector in Ireland, ensuring a continued requirement for measures to reduce ‘greenhouse gas’ emissions. This is of relevance to part of the second term of reference, that of the ongoing validity of the objectives of the Sustainable Energy Priority. This is referred to again in the next chapter, however, given the ongoing nature of the Kyoto Treaty and concerns about global warming, the objectives of this Priority are likely to remain valid well into the future.

2.3 Policy Evolution

Given that this review examines the success, or otherwise, of the Alternative/Conservation of Energy Scheme with regard to the ESIOP criteria, it is first of all necessary to explain the evolution of the Sustainable Energy Priority of the ESIOP, and place this evolution in its institutional context.

2.3.1 The EIOP, 1994-1999

The Economic Infrastructure Operational Programme (EIOP), which ran from 1994-1999, contained an Energy Efficiency Measure. In order to deliver on this programme, the Irish Energy Centre (IEC) was established under the auspices of Forfás. Along with its core role of delivering the Energy Efficiency Measure, the IEC was also assigned an information and support function with regard to renewable Energy.

The EIOP funded two types of measure in the Energy area, direct and indirect. The direct measures were co-funded by industry and offered financial support for energy audits and energy efficient investments. Indirect measures had a wider application and covered information, advice and support (including the establishment of the IEC itself). According to DCMNR’s Final Report on the EIOP⁴, the Energy Efficiency Measure ultimately covered a range of activities, including:

- Energy Audits,

⁴ Published 17th February, 2003

- Energy Efficiency Investment Support Scheme (including special call for large scale Combined Heat and Power (CHP)),
- Self Audit Scheme for industry,
- Technical Advice,
- Backup, promotion and information measures,
- Grant Support for Combined Heat and Power projects (new scheme arising from reallocation of aid within the measure following on from the Mid-Term Review and administered by the Department of Public Enterprise),
- Energy Awareness Week,
- Boiler Awards,
- Other initiatives to support and promote energy efficiency

In total, a sum of €69,837,503 was spent under this measure in the period 1994-1999. The specific schemes provided during this time are set out in Appendix 1.

The AER schemes (I to VI) are covered at the end of this chapter.

2.3.2 Inception of the NDP/ESIOP

The National Development Plan was preceded by an ESRI compiled analysis of the national requirements under the future NDP. This document, entitled “National Investment Priorities for the Period 2000-2006” (published in 1999), laid out an analysis of those sectors requiring investment, and of the most suitable means of redressing those infrastructural deficits. The treatment of both the renewable and energy efficiency areas is brief, and recommends a reduction in spending on energy as a whole. It is pointed out however (p.250) that there is evidence to suggest that there is some element of market failure in the energy efficiency area, but that the (then) current programme was not fully satisfactory in addressing it.

2.3.3 The ESIOP and the Sustainable Energy Priority

The Economic and Social Infrastructure Operational Programme (ESIOP) is the successor to the EIOP. It was prepared in the framework of the National Development Plan (NDP) and the Community Support Framework (CSF), and was aimed at redressing a number of infrastructural deficits. The programme provided for, at its inception, a total of €26.018 billion in six priorities. Of these, the Sustainable Energy

Priority was the smallest in terms of investment, with €222.52 million scheduled for investment during the time period involved. An additional €43.42m of ERDF funding was also planned for the sub measure. It is worth noting, by contrast, that in the 7 years from 1994 to 2000, a total of just under €70m was spent. The figures involved in the ESIOP, from the outset, were several times that.

The ESIOP noted that the Irish energy market is characterised by “increasing demand, scarce indigenous sources of energy, a high dependence on imports for our energy supply and limited interconnection”. The demand growth experienced between 1980 and 1998 was quantified at 58% and was projected to increase by a further 32% by 2010. Following this analysis, and in this context, the objectives of the Sustainable Energy Priority were established. These were:

- The development and implementation of an intensified energy conservation/efficiency programme,
- The promotion of alternative energy sources.

These outline objectives were to be met through the two following specific measures:

- (a) an energy conservation measure,
- (b) an alternative/renewable energy measure.

Energy Conservation Measure

This measure was established to focus on:

- intensified energy conservation/efficiency programmes to be delivered through an enlarged Irish Energy Centre (€46.81 million)
- energy conservation research, decentralisation and development activities (€36.67 million)
- an energy conservation initiative for pre 1980 housing/public sector buildings (€72.21 million)

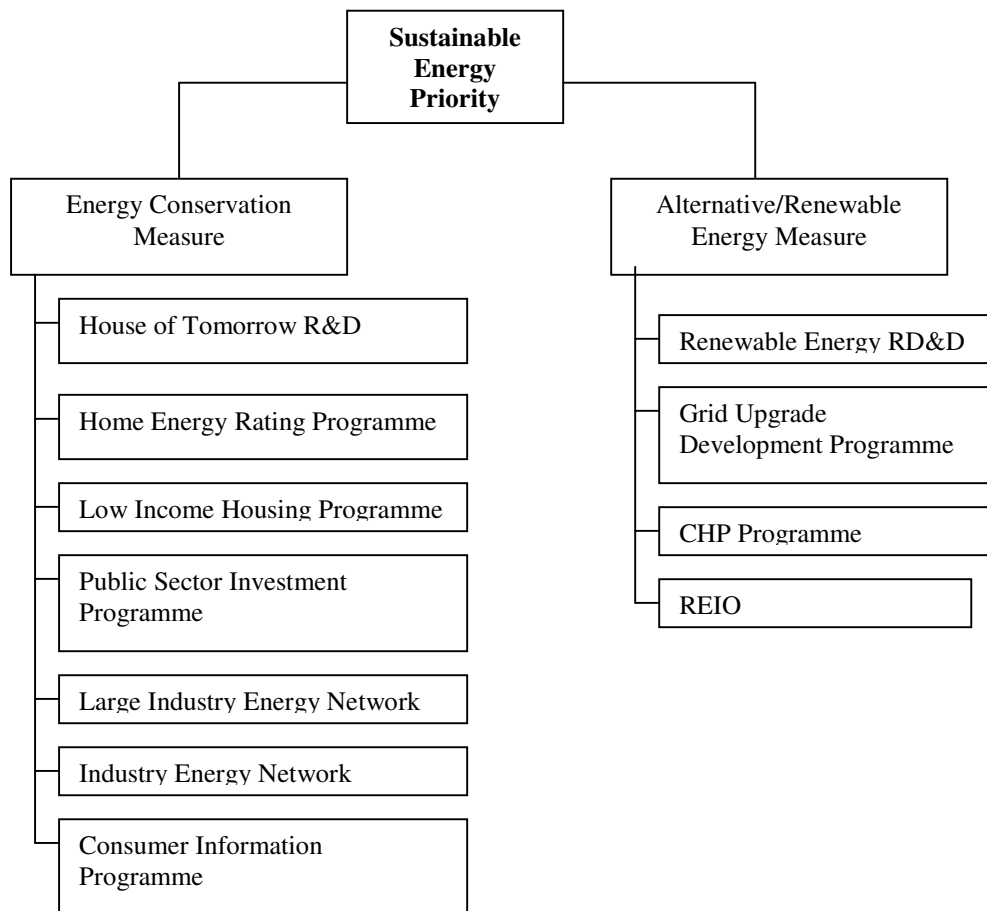
Alternative/Renewable Energy Measure

This measure was established in the context of a decision to significantly increase the contribution of renewable energy sources with a working target of 500MW in the period 2000-2005. It was envisaged that the programme would aim to do the following in order to support the delivery of this objective:

- “Facilitate the strategic reinforcement and upgrading of the electricity network in order to redress the weaknesses and grid constraints to accommodate connection of renewable energy projects. This capital investment is additional to the extensive rural network renewal programme currently being undertaken by ESB.
- Support the delivery at least cost of an additional 500MWe of renewable energy based electricity generating plant compared to conventional capacity of the order of 4,000MWe in the period 2000-2006.
- Encourage new entrants to the renewable energy market by (i) offering additional support to a limited number of small scale projects in proven technologies and (ii) providing selective support for feasibility studies.
- Increase peripheral confidence in the sector, e.g. among finance houses and retail customers, and further awareness in the capital markets of the new investment opportunities in renewable energy.”

As already noted, the amounts to be spent under the Sustainable Energy Priority of the ESIOP were much greater than the funding spent on the area under the EIOP. Moreover, the ESIOP brought with it a number of new programmes, each of which had to be initiated while existing schemes were being expanded.

The programmes currently run under the Sustainable Energy Priority are laid out in the diagram below. Critically, since the ESIOP was drawn up, SEI has used a different categorisation of the measures for logical administrative reasons. For similar reasons, it is the later structure that is adhered to for this review. Further details of this are included in the next chapter. Full details of all measures run by SEI under the Sustainable Energy Priority are included in Appendix 2.



2.3.4 Mid Term Evaluations, NDP/ESIOP

The Mid Term Evaluation of the NDP (conducted by the ESRI in 2003) took note of the progress of the Sustainable Energy Priority and made recommendations on future spending under each heading.

On the Conservation Measure, the ESRI noted that expenditure to end 2002 was €17.4million (as opposed to the €44.5million programmed for that point) and that *“This Priority is significantly behind target in expenditure terms, and physical delivery is even further behind”*. The ESRI also pointed out (in its final report to the Dept of Finance) that grant aiding energy conservation in the private sector is not justified *“... unless there are identified market failures that cannot be easily corrected”*. It went on to suggest that a carbon tax should be used to correct any externality ensuing from an inappropriate energy price. The report suggested that, while the spending on the Conservation Measure should be preserved at programmed levels, the spend on the Alternative Energy Priority should be reduced, and *“... where*

strengthening of the transmission and distribution system is suggested, the appropriate approach will be determined by the regulatory authorities, with the costs carried as part of use of system charges”.

Critically, this analysis of the Sustainable Energy Priority of the ESIOP was conditioned by the assumption that a carbon tax would be introduced in Ireland, thus correcting the externality associated with energy prices that were cheaper than their ‘real’ cost to the state. However, it was announced on 10th September 2004 that such a carbon tax would not be instituted in Ireland. This fundamentally affected the Sustainable Energy Priority. Its measures were largely structured to ‘support’ change, and were to rely upon a carbon tax to provide the economic push towards greater energy conservation. The absence of such a tax is a central factor in this review.

A separate Mid Term Evaluation of the ESIOP was also carried out by Indecon International Economic Consultants and published in September 2003. This was a more detailed evaluation of the ESIOP. The report placed similar emphasis on the degree of under spending on the Conservation Measure, noting also that physical progress indicators, were, in general, not being met. The ESIOP Review pointed particularly to the fact that only 39% of the allocated capital had been spent in the required time-frame.

The picture then, up to end 2002, is of significant under spending in the Sustainable Energy priority. While the precise modalities of progress under the Measure are considered in the next chapter, it is important to note that, by the mid point of the ESIOP, progress in meeting targets was slow and questions had been raised over the choice of methods being used to address the issues in question.

Following the Mid Term Review, the total planned investment for the Sustainable Energy Priority was revised downward from €222.52m to €117.08m. SEI submitted a 3 year plan in 2004, outlining how they would fully absorb and spend the remaining €88.80m (and draw down the ERDF component of €10.74m). A Service Level Agreement/Performance Contract was also agreed between SEI and DCMNR in which delivery of the various programmes under the ESIOP are key factors.

2.4 The Rationale for Government Intervention.

The 1999 Green Paper on Sustainable Energy set out (in Sections 4.2 and 4.3) an analysis of Market Failure in Energy Markets. The two market failures of direct relevance to the subject covered in this expenditure review are those of 'Public Goods' and 'Externalities'. Public Goods are those goods which, by dint of their being non excludable and non rival, private concerns have little interest in providing. The main examples of public goods in terms of energy markets are the provision of information (on energy conservation *and* on opportunities in generation) and on fundamental research and development.

Externalities occur where the value of 'goods' as priced by the market does not take into account the full costs and/or benefits associated with them. An example of this in the energy sector is the fact that atmospheric emissions of CO² may impose costs that are not taken into account when the fossil fuels concerned are priced (by the market). Government may choose to redress this by adding a tax to energy products in order to price this externality.

According to the Green Paper, this analysis of market failure informs the approach taken by the policy in suggesting remedies for a range of these failures. The Green Paper goes on to set out, in a series of conclusions in Chapter 5, the suggested courses of action to be taken to redress these market failures. Each of these conclusions is thus backed up by an argument based on the analysis of market failure. In turn, each of these recommendations are met by the various programmes laid out under the ESIOP (see above), and are thus reflected in the activities of the SEI. There has been a coherent approach to sustainable energy policy in the state, with policy initiatives laid out at Green Paper stage being integrated, successively, in the ESIOP of the NDP and the work of the SEI. There is both consistency and an internal logic to the approach taken. The ESRI concur with the Departmental description of the programmes in question. In the Mid-Term Review of the 1994 to 1999 CSF, it pointed out that the programmes covered by the Alternative/Conservation of Energy scheme could be classified as public good and corrective subsidy type interventions.

The energy conservation measure then, was established (as was its predecessor) to deal with a number of market failures, each a barrier to greater energy efficiency or

provision of greater amounts of energy from sustainable means. The case of domestic energy efficiency is a particular example. Clinch and Healy (1999) outline 5 processes which operate to slow progress towards greater energy efficiency in Irish households. This was done in the context of a study carried out by Brophy (1999) which concluded that a programme of energy conservation measures costing €1,601m would result in a net social benefit of €3,124m, with an internal rate of return of 33%.

The barriers outlined by Clinch and Healy were as follows⁵;

Private vs Social benefits: The private benefits of energy efficiency are small relative to the national or collective benefits. In this sense, energy efficiency has some of the characteristics of a ‘public good’.

Market Interest Rate vs Social Interest rate: The Social Interest Rate, generally taken to be 5% for the sake of public policy analyses, differs substantially from the market rate. Thus the rate used in a social cost benefit analysis is generally less than the rate at which individuals can access capital. If the difference between the two rates is of a certain level, then it makes no financial sense for the private individual to invest in the efficiency measures.

Socioeconomic considerations: The least energy efficient households are more likely to be lower income households, and are therefore less likely to either have access to funds or to be prepared to borrow for this purpose.

Information gap: One of the primary reasons for a lack of uptake of financially viable conservation measures is the lack of information on the subject, a gap that is likely to be even wider in low income houses.

Transaction costs: There are substantial fixed costs associated with learning about and administering energy conservation measures. The difficulties associated with locating contractors to do work, to administer and oversee it, and in dealing with the disruption of installing these measures all act as barriers to the installation of energy conservation measures

Property Rights Failure: Experiences in the UK suggest that some of the least energy efficient houses are tenant occupied, and research in Ireland would appear to confirm that trend.

⁵ Clinch and Healy (1999) Domestic Energy Efficiency in Ireland: Correcting Market Failure, pp6-9.

Many of the programmes of the Energy Conservation/Efficiency sub measure of the Sustainable Energy Priority exist to tackle these specific barriers to greater energy efficiency and to remedy the market failure through state intervention. In many ways, an analysis of the effectiveness and efficiency with which this is done forms the basis of this expenditure review. Critically, it must be borne in mind that the programmes laid out in the ESIOP owe their origins not just to an evolution of the previous national plan (EIOP), but also to other developments, both within Ireland and the EU, and in the wider international context. In that regard, it is not possible to merely examine the ESIOP in isolation, reference must be made to the broader context.

This debate over the ideal methods of addressing these market failures must be conditioned by a cognisance of the importance of two facets of state involvement in markets, *Deadweight* and *Displacement*. ‘Deadweight’ is activity that would have occurred regardless of the intervention, in other words, in the context of sustainable use of energy, it is that conservation behaviour that would have occurred in any case due to energy prices (or that additional generation capacity provided for the same reason). ‘Displacement’ refers to activity which has been displaced by the operation of the programme. These are critical because they inform the discussion on the precise effect the chosen method of redress has on the market. These are examined in greater detail in Chapter 5, as part of the discussion on whether or not alternative methods could be used to achieve the objectives of the sustainable energy priority. Another effect that is pertinent to this review is that of *Additionality*, defined in the UK Treasury ‘Green Book’ as “The success of government intervention in terms of increasing output or employment in a given target area”. It is “a ‘supply side’ or ‘structural’ impact, which operates by altering the productive capacity of the economy”⁶.

There is one further rationale for government intervention in this case. Concerns over security of supply and the reduction of dependence on imported (and price volatile) energy sources have been a constant in Irish energy policy. Problems arise, however, when attempting to quantify the economic benefits of measures taken to reduce risks

⁶ <http://greenbook.treasury.gov.uk/annex01.htm#additionality>

in this area. On this basis, it is generally not figured in the calculations of benefit associated with renewable energy.

2.5 Sustainable Energy Ireland

The Sustainable Energy Act 2002 provided for the establishment of the Irish Energy Centre as an independent statutory body under the aegis of the Minister for Communications, Marine and Natural Resources, as recommended in the *Green Paper on Sustainable Energy*. This also meant that, for the first number of years of the ESIOP, the IEC did not have statutory status or powers. As discussed above, the role of the IEC was substantially enlarged on the inception of the NDP/ESIOP, with a larger number of programmes introduced by comparison with the previous EIOP. These programmes were generally introduced to deliver more focused responses to the market failures outlined above by building on the experience gained under the EIOP. It was only in 2002 that SEI, on its institution as a statutory body, received the powers to carry out much of its work.

Currently, SEI is structured as follows:



Full details of the programmes currently run by SEI are included in Appendix 2.

2.6 AER Programme

The AER programme was introduced to increase the contribution from renewable energy technologies in electricity production in Ireland, with the first such competition being held in 1995. It is a competitive tendering process for rights to sell electricity produced from renewable energy sources to the ESB for up to fifteen years at guaranteed prices. There have been six competitions to date. Applicants with the lowest bid price in different technological categories (e.g. onshore wind, offshore wind, hydro, biomass etc) are selected up to a designated capacity threshold. This discussion of the AER programme is necessary because of the fact that the success (or otherwise) of the Sustainable Energy Priority is inextricably bound up with this programme.

To recap briefly, the Alternative/Renewable Energy sub measure of the Sustainable Energy Measure was established in the context of a decision to significantly increase the contribution of renewable energy sources with a working target of 500MW in the period 2000-2005. It was envisaged that the programme would *support* the delivery of this objective by a variety of means, *to wit*:

- Facilitate the strategic reinforcement and upgrading of the electricity network
- Support the delivery at least cost of an additional 500MWe of renewable energy based electricity generating plant
- Encourage new entrants to the renewable energy market by offering additional support to a limited number of small scale projects and providing selective support for feasibility studies.
- Increase peripheral confidence in the sector

Section 39 of the Electricity Regulation Act 1999 allows the higher costs of electricity from sources supported by the AER programmes to be passed on to final customers in the form of a public service levy. While this means that there is no direct cost to the exchequer of running the AER programmes the inputs used by the programme must still be identified.

These costs, therefore, are recouped as follows. The amount of the levy is determined on the basis of a hypothetical ‘best new entry’ generating plant of a conventional type,

producing power at €48/MWh. In 2003, the CER calculated that the net additional costs incurred by the ESB from the AER contracts would be €6.57 million. Also, the PSO levy as passed on to energy consumers includes those additional costs incurred from peat power generation. Once administrative costs are split proportionately, peat accounts for 85.6% of the PSO levy while AER purchases account for 14.4%. When reduced to the level of the individual consumer, this means that for a domestic profile customer, of a PSO levy of €11.49 per annum, €1.66 is paid to sustain the AER programmes⁷.

AER I scheme

Under the first AER scheme, the following facilities were added to the network:

- 7 wind energy (45.8MW)
- 6 small scale hydro (2.304MW)
- 4 CHP (10.716MW)
- 5 landfill gas (11.804MW)

AER II scheme

The technology supported in this scheme was waste-to-energy. The competition which aimed to secure one biomass/waste fuelled electricity generating plant of between 10 and 30 MW of installed generation capacity was held in 1996. An application to build, own and operate a 30 Megawatt plant at a site in north Dublin was the winner of the competition. However, the project did not proceed.

AER III scheme

The technologies supported in AER III were large scale wind (over 5 MW capacity), small scale wind (under 5 MW capacity), biomass (landfill gas), small-scale hydro and wave energy. The following table illustrates the projects which went ahead under this scheme:

⁷ From IEA 2003 Review of Irish Energy Policy

Table 2.1 Projects Contracted under AER III

Category	Target	Contracted
Large wind (over 5MW)	65 MW	100.82 MW
Small wind (under 5MW)	25 MW	36.51 MW
Biomass/Waste	7 MW	17 MW
Small scale hydro schemes	3 MW	4.42 MW

AER IV scheme

The technology supported in AER IV was Combined Heat and Power (or CHP). The competition was launched in September 1997. The purpose of the competition was to secure 25MW of newly installed additional electricity generating capacity from high efficiency CHP systems and up to 10MW of additional electricity generation capacity from existing similar systems. The results of the competition were announced in August, 1998. 19 projects were selected to receive the offer of a Power Purchase Agreement with the ESB - 17 new projects (totalling 45 MW) and extensions to 2 existing projects (7.6MW).

Following the announcement of the results, a number of developers decided at that stage not to proceed with their projects. Altogether three new plants and two existing plant extensions were commissioned representing a total installed capacity of 18.353MW.

AER V scheme

The technologies supported in AER V were large scale wind (over 3MW capacity), small-scale wind (under 3MW capacity), small-scale hydro and Biomass (landfill gas). The competition was launched in May 2001 and the results were announced in February, 2002. The following table illustrates the capacity offered under this programme:

Table 2.2 Capacity offered under AER V

Technology	Capacity Cap (MW)	Capacity offered (MW)
Large scale wind	200	318.3
Small scale wind	40	35.795
Hydro (small-scale)	5	0.949
Biomass (including Landfill Gas)	10	8.008
Totals	255	363.052

AER VI scheme

As a number of fiscal incentives used by renewable energy developers to attract investment in their AER V projects were no longer available, these applicants were allowed to submit fresh bids in AER VI (which was launched in February, 2003)

A total of 48 contracts, amounting to 365 Megawatts of capacity were offered to the market including - for the first time - two 25MW offshore wind demonstration projects. A further 140MW of capacity was allocated at a later stage.

The AER Scheme must be contextualised with reference to a number of other issues however. In December 2003, the Commission for Energy Regulation (CER) decided, as an interim measure, that the electricity network operators, ESB and ESB Networks were not required to offer new binding connection offers for wind farms. This was due to concerns expressed by the grid operators about system stability and reliability. This decision did not affect the 600MW of windfarms that had already received connection offers. Following this decision, the CER requested that the network operators address specific issues which had arisen around wind energy access to the national grid. This was resolved in December 2004 when CER approved a revised connections regime.

There are also two other support mechanisms in place to encourage investment in sustainable energy generation. These are;

- **Section 486B of the Finance Act 1998** offers tax relief for corporate investors in renewable energy projects. These are effected through deductions in company profits for investment in new shares in a qualifying company. Benefits have diminished with reductions in Corporation tax over the last number of years.
- The **Business Expansion Scheme (BES)** allows individual taxpayers to write off qualifying investments against personal income where the investment is in renewable energy projects. This scheme is of particular interest to small scale projects. The aggregate that a company can raise was increased under the Finance Act 2004 from €750,000 to €1m.

Given the difficulty in obtaining precise information on these schemes, and their likely minor impact on the sector as a whole (particularly given the fact that this is just one of a wide range of sectors benefiting from tax credits), it is not proposed to include these schemes in the analysis.

Chapter 3

3.1 Introduction

This chapter details the precise courses of action pursued by DCMNR and lays out the achievements of the relevant programmes to date. In this context, the continuing validity of the objectives is assessed, as is their compatibility with the overall strategy of DCMNR. This chapter has the following structure. First of all, current departmental strategy with regard to sustainable and renewable energy is outlined, and the ESIOP Sustainable Energy Priority as described in the previous chapter is related to these. Then the AER programme is summarised and contextualised with reference to the ESIOP targets.

The current status of the programmes being run under this priority of the ESIOP is then evaluated on the basis of both spend to date and physical indicators of progress. This is done with particular reference to the most recent Departmental Progress Report (December 2004) on the Sustainable Energy Priority.

3.2 Departmental Strategy

The Department of Communications, Marine & Natural Resources is the Government Department with primary responsibility of implementing energy policy in Ireland. The Department's latest strategy statement, covering the period of 2002-2005 lays out the Departmental objectives for the Energy sector. These objectives are split between core policy goals and strategic objectives and are as follows;

Core Policy Goals

- The development of competitive, efficient and properly regulated energy markets, which provide customers with a choice of energy services and support sustainable economic growth.
- The protection of security of energy supply.
- Ensuring that energy supply and use are environmentally sustainable.

Strategic Objectives

1. Ensure that the needs of customers and industry are better met through the promotion of market liberalisation and the development of effective independent economic regulation.
2. Ensure effective corporate governance of the energy State bodies so as to protect shareholder interest and contribute to national economic development.
3. Ensure that measures are in place so that the nation's energy infrastructure better meets customer and industry needs, that the electricity grid does not act as a constraint on economic development and that the energy sector contributes to the Government's objectives of promoting regional development and enhancing social inclusion.
4. Ensure that effective measures to protect security of energy supply are in place.
5. Capture the opportunities opened up by the peace process for greater competitiveness and efficiency through North/South economic cooperation.
6. Ensure that the Energy Sector meets the environmental obligations associated with its energy production and use and contributes towards sustainable development.

Strategic Objective 6 clearly refers directly to the sustainable energy priority, while Objectives 3 and 4 have at least a bearing on it. These are the relevant elements of DCMNR's strategy with which the objectives laid out in the ESIOP have to be assessed against on the grounds of compatibility (as per #2 of the Terms of Reference). The outline objectives of the Sustainable Energy Priority of the NDP (the development and implementation of an intensified energy conservation/efficiency programme and the promotion of alternative energy sources) remain entirely *ad idem* with Departmental strategy. As such, Departmental strategy forms a coherent and

unified whole with those targets laid out in the ESIOP, and the methods chosen to achieve them.

The second term of reference also states that this review should examine the current validity of the objectives of the Sustainable Energy Priority. In short, the objectives remain entirely valid. The diverse challenges which this sub measure of the ESIOP were designed to address, reducing carbon dioxide emissions and reducing energy import dependence are both as pertinent to public policy in 2005 as they were in 2000. If anything, due to the increasing cost of energy and the rapidly growing (and increasingly energy intensive) Irish economy, the objectives have become increasingly important and relevant since they were framed.

3.3 Level and Trend of Outputs

The Terms of Reference for this Expenditure Review (#3) require that outputs associated with the Alternative/Conservation of Energy programme be defined and that the 'level and trend' of these outputs be identified. The objectives of this programme are outlined in Chapter 2 (in Section 2.3.3). An analysis of the physical target indicators, and progress made in reaching them, is included at the end of this chapter.

Due to the fact that all ESIOP/NDP programmes are subject to a range of formal reviews and evaluations, and a regular and ongoing reporting process, substantial data is available on the subject of the material outputs of this programme. For the purposes of this section, the most important of these is the most recent Progress Report (to end December 2004).

Taking the figures for the entirety of the project to begin with, it is clear (see Figure 3.1 below) that spending on the Sustainable Energy Priority is running far below that intended. Critically also, this Progress Report notes that SEI spent all of its budget for 2004 (more accurately, it spent €468,000 more than its budget, but recouped the additional cost through income from non-exchequer sources). It is apparent that the full amount budgeted is being spent by SEI, but that those funds budgeted for and not spent in previous years are not being spent.

The remainder of this section takes the following format. The two specific measures of the Sustainable Energy priority (energy conservation measure and alternative/renewable energy measure) are taken separately and assessed on the basis of resources expended. The physical indicators are then evaluated in the same order.

**Figure 3.1. Total Expenditure, Sustainable Energy Priority
(January 2000 to December 2004⁸)**

<i>National €m</i>	<i>Total NDP</i>	<i>Total CSF</i>	<i>ERDF AID</i>	<i>National Public</i>	<i>Private</i>
Exp. 2000	3.691			3.691	
% of OP Forecast	114%			114%	
Exp. 2001	4.728	0.023	0.014	4.705	
% of OP Forecast	38%			38%	
Exp. 2002	9.284	1.224	0.684	8.060	
% of OP Forecast	35%	13%	11%	47%	
Exp. 2003	13.360	2.242	1.221	11.118	
% of OP Forecast	30%	13%	12%	40%	
Exp. 2004 €m	14.208	3.870	2.125	10.338	
% of OP Forecast	29%	24%	21%	32%	
Total cumulative exp. 01/01/00 – 31/12/04 €m	45.271	7.359	4.044	37.912	
% of OP Forecast 2000- 2004	33%	16%	14%	42.66%	

3.3.1 Energy Conservation Measure

A total of €42.30 million has been spent under the Energy Conservation measure in the period 2000-2004. The original ESIOP forecast during the period to December 2004 was €87.62 million. Budgets in this measure were adjusted after the Mid Term Review and the remaining allocation will amount to €83.52 million over the entirety of the period. Thus approximately 50.6% of the adjusted allocation had been spent by end 2004.

Full expenditure of the allocated budget for the Energy Conservation Measure was achieved for the year 2004. The budget allocation for the Sustainable Energy Priority

⁸ NB, for reference, the 'OP forecast' figures included in these tables refer to the original ESIOP programmed spend

for 2004 was €13.74 million with the Energy Conservation Programme accounting for the major part of this.

**Figure 3.2 Cumulative Expenditure 1 January 2000 to 31 December 2004
Energy Conservation Measure**

€ Millions	Total ESIOP spend	Total CSF spend	ERDF AID	National Public	Private
National Total					
Expn. 01/00-12/04	42.301	4.658	2.608	37.643	
OP forecast 2000-2004	87.620	6.885	4.077	80.733	
Expn. As % of OP Forecast 2000-2004	48%	68%	64%	47%	
BMW					
Expn. 01/00-12/04	4.951	1.117	0.838	3.834	
OP forecast 2000-2004	20.461	2.537	1.903	17.923	
Expn. As % of OP Forecast 2000-2004	24%	44%	44%	21%	
S&E					
Expn. 01/00-12/04	37.350	3.541	1.770	33.809	
OP forecast 2000-2004	67.159	4.348	2.174	62.811	
Expn. As % of OP Forecast 2000-2004	56%	81%	81%	54%	

**Figure 3.3 Expenditure 1 January 2004 to 31 December 2004
Energy Conservation Measure**

€ Millions	Total ESIOP spend	Total CSF spend	ERDF AID	National Public	Private
National Total					
Expn. 01/04 – 12/04	13.408	3.070	1.715	10.338	
OP forecast 2004	32.293	2.843	1.609	29.449	
Expn. 2004 as % of OP Forecast 2004	42%	108%	107%	35%	
BMW					
Expn. 01/04 – 12/04	1.695	0.719	0.539	0.976	
OP forecast 2004	8.173	0.749	0.562	7.423	
Expn. 2004 as % of OP Forecast 2004	21%	96%	96%	13%	
S&E					
Expn. 01/04 – 12/04	11.713	2.351	1.176	9.362	

OP forecast 2004	24.120	2.094	1.047	22.026	
Expn. 2004 as % of OP Forecast 2004	49%	112%	112%	43%	

3.3.2 Built Environment Sub-Measure

Home Energy Rating Programme

This programme has been refocused on assisting DEHLG and DCMNR to enable Ireland to meet its obligations under the Energy Performance in Buildings Directive as they apply to all building types. During the course of 2004 SEI initiated work with DEHLG, NSAI and a number of international consortia to establish a framework for calculating the energy performance of a building (both residential and non-residential), and to develop a certificate of energy performance for all buildings that are constructed, sold or rented.

SEI has provided the secretariat to the interdepartmental working group on the Energy Performance of Buildings Directive. The draft for consultation was completed in February 2005. SEI has also funded the development of audit and reporting software for the Directive.

Low Income Housing Programme

The NDP set a target of 12,000 homes to be rated by the end of 2003. However, in light of the fact that the Energy Performance in Buildings Directive (or EPBD) was not issued until 2002, no homes were evaluated by this programme. Instead SEI commissioned several reports such as a validation study of their draft strategy, a comparative assessment of home energy rating schemes across Europe, a review of the Heat Energy Rating calculation methodology and an assessment of the balance of the work necessary to implement the requirements of the EPBD in Ireland.

The expenditure to the end of 2004 was €0.81 million and the outstanding commitments to the end of 2006 are €2.6 million. The number of fuel poor homes improved in 2004 was 1,947, bringing the total to 6,815. The level of intervention – and hence energy and comfort benefits – has been raised in many of the homes now supported.

Eight SEI-funded community-based installers are fully operational. During the summer of 2004, SEI appointed two contractors to manage the operation of the main fund disbursement programme through which energy efficiency measures are installed. The programme was renamed “The Warmer Home Scheme”. Towards the end of 2004 SEI initiated a pilot project through which a model for the engagement of private sector installers will be established.

SEI is partnering with a number of Government departments and agencies in a research project investigating the impacts of undertaking energy efficiency improvements in low income households, from the perspective of health, comfort, temperature, fuel bills, environment and other quality of life issues.

Public Sector Investment Programme

The first of the energy management bureaux, entitled ‘E3’, recently published its annual report for 2004, which demonstrates average energy savings of over 3% per annum. One university (DIT) achieved savings of over 9% per annum. A second application by the Department of Health and incorporating the five Dublin teaching hospitals has now been approved for funding.

In total, 79 Design Studies, 75 Model Solutions and 3 Energy Management Bureaux have been supported to date. The programme is currently closed for applications. The projects / drawdown are currently being managed.

Expenditure to the end of 2004 was **€1.85 million** and there are outstanding commitments of €5.6 million.

3.3.3 R&D Sub-Measure

House of Tomorrow R&D Programme

Thirty three demonstration projects have been supported to date with a total of 1,670 dwellings covered. These include 12 social housing new build projects (579 dwellings), 17 private housing new build (901 dwellings) and 4 social housing refurbishment projects (190 dwellings). In the period to June there were 4 projects approved with a total of 252 dwellings. In the period January to December 2004 there were 22 projects approved with a total of 1,183 dwellings, indicating very significant

programme progress. One thousand, six hundred and seventy (1,670) houses have now been approved, as opposed to the target of 1,650 set out in the NDP.

There are outstanding commitments of €5.5 million, with expenditure to date of €2.05 million. Eight public 'good' research projects and five international collaboration projects have also been funded.

Renewable Energy R&D Programme

This programme saw expenditure of €2.97 million in the year to December 2004, and has net commitments of a further €2.5 million.

Five resource studies were published in 2004. Three wind studies investigating some of the issues around the wind moratorium and the connection of wind energy to the grid were published. A range of wind, wave, biomass, biofuels and solar demonstration projects were also supported and Ireland's first biomass-powered CHP project commenced operation. A total of 75 applications were reviewed in 2003, of which 37 applications were approved for support.

The new programme strategy was launched at the Renewable Energy Summit in September 2004, and the resource studies were presented the same day.

Sustainable Transport R&D

Transport is the fastest growing sector in terms of energy consumption and now accounts for 39.5% of Ireland's final energy demand. Under a 'business as usual' scenario greenhouse gas emissions- mainly CO₂ emissions- from transport are projected to grow by 179% between 1990 and 2010.

Funding allocation for SEI's Sustainable Transport R&D programme is limited. However, it is anticipated that programme elements would include:

- Providing an underpinning R&D programme to support government policies
- Addressing the lack of awareness of the cost of current means of transport and the alternatives

In 2004 the Transport R&D programme funded the demonstration support of €100,000 for a Dublin City Council project aimed at testing LED traffic lights on a large-scale. The use of these lights brings about substantial energy savings, and use only 20% of the electricity compared to a conventional traffic light. The project has seen 1,000 LED traffic lights installed in the city centre. The replication potential is estimated to be at least thirty times the benefit arising from this project alone. Direct savings of €80,000 per annum are expected, and the project is being rolled out to the rest of the city.

3.3.4 Institutional Infrastructure Sub-Measure

The Large Industry Energy Network

To date, the Network, which had a budget for 2004 of approximately €125,000, has saved approximately 410,000 tonnes of CO₂ and 1260GWh. Savings for 2003 were 24,000 tonnes of CO₂ (savings for 2004 are not yet available).

Industry Energy Network (IEN)

The IEN launched the Sustainable Energy Awards 2004 in May of that year. These build on the previously successful Boiler Awards. It is targeting companies with a combined energy use equivalent to 20% of Ireland's energy consumption.

The awards, organised by SEI and sponsored by ESB Customer Supply, encourage, recognise and reward excellence in energy management in the industrial, commercial and public sectors. 2004 was the first year of the awards and 250 nominations were received. In total, eighteen Sustainable Energy Awards were presented across seven categories.

Consumer Information and Marketing Communications

The Consumer Information Programme aims to motivate consumers to become more energy efficient in their daily lives by making them aware of their energy usage and informing them of the simple actions they can take. The programme includes:

- Energy Awareness Week,
- Information and advice through brochures, telephone hotline and exhibitions,
- Consumer behaviour activities,

- Schools initiatives to inform early formation of long-term behaviour and attitudes.

The Energy Show: The biennial SEI Energy Show in 2004 had over 100 exhibitors and 1,200 visitors making it the most successful to date.

Energy Awareness Week: The theme of the 2004 Energy Awareness Week was sustainable heat, which covers a wide range of measures including using renewable energy to heat your home and also being more efficient in how you use your current heating system.

The outputs of this programme included the launch of a new suite of consumer information brochures, attendance at the high profile Ideal Homes Exhibition, participation in European Car Free Day, co-ordinated nationally by SEI and the Department of Environment, Heritage and Local Government. Numerous inspections of retail outlets were also undertaken to ensure their compliance with labelling legislation. Compliance rates were found to generally range from 71% in the case of fridges to 88% for lamps.

Energy Policy Statistical Support Unit: The legislation establishing SEI as a new authority made it responsible for developing and maintaining comprehensive national and sectoral statistics for energy production, transformation and end-use. For this purpose, SEI established the Energy Policy Statistical Support Unit (EPSSU) as a specialist team within SEI.

In the six months to December 2004 the EPSSU has published the following reports:

The Energy and CO₂ in Industry Report,

Renewable Energy in Ireland Report,

Energy and CO₂ in Industry Report: SEI's second industry report, entitled "Profiling Energy Consumption and CO₂ emissions in Industry, 2004 Update (Sensitivity to Energy Price Changes)" was published in October 2004.

The report showed that only 4% of Irish industrial enterprises have energy costs in excess of 5% of their direct costs. It also showed that between 1990 and 2003, industrial output measured by gross value added of industry increased by 226% whereas industrial energy consumption grew by only 28%.

Renewable Energy Report: This report, which included analysis on an all-Island basis, was launched by SEI at the Renewable Energy Summit held by SEI in September 2004.

The report showed that Renewable energy accounted for 1.9% of Ireland's 2002 primary energy requirement. The EU White Paper target is to achieve 12% EU-wide by 2010. It also showed that renewable energy accounted for 5.3% of electricity consumption in 2002. Ireland's target under the RES-E Directive target is 13.2% by 2010.

3.3.5 Alternative Energy Measure

A total of €2.97 million has been spent to date under the Alternative Energy Measure. Of this total, €2.63 million (88%) was spent in the South and East region and €0.34 million (12%) was spent in the Border, Midlands and Western region.

The original Operational Programme forecast during the period to December 2003 was €47.75 million. The Managing Authority reallocated some funding in 2004. The balance of the monies remaining is to be €33.893 million with €5.28 million of this going towards the Heat and Information programmes in this measure.

Ongoing delays in EC DG Competition to sanction State Aids approval for the additional 140Mw capacity under the Alternative Energy Requirement delayed the rolling out of the Alternative/Renewable Energy portion of the Measure, causing obvious delays in the spending of the monies available.

Figure 3.4 Cumulative Expenditure 1 January 2000 to 31 December 2004
Alternative Energy Measure

€ Millions	Total ESIOP spend	Total CSF spend	ERDF AID	National Public	Private
National Total					
Expn. 01/00 – 12/04	2.970	2.701	1.436	0.269	
OP forecast 2000-2004	47.748	39.611	25.748	8.137	
Expn. as % of OP Forecast 2000 – 2004	6%	7%	6%	3%	
BMW					
Expn. 01/00 – 12/04	0.344	0.344	0.258	0	
OP forecast 2000-2004	28.650	23.767	17.826	4.883	
Expn. as % of OP Forecast 2000 – 2004	1%	1%	1%	1%	
S&E					
Expn. 01/00 – 12/04	2.626	2.357	1.178	0.269	
OP forecast 2000-2004	19.098	15.844	7.922	3.254	
Expn. as % of OP Forecast 2000 – 2004	14%	15%	15%	8%	

Figure 3.5 Expenditure 1 January 2004 to 31 December 2004
Alternative Energy Measure

€ Millions	Total ESIOP spend	Total CSF spend	ERDF AID	National Public	Private
National Total					
Expn. 01/04 – 12/04	0.800	0.800	0.410	0	
OP forecast 2004	16.572	13.597	8.665	2.975	
Expn. as % of OP Forecast 2004	5%	6%	5%	0%	
BMW					
Expn. 01/04 – 12/04	0.043	0.043	0.032	0	
OP forecast 2004	9.250	7.465	5.599	1.785	
Expn. as % of OP Forecast 2004	0%	1%	1%	0%	
S&E					
Expn. 01/04 – 12/04	0.757	0.757	0.378	0	
OP forecast 2004	7.322	6.132	3.066	1.190	
Expn. as % of OP Forecast 2004	10%	12%	12%	0%	

There are three programmes under the Alternative Energy Measure: the Grid Upgrade Development Programme, which is run by DCMNR with assistance from SEI, the CHP Programme and the Renewable Energy Information Office, delivered through SEI.

Grid Upgrade Development Programme

The funding mechanism for the Grid Upgrade Development Programme was revised following the Mid Term Review of the ESIOP/NDP. Total funds identified for the Grid programme (included above) are now €28.61 million. This will be expended in the period up to the end of 2006. The programme is now intended to be rolled out using co-financing through Transmission Use of System Charges (TUoS) as agreed by the CER.

This €28.613 million is comprised of €10.97m in co-funding from the TUoS and €17.604 million in funding from the post Mid Term Review of ESIOP. This funding is sourced from the ERDF.

Work is proceeding on a 40 MW facility at Corderry. There have been 6 notified planned connections with a combined capacity demand of 34 MW. The GUDP was to invest €5.72 million by mid-2005 on this cluster.

In December 2004 the CER issued a decision on the future processing of grid connections. Since the lifting of the moratorium in December 2004 an interim report has identified three strategic sites suitable for GUDP investment, and outlined the amounts of investment required. These sites were Ballycadden (Wexford/Wicklow-€7.3m), Trillick (Donegal-€4m) and Muignaminnane (Kerry/Limerick-€ 4.2m). These costs are additional to the Corderry investment. The finalised work programme, which was due by end March 2005, was expected to exceed the available fund. This timeframe is reasonable given that the moratorium was only lifted in December 2004 and an iterative process between developers and ESB Networks could only commence in January 2005.

In addition, SEI has submitted to DCMNR a paper outlining a number of requests for the alternative allocation of funds. These requests fall into three categories:

1. Electricity system infrastructure upgrades directly related to the grid connection of specific clusters of projects which coincides with current work post the CER decision;
2. Projects which would support the growth of a robust wind generation sector;
3. Strategic electricity transmission system investment.

The SEI proposals were not pursued further until the ESB Networks submission was finalised in March 2005. Current indications are that the final work programme will at least match the available fund measured under proper regulatory controls.

SEI's Renewable Energy Information Office

The Renewable Energy Information Office (REIO) is a national service of SEI, established to promote the use of renewable energy resources and provide independent advice and information nationwide on financial, social and technical issues relating to renewable energy development (wind, solar, biomass, geothermal and hydropower).

Expenditure for the year was €0.68 million. Outputs included its biannual publications 'Energy Update' and 'Planning Update', as well as its monthly e-newsletter, "E-Update". Three conferences were organised: the Wood Energy Conference in conjunction with COFORD in October, the Passive House Conference and Study Tour in November, and the Energy from Fresh Air conference, also in November.

CHP Programme

Expenditure for 2004 was €0.12 million, with outstanding commitments of €0.08 million. One key focus for this programme is the support of the DCMNR CHP Strategy Group, to which SEI is providing the chair and secretariat and funding the commissioned research.

Commissioned research to support the group includes a summary report on projected characteristics of new ‘prime mover’ technologies in CHP; an evaluation of existing legislation and regulation affecting new technologies in Ireland; an international benchmarking report; and a report into Irish CHP supply chain capability.

In order to create awareness for CHP, the programme has funded the development of a guide to CHP in Ireland, which includes information on the technology, its advantages and relevant applications, and an interactive online tool to facilitate site-specific evaluation of CHP as an energy solution.

With regard to biomass CHP, three projects with a total installed capacity of 26.8 MW have been approved under the AER VI scheme. Five CHP feasibility studies have been supported to date.

3.4 Conclusion

The two measures of the Sustainable Energy Priority are clearly in different situations as regards funding, although both show significant under spending. The Conservation Priority is now (2005) spending at the programmed rate, but it still seems highly unlikely, given current programme expenditure, that the full amount programmed over the life of the ESIOP will be spent⁹. The Alternative/Renewable Energy Priority on the other hand has only seen a very small fraction of the programmed amount spent (*circa* 1/20th) over the totality of the ESIOP lifespan, with its annual spend in 2004 remaining at that level. Unlike the previous priority, spending has not accelerated to programme levels.

In both cases, the lag in spending in the first few years was due (and noted as such by the Mid Term Evaluation of the ESIOP - see previous Chapter) at least in part to institutional factors; the SEI was not in a position to draw up the required programmes and begin spending money in the allotted time frame. This, of course, merely serves to point up the serious nature of the institutional and operational problems which prevented this level of spending at an earlier stage. As already mentioned, these problems included the delay in changing the status of the organisation and the delay in recruiting extra staff to deal with the increased demands. Similarly, the logic of the

⁹ A table of spending to date in 2005 is included in Appendix 4

budgeting process which took place during the drawing up of the ESIOP must be called into question; the rapid increase in the amount of investment (from €70m in the period 1994-1999 to an anticipated €155m in the period 2000-2006) for this sub-measure alone was clearly going to pose a significant challenge for the then Irish Energy Centre. In that context, any further such increase in funding should be accompanied by a recognition of the difficulties experienced previously with ‘ramping’ up spending. Critically, the fact that a carbon tax has failed to materialise meant that a proportion of the economic ‘push’ towards greater energy efficiency also failed to appear. This had an effect across a range of SEI’s programmes, and exposes the difficulties associated with adhering to many of the current programmes without a carbon tax in place (or likely to appear). Without the demand side ‘push’ engendered by increased energy prices, the supply side element provided by SEI was taken up at the rate initially expected.

While spending on the Energy Conservation Measure may now be running at programmed levels, spending on the Alternative Energy Measure is still far below that budgeted. While there were external factors in place which restricted opportunities for spending, most notably in the context of the CER moratorium on further connections, the extent of the disparity between what was programmed and that which was actually spent, poses further questions for both the initial budgeting process and the mechanisms chosen to spend those available resources. These questions will be returned to [in the next chapter]; it remains to be clarified as to what was achieved with that spending carried out.

3.5 Physical Indicators

A list of physical indicators or targets for each of the programmes run under the Sustainable Energy Priority was compiled at the mid term review stage. The complete list of physical indicators is contained at the end of this chapter, however some pertinent elements can be drawn out at this juncture.

For the most part, it appears that substantial progress has been made with regard to meeting the targets set out, particularly in recent years. There remain some difficult areas, however. For example, in the Built Environment Sub-measure, the Low Income Housing element had achieved a total of 6,815 Homes Substantially

Addressed/Insulated at end 2004, against a target of 13,500 by end 2006. The fact that the numbers completed at the time of the mid term review (to end 2002) were just under 5,000 would seem to suggest that, at current rates, the target will not be met.

Similarly, in the Institutional Infrastructure sub-measure, slow progress in meeting the output target of 'Percentage of Industrial Energy Spend' accounted for by SEI Industrial clients would indicate difficulty in meeting the 2006 target of 60% (as opposed to 42.4% at end 2004). Also in the same measure, estimated annual CO₂ savings do not appear to be in line to meet physical target indicators (Estimated 0.22Mt CO₂ savings actual at end 2004 compared with target of 0.36 by end 2006). That said, some elements of the Energy Conservation Measure, such as the number of units supported under the House of Tomorrow Programme and the Energy Savings for Public Sector Approved Projects are either already running ahead of 2006 targets, or seem likely to meet physical targets before the end date.

The Alternative Energy Measure, on the other hand, seems on target to deliver on most, if not all, of its indicators, despite significant under spending as already outlined above. The results of the last AER programme, though not reflected in the table (below) will bring the figure for renewable energy sources above the target levels. Critically, of course, achievement of many of these targets is predicated on the activity of other bodies, such as the CER and DCMNR, with SEI's role being mainly one of support. This distinction poses particular problems for analysis, with particular difficulty arising from the multiple contributors to the success of this measure. This matter will be discussed in greater detail in the following chapters. However, even on a cursory level, if targets are being met with minimal spending, two questions suggest themselves. Firstly, were the initial sums budgeted justified given success with fractions of them? Secondly, were all of the mechanisms included in this measure actually required, or in other words, which of the mechanisms/measures actually contributed to the increase in Alternative or Renewable Energy Generation? The figures for 2004 generally reinforce the position taken by the ESRI in their mid term review of the NDP (though not by Indecon in their review of the ESIOP) that it would be more appropriate for responsibility for many aspects of the Alternative Energy sub-measure (particularly the Grid Upgrade Programme) to be shifted to the CER. This issue is discussed in more detail in the next chapter.

Figure 3.6 Physical Indicators-to December 2004

Monitoring Indicators				
Built Environment Sub-Measure:				
Indicator Type	Indicator Title	Midterm Review [Actual] At end 2002	Dec 2004 [Actual]	Dec 2006 [Target]
Output	<i>Low Income Housing: Additional Homes Substantially Addressed / Insulated</i>	4868	6815	13500
	<i>Public Sector Investment Programme</i>			
	Design Studies Carried Out	85	79 **	90
	'Model Solution' Demonstration Projects Approved	75	75 ***	80
Result	Estimated Percentage Reduction in CO ₂ Emissions per SEI-Funded Public Sector Buildings After Intervention	39%	39% *	39%
	Energy Savings per annum relating to Public Sector Approved Projects <i>(note: targets are based on project applications; actual savings will be measured for all projects, and these may differ)</i>	€4.4 M	€4.7M*	€5.3 M

R&D Sub-Measure:				
Indicator Type	Indicator Title	Midterm Review [Actual]	Dec 2004 [Actual]	Dec 2006 [Target]
Output	Number of the Research, Development and Demonstration Projects			
	≤ €100,000	49	65	130
	€100,000 ≤ €500,000	17	29	45
	> €500,000	5	5	13
	Number of Units Supported under House of Tomorrow Programme	405	1670	1650 [Target met]
Result	Matching Funding / Investment Leveraged for Renewable Energy research, development and demonstration projects (€ million)	€10 M	€18M	€40 M
	Percentage Reduction in Heat Demand of SEI-Supported Dwelling Compared to House Built to the Building Regulations	24%	24%*	24%

Institutional Infrastructure:				
Indicator Type	Indicator Title	Midterm Review [Actual]	Dec 2004 [Actual]	Dec 2006 [Target]
Output	Percentage of Industrial Energy Spend accounted for by SEI Industrial clients (members of the SEI networks; SEI agreements programme; participants in the SEI Energy Awards)	39%	42.4% *	60%
Result	Percentage of Consumers having heard of and understand concept of sustainable energy	-	Available in 2005	24%
	Energy Efficiency Index of SEI Industry Clients (Year 2000 = 100)	96.8%	95.8% *	93.5%
Impact	Percentage of Consumers Implementing Some or a Lot of Energy Efficiency Measures	-	Available in 2005	60%
	Estimated Annual CO ₂ savings by SEI Industry Clients (Mt CO ₂)	0.18	0.22*	0.36

Alternative Energy Measure				
Indicator Type	Indicator Title	Midterm Review [Actual]	Dec 2004 [Actual and actively under construction.]	Dec 2006 [Target]
Output	District Heating/CHP Feasibility Studies	1	5	5
	Additional Connection Capacity++ planned for 2004 for Renewable Energy Connections (MW)	0 MW	148 MW	132 MW
Result	Connection Capacity++ to which Renewable Energy has Connected (MW)	0 MW	108 MW	132 MW
Impact	CO ₂ intensity of electricity supply (kg CO ₂ / kWh)	0.67	0.65 [2003]	0.60
	Total Grid-Connected Wind Energy in Ireland (MW)	189	365 MWs ⁺⁺	600 ⁺⁺⁺

* Estimate

** 87 originally approved, 8 subsequently revoked

*** 76 originally approved, 1 subsequently revoked

+ With regard to the impacts arising from the R&D and Built Environment sub-measures, it is not possible to adequately or cost-effectively establish the extent to which possible impacts (such as modal shifts, decreases in CO₂ emissions due to increased renewable energy, and decreases in the CO₂ per dwelling) are due to SEI's programmes. This is due to the fact that multiple influences / other contributory factors also influence possible impact indicators

++ In lieu of "*actively under construction*" as denoted in the column heading this figure counts projects built up to the drafting of this report

+++ 110 MW AER I-IV+EU support = 110 MWs. AER V+VI = 500 MWs. This is the current published target. This must rise short term to deliver the 13.25 target addressed to Ireland in (EU) Directive 2001/77/EC.

Conclusions and Recommendations

1. The objectives of the Priority remain valid, and continue to warrant the use of public monies. They are also entirely compatible with the strategy of DCMNR.

2. The outputs of this programme are, for the most part, clear and quantifiable. The level and trend is towards greater levels of delivery on targets as the programme has proceeded. There were difficulties at the outset, at least partially due to capacity problems within SEI due to the severity of the 'ramp up' from EIOP to ESIOP programmes. In recent years however, SEI has accumulated greater capacity for delivery, as evidenced by the advances in meeting physical target indicators.

Chapter 4

This chapter consists of an assessment of the extent to which the objectives of SEI's programmes have been achieved, and whether the objectives and physical indicators chosen accurately represent the effect of the programmes. This is achieved by way of an analysis of the progress of the two sub measures and the programmes contained within these, including an assessment of those factors seen to be restraining, or otherwise affecting, their success. This analysis is then contextualised with reference to the situation in two other European countries of comparable size (Denmark and Austria).

4.1 Energy Conservation Measure

To recap briefly, this sub measure of the Sustainable Energy Sub Measure was established to focus on the following:

- intensified energy conservation/efficiency programmes to be delivered through an enlarged Irish Energy Centre,
- energy conservation research, decentralisation and development activities,
- an energy conservation initiative for pre 1980 housing/public sector buildings.

However, given that results are generally presented in terms of the manner (or arrangement) in which they are run by SEI, it is this latter structure that is adhered to here.

4.1.1 R&D Sub Measure

The nature of the **Renewable Energy R&D Programme** means that evaluation can be problematic. While the principle of publicly funding research into renewable and sustainable energy is a sound one, and in line with both academic findings and experiences in other jurisdictions, it is difficult to measure the precise effectiveness of the programme. Significant progress has been made on the physical target indicators, with 99 of the required (by 2006) 188 projects completed by December 2004; the amount of research material published has also been substantial, with some particularly important work being carried out on the subject of connecting wind energy to the grid (including reports referenced later in this chapter). Importantly, as

discussed in the next chapter, the rate at which R&D funding is dispersed to private sector companies meeting the requirements for the programme has increased, with €3m spent in 2004, out of €4.5m spent over the entirety of the programme. Additionally, it should be noted that SEI report that by 2004 a matching €18m had been leveraged from the private sector for Renewable Energy R&D.

However, as explained in chapter 2, the ESRI Mid Term Evaluation of the NDP raised concerns about the grant aiding of such projects in the private sector. More pressing, however, is the fact that, difficulties aside for a moment, private operators seem likely to meet or surpass renewable energy targets in the medium term. As such, the focus of this project should be subject to a review in the context of alternative uses for this funding, including industrial and municipal programmes. There are a number of reasons why this is particularly pressing in this case. The experience garnered by the private sector through the roll out of the AER projects means that there is a considerable body of knowledge in place in Ireland on the subject. Also, the Ministerial decision to adopt a Fixed Feed in Tariff system for new projects seems likely to make such projects more attractive to the private sector. Assuming that the grid connection issue is taken care of, there is every reason to believe that market demands alone may well be sufficient to induce the use of new technologies in the 'mainstream' (ie wind energy) sector. There is substantial opportunity therefore to use this programme to encourage other types of renewable energy generation.

The **House of Tomorrow R&D Programme** has surpassed its physical targets for the end of 2006. SEI estimate that this project brings about a saving of the order of 24% in terms of the heat demand for houses built with aid from this project as opposed to projects constructed to the Building Regulations. If this figure is accurate, then this represents a substantial saving in energy costs for these projects, with a stream of saving stretching into the future. While it is unfortunate that more information is not available on the precise savings made by this project (if nothing else than to be able to assess the efficiency or cost/benefit equivalence of the programme) the fact that targets have already been met would seem to suggest that there is significant private interest in this programme. In that light, and given the relatively small amounts of investment involved (€810,000 in the year to Dec 2004, €2.05m over the entire

period) the project would seem to be a candidate for continued spending, despite targets being reached.

While there may be legitimate concerns about deadweight, and the potential role state investment may have in ‘crowding out’ private investment in the area, the relative importance of either of these must be questioned in the light of both Irish experiences and those elsewhere. In the last part of this chapter, the sustainable energy policies of both Denmark and Austria are considered, and, in both of those countries, direct subsidies are used to encourage greater energy efficiencies in private construction. In this context, the most notable element of this programme is the relatively small amount of funding involved. While there is undoubtedly some element of deadweight involved, its magnitude can only be regarded as inconsequential given the scale of domestic household construction in Ireland in the period in question.

The **Sustainable Transport R&D** measure, despite limited funding, has displayed the potential of a particular energy saving technology (LED traffic lights). The €100,000 investment should result in a saving of €80,000 over the course of a single year for Dublin City Council. It remains to be seen, however, as to whether or not SEI’s direct financial involvement was entirely appropriate or necessary in this programme. The technology was proven in other jurisdictions, and if the potential savings were such that they justified installation of these lights in and of themselves then this investment effectively took the form of an inter-institutional transfer of resources. In this type of case, it seems that a promotional and information provision role would be more appropriate for the SEI, leaving investment financing to the public bodies themselves.

4.1.2 Energy Efficiency Programmes (or Built Environment Measure)

As detailed in the previous chapter, analysis of this sub measure is complicated by the multifaceted nature of the sector; it is singularly difficult to assess the effects many of the programmes have had on energy efficiency or use patterns without primary research. Also, given that many of the programmes have evolved to take into account developments in terms of EU legislation, analysis is complicated by a shift, ‘mid stream’, in the nature of the programme.

The **Home Energy Rating Programme** was refocused on meeting the terms of Directive 2002/91 on the Energy Rating of Buildings, and, in this context, a Certificate of Energy Performance for buildings is being developed. As explained in chapter 2, this type of measure is designed to reduce informational asymmetries in the housing market. Analysis of its effect, however, will have to wait until it has been implemented for a number of years. It would appear logical that the necessity of this evaluation be recognised from the inception of such a programme of certification. If data can be recorded from the outset, and the effects of this programme measured, it may provide valuable evidence to contribute to future policy formulation.

The **Low Income Housing Programme** differs from the previous programme in that clear and concise indices of progress are available (6,815 homes substantially addressed/insulated). However it is more difficult to accurately assess the effect this has had on energy use or, equally, CO₂ emissions. It is notable that SEI is conducting research into the impact of these improvements on low income households, the findings of which will be of great interest. The rate at which homes are being improved has increased, as the capacity of SEI to deliver projects like this has improved. Further institutional improvements are in train also, not least the pilot project for engaging private sector installers and engaging with community development groups to extend the reach of the programme.

This type of measure falls into the category of subsidy/direct investment as outlined in chapter 2, and is in line with best practice in the field, given the experiences of Germany and the UK in this regard. The physical target indicators chosen are not entirely adequate (given that they do not provide an overall estimation of the amount of energy saved) but will be well served by the research, currently in train, to assess the net effect of this programme.

Like the Low Income Housing Programme, relatively accurate indices of success are available for the **Public Sector Investment Programme**. While the programme has almost reached its physical targets, it has also delivered significant, and measurable, savings for public institutions. It must also be noted that this programme is of a piece with the Low Income Housing Programme in that both target areas of the economy

within which it is possible for the state to make significant efficiency gains as per international experience (The ESRI Mid Term Evaluation of the NDP/CSF noted that “*Experience overseas indicates that there is scope for economically efficient energy savings in, for example, public sector/low income housing*”p.140). In this case, the target indicators are ideally suited for gauging its actual effect. Another aim of this programme (and the Low Income Housing Programme) is to act as a ‘pump priming’ mechanism, to stimulate supply of technical solutions for such projects by boosting demand. There are no objectives or indices to measure the growth in capacity to deliver such services in place for this element of the programme, something that could perhaps be addressed in the next iteration of the ESIOP.

4.1.3 Institutional Infrastructure

The members of the **Large Industry Energy Network** currently account for almost 40% of the energy used in the industrial sector. The most recent figures suggest that the Network has encouraged significant savings in terms of both energy and CO emitted through a relatively small annual allocation. It is difficult to evaluate the degree of deadweight that may exist, however given the small amount of spending involved and the relative magnitude of the results it can only be assumed that it is considerable. It is similarly impossible to accurately analyse the positive effects of the programme outside of those companies included in the network (in suppliers, customers or even competitors). However, even if a small part of the savings in energy can be attributed directly to SEI, then the programme can only be regarded as a success, particularly given the relatively small amount of spending involved.

The **Industry Energy Network**, on the other hand, concentrates on the promotion of a range of energy management technologies, and is aimed at small and medium sized commercial and industrial energy users. The programme also funds the Sustainable Energy Awards which began in 2004. While this type of measure is in line with international best practice, assessing the extent to which it has been achieved is not easy. While the rate of uptake in such technologies may be assessed nationally, it remains very difficult to determine whether this programme was responsible for all (or any) of the uptake.

The other major element of the Institutional Infrastructure sub-measure is the **Consumer Information and Marketing Communications element**. This comprises of a series of programmes aimed at promoting the conservation of energy. These programmes take the form of print and broadcast advertising, the publication and circulation of brochures and school programmes aimed at early formation of long term behaviour. As mentioned in Chapter 1, this type of programme poses certain problems for analysis. While it may be possible, in some circumstances, to audit the thoroughness with which programmes were executed, this will not result in any worthwhile evaluation of the success of the programmes. Any study of effectiveness, it follows, requires primary research. SEI has conducted, through an external firm, a number of market research initiatives into the general effectiveness of its promotional activities and the effectiveness of specific programmes. These are discussed, in detail, in the next chapter with regard to efficiency and effectiveness. It is sufficient at this point to note that the type and focus of the Marketing Programmes pursued by the SEI are both closely tied to their overall role and the priorities outlined in the ESIOP.

4.2 Renewable Energy Measure

As discussed in the previous chapter, this sub measure involves a significantly smaller allocation than the Conservation of Energy Measure. Also, spending has been significantly lower than forecasted. Despite this, it seems likely that the physical targets will be met by end 2006; as discussed previously, this gives rise to two distinct questions. Firstly, were the initial sums budgeted justified given success with fractions of them, and secondly, were all of the mechanisms included in this measure actually required, or in other words, which of the mechanisms/measures actually contributed to the increase in Alternative or Renewable Energy Generation?

Before attempting to answer these questions, it is necessary to briefly outline the objectives of this sub measure. It was established to support the delivery of the objective of significantly increasing the contribution of renewable energy sources with a working target of 500MWe in the period 2000-2005. There were four components to this.

1. Facilitate the strategic reinforcement and upgrading of the electricity network in order to redress the weaknesses and grid constraints to accommodate connection of renewable energy projects.
2. Support the delivery at least cost of an additional 500MW of renewable energy based electricity generating plant compared to conventional capacity of the order of 4,000MW in the period 2000-2006.
3. Encourage new entrants to the renewable energy market by (i) offering additional support to a limited number of small scale projects in proven technologies and (ii) providing selective support for feasibility studies.
4. Increase peripheral confidence in the sector, e.g. among finance houses and retail customers, and further awareness in the capital markets of the new investment opportunities in renewable energy.

Critically, it should be noted that while these are very different objectives, requiring dissimilar procedures to accomplish them, in many cases they are closely related. For example, Objective 1 is accomplished through the Grid Upgrade Development Programme, which also impacts on Objective 2 and 3. Objective 4 relates more to the activities of the SEI in the Consumer Communications arena, in publicising and promulgating the benefits and business opportunities involved in renewable energy generation. Events have, however, evolved beyond the situation envisaged when these priorities were drawn up, a fact recognised by the SEI in a recent paper submitted to DCMNR requesting an alternative allocation of funds.

The operational consequences of these targets are as follows. The SEI runs its Renewable Energy Information Office (REIO) in Bandon, a CHP Development Programme, and supports the Grid Upgrade Development Programme (GUDP), which is effectively run by DCMNR. The REIO, as mentioned above is more closely related to the other communications areas of the SEI, and will be discussed in greater detail in the next chapter. The other two programmes under this sub measure are complex in that they are closely related to other elements of national policies on renewable energy, not least the AER programmes and the operation of DCMNR and CER in this regard. As noted in the previous chapters, spending in these areas is far lower than expected, largely through no fault of SEI. In order to understand the nature of the problems in this sector however, it is necessary to briefly look at some of the

issues surrounding the planning and construction of renewable energy plants in Ireland.

Many of the difficulties experienced in getting renewable energy production on line has been due to problems experienced by operators in successfully developing plants, including “... *the inability to obtain local planning consent or financing for the project*”¹⁰. In reality, the situation is even more complex than this simple analysis would suggest. There are a series of institutional, legal and financial constraints which act together to make the construction of wind farms (which are the most common renewable energy source in Ireland) very difficult. Importantly, these constraints operate in an integrated way, with planning issues, for example, posing additional problems when it comes to gaining access to investment capital¹¹.

These problems centre around planning and institutional problems, sometimes directly related to access to infrastructure, such as the electricity distribution network. The perceived solution to this set of problems has been to ‘cluster’ wind farms in certain areas of high yield, and to ‘fast track’ both grid upgrades and planning processes for these. This is being done in the case of three strategic sites (Ballycadden, Trillick and Muignaminnane). This, in turn, poses additional problems for both the network and the grid. First of all, this clustering, while undoubtedly necessary, puts the transmission system under additional stress due to the concentration of wind power at one point on the grid, but also due to the fact that these ‘clusters’ are likely to share very similar dynamic characteristics as regards generation (variations in output due to wind speed). A more distributed network would avoid this problem by providing a more ‘balanced’ profile of power delivery to the grid.

Similarly, those areas selected as strategic wind development areas by local authorities (under regional planning guidelines, and those guidelines set by the Department of the Environment, Heritage and Local Government for local authorities) are usually chosen on the basis of elevation (and thus potential yield) vs. landscape sensitivity. However, the net result of this selection is that the landscape in these areas quickly becomes ‘sensitive’ from a planning perspective due to the presence of a

¹⁰ IEA Review of Irish Energy Policy, 2003

¹¹ See note in Appendix 2

number of wind farms; thus there is an implicit limit on the intensity of development possible. In this context, the advantage tends to go to those developers with the resources and the experience to expedite their own planning and applications processes, thus ruling out community groups and local landowners operating on their own.

4.2.1 CHP and Biomass

CHP and Biomass plants face similar difficulties with regard to obtaining grid connections and with getting planning permission. However, in their case, there is an additional difficulty with obtaining permission to operate. Such plants are subject to licensing by the Environmental Protection Agency (EPA) which adds an additional process to the already complicated initialisation procedure. Also, there is the added risk that such approval may not be granted, further increasing the risk loading on these projects. Additionally, the Purchase Price Agreement (PPA) provided for CHP plants is only for 10 years (as opposed to the 15 year term applied to wind projects), thus reducing their viability as they will be licensed to operate over a shorter period.

There are a number of particular problems with the introduction of CHP in Ireland on a continental European model. The first of these is that Ireland has one of the smallest percentages of land under forest in Europe (9%, as opposed to 39% in Austria or 28.9% in France), although area under forestry has grown from under 400,000ha in 1980 to approximately 700,000ha in 2002¹². This means that output of both ‘processable’ (ie into pellets) or waste timber is quite low. For example, the Bacon report estimates that approximately 50MW ‘worth’ of energy is available from waste timber as at 2002. This is the type of plant used at the facility part funded by the Alternative Energy Priority at Enniskeane in Co Cork. Although the total potential available energy from this source is set to grow to 132 MW by 2015, this still means that there is a ‘natural’ limit to the amount of energy that can be expected to accrue from this source. Denmark, for example, with a similar percentage of forest to Ireland (10.5%) has been experiencing problems in encouraging large scale CHP based on wood chip and pellet due to lack of local supply, with the consequence that much of future pellet supply will have to be imported.¹³ In the context of reforms to the EU

¹² Bacon Report on Forestry in Ireland, 2003.

¹³ IEA Review of Danish Energy Policy, p.66

Common Agricultural Policy, and proposed changes to the sugar regime, it appears that large amounts of arable land in Ireland will become available for alternative crops. In that context, ‘coppicing’ or growing short rotation wood crops for use as biomass seems a promising option¹⁴, particularly when the suitability of Ireland’s climate for such crops is taken into account. Also, as pointed out in a recent Teagasc Report,¹⁵ there are also opportunities available for the use of straw, biogas, waste organic oils and ethanol.

These difficulties have been recognised by SEI, and as noted in the previous chapter, they have submitted a series of proposals to address the problems, including suggestions on future strategic investment in the transmission system and upgrades to facilitate the connection of clusters. Taking the issues separately, it is clear then that there are particular problems with adding further wind power to the grid, and that these problems lie, for the most part outside of the control of SEI. In that context the lack of spend on the GUDP is understandable. While it must be emphasised that these issues are being addressed by DCMNR, CER and SEI, it is clear this situation has a number of consequences for this expenditure review.

At present, the situation for the connection of alternative energy resources is beset by a series of systemic problems. SEI finds itself unable to intervene in negotiations on grid connections, critical to the development of alternative energy resources, and, thus faces difficulties in planning spending for a situation largely beyond its control. A number of potential solutions present themselves. Transferring the Grid Upgrade Development Programme to the CER, as suggested by the ESRI in its mid term review, would facilitate a more proactive stance in the resolution of grid issues. As an organisation, CER already deals with this type of issue on a daily basis, and already has a regulatory relationship with the parties involved (particularly ESB Networks). It would also allow SEI to concentrate resources on the promotional aspect of the sub measure. Secondly, the issues of planning and locational problems require the provision of clearer guidelines governing the construction of renewable energy plants, with specific reference to grid connections. These guidelines, once agreed, could then facilitate the work of the CER in delivering targeted improvements to the grid.

¹⁴ The first such plant recently received planning permission in the UK, it will burn *micanthus*.

¹⁵ Opportunities for Biomass as Fuel, Teagasc, 2005

Thirdly, there exist a number of opportunities for the CHP scheme to act in a broader manner, encouraging other state organisations and the private sector to investigate the opportunities offered by CHP, both for municipal and industrial use.

4.3 Other Experiences: Denmark and Austria

In order to contextualise developments in Ireland it is necessary to examine, briefly, the experiences of other European countries and compare them with the Irish situation. The countries chosen, Denmark and Austria, were selected for a variety of reasons. Both are small Northern European countries, and while both are EU member states, neither were founder members of the EU. Also, both countries have similar industrial and geographic structures to Ireland, specialising in the production of high value goods for export, and with large proportion of population concentrated in relatively small areas of the country. Critically, both of these states are widely regarded as being world leaders when it comes to the sustainable use and generation of energy; a comparison with what is generally regarded as ‘best practice’ is helpful in that it informs the discussion on future objectives and methods in Irish energy policy. The sources for this analysis are the IEA reports on individual countries energy policies, along with academic and conference material.

4.3.1 Denmark

Successive Danish governments have encouraged the production of energy from renewable sources. This policy was driven by environmental principles, and supported by the electorate, despite the additional costs to the economy over that time and the use of energy taxes. Among the results of this policy is the fact that by 2003, 13.6% of the climate-adjusted gross energy consumption was met by renewable sources of energy (as opposed to 6.4 per cent in 1990 and 3.4 per cent in 1980). Another effect of this is that the country is now self sufficient in energy, aided of course by the exploitation of domestic oil and gas reserves (Denmark now produces 200% of its domestic oil requirements pa)¹⁶. Nevertheless, more than 50% of all domestic heat installations used ‘district heat¹⁷’ sources, and most of these were powered by CHP. Moreover, approximately half of Danish electricity requirements are met through CHP plants. Most of these plants use natural gas but there is an increasing trend towards a variety of other (renewable) materials including woodchips, wood pellets,

¹⁶ Danish Energy Authority Website

¹⁷ The communal use of hot water, a by product of electricity generation, for domestic heating.

domestic waste and straw. For example, in 2003, 16,719 Terrajoules of energy was generated from burning straw alone.

Danish energy policy and the tools used to implement it provide some interesting comparisons with the Irish case. One organisation, the Danish Energy Agency (*Energistyrelsen*, DEA), is charged with delivering several and varied aspects of energy policy, including setting the “general conditions” for the “Electricity Savings fund”. The Danish Energy Agency has responsibility for a broad range of policy areas in energy, including the promotion of energy efficiency initiatives through energy conservation campaigns, appliance labeling and various subsidy schemes. In a manner almost completely analogous to that of SEI, this also includes administration of an energy labeling scheme for buildings, undertaking systematic energy auditing of public institutions and providing subsidies for conversion of electrical heating in areas where heat or natural gas networks are available. Unlike Ireland however, the DEA also has responsibility for overall planning of energy policy and management of natural resources, such as oil and natural gas. It is left to the Department of Economic and Business Affairs to conduct general policy work and draft legislation.

A number of important comparisons between Ireland and Denmark are apparent in this context. For a variety of reasons, Denmark is distinctly more advanced in terms of its use of renewable energy production. There were a number of reasons why this was possible in Denmark. The first, and probably most important, has been the ongoing willingness of the Danish electorate to accept taxes on energy, taxes which made the provision of renewable energy more attractive to business and public sector interests alike. Secondly, the more nucleated settlement pattern in Denmark has allowed the widespread use of CHP based ‘district heating’. Thirdly, and of further importance for this review, Denmark began investing in sustainable and renewable energy resources before Ireland did. When taken together with the fact that the public was apparently willing to pay for these developments, the apparent progress of Denmark in this regard is easy to explain. The institutional arrangements behind the development of Danish renewable energy resources are noteworthy also; with one organisation responsible for the specific policy area over a sustained period of time, thus avoiding ‘ramp up’ problems and subsequent delays in rolling out projects. Also, the mechanisms used, over time, by Danish governments to incentivise the construction

of renewable energy facilities were more inclined to use direct state expenditure. For example, from 1979 to 1989 the government had in place a programme of capital grants for the installation of wind turbines. Even outside of that period, the support mechanism involved utilities being required to purchase electricity from wind farms at 85% of the retail price. This equates to a fixed price contract system, much more favourable to potential wind operators than the PPA system under the AER programme used in Ireland.

It is also significant that the DEA has adopted a very similar series of programmes to the SEI/ESIOP in encouraging the efficient use of energy, including an industrial and domestic component. It seems that, in this case at least, the methods chosen in Ireland are in line with best practice elsewhere. Importantly also, the IEA Review of Danish Energy policy noted that there was significant room for improvement as regards the cost effectiveness of the various policies being pursued, not least due to the complexity and high administrative costs involved. Essentially, the IEA recommended the formation of more market based policies, criticising the high level of subsidies involved in the Danish model, a criticism tacitly accepted following a change of government in Denmark (in November 2001).

4.3.2 Austria

Austria has some particular advantages when it comes to the use of renewable energy. Its physical geography, with some very elevated areas populated with fast flowing rivers (partially due to glacial meltwater) gives it significant natural potential for hydropower, a potential that has been tapped to the extent that 70% of its electricity is met from this resource. More precisely, approximately 60% of Austria's territory is categorised as alpine, with these areas receiving upwards of 1000mm of rainfall per annum. This generation is of course seasonal, with the net result that Austria, while a net exporter of energy over the course of the year, still imports 26.4% of the electricity used (2000 figures).

Approximately 27% of electricity needs are met though CHP plants, which tend to operate more in the winter months (both to offset the seasonal nature of hydropower and to provide more heat in the winter months). Due to a requirement for co-location of generation and domestic users, the cities are the main users of CHP. Vienna, for

example has a system which provides 50% of the city's power and 40% of its heat and hot water. These CHP plants are well supported, with most being paid a tariff per kilowatt hour above market prices; these tariffs are then recovered through a levy charged on all grid users. Similarly, the law currently requires that all electricity suppliers source a minimum percentage of their power from renewable resources. Also, different feed-in tariffs are established for each renewable resource eligible for such support.

While the measures and institutions supporting the generation of energy by renewable means are very similar to Ireland, those supporting and encouraging energy efficiency show some remarkable differences. In Ireland, the measures are handled, for the most part, by one Department and one of its agencies. In Austria a much more fragmented system is in place. On the Länder (federal province) level, the state governments are in charge of the legal instruments for energy conservation (primarily building codes) and support energy conservation projects through subsidies. They receive 11.84% of total electricity and natural gas taxes collected at the federal level in order to cover these subsidy expenses. On a national level, both the Ministry for Economic Affairs and the Ministry of Agriculture, Forestry, Environment and Water Management are involved in making policy for the area. In total, there are 30 programmes which address industrial energy efficiency, 26 programmes for the support of various residential energy efficiency measures and 21 programmes for financial support in connection with district heating. The 2002 IEA Report on Energy policy in Austria pointed out that *"An attempt at either consolidation or greater co-ordination of activities could make these initiatives more effective"*. Also criticised was the lack of monitoring of policy performance in terms of the amount of energy saved from this broad range of policies.

The Austrian experience shows some marked similarities with that of Denmark. A complex and expensive range of taxes and subsidies have been used over a period of time to encourage greater generation of renewable energy, and greater efficiency in the use of energy. Despite the undoubted success of these initiatives, in both cases their direct costs and costs of administration, and the manner in which they use subsidies, draw criticism from the IEA. Unlike Ireland and Denmark, however,

Austria has a range of government institutions involved in promoting and running these programmes, resulting in an apparent lack of coordination.

4.4 Conclusion

It appears from this cursory overview of two other EU countries that the objectives, and the methods of achieving them used in Ireland are generally in line with best international practice. It is notable that in terms of the energy efficiency and R&D sub measures, it seems like all three countries have taken very similar approaches (perhaps unsurprisingly given the role of EU Directives in shaping policy in this area). In ways, Ireland has benefited from being a late adopter, avoiding many of the pitfalls experienced by these other countries. For a start, the need for monitoring and evaluation of all the programmes under the SEI was recognised at an early stage (even under the EIOP), being delivered both through the SEI and through the evaluation processes of the ESIOP and NDP. Secondly, the need for cost effectiveness in these programmes was also to the forefront in the construction of these policies in Ireland. The change in government in Denmark, for example, has led to a re-evaluation of many of the programmes, with the more capital intensive elements facing particular scrutiny.

Critically, both Austria and Denmark have adopted a carbon tax and more substantial financial inducements to build renewable energy plants. Both countries have made significantly greater use of renewable energy resources than Ireland. For the most part, this is due to the fact that both Denmark and Austria began to encourage the construction of these facilities long before Ireland. While it might be argued that progress could have been more rapid in Ireland had other methods been used, it must be pointed out that, starting from a relatively low base, considerable progress has been made (from 20MW of wind connected in 1997 to over 400MW in 2005, with a further 575MW with grid connection contracts agreed). There is however, an issue of coherence between the current Sub Measure and the broader public policies in this sector. The type of programmes adopted in Ireland are similar in many respects to those in use in the other countries examined. However in all three cases the public policies involved were designed to operate in tandem with a carbon tax. Given that such a tax has been ruled out in Ireland for the foreseeable future, the advisability of adhering to the rest of such a policy platform *ad infinitum* and expecting the same

level of deliverable results is dubious. This issue is discussed in greater detail in the next chapter.

In terms of potential lessons for Ireland, there are several practices in both countries that bear further investigation in an Irish context. Firstly, the idea of a fixed tariff system for renewable generation seems to offer particular advantages, as would the Danish practice of a wide distribution of turbines across the country, and thus the grid¹⁸. The fixed rate feed in tariff system offers some advantages over the competitive process used in the AER programme, not least greater security of income for operators and (in theory) higher payments¹⁹. This type of procedure would also facilitate greater access by smaller operators.

Both CHP and District Heat have some particular attractions for Ireland – particularly given the availability of agricultural land due to the reform of the Common Agricultural Policy. There is a CHP priority within the Alternative Energy Sub Measure, but spending remains low (€12m in 2004) and only a very small number of plants are involved (5, including those under construction, with only one in operation at present). However, there remain a number of problems with the expansion of both CHP and District Heat in Ireland. The ash product resulting from the combustion, even if declared a non hazardous material, poses problems in terms of disposal. Because of its relatively inert state, it can be landfilled with ease (or used in building), however the state of the construction industry in Ireland is such that finding disposal solutions for even ‘clean’ topsoil is difficult, for ash it would probably be prohibitive on a large scale. It is certainly an area that bears further investigation, however. Similarly, for District Heat, the relatively dispersed character of the Irish population would militate against it in many areas. However, potential does exist, and it should be explored in greater detail. The potential for CO₂ savings are large, as evidenced by both the Danish and Austrian examples, and there are also noteworthy advantages in terms of energy security.

¹⁸ It is in fact likely that a more substantial PPA price would facilitate a wider distribution, as it would enable operators to exploit more lowland sites (with lower yield). The fact that these sites would also have better grid access, particularly in the midlands (due to now closed peat stations) would be an added bonus.

¹⁹ In June 2005, the Minister for Communications, Marine and Natural Resources announced that the AER replacement would indeed use such a procedure, involving a ‘banded’ approach similar to that used in Austria, with different prices used for different technologies.

Conclusions and Recommendations

3. Inter institutional issues are a major barrier to the provision of more renewable sustainable energy capacity, and the effectiveness of SEI in this regard is hampered by the status and general role of the organisation (facilitative rather than enforcement). In this regard, and in the context of the recent Ministerial announcement and extant situation regarding funding, it seems logical that the Grid Upgrade Development Plan be run in future by the Commission for Energy Regulation (CER).

4. Given the difficulties experienced with developing renewable energy generation, and constraining spending on the Alternative Energy priority, there is a strong argument for clear regional guidelines on locations suitable for such developments, with specific regard to connections to the grid. This would involve the development of national guidelines for the construction of renewable energy plants, perhaps in conjunction with the strategic review of energy currently being conducted by DCMNR. These guidelines would then direct the GUDP.

Chapter 5; Effectiveness and Efficiency

This chapter deal with two main issues. The first relating to the efficiency with which the objectives of these programmes are being met and the second to the degree to which the objectives warrant the allocation of public funding and whether alternative policies or organisational approaches could be pursued to bring about more effective or efficient outcomes in this field. These considerations are directly linked to two of the terms of reference (5 and 6). The analysis of the second issue obviously draws heavily on the evidence presented in the earlier chapters of this review. However, for the sake of brevity, a broader thematic approach is used here, with the various programmes discussed in the context of their categorisation under the two sub measures. Firstly, however, the issue of staffing and resources expended must be addressed.

5.1 Staffing

The numbers of staff employed by SEI rose steadily throughout the period, from 23 in 1999 to 42 in 2004. These staffing increases can be directly related to the problems experienced by SEI, particularly in the early years of the ESIOP, in ‘ramping up’ its capacity to deliver those programmes required of it. In 1999, for example, the organisation employed 23 people, dropping to 18 in 2000 (due to staff ending contracts). The total wage and pension costs for 2000 were €1.15m (including agency and board staff). From this point on, staff numbers rose steadily, to 25 in 2001, 32 in 2002, and 42 in 2003 and 2004. A table of SEI staffing by Department²⁰ is included below.

Table 5.1 SEI staff by Department

Year	Customer Services	Development Groups	SES	Built Environment	Industry	CEO, HR and PA	Total
2001	9	2	2	2	7	3	25
2002	11	3	5	5	7	3	34
2003	11	5	8	7	8	3	42
2004	11	5	8	7	8	3	42

²⁰ See chapter 2 for a description of the functions of each Department of SEI

NB. Customer Services includes Marketing, PR, Grant Administration, Procurement, Finance MIS and the Education programme.

As can be seen from the table, while increases in staffing levels were generally spread across departments, there is some variance. In some areas, notably Customer Services and Industry, staff levels throughout the period involved remained stable, at least partly due to the fact that these functions had been operational under the previous EIOP. In areas like SES (Sustainable Energy Services) and Built Environment, significant increases in staffing were required to administer new programmes, and to deal with the increased budgets allocated to existing ones.

SEI did employ agency staff during the time period involved, mainly to cover for staff absences due to maternity leave (of particular importance in 2004). The amounts spent varied widely, with €7,000 spent in 2003 and €117,000 in 2004 (information for earlier years is not available).

Table 5.2 Staff Costs and Spending in SEI

Year	Staff Costs	Programme Spend	Cost-Spend Ratio
2000	€1.15m	€3.691	3.2
1/1/01-30/4/02 (16 months)	€1.88m	€4.728 (12months of 2001)	N/A
1/5/02-31/12/02 (8months)	€1.33m	9.284 (12 months of 2002)	N/A (but taking 01-02 together gives 4.22)
2003	€2.44m	€13.360	5.48
2004	€3.05m	€14.208	4.66
Total	€9.85m	€45.271	4.59

NB The 2001/2002 gap is due to the fact that SEI became a statutory body in May 2002, and was audited for the 16month period to that date separately from the 8 months after.

The table above sets out the staffing costs and the overall project expenditure of SEI in the period 2000-2004. It also includes a synthetic index, constructed to allow easy comparison of the staffing costs with the most simplistic measure of output efficiency available for SEI, that of unit project spend. Given the fact that SEI runs a variety of different types of programme, deriving a more appropriate single index would be a complex exercise, and probably over complex for the needs of this review in any case. This simple index bears a caution, however, as the external difficulties facing SEI in reaching programmed spend in many areas makes any such analytical exercise difficult. In brief, some of the forces driving increased spend have little to do with increased efficiency within SEI. However, it must be assumed that there is at least some correlation between increased staffing and increased output. Table 5.2 shows that SEI, have, in general, become more efficient in the spending of project resources, even allowing for increased staff costs.

Some conclusions can be drawn from this analysis. The organisation experienced difficulties in rolling out new or expanded schemes due to a lack of capacity within the organisation, an issue addressed through the recruitment of additional staff to some departments. Similarly, new programmes took time to begin full operations, particularly when they involved interaction, on a detailed level, with a large number of other organisations (see chapter 3). In that context, the allocated levels of funding in the early years of the ESIOP seem highly optimistic, as noted in chapters 3 and 4. However, questions remain about the performance of SEI in this regard. Once staff were employed, and the programmes given time to 'bed in', the output of the organisation increased, as did the efficiency with which this output was delivered. However, spending is still far below that originally programmed, and regardless of the optimistic nature of the original budget process, the effectiveness of SEI should be reviewed more thoroughly before any additional funding is allocated to that body for dispersal. If this review finds that the body has been effective, and that the lag was indeed due to external factors, as well as a shortage of staff, then some intervention in staffing levels, skills sets, or both may be required. Moreover, a more rigorous performance management system may be required also.

The fact that SEI is scheduled for decentralisation to Dundalk poses a challenge to the organisation, particularly in the context of the critical nature of human capital in an

organisation of this size and type. Staff turnover, if and when it occurs, must be managed very carefully to ensure that the work of the organisation does not suffer from the lags in capacity that hampered programme administration in the early years of the ESIOP

5.2 Effectiveness, Efficiency and Relevance

The purpose of this section is to evaluate the degree to which the objectives warrant the allocation of public funding on an ongoing basis, and to examine the scope for alternative policy or organisational approaches to achieving these objectives on a more efficient or effective basis (as per No.6 in the Terms of Reference). This latter element is particularly central in the context of the upcoming end of the NDP and ESIOP and the composition of their successor programmes. If the problems associated with the early manifestation of the sustainable energy priority are to be avoided, the precise reasons for lags in delivery must be understood.

In Chapters 3 and 4, the individual programmes were outlined and assessed on the basis of level and trend of outputs, costs, and effectiveness in meeting the objectives laid out for the Priority. Rather than duplicate this text, the material is approached from a broader and more thematic perspective in this case. The general topics are dealt with in the same order as before, but reference is only made to specific programmes where necessary. This analysis is conducted with specific reference to the discussion on the rationale for state intervention in the sector contained in chapter 2. Again, for clarity, the order and categorisation used in this chapter is that used by the SEI in reporting, not the order in which these measures are laid out in the ESIOP (as set out in graphical form in Chapter 2).

5.2.1 R&D Sub Measure

The various R&D programmes conducted under this measure cover several aspects of market failure, serving to drive forward R&D in this sector, and induce private funding through the use of state funds. The results of this R&D should, in theory, correct informational problems in domestic, transport and renewable energy sectors and provide opportunities for private sector operators to bring solutions based on this research to market. International experience has shown that this is a valid and worthwhile mode of intervention, and that such activity by the state can leverage considerable amounts of private capital and generate substantial energy efficiencies.

The R&D Programmes were among the largest programmes the SEI supported in 2004 with regard to expenditure, with over €4.5 million spent. This funded 46 projects, 29 of which were in the Renewable Energy Area. As noted previously, the ESRI has expressed a note of caution about the use of public monies in this way. Given the nature of the difficulties facing this sector at the moment, however, there are valid reasons for this funding to continue, despite concerns over displacement. In the Renewable Energy area, for example, the figures for generation capacity likely to come on stream in the medium term indicate that the private sector has embraced the concept and there is sufficient knowledge on the subject in the public domain for this sector to grow of its own accord. Equally, research in this sector has been ongoing across the world. Commercial companies operating in Ireland have shown themselves to be perfectly able to make use of research data from elsewhere and apply it to operations here. There are a number of alternative roles for this Priority, however. The first is for SEI to revert to its promotional and information provision role, disseminating the results of previous research and thus gaining optimum use of publicly funded research. The second is for SEI to concentrate research funding on types of renewable energy that have yet to achieve sufficient traction in Ireland. Examples of this would include CHP from industrial and municipal sources, biogas or biomass.

Given the energy savings that are likely to accrue from the House of Tomorrow Programme, not to mention the potential savings from the ‘knock on’ or promotional effect of same, it seems a programme worthy of further funding on its own merits, even before arguments on market failure are brought into the equation. As already noted, there is an argument to be made that the Sustainable Transport measure, as currently constituted, is merely cross funding already proven technology in another public sector body. There is no doubt but that this is a useful and potentially very efficient technology, but SEI’s role in this regard should remain one of support and promotion, rather than direct funding. That said, there is substantial room for the expansion of SEI’s promotional activities in the transport sector due to its position as the largest user of energy in Ireland.

In conclusion, it is clear that the objectives warrant further funding. There have been some significant successes for what is, after all, a relatively small amount of money

for the size of the sector. By comparison for example, in 2005 the Danish Energy Agency is making available €6.9m for research into energy R&D, with a further €17.4m available from Energinet, the transmission operator, and another €8.7m available from the Strategic Research Council. Clearly the amounts being spent by the SEI are not disproportionate in an international context. In fact, they are considerably lower than in the case of the examples provided. However, there are alternative uses for some of the funds which are likely to result in a greater benefit. Both the Sustainable Transport and Renewable Energy R&D programmes would benefit from a refocus, taking into account some of the changes in the market place since their inception. Critically also, the SEI has tended to concentrate its efforts on high level research, with little emphasis on deploying the results of this research. Greater consideration could be given to marketing and encouraging the use of new technologies through existing networks.

5.2.2 Energy Efficiency Programmes (Built Environment Measure)

These programmes are explicitly aimed at addressing several distinct market failures, or aspects thereof. The Home Energy Rating Programme and the Low Income Housing Programme are intended to redress informational and socio-economic failures. Moreover, the Low Income Housing Programme also deals with elements of property rights failure, as outlined in chapter 2. The Public Sector Investment Programme is aimed, on the other hand, at delivering energy efficiencies in public buildings. As noted in chapter 4, the latter two projects are targeted at delivering efficient improvements in areas of the economy from which the state can achieve relatively significant gains from a limited investment. Each of these three programmes are in line with international best practice, and seem set to deliver substantial energy efficiencies. Each of them is subject to either an ongoing scheme of evaluation or a research project, which will, in theory at least, result in clear and relatively precise information on the outputs of the programmes.

The total spend in this area in 2004 was €2.964m, the majority of which was spent on the Public Sector Programme (€1.807m). Again, these figures are substantially less than those provided in other jurisdictions. Critically also, the two other EU member states discussed in the previous chapter have introduced taxes on carbon dioxide (and sulphur dioxide) emissions, the revenue gathered from these is then used to subsidise energy efficiency programmes in industry (between 30% and 40%, depending on the

type of programme, with no upper limit on the value in Denmark²¹). A total of 1.8 billion Danish Kroner was appropriated and reallocated between 1996 and 1999 (€241m at 2005 prices and exchange rate). When compared to the scale of these transfers, the amounts being allocated in Ireland are very modest, particularly when the benefits are as clear and quantifiable as they are in this case.

There are a large number of potential alternative avenues for expenditure in this regard, not least in a situation such as that found in Ireland, where a large number of new housing units are being constructed every year. A range of possibilities exist to 'mainstream' the work of SEI, and encourage a more widespread use of energy efficient or renewable energy technologies in private domestic dwellings. The 2005 Budget included an allocation of a significant amount of funding to do just this, and to incentivise the installation of sustainable energy technologies in domestic dwellings, either at initial construction or as a retrofit.

5.2.3 Institutional Infrastructure

This measure is made up of two distinct types of programme. The Large Industry Energy Network and Industry Energy Network each act to promote energy efficiency and share information among industrial energy users. The Consumer and Marketing Communications element of the sub measure is used to run a series of programmes designed to increase public awareness of energy issues.

Taking the industrial networks first, this type of measure is common practice internationally. They are designed to advertise the benefits of energy saving technologies, promote best practice and allow clients share experiences. Through these mechanisms, the measure is designed to reduce the information gap within industry and to reduce transaction costs in learning about the existence and deployment of such technologies, which is of particular importance for smaller industries. The sums involved are relatively small, and the potential savings quite large (as noted in chapter 3, to the 2003, SEI estimate that the companies involved in the network had saved approximately 410kt of CO₂ and 1260GWh).

The Consumer Information and Marketing Communications element is significantly more complex. It involves a number of different programme elements, ranging from

²¹ Green Taxes for Trade and Industry, Danish Energy Authority, 2000

the dissemination of information and advice via a variety of media, schools initiatives and the running of an 'Energy Awareness Week'. The amount of money involved in running these programmes is not large in relative terms, coming in at approximately €700,000 in 2004. In total, in 2004 SEI spent €468,410 on advertising, which is relatively little when the fact that this is one of the core functions of SEI is taken into account. The total amount spent on the Advertising and Promotional activities (across all programmes) ran to €1.683m in 2004. By comparison, the "Race Against Waste" campaign, run by ENFO as part of the Department of Environment, Heritage and Local Government, received €3.5m in funding for the first year of its campaign.

The basis for these programmes is straightforward. They are to address informational 'gaps' and build a long term comprehension of the importance of energy efficiency. Clearly, the amount of money expended is in line (albeit slightly lower) with similar programmes in this country. To determine the effectiveness of these advertising campaigns, SEI sponsors a number of market research projects. The most important of these is a programme of baseline quantitative consumer research, first conducted in a major national survey in the autumn of 2002. This provided an initial 'baseline' against which to measure the efficacy of SEI advertising programmes from that point on. This programme is being repeated in the autumn of 2005 to gauge the advances made, and to gauge the extent of shifts in attitudes and awareness of the areas dealt with by SEI. This has the obvious benefit of facilitating the adjustment of advertising campaigns to make them as effective as possible, either through altering the content, method of delivery or target group.

The SEI also conducts market research on significant advertising campaigns, such as the "See Red Switch off" (2003) and the "One Degree is Ten Percent"(2004) campaigns. These research programmes were administered within one month of the end of the campaign and looked at awareness, recall, comprehension and reaction to the core television advertisement. These are essentially quick snapshots of the effects and attitudinal changes engendered by the campaigns in question.

The baseline "Attitudes to Energy" research programme is central to the evaluation of one of SEI's central objectives, that of "raising awareness and providing information, advice and publicity on best practice". Obviously, determining causality in this area has to be a central part of the research project; equally, any evaluation of the

effectiveness of SEI in this regard will have to wait until the publication of the result of the programme of research, carried out in the Autumn of 2005. The initial programme of research, published in June 2002, just after SEI became a statutory body (May, 2002) was extremely detailed and comprehensive. A representative sample (consisting of 800 householders) was interviewed, face to face, from 67 sampling locations across the state, in May 2002. The objectives of the study included exploring consumer attitudes and behavioural patterns to energy use and to establish benchmark measures upon which to base future comparative studies. The study included questions on public knowledge of the Irish Energy Centre (forerunner to SEI), and assessed its effectiveness in changing attitudes. The results for various questions were then cross tabulated, allowing analysis of several variables in comparison with each other (such as attitudes to energy use categorised by location, income group or age of respondent).

Such a research project is critical in setting a baseline or index against which the work of SEI can be measured. It is comprehensive and detailed, dealing with all of the areas in which SEI is expected to operate in its Consumer and Marketing Communications guise. The smaller 'snapshot' type evaluations are more valuable for the purposes of this review, given that the larger research project is essentially a background or benchmark exercise and will remain descriptive until the second component is completed.

The research study on the "See Red Switch Off" campaign was comprehensive, in that it was based on a nationally representative quota sample of 940 householders who were interviewed during November 2003. It found that the advertising campaign had achieved a "very respectable" level of impact. The core messages were clearly communicated and a high proportion (46% of those who had seen the advertising campaign were 'much more conscious') responded that the advert had influenced their thinking. The "One Degree Ten Percent" research programme was launched to ascertain the effectiveness of a television advertising campaign to demonstrate that a one degree reduction in heating temperatures could result in a 10 per cent reduction in heating bills. Again, a large quota sample was taken (922 householders) from across the state and a similar degree of success was recorded, both in terms of the communication of the core message and of the reported change in behaviour as a

consequence. Also, it appears that both campaigns had very similar levels of recognition and effect, and similar variations across social and regional categories, important in that it confirms the degree of impact these programmes are having. An additional benefit, identified in both these studies, is that the television campaigns themselves tend to re-emphasise the overall message of SEI in this area, that of the importance and possibility of saving energy through relatively simple means.

Both of these ‘snapshot’ studies show that SEI has been very successful in getting its message across, and in delivering real attitudinal shifts. While a full account of the overall effectiveness of SEI in this regard will have to wait until the publication of its second baseline report, it would seem that the organisation has been quite successful already, even on the basis of the results presented here.

5.2.4 Alternative Energy

This measure is intended to support the construction of renewable energy generation capacity in Ireland, an objective in line with both the analysis contained in the Green Paper on Sustainable Energy and the general rationale used for sustainable energy projects in Ireland, as outlined in chapter 2. The administration and operation of the programme is not quite so straightforward however.

The difficulties experienced by SEI in spending the monies allocated have been outlined in previous chapters, with the main reason for the dramatic underspend in this measure being due to the difficulties with the GUDP. In total, approximately 6% of the funding allocated to this sub measure has been spent in the period 2000-2004. In the previous chapter, the structural, institutional and technical difficulties facing the administration of this sub measure were outlined, and it was pointed out that in most cases much of the responsibility for the lack of spending lay outside SEI. However, the amount of Renewable Energy generation capacity coming on stream seems likely to exceed targets (network problems notwithstanding), posing specific questions as to the need for such a priority in the first place. For example, the financial impetus for private operators to provide much of this capacity has come from outside the work of the SEI.

SEI has a number of different programmes included in the sub measure. The Grid Upgrade Development Programme has already been analysed in detail, with the low

level of spending (approximately €100,000 in the period) being largely due to external factors. The CHP programme is focused on building greater awareness of the potential uses of CHP; to this end SEI have formed a CHP Policy Group (March 2004) and commissioned a number of reports to inform decision making on the subject. The total spend in this area has also been small also, running to just over €120,000 in 2004. The Renewable Energy Information Office has a similarly small spend, running to €68,000 in 2004.

Leaving the GUDP aside for a moment, the other measures in this area were limited in their extent and have essentially functioned as adjuncts to elements of other programmes. The Renewable Energy R&D Programme, part of the Alternative Energy Sub-Measure of the ESIOP but run, for logical reasons, along with the other R&D programmes of the SEI, has already been dealt with. The REIO is run through the Development Services division of SEI, with CHP falling into the Renewable Energy division, along with the transport measure as outlined above. Even in the context of the SEI, these are small programmes.

There does seem to have been a recursive relationship between the SEI (and specifically the REIO) and industry. As interest in renewable energy grew in the private sector, so too did the ability of SEI to spend its allocation. This indicates that there was industry uptake in this area, and equally, that SEI may have contributed to this process, feeding back into greater interest in renewable energy. Anecdotal evidence from SEI and industry suggests that this interest came mainly from the smaller operators, with larger interests more able to operate on their own resources. This indicates that there was a degree of additionality occurring.

Equally, as recognised in the Mid Term Review, the amounts initially allocated were overly large, and even after the reductions which followed the review, difficulties remain in spending the allocation. However, the pace of spending is clearly picking up, and if further progress is to be made in encouraging future investment in renewable energy resources, there is a strong argument that this measure be maintained, albeit in a substantially modified form. Institutional and technical factors aside, it is clear, not least from the experiences of other countries, that there is substantial scope for additional energy provision from renewable sources. SEI

continues to have a valuable contribution to make in this regard, particularly given both the administrative and technical knowledge it has obtained in recent years.

There are a number of possible alternative uses for funds in this regard. Among these is the possible use of SEI's existing contacts within industry to encourage the use of industrial CHP, or to specifically target the agricultural industry, through their representative groups if necessary, to encourage greater awareness of the opportunities offered by both wind and biological energy resources²².

5.3 Conclusion

This review was commissioned to evaluate the performance of the Sustainable Energy Priority (SEP) of the ESIOP. The particularly critical issue that requires explanation and analysis in this case however, is not the uses to which this money was put (though obviously it has been a major component of this review), but rather as to why there were significant delays in spending the allocated resources. This issue poses a challenge to using a typical 'traditional' Expenditure Review, with the associated methodology. Because of this, this review, while still reviewing the expenditure of resources, also ventures into the realm of policy. The twin issues of the effectiveness and efficiency with which money was spent, and the reasons why overall allocations were not reached have proven to be intertwined in a complex and recursive manner.

The objectives were clearly defined and remain entirely compatible with the overall strategy of DCMNR. Changes in the external context have made these measures more relevant since the inception of the ESIOP. The outputs, both in terms of financial goals and the physical target indicators, have been articulated, and the trends involved in both have been identified.

Determining the extent to which the goals of the SEP were reached has been shown to be a complex question however. Many of the outcomes which SEI have been charged to support the delivery of, have been shown to have been at least partly beyond their control. Despite these difficulties, a number of programmes have begun to reach their targets, as outlined in chapters 3 and 4. As already pointed out, these programmes

²² The Irish Farmers Association is already involved in a scheme to deliver lower cost energy to farmers from renewable sources

remain relevant, given pressing concerns in the sector. However, there would be an appreciable benefit to rearranging some of these, and investigating a change in focus for others. Specifically, the degree of deadweight in some elements of the R&D programme suggests that a refocus on certain types of energy provision would be more beneficial. The GUDP, as discussed at length, would be more productively located in an organisation with a more executive role in the energy sector in Ireland, with the CER being the obvious candidate. There is also a substantial role going unaddressed currently in supporting the installation of sustainable energy technologies in domestic dwellings. SEI's work to date has been limited to low income and public service buildings. Given the very large numbers of private dwellings being constructed annually in this state, there exists a significant potential benefit to the state from encouraging greater energy efficiency and greater use of alternative forms of energy.

This review is explicitly not a review of SEI *per se*, but of the SEP. However it is unavoidable that the efficiency with which SEI does its job comes under scrutiny. In that regard, there is no evidence to suggest that the performance of SEI has been particularly poor. Indeed, the empirical evidence suggests that they have improved markedly over time. These circumstances are particularly difficult since a major component of the overall policy framework within which the SEP was designed to operate, the carbon tax, failed to materialise. There were pressing external reasons for this occurring in almost every programme, and SEI themselves relate staffing shortages, and staff turnover, as a major constraint on delivery. However, the incontrovertible fact remains that the SEI fell dramatically behind targets set for it. Given the importance of this area, this pattern bears further investigation, particularly in the light of the increased budget allocation for sustainable energy projects in the 2005 budget.

No 7 in the terms of reference asks that this review should specify potential future performance indicators. This can be done at a number of levels. At a macro, or national level, there are two generic ways in which the success of the Sustainable Energy Priority, and any successors can be gauged. One of these is to use energy intensity as an overall index of the success of national policies. The other is to use the market research carried out by SEI to provide indicators of public awareness of

energy efficiency issues. Both of these should be long term indicators for gauging SEI's performance in delivering the SEP.

At a lower level, the percentage of electricity generated nationally from non hydrocarbon sources is already being used as an indicator, as is the carbon intensity of electricity generation. Both of these should be considered as explicit indicators in the future. The Energy Rating of Homes Programme provides an opportunity for an index of domestic energy efficiency to be used as a performance indicator for the SEI, once the details of that programme are finalised.

Conclusions and Recommendations

5. Given the difficulty in measuring the impact of many of SEI's programmes, particularly in the advertising/promotional area, a greater emphasis on market research to understand the effect these campaigns are having on energy use is advisable. It should also extend to the use of such research to measure awareness in specific energy intensive industries. This should result in the development, and use of, clearer objectives and targets for domestic energy efficiency for the SEI in the future.
6. Many of the programmes run by SEI under the Conservation of Energy Sub Measure lack a meaningful indicator of success due to the nature of the area. The use of *energy intensity* as an index or indicator of success for the country as a whole and by sector bears further investigation. Another potential performance indicator that bears investigation is national awareness of energy efficiency issues.
7. Given international experiences, greater consideration could be given to biomass, biogas and municipal waste as a source for CHP. Opportunities exist for cooperation with other Govt bodies, notably Teagasc and the Department of Agriculture and Food in this regard. Priority should be given to meeting the headline budgets in these areas.

8. Given SEI's existing contacts with industry, opportunities exist for the promotion of industrial biomass, heating or CHP. This is used in industries that require large amounts of heat (such as petrochemical, food processing, wood and paper) and facilitates the sale of electricity to the grid. The announcement of a multi annual capital investment programme in renewable heat and fuel technologies will allow SEI to capitalise on these opportunities and programmes should be developed and rolled out as a matter of priority.

9. The performance of SEI in relation to spending in the period involved bears closer investigation. This review should deal with internal and external factors such as human resource issues, the qualifications of staff. However, if, on closer examination, external factors or a lack of resources are indeed found to be primarily responsible for the lag in spending, there may be action required on the human resources issues.

10. The proposed decentralisation of SEI to Dundalk poses a risk to the work of the organisation. In advance of exploring the relationship between output and resources (see previous recommendation), any staff turnover must be handled carefully to ensure that institutional knowledge is not lost. In particular, the knowledge management strategy underway within SEI (funded via DCMNR's "*Innovation Programme*") should be utilised to the fullest extent possible.

11. There is a substantial argument to be made in favour of state assistance for mainstream deployment of sustainable energy technologies. Given the high number of housing units constructed every year, and the high cost of fuels, greater use of sustainable energy technologies would have substantial energy efficiency and import dependence benefits. The multi-annual funding package announced in Budget 2006, should allow for the deployment of a grants scheme for individual householders and should be rolled out and monitored carefully in terms of impact and cost effectiveness.

12. Greater emphasis should be placed on marketing and encouraging the use of the results of state funded R&D in this sector.

Appendix 1: EIOP Programmes

Energy Audit Grant Scheme (EAGS)

This scheme provided grants of up to 40% to energy users in the industrial, commercial and institutional sectors towards the cost of hiring consultants to conduct energy audits and to advise on the steps to be taken to improve and enhance energy efficiency. It was discontinued after June 1997, on the recommendation of the mid term review of the Energy Efficiency Measure. A total of €2,829,879 was spent on this scheme.

Self Audit Scheme

Activities of this voluntary agreement, additional to the ongoing informal networking, included workshops and site visits focussing on technological solutions such as Energy Management Systems, Efficient Motors, Process Change, and on behavioural solutions such as Staff Awareness and Energy Monitoring and Targeting. A total of €622,801 was spent on this scheme.

Energy Efficiency Investment Support Scheme (EEISS)

This scheme provided grant assistance for investment in energy efficient technologies for the industrial, commercial and institutional sectors. A total of €49,507,357 was spent on this scheme.

Grants for CHP

The IEC launched a special scheme in October 1998 to support the introduction of large scale Combined Heat and Power Plants. A total of €7,024,508 was spent on this scheme, and 16MW of CHP was installed and commissioned by early 2000. A second such CHP scheme was run by the Department of Public Enterprise (DPE) under the auspices of the AER IV scheme.

Other Initiatives

In addition to these grant schemes, a number of other elements of the Irish Energy Centre were funded under the EIOP. These included the IEC building as well as advice and backup. A total of €9,852,959 was spent on these schemes.

Renewable Energy Measure

The Renewable Energy Measure was originally intended to support the first Alternative Energy Requirement Scheme (AER I) which involved the procurement of an additional 75 MW of renewable/alternative based electricity generating plant. When, as it turned out, this grant aid was not required for this competition, the EIOP monitoring committee agreed that the aid should be deployed towards the development of other projects in the Renewable Energy area. The fact that EIOP funding was subsequently withdrawn from 'waste to energy' and 'wave to energy' projects, and the lower requirements of AER III projects, resulted in a significantly reduced spend profile for this measure. A total of €3,730,987 was disbursed in grant aid payments under the measure.

Appendix 2: The Programmes of SEI

As a part of the mid-term evaluation of the ESIOP of the National Development Plan 2000-2006, SEI's proposed funding levels for the years 2000-2006 were reviewed. Total planned investment under the Sustainable Energy Priority of the NDP over the period 2000-2006 was originally €222m. Following recommendations contained in the mid-term review this figure was cut back to a total of €117.08m. SEI does have some other sources of income beyond grants received from the Department of Communications, Marine & Natural Resources. However, this income amounts to less than 2% of SEI's total income over the period 2002-2004 and so can be effectively disregarded as a significant input for the purposes of this expenditure review.

The table below outlines the revised profile, by measure. The sub measures both saw significant reductions in spend, with *Energy Conservation* falling from an original total of €155.69m to €83.52m and *Alternative/Renewable Energy* falling from €66.82m to €5.28m. The latter is somewhat complicated by the fact that, in the revised profile, the spending for the Grid Upgrade and Development Programme (GUDP-€28.613m) was treated separately, as was the CER contribution to grid upgrades (collected through user charges, as recommended by the ESRI review of the ESIOP).

Table 2.1 Revised Profiles by measure, Sustainable Energy Priority (2000-2006)

Measure/Priority	2000 €m	2001 €m	2002 €m	2003 €m	2004 €m	2005 €m	2006 €m	Total €m
<i>Sustainable Energy Priority</i>								
Revised Total	3.69	4.73	9.28	13.36	13.74	16.151	56.462	117.413
Revised ERDF	0	0.15	0.68	1.23	2.12	1.83	22.454	28.344
<i>Energy Conservation</i>								
Revised Total	3.69	4.73	8.28	12.46	13.41	15.30	25.65	83.52
Revised ERDF	0	0.14	0.14	0.74	1.71	1.38	3.94	7.94
<i>Alternative/Renewable Energy</i>								
Revised Total	0	0	1.0	0.90	0.80	0.85	1.73	5.28

Revised ERDF	0	0	0.55	0.48	0.41	0.45	0.91	2.80
<i>Grid Upgrade Programme</i>								
Revised Total	0	0	0	0	0	0	28.613	28.613
Revised ERDF	0	0	0	0	0	0	17.604	17.604
CER Contribution	0	0	0	0	0	0	11.009	11.009

2.5.2 Outputs

With the resources granted it by the Department of Communications, Marine & Natural Resources SEI funds a number of programmes and conducts several research activities. This section details each activity undertaken by SEI and the outputs they generate broken down among sub-categories defined by SEI's market facing teams. A quantification of the outputs generated by the SEI, and success in meeting physical indicator targets are discussed in chapter 3. The remainder of this section consists of an explanation of the work of the SEI and the projects and schemes currently in operation. As previously, the work of the SEI is taken under the headings of the two sub measures, the *Energy Conservation Measure* and the *Alternative/Renewable Energy Measure*. The programmes run under the Conservation Measure are further categorised by type; these categories are *Research and Development*, *Energy Efficiency Programmes (Built Environment)* and *Institutional Infrastructure*.

Energy Conservation Measure

This measure was introduced to address areas of market failure and ensure take up of opportunities for greater energy efficiency. These include the prospects offered by sustainable energy research and the poor energy efficiency of much of the Irish building stock.

Research & Development Sub measure

House of Tomorrow R&D

The aim of the House of Tomorrow Programme is to accelerate improvements in the quality of energy features in Irish housing. It does this by funding projects researching, developing and demonstrating more sustainable energy practices.

Its focus is to stimulate the widespread uptake of superior sustainable energy planning, design, specification and construction practices in both the new home building and home improvement markets.

Programme elements include:

- Research to guide policy and identify barriers to energy performance improvements
- Model demonstration projects
- R&D of products, systems and services

Renewable Energy R&D Programme

The focus of this programme is on stimulating increased application and deployment of renewable energies, particularly those close to market viability.

Programme elements include:

- Research aimed at developing policy options, defining the market structure, reducing costs, improving reliability and/or opening new markets
- Feasibility studies for renewable energy projects
- Demonstration aimed at high risk, high reward projects or non-technical innovation
- Investigation into core areas common to many renewable technologies

A total of 75 applications were reviewed in 2003, of which 37 applications were approved for support.

Energy Efficiency Programmes (Built Environment)

This programme has been formulated in response to the EU Directive on Energy Performance in Buildings (as outlined above). Its aim is to improve the energy efficiency of Irish building stock, focusing, in the domestic arena, on low income households, and in the non residential arena, on the Public Sector.

Home Energy Rating Programme

This programme focuses on the need for a comprehensive nationally recognised Home Energy Rating system with the aim of making energy efficiency in homes an important factor in house purchase and renovation. Its objective is to stimulate householders and investors to identify the most effective means of improving the energy performance of their homes.

Programme elements include:

- Developing the energy audit procedure and tools
- Building a national network of professional capacity
- Developing a national database
- Promotional, financial and regulatory instruments as appropriate

The NDP set a target of 12,000 homes to be rated by the end of 2003, however in light of the introduction of the Energy Performance in Buildings Directive issued in 2002 no homes were evaluated by this programme. Instead SEI commissioned several reports such as a validation study of their draft strategy, a comparative assessment of home energy rating schemes across Europe, a review of the Heat Energy Rating calculation methodology and an assessment of the balance of the work necessary to implement the requirements of the EPBD in Ireland.

Low Income Housing Programme

It is estimated that 62,000 households in Ireland live in persistent fuel poverty and up to 227,000 households are intermittently affected. This programme contributes to the establishment and implementation of a national plan of action to address fuel poverty in low-income households.

Programme elements include:

- Improving the energy efficiency of homes occupied by low-income householders
- Increasing the capacity of organisations in Ireland to deliver such measures
- Supporting this action through a targeted information and awareness-raising programme. And partnership building a local, regional and national level

The NDP called for 7,500 homes to have improved energy efficiency and comfort by the end of 2003. The total number of homes improved under this scheme to date has been 4,868. Five community based organisations were also approved for funding under this scheme. Finally a strategy review “A review of fuel poverty and low-income housing” was also concluded and launched at a seminar in 2004.

Public Sector Investment Programme

The Green Paper on Sustainable Energy proposed that the public sector should be an exemplar in implementing energy efficiency best practice. SEI’s industry and public sector programme is designed to enable significant energy efficiency improvements to be made in new buildings and in the refurbishment of public buildings. It also includes the establishment of energy management operations to encourage the provision of contracted energy control and management for Public Sector buildings.

Programme Elements include:

- Design studies to highlight new opportunities for energy efficient solutions in refurbishment and construction
- Model solutions to support new investment in more energy efficient solutions
- Energy management bureau operations to encourage the provision of contracted energy control and management for public sector buildings

Institutional Infrastructure

This sub measure covers a number of programmes aimed at increasing energy efficiency (and awareness thereof) within Industry and among the public, as well as SEI's administrative costs and provision of policy advice to Government.

Large Industry Energy Network

The Large Industry Energy Network (LIEN) is a voluntary networking initiative of 80 of the largest industrial sites dedicated to reducing their energy intensity on a collaborative basis.

The programme's main elements are:

- Reporting energy performance progress and setting realistic targets
- Sharing information and replicating best practice, via workshops, courses, studies and awards
- Improving competitiveness by reducing energy costs
- Assisting companies in meeting environmental and regulatory requirements

LIEN membership now accounts for approximately 40% of industrial energy spend and 9.4% of the national primary energy requirement. This exceeds the 33% target specified in the NDP. The Minister also launched the LIEN 2002 Report in August 2003. This report concluded that members had achieved savings of €1.4 million, which corresponds to a reduction of 24,000 tonnes of CO₂. The network also

organised workshops and seminars for members and published newsletters detailing recent developments in the area.

Industry Energy Network

Elements of this programme include:

- Stimulating uptake of best practice techniques and technologies within industry
- Encouraging and supporting energy research, development and technology demonstration (RDD)

The NDP called for this programme to generate 5 new capability packages, 2 new award scheme and 10 training packages by 2003. As of the end of 2003 there were 4 new capability packages, 1 new award scheme and 5 training packages in place.

The Consumer Information and Marketing Communications Programme

The residential sector accounts for one quarter of Irish energy-related CO₂ emissions. The sector is characterised by moderately high levels of awareness of basic energy efficiency measures. However, consumers are generally not very aware of the environmental impacts of energy use or Ireland's international obligations. Consumers indicate a willingness and desire to become more energy efficient, but this is not generally matched by genuine action.

The consumer information programme aims to progress society towards higher levels of awareness and action in favour of more sustainable energy behaviour.

The programme includes:

- Energy Awareness Week
- Information and advice through brochures, telephone hotline and exhibitions
- Consumer behaviour activities

- Schools initiatives to inform early formation of long-term behaviour and attitudes

The outputs of this programme included the launch of a new suite of consumer information brochures, attendance at the high profile Ideal Homes Exhibition, participation in European Car Free Day, co-ordinated nationally by SEI and the Department of Environment, Heritage and Local Government. Numerous inspections of retail outlets were also undertaken to ensure their compliance with labelling legislation. Compliance rates were found to generally range from 71% in the case of fridges to 88% for lamps.

The Energy Policy Statistical Support Unit (EPSSU)

The EPSSU was established within the SEI to accomplish its requirement, under the 2002 Sustainable Energy Act, to develop and maintain comprehensive national and sectoral statistics for energy production and end use. Part of its role is to conduct analyses of the sector to inform policy advice and contribute to the development of suitable indicators for future programmes.

Alternative/Renewable Energy Measure

This measure is aimed at encouraging the development and deployment of alternative energy sources by addressing a number of infrastructural constraints. These constraints act, in a number of ways, to slow progress towards the target of having an additional 500MW of renewable energy sources connected to the grid by end 2005.

Grid Upgrade Development Programme

Ireland's electricity grid is, as currently configured, unsuitable for the connections of large numbers of small to medium scale renewable and CHP generators, sited mostly in remote areas. This presents a barrier to the deployment of these technologies. Removing these barriers will help stimulate growth of Irish renewable electricity.

The main objective of this programme is to remove a strong disincentive against being the first renewable project in areas with poor electricity infrastructure, and to optimise the amount of electrical infrastructure and reduce associated planning difficulties. Elements of this programme include developing a focused grid

infrastructure extensions and reinforcement programme for renewables and committing funds to upgrade the distribution and transmission network.

The Grid Investment Programme was designed to assist in bringing planned renewable electricity generation projects to fruition. This Programme has been significantly revised following the Mid-term Review of the ESIOP/NDP.

Following the Mid-term Review of the ESIOP/NDP the overall programme was reduced from €67m to €28.28 million. This will be expended in the period up to the end of 2006. The programme is to be rolled out using co-financing through Transmission Use of System Charges (TUoS) as agreed by the CER.

This €28.613 million is comprised of €10.97m in co-funding from the TUoS and €17.604 million in funding from the post Mid-Term Review of ESIOP. This funding is sourced from the ERDF.

Combined Heat and Power (CHP)

The SEI Combined Heat and Power (CHP) programme seeks to build greater awareness of the impacts and benefits of CHP technology, and ultimately lead to an increased willingness by financiers to support CHP developments.

Elements of the programme include:

- Identifying and removing inappropriate barriers to development
- Assisting the development of project financing and other market stimulation measures
- Support for up to five feasibility studies and implementing and monitoring two demonstrations

The NDP called for two CHP schemes to be undertaken. To achieve this D/CMNR, in association with Sustainable Energy Ireland (SEI), established a CHP Policy Group, representative of Government, research and industry interests, in March 2004. The objective of the group is to consider the most suitable and appropriate environments

in which CHP can usefully be implemented in Ireland, so as to maximise energy efficiency. The Group will consider the policy options and support mechanisms available to Government to stimulate increased and appropriate use of CHP and consider specific recommendations for action to increase the penetration of CHP at appropriate locations / installations in Ireland. The Group will also consider suggestions for the implementation of a national policy on CHP, based on staged, achievable targets. The group will publish a report on its findings and the report will form the road map and vision for Government policy and action for CHP in Ireland.

REIO

The Renewable Energy Information Office (REIO) is a national service provided by SEI, established to promote the use of renewable energy resources and provide independent advice and information on financial, social and technical issues relating to renewable energy development. It facilitates the increased use of energy from renewable sources such as wind, solar, biomass, geothermal and hydropower.

Elements of this programme include:

- Publishing a regular newsletter, and a range of information brochures
- Maintaining a database of relevant parties in Ireland who have a key role to play in the further growth of the renewable energy industry
- Organising conferences, workshops and information meetings on issues relevant to renewable energy
- Providing a priority advice service for local authority planners and decision makers

The NDP called for this sub-measure to contribute towards achieving 500 MW additional capacity from renewable energy. Though only 205 MW were installed, with an additional 107 MW under construction, to end 2003 the REIO supported this achievement by holding three national conferences, conducting several information evenings and study tours and holding technology exhibits. The REIO help desk also dealt with several thousand calls and published numerous documents on various areas of renewable energy.

The aim of this programme is to promote a range of energy management technologies and techniques. These include monitoring and targeting, energy auditing, raising energy awareness, lighting, building energy management systems and heating controls.

Appendix 3: Legislation and Directives

This section deals with the various pieces of legislation and EU Directives that influence the Irish Energy Sector.

Sustainable Energy Act 2002

The Sustainable Energy Act came into force on May 1st 2002. It provided for the establishment of Sustainable Energy Ireland, formerly the Irish Energy Centre, as Ireland's national energy authority, and laid out the roles and responsibilities of the SEI.

Biofuels Directive 2003/30/EC

The Biofuels Directive requires Member States to set indicative targets for a minimum proportion of biofuels and other renewable fuels placed on their markets. The Directive established reference targets of 2% market penetration of biofuels in transport by end 2005 and 5.75% by 2010. Ireland submitted its first report to the Commission in late 2004. Discussions with relevant Government Departments are ongoing, with a view to developing a policy strategy for Ireland's biofuels sector and identifying indicative targets for 2005, as required by the Directive. Targets for 2010 are not required at this point.

Combined Heat and Power Directive 2004/8/EC

The aim of this directive is the “... *promotion of cogeneration based on a useful heat demand in the internal energy market*”. This Directive creates a framework for promotion and development of high efficiency cogeneration of heat and power based on useful heat demand and primary energy savings, taking into account the specific national circumstances especially concerning climatic and economic conditions.

The implications of the Directive for Ireland are not significant. The Directive does not set targets for cogeneration or specify any particular or harmonised support mechanisms for the technology. Instead the Directive aims, after appropriate consultation, to harmonise the methodology for defining high efficiency cogeneration and remove any technical barriers to trade in electricity generated by cogeneration

plants.

On a technical level the statutory and administrative procedures to enable the transposition of the Directive into Irish law are largely in place. The Directive is helpful in that it will establish a harmonized definition for what constitutes high efficiency cogeneration or CHP eliminates uncertainty on this point and provides for a guarantee of origin system.

Energy Rating Of Buildings Directive 2002/91/EC

A Directive requiring certification of the energy rating of residential and non-residential buildings is due to come into force in 2006. This is an issue with cross-departmental responsibility with the Department of the Environment, Heritage and Local Government. Together with SEI, both Departments are developing an implementation plan for the transposition of the Directive.

Following legal advice on which legislative route would be best to introduce this Department's areas of responsibility under the Directive, it appears that transposition under Section 3 of the European Communities Acts 1972 to 2003 will be the chosen mechanism for transposition.

The Directive requires 3 new legislative provisions;

- Enhanced energy efficiency standards for new buildings and major renovations from 2006 onwards,- DOHELG.
- Certification of energy rating of all buildings offered for sale or rent, - DCMNR.
- An inspection regime for boilers and air conditioning systems, - DCMNR.

Boiler Efficiency Directive 92/42/EEC

Council Directive 92/42/EEC regarding efficiency requirements for new hot-water boilers fired with liquid or gaseous fuels was introduced in May 1992. The Directive requires all boilers to be certified as operating to certain efficiency standards. The certification is carried out by "Notified Bodies" in Britain and Northern Ireland. The

Notified Bodies are also responsible for ensuring that their certification is complied with and have a shared information network on compliance, across Europe.

Ireland provided for the establishment of a “Notified Body” in the implementing regulations but did not appoint such a body, given the relatively small nature of the business in Ireland and availability of testing services in Britain and Northern Ireland. The Directive does not specifically require Ireland to establish a such a body.

The Directive also allows Member States to appoint “authorised officers” who have powers of inspection at manufacturing premises and can remove boilers for testing, to ensure compliance with the Directive. The Minister may order the withdrawal of an appliance from service if it is found that the boiler does not comply with the relevant EU standards.

Energy Appliance Labelling Directive 2003/66/EC

Commission Directive 2003/66/EC 2003 regarding energy labeling of household electric refrigerators, freezers and their combinations was introduced on 3 July 2003. The aim of Directive 2003/66/EC is to divide the existing energy efficiency rating category of A on energy labels, required to be affixed to household refrigeration appliances displayed for sale, into 3 new categories (A, A+ and A++). This updates a previous Directive and regulations, to take account of technology improvements. The Transposing S.I. has been drafted and manufacturers will be obliged to include the A+, A++ categories on all labels from December 2004.

Renewables Directive 2001/77/EC

The EU Directive on the promotion of Renewable Energy Sourced – Electricity (RES-E) was published in 2001. The Directive includes a table addressing individual indicative targets for the increased consumption of RES-E in each member state. In the case of Ireland the indicative target is 13.2% by 2010. This compares reasonably with the national target of 500MW by 2005 estimated as equivalent to 12%.

The Directive requires member states to perform a number of incidental obligations regarding, for example, reports and costing. Irish legislation liberalised the entire green electricity market prior to the publication of the Directive. Reviews of the

regulatory rules and support programmes are ongoing to ensure the Directive's target is delivered.

Emissions Trading Directive 2003/87/EC

The European Emissions Trading Scheme (EU ETS) is to be the world's first multi-national emissions trading scheme. The initial pilot phase is due to begin on January 1, 2005 and will run up to 2007. The second phase will incorporate the Kyoto Protocol commitment period and will run from 2008-2012. The scheme will initially only apply to those installations above a certain threshold and to emissions of CO₂, though other greenhouse gases and sectors may be incorporated into the scheme at a later date. In Ireland this will cover all fossil fuel power generation stations and approximately 70% of CO₂ emissions from the industrial sector. It will follow a cap and trade approach with installations being allocated a set amount of allowances which they must either surrender at the end of the trading period or instead buy additional allowances on the market to cover any shortfall.

Energy End-Use Directive COM 739(2003)

This proposed Directive is currently at Working Group Stage and is being discussed by the EU Working Group on Transport and Energy. The Proposed Directive proposed a mandatory reduction in energy usage by 1% per annum, and 6% by 2012. There is also a Public Sector target of 1.5% per annum. The Directive will obligate suppliers to provide detailed information to consumers, encouraging more efficiencies.

Appendix 4: SEI Spending in 2005

Energy Conservation

Sub-Measure	Programme	Annual Budget	Budget to Sept 2005	Total Spend to Sept 05
Institutional Infrastructure	Pay and Related Costs	€3.578	€2.674	€2.739
	Non Pay Costs	€2.573	€1.694	€1.691
	Total	€6.151	€4.368	€4.430
Built Environment	Public Sector	€1.550	€0.913	€1.088
	Home Energy	€0.450	€0.205	€0.135
	Low Income Housing	€1.550	€1.207	€1.033
	Total	€3.550	€2.325	€2.256
R&D	House of Tomorrow	€2.600	€1.950	€1.832
	Renewable Energy	€2.400	€1.615	€1.334
	Industry	€0.600	€0.514	€0.243
	Total	€5.600	€4.079	€3.409
	Total Energy Conservation	€9.150	€6.404	€5.665

Alternative Energy

Sub-Measure	Programme	Annual Budget	Budget to Sept 2005	Total Spend to Sept 05
Grid and CHP	Electricity	€0.00	€0.00	€0.00
	Heat and CHP	€0.135	€0.061	€0.067
	Info and Support (REIO)	€0.715	€0.510	€0.516
	Total	€0.850	€0.571	€0.583

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