Action Plan
Under Article 14(2) of
Directive 2006/32/EC

Ireland

Department of Communications, Energy and Natural Resources
An Roinn Cumarsáide, Fuinnimh agus Acmhainní Nádúrtha

Table of Contents

Executive Summary 2

Chapter 1 Introduction 4
Chapter 2 Targets and Savings 12
Chapter 3 Public Sector 16
Chapter 4 Business Sectors – Commercial and Industrial 22
Chapter 5 Residential Sector 30
Chapter 6 Transport Sector 39
Chapter 7 Electricity Supply Sector 45
Chapter 8 Research and Development 51
Chapter 9 Cross Sectoral and Underpinning Measures 54

Annex 1 Methodology for Calculating Energy Savings Targets 60
Annex 2 Methods and Assumptions for Projected Energy Savings 63
Annex 3 Delivery Schedule 67

Glossary of Terms 72

Executive Summary

This Action Plan is Ireland's response to the requirements of Article 14(2) of the Energy End-Use Efficiency and Energy Services Directive (ESD)[1]. The Department of Communications, Energy and Natural Resources is the lead Department in implementation of the ESD in Ireland. The ESD requires Member States to submit an action plan in 2007 setting out how they will achieve energy efficiency savings of 9% by 2016. The ESD envisages Member State's 2007 action plans as preliminary, with more advanced plans to be submitted in 2011 and 2014. Implementation of this Action Plan will be monitored and the Plan updated as needs be, but no later than 2011.

This Action Plan also sets out Ireland's plans for achieving a 20% (33% for the public sector) reduction in energy demand across the whole economy by 2020, including the electricity, transport and heating sectors, in line with Government commitments in the 2007 Government Sustainable Energy White Paper 'Delivering a Sustainable Energy Future for Ireland' and the Programme for Government and echoing the aims of the EU Energy Efficiency Action Plan, published in October 2006.

Energy efficiency is about achieving the same result with less energy. Energy efficiency is a central component of Ireland's sustainable energy policy, as set out in the Sustainable Energy White Paper. The White Paper sets out the energy policy framework for 2007-2020, designed to steer Ireland to a new and sustainable energy future. Energy efficiency helps us reduce greenhouse gas emissions and energy costs. Efficient energy use directly contributes to security of energy supply, sustainable transport, affordable energy, competitiveness and environmental sustainability. Developing energy efficiency products and services will also support jobs and growth in the energy sector. Energy efficiency is therefore a priority for Ireland, as it is for the European Union.

Energy Saving Targets

Table 1 sets out the ESD and national targets for energy efficiency, the related energy savings expressed as Gigawatt Hours, primary energy equivalent, and the basic underlying calculations for these savings.

Table 1: Reference Energy Consumption and Target Savings Values

	Target Energy Saving PEE[2]	
ESD 9% Target 2016	**(ktoe)**	**(GWh)**
Reference Energy Consumption	12,531	145,741
ESD Target (9% of Reference Energy Consumption)	1,128	**13,117**
ESD Interim Target 2010		**6,500**
White Paper 20% Target		
Reference Energy Consumption	13,725	159,624
White Paper 20% Target (20% of Reference Energy Consumption)	2,745	**31,925**

Energy Savings

Table 2 summarises the projected impacts of all existing and committed actions, demonstrating how they build to meet the ESD and National energy savings targets. Details of the actions are presented in each Chapter and the basis for the projected impacts is set out in Annex 2. It should be noted that all projections of savings impacts are best estimates based on current data and assumptions. All projections will be developed and refined on an ongoing basis, as additional data becomes available. Table 4 in Chapter 2 presents this table in more detail.

[1] Directive 2006/32/EC
[2] PEE – primary energy equivalent

Total predicted savings in 2020 amount to 34,885 GWh PEE, exceeding the national 20% target of 31,925 GWh PEE. The 34,885 GWh saving is made up of a contribution of 23,895 GWh PEE of efficiency savings from known actions and 10,990 GWh PEE of additional identified potential. This additional potential comprises the public sector 33% target and additional economic potential known to exist in the business and residential sectors, but not yet captured by known actions.

Table 2: Energy Efficiency Savings

	Savings towards targets (GWh) PEE		
	2010 (ESD Target)	**2016 (ESD Target)**	**2020 (National Target)**
Business and Public Sectors	1,300	1,659	9,880
Residential sector	2,730	10,315	18,370
Transport Sector	2,170	5,450	5,450
Electricity Supply Sector	375	850	1,185
OVERALL TOTAL	**6,575**	**18,274**	**34,885**

Comparison of 2016 and 2020 Savings

Care should be taken in comparing the impacts in 2016 and 2020. In some instances it may appear that very substantial progress is made between 2016 and 2020. This is largely caused by differences in the method of calculation. Principally, the EU Emissions Trading Sector is required to be excluded from the ESD analysis, while the National Target covers the whole economy. Annex 1 provides further detail on the methodology used to calculate the targets.

Our Actions

Achievement of the 20% target will require action across the entire economy. The Delivery Schedule at Annex 3 summarises our actions for each sector of the economy and details the agency responsible for delivery and the timeframe. Sectoral chapters provide more detail on each of the actions.

Conclusion

This Action Plan demonstrates how Ireland will achieve and exceed its ESD and national energy efficiency targets through a mixture of known actions and identified potential that will be captured as the wider technological and policy context evolves. Achievement of our targets will require well thought out and coordinated policy action. Ultimately, success in this endeavour will help reduce our dependence on imported fossil fuels and increase Ireland's competitive position in the global economy, while contributing to a more sustainable future.

CHAPTER 1

INTRODUCTION

1.1 Energy Efficiency

The ESD defines energy efficiency as 'a ratio between an output of performance, service, goods or energy, and an input of energy'. Improving energy efficiency means that the benefits we derive from our energy use become greater in proportion to the amount of energy used. As the EU Energy Efficiency Green Paper put it - doing more with less!

1.2 Purpose of this Document

This Action Plan is Ireland's response to the requirements of Article 14(2) of the Energy End-Use Efficiency and Energy Services Directive (ESD)[3]. The Department of Communications, Energy and Natural Resources is the lead Department in implementation of the ESD in Ireland. The ESD requires Member States to submit an action plan in 2007 setting out how they will achieve energy efficiency savings of 9% by 2016. The ESD envisages Member State's 2007 action plans as preliminary, with more advanced plans to be submitted in 2011 and 2014. Implementation of this Action Plan will be monitored and the Plan updated as needs be, but no later than 2011.

This Action Plan sets out the path to achieving a 20% (33% for the public sector) reduction in energy demand across the whole economy by 2020, including the electricity, transport and heating sectors, in line with Government commitments in the 2007 Government White Paper 'Delivering a Sustainable Energy Future for Ireland' and the Programme for Government. The Plan also demonstrates Ireland's commitment to meeting the 20% energy savings target set out in the EU Energy Efficiency Action Plan, published in October 2006. Together with other Member States, Ireland endorses the need for an ambitious multi annual programme of priority actions. We have agreed a shared goal to realise a 20% energy saving for Europe by 2020, which will potentially mean annual savings of €100 billion and 390 Million tonnes oil equivalent, while reducing the EU's CO2 emissions by more than twice the Kyoto Protocol requirement by 2012. The EU Action Plan sets out 10 priority actions and will see the progressive negotiation and roll out of measures between 2007 and 2012 to achieve the 20% savings by 2020

The Plan demonstrates Ireland's commitment to significant improvements in energy efficiency as part of its broader policy, designed to enable Ireland to address future energy challenges and deliver a sustainable energy future.

1.3 Historic and Projected Trends for Energy Use

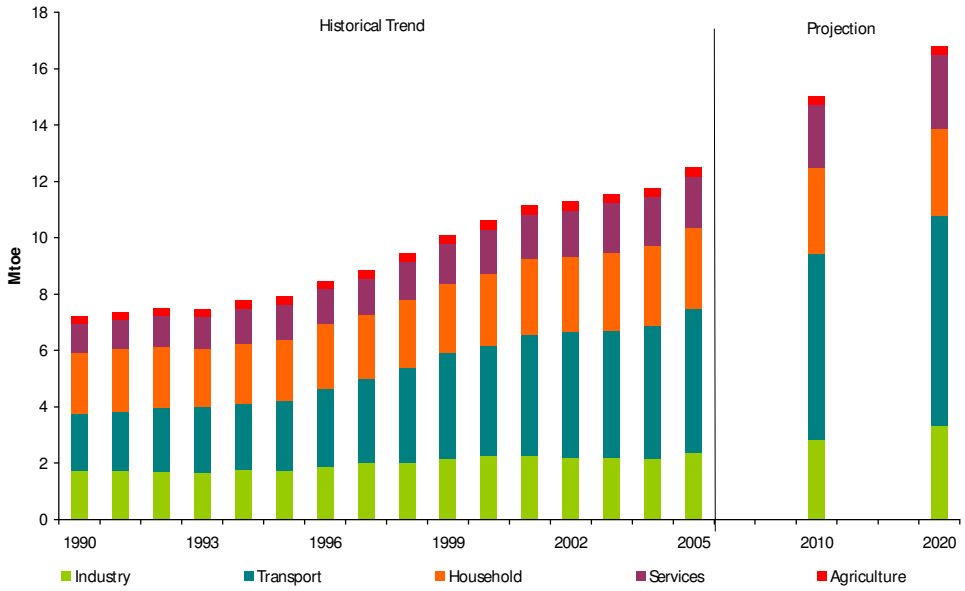
Ireland's demand for energy has grown by over 70% in the last fifteen years, with usage increasing in every sector. Energy demand has been projected to grow by about 30% between now and 2020. This is illustrated in Figure 1 which shows historical trends in energy demand and future projections carried out by SEI and ESRI.

Ireland's energy demand growth stems from increased economic activity and our rising standards of living. Ireland is not alone in this. The International Energy Agency projects a 50% increase in world energy demand by 2030, and a doubling between now and 2050, with the fastest growth in developing countries. The bulk of this demand is expected to be met by fossil fuels.

[3] Directive 2006/32/EC

Continued global growth on this scale presents many challenges. Increasing demand for oil and gas is causing increasing and volatile fuel prices and concerns over security of supply. Greenhouse gases are causing global environmental change with potentially very serious consequences.

Figure 1: Total Final Demand for Energy by Sector 1990-2020 (final energy consumption)



Source :SEI

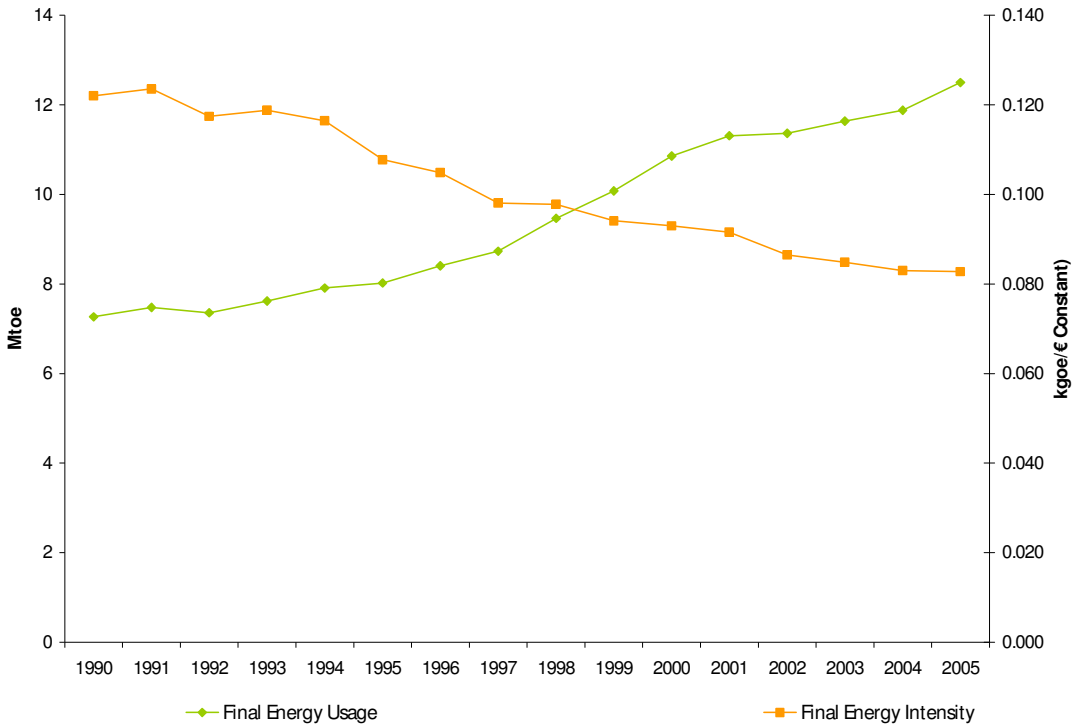
1.4 Potential for Improved Energy Efficiency

Efficient use of resources is one of the core principles of sustainable development – it extends the resource base over time, reduces negative impacts, and frees up resources for use in other socially important activities. Some progress has been made in improving energy efficiency in Ireland. While overall demand continues to grow, energy intensity (as measured by the energy usage per unit of GDP) has fallen by 32% between 1990 and 2005, as illustrated in Figure 2. This has been due both to structural change in the economy (the trend towards higher value-added, less energy-intensive activity in industry and commerce in particular) and also to improving energy efficiency in itself.

There is great potential to increase the efficiency of energy use in Ireland and hence reduce demand from what it otherwise would be. According to the EU[4], energy demand could be reduced by 20% through currently available efficient technologies. Importantly, this could be done economically with the cost to society of delivering the improvements less than the value of the energy savings.

[4] EU Green Paper on Energy Efficiency 'Doing More With Less' 2006

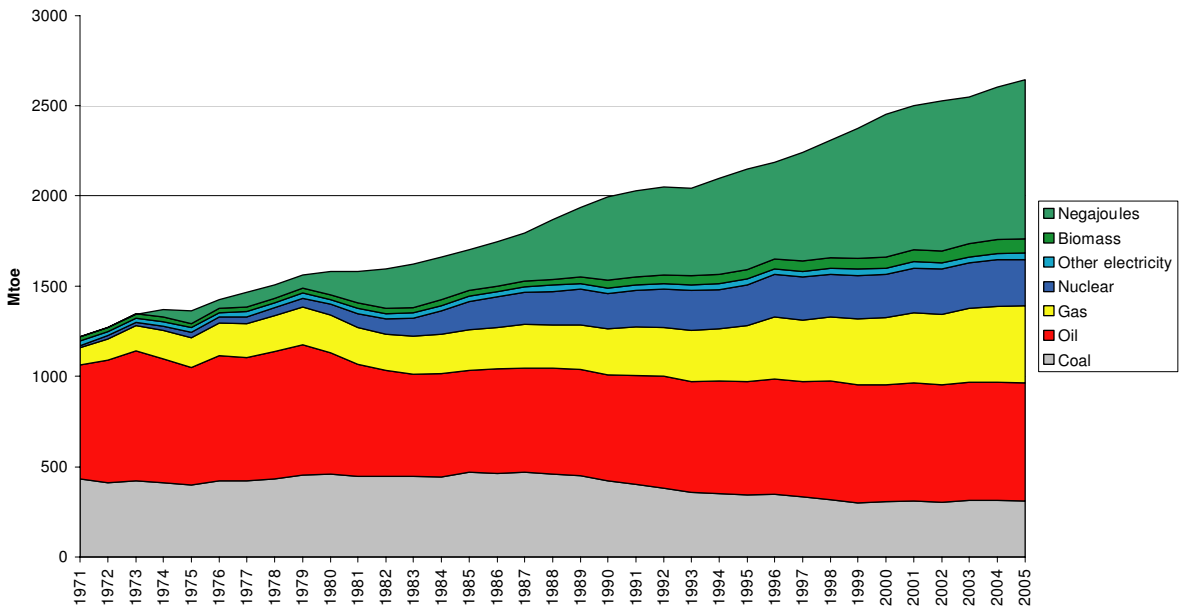
Figure 2: Energy Usage 1990 -2005 (final energy consumption)



Source :SEI

The savings available from efficiency are sometimes referred to as 'negajoules', indicating that they are a vital component of meeting future demand, and just as important as developing new supply sources. Improvements in supply or deployment of renewables are undermined if such resources are not being used efficiently.

Figure 3: Meeting EU Energy Demand – The Contribution of 'Negajoules' (final energy consumption)



Source: EU Action Plan. 'negajoules' : energy savings calculated on the basis of 1971 energy intensity

Economic modelling[5] of the Irish energy economy has shown that there is considerable economic opportunity for investment in energy efficiency – opportunity that offers a positive private net present value, even before societal benefits are taken into account.

SEI has undertaken extensive new modelling work of the Irish energy economy. The model analysis provides estimates of the potential for energy efficiency gains, along with how much of this potential could be achieved through a comprehensive suite of strong support measures and actions. The analysis suggests that potential gains on the basis of fully economic investments and currently available technologies are equivalent to about 24% of current demand (in the sectors examined: industrial, commercial and public, and residential). Even though this potential is economically favourable in itself, international experience indicates that a strong programme of measures will to be required to achieve the savings.

Improving energy efficiency makes sense in that it gives economic benefits through direct savings, moderates prices, reduces the need for investment in supply, and increases security of supply. It also brings environmental and social benefits, not least in addressing the urgent need for emissions abatement in order to help tackle climate change. It makes sense for the consumer too – efficient energy use can make life more comfortable and convenient at lower cost, and fits with the rapidly growing societal interest in smart and environmentally oriented lifestyles.

1.5 Challenges and Solutions

Historic rates of improvement of energy efficiency will not be sufficient to achieve the proposed targets. Substantial additional activity will be required.

There is significant potential in Ireland for energy efficiency gains through actions and technologies that are well proven and make very good economic sense. The role of Government policy and action is to address the reasons why these gains do not happen in the market by themselves. There are a number of widely recognised market barriers to energy efficiency, not least price. Often energy prices or the costs and benefits of efficiency actions do not fully reflect their true societal impact. The costs to society of climate change is a prime example and the proposal in the Programme for Government to consider a carbon tax recognises the importance of giving correct market signals.

The measures for stimulating better energy efficiency involve technology, infrastructure, behaviour, legislation and, of course, policy. There are many technologies available in all sectors that are well above average energy efficiency, and it is important that these are known to potential buyers, that they are able to make rational decisions about their potential benefits, and that the 'natural' trend towards more efficient technology is greatly accelerated. It is equally important that behaviour is also oriented towards energy efficiency, recognising that ultimately we all use energy and we must determine how well it is used. This suggests the requirement for intervention in relation to market barriers such as lack of information or lack of trust in information.

It is the task of government to set market and policy conditions so that everyone recognises their best interest and acts on it. This means there should be a market interest in energy efficiency, with a healthy supply of energy efficient technologies, advice and services. Markets will respond to opportunities if they are attractive, but the conditions need to be supportive and stable so that people can make decisions that will continue to bring benefits to them. The long-term commitments of the Sustainable Energy White Paper, and of this Action Plan, now set the context for informed pro-efficiency decisions and actions that will bring benefits to individuals and to society.

A key benefit of increased energy efficiency is the potential to save money. Some actions set out in this Action Plan may involve initial costs on the part of Government or consumers but they will result in economic gains to society. These actions will make business more competitive, homes more comfortable and Ireland more environmentally sustainable.

[5] Including two major studies conducted recently for SEI by Indecon and Kema Consultants

1.6 Policy Framework

1.6.1 National Policy

Sustainable energy policy is set out in the 2007 Government White Paper, '*Delivering a Sustainable Energy Future for Ireland'*. The Sustainable Energy White Paper lays out the energy policy framework for 2007-2020 designed to steer Ireland to a new and sustainable energy future. The framework is set in the context of the continuously unfolding global and European policy making.

The Sustainable Energy White Paper places sustainability at the heart of the Government's energy and environment policies. It sets strategic goals for -

- ensuring security of supply,
- sustainability of energy supply and use, and
- enhancing the competitiveness of energy supply.

Moving towards energy sustainability implies accelerating the growth of renewable energy supply while maximising energy efficiency. Each of these goals contributes to addressing climate change, to increasing security of supply and to improving economic competitiveness. The Sustainable Energy White Paper lays out a series of specific targets and essential actions to meet those goals and makes clear the importance of energy efficiency as a key component of Irish sustainable energy policy. It states that -

> *"Energy Efficiency and energy savings are pivotal to meeting Ireland's sustainable energy goals. It helps us reduce carbon emissions and energy costs.*
>
> *"Efficient energy use directly contributes to security of energy supply, sustainable transport, affordable energy, competitiveness and environmental sustainability.*
>
> *"Developing Energy Efficiency products and services will also support jobs and growth in the energy sector. Energy efficiency is therefore a priority for Ireland as it is for the European Union".*[6]

The National Climate Change Strategy (2007-2012) is another important source of energy efficiency policy and actions in Ireland. The Strategy includes a range of energy efficiency measures that will contribute to greenhouse gas emission abatement. The Sustainable Energy White Paper and the National Climate Change Strategy are complimentary parts of Ireland's integrated and cross-cutting response to the challenges of energy sustainability and climate change.

The Programme for Government published in June 2007 follows up the commitments in the Sustainable Energy White Paper and National Climate Change Strategy and also sets out important new elements of Ireland's sustainable energy response that will be highlighted in this Action Plan.

The goals in the Sustainable Energy White Paper are reflected in Ireland's National Development Plan 2007-2013 (NDP 2007-2013), which includes very significant investment plans to contribute towards sustainable energy objectives, contained principally in two priorities within the plan. The Economic Infrastructure Priority aims *to 'promote security of energy supply, which is competitively priced, in the long term and implement a significant programme of energy diversification with beneficial environmental effects'.*

A Sustainable Energy Sub-Programme of the Economic Infrastructure Priority will encompass investment in renewable energy measures, energy efficiency measures and integration and innovation measures. The renewable energy measures will focus on the large-scale deployment of wind energy, the emerging potential and deployment of biomass and biofuels, preparatory action on ocean energy

[6] Delivering a Sustainable Energy Future for Ireland, 2007, p.40

and deployment of other technologies such as solar and geothermal technologies. The energy efficiency measures will comprise actions that deliver the targets discussed in the Action Plan. The integration and innovation measures will focus on integrating sustainable energy practices and structures into public policies and developing regional and national infrastructures. There will be two sets of activities: the integration of national sustainable energy policy measures at a regional and city level; and the smaller-scale piloting and evaluation of sustainable energy technology options, including those in the renewable energy, energy efficiency and urban transport areas.

The second priority of NDP 2007-2013 of particular relevance is the Enterprise, Science and Innovation Priority, the objective of which is to fully implement the Strategy for Science, Technology and Innovation in the period to 2013. This priority will fund the research activity discussed in Chapter 8 of this Action Plan.

1.6.2 European Union Policy

The European Union published its energy efficiency action plan entitled *Action Plan for Energy Efficiency- Realising the Potential*[7] in October 2006. At the outset the plan recognises that saving energy is the easiest, quickest and most effective way to answer the challenge of society's growing energy dependence, while helping to reduce damage to the environment. It outlines a framework of policies and measures to save 20% of EU annual primary energy usage by 2020. It proposes 10 targeted priority, cost-effective, energy efficiency improvement initiatives (actions) to be put in place and implemented in the coming six years. The ambition is to mobilise market actors and to transform the internal energy market, with the objective of providing EU citizens with the most energy-efficient buildings, appliances, processes, cars and energy systems in the world. The plan calls for political will and engagement at national, regional and local level to ensure the objectives are achieved.

The Government has welcomed the EU's ambitious Action Plan and, together with the other Member States, endorses the need for a multi-annual programme of priority actions. In its Sustainable Energy White Paper and its Programme for Government, the Government has committed to achieving the EU 20% energy savings target.

One of the key parts of the EU's policy framework in this area is the ESD. The ESD is an overarching Directive which seeks to promote cost-effective energy efficiency in EU member states through various promotional, awareness and support measures and through the removal of institutional, financial and legal barriers. It also aims to promote the development of a sustainable market for energy efficiency and related services. It applies to the Government and also to the providers of energy efficiency measures; energy supply, distribution and retail companies; and final users of energy. The ESD is largely an enabling Directive, intended to increase the focus on cost-effective and verifiable energy efficiency measures and to encourage the development of new business and activities in the area of energy services. Examples include the growth in energy auditing, smart metering, billing and financial instruments for energy saving.

The ESD requires Member States to submit an Energy Efficiency Action Plan (EEAP) in 2007 that describes the energy efficiency improvement measures planned to reach targets set for 2010 and 2016 which will be monitored by the EU. Lists of options for measures are provided, though relatively few specific requirements are stipulated. The ESD requires that further action plans be submitted in 2011 and 2014. These later, more advanced EEAPs must include a thorough analysis and evaluation of the preceding EEAP and its achievement of targets and set out plans for adjustment or addition to the actions in light of experience.

This Action Plan fulfils Ireland's commitment to deliver a first energy efficiency action plan, setting out how the provisions and targets of the ESD will be met.

[7] COM(2006)545 final

1.7 Structure of this Action Plan

This Action Plan discusses in Chapter 2 the sources of our energy efficiency targets, how they are calculated and the energy equivalent that corresponds to the targets. Chapter 2 also sets out in more detail in Table 4 the energy savings expected for each sector. Finally it discusses issues concerning monitoring and measuring of savings.

Chapters 3 to 7 set out our actions for the Public Sector, Business and Industrial Sectors, Residential Sector, Transport Sector and Electricity Supply Sector respectively and detail our existing early actions on the energy efficiency of those sectors and the further actions we have committed to.

Chapter 8 discusses our research and development activities relevant to energy efficiency. While these do not contribute directly to the achievement of our energy efficiency targets, they are nonetheless vital to the development of the technologies, processes and practices that do contribute to those targets.

Chapter 9 discusses our Cross Sectoral and underpinning actions, including supporting the development of energy service companies, awareness raising, training and accreditation schemes and fiscal measures including a carbon tax.

Annex 1 discusses the methodology employed in this Action Plan for calculating targets and energy savings, while Annex 2 provides detail on the sources, methods and assumptions used to calculate energy savings for measures contributing to the overall targets.

1.8 Specific Directive Requirements

Article 14(2) of the ESD requires that Member State's Action Plans describe the energy efficiency improvement measures planned to reach the targets set out in Article 4(1) and 4(2), as well as comply with the provisions on the exemplary role of the public sector and provision of information and advice to final customers set out in Articles 5(1) and 7(2) respectively.

1.8.1 Compliance with Articles 4(1) and (2)

The 9% target specified in Article 4(1) has been calculated as 13,117 GWh PEE in 2016. Chapter 2 and Annexes 1 and 2 comment further on this issue.

The Intermediate target calculated in accordance with Article 4(2) has been established as 6,500 GWh PEE in 2010. Table 4 in Chapter 2 provides an overview of Ireland's strategy for achieving the intermediate and overall ESD targets. Chapters 3 to 9 provide detail of the actions that will lead to achievement of these targets.

1.8.2 Compliance with Article 5(1)

Article 5(1) of the Directive requires that Member States ensure that the public sector fulfils an exemplary role in relation to energy efficiency. Ireland has set a national energy efficiency target for the public sector of 33% savings by 2020, to demonstrate its exemplar role. This hugely ambitious target has been widely communicated through Ireland's Sustainable Energy White Paper. Ireland's actions for the public sector are specified in Chapter 3.

Article 5(1) first indent requires that Member States adopt at least 2 of the measures specified in Annex VI of the Directive. As indicated in Chapter 3, Ireland is taking action relevant to options (C.) and (E.) from that Annex (actions labelled Green Public Procurement and Energy Efficiency Programmes). Further actions relevant to the measures listed in Annex VI are likely to be adopted in 2008, on completion of Ireland's Energy Efficiency Action Plan for the Public Sector, designed to set out the path to Ireland's national 33% savings target for the public sector.

Article 5(1) second indent requires that Member States publish guidelines on energy efficiency and energy savings as a possible assessment criterion in competitive for public contracts. Ireland is developing Green Public Procurement Guidelines for publication in 2008. These guidelines will satisfy this requirement.

1.8.3 Compliance with Article 7(2)

Article 7(2) requires that Member States ensure that greater efforts are made to promote energy end use efficiency. Ireland launched a major multi media awareness campaign on energy efficiency in 2006 titled Power of One. Further details of this campaign are set out in Chapter 9 and at www.powerofone.ie.

1.9 Implementation and Reporting

There are in excess of 60 actions identified in this Action Plan, with multiple agencies involved in their implementation. Many of these actions are already being implemented, while others are being progressed by the agencies concerned. Other actions identified in this Action Plan will lead to the development of still further actions that may contribute significantly to our energy savings targets.

Clearly, in order to maintain a focus on and drive the achievement of our targets, a coherent effort will be needed to monitor implementation of actions, identify corrective or alternative actions where necessary and ensure the contribution of actions to our targets is being recorded.

In order to ensure this coherent approach, an interdepartmental committee involving the key delivery agencies will be convened in 2007 to draw up a reporting template. This committee will prepare an annual report for Government on the progress in implementing this Action Plan and achievement of our targets. The Committee's report will be informed by the Energy Efficiency in Ireland report to be produced by SEI as detailed in Chapter 9. This Committee will be chaired by a senior official from the Department of Communications, Energy and Natural Resources.

CHAPTER 2

TARGETS AND SAVINGS

2.1 Targets

The Sustainable Energy White Paper sets a national target of a 20% reduction in energy demand across the whole economy by 2020, including the electricity, transport and heating sectors. It also sets a specific national target of 33% improvement in the public sector in order to demonstrate its leadership and exemplar role.

The ESD sets EU member states an indicative national energy savings target of 9% by 2016, with an interim target to be set by Member States for the end of 2010. The ESD target excludes businesses within the EU Emissions Trading Scheme, aviation sector and marine bunker fuels.

2.2 Methodology

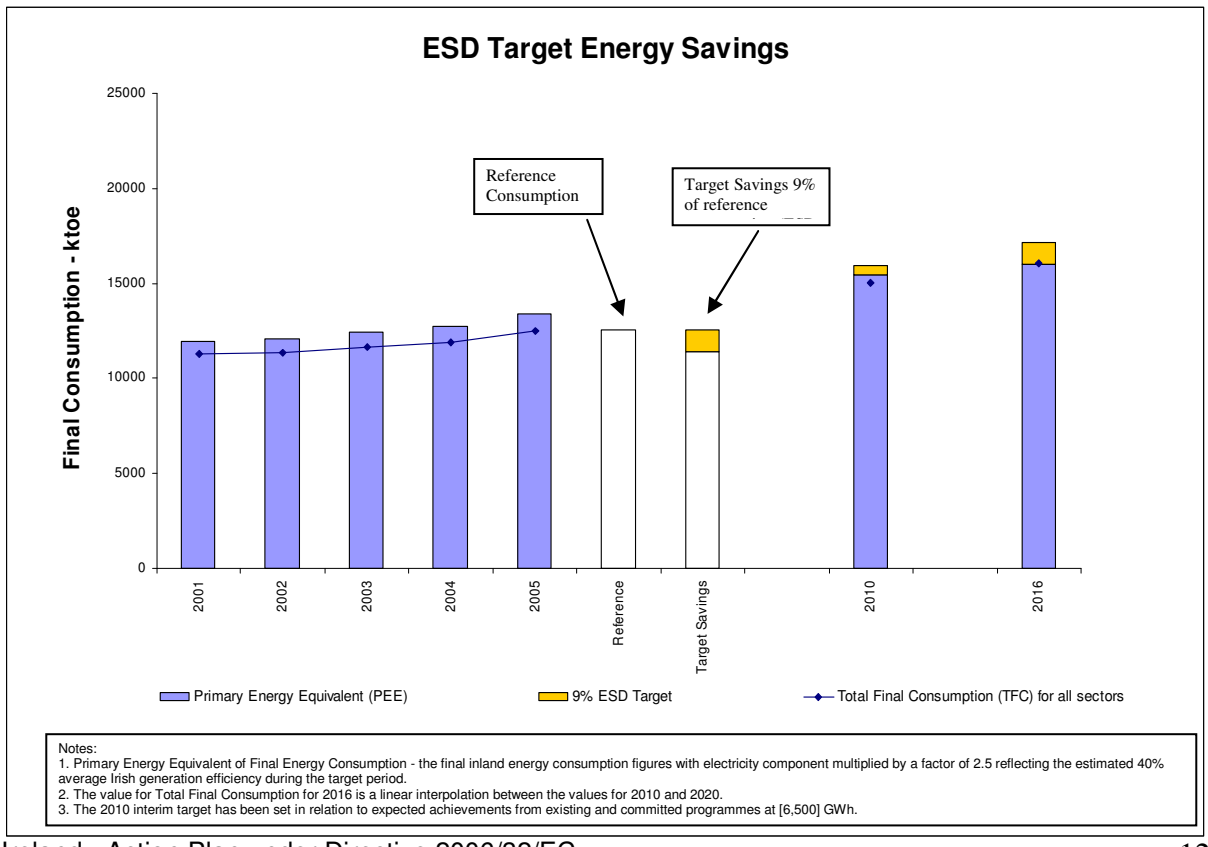
A methodology for calculating the ESD target is specified in the Directive, with a baseline reference of the average of historic energy usage (2001-2005), converted to a 'primary energy equivalent' (PEE) basis (as illustrated in figure 4 below). The conversion to primary energy equivalent takes into account the conversion losses in electricity generation and makes units of different energy streams more comparable. The target is taken as 9% of the baseline reference value.

It should be noted that only monitored contributions from specified programmes can contribute towards the achievement of the ESD target. All the targets and projected impacts of actions are presented in units of primary energy equivalent (PEE) in this document.

We have calculated the values of the national targets in energy units using the methodology set out in the ESD, except that the targets cover the whole economy, excluding aviation and marine bunker fuels.

The methodology and underlying calculations for the national and ESD targets are explained in Annex 1.

Figure 4: Illustration of Target Energy Savings



2.3 Savings

Table 3 below gives the annual energy saving to be achieved corresponding to the national and ESD targets.

Table 3: Energy Savings Targets

	Target Energy Saving PEE	
	(ktoe)	(GWh)
ESD 9% Target 2016		
Reference Energy Consumption	12,531	145,741
ESD Target (9% of Reference Energy Consumption)	1,128	**13,117**
ESD Interim Target 2010		**6,500**
White Paper 20% Target		
Reference Energy Consumption	13,725	159,624
White Paper 20% Target (20% of Reference Energy Consumption)	2,745	**31,925**

2.4 Contribution to Savings

Known actions (existing and committed) plus known additional sectoral potentials amount to 34,885 GWh, exceeding the national 20% target. These figures are detailed in each sectoral chapter and are set out in Table 4 below:

Table 4: Savings towards Targets (detailed)

	Savings towards targets (GWh) PEE		
	2010 (ESD Target)	**2016 (ESD Target)**	**2020 (National Target)**
Business and Public sectors			
SEI Public Sector Programme – support for new and retrofit public sector building initiatives	160	160	160
Building Regulations 2005 – improved efficiency of non-residential buildings	180	180	180
Large Industry Energy Network - savings accruing from programme participants	375	500	1,220
SEI Energy Agreements Programme - savings accruing from programme participants working towards obtaining IS393	90	165	1,300
SEI small business supports – Energy MAP and training for small business	30	30	30
Existing ESB demand side management initiatives	465	624	750
Public sector target - 33% saving by 2020			3,240
Possible additional contribution from extended business supports			3,000
Sector Total	**1,300**	**1,659**	**9,880**

Residential sector			
Building Regulations 2002 – improved energy performance of residential buildings	1,350	1,350	1,350
Building Regulations 2007 – 40% improvement on energy performance of residential buildings relative to current building regulations	550	3,805	5,980
Building Regulations 2010 – 60% improvement of residential buildings relative to current building regulations	0	1,355	2,440
SEI House of Tomorrow programme – developer support for buildings exceeding existing building regulations	30	30	30
Insulation and home heating support programme – improving current residential building stock in Ireland	750	3,000	3,000
Dundalk Sustainable Energy Zone – sustainable community demonstration project	50	50	50
Smart meter installation – estimated efficiency gains among domestic users	0	725	770
Additional potential from priority technologies in existing homes			4,750
Sector Total	**2,730**	**10,315**	**18,370**
Transport Sector			
Dublin traffic measures – road transport infrastructure construction and upgrade	400	1,000	1,000
Technology Improvements – fuel efficiency of Ireland's vehicle fleet	710	1,775	1,775
Alignment of transport investment with spatial planning – appropriate transport infrastructure	120	308	308
Transport 21 - Modal Shift to public transport following development of Transport 21 infrastructure	750	1,885	1,885
Efficient driving campaign - proposed Department of Transport initiative	190	482	482
Sector Total	**2,170**	**5,450**	**5,450**
Energy Supply Sector			
Distribution efficiencies improvement – reaching loss target of 7.5%	0	250	435
Delivery of targets for installed CHP capacity as outlined in the White Paper	375	600	750
Sector Total	**375**	**850**	**1,185**
OVERALL TOTAL*	**6,575**	**18,274**	**34,885**

* 2020 totals include impacts of known actions plus additional identified savings potential in residential and business sectors

At present, the 34,885 GWh national savings total in table 4 is made up of a contribution of 23,895 GWh PEE of efficiency savings from known actions and 10,990 GWh PEE of additional identified potential. This additional potential comprises the public sector 33% target and additional economic

potential known to exist in the business and residential sectors, but not yet captured by known actions. This is a strong basis on which to build the final set of actions that will deliver the full savings target, indicating a clear path for Ireland to deliver and indeed exceed its targets. Further potential and new opportunities will emerge as the wider technological and policy context evolves.

2.5 Measurement of Savings

Methods to precisely measure and verify energy savings from actions are complex and not yet fully developed. It is important that methods are clear and transparent and can confidently establish the contributions of all actions and measures. Ireland's modelling and measuring capability is being enhanced through work by SEI's Energy Policy and Statistical Support Unit (EPSSU), particularly in the development of efficiency indicators and more advanced modelling systems.

The EPSSU collects and analyses a wide range of energy statistics and produces regular reports on overall energy patterns, as well as sectoral analyses. It has also published a report on security of supply metrics, which will be regularly updated.

SEI will continue to build on its suite of statistical publications, commencing shortly with the first publication of a new annual Energy Efficiency in Ireland report. This new annual report will form the basis for the monitoring of progress on energy efficiency and on the targets discussed in this Action Plan. This is the first EPSSU publication to focus solely on Energy Efficiency in Ireland. The report aggregates a range of metrics and indicators relating to energy efficiency. New analysis has also been conducted in order to better understand the trends. In particular, ODEX indices of energy efficiency have been constructed for the overall economy and for the transport, residential and industrial sectors. The trends are also compared with Ireland's EU counterparts. It is intended that the report will offer timely and comprehensive data on energy efficiency, in order to provide context and background to discussions surrounding future policy options.

SEI will also continue to build its capacity to model energy usage and efficiency, and to enhance the data and analysis available. A priority area is to develop its ability to determine the impact of different policies and measures on baseline energy forecasts, and to assess the associated energy, economic and environmental implications. This involves modelling a range of scenarios for short (up to 2010), medium (up to 2020) and long term (up to 2050) energy demand and supply growth with various measures. The requirements of the ESD (and White Paper) monitoring process emphasises this need. In addition, energy forecasts and an assessment of the impact of different policies and measures will underpin the development of greenhouse gas emissions projections, required under the EU monitoring mechanism, and transboundary air emissions projections required under the National Emissions Ceiling Directive.

CHAPTER 3

THE PUBLIC SECTOR

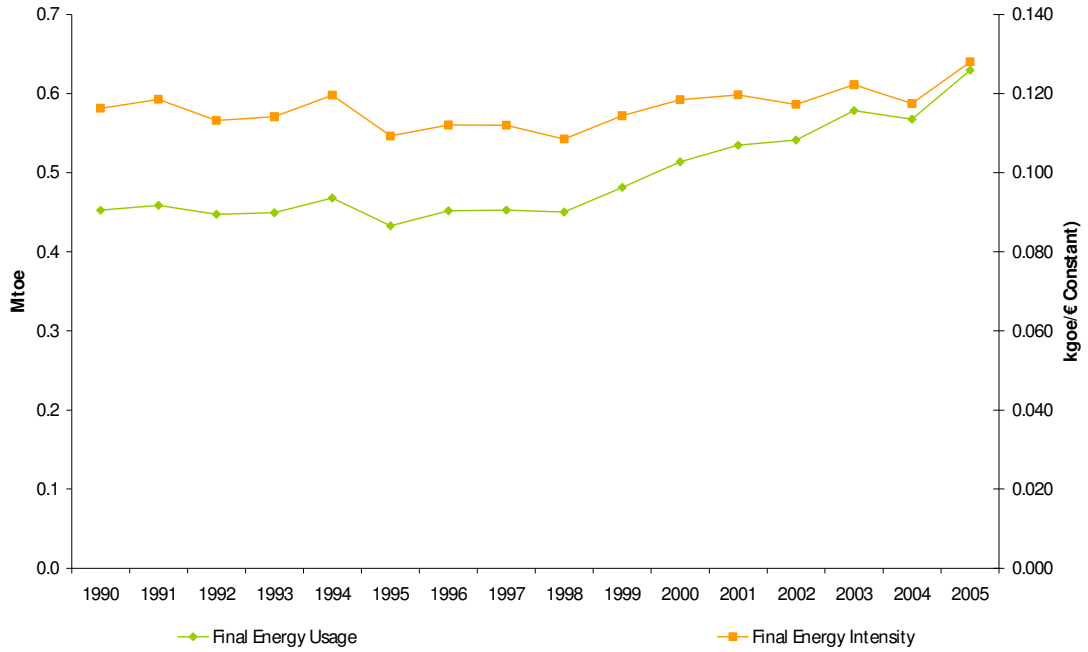
OUR ACTIONS →

- *We are supporting exemplary design and energy management practice by public sector organisations through SEI's Public Sector Programme*
- *We will establish a high level working group in 2007 involving key Departments and agencies to draw up an action plan by 2008 for achievement of the 33% energy savings target for the public sector*
- *We will introduce energy efficiency programmes for Government Departments, State Agencies, Local Authorities, the Health Service and all other areas of the public sector*
- *We will require all public sector bodies to produce annual reports setting out their energy efficiency actions and progress towards the 2020 target*
- *We will commence in 2007 a programme of awareness-raising specifically for the public sector, as part of Ireland's national energy efficiency awareness campaign, Power of One.*
- *We will put in place in 2008 mechanisms to facilitate and enable the exchange of energy efficiency best practice between public sector bodies, at local, national and international level.*
- *We will introduce in 2008 guidelines and an action plan for green public procurement in the public sector.*
- *We will require public bodies to purchase only energy efficient lighting from the end of 2007 when installing or replacing lighting*
- *We will require that all street and traffic lights are energy efficient*
- *We will roll out an energy rating system to public buildings from 2008*

3.1 Energy Usage in the Public Sector

Energy use in the public sector amounted to 7,239 GWh (final energy consumption) in 2005. Energy usage grew by 39% in the public sector between 1990 and 2005, as illustrated in Figure 5 below. The energy intensity of the public sector measured as energy usage per unit of added value increased by 10%.

Figure 5: Energy Usage in the Public Sector 1990 -2005[8] (final energy consumption)



Source: SEI

3.2 Introduction

The public sector represents a very significant element of the total economy and has considerable purchasing power that can be used to demand the highest standards. Systematically approached, it offers a sizeable market with the potential to establish new technologies and show them in action to convince others. In addition, the behaviour of the public sector sends a very important leadership signal. Government, in leading by example, demonstrates its commitment to the energy efficiency agenda, and offers confidence to all others in the market that the future will belong to technologies and services that emphasise energy efficiency. The performance of the public sector is therefore critical.

In line with both the Energy End-Use Efficiency and Energy Services Directive, and the EU's Energy Efficency Action Plan, the Government has decided that the public sector is to play an exemplary role in delivering significant improvements in energy efficiency. In signalling this exemplary role, the Government has committed in its recent Energy White Paper that it will achieve a 33% energy efficiency improvement for the public sector by 2020,. This represents approximately 3,240 GWh PEE of identified savings in 2020.

The public sector is a diverse set of institutions and activities, with equally diverse patterns of energy use. Decisions that influence energy efficiency range from planning, through procurement and maintenance, to the use of equipment, buildings and vehicles by all public sector staff. Design and specification of buildings have long term impacts on energy efficiency, as does choice of equipment and vehicles. Thus procurement and specification are important focal points. In terms of the behaviour of the energy user, most public sector employees are remote from energy considerations and the costs and other impacts, and motivating efficient behaviour is all-important.

Current programmes that will contribute towards energy savings for this sector include SEI's Public Sector Programme, and the Office of Public Works' activities on both technical and awareness aspects of energy usage in government buildings across the State. These programmes will lead to the incorporation of energy efficient design, technologies and services in new and retrofitted buildings and demonstrate best practise in this area to the broader market.

[8] Note that these trend diagrams report final energy usage, not the primary energy usage quoted in discussions of targets and action impacts

For the future, strong programmes will be required and will include The Power of One's new public sector targeted campaign as well as specific building, energy management and monitoring programmes in all public bodies.

3.3 Our Actions

3.3.1 Our Existing Early Actions

Public Sector Programme

- *We are supporting exemplary design and energy management practice by public sector organisations through SEI's Public Sector Programme.*

The Public Sector Programme implemented by SEI offers financial support to public and commercial sector organisations to stimulate the innovative application of more sustainable energy design strategies, technologies and services in new and retrofit projects, acting as both an exemplar for good practice and as a demand leader for the services and technologies involved.

Funding under the programme is provided for three main elements:

- *Design Support* - Support for procuring external consultants to undertake technical and economic feasibility studies for energy efficient design and technology solutions
- *Model Solutions Investment Support* - Support for implementation of energy efficient solutions
- *Energy Management Bureau Services* - Support available for outsourced energy management to monitor and report on energy control and management.

Agency responsible for this action: Sustainable Energy Ireland

3.3.2 Our Committed Actions

Action Plan for the Public Sector

- *We will establish a high level working group in 2007 involving key Departments and agencies to draw up an action plan by 2008 for achievement of the 33% energy savings target for the public sector*

The Sustainable Energy White paper sets a target of 33% energy savings by 2020 for the public sector, to demonstrate its leadership and exemplar role. The Programme for Government repeats this commitment, demonstrating its importance to Government. Article 5 of the ESD also requires that the public sector fulfil this leadership role in relation to energy efficiency.

The 33% public sector target represents savings of 3,240 GWh by 2020, more than 10% of the energy saving required by 2020 for the entire economy under the National 20% target. Clearly, this is an ambitious target and will require radical action by the public sector to achieve it. Our existing and other committed actions are not sufficient in themselves to achieve this target.

The public sector is diverse, involving Government Departments, multiple agencies, the Defence Forces and the Garda Síochána among others. Only co-ordinated action will achieve sufficient energy efficiency savings to reach the target.

To ensure this co-ordination and to determine the radical actions necessary, the Department of Communications, Energy and Natural Resources will establish a high level working group in 2007, under the chairmanship of a senior official from the Department, and involving senior representatives

from all relevant Departments and State Agencies. This Group will be charged with the task of drawing up an action plan for submission to Government in 2008, setting out the actions that will be necessary to achieve the 33% public sector target.

Agency responsible for this action: Department of Communications, Energy and Natural Resources.

Energy Efficiency Programmes

- *We will introduce energy efficiency programmes for Government Departments, State Agencies, Local Authorities, the Health Service and all other areas of the public sector*

These programmes will be rolled out progressively from 2008, building on the work of SEI with the sector. A number of public sector bodies have been active on energy efficiency, including the Department of Education and Science in its school building programme, many local authorities, and the OPW's operation of an Energy Management Bureau. The Bureau gathers extensive data on energy performance across 250 public buildings and makes it available in accessible formats to allow for monitoring of performance and improvement. A similar bureau service is operating successfully among several third level colleges. Other public Bodies working with SEI on energy management include the Defence Forces, who recently launched a national staff awareness campaign, and the Health Service Executive, who are considering a national strategy on sustainable energy.

Agency responsible for this action: Department of Communications, Energy and Natural Resources (lead), Sustainable Energy Ireland, OPW

- *We will require all public sector bodies to produce annual reports setting out their energy efficiency actions and progress towards the 2020 target*

SEI is already engaging with a number of public sector bodies interested in leading on energy efficiency. The OPW also works extensively across many organisations and buildings and has piloted awareness campaigns based on the energy data available from the Energy Management Bureau.

These two actions partly satisfy the requirement of Article 5 of the ESD to select measures from Annex VI of the ESD for adoption by the public sector.

Agency responsible for this action: Department of Communications, Energy and Natural Resources

Communication

- *We will commence in 2007 a programme of awareness-raising specifically for the public sector, as part of Ireland's national energy efficiency awareness campaign, Power of One.*

This action recognises the importance of communicating the exemplary role of the public sector. The awareness programme will engage public sector employees directly and offer advice on energy efficiency in the workplace. It will gather and disseminate success stories and ideas for replication.

Agency responsible for this action: Department of Communications, Energy and Natural Resources

- *We will put in place in 2008 mechanisms to facilitate and enable the exchange of energy efficiency best practice between public sector bodies, at local, national and international level.*

This will include elements of the Power of One activity, as well as SEI's programmes. Several public sector organisations are participating in SEI's business programmes discussed in the next chapter.

Agency responsible for this action: Sustainable Energy Ireland

Green Public Procurement

- *We will introduce in 2008 guidelines and an action plan for green public procurement in the public sector.*

The total Government purchasing budget is over €10 billion per annum, giving significant leverage to procurers in the public sector to "move the market" towards the competitive provision of sustainable products and services. To maximise this leverage, while also maximising energy efficiency and associated savings in its own estate, the public sector must take the lead through (inter alia) the procurement of energy efficient accommodation, mobility, products and services.

We will therefore publish a green public procurement action plan that will aim to achieve a level of green public procurement equal to that achieved by best performers in the European Union. The plan will underline how high environmental and energy efficiency standards must be an integral element of value for money across the whole range of public purchasing. A key emphasis of the plan will be the importance of training in green procurement, especially in the concept of life cycle costing or whole of life costing, for buyers in the public sector.

This action partly satisfies the requirement of Article 5 of the ESD to select measures from Annex VI of the ESD for adoption by the public sector.

Agency responsible for this action: Department of Environment, Heritage and Local Government

Lighting

- *We will require public bodies to purchase only energy efficient lighting from the end of 2007 when installing or replacing lighting*

Lighting accounts for a significant proportion of electricity use in the public sector. Modern energy efficient bulbs and luminaires provide an immediate opportunity for significant efficiency gains. Government has committed to the use of fluorescent lighting wherever practicable and to the replacement of incandescent light bulbs in public buildings with modern Compact Fluorescent Lamps (CFLs).

Agency responsible for this action:

- *We will require that all street and traffic lights are energy efficient*

There are over 400,000 street lights and approximately 15,000 traffic light signal heads in Ireland, representing a significant energy load. A programme of replacement of inefficient street and traffic lighting will be developed involving the Department of the Environment, Heritage and Local Government and local authorities.

Agency responsible for this action: Department of Environment, Heritage and Local Government

Building Energy Rating

- *We will roll out an energy rating system to public buildings from 2008*

From July 2008, in line with the requirements of the Energy Performance of Buildings Directive (Directive 2002/91/EC), we will require all new public service buildings to have their energy efficiency assessed and certified by an expert. This will be extended to existing public buildings from 2009 when they are offewred for sale or lease. All public buildings with a floor area in excess of 1,000m^2 will be required to display their Building Energy Rating. The rating will provide information on the building's energy use and can be used to demonstrate improvements over time. This will encourage transparency of energy performance by the building occupier and will motivate and inform all building users.

Agency responsible for this action: Sustainable Energy Ireland

3.4 Analysis of Potential Impacts

Since many actions overlap between the public, commercial, and industrial sectors, analysis of the impacts of known and potential new actions is presented for these sectors together at the end of the chapter 4.

CHAPTER 4

BUSINESS SECTOR – COMMERCIAL & INDUSTRIAL

OUR ACTIONS →

- *We are supporting the networking and exchange of best energy efficiency practice by the largest industrial energy users through the Large Industry Energy Network*
- *We are supporting through the Energy Agreements Programme businesses leading the way on best practice energy management in installing IS393, the Irish Standard for Energy Management*
- *We are assisting smaller businesses with limited resources to improve their energy management through the Energy MAP initiative*
- *We are assisting the SME sector with a targeted scheme providing assessments of their energy use and advice on their energy management*
- *We are recognising and rewarding best achievements in energy efficiency through the Sustainable Energy Awards*
- *We are requiring developers of new buildings of over 1,000 m^2 to carry out a feasibility assessment of using renewable energy systems for the building*
- *We will target the SME sector, and its employees, through the Power of One at Work initiative, a new element of the National Energy Efficiency Campaign - Power of One, to promote an understanding of the need for efficient energy use in the workplace*
- *We will support the Energy Star initiative in Ireland to promote energy efficiency in office equipment*
- *We will roll out a Building Energy Rating system to business premises from 2008*
- *We will require that all air conditioning systems with a rated output of 12 kW are regularly inspected by trained experts from 2008, to ensure that they operate to maximum energy efficiency.*

4.1 Energy Usage in the Business Sector

Energy use in the commercial and industrial sectors amounted to 12,851 GWh and 28,959 GWh (final energy consumption) respectively in 2005.

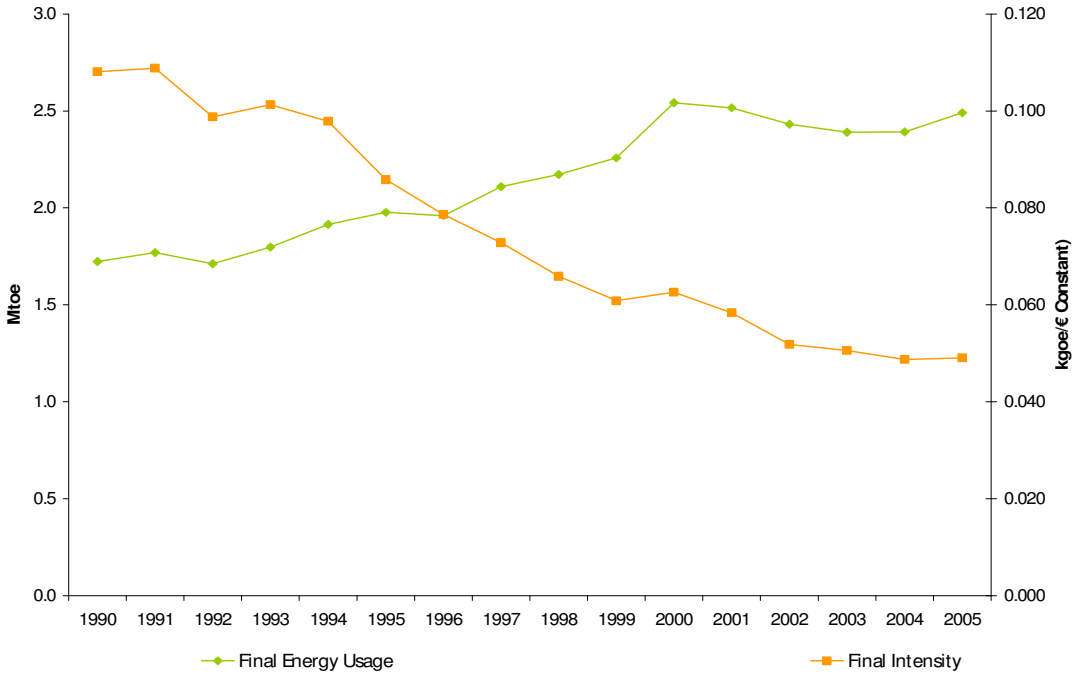
Energy usage in the commercial sector showed almost the fastest growth of any sector (99%) between 1990 and 2005, as illustrated in Figure 6, with electricity use growing particularly strongly (possibly reflecting the changing structure of the sector and the general increase in the use of information and communication technology and air conditioning). The energy intensity (measured as energy usage per unit of added value in the sector) decreased by 15%, reflecting significant improvement in energy efficiency overall and increasing added value for a given energy input.

Figure 6: Energy Usage in Commerce 1990 -2005 (final energy consumption)

Source: SEI

Energy usage grew by 44% in the industrial sector between 1990 and 2005 as illustrated in Figure 7 below. This overall rapid growth masks the nature of structural change within the economy, as trends towards higher added value products such as pharmaceuticals and electronics influence the energy intensiveness of the industrial sector. The energy intensity of industry overall fell by 55%, reflecting both the structural changes and some improvement in energy efficiency.

Figure 7: Energy Usage in Industry 1990 -2005 (final energy consumption)



Source: SEI

4.2 Introduction

In no sector is the case for energy efficiency more compelling than in business, where scale, intensiveness and competitiveness pressures combine to drive awareness of environmental impacts, raise concerns about future supply security and support the intelligent and efficient use of energy. Indeed many businesses, especially the larger energy users, have been acting on efficiency in recent years, demonstrating the gains that are possible. Existing Government actions have the potential to provide over 3,480 GWh PEE of energy savings in 2020.

There has been progress on energy efficiency and much increased interest in the issue in recent years. This progress means that for some users many of the easiest opportunities have already been captured. However, research suggests that longer term opportunities, in areas such as process re-design, could hold very significant potential.[9]

For the majority of businesses that have taken little action on energy efficiency, the potential for their own efficiency and financial gain remains considerable. This is true for the commercial sector in particular, where energy efficiency has been less of a focus generally due to lower energy intensities and also a tendency for ownerships and usage of buildings and equipment to be separated. Recent price rises in energy have stimulated interest and have led to new action.

The role of policy is to create the conditions for business to capture this potential. This starts, as in all areas, with the signal of long term policy interest in efficiency, as has been established by the Energy White Paper, the National Climate Change Strategy and now this Action Plan. As with all sectors, natural turnover in stock (buildings and equipment) sets the pace of change. The challenge is to avail of all opportunities to bring new technologies and behaviours on line as quickly as possible and in doing so, effectively accelerate the natural pace of efficiency progress.

Businesses will generally react to opportunities if there is a clear case for, and confidence in, the proposed investment or action. This points to a key challenge – making information about energy efficiency solutions and their benefits available widely known to decision-makers in business. Also, many businesses make investment decisions on the basis of initial capital costs, not accounting for the lifecycle costs of equipment where the true cost of inefficiency emerges. There is an important role for public intervention to build knowledge and confidence through real experiences and success stories. This is best done with an aim to develop both supply and demand in efficiency solutions and services, leading to a more complete and mature market.

Recent experience in Ireland with energy efficiency in large businesses, driven by the Irish Energy Management Standard IS 393, demonstrates the value of a structured and adequately resourced approach to energy management. As more firms take a strategic rather than an ad hoc approach to energy efficiency, more economic potential will be realised and the momentum in the energy efficiency services market will build.

4.3 Our Actions

4.3.1 Our Existing Early Actions

Information and Advice to business

- *We are supporting the networking and exchange of best energy efficiency practice by the largest industrial energy users through the* ***Large Industry Energy Network***

The Large Industry Energy Network (LIEN) managed by SEI is a well established networking and information programme for large industrial energy users. In operation for more than 10 years, it engages almost 100 of the largest energy users in ongoing relationships including site visits, workshops and annual performance reporting.

[9] Comparative research on industrial energy efficiency commissioned by SEI in 2006

LIEN members share information on energy saving technologies and techniques to maximise savings and maintain competitiveness. Member companies have an average annual energy spend of €4 million each. The LIEN membership together accounts for almost two thirds of all industrial energy usage and for more than 10% of national primary energy usage.

In 2005 alone, LIEN members undertook energy efficiency projects that resulted in avoided energy costs of €27 million. On average, LIEN members report efficiency gains of more than 1% per annum.

We will continue the work of LIEN with Ireland's largest industrial companies to improve networking and information exchange opportunities. The emphasis will be on continued implementation of efficiency programmes and measures.

Agency responsible for this action: Sustainable Energy Ireland

- *We are supporting through the **Energy Agreements Programme** businesses leading the way on best practice energy management in installing **IS393**, the Irish Standard for Energy Management*

The Energy Agreements Programme administered by SEI offers supports to firms leading the way on energy management by installing IS393 and acting to capture the efficiency opportunities generated. The early successes emerging in the implementation of IS 393 are generating wider interest and confidence. The programme will continue to support firms and will aim to widen participation. Already, over 50 large firms (industrial and commercial) are pursuing certification to IS393.

IS 393, the Irish Standard for Energy Management, was developed by SEI to support and drive highest levels of structured, strategic energy management. It is one of only four fully certifiable energy management standards in the world, and is currently being used as the basis for the development of an EU-wide standard. It provides a framework for addressing energy strategically and systematically that will bring immediate profitability benefits, while setting a long term course for cost and risk management. The energy efficiency gains are proving considerable, with the deep embedding of efficiency logic in business operations generating opportunities even among firms already at an advanced level of efficiency and energy management. The standard will continue to be promoted for all types of business.

Agency responsible for this action: Sustainable Energy Ireland

- *We are assisting smaller businesses with limited resources to improve their energy management through the **Energy MAP** initiative*

SEI's Energy MAP (Energy Management Action Plan) offers businesses of all size the opportunity to engage in the appropriate level of energy management to maximise their efficient use of energy. It is built on the logic of IS 393 and is geared towards smaller or less technically resourced firms. It centres on a large web resource offering advice, training and an interactive energy efficiency opportunities generator.

Training courses are also available that offer introductions to good energy management. These are tailored for specific groups or sectors, with associated advice and support for participants. Many courses include on-site assessments for participating firms.

The EU Action Plan discusses the development of an energy toolkit for SMEs, also mentioned in the EU Commission Environment Programme for SMEs[10]. SEI's Energy MAP web resource is designed as a toolkit for SMEs on both the managerial and technical aspects of energy efficiency, and aligns with the IS 393 standard, embodying the same principles but for a wider audience.

Agency responsible for this action: Sustainable Energy Ireland

[10] Priority action 8 of the EU Action Plan. An energy toolkit relating to EMAS (European Eco-Management and Audit Scheme) is available at http://ec.europa.eu/environment/emas/pdf/general/energyeff_en.pdf

- *We are assisting the **SME sector** with a targeted scheme providing assessments of their energy use and advice on their energy management*

In 2007 SEI launched new support and assessment programmes for all businesses that placed the emphasis on extending services to small and medium enterprises (SMEs). SEI offers free assessments to firms analysing their current energy use and their immediate opportunities for savings, and advises on appropriate monitoring and management. Early indications are that the service is proving popular and effective in stimulating early action on energy efficiency.

This service will be built upon to engage a larger number of businesses over time, delivering significant direct energy efficiency gains, as well as building the case for, and market for, energy advisory services.

Agency responsible for this action: Sustainable Energy Ireland

Recognition and Reward

- *We are recognising and rewarding best achievements in energy efficiency through the **Sustainable Energy Awards***

The Sustainable Energy Awards held annually SEI recognise the best achievements in energy efficiency and renewable energy. The scheme is open to all businesses and organisations, private and public sector. The awards attract considerable interest from businesses both North and South, and help to spread good practice ideas and success stories and reward those leading the way on sustainable energy activity.

The Awards programme will continue to build on its wide recognition among energy practitioners, offering a showcase for energy best practice on the island of Ireland. Entrants to the 2006 Awards undertook projects that led to avoided energy spend of €28 million in the same year.

Agency responsible for this action: Sustainable Energy Ireland

Assessment of Renewable Energy Alternatives at Design Stage

- *We are requiring developers of new buildings of over 1,000 m^2 to carry out a feasibility assessment of using renewable energy systems for the building*

From 2007, any person who commissions the construction of a new building with a floor area exceeding 1,000 m^2 is obliged by law to ensure, before work commences on its construction, that due consideration has been given to the technical, environmental and economic feasibility of installing renewable energy systems in the proposed building, and that the use of such systems has been taken into account, as far as practicable, in the design of that building.

SEI is currently developing a free software tool for use at the design stage to assist developers with this. Design teams may choose to use the software tool or conduct their own building specific study. This action should see a significant growth in interest in and awareness of alternative heat options. It will also compliment the Reheat and Combined Heat and Power Deployment grant schemes operated by SEI.

Agency responsible for this action: Department of Environment, Heritage and Local Government

4.3.2 Our Committed Actions

Awareness Campaign - Power of One

- *We will target the SME sector, and its employees, through the Power of One at Work initiative, a new element of the National Energy Efficiency Campaign - Power of One, to promote an understanding of the need for efficient energy use in the workplace*

The Power of One at Work campaign, launched on 25 September 2007, will work in tandem with SEI's SME programmes. The campaign will bring the message overall Power of One campaign has successfully delivered to the consumer market – that all of us can have a positive impact on energy efficiency – to the same consumers in their role as staff in offices, factories and other locations. The campaign will target both employers and employees. It will empower champions and committed individual employees to change their own behaviour and encourage their colleagues to do the same. The messages will focus on what each individual can do, including switching off equipment when not in use, and turning off lights whenever possible. It will emphasise the importance of such individual behaviour, while also encouraging employers to engage strategically in energy efficiency (via SEI's programmes).

Agency responsible for this action: Department of Communications, Energy and Natural Resources

Energy Star

- *We will support the Energy Star initiative in Ireland to promote energy efficiency in office equipment*

The EU has entered into an agreement with the Government of the United States of America on the coordination of energy-efficient labelling programmes for office equipment under the *Energy Star* programme.

The programme initiated by the US Environmental Protection Agency, has now matured into a world-wide energy efficiency programme, run in partnership by the US EPA, the European Union, Japan, Australia, New Zealand, Taiwan and Canada, to promote energy-efficient office equipment on a world-wide market.

The promotion of the use of Energy Star office equipment in Ireland will lead to significant cost effective improvements in energy efficiency. Savings of up to 50% of energy use in specific items of office and home office equipment are achievable through switching from current equipment to best efficiency versions.

Agency responsible for this action: Department of Environment, Heritage and Local Government

Building Energy Rating

- *We will roll out a Building Energy Rating system to business premises from 2008*

From July 2008, in line with the requirements of the Energy Performance of Buildings Directive (Directive 2002/91/EC), we will require all new business premises to have their energy efficiency assessed and certified by an expert. This will be extended to existing business premises from 2009, when they are offered for sale or lease. The Building Energy Rating will provide information on the building's energy use and can be used to demonstrate improvements over time. This will encourage transparency of energy performance by the building occupier and will motivate and inform all building users.

Agency responsible for this action: Sustainable Energy Ireland

Air Conditioning Systems

- *We will require that all air conditioning systems with a rated output of 12 kW are regularly inspected by trained experts from 2008, to ensure that they operate to maximum energy efficiency.*

From 1 January 2008, in line with the requirements of the Energy Performance of Buildings Directive (Directive 2002/91/EC), the owner of any air conditioning system with a rated output of more than 12 kW will be required by law to have the system inspected by a trained inspector in order to ensure efficient energy usage by the system. A manual is being prepared to standardise a national methodology for inspections, and assist owners in fulfilling their responsibilities. This manual will detail how and when inspections are to be carried out. This action will affect an estimated 30,000 AC systems on 14,000 different sites in Ireland that consume nearly 20,000 MWh of electricity per annum.

Agency responsible for this action: Sustainable Energy Ireland

4.4 Analysis of Potential Impacts

Looking at all parts of the business sectors (public, commercial and industrial), existing and committed actions in the sector are expected to have an impact of avoided energy usage of 6880 GWh by 2020.

Modelling of the commercial sector (incorporating the public sector) suggests that considerable savings could be made through an aggressive programme suite that builds on and adds to existing actions. For electricity, potential lies in the use of efficient lighting (CFLs, fluorescent tubes, occupancy sensors), boilers, motors, heat recovery systems, insulation and appropriate use and maintenance of Heating Ventilation and Air Conditioning (HVAC) installations. For gas and oil, the use of efficient water and space heating infrastructure are the main priorities. Penetration of efficient technologies in all these areas could be achieved through the actions discussed above.

The Sustainable Energy White Paper specifies an energy efficiency improvement target for the public sector of 33% in 2020. The target energy savings are set as a percentage of a reference value calculated as the average of the most recent five year period of unadjusted final energy consumption, expressed as 'primary energy equivalent'. Precise data for energy use in the public sector is not currently available, but SEI estimates the reference value to be approximately 9,820 GWh PEE (determined on the same basis as the overall primary energy baseline used throughout this Action Plan – refer to Annex 1 for further detail). Thus, the 33% target equates to a saving of 3,240 GWh PEE in 2020.'

SEI experience in the business sectors indicates that most firms (excluding the largest and most energy-aware) that have not addressed energy efficiency in the past quickly identify savings of at least 10% when they actively engage the issue. Support programmes for audits and/or investments in efficient technologies could help capture this potential. This may be in the form of extensions to current SEI programmes or of new fiscal supports. Modelling suggests there is potential gain of at least 3,000 GWh available. A provisional analysis of the business sectors suggests that a programme of the scale of €60 million in fiscal supports could realise additional energy savings gains of this scale[11].

Expected impacts of current programmes and further potential impacts from additional actions are summarised in Table 5 below:

[11] This is an outline estimate based on a hypothetical engagement scenario of 5000 small firms, 1500 medium firms, and 250 large energy consuming firms.

Table 5: Projected impacts and further potential – business and Public sectors

	Savings towards targets (GWh) PEE		
	2010 (ESD Target)	**2016 (ESD Target)**	**2020 (National Target)**
Known Actions			
SEI Public Sector Programme – support for new and retrofit public sector building initiatives	160	160	160
Building Regulations 2005 – improved efficiency of non-residential buildings	180	180	180
Large Industry Energy Network - savings accruing from programme participants	375	500	1,220
SEI Energy Agreements Programme - savings accruing from programme participants working towards obtaining IS393	90	165	1,300
SEI small business supports – Energy MAP and training for small business	30	30	30
Existing ESB demand side management initiatives	465	624	750
Further savings potential			
Public sector target - 33% saving by 2020			3,240
Possible additional contribution from extended business supports			3,000
Sector Total	**1,300**	**1,659**	**9,880**

Note that the projected impacts of SEI's business support programmes are derived assuming current orders of scale; greater impacts are available from larger scale engagements.

Modelling suggests that the total current economic potential efficiency gains in the business sectors (without allowing for technological development) amount to approximately 13,770 GWh.

CHAPTER 5

RESIDENTIAL SECTOR

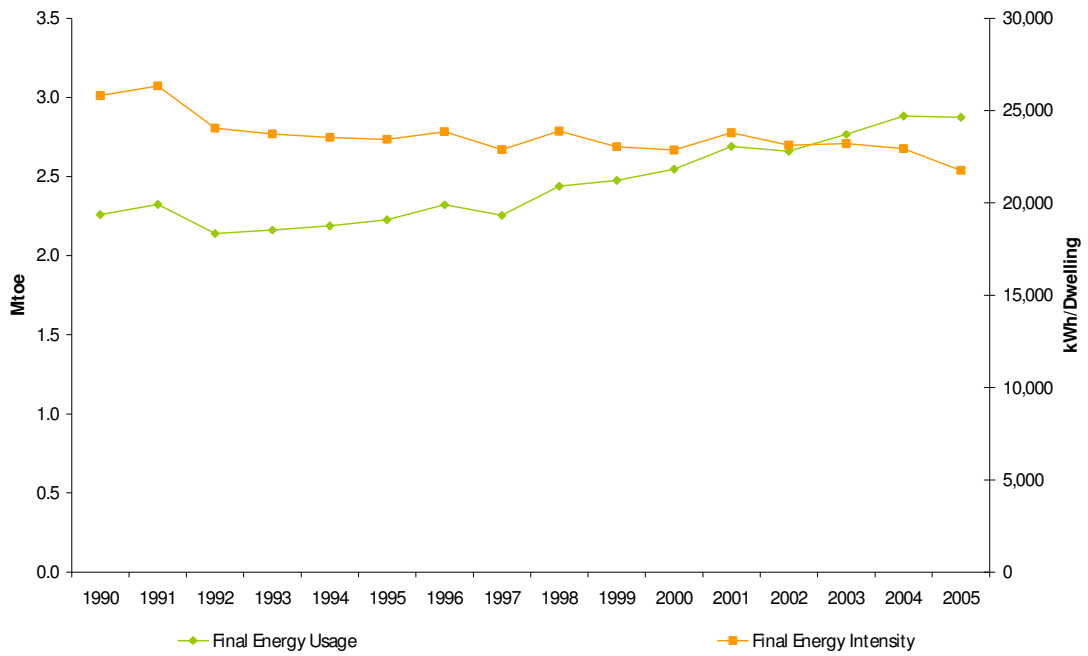
OUR ACTIONS →

- *We are promoting the need for efficient energy use in the home through the National Energy Efficiency Awareness Campaign - Power of One.*
- *We are encouraging developers to adopt building energy standards well above those prescribed by law in the building regulations*
- *We are promoting higher standards of energy efficiency in social housing*
- *We have rolled out a Building Energy Rating system to new houses from 2007 and will extend this to existing houses from 2009*
- *We are encouraging more energy efficient communities through our spatial and planning policies*
- *We are offering grants to householders to install certain renewable energy technologies*
- *We are upgrading the energy performance of homes occupied by those on low incomes*
- *We are revising the building regulations to ensure an improvement in energy performance and a reduction of CO2 emissions of 40% in new domestic dwellings, relative to current standards*
- *We will review the Building Regulations again in 2010 with a view to improving energy performance by 60% relative to current standards.*
- *We will launch an awareness campaign in 2008 to encourage householders and other building owners to maximise the energy efficiency of their boilers through regular servicing and where necessary replacement.*
- *We will offer financial incentives to householders from 2008 to upgrade the energy efficiency of older housing stock*
- *We will encourage more energy efficient behaviour by householders through the introduction of smart meters*
- *We will apply a levy to all incandescent light bulbs to encourage a shift to efficient low-energy bulbs*

5.1 ENERGY USAGE IN THE RESIDENTIAL SECTOR

Energy usage in the residential sector amounted to over 33,425 GWh (final energy consumption) in 2005. Energy usage grew by 27% in the residential sector over the period 1900-2005 as illustrated in Figure 8, with the number of households increasing by 52%. Energy intensity (average energy usage per household) decreased by 16% over the period reflecting an improvement in energy efficiency of the housing stock, much of it due to higher efficiency standards of new housing stock additions. Not all of the improvement in energy efficiency resulted in lower energy usage. Higher standards of heating and comfort levels followed from the deployment of central heating.

Figure 8: Energy Usage in the Residential Sector 1990 – 2005 (final energy consumption)



Source: SEI

5.2 Introduction

The main actions underway in this sector centre on a forthcoming strengthening of the energy aspects of the Building Regulations, building on a previous revision in 2002 and on the success of SEI's House of Tomorrow programme. Current and committed actions will result in projected savings of over 13,600 GWh PEE in 2020. The introduction of building energy rating for new (2007) and existing (2009) houses will provide an instrument that can be used to raise awareness of energy performance and stimulate incorporation of such performance into purchase decisions.

The two major energy efficiency challenges that must be met by Ireland's residential building sector are i) creating a generation of buildings over the next 10 years that meet expectations of comfort and functionality while extending energy performance and emissions reduction well beyond current norms, in line with the life of energy services; and ii) tackling the legacy of large amounts of older housing with poorer energy performance.

The pace of building activity, as reflected in the housing stock addition of recent years, contributed to a positive shift in average efficiency. For the same standard of comfort and amenity, a new house today (2007) typically has a 70% lower energy demand for space and water heating than for its counterpart built 20 years ago. However, since homes being built now will have a lifetime of at least several decades, it is important to ensure that efficiency performance standards are robust. Building regulations are important in setting the standard, and driving performance improvements. At the same time, Building Energy Rating (energy labelling of buildings) will allow everyone to understand relative performance and make appropriate purchase or rental decisions. There is also a need for a focus on the existing building stock and many options for upgrading efficiency exist.

Beyond the many aspects of building fabric that influence energy performance, the nature of the energy services provided and energy-using equipment installed is clearly very important. This includes purchase choices on everything from boilers to televisions, but also how equipment is maintained and used. Lighting is also an important area, accounting for a significant proportion of electricity usage.

The success of The Power of One campaign shows that many people are very interested in their own energy behaviours and impacts, and are open to change if empowered through choices and information. This willingness needs to be backed up with the availability of good technologies and solutions, information and trustworthy advice, and market conditions (such as energy prices) that support good decision making.

5.3 Our Actions

5.3.1 Our Existing Early Actions

Awareness Campaign - Power of One

- *We are promoting the need for efficient energy use in the home through the National Energy Efficiency Awareness Campaign - Power of One.*

In its first year of operation, the Power of One campaign has achieved significant impacts in terms of brand recognition and reach of its message. It has brought the message of the importance of energy efficiency to all consumers and also offered them easy first steps in improving their own personal energy efficiencies through small changes in behaviour and choices. These messages have been delivered through various media including television, radio, web and print, as well as next generation channels such as online communities and social networks. A particularly successful component has been The Power of One Street (www.powerofonestreet.ie), which has tracked and shared the real experiences of eight families across Ireland that have undertaken energy efficiency challenges in their own lives, demonstrating what can be achieved by all.

We will strengthen the campaign's messages and offer stronger opportunities to householders, as well as moving into the business and public sectors. Further information on the Power of One campaign is included in Chapter 9.

Agency responsible for this action: Department of Communications, Energy and Natural Resources

Building Energy Standards

- *We are encouraging developers to adopt building energy standards well above those prescribed by law in the building regulations*

The House of Tomorrow Programme has for a number of years been demonstrating to the market the deployment of energy efficient building and renewable energy technologies. The Programme has successfully prepared the market for the revision of the Building Regulations later this year requiring a 40% improvement in the energy performance of new houses compared to the current standard. The Programme is now being revised to offer supports to developers to build housing with an energy performance standard at least 60% above that required in the current Building Regulations. This action will demonstrate the opportunities for a strong shift towards low carbon housing in Ireland, pushing innovation and informing the next step beyond the upcoming building regulations review and to the further scheduled review in 2010.

Agency responsible for this action: Sustainable Energy Ireland

Best Practice Design for Social Housing

- *We are promoting higher standards of energy efficiency in social housing*

The best practice Guidelines - Quality Housing for Sustainable Communities - published in March 2007, focus on promoting high standards in design, construction, environmental performance and durability. Sustainable development can be achieved through settlement patterns that are planned in

accordance with urban design principles that create high quality neighbourhoods, at a density which supports schools, shops and amenities within easy walking distances of dwellings.

The Guidelines advocate that climate sensitive design should take account of orientation, topography and existing features of the site of a proposed development, so as to control wind effects, while optimising the benefits of sunlight and solar gain. Designing for sustainability involves achieving energy efficiency at the design, manufacture and construction stages and during the lifetime of the dwellings. The guidelines set the ambition of optimising the energy performance of new homes with the aim of reducing emissions and improving energy efficiency by 40%.

Agency responsible for this action: Department of Environment, Heritage and Local Government

Building Energy Performance Rating

- *We have rolled out a Building Energy Rating system to new houses from 2007 and will extend this to existing houses from 2009*

From January 2007, in line with the Energy Performance of Buildings Directive (Directive 2002/91/EC), we have required all new houses and apartments to have their energy efficiency assessed and certified by an expert. We will extend this requirement to existing dwellings from 2009, when they are offered for sale or lease. The Building Energy Rating will provide information on the dwelling's energy performance and can be used to demonstrate improvements over time. This will encourage transparency of energy performance and help inform purchase or rental decisions. The rating certificate will be accompanied by an advisory report, with recommendations for cost-effective improvements to the energy performance of the building, allowing the householder to improve the energy efficiency of their home and save money on their energy bill.

Agency responsible for this action: Sustainable Energy Ireland

Spatial and planning policies

- *We are encouraging more energy efficient communities through our spatial and planning policies*

Integrated planning and sustainable community initiatives offer important benefits in terms of reduced travel requirements, integrated services and better quality of life. The National Spatial Strategy 2002-2020 is based on a sustainable development policy framework and emphasises public transport access and sustainable travel through walking and cycling and settlement patterns that reduce distances between home, work, services and leisure.

Other supporting policies in this area include the Residential Density Guidelines (1999) and the recently published housing design guidelines - Quality Housing for Sustainable Communities**.** The purpose of these guidelines is to foster the objectives of the Government's statement on housing policy - Delivering Homes, Sustaining Communities (February, 2007) - which is to create sustainable communities through quality housing

The Dundalk 2020 initiative, led by SEI, aims to demonstrate the gains possible from an integrated, ambitious approach to sustainability on a community basis through a sustainable development zone. The vision of the Dundalk 2020 project is to stimulate a national move towards sustainable energy practice through demonstration in an exemplar community. The project will demonstrate and promote the range of technologies, techniques, policies and behaviours that will help deliver a sustainable energy future for Ireland.

The energy efficiency impacts of these policies are discussed in the next chapter.

Agency responsible for this action: Department of Environment, Heritage and Local Government, Sustainable Energy Ireland

Greener Homes Scheme

- *We are offering grants to householders to install certain renewable energy technologies*

The Greener Homes Scheme, launched in 2006, provides grants to homeowners to install new renewable energy heating systems in their homes. The scheme aims to develop a sustainable market for domestic renewable energy technologies by increasing their uptake in the domestic market, thereby reducing emissions in that sector, encouraging energy efficiency, contributing to security of supply objectives and facilitating greater consumer choice in the heating sector. In developing the market, the scheme paves the way for future regulations in respect of the use of renewable energy in new home building.

The scheme has surpassed its original targets and 16,000 householders are now availing of grant aid to convert or install renewable heating systems in their homes, with a consequent saving of 40,000 tonnes of CO_2 per annum. The number of registered renewable heat products on the market increased ten-fold since the scheme was launched in March 2006 and there has been a significant increase in the number of registered renewable energy installers.

Building on the success of this first phase, a second phase of the scheme is being launched on 1 October 2007. The second phase will focus strongly on quality standards and training, and reduces grant levels where it is considered that the market for a particular technology is well established. The scheme will continue to be reviewed and adapted in line with market development or renewable technologies.

Agency responsible for this action: Sustainable Energy Ireland

Warmer Homes Scheme

- *We are upgrading the energy performance of homes occupied by those on low incomes*

We are addressing the problem of fuel poverty through the Warmer Homes Scheme, improving the energy efficiency and comfort conditions of homes occupied by low-income households. The scheme has to date successfully delivered comfort and efficiency improvements to significant numbers of homes, in partnership with community organisations and private sector installers. Some 3,000 homes will be addressed by the programme in 2007 alone. Much potential for growth is envisaged. A pilot initiative has commenced that extends beyond the normal package of insulation and draft-proofing measures to include complete installation of an efficient central heating system.

Agency responsible for this action: Sustainable Energy Ireland

5.3.2 Our Committed Actions

Building Regulations

- *We are revising the building regulations to ensure an improvement in energy performance and a reduction of CO2 emissions of 40% in new domestic dwellings, relative to current standards*

This actions builds on the success of SEI's House of Tomorrow programme in demonstrating the viability of this level of performance, as well as the move by several local authorities to push performance through minimum standards. The Minister for the Environment Heritage and Local Government published draft revised regulations for public consultation on 24 September 2007. The new regulations will deliver significant energy efficiency gains and reduced CO2 emissions in newly built housing stock, taking advantage of building activity to push overall performance levels. The draft Regulations require a mandatory minimum level of renewable energy technologies be installed, such as solar panels or biomass heating systems. Mandatory minimum levels of energy efficient lighting and minimum standards on heating systems are also a feature of the new Regulations.

The new Regulations will come into force on a phased basis from July 2008.

Agency responsible for this action: Department of Environment, Heritage and Local Government

- *We will review the Building Regulations again in 2010 with a view to improving energy performance by 60% relative to current standards.*

The Building Regulations will be reviewed again in 2010 with a view to further improving energy performance to a level 60% above the present standard.

These two actions, together with the impacts of the previous revision of the residential building regulations in 2002, are expected to contribute a total of 9,770 GWh PEE to our 2020 efficiency target[12].

Agency responsible for this action: Department of Environment, Heritage and Local Government

Boiler Efficiency Campaign

- *We will launch an awareness campaign in 2008 to encourage householders and other building owners to maximise the energy efficiency of their boilers through regular servicing and where necessary replacement.*

This awareness campaign will be delivered through SEI from January 2008. The campaign will encourage building owners (primarily householders) to commit to regular boiler servicing practices and replacement of older or less efficient boilers and heating systems. The campaign will prioritise boilers that need most attention (e.g. older, less efficient boilers) and will include special consumer awareness and linked trade initiatives, awards schemes and specific promotions of quality products such as condensing boilers, efficient heating controls, and possibly renewable energy heating systems.

This campaign will be closely linked to the national energy efficiency campaign - Power of One.

Agency responsible for this action: Sustainable Energy Ireland

Upgrade of older housing stock

- *We will offer financial incentives to householders from 2008 to upgrade the energy efficiency of older housing stock*

Following on from the Programme for Government commitment to introduce a €100m wall and attic insulation grants scheme, an incentive programme is being developed to encourage owners of older housing stock to upgrade the energy performance of their homes. The programme is likely to offer support for installation of key energy efficiency technologies, possibly including condensing boilers, wall insulation and attic insulation. Irish-specific research shows that State support for such technologies could deliver significant energy efficiency benefits at a strongly positive net present value to the economy.

Agency responsible for this action: Sustainable Energy Ireland

[12] Impact estimates based on assumed house build rates derived from the revised National Climate Change Strategy. Changes in annual building rates may affect impacts.

Smart Metering

- *We will encourage more energy efficient behaviour by householders through the introduction of smart meters*

Our Programme for Government commits to ensuring the installation of a smart meter in every household. International experience suggests that smart meters can prompt behaviour change leading to electricity savings of at least 3%. This conservative figure suggests a direct savings contribution from smart metering in the residential sector of 770 GWh PEE in 2020. There are of course wider benefits to smart metering. One important potential system benefit is the accommodation of micro-generation through export to the grid. Pilot research on smart metering is being conducted by SEI and a wider trial programme is planned before full implementation. This is further discussed in Chapter 6.

Agency responsible for this action: Commission for Energy Regulation (lead), Sustainable Energy Ireland, Department of Communications, Energy and Natural Resources, ESB Customer Supply

Energy Efficient Lighting

- *We will apply a levy to all incandescent light bulbs to encourage a shift to efficient low-energy bulbs*

This action will accelerate the trend away from inefficient lighting which is already being seen in Ireland and will lead to direct benefits to the householder and to the economy. Funds raised from this levy will be applied to energy efficiency and climate change projects.

Agency responsible for this action: Department of Environment, Heritage and Local Government

5.4 Analysis of Potential Impacts

5.4.1 Projected Impacts

The above existing and committed actions in the sector are expected to have an impact of avoided energy usage of 13,620 GWh PEE per year by 2020.

Modelling suggests that programmes promoting the use of efficient lighting and appliances, condensing boilers, heating controls (timers and thermostats), increased insulation, and lagging jackets for water tanks will be required to deliver further savings.

Table 6: Projected impacts and further potential – Residential sector

	Savings towards targets (GWh) PEE		
	2010 (ESD Target)	**2016 (ESD Target)**	**2020 (National Target)**
Known Actions			
Building Regulations 2002 – improved energy performance of residential buildings	1,350	1,350	1,350
Building Regulations 2008 – 40% improvement on energy performance of residential buildings relative to current building regulations	550	3,805	5,980
Building Regulations 2010 – 60% improvement of residential buildings relative to current building regulations	0	1,355	2,440

SEI House of Tomorrow programme – developer support for buildings exceeding existing building regulations	30	30	30
Insulation and home heating support programme – improving current residential building stock in Ireland	750	3,000	3,000
Dundalk Sustainable Energy Zone – sustainable community demonstration project	50	50	50
Smart meter installation – estimated efficiency gains among domestic users	0	725	770
Further savings potential			
Additional potential from priority technologies in existing homes			4,750
Sector Total	**2,730**	**10,315**	**18,370**

Note: Impacts ramp up profile assumed for 2010 insulation, and smart meters.

5.4.2 Older Housing Stock

As stated in section 5.3.2, we are developing an incentive programme to encourage owners of older housing stock to upgrade the energy performance of their homes. The programme is likely to offer support for installation of key energy efficiency technologies. SEI has estimated that the energy saving potentials in existing housing for the priority technologies are as follows:

Table 7: Efficiency savings potential in key residential areas

Technology	Efficiency potential (GWh/year) PEE
Condensing boilers	4,370
CFLs	690
Attic insulation	1,250
Cavity wall insulation	380
Wall lining insulation	1,060
Total	7,750

Economic analysis by Indecon illustrates the potential costs and benefits of a support scheme. This is shown in the following table, which examines some of the key technologies, based on an assumed support level of 25%. The figures refer to each installation of a given technology.

Table 8: Extracts from Indecon analysis of possible domestic grant programme

Technology	Private NPV (€)	Social NPV (€)	Total quantity (MWh)	Present value over lifetime (€)	Exchequer Cost of Scheme (€)
Condensing Boiler	782	691	107	1,892	370
CFL	435	464	6	525	30
Loft Insulation	1,135	1,289	90	1,315	60
Cavity Wall Insulation	930	1,006	95	1,380	150

There is a strongly positive economic case for support in all cases. Interest in such a scheme targeted at households is likely to be high, when combined with appropriate actions to raise awareness.

Depending on the exact mix of technologies supported, the support programme is expected to contribute in the order of 3,000 GWh PEE to the 2020 target[13].

[13] Based on the installation of 165,000 condensing boilers, 450,000 loft insulations, 40,000 cavity wall insulations and 4,000,000 CFL bulbs

CHAPTER 6

TRANSPORT

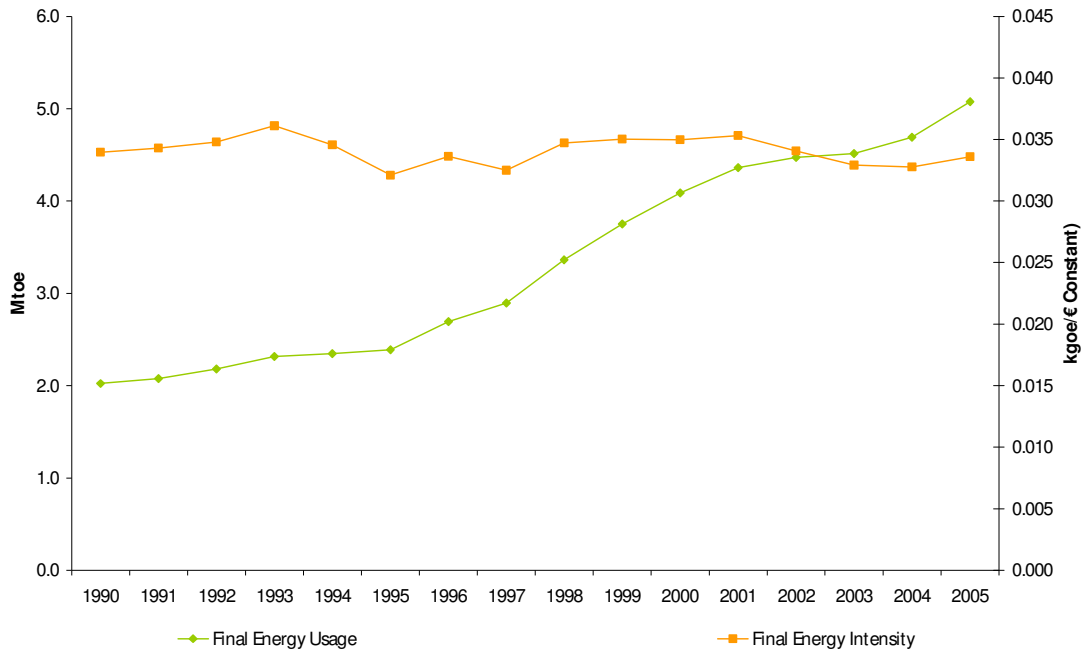
OUR ACTIONS →

- *We will publish a Sustainable Travel and Transport Action Plan in 2008 designed to enhance the energy efficiency and sustainability of the transport sector*
- *We are promoting modal shift through investment in our public transport services under Transport 21*
- *We will implement a demand management strategy as part of our Transport 21 initiative*
- *We will strengthen the relationship between land-use and transport*
- *We are providing transport specific advice to fleet managers on energy management*
- *We are maintaining the fuel efficiency of older private cars through the National Car Test system*
- *We will raise public awareness of the benefits of eco-driving*
- We will provide tools to help car buyers choose more fuel efficient cars
- *We will offer incentives through the VRT and motor tax systems to encourage the purchase of more energy efficient vehicles*

6.1 ENERGY USAGE IN TRANSPORT

Energy usage in the transport sector amounted to over 59,022 GWh (final energy consumption) in 2005. Energy usage in the transport sector grew by 151% between 1990 and 2005, with the highest growth in 2005, as illustrated in Figure 9. The fastest growth rates were in road transport, with energy usage in freight increasing even more rapidly than private cars. Energy intensity, measured as energy usage per unit of gross domestic product, remained relatively constant with a small decrease of only 1% over the period. There has been an increase in efficiency of vehicle use, but this has been far outweighed by the increasing number of vehicles, engine sizes and volumes of freight carried.

Figure 9: Energy Usage in Transport 1990 -2005 (final energy consumption)



Source: SEI

6.2 Introduction

The energy load of transport depends on the system (the mode of transport); the technology (the vehicle) and the user (driver behaviour). Irish policy, in Transport 21 (the Government's capital investment framework for transport for the period 2006-2015) in particular, is emphasising the importance of ensuring a greater share of demand is met by public transport and is building infrastructure to this end. However, we remain dependent on private road transport, both for our personal journeys and for inland freight.

The availability of attractive alternatives will deliver modal shift away from private car journeys and these will be addressed by Transport 21. Government policy has the aim of diversifying the modal and fuel mix of the transport sector, together with maximising efficient use of energy. Measures planned will seek to decouple energy use from growth in activity and demand in the sector.

The major contributions towards energy savings for this sector will arise from a modal shift to public transport as a result of measures planned under the Government's Transport 21 initiative. Transport 21 will deliver significantly improved public transport infrastructure and services. A major expansion of rail infrastructure and rolling stock will transform public transport in the capital.

Vehicle technology is pushing towards greater energy efficiency and Ireland is strongly committed to supporting this. The EU has published legislative proposals to achieve an average emissions level of 130g of CO2 per kilometre in new passenger cars by 2012, with an additional 10g per kilometre to be achieved through measures relating to air-conditioning systems, tyre pressure monitoring systems, standards for the rolling resistance of tyres, gear shift indicators, fuel-efficiency progress in light-commercial vehicles and sustainable biofuels.

Projected energy savings from these measures are up to 5,450 GWh PEE in 2020. Further consideration of transport initiatives will be undertaken in the development of the Sustainable Travel and Transport Action Plan due for publication in 2008.

6.3 Our Actions

6.3.1 Our Existing Early Actions

Public Transport investment - Transport 21

- *We are promoting modal shift through investment in our public transport services under Transport 21*

We will be investing nearly €16 billion over the 10-year period 2006-2015 under Transport 21 with the aim of transforming public transport in the Greater Dublin Area and greatly improving public transport nationally, consistent with the National Spatial Strategy.

Our record level of investment in public transport under Transport 21 will promote a significant modal shift from private to public transport. We expect this investment will result in 2016 in an additional 75 million passenger trips per annum on DART/suburban rail services, over 80 million additional passenger trips on Luas/Metro services and a 60% increase in bus capacity.

The Dublin rail projects to be delivered under Transport 21 include 2 new Metro lines, a tunnelled interconnector line to link and transform suburban rail services in the city and extension of the Luas light rail network to the Docklands, Citywest, Cherrywood, Bray, Liffey Junction and Lucan. The expanded bus network in Dublin will be reoriented to create a meshed network of services and take account of the rail developments above.

Further development of the Quality Bus Corridor network, other bus priority measures, a major expansion in park and ride facilities and improved cycling and pedestrian infrastructure will further promote easy access to these high quality public transport services.

Modelling of the impacts of Transport 21 in the Greater Dublin Area shows a reduction of almost 20% in fuel usage and CO_2 emissions during rush hour in 2016, compared to a situation in 2006 without Transport 21 in place, provided demand side measures are implemented.

Agency responsible for this action: Department of Transport (lead), Railway Procurement Agency, Iarnród Éireann, Dublin Bus, Dublin City Council, Dublin Transportation Office.

Advice to Fleet Managers

- *We are providing transport specific advice to fleet managers on energy management*

SEI has extended its Energy MAP web resource to cover transport topics, with information aimed primarily at fleet managers and haulage companies. This resource offers extensive advice on how to undertake complete strategic energy management programmes in the transport sector.

Agency responsible for this action: Sustainable Energy Ireland

National Car Test

- *We are maintaining the fuel efficiency of older private cars through the National Car Test system*

The National Car Test (NCT) programme will help to develop and maintain a more efficient fleet of private vehicles for Ireland, ensuring maintenance of maximum fuel efficiency of ageing vehicles. While it is difficult to estimate actual savings from this programme, it is noteworthy that the number of cars failing the emissions test has reduced significantly since its inception.

Agency responsible for this action: Department of Transport

6.3.2 Our Committed Actions

Sustainable Travel and Transport Action Plan

- *We will publish a Sustainable Travel and Transport Action Plan in 2008 designed to enhance the energy efficiency and sustainability of the transport sector*

A Sustainable Travel and Transport Action Plan, to be published by the Minister for Transport in 2008, will set out detailed plans for enhancing the energy efficiency and wider sustainability of the transport sector. It will become the central platform for enhancing sustainability (including energy efficiency) in the transport sector. The Plan aims to review all existing and potential policy interventions with the overall aim of achieving a sustainable transport system by 2020.

The Plan will secure a sustainable transport network through continued investment in capital infrastructure and the implementation of demand side policies and measures. It aims to reduce travelling times, improve safety, deliver real commuting choice, reduce congestion and protect the environment. The overall goal is an immediate reduction in the annual increase in energy demand and emissions, with a long-term goal of absolute reduction or decoupling of transport demand from economic and population growth.

Agency responsible for this action: Department of Transport

Demand Side Management

- *We will implement a demand management strategy as part of our Transport 21 initiative*

Demand side management (DSM) includes soft support measures for influencing modal shift and behavioural change and essentially involve achieving greater energy efficiency from the transport sector. Our Demand Management strategy will be progressively introduced as the infrastructure and services under Transport 21 are delivered. Our strategy involves land use policies that facilitate better links with public transport, measures to encourage walking and cycling, soft measures to reduce car use, including car sharing, flexible working, travel blending and individual or workplace travel plans. Fiscal measures such as road pricing or congestion charges will be considered towards the end of the 10-year investment timeframe of Transport 21, when high quality public transport alternatives to private car commuting are in place.

Agency responsible for this action: Department of Transport (lead), Dublin City Council, National Roads Authority, Dublin Transportation Office

Spatial and planning policies

- *We will strengthen the relationship between land-use and transport*

The National Spatial Strategy (NSS) as well as Regional Planning Guidelines aim to integrate spatial development and transport investment in order to support more sustainable travel patterns and facilitate a modal shift to public transport, cycling and walking. Our policy will focus on strengthening the land use-transport interaction and a range of measures will be deployed. We will encourage and support the continuing development of integrated land use-transportation strategies for the major urban areas and their hinterlands, building on the Cork Area Strategic Plan (CASP) model.

Funding for public transport investment and service development will be prioritised to support the implementation of integrated strategies. Within major urban areas, the use of local area plans and special development zones (SDZ) will be encouraged as a way of improving the land use-transport interface. Local authorities will also be encouraged to use the physical planning system to promote public transport, walking and cycling as well as workplace travel plans.

Agency responsible for this action: Department of Transport, Department of the Environment, Heritage and Local Government

Eco-driving

- *We will raise public awareness of the benefits of eco-driving*

Eco-driving and the promotion of smooth and safe driving at lower engine revolutions is a way of reducing fuel consumption and maximising fuel economy, through increasing driver awareness and changing personal driving behaviour.

Eco-driving techniques have been shown to improve individual vehicles energy performance by as much as 20%, in other words a saving of 20% on fuel costs. A public awareness campaign will be rolled out as part of the proposed *Sustainable Travel and Transport Action Plan* and the National Climate Change Awareness Campaign, in order to disseminate information and affect behavioural change. This will include advice on optimizing mileage through vehicle maintenance, avoiding drag by minimizing mass and car luggage, using air-conditioning sparingly, keeping windows and sunroofs closed, switching demister off, optimizing acceleration and speed, combining multi-purpose trips, and avoiding congested routes, sudden braking and engine idling. It is also intended to develop a Driver Skills Development Programme as part of driver education curriculum in order to raise awareness about fuel consumption savings associated with eco-driving.

In addition, the National Energy Efficiency Campaign - Power of One - will continue to promote the need for energy efficient driving, building on actions already carried out.

Agency responsible for this action: Department of Transport

Energy Efficient Vehicle Selection

- We will provide tools to help car buyers choose more fuel efficient cars

The number of cars with an engine size of 1.2 litres or less is declining, while the number greater than 1.2 litres is increasing. The fuel consumption for new petrol cars in Ireland in 2005 was 7.2 litres/100km (40 miles per gallon). This represents an increase of 1.6% on the average consumption in 2000 and indicates that our car fleet is becoming less fuel efficient. Consumers have become familiar with the concept of energy labelling of household appliances and it is now a factor in many purchase decisions.

The European Communities (Consumer Information on Fuel Economy and CO_2 Emissions of New Passenger Cars) Regulations 2001 require all new cars displayed or offered for sale or lease to bear a label detailing the vehicle's fuel efficiency and CO_2 emissions and requires showrooms to display such information in a prominent position at all points of sale. The Regulations also require the Society of the Irish Motor Industry (SIMI) to publish an annual guide detailing fuel efficiency and CO_2 emissions of all new makes and models to allow consumers make informed choices and alter behaviour, if desired.

We plan to contribute to a reversal of the negative efficiency trends, by enhancing the existing mandatory labelling system to provide more information on CO_2 emissions and on fuel economy. This will contribute to enhancing private motorists' awareness of the environmental and energy impacts associated with different vehicle types and influencing purchase decisions in favour of higher efficiency cars.

SEI will also produce a web-tool to be called '*Low Carbon Cars'* that will allow buyers search and compare the fuel economy of an exhaustive database of all cars available in Ireland. Energy and environmental data will be presented in a format similar to the Environment Label, further building familiarity. The database will cover the years 2000 – 2007, ensuring the tool's usefulness in the used, as well as new car markets. We will promote the site through links from motor sales websites.

Agency responsible for this action: Department of Environment, Heritage and Local Government, Sustainable Energy Ireland.

Vehicle Registration tax

- *We will change the VRT and motor tax systems to favour more energy efficient vehicle engine sizes*

Tax incentives to encourage the purchase of cleaner and more energy efficient vehicles have the potential to increase the fuel efficiency of the vehicle fleet. Provision exists for a 50% reduction in Vehicle Registration Tax (VRT) in Ireland for hybrid-electric vehicles, which aims to stimulate the market for these vehicles. This VRT relief has been extended to flexi-fuelled vehicles, i.e. vehicles capable of operating on an E85 bio-ethanol mix, for a trial period of two years, following its announcement in the 2006 Budget.

A 50% VRT relief was also introduced for electric cars in the 2007 Budget on a pilot one-year basis.

Agency responsible for this action: Department of Finance, Revenue Commissioners

6.4 Analysis of Potential Impacts

Existing and committed actions in the sector are expected to have an impact of avoided energy usage of 5,450 GWh/yr PEE by 2020.

Table 9: Projected impacts and further potential – transport sector

	Savings towards targets (GWh) PEE		
	2010 (ESD Target)	**2016 (ESD Target)**	**2020 (National Target)**
Dublin traffic measures – road transport infrastructure construction and upgrade	400	1,000	1,000
Technology Improvements – fuel efficiency of Irelands' vehicle fleet	710	1,775	1,775
Alignment of transport investment with spatial planning – appropriate transport infrastructure	120	308	308
Transport 21 - Modal Shift to public transport following development of Transport 21 infrastructure	750	1,885	1,885
Efficient driving campaign - proposed Department of Transport initiative	190	482	482
Sector Total	**2,170**	**5,450**	**5,450**

The Department of Transport is undertaking work to refine analysis and impacts estimation, which will result in new, more precise projections becoming available.

CHAPTER 7

ELECTRICITY SUPPLY SECTOR

OUR ACTIONS →

- *We are promoting competition and choice and developing the overall market framework for electricity through the development of an all-island Single Electricity Market, leading to a more efficient supply sector*
- *We will prioritise energy efficiency in our investment decisions for new generation plant under the National Development Plan 2007-2013*
- *We will complete a comprehensive cost-benefit review in 2008 of the potential for distributed generation*
- *We will reduce distribution losses to 7.5% by 2010*
- *We will investigate the scope for reducing transmission losses*
- *We will significantly expand our demand side management measures and will publish a comprehensive DSM plan in 2008*
- *We will launch a programme to install smart meters for all electricity consumers*
- We will achieve at least 400 MWe of CHP by 2010 and aim to achieve at least 800 MWe by 2020
- *We have commenced a trial of micro-CHP generation in residential and small business settings to assess current technology and identify possible barriers, risks and benefits associated with its deployment.*

7.1 Introduction

This chapter covers the electricity supply sector both in terms of its own use of energy and its important role in supporting efficiency of end-use by final customers.

The overall efficiency of electricity production in Ireland has risen steadily in recent years, with the addition of more efficient plant and improvements in infrastructure. Further savings are available through higher generation efficiencies and reductions in transmission and distribution losses.

The electricity supply sector has a potentially important role in securing efficiency gains among all end-users. Demand side management programmes led by electricity suppliers can avail of existing market relationships and knowledge. Such programmes can be delivered through licence conditions or other obligation systems, including so-called tradable white certificates. In the longer term the engagement of the demand side electricity market will involve smart meters and related appropriate incentives and information to users.

There is substantial scope for improving the efficiency of the electricity supply sector. Significant losses occur in the process of converting primary energy sources such as gas, oil or coal, into electricity. Typically 50-65% of the energy of the input fuel is lost and while much of these losses are unavoidable, gains are possible. Similarly, a further 7.5 - 8% has been lost through transformers, overhead lines and underground cables in the electricity transmission and distribution networks in recent years.

The electricity industry continuously invests to meet increased demand, replace ageing assets and reduce losses. These factors often go together in any particular investment. Substantial improvements have been made in energy efficiency as illustrated by Figure 10, which shows an increase in efficiency of from 33% in 1990 to 40.6 % in 2005.

Figure 10: Energy Efficiency of the Electricity Sector 1990 -2005

Source: SEI

The main factor in this improvement has been the shift from old peat and coal-fired generation plant, with an efficiency of around 30-35%, to modern peat plant with an efficiency of around 40% and combined-cycle plant with an efficiency of around 50-55%. Other technology and operational improvements, such as reduced losses in transformers, motors and generators, have also contributed, as have reinforcements to the transmission and distribution networks[14].

The current generation mix in Ireland comprises some 30% new, efficient, CCGT generation capacity; 37% condensing steam cycle (mostly older plant); 10% open cycle gas turbine peaking plant; 7% dispatchable hydro and almost 13% wind. Over the next 7 years, 1,300 MW of older plant is due to be replaced by about 850 MW of efficient CCGT and increased wind capacity.

There is still considerable scope for increasing efficiency further in generation, transmission and distribution. The development and management of the electricity infrastructure provides a range of opportunities for improved energy efficiency. This may include the deployment of new technologies, reinforcement of the system, replacing ageing assets, increased use of embedded local generation, and the introduction of improved load-management regimes.

The Commission for Energy Regulation monitors energy efficiency in transmission and distribution and sets targets for energy efficiency in the conditions of licence and the five year price control agreements for the two licence holders, EirGrid and ESB Networks. The CER is currently undertaking a review of all supply licences. This review includes consideration of efforts made by supply companies to support energy efficiency, for which a consultation process is scheduled for 2007. Feedback received may be considered for incorporation into licence revisions. Final licence requirements are to be decided in the Autumn of 2007.

[14] For example, upgrading the 10 kV distribution system to 20kV has made a significant contribution to reducing distribution losses.

As well as the efficiency of generation itself, the electricity supply sector has a role in supporting efficiency among its customers – the end-users of the electricity generated. Addressing consumers via the supply sector companies (principally the energy retail companies) can exploit their market access and expertise to deliver services such as advice programmes directly to their customer base. Such an approach can be delivered via regulatory approaches such as licence conditions or obligation schemes, with additional flexibility available through tradable obligations (so-called White Certificates). Several EU states have placed such energy efficiency obligations on energy supply companies.

7.2 Our Actions

7.2.1 Our Existing Early Actions

Single Electricity Market

- *We are promoting competition and choice and developing the overall market framework for electricity through the development of an all-island Single Electricity Market, leading to a more efficient supply sector*

The key factor in influencing correct investment decisions is that prices at which electricity is bought and sold should reflect long and short term costs appropriately. The Single Electricity Market covering the island of Ireland will be launched in November 2007. This will underpin capital investment decisions impacting on generation, import and export of electricity and through that on investment in transmission and distribution, leading to a more efficient supply sector.

Agency responsible for this action: Commission for Energy Regulation (lead), Department of Communications, Energy and Natural Resources

7.2.2 Our Committed Actions

Investment in New Generation Plant

- *We will prioritise energy efficiency in our investment decisions for new generation plant under the National Development Plan 2007-2013*

- *We will complete a comprehensive cost-benefit review in 2008 of the potential for distributed generation*

Our Energy White Paper sets a target of 33% of electricity consumption to be met by renewable energy by 2020. The majority of this is expected to be provided by wind-powered generation, with the need for a balanced portfolio of renewable technologies being recognised, including biomass and ocean technology.

We expect an increasing deployment of distributed generation, with generating plant embedded in the transmission and distribution networks, resulting in lower flows in the networks and lower system losses.

Growth in distributed generation will be driven by the growth in the renewable technologies mentioned above. Also, most of the target 800 MWe of CHP plant will be embedded in the system. The reduced losses from distributed generation may be partly offset if there is any need to maintain higher spinning reserve or other back-up plant in operation. System studies would be required to estimate the impact of this.

Connection and tariff arrangements for importing and exporting electricity from embedded generation may require review to ensure that equitable arrangements are in place and no disincentives to embedded generation exist.

The construction of modern power plant and ever increasing contribution from renewable electricity sources will continue the trend towards more efficient, less carbon intensive power generation up to 2020.

We also envisage that new clean coal technology with carbon capture and storage will be constructed prior to 2020.

Agency responsible for this action: Department of Communications, Energy and Natural Resources

Transmission and Distribution Efficiencies

- *We will reduce distribution losses to 7.5% by 2010*
- *We will investigate the scope for reducing transmission losses*

The Commission for Energy Regulation (CER) has placed a target on the licence holders (EirGrid and ESB Networks) of reducing distribution losses to 7.5% by 2010. CER will reassess this target in light of data from bulk supply meters and will also investigate whether time of day losses can be incorporated in the overall distribution loss targets.

EirGrid has a set of strategic challenges over the next decade in terms of all-island security of supply, sustainability and competitiveness, including the implementation of a long-term Grid strategy, interconnection and taking on the role of the transmission asset owner, as well as operator. CER is considering adding transmission losses to the performance incentives applying to EirGrid.

Agency responsible for this action: Commission for Energy Regulation

Demand Side Management

- *We will significantly expand our demand side management measures and will publish a comprehensive DSM plan in 2008*

We have a range of programmes already in operation designed to reduce peak loading, bringing with them reduced losses in generation, transmission and distribution. These include Nightsaver in the domestic market and Winter Peak Demand Reduction, Powersave, and Winter Demand Reduction Incentive in the industrial, commercial and public sectors. There are also efficiency elements, principally the work of ESB Customer Supply in Demand Side Management with its customers, including efficiency advice services.

Based on savings achieved over recent years, the expected savings impact of the ESB Customer Supply activity is estimated at 750 GWh PEE in 2020. This estimate makes no assumptions about expanded DSM measures. Potential savings from an enhanced programme may be considerably higher.

We consider that greater priority needs to be given to sustained cost-effective DSM initiatives for the residential and business sectors, building on existing programmes. We will give priority to expanded cost-effective demand side management initiatives from 2008 under a comprehensive DSM Plan. This plan will be informed by a study on DSM Options for Ireland, commissioned by SEI. Initial results from this study suggest that significant potential exists in each of the sectors considered. The report provides a business case, including cost/benefit analysis, for public interventions designed to achieve the largest potential savings in each sector. The Report estimates overall economic potential for efficiency gains to be 24% at present. Technological and market developments will change this over the period covered by this Action Plan.

Agency responsible for this action: Department of Communications, Energy and Natural Resources (lead), Sustainable Energy Ireland, ESB, Commission for Energy Regulation

Smart Metering and Information

- *We will launch a programme to install smart meters for all electricity consumers*

Smart meters that measure and show consumers energy usage patterns in real time support energy efficient behaviour in homes by offering consumers information on their energy usage and making evident opportunities for change and improvement. Smart meters can also include features such as net-metering to allow users to sell micro-generated power to the grid, and active control functions to allow operators control peak demand remotely. Government is now commencing an extended trial of smart metering to be followed by a full national roll-out to all homes. The trial and further roll out will build on an initial trial in Dundalk being undertaken by SEI, and will extend to up to 25,000 homes, and well as possibly to small businesses. The trial will involve CER, ESB Networks, SEI and other key stakeholders. Issues for testing include meter technology and functionality, data collection and analysis, and behavioural responses. All smart meter functions, from display to net metering and active control, will be tested, as will behavioural responses to different types of information.

Linked to the roll out of smart meters is the provision of information to the user on the amount of energy consumed to the uses and the costs. This can be undertaken in a number of ways including via real time displays and correlation to bills. It is intended to progressively provide electronic displays linked to meters to provide real-time information on electricity usage and costs.

Smart metering can also be linked to the design of appropriate tariffs to reflect the costs of electricity at all times of day and year, designed to influence the behaviour of consumers. The CER regulates tariffs offered to final customers by ESB PES (and BGS for gas). At present, the vast majority of customers covered by regulated tariffs pay 'flat' tariffs i.e. tariffs that do not change by time-of-day. These flat tariffs may risk losing the opportunity to decrease volumes transmitted and distributed during peak demand periods, thereby increasing the amount of investment in the transmission and distribution systems. About 10% of domestic and small business customers use tariffs that vary by day and night. In addition, all large customers face tariffs with time variances. Extending the percentage of customers on time-varying will be facilitated by the wider installation of appropriate interval or smart metering.

Agency responsible for this action: Commission for Energy Regulation (lead), Department of Communications, Energy and Natural Resources, Sustainable Energy Ireland, ESB Customer Supply

Support for Combined Heat and Power (CHP)

- *We will achieve at least 400 MWe of CHP by 2010 and aim to achieve at least 800 MWe by 2020*

Existing capacity of operational CHP is just under 300MWe. The existing small-scale CHP Deployment Programme is expected to achieve savings of 20 GWh/yr from an additional capacity of up to 20 MWe. We have set targets of 400 MWe of CHP capacity by 2010 and 800 MWe by 2020. A further target for CHP will be considered within two years in light of further studies. A review of potential administrative and regulatory barriers and decisions on appropriate support for large scale CHP will be undertaken, following up the report from the CHP Policy Group.

Agency responsible for this action: Department of Communications, Energy and Natural Resources (lead), Sustainable Energy Ireland

Micro-generation

- *We have commenced a trial of micro-CHP generation in residential and small business settings to assess current technology and identify possible barriers, risks and benefits associated with its deployment.*

A micro-CHP advisory group was initiated in June 2007 with the objective of engaging all key stakeholders, including ESB Networks, Bord Gais and the CER, to ensure that their objectives are incorporated in the design of the trial and that the trial can reflect and inform the development of regulatory arrangements for micro-generation.

Based on a recommendation of the CHP Policy Group, SEI has commenced a trial of micro-CHP generation in residential and small business settings. The trial will assess current technology and identify possible barriers, risks and benefits associated with its deployment. The trial is being carried out in parallel with similar trials underway in Great Britain and Northern Ireland. The study will provide strong Irish-specific data on the technologies' performance, and implications for local generation efficiencies and grid integration. This will inform future policy consideration of micro-generation and the opportunities for further efficiency gains through distributed small scale generation.

Trial technologies will be installed at twelve sites. The domestic trial sites will be located within the Dundalk Sustainable Energy Zone, where it is planned to install and monitor 6 domestic micro-CHP units and 3 condensing gas boilers as a reference technology.

The domestic micro-CHP trial will be linked to the smart metering and time of use tariff trials planned for the Dundalk Sustainable Energy Zone

Agency responsible for this action: Sustainable Energy Ireland

7.3 Analysis of Potential Impacts

Table 10: Projected impacts – Energy Supply sector

	Savings towards targets (GWh) PEE		
	2010 (ESD Target)	**2016 (ESD Target)**	**2020 (National Target)**
Transmission and distribution efficiencies improvement – reaching loss target of 7.5%	0	250	435
Delivery of targets for installed CHP capacity as outlined in the White Paper	375	600	750
Sector Total	**375**	**850**	**1,185**

CHAPTER 8

RESEARCH AND DEVELOPMENT

OUR ACTIONS →

- *We are supporting research and development projects geared towards bringing renewable energy technologies to market*
- *We have provided substantial funds under NDP 2007-2013 for research on energy efficiency and renewable energy sources*
- *We are ensuring a strategic and integrated approach to developing our energy research capacity through the Irish Energy Research Council*
- *We are providing funding to early stage researchers in priority areas of energy research through the Charles Parsons Energy Research Awards*
- We will support post-doctoral research fellowships in the area of energy efficiency

8.1 Introduction

Energy research and development in Ireland has never been more extensive as it is now, with considerable state and private sector investment through academic institutions and development companies. We consider research to be central in determining the long term path towards sustainability and believe it offers significant business opportunities as energy efficiency and renewable energy markets expand rapidly.

The considerable R&D activity now underway or soon to commence will be an important foundation for future efficiency gains and will also be important for developing Ireland's position as a leading actor in sustainable energy technologies and services.

Investment in research and development is vital to ensure an increase in the knowledge base required to support the rapidly growing energy sector in Ireland. We plan substantial investments over the period of the National Development Plan 2007-2013 for this purpose. Through the establishment of the Irish Energy Research Council, we have established a structure to ensure targeted and strategic spending on research that will support continued growth, whilst improving energy efficiency in transport, energy supply systems, buildings and industry for the island of Ireland.

Investment in the sector has proven links to energy savings through development and promotion of new technologies and services. Potential exists for Ireland to take a lead role in the area into the future, as it builds a solid knowledge base of students and researchers, together with the structure required to benefit fully from the research sector.

Enterprise Ireland (E.I.) offers supports for the commercialisation and development of renewable energy technologies, products and/or processes that have a commercial potential. E.I. provides feasibility and RTI support. Commercialisation Funding and support for Industry Led Research Projects are also available for research projects based in 3rd Level institutions. "EI Bio" is working with interested companies, through IBEC, to see if there are future research projects that Enterprise Ireland can help to fund in this area. While E.I. does not provide R & D funding for certain renewable energy

technologies such as wind and tidal power, E.I. will consider, on the presentation of viable business plans, support for the development of manufacturing projects to manufacture equipment for such opportunities.

At EU level significant funding is available under the **Seventh EU Framework Programme for Research and Technological Development** (FP7 2007-2013). Energy is one of the 10 themes of the Co-operation Programme of FP7 that seeks to support trans-national research. The energy budget for 2007-2013 (€2.3billion) will be targeted at developing a more sustainable energy system for Europe.

SEI has a lead role in developing and maintaining comprehensive national and sectoral statistics for energy production, transformation and end use. The Energy Policy Statistical Support Unit is SEI's dedicated statistics team, working on collecting, processing and publishing energy statistics to support policy analysis and development in line with national needs and international obligations, conducting statistical and economic analyses of energy services sectors and sustainable energy options and contributing to the development and promulgation of appropriate sustainability indicators.

8.2 Our Actions

8.2.1 Our Existing Early Actions

Renewable Energy Research & Development Programme

- *We are supporting research and development projects geared towards bringing renewable energy technologies to market*

The Renewable Energy Research and Development Programme administered by SEI is primarily focused on stimulating the deployment of renewable energy technologies that are close to market and on assessing the development of technologies that have prospects for the future. Areas currently receiving support under the programme include wind, biomass, ocean energy, solar energy and ground source heat pumps. Over €27 million has been committed to renewable energy research under this programme in the past five years.

Agency responsible for this action: Sustainable Energy Ireland

National Development Plan (NDP) 2007-2013

- *We have provided substantial funds under NDP 2007-2013 for research on energy efficiency and renewable energy sources*

Investment of €149 million has been committed by the Irish Government to the Energy Research Sub-Programme of the National Development Plan (NDP) 2007-2013. The funds will be directed at research on energy efficiency and renewable sources. Research will support initiatives to reduce demand, enhance security of supply, and promote competition in the energy market. The investment programme will also be used to leverage further funding from related EU programme.

Agency responsible for this action: Department of Communications, Energy and Natural Resources

Irish Energy Research Council

- *We are ensuring a strategic and integrated approach to developing our energy research capacity through the Irish Energy Research Council*

The Irish Energy Research Council was established in June 2006 to co-ordinate energy research and technological development and innovation (RTDI) in Ireland. The Council will play a vital role in

determining the priorities for research undertaken with funds stemming from the NDP, and will ensure a strategic and integrated approach to developing Ireland's research capacity. It will co-ordinate efforts on a national level with those proposed by the EU to maximise access to potential EU funding. The Council will compliment existing SEI programmes that seek to demonstrate best practice and technologies for energy efficiency. Research and development in energy efficiency and technology conversion will be supported through the Energy RTDI Programme 2007-2013.

Agency responsible for this action: Department of Communications, Energy and Natural Resources

Charles Parsons Energy Research Awards

- *We are providing funding to early stage researchers in priority areas of energy research through the Charles Parsons Energy Research Awards*

The Charles Parsons Energy Research Awards seek to develop sustainable research capacity in priority areas of energy research. The awards provide funding of early stage researchers for extended periods of up to seven years, a measure that has been widely welcomed by the research community. More than €20million was invested in the initiative in 2006, supporting the efforts of over 200 researchers and students.

Agency responsible for this action: Department of Communications, Energy and Natural Resources

8.2.2 Our Committed Actions

Post Doctoral Research Fellowships

- *We will support post-doctoral research fellowships in the area of energy efficiency*

In Ireland there are increasing demands in relation to the strengthening of evidence-based policy formation by determining the impact of different policies and measures on baseline energy forecasts, and assessing the associated energy, economic and environmental implications. This involves modelling a range of scenarios for short (up to 2010), medium (up to 2020) and long term (up to 2050) energy demand and supply growth with various measures. In response to the need for analytical work to underpin the Energy Services Directive (specifically under the technical Annexes 1 and 4), and other EU Directives, SEI and the Environmental Protection Agency have invited applications for a Fellowship in Energy Analysis and Modelling. The focus of the analytical work will be in the area of energy efficiency.

Agency responsible for this action: Sustainable Energy Ireland, Environmental Protection Agency

CHAPTER 9

CROSS SECTORAL AND UNDERPINNING MEASURES

OUR ACTIONS →

- We are promoting energy efficiency through our multi media campaign - Power of One.
- *We are promoting the development of training and accreditation schemes in the area of energy efficiency and renewable energy*
- *We are implementing many fiscal measures to protect and enhance the environment and are examining others, including the introduction of a carbon tax*
- We will develop and publish a model contract template and guidelines for Energy Service Companies (ESCOs)
- We will publish an annual report "Energy Efficiency in Ireland", starting in 2007, monitoring progress on energy efficiency

9.1 Introduction

Cross-sectoral measures are vital to creating the conditions for change and supporting all the sector-specific actions discussed in this Action Plan. Information activities, particularly The Power of One campaign, raise awareness and build support, commitment and momentum, as well as directly raising demand for efficiency products and services. Strong policy signals are also important in this regard, and these are now clearly demonstrating our long term commitment to the agenda and creating a stable environment for market interest and investment.

Price-related underpinning measures also play a potentially important role, again giving market signals that support investment and explicitly value the full societal benefits of energy efficiency gains.

All sector- or technology-specific actions to improve energy efficiency depend on the background conditions being right. Market, infrastructure and policy contexts can support efficiency measures by making sure the right choices are available and that the signals and incentives are right to reward these choices. Such conditions are determined largely by measures and policies that cut across all sectors and are an important element of the 'background' that determines the success of the many specific actions set out in this Action Plan.

Many of the important cross-sectoral and underpinning measures have been discussed in earlier chapters of this report, although some offer opportunities for expansion and hence greater impact.

9.2 Our Actions

9.2.1 Our Existing Early Actions

Information and Advice

- *We are promoting energy efficiency through our multi media campaign - Power of One.*

Article 7 of the End-Use Efficiency and Energy Services Directive requires Member States to ensure that greater efforts are made to promote energy end-use efficiency. Since its launch in 2006, the National Energy Efficiency Campaign - The Power of One - has built a strong national presence and achieved wide recognition, and will now build on this to develop stronger and wider messages. The campaign involves:

- Building awareness of the types and sources of energy we use;
- Raising awareness of the impact of inefficient use of energy in terms of increased costs to the user, the economy and the environment;
- Informing and empowering the general public on best practices in terms of saving energy at home and at work;
- Targeting individual sectors (e.g. the public sector, SMEs, schools, the transport sector) with specific energy saving strategies;
- Building on existing programmes and initiatives on the island of Ireland and taking full account of EU developments.

The first phase of the campaign -Tell Me Why - highlighted the need to adopt more energy efficient practices. Initial elements of the campaign included an extensive TV campaign across all stations, the launch of the website www.powerofone.ie, a billboard campaign throughout the country and a cinema advertising campaign. The second phase - Show Me How - deals with the many positive steps that people can take to improve their energy efficiency. Key elements include:

TV and Radio commercials
Individual TV and Radio commercials focus on:

- Switching to more energy efficient lighting
- Using domestic heating systems more efficiently
- Buying energy efficient Christmas lights
- Highlighting the energy wasted by leaving equipment on standby
- Ensuring that tyres are correctly inflated for more efficient driving
- Highlighting the importance of buying energy efficient appliances
- Encouraging people to use less energy during peak time

Press ads
A series of press advertisements are currently running across national titles and consumer magazines highlighting simple consumer messages about energy efficiency with a call to action to visit the website, call the information line or visit the mobile portal.

Website
The Power of One website www.powerofone.ie acts as a central hub for all campaign activity. All outbound communications reference the power of one website. To date there has been almost 100,000 unique visitors to the site. Online, users can take an interactive energy survey, get energy efficiency tips for the home and at work, enter competitions, view the TV ads etc.

The Power of One Regional Roadshow
A series of roadshow events around the country was held featuring the appliances we use everyday as 'avant-garde' works of art, with captions displayed that highlighted relevant energy saving tips. Guests were invited to enjoy the exhibition while learning how they could make simple changes like turning down the thermostat by 1 degree in order to cut their heating bill by up to 10%.

Power of One Christmas Campaign
The focus of this campaign is to encourage consumers to have an energy conscious Christmas. Power of One has linked with City Councils to promote energy efficient Christmas lights.

The Power of One Street
One of the campaign's key initiatives the Power of One Street study, which tracks the energy usage of 8 families from all over the country, began in March 2007. Each month the participants are set a challenge to improve energy efficiency in their homes. Areas focused on include:

- Space Heating
- Water Heating
- Lighting
- Small Power (electronics, small appliances)
- Cooking
- Transport

Progress is monitored and reported on, on Ireland's national primetime news programme, online on www.powerofonestreet.ie and across national and regional press. This initiative clearly demonstrates the simple changes that can be made to improve energy efficiency and save on domestic energy costs.

Library campaign
A Power of One information pack containing posters, mouse mats, and bookmarks was sent to all of the 34 main County libraries in Ireland.

Direct Mail consumer packs
To date over 30,000 information packs have been distributed to consumers, schools and offices.

Bebo site
A Bebo website site has been developed to target a younger audience. This site highlights the Power of One message but makes the campaign more accessible to a younger audience. To date 30,000 Bebo members have viewed the Power of One page and 160 children have submitted drawings with energy efficiency themes to the Power of One profile page

Utility Bill Insert
Power of One messaging has featured in national electricity and gas bills delivered to every home and business in Ireland.

Schools programme
A pilot Power of One schools programme will commence in October 2007 in 20 schools throughout the country. This programme will involve Transition year students (15 and 16 year olds) who will develop an energy efficient marketing programme targeting the following groups:

- Their own schools
- Local primary schools
- The local community

At the end of the pilot programme the successful school groups will attend an awards day to present their work to a panel of judges. The long term aim of this pilot programme is the development of a full-scale education module which can be rolled out to all schools in the country.

Seminars and Sponsorship
Power of One provides expert speakers to address key audiences throughout the country and has had significant presence in many fairs, forums and seminars.

TV Programme
Power of One is sponsoring the popular About the House RTE TV series, now in its eighth season. The Power of One Street will form a new strand for the series, dealing with the simple ways of saving energy in the home, by focusing on awareness, information, practical home management skills and simple actions that don't necessarily cost householders money. Viewing figures for the show are on average 400,000.

Power of One At Work
Launched in September 2007 in partnership with Sustainable Energy Ireland, the campaign to the business sector targets employees and employers across all sectors, including the public sector. This campaign includes TV, radio and press advertising and a website - www.powerofoneatwork.ie. As part of the Power of One At Work programme, we will follow on from the success of Power of One Street by enlisting a number of businesses who will take on challenges in the workplace all focussed on energy efficiency behavioural change. Their progress will be tracked across all media and showcased accordingly.

Consumer Research
As a key benchmark for the impact of the campaign, a quantitative questionnaire was developed at the inception of the initiative. This was designed to track attitudes and awareness to energy efficiency. This questionnaire was included in a nation wide study of 1200 adults conducted across 60 sampling points around the country. Quotas are set on gender, age, social class and region to ensure it correctly reflects the demographics of the population. Quantitative analysis carried out at regular intervals since the campaign began indicates there has been a substantial increase in the numbers of people who reject the notion that one person using less energy is not going to make any difference. It is now apparent that people across all sectors realise that the changes we make can have a huge impact on the energy we use. The Power of One campaign will continue to drive home this message and equip the nation with the tools and knowledge with which to make the necessary behavioural changes.

Throughout the campaign, the Department of Communications, Energy and Natural Resources has engaged with key stakeholders: the Department of Transport, the Department of the Environment, Heritage and Local Government, the Commission for Energy Regulation, EirGrid, SEI, ESB Customer Supply, Bord Gáis, Airtricity and Energia/Viridian and ongoing contact is developing joint approaches to the promotion of energy efficiency across all market sectors. The Power of One will also link to the forthcoming climate change awareness campaign by the Department of the Environment, Heritage and Local Government.

Agency responsible for this action: Department of Communications, Energy and Natural Resources

Qualification, Accreditation and Certification schemes

- *We are promoting the development of training and accreditation schemes in the area of energy efficiency and renewable energy*

Article 8 of the Energy End-Use Efficiency and Energy Services Directive requires Member States to ensure the availability of appropriate qualification, accreditation and/or certification schemes for providers of energy services, energy audits and energy efficiency improvement measures. Such schemes already in operation in Ireland include:

- SEI's *Renewable Energy Installer Academy,* promoting the development of accredited training courses for installers of domestic renewable energy sources;

- SEI's Sustainable Energy Buildings Network (SEBNet), established to help meet the challenge of a changing market and expand growth and sales opportunities for higher value products and services.

- Installer training associated with the Low Income Housing programme, and training and accreditation associated with the Building Energy Rating (BER) programme;

- SEI training courses for the business sectors.

- Academic courses in energy management offered by universities and technology institutes in Ireland.

Further schemes will be developed as the need arises.

Agency responsible for this action: Sustainable Energy Ireland

Price Signals and Financial Supports

- *We are implementing many fiscal measures to protect and enhance the environment and are examining others, including the introduction of a carbon tax*

A range of taxation measures supporting renewable energy in particular are already in place or will shortly be introduced. These include:

- a five year excise relief scheme for biofuels (€200M);
- extension of the qualifying period for the scheme of corporate tax relief for corporate equity investments in certain renewable energy generation projects;
- extension and enhancement of the Business Expansion Scheme and the Seed Capital Scheme which can, among other manufacturing areas, be used for investment in companies engaged in renewable energy generation and recycling;
- 50 per cent VRT relief for hybrid vehicles, flexible fuel vehicles and electric vehicles; and
- Proposed amendments to the VRT and motor tax systems to take greater account of environmental issues.

On energy efficiency, the CHP deployment grant administered by SEI is delivering significant new build of CHP leading to efficiency gains.

Agency responsible for this action: Department of Finance (lead), Revenue Commissioners, Department of Environment, Heritage and Local Government, Department of Communications, Energy and Natural Resources, Sustainable Energy Ireland

9.2.2 Our Committed Actions

Developing the Energy Services Sector (ESCOs)

- We will develop and publish a model contract template and guidelines for Energy Service Companies (ESCOs)

An ESCO is generally defined as a company that guarantees energy savings and/or the provision of the same level of energy service at a lower cost through the implementation of an energy efficiency (or renewable energy) project and is rewarded based directly on the energy savings achieved.

The ESCO business model offers potential to improve efficiency gains through aligning expertise and incentives, and it is an important policy goal to foster the sector's development.

With a view to developing policy to encourage the uptake of energy services via the ESCO model for energy efficiency, a study was commissioned by SEI in 2005 to provide a review of the existing Irish and EU ESCO market, consider potential barriers, and determine the potential for its future development.

The report considered the current Irish and EU regulatory environment, together with Irish energy market trends for the short to medium term, to be highly favourable for the development of ESCOs in Ireland. A number of key imperatives to maximise this potential were identified. The need for flexible, performance based contract arrangements providing guarantee of energy savings, plant performance and/or energy cost rates is seen as a priority. Development of financial incentives promoting the uptake of energy efficiency measures in order to improve the cash flow and payback for ESCO type projects is recommended.

SEI is currently developing a standard contract template for ESCO engagement through a pilot project in the Dundalk Sustainable Energy Zone. This will be published in 2008, with supporting guidelines, to allow all firms in the market to explore engaging ESCOs and to remove the barriers associated with complex contractual arrangements and associated uncertainty.

Agency responsible for this action: Sustainable Energy Ireland

INFORMATION GATHERING

- *We will publish an annual report "Energy Efficiency in Ireland", starting in 2007, monitoring progress on energy efficiency*

We will publish a new annual Energy Efficiency in Ireland report, starting in 2007. This new annual report will form the basis for the monitoring of progress on energy efficiency and on the targets discussed in this Action Plan. This is the first SEI Energy Policy Statistical Support Unit publication to focus solely on Energy Efficiency in Ireland. The report aggregates a range of metrics and indicators relating to energy efficiency.

New analysis has also been conducted in order to better understand the trends. In particular, ODEX indices of energy efficiency have been constructed for the overall economy and for the transport, residential and industry sectors. The trends are also compared with Ireland's EU counterparts. It is intended that the report will offer timely and comprehensive data on energy efficiency, in order to provide context and background to discussions surrounding future policy options.

Agency responsible for this action: Sustainable Energy Ireland

ANNEX 1

METHODOLOGY FOR CALCULATING ENERGY SAVINGS TARGETS

A1.1 Introduction

The Energy Services Directive requires the calculation of an indicative energy savings target (Annex 1 of the Directive) and harmonised methodology for estimating actual savings against that target (Annex 4). The methodology for the savings will be progressively developed by the European Commission in the coming years through a technical working group. SEI's Energy Policy Statistical Support Unit will service the working group on behalf of Ireland.

For present purposes we have applied the current understanding of the methodology in Annex 1 of the Directive to convert the percentage savings targets in the Energy Services Directive and White Paper to provide initial estimates of the targets for Ireland in energy units which can be monitored. The final targets in energy units will only be calculable when the methodology has been developed and agreed. (The work outlined in Annex 4 of the Directive, which discusses the methodology for calculating savings, is ongoing).

A1.2 ESD Methodology and Targets

The indicative target in the ESD is a 9% energy savings between Jan 2008 and the end of 2016. The indicative target energy savings are set as a percentage value of a reference level of total final energy consumption excluding that covered by the Emissions Trading Directive, and aviation and marine bunker fuels[15]. The reference energy consumption is calculated as the average of the most recent five year period of unadjusted final energy consumption expressed as 'primary energy equivalent'. The final energy consumption is converted to primary energy equivalent by multiplying the electricity component by a factor (assumed to be 2.5) to reflect the average electricity generation efficiency during the reference period (assumed to be 40%) and adding it to the remainder of the final energy consumption as in the following formula.

The final energy consumption for target purposes calculated as 'primary energy equivalent' is referred to here as the "primary energy equivalent" of total final energy consumption.

Primary energy equivalent TFC = (TFC – Electricity TFC) + (Electricity TFC X 2.5)

The 9 % total savings, equivalent to 13,117 GWh PEE, are assumed to be achieved allowing for contributions from monitored existing and committed programmes.

The Directive also requires setting of an interim target to be achieved by the end of 2010. Given the time taken to establish new programmes to achieve the longer term targets the interim target has been set, informed by expected achievements from existing and committed programmes, at 6,500 GWh PEE .

A1.3 National Targets

The Sustainable Energy White Paper sets an overall energy efficiency target for Ireland of 20% saving across the whole economy including electricity, transport and heating sectors by 2020 and higher target for the public sector of 33%.

[15] Where figures or projections were not currently available for the final consumption of those covered by the Emissions Trading Directive, the equivalent ratio of the 2005 value against total final energy consumption was applied to estimate values for all other relevant years.

Where projections were not available for the final consumption of aviation and marine bunker fuels, the average ratio against total final energy consumption for each respective year in the region 2001-2005 was taken and applied to all future years against the total final energy consumption for each future year to obtain an estimate of final consumption of aviation and marine bunker fuel for that year.

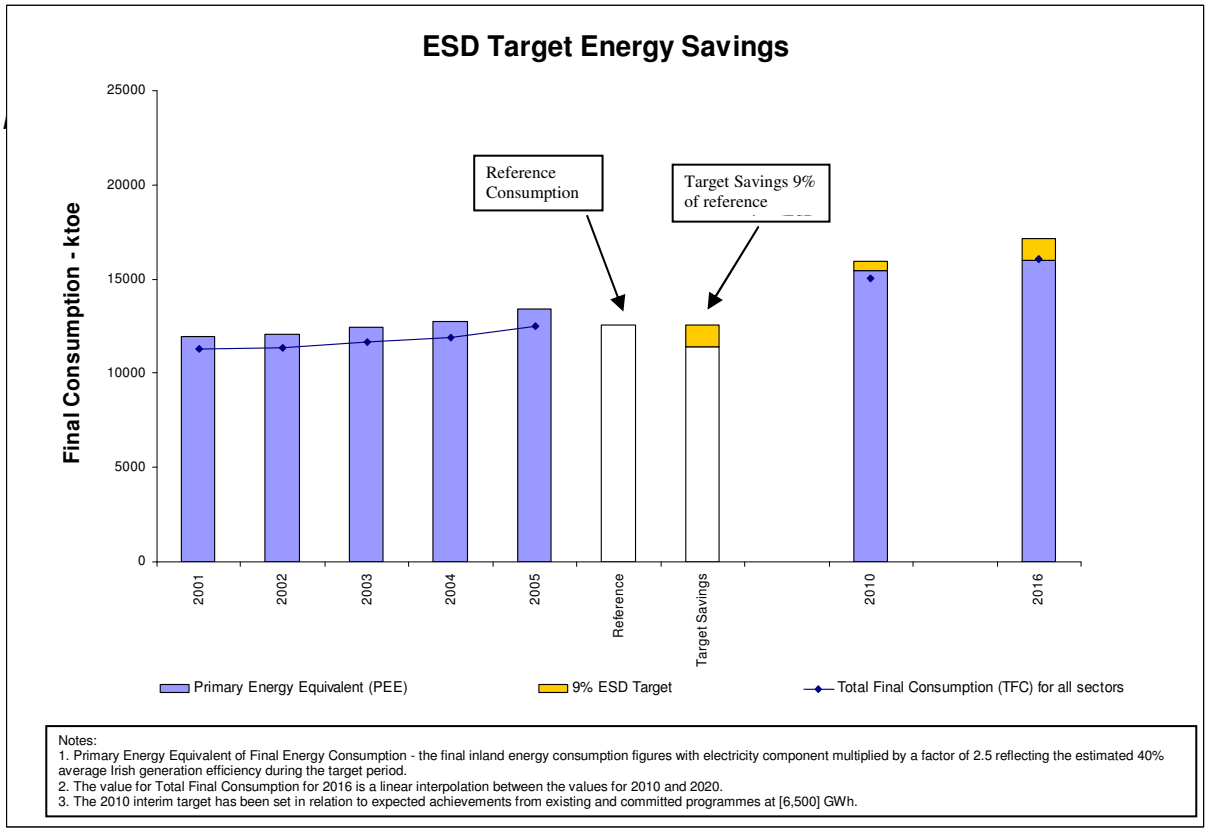
The ESD methodology has been applied to provide a quantitative estimate of the required energy savings for the White Paper target. While it is possible to define this target in a number of ways, it is appropriate to utilise the same methodology as the ESD for consistency and clarity. This means using historic energy demand as the reference point, as opposed to using projections of future energy demand, which are less certain.

Table A1.1 Reference Energy Consumption and Target Savings Values

	Target Energy Saving PEE	
	(ktoe)	(GWh)
ESD 9% Target 2016		
Reference Energy Consumption	12,531	145,741
ESD Target (9% of Reference Energy Consumption)	1,128	**13,117**
ESD Interim Target 2010		**6,500**
White Paper 20% Target		
Reference Energy Consumption	13,725	159,624
White Paper 20% Target (20% of Reference Energy Consumption)	2,745	**31,925**

The projected total final energy consumptions and the primary energy equivalent of the final consumptions are plotted for illustrative purposes in Figures A1.1, A1.2, and A1.3 using the Energy in Ireland 1990-2005 forecasts for 2010 and 2020. The average reference energy saving and the target savings for each year to achieve the ESD and White Paper targets are also shown on the diagrams. These figures would need to be reworked if other energy savings indices or methodologies were adopted.

Figure A1.1 Illustration of Target Energy Savings against Final Consumption (ESD)



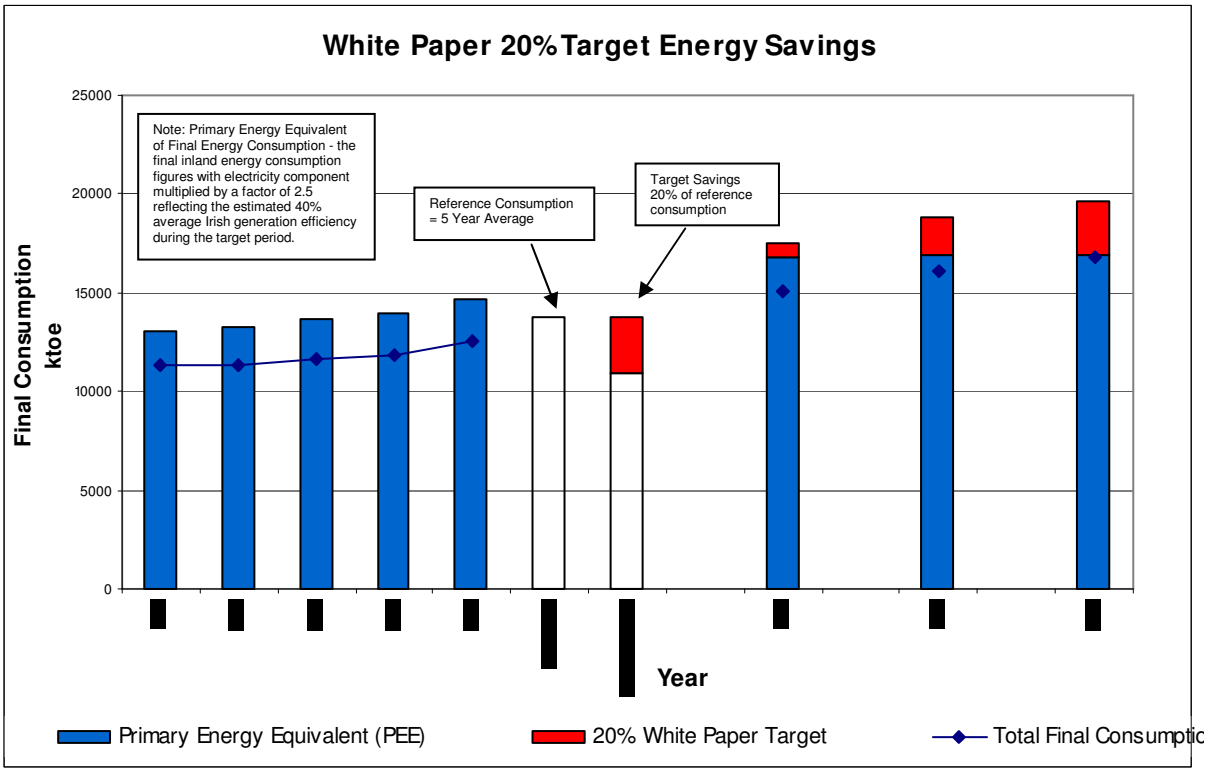


Figure A.1.2 Illustration of Target Energy Savings against Final Consumption (20% White Paper)

Annex 2

Calculation methods and assumptions for energy savings projections

A2.1 Savings calculations: Methods and Assumptions

The following annex provides detail on the sources, methods and assumptions used to calculate energy savings for measures contributing to the overall targets as detailed in the action plan. SEI has estimated the energy savings likely to result for each existing and committed measure based on the potential, start date, likely market penetration and the impact of the mechanism proposed, either directly or by using estimates from other publications.

A2.2 Primary energy equivalent

In accordance with ESD methodology, where data for electricity savings is measured in 'total final consumption' these are multiplied by a co-efficient of 2.5 to convert the result to 'primary energy' equivalent. This reflects the estimated 40% average EU generation efficiency, and is accepted as the EU average for generation efficiency consistent with the ESD. In this way the total amount of energy actually saved through the implementation of a particular measure is accounted for.

Given available data, graphs for historic trends for each sector included at the beginning of each chapter are based on total final energy consumption for that sector. All other energy savings data projections are accounted for in total primary energy.

A2.3 Data Sources

Main sources of data used in the calculations include (refer to table for detail per measure);

- National Climate Change Strategy 2007-2012 (NCCS)
- SEI's Energy Policy Statistical Support Unit (EPSSU)
- Sustainable Energy Ireland publications available at www.sei.ie
- Various internal reports produced by and on behalf of SEI

In a number of cases the energy savings presented are consistent with the CO_2 savings given in the NCCS. The relationship between the energy savings and CO_2 savings is given below. In these instances, data relates to projected CO_2 abatement for the year 2010 resulting from measures detailed in the report. 2010 figures have been used as a proxy for the 2008-2012 average; this being the relevant timeframe for achieving the committed target of 8% emissions reduction based on 1990 levels under the Kyoto protocol.

Where such data has been used, savings figures in GWh are calculated from the CO_2 savings figure based on a split (percentage share) of energy related CO_2 per fuel relevant for the sector in which the measure is effective. This data is contained in 'Energy in Ireland 1990-2005', EPSSU, 2006.

The following tables detail methods and assumptions used in calculating potential energy savings on a measure by measure basis for each sector in the report.

Business and Public Sectors

Public Sector specific actions	Includes savings resulting from SEI's Public Sector Programme (2001-2006), and the OPW Energy Management Bureau. Savings for Public Sector Programme from SEI, data relates to savings achieved for all projects approved at the end of 2006 - expected completion for all projects end 2009.
Building Regulations 2005	Savings resultant from changes to Part L of the Building Regulations providing for improved energy performance of non-residential buildings (Source: NCCS).
SEI Large Industry Network (LIEN)	Based on SEI data (refer LIEN annual reports) for total primary energy requirement of LIEN companies. Savings figure derived based on the following: ● projected 5% growth of total primary energy requirement of LIEN companies from 2006 (latest data) onwards ● 5% of primary energy saving attributed to membership in the programme, based on historic results (conservative estimate to eliminate overlap with savings derived through the Energy Agreements Programme) ● 50% of LIEN companies are taking part in the Emissions Trading Scheme (ETS), therefore results are halved when considering the contribution of savings towards the ESD targets
SEI Energy Agreements Programme	Potential savings for the Energy Agreements Programme target market as determined for SEI. Based on a ramp-up in potential number of companies within the programme to 105 over 3 years starting in 2007, and potential energy savings by those companies. Assuming 1.5% savings for companies in first year, ramping up to 3% in second year, 4% in third year and growing by 0.5% per year after that to 2020.
SEI small business supports	Conservative estimate of savings based target market of SMEs considered suitable for SEI's SME programme.
Existing ESB (Customer Service) DSM	Conservative estimate assuming a continued programme with no extensions, with savings achieved by the programme growing at 0.5% up to 2020 based on growing energy use of the customer base, starting at 300GWh in 2001 (Source for base figures: ESB Annual Reports - various).

Residential sector

Building Regulations 2002	Based on 2002 improvements to residential building regulations. CO_2 savings based on Ireland-specific average energy consumption per dwelling for space/water heating and oil/gas split multiplied by expected number of unit completions to 2002 building regulation standard by 2012, converted to energy savings based on the 'Share of energy related CO_2' for the residential sector (sources: 'Energy in Ireland 1990-2005', NCCS).
Building Regulations 2008	Savings derived from the construction of new dwelling to an improved energy efficiency standard as determined by revised building regulations requiring a 40% improvement on current standards. In order to calculate projected savings in 2020 the following assumptions are made: ● Average floor area per dwelling = 130m2, Estimated average energy use = 137kWh/m2 ● DEHLG projections for new dwellings to 2012 - extrapolated to 2020 ●ramp-up factor following the introduction of new regulations used - 25% effect on new dwellings market in the first year, 75% in the second and full market effect (i.e. all new dwellings) in the third year to account for percentage of new buildings built to the new standard in a given year

Building Regulations 2010	Savings deduced as above for the 2008 building regulations review. Based on a subsequent building regulations review in 2010 requiring a further 20% efficiency gain for new dwellings beyond 2008 regulations (i.e. equiv. to 60% improvement on current building regulations). New dwelling size and quantity projections and ramp-up factor included as above.
SEI House of Tomorrow programme	Based on SEI projection of savings resulting from the House of Tomorrow grant scheme to private or social housing developments in support of features that deliver energy performance 40% superior to current Building Regulations. Estimate includes direct savings due to the programme only. Wider replication impact covered in building regulations above.
Insulation support programme	Initial analysis of potential impact in line with the Programme for Government commitment of €100 million spend on insulation and home heating and lighting programme. The overall savings figure derived using a model developed by Indecon, July 2007. Percentage efficiency improvement per technology is determined by a comparison of replaced and new technologies to calculate actual annual energy savings achieved per unit of technology installed. This result is multiplied by the number of installations of each technology. Projected savings for 2020 assuming a scenario in which 25% Exchequer contribution per measure for a programme extended to 450,000 loft insulations, 40,000 cavity wall insulations, as well as 4,000,000 CFL's and 165,000 condensing boilers.
Dundalk Sustainable Energy Zone	Savings based on projected savings resulting form a range of energy efficiency improvement measures currently being implemented within the Dundalk Sustainable Energy Zone.
Smart meters	Savings calculated based on estimated savings attributed to the installation of smart meters. Based on 'Smart Meters – Costs and Consumer Benefits' report to Energywatch by Eoin Lees Energy (July 2007), which determines 3% as a conservative achievable energy saving. Calculation assumes a linear increase for total final electricity for residential sector between 2010 and 2020 based on EPSSU projections.

Transport Sector

Dublin traffic measures	Savings resulting from a number of transport initiatives being undertaken in Dublin, including those resulting following completion of the Dublin Port Tunnel (Source: NCCS).
Technology Improvements	Savings resulting from the progressive replacement of the Irish private car fleet with more efficient vehicles to 2010, assuming an acceleration of turnover due to support measures (Source: NCCS).
Alignment of transport investment with spatial planning	Based on Department of Transport (DOT) analysis, assuming a 2% reduction in passenger-kilometres in 2010 from 2002 figures as a result of appropriate spatial planning and the integration of land use and transport infrastructure (Source: NCCS).
Transport 21 - Modal Shift	Savings based on projections of changed modal share in 2010 as a result of Transport 21 investment without demand management. Base year for modal share comparison is 2002 (Source: NCCS).
Efficient driving campaign	Based on DOT analysis of proposed action (Source: NCCS).

Energy Supply Sector

Transmission and distribution efficiencies	Savings based on CER targets set for licence holders i.e. a reduction in losses during transformation and distribution from 7.5% to 7.0% by 2020. Assumes a linear ramp up to 0.5% savings from zero in 2010 to 0.5% (i.e. meeting the target) in 2020. Based on total primary energy projections to 2020 derived from latest EPSSU data.
Delivery of CHP targets	As detailed in the White Paper, targets of 400MWe of installed CHP capacity by 2010, and 800MWe by 2020 have been set. Based on available data, 1MWe provided by CHP results in a savings of 0.6kt CO_2 where CHP replaces an electricity based alternative.

Potential future contributions

Contribution of delivery of public sector target	As detailed in the White Paper, the public sector will set out to achieve 33% energy saving by 2020. This equates to 3240 GWh when calculated on the same basis as the White paper 20% and ESD 9% targets (refer to annex 1 of the NEEAP for method). Note: precise data is not available for the public sector in terms of final energy consumption, hence it is derived here by EPPSU based on a split of commercial and public sector data.
Possible additional contribution from extended business supports	Figure derived using a model developed by SEI, for the specific purpose of determining costs and potential benefits of a range of public finance mechanisms. A level of potential savings identified by the process of energy audit is scaled to account for estimated energy saving opportunities actually taken up. Based on an estimated average energy spend for a particular size company (small, medium and large), and assuming a payback periods for investment in energy saving technologies. Potential energy savings are calculated based on assumed average energy spends and current energy prices for gas and electricity. Using the model, a scenario for businesses was run to determine the cost/benefits of supporting 5000 small, 1500 medium and 250 large companies (budget approx €60mill) at a 30% exchequer contribution per company towards the cost of an energy audit and implementation of recommendations for energy efficiency improvement.
Additional potential from priority technologies in existing homes	Figure derived from a model developed by Indecon (July, 2007) and refined by SEI, to determine the cost and benefits of public finance mechanisms supporting the installation of energy efficient technologies in residential households. Potential energy savings here flow from the installation of a range of measures in all 'available' households as estimated by SEI. That is, the maximum number of suitable installations of CFL bulbs (4,000,000), condensing boilers (1,000,000), loft insulation (468,000), cavity wall insulation (62,400), wall lining insulation(120,000).

ANNEX 3

DELIVERY SCHEDULE

No.	Action	Agency responsible for Implementation	Timeframe
Public Sector			
1	We are supporting exemplary design and energy management practice by public sector organisations through SEI's Public Sector Programme	Sustainable Energy Ireland	Ongoing
2	We will establish a high level working group in 2007 involving key Departments and agencies to draw up an action plan by 2008 for achievement of the 33% energy savings target for the public sector	Department of Communications, Energy and Natural Resources	2007/8
3	We will introduce energy efficiency programmes for Government Departments, State Agencies, Local Authorities, the Health Service and all other areas of the public sector	Department of Communications, Energy and Natural Resources; Sustainable Energy Ireland; Office of Public Works	2008
4	We will require all public sector bodies to produce annual reports setting out their energy efficiency actions and progress towards the 2020 target	Department of Communications, Energy and Natural Resources	2008
5	We will commence in 2007 a programme of awareness-raising specifically for the public sector, as part of Ireland's national energy efficiency awareness campaign, Power of One	Department of Communications, Energy and Natural Resources	2007
6	We will put in place in 2008 mechanisms to facilitate and enable the exchange of energy efficiency best practice between public sector bodies, at local, national and international level	Sustainable Energy Ireland	2008
7	We will introduce in 2008 guidelines and an action plan for green public procurement in the public sector	Department of Environment, Heritage and Local Government	2008
8	We will require public bodies to purchase only energy efficient lighting from the end of 2007 when installing or replacing lighting	Various	2007
9	We will require that all street and traffic lights are energy efficient	Department of Environment, Heritage and Local Government	2008
10	We will roll out an energy rating system to public buildings from 2008	Sustainable Energy Ireland	2008
Business Sectors			
11	We are supporting the networking and exchange of best energy efficiency practice by the largest industrial energy users through the Large Industry Energy Network	Sustainable Energy Ireland	Ongoing
12	We are supporting through the Energy Agreements Programme businesses leading the way on best practice energy management in installing IS393, the Irish Standard for Energy Management	Sustainable Energy Ireland	Ongoing
13	We are assisting smaller businesses with limited resources to improve their energy management through the Energy MAP initiative	Sustainable Energy Ireland	Ongoing

14	We are assisting the SME sector with a targeted scheme providing assessments of their energy use and advice on their energy management	Sustainable Energy Ireland	Ongoing
15	We are recognising and rewarding best achievements in energy efficiency through the Sustainable Energy Awards	Sustainable Energy Ireland	Ongoing
16	We are requiring developers of new buildings of over 1,000 m^2 to carry out a feasibility assessment of using renewable energy systems for the building	Department of Environment, Heritage and Local Government	2007
17	We will target the SME sector, and its employees, through the Power of One at Work initiative, a new element of the National Energy Efficiency Campaign - Power of One, to promote an understanding of the need for efficient energy use in the workplace	Department of Communications, Energy and Natural Resources	2007
18	We will support the Energy Star initiative in Ireland to promote energy efficiency in office equipment	Department of Environment, Heritage and Local Government	2008
19	We will roll out a Building Energy Rating system to business premises from 2008	Sustainable Energy Ireland	2008
20	We will require that all air conditioning systems with a rated output of 12 kW are regularly inspected by trained experts from 2008, to ensure that they operate to maximum energy efficiency.	Sustainable Energy Ireland	2008
Residential Sector			
21	We are promoting the need for efficient energy use in the home through the National Energy Efficiency Awareness Campaign - Power of One.	Department of Communications, Energy and Natural Resources	Ongoing
22	We are encouraging developers to adopt building energy standards well above those prescribed by law in the building regulations	Sustainable Energy Ireland	Ongoing
23	We are promoting higher standards of energy efficiency in social housing	Department of Environment, Heritage and Local Government	Ongoing
24	We have rolled out a Building Energy Rating system to new houses from 2007 and will extend this to existing houses from 2009	Sustainable Energy Ireland	2009
25	We are encouraging more energy efficient communities through our spatial and planning policies	Department of Environment, Heritage and Local Government; Sustainable Energy Ireland	Ongoing
26	We are offering grants to householders to install certain renewable energy technologies	Sustainable Energy Ireland	Ongoing
27	We are upgrading the energy performance of homes occupied by those on low incomes	Sustainable Energy Ireland	Ongoing
28	We are revising the building regulations to ensure an improvement in energy performance and a reduction of CO2 emissions of 40% in new domestic dwellings, relative to current standards	Department of Environment, Heritage and Local Government	2007
29	We will review the Building Regulations again in 2010 with a view to improving energy performance by 60% relative to current standards.	Department of Environment, Heritage and Local Government	2010
30	We will launch an awareness campaign in 2008 to encourage householders and other building owners to maximise the energy efficiency of their boilers through regular servicing and where necessary replacement.	Sustainable Energy Ireland	2008

31	We will offer financial incentives to householders from 2008 to upgrade the energy efficiency of older housing stock	Sustainable Energy Ireland	2008
32	We will encourage more energy efficient behaviour by householders through the introduction of smart meters	Commission for Energy Regulation; Sustainable Energy Ireland; Department of Communications, Energy and Natural Resources; ESB Customer Supply	2007/2012
33	We will apply a levy to all incandescent light bulbs to encourage a shift to efficient low-energy bulbs	Department of Environment, Heritage and Local Government	TBC
Transport Sector			
34	We will publish a Sustainable Travel and Transport Action Plan in 2008 designed to enhance the energy efficiency and sustainability of the transport sector	Department of Transport	2008
35	We are promoting modal shift through investment in our public transport services under Transport 21	Department of Transport, Railway Procurement Agency, Iarnród Éireann, Dublin Bus, Dublin City Council, Dublin Transportation Office	2006-2015
36	We will implement a demand management strategy as part of our Transport 21 initiative	Department of Transport, Dublin City Council, National Roads Authority, Dublin Transportation Office	TBC
37	We will strengthen the relationship between land-use and transport	Department of Environment Heritage and Local Government	Ongoing
38	We are providing transport specific advice to fleet managers on energy management	Sustainable Energy Ireland	Ongoing
39	We are maintaining the fuel efficiency of older private cars through the National Car Test system	Department of Transport	Ongoing
40	We will raise public awareness of the benefits of eco-driving	Department of Transport	2008
41	We will provide tools to help car buyers choose more fuel efficient cars	Department of Environment Heritage and Local Government, Sustainable Energy Ireland	2008
42	We will offer incentives through the VRT and motor tax systems to encourage the purchase of more energy efficient vehicles	Department of Finance, Revenue Commissioners	TBC
Electricity Supply			
43	We are promoting competition and choice and developing the overall market framework for electricity through the development of an all-island Single Electricity Market, leading to a more efficient supply sector	Commission for Energy Regulation, Department of Communications, Energy and Natural Resources	2007
44	We will prioritise energy efficiency in our investment decisions for new generation plant under the National Development Plan 2007-2013	Department of Communications, Energy and Natural Resources	2007-2013
45	We will complete a comprehensive cost-benefit review in 2008 of the potential for distributed generation	Department of Communications, Energy and Natural Resources	2008
46	We will reduce distribution losses to 7.5% by 2010	Commission for Energy	2010

		Regulation	
47	We will investigate the scope for reducing transmission losses	Commission for Energy Regulation	TBC
48	We will significantly expand our demand side management measures and will publish a comprehensive DSM plan in 2008	Department of Communications, Energy and Natural Resources, Sustainable Energy Ireland, ESB, Commission for Energy Regulation	2008
49	We will launch a programme to install smart meters for all electricity consumers	Commission for Energy Regulation, Sustainable Energy Ireland, Department of Communications, Energy and Natural Resources, ESB Customer Supply	TBC
50	We will achieve at least 400 MWe of CHP by 2010 and aim to achieve at least 800 MWe by 2020	Department of Communications, Energy and Natural Resources, Sustainable Energy Ireland	2010, 2020
51	We have commenced a trial of micro-CHP generation in residential and small business settings to assess current technology and identify possible barriers, risks and benefits associated with its deployment.	Sustainable Energy Ireland	Ongoing
Research and Development			
52	We are supporting research and development projects geared towards bringing renewable energy technologies to market	Sustainable Energy Ireland	Ongoing
53	We have provided substantial funds under NDP 2007-2013 for research on energy efficiency and renewable energy sources	Department of Communications, Energy and Natural Resources	2007-2013
54	We are ensuring a strategic and integrated approach to developing our energy research capacity through the Irish Energy Research Council	Department of Communications, Energy and Natural Resources	2007-2013
55	We are providing funding to early stage researchers in priority areas of energy research through the Charles Parsons Energy Research Awards	Department of Communications, Energy and Natural Resources	Ongoing
56	We will support post-doctoral research fellowships in the area of energy efficiency	Sustainable Energy Ireland, Environmental Protection Agency	2008
Cross Sectoral Measures			
57	We are promoting energy efficiency through our multi media campaign - Power of One.	Department of Communications, Energy and Natural Resources	Ongoing
58	We are promoting the development of training and accreditation schemes in the area of energy efficiency and renewable energy	Sustainable Energy Ireland	Ongoing
59	We are implementing many fiscal measures to protect and enhance the environment and are examining others, including the introduction of a carbon tax	Department of Finance, Department of Environment, Heritage and Local Government, Department of Communications, Energy and Natural Resources	Ongoing

60	We will develop and publish a model contract template and guidelines for Energy Service Companies (ESCOs)	Sustainable Energy Ireland	2008
61	We will publish an annual report "Energy Efficiency in Ireland", starting in 2007, monitoring progress on energy efficiency	Sustainable Energy Ireland	2007

TBC – To be confirmed

Glossary of terms

BER – Building Energy Rating

BGS – Bord Gáis Éireann

CER – The Commission for Energy Regulation

ComReg – The Commission for Communications Regulation

DSM – Demand side management – measures that influence the quantity or patterns of use of energy consumed by end users, such as actions targeting reduction of peak demand during periods when energy-supply systems are constrained or temporarily shifting customer demand away from peak periods.

EEAP – Energy Efficiency Action Plan

EPBD – Energy Performance of Buildings Directive

EPSSU - Energy Policy Statistical Support Unit, SEI (Cork)

ESB DSO – Electricity Supply Board (ESB) Distribution System Operator

ESD – Directive 2006/32/EC on Energy End Use Efficiency and Energy Services (commonly referred to as the Energy Services Directive)

ESB PES – ESB Public Electricity Supplier

CCGT – Combined Cycle Gas Turbine

GWh - Gigawatt Hours

IEA – International Energy Agency

MPRN's – The Meter Point Reference Number (MPRN) is the unique identifier for each Service Delivery Point on the network.

Mt – Metric tonne - a measurement of mass equal to 1,000 kilograms.

Mtoe/ktoe – The ton of oil equivalent (toe) is a unit of energy: the amount of energy released by burning one metric ton of crude oil (M – million, k – thousand).

MWe – Megawatt electrical - refers to power produced as electricity.

NACE (code) – a pan-European classification system which groups organisations according to their business activities. It assigns a unique 5 or 6 digit code to each industry sector.

ODEX indicator – an energy efficiency index (indicator) for all final consumers calculated across the main use sectors (industry, households, transport and services)

PEE – Primary Energy Equivalent

SEI – Sustainable Energy Ireland

SME – Small and medium sized enterprise

TPER – Total Primary Energy Requirement