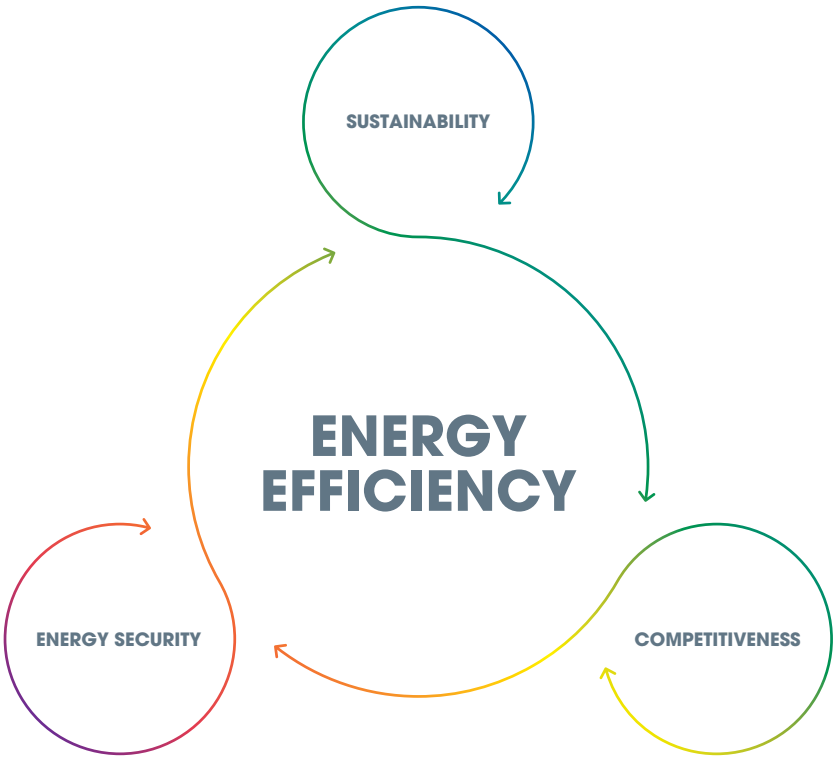
Department of Communications, Energy and Natural Resources
Roinn Cumarsáide, Fuinnimh agus Acmhainní Nádúrtha

Maximising Ireland's Energy Efficiency

The National Energy Efficiency Action Plan 2009 – 2020



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Foreword

The Taoiseach, Brian Cowen T.D.

Ireland has witnessed a great many changes over the past two decades, including rapid and sustained economic growth, substantive investment in road and rail infrastructure and the widespread availability of broadband. In parallel, the energy sector has expanded to meet the rising energy demand from a growing economy. We have brought on stream the second gas interconnector, formed the Single Electricity Market with Northern Ireland and actively pursued a liberalised market as a means of mitigating our reliance on imported fossil fuels. We have come a long way in a few short years, yet the challenges that we are now confronted with are as great as any that the country has witnessed previously.

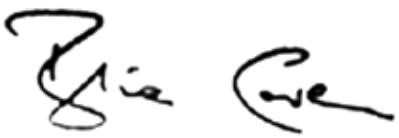
Like Ireland, other Member States are grappling with the ongoing turmoil in the financial markets and the need to stabilise the economy before moving back towards growth and expansion. We have set out a Framework for Sustainable Economic Renewal: Building Ireland's Smart Economy, which places energy policy at the heart of our programme for recovery and identifies the twin imperatives of securing the supply of reliable and affordable energy and achieving the transformation to a low-carbon, high efficiency, sustainable and smart energy system.

Our relative size and peripherality, combined with an over reliance on imported fossil fuels, has resulted in comparatively high energy costs for business and domestic consumers with a consequential adverse impact on national competitiveness. Improving the energy efficiency of all sectors of the economy, together with diversification of supply through investment in renewable energy will deliver reduced costs and emissions while increasing energy security. Putting energy efficiency at the heart of our framework for economic renewal will help protect us from the inevitable rise in world energy prices for fossil fuels.

An essential component of efforts to improve our national competitiveness and reduce CO_2 emissions is led by our energy policy and more specifically, our energy efficiency policy. We have clearly set out a robust energy policy framework for the period to 2020 that will address issues of security of supply, environmental sustainability and economic competitiveness. This National Energy Efficiency Action Plan represents the next step in addressing the imperative for energy efficiency.

We have been successful in building a knowledge economy, attracting key international organisations because of a skilled and innovative workforce. We now need to challenge ourselves to replicate this success in the energy sector and create a smart economy, one that is underpinned by green goods and services and which leads the world in innovative adaptation of sustainable research. Internationally, the energy sector is increasingly seen by investors as the single most attractive investment opportunity available in a turbulent market. The United Nations Environment Programme, New Green Deal, seeks to mobilise the global economy towards investments in clean technologies. Ireland needs to position itself as central to this process, bringing knowledge, skills and robust practical research with it.

The National Energy Efficiency Action Plan marks an important stage in the development of our energy policy framework, and challenges the public sector to act as an exemplar in how it uses energy. In these difficult economic times it is timely that this Action Plan is being published as it provides the necessary guidance and leadership for society as a whole. Substantial financial and environmental savings are available now to all sectors of the Irish economy. The Government remains committed to ensuring that these savings are realised and that new, innovative products and services are developed that will launch Ireland on a path towards a sustainable energy future.



Foreword

The Minister for Communications, Energy and Natural Resources, Eamon Ryan T.D.

Energy is the lifeblood of our economy; for too long we have taken it for granted and used it inefficiently and in ever increasing quantities. It is no longer realistic to expect that we can benefit from cheap imported energy supplies. While oil and gas prices may have retreated in recent months, we can expect a future dominated by higher world energy prices. Ireland needs to take urgent, well-focused and collective action to move to an efficient and low-carbon energy system.

Energy efficiency is internationally recognised as one of the central pillars of modern energy policy. It has been clearly demonstrated that the private and societal benefits of investment in energy efficiency improvement measures greatly outweigh the costs. Energy efficiency offers the most cost-effective means of reducing GHG emissions, and allows us to maximise the value we get for the energy services we use. It means getting the greatest comfort in our homes, the best lighting in our shops, and the highest productivity in our factories – all using no more energy than we have to. Energy efficiency is the foundation for moving to a strong green economy for Ireland.

We have set Ireland a challenging target of delivering 20% energy efficiency savings in 2020. We recognise that Government must take a lead role in this process, so we have set a higher target of 33% for the public sector. While these targets are bold, they are essential for our future. Every year Irish consumers export nearly €6 billion from our economy buying energy from overseas. This needs to change.

The National Energy Efficiency Action Plan is designed to chart Ireland's path towards a more sustainable future. It is Ireland's first national energy efficiency policy. Fundamental to this process is the creation of a vision for the intelligent delivery of energy services, around which public and private sector actors can mobilise to deliver energy efficiencies to all parts of the economy. Strong commitment from all sectors of the economy, underpinned by Government support, will be required to realise the vast benefits available from improved energy efficiency.

One of the most noticeable effects of the last 15 years has been the huge increase in the number of houses built. As a consequence, energy demand grew by 29% in the residential sector between 1990 and 2007. These figures demonstrate the importance of improving the quality of our housing stock. Earlier this year the Minister for the Environment, Heritage and Local Government and I launched the National Insulation Programme for Economic Recovery with a budget of €100 million in 2009, €49 million of which has been allocated to the Home Energy Saving scheme. There has been huge public demand for this scheme already. It is making our homes more comfortable and creating and maintaining jobs.

The Home Energy Saving scheme will be complemented by the Warmer Homes Scheme for low-income households, funding for which has been increased by more than eight times in the last two years. Over 15,000 households are expected to benefit from measures under this scheme in 2009.

This National Energy Efficiency Action Plan details the range of actions currently committed to by Government across all sectors of the economy. Between now and 2020 there will be additional initiatives. Future Action Plans in 2011 and 2014 will demonstrate our progress towards achieving our challenging targets. I look forward to working with the whole population to ensure its success.

Executive Summary

Fossil fuels accounted for 96% of all energy use in Ireland in 2007. Our reliance on these fuels means that Ireland, like the rest of the world, is faced with a dilemma. Our current trend of increasing energy use derived from fossil fuels is not sustainable, and with the threat of increasing oil prices as supply dwindles, action needs to be taken now to shift to a sustainable energy future. We have reached a point where we need to make major changes in our lifestyles, our business and the public sector. By reducing our dependence on imported energy, we protect ourselves against international energy price rises whilst reinforcing national competitiveness.

Improving Ireland's energy efficiency is an essential component of our sustainable energy policy. Energy efficiency is internationally recognised as the most cost-effective means of reducing dependence on fossil fuels. The Government's energy policy framework for the period 2007 – 2020 incorporates this goal at its heart and is designed to steer Ireland towards a new and sustainable energy future; one that helps increase security of supply, makes energy more affordable, improves national competitiveness and reduces our GHG emissions.

The International Energy Agency (IEA) recognises the importance of energy efficiency (see Figure 1 below), stating that while technological progress is needed to achieve some emissions reductions, efficiency gains and deployment of existing low-carbon energy accounts for most of the savings.[1] The IEA propose a climate policy scenario, the 450 Policy Scenario, which targets a stabilisation of GHG emissions at 450ppm CO_2-eq and consists of a broad suite of policy measures designed to steer the world away from the harmful effects of dependence on fossil fuels. It is noticeable that the most significant savings can be realised from energy efficiency.

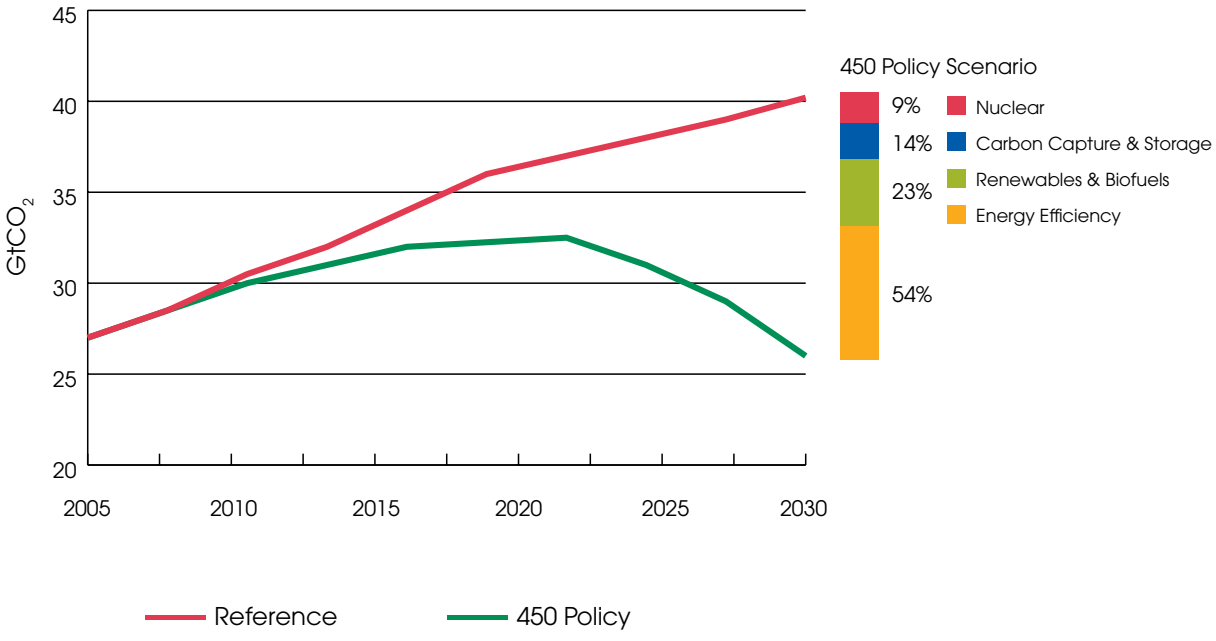


Figure 1: Reductions in Energy-Related CO_2 Emissions in the Climate-Policy Scenario[2]

1 IEA (2008) *World Energy Outlook 2008.*

2 Source: IEA (2008).

Extent of the Challenge

Ireland's demand for energy has grown by 84% over the period 1990 – 2007, with usage increasing in every sector of the economy. Last year, approximately €6 billion was spent on imported energy, and demand is projected to grow by about 24% over the period 2007 – 2020[3] unless action is taken now to reduce demand and usage. This is illustrated in Figure 2 below, which shows historical trends in energy demand and future projections.

The Government has committed to achieving by 2020 a 20% reduction[4] in energy demand across the whole of the economy through energy efficiency measures. A national target of 20% equates to a total of 31,925 Gigawatt hours (GWh) saved in 2020. Recognising that Government must lead by example, we are challenging the public sector to achieve a 33% reduction in public sector energy usage over the same period.

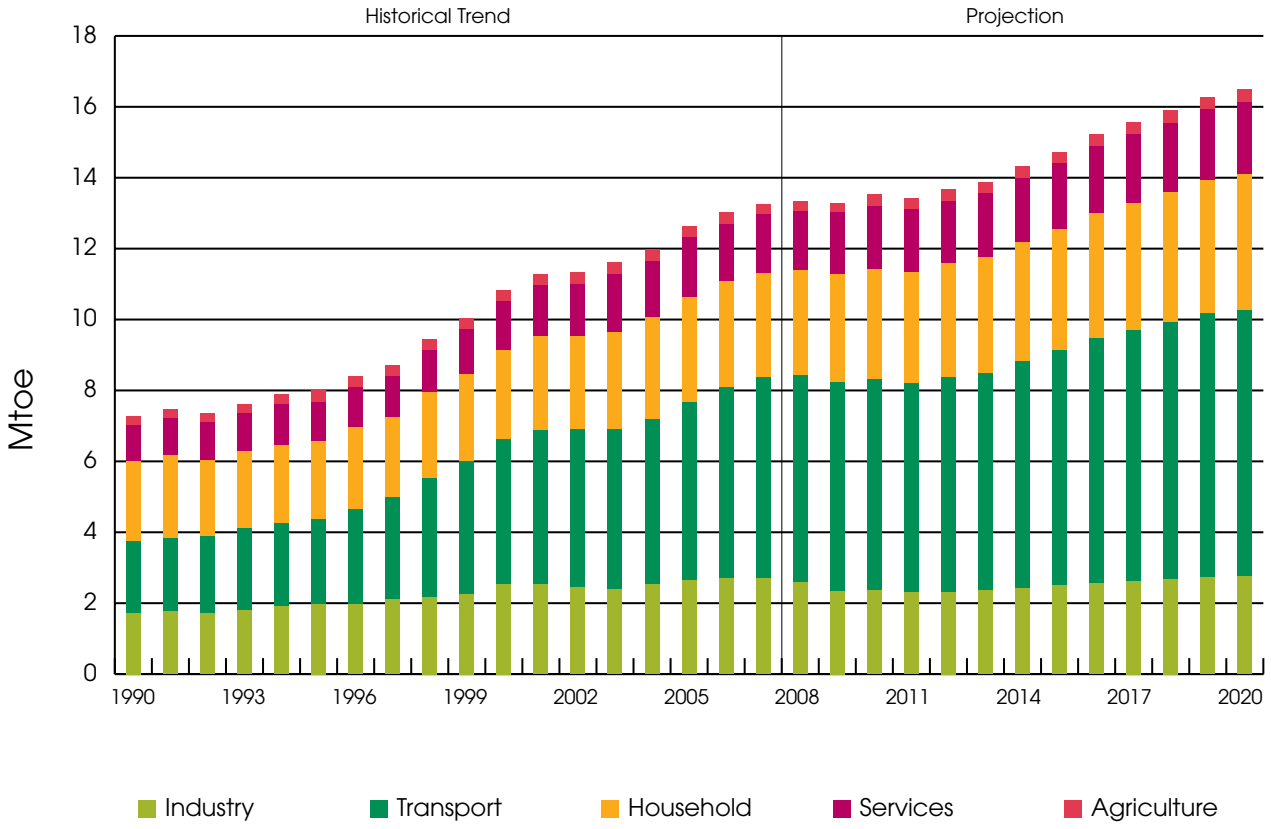


Figure 2: Total Final Demand for Energy by Sector 1990 – 2020 (Final Energy Consumption)[5]

3 Based on revised baseline projections produced for SEI by ESRI using the HERMES macroeconomic model. Further detail available in SEI (EPSSU) (2008) *'Energy in Ireland 1990 – 2006'*.

4 As compared to average energy use over the period 2001 – 2005.

5 Source: Sustainable Energy Ireland.

Reducing energy demand and consumption also works towards achieving Ireland's climate change objectives. The National Climate Change Strategy 2007 – 2012 outlines how the various measures, taken across all sectors of the economy, will act to reduce Ireland's GHG emissions in the Kyoto period 2008 to 2012. It also identifies how the effect of the measures being pursued will position us for the post-Kyoto period, and which further measures are being researched and developed to enable us to meet our 2020 commitment. Figure 3 below demonstrates the GHG emissions contribution from each sector of the economy.

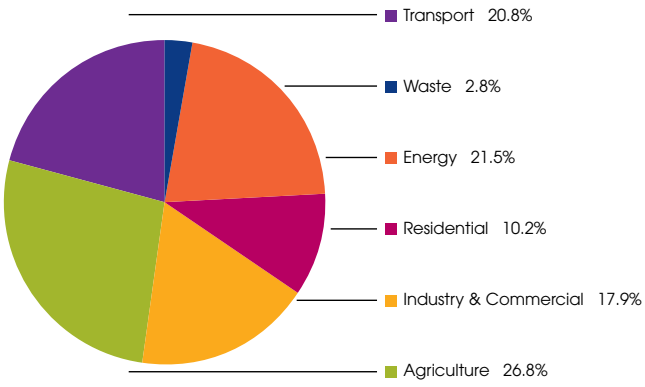


Figure 3: Ireland's Greenhouse Gas emissions[6]

A Roadmap to Energy Savings

The purpose of this Action Plan is to identify policies and measures that have the potential to contribute towards our national 20% target. The Action Plan builds upon the Energy Efficiency Action Plan that was submitted to the European Commission in September 2007; required as part of Ireland's obligations under the Energy Services Directive (ESD), which requires Member States to deliver energy savings of 9% by 2016.

Our existing and committed actions at this time (which are outlined more fully in the following chapters) are projected to deliver 23,730GWh of energy savings in 2020, which is equivalent to a 15% saving on the baseline period or reference energy consumption.[7] We will also reduce our CO_2 emissions by approximately 5.7 million tonnes. The savings identified in Table 1 overleaf[8] represent approximately €1.6 billion in avoided energy costs for the economy in the year 2020:[9]

6 Source: Environmental Protection Agency.

7 Estimates of the impact of future actions are based on available economic forecasts and informed by relevant national and international studies and experience. Actual impact figures may vary considerably and will therefore be adjusted in the next and subsequent National Energy Efficiency Action Plans, the first of which is due no later than 2011.

8 Estimates have been adjusted to account for current economic conditions where appropriate.

9 Based on average 2008 energy prices.

	GWh PEE[10]	$ktCO_2$
Business and public sectors		
SEI Public Sector Building Demonstration Programme – support for new and retrofit public sector building initiatives	140	40
Building Regulations 2005 – improved efficiency of non-residential buildings	560	133
Building Regulations 2010 – 30% improvement on energy performance of non-residential buildings relative to 2005 building regulations	1,360	322
SEI Large Industry Programmes (Energy Agreements IS393 and Large Industry Energy Network)	4,070	887
SEI small business supports – Energy MAP and training for small businesses	565	141
Existing ESB demand side management initiatives	435	96
Renewable Heat Deployment Programme (ReHeat)	410	92
Accelerated Capital Allowances for Energy-Efficient Equipment	800	143
Sector Total	8,340	1,854
Residential sector		
Building Regulations 2002 – improved energy performance of residential buildings	1,015	266
Building Regulations 2008 – 40% improvement on energy performance of residential buildings relative to 2002 building regulations	2,490	615
Building Regulations 2010 – 60% improvement of residential buildings relative to 2002 building regulations	1,100	272
Low Carbon Homes 2013 – 70% improvement of residential buildings relative to 2002 building regulations	395	98
House of Tomorrow Programme – developer support for buildings exceeding existing building regulations	30	7
Warmer Homes Scheme	170	42
Home Energy Saving scheme – improving current residential building stock in Ireland	600	157
Smart meter installation – estimated efficiency gains among domestic users	690	120
Greener Homes Scheme	265	64
Ecodesign for Energy-Using Appliances (Lighting)	1,200	210
Efficient Boiler standard	2,400	585
Sector Total	10,355	2,436
Transport sector[11]		
Improved fuel economy of private car fleet	1,530	412
Efficient driving measures	655	176
Electric Vehicle Deployment	955	350

10 The conversion to primary energy equivalent takes into account the conversion losses in electricity.

11 Savings estimates relating to transport measures are based on analysis undertaken by Department of Transport (DoT). Results have been calibrated to reflect latest methodologies developed at EU level for the purpose of estimating savings against EU Energy Services Directive (ESD) targets. A full range of potential savings from transport is included in the Government's Smarter Travel Policy, which includes additional measures not referenced here.

Mobility management – travel plans	1,090	294
VRT / Motor tax changes	200	54
E-working	150	40
More sustainable public transport fleets	90	24
Sector Total	4,670	1,350
Energy supply sector		
Transmission and distribution efficiencies improvement – reaching loss target of 7.5%	310	72
Winter Peak Demand Reduction Scheme	55	10
Sector Total	365	82
Total Projected Savings	23,730	5,722
National 20% Savings Target	31,925	
Additional Savings to be Captured	8,195	

Table 1: Projected Energy Savings 2020

While it is hugely positive that we are in a position to demonstrate actions and measures that are projected to achieve three-quarters of the national target, this is only the first step for Ireland. We will have to identify further savings of 8,195GWh, through a combination of new measures and over-achievement of existing actions. We anticipate that the list of measures will evolve as new actions are developed and ongoing programme experience informs our calculations of energy savings. Likewise, some of the actions contained within this Action Plan have no savings yet associated with them. As we develop these actions, we will ensure that an appropriate level of energy and CO_2 saving is represented in the calculation of the national target.

The Action Plan contains 90 actions, measures and programmes which will each play their part in securing a more sustainable energy future for Ireland. Of the 90 actions five stand out as having key importance for the delivery of the national target:

1 **We have launched a multi-annual National Insulation Programme for Economic Recovery to assist homeowners and vulnerable members of society to substantially reduce their energy bills.**

2 **We will continue to support business to become more competitive through tax allowances for energy-efficient technologies, energy management tools and support programmes.**

3 **We will develop proposals for the introduction of an Energy Demand Reduction Target, which could make a significant contribution to our 2020 target.**

4 **We will drive the public sector towards purchasing only green goods and services as part of the target to reduce energy usage in the public sector by 33%.**

5 **We are developing an electric vehicle deployment strategy which will result in a minimum of 10% of our passenger car and light commercial vehicle fleet being electrically powered by 2020.**

The total Government purchasing budget is over €10 billion per annum, giving significant leverage to those in the public sector to 'move the market' towards the competitive provision of sustainable products and services. To exploit 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, products and services. We are therefore committed to publishing Green Public Procurement Guidelines that will aim to achieve a level of green public procurement equal to that realised by best performers in the European Union.

From January 2009 all homes offered for sale, rent or lease are required to have a Building Energy Rating (BER). This rating will classify the energy efficiency of the house and provide homeowners with the information required in order to improve the thermal efficiency of their dwelling. Combined with the allocation of €49 million for the Home Energy Saving scheme in 2009, the demand for BERs should serve to stimulate the market for green goods and services.

In the business and public sectors, significant savings are expected from improving the energy performance requirements of new non-residential buildings, improving existing buildings and encouraging more businesses and public bodies to actively address their energy use and to use the most energy-efficient plant, machinery and equipment.

For the energy supply sector, we believe that introducing an Energy Demand Reduction Target for energy suppliers or distributors holds great promise, and are working towards bringing forward proposals for such a scheme to Government in 2009. In the advance, a national consultation exercise will be undertaken.

Significant potential energy savings exist through the development of energy efficiency lighting. Modern energy-efficient bulbs and luminaires provide an immediate opportunity for significant efficiency gains. The 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). As part of the Carbon Budget 2008, Government announced its intention to bring forward legislation to remove inefficient lighting products such as incandescent bulbs from the Irish market. During the course of the consultation period, the European Commission published its proposals for an EU-wide phasing out of incandescent light bulbs, to begin in September 2009. Rather than having to introduce primary legislation, the elimination of inefficient incandescent light bulbs will now take place under the 2005 EU Ecodesign of Energy-Using Products Directive.

Transport 21, and the more recently published Smarter Travel – A Sustainable Transport Future, identify a number of actions and measures that will make a substantial contribution towards achieving our 20% target; amongst the most important is Government's intent to ensure that 10% of our passenger car and light commercial vehicle fleet will be electrically powered by 2020. We will also provide Sustainable Energy Ireland (SEI) with funding to further research and identify demonstration projects over the lifetime of this plan.

This Action Plan will be closely monitored on an ongoing basis by an Interdepartmental Implementation Group that will report to Government at regular intervals on progress being made towards our 20% target. As new measures and savings are identified, this Action Plan will be periodically revised accordingly. We will publish updated Action Plans in 2011 and 2014, in accordance with European Commission requirements.

Key Action Plan Measures

The following are the principal measures contained within this Action Plan, and represent the key targets for Government to achieve to meet our 2020 commitments.

Public Sector

4 We will establish in 2009 a high level Working Group, involving key Departments and Agencies,

to draw up an Action Plan for achievement of the 33% energy savings target for the public sector.

5 We will investigate the feasibility of a public sector obligation scheme to facilitate the achievement of the 33% target.

6 We will require all public sector bodies to produce annual reports setting out their energy efficiency actions and progress towards the 33% target.

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

9 We will investigate the feasibility of applying a minimum standard beyond building regulations for new buildings (including significant renovations) intended for use by public sector bodies.

12 We will introduce in 2009 Guidelines for Green Public Procurement in the Public Sector.

Business

15 We are providing tax incentives to encourage companies to buy the most energy-efficient equipment.

17 We are supporting the networking and exchange of best energy efficiency practice by the largest industrial energy users.

18 We are supporting businesses in maximising their energy efficiency through adoption of IS393, the Irish Standard for Energy Management.

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

28 We will review Non-Domestic Building Regulations in 2010.

29 We will demonstrate the significant potential available through ICT efficiencies, working closely with the industry, utilising technological solutions such as virtualisation, co-location, efficient IT hardware, optimised cooling technologies, and energy management controls.

30 We will plan for the development of energy-efficient cloud computing and co-location of data centres.

Residential

32 We are providing grants and other incentives to householders to upgrade the energy-efficiency of older homes through the Home Energy Saving scheme.

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

34 We are upgrading the energy performance of homes occupied by those on low incomes through the Warmer Homes Scheme.

40 We have made new Building Regulations delivering a 40% improvement in new housing energy efficiency standards.

42 We have rolled out a Building Energy Rating system to new houses from 2007 and have extended this to existing houses from 2009.

46 We will investigate the feasibility of applying a minimum standard for dwellings occupied by those in receipt of rent supplement.

Transport

47 We will develop an electric vehicle deployment strategy that will result in a minimum of 10% of our passenger car and light commercial fleet being electrically powered by 2020.

48 We have re-structured the VRT and motor tax systems to incentivise the purchase of more energy-efficient vehicles.

49 We are enhancing the labelling system for cars to provide more information on CO_2 emissions and on fuel economy.

52 We are encouraging use of public transport through tax incentives under the TaxSaver Commuter Ticket Scheme.

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

59 We will introduce mobility management initiatives including support for workplace travel plans, school travel plans and personalised travel planning.

62 We will implement the National Cycle Policy Framework and publish a National Walking Policy to encourage modal shift.

Energy Supply

65 We are promoting competition and choice and continuing to developing the All-Island Energy Market Framework across a range of energy priorities, building upon the establishment in 2007 of the Single Electricity Market, leading to a more efficient supply sector.

67 We will work towards the introduction of an Energy Demand Reduction Target for energy suppliers.

68 We will prioritise energy efficiency in our investment decisions for new generation plant under the NDP 2007 – 2013.

69 We will complete a comprehensive cost-benefit review in 2009 of the potential for distributed generation.

70 We will reduce distribution losses to 7.5% by 2010.

72 We will significantly expand our demand side management initiatives.

74 We will implement a wide-ranging programme to fully investigate the opportunities and long-term policy options for the micro-generation of electricity via small-scale technologies.

Research & Development

79 We are targeting a world-class research capacity in sustainable energy and energy-efficient technologies through Science Foundation Ireland.

80 We have provided substantial funds for research, development and demonstration in energy efficiency, renewable energy sources, end-use technologies and related capacity building through Sustainable Energy Ireland.

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

83 We are demonstrating and promoting, through Sustainable Energy Zones, the range of technologies, techniques, policies and behaviours that will help to deliver a sustainable energy future for Ireland.

83 We are developing a Greenhouse Gas Abatement Cost Curve for Ireland.

Cross-Sectoral

84 We are raising awareness of energy efficiency and providing advice on how to be more energy efficient through Power of One – our National Energy Efficiency Awareness Campaign, and other initiatives such as Green Schools.

85 We are raising awareness of the significant contribution of inefficient use of energy to climate change through our Climate Change Awareness Campaign – CHANGE.

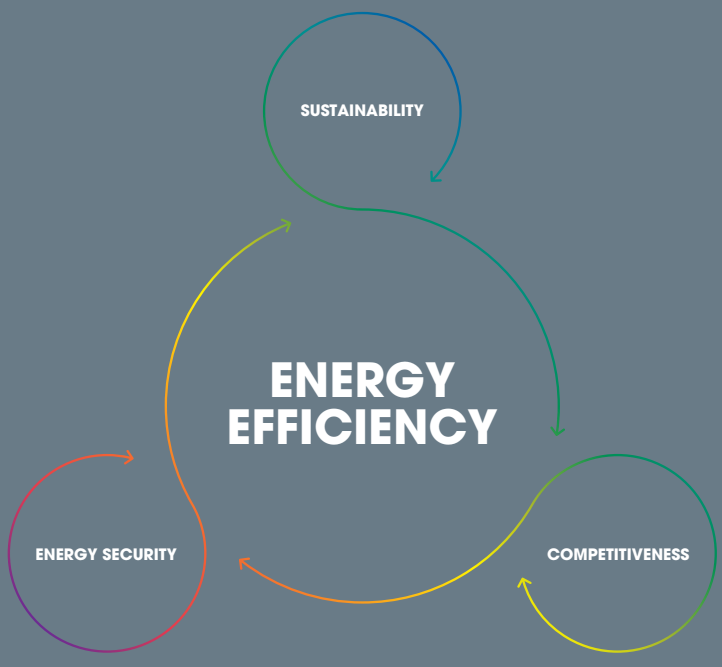
86 We are implementing many fiscal measures to protect and enhance the environment and are examining others, including the introduction of a carbon tax.

89 We will develop and publish a model contract template and Guidelines for Energy Service Companies (ESCOs).

90 We will continue to publish *Energy Efficiency in Ireland* reports, which monitor progress on energy efficiency.

Section 01

The Energy Efficiency Challenge



Chapter 01

The Context for Energy Efficiency in Ireland

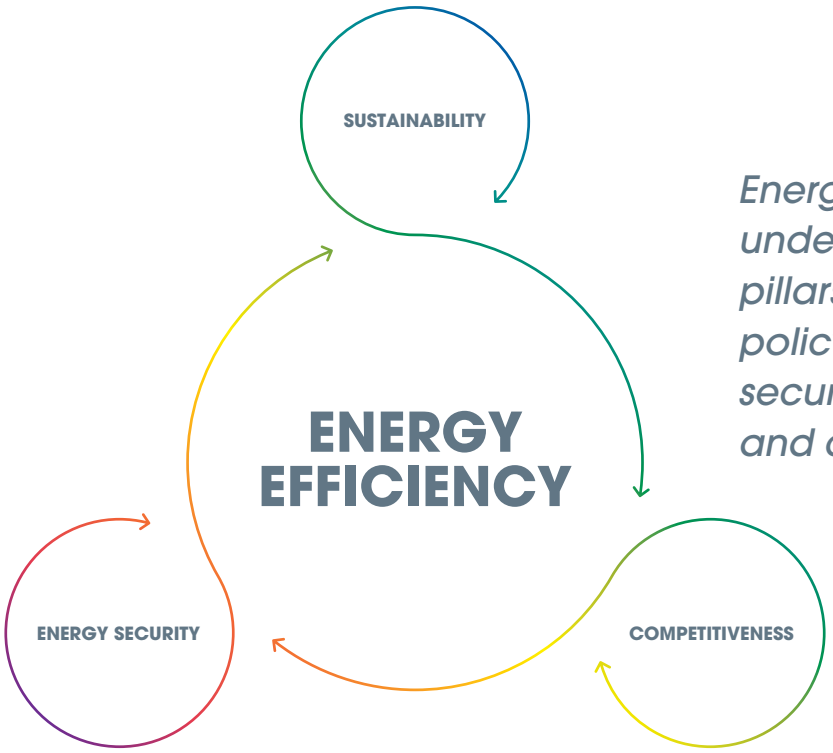
Energy efficiency for growth, competitiveness and the environment

Introduction

The International Energy Agency has issued a stark warning to the world in its *World Energy Outlook 2008*: the era of cheap oil is over. Ireland, like other countries, is standing at an energy crossroads. One path leads to a continued reliance on fossil fuels to meet all of our energy needs, with the inevitable increases in the price of oil, gas and coal. The other path leads to the creation of a sustainable future in which energy efficiency and renewables, such as wind, wave and tidal, are combined to reduce our dependence on imported energy and to provide us with sufficient energy to power our homes, businesses and transport infrastructure. This latter path is the one we want to take, but to do so we need to create an energy-efficient economy.

Energy efficiency means maximising the value we get from the energy we use. It means getting the greatest comfort in our homes, the best lighting in our shops and the highest productivity in our factories while using the minimum amount of energy necessary to do so. Each and every one of us benefits when we use energy efficiently because by doing so we spend less money and minimise environmental impacts. If the actions and measures outlined in this Action Plan are delivered, over €380 million will be saved by business in 2020, while energy demand in the residential sector will reduce by the equivalent of approximately 400,000 homes. Our actions in the transport area will have the equivalent effect of removing 325,000 cars from the road in 2020.

Energy efficiency is internationally recognised as the most cost-effective means of reducing our dependence on fossil fuels and abating Green House Gas (GHG) emissions.



Energy Efficiency underpins the three pillars of our energy policy: sustainability, security of supply and competitiveness.

Figure 4: Interaction of Energy Efficiency and Energy Policy Framework

Figure 5, below, demonstrates the relative cost of carbon abatement technologies. As is evident from the diagram, the most cost-effective mechanisms are those relating to improved efficiency, be it building insulation, commercial vehicles, lighting or water heating.

Energy efficiency offers exciting opportunities for Ireland to develop new markets for green technologies and services, which will greatly improve the country's economic competitiveness. Improving energy efficiency provides additional economic benefits through direct savings and price moderation; it reduces the need for investment in infrastructure 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 tackle climate change successfully.

Concerted action is required urgently to reduce our demand for energy. Without an immediate response from all sectors of the economy, Ireland will become increasingly susceptible to energy price shocks. Therefore, new approaches to energy generation, transformation, distribution and usage are needed. Such change is never easy, but the foundations that need to be laid have been identified at a global and a national level and we are working towards full achievement of those goals.

Improving the level of energy efficiency is not just a national issue. We are confronted with similar challenges to those being faced worldwide, although our situation is intensified by the size of our energy market, our geographical peripherality and our limited indigenous energy supplies. The importance of energy efficiency has been reaffirmed at successive G8 summits, at Gleneagles, St Petersburg and Heiligendamm, as well as at European Union level.

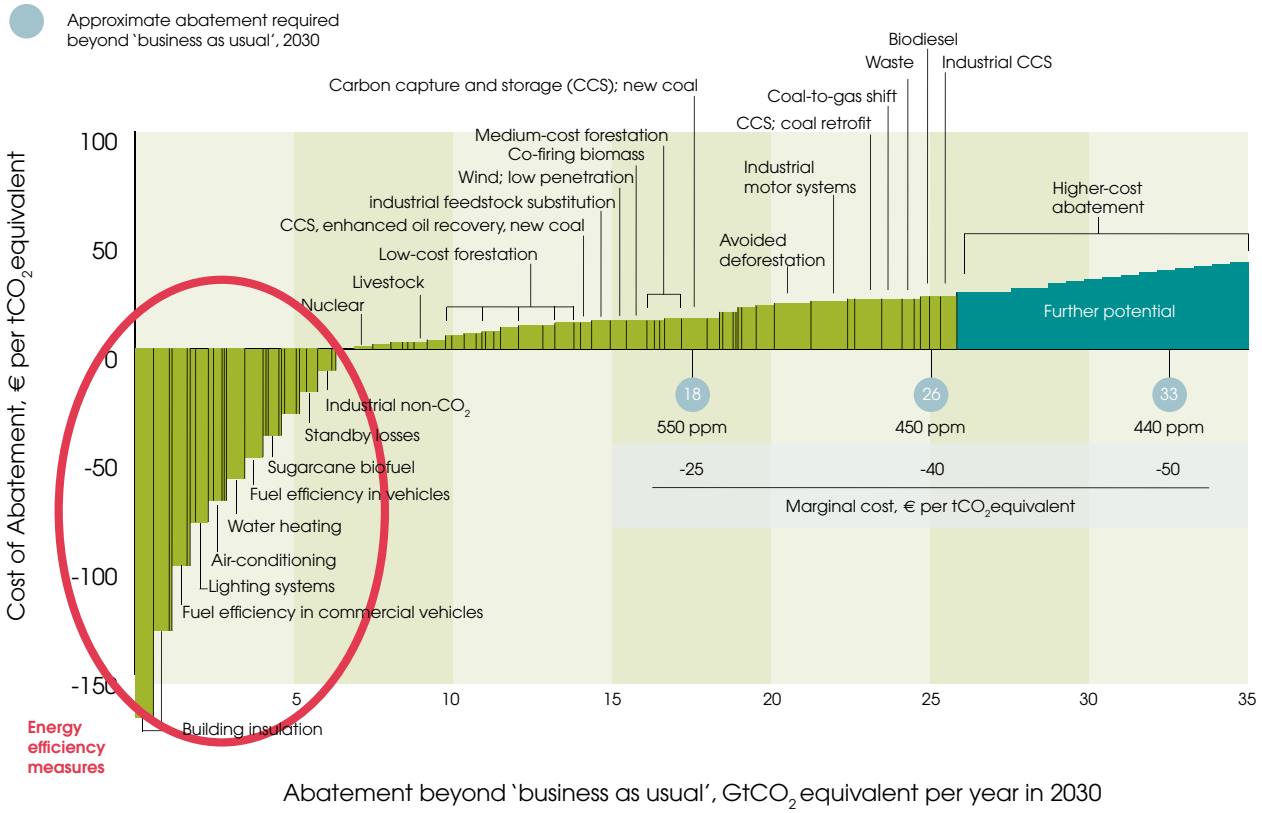


Figure 5: Global Cost Curve of GHG Abatement Opportunities beyond Business as Usual[12]

12 Source: McKinsey Climate Change Special Initiative.

Global Energy Efficiency Developments

Globally, energy demand shows no sign of abating (see Figure 6 below). The International Energy Agency (IEA) projects a 45% increase in world energy demand by 2030 and a doubling between now and 2050. The fastest growth will occur in developing countries and the bulk of this demand is likely to be met by fossil fuels. Continued global growth on this scale presents many challenges, most notably increasing and volatile fuel prices and concerns over security of supply.

Of particular relevance are the IEA's 25 energy efficiency policy recommendations made to the G8 countries.[13] These recommendations seek to reduce energy consumption across a wide range of areas, including lighting, buildings, transport and industry. They provide a comprehensive set of cost-effective actions that have the potential to unlock a reduction in global CO_2 emissions by over 8 gigatonnes, if fully implemented. The recommendations, which are at the forefront of current thinking on energy efficiency, provide a framework for action on an international level.

Ireland has already taken significant strides towards introducing a substantial number of the recommendations; including regular revision of domestic and non-domestic building regulations in order to ensure that future buildings require less energy. Ireland will continue to support the IEA in its work, and will seek to further develop actions and measures that are aligned with the 25 recommendations.

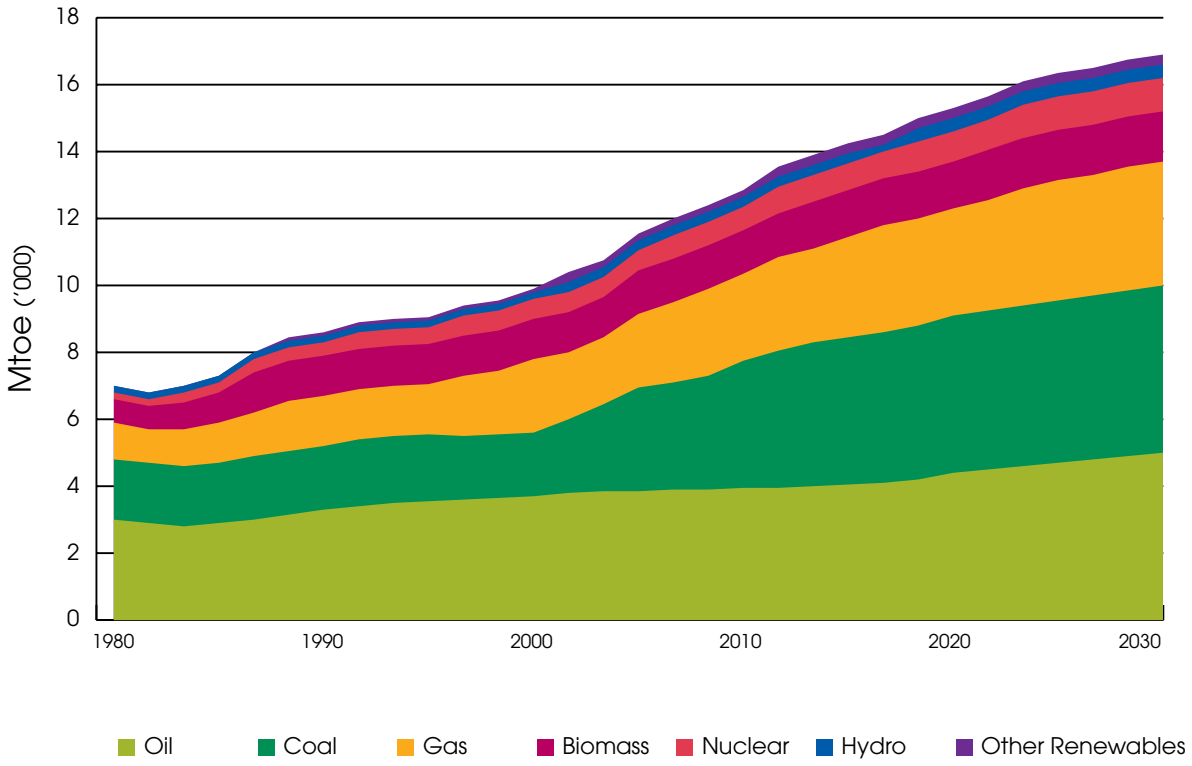


Figure 6: World Primary Energy Demand[14]

13 OECD/IEA (2008) *Energy Efficiency Policy Recommendations.*

14 Source: IEA (2008).

The IEA's most recent World Energy Outlook (November 2008) sets out clearly the extent of the energy and climate change challenge that we are facing. Unless we radically de-carbonise our energy sources, greenhouse gases will continue to rise to levels that threaten the long-term environmental stability of the planet. Although the energy price shocks that were witnessed throughout 2008 had a depressing impact on energy-related emissions of CO_2, it was not enough to create a definite and long-term transformation. Ultimately, positive change requires everybody to take individual ownership of the challenge and to make adjustments in the way they use energy at home and at work. Small, individual changes collectively add up to significant national savings.

European Energy Efficiency Policy

In recent years, European energy policy has become increasingly aligned with environmental policy, culminating in an agreement at the March 2007 European Council meeting to establish a joint vision for delivering the core energy objectives of sustainability, competitiveness and security of supply. This agreement led to the embracing of the 20-20-20 initiative, which aims to reduce GHGs by 20%, to increase the share of renewables in energy use to 20% and to improve energy efficiency by 20% – all to be achieved by 2020.

Underpinning the 20-20-20 initiative is Europe's new energy policy,[15] which seeks to ensure more effective competition by fostering investment, diversity and security of supply. Energy efficiency lies at the heart of European energy policy and is fundamental to improving energy supply, reducing carbon emissions, fostering competitiveness and stimulating green technological development.

The recent Second Strategic Energy Review reaffirms the commitment of the European partners to delivering these goals. It proposes a five-point EU Energy Security and Solidarity Plan[16] that focuses on infrastructure and diversification of energy supplies, external energy relations, oil and gas stocks and crisis-response mechanisms, energy efficiency and use of indigenous energy resources. The Plan confers a new impetus on energy efficiency, proposing a range of initiatives to stimulate delivery of the 20% target, including, *inter alia*: a revision of the Energy Performance of Buildings Directive, a revision of the Energy Labelling Directive, intensification of the implementation of the Ecodesign Directive, promotion of co-generation and a green tax portfolio.

The European Commission has estimated that EU Member States waste €100 billion annually through inefficient use of energy.[17] The Commission published its energy efficiency Action Plan, entitled Action Plan for Energy Efficiency: Realising the Potential,[17] in October 2006. The Action 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 that will save 20% of EU annual primary energy usage by 2020.[19] It proposes ten targeted, priority, cost-effective energy efficiency improvement initiatives (actions) to be implemented over the next six years (2007 – 2012). The goal 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, transport and energy systems in the world.

Ireland 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. We have formalised our commitment to this plan by adopting a national 20% energy savings target for 2020.

15 Source: McKinsey Climate Change Special Initiative.

16 SEC (2008) 2794.

17 COM (2006) 545 Final.

18 *Ibid.*

19 Compared to baseline. See COM (2005) 265 final of 22.06.2005.

The Energy Services Directive (ESD) is the overarching framework within which energy efficiency policy is formulated. The Directive seeks to promote cost-effective end-use energy efficiency in EU Member States through various promotional, awareness and support measures, as well as the removal of institutional, financial and legal barriers. Examples of actions include the growth in energy auditing, smart metering, billing and financial instruments for energy saving. The ESD aims to promote the development of a sustainable market for energy efficiency and related services.

The ESD applies to Government as well as to energy suppliers (including energy supply, distribution and retail companies) and final users of energy. It 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.

The ESD required all Member States to submit an Energy Efficiency Action Plan (EEAP) to the European Commission in 2007, outlining how we plan to achieve a 9% energy savings target by 2016; the EEAP should be considered the forerunner of this National Energy Efficiency Action Plan (NEEAP). The ESD also 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 the achievement of its targets, and must also set out plans for adjustment or addition to the actions in light of this analysis.

In addition to the ESD, Ireland is committed to implementation of the following energy efficiency-related EU Directives (proposed and extant):

- Energy Performance of Buildings Directive (2002/91/EC) – to increase the energy performance of public, commercial and private buildings in all Member States;
- Eco-design of Energy Using Products Directive (2005/32/EC) – to set minimum energy performance standards for a broad range of energy usage and related technologies;
- Council Directive 92/75/EEC on the indication by labelling and standard product information of the consumption of energy and other resources by household appliances;
- Combined Heat and Power (Co-Generation) Directive (2004/8/EC) – to promote the on-site generation of power and use of the associated heat produced;
- Proposal for a Directive on the indication, by labelling and standard product information, of the consumption of energy and other resources by energy-related products;
- Proposal for a Directive of the European Parliament and of the Council on labelling of tyres with respect to fuel efficiency and other essential parameters.

National Energy Policy

Ireland's energy policy framework is set out in the 2007 Government White Paper, `Delivering a Sustainable Energy Future for Ireland' and is designed to steer Ireland to a new and sustainable energy future. The White Paper places sustainability at the heart of the Government's policies on energy and the environment. The decision to move towards energy sustainability implies accelerating the growth of renewable energy supply while maximising energy efficiency. These twin goals of renewable energy and energy efficiency contribute to addressing the problem of climate change, increasing security of supply and improving economic competitiveness. A series of specific targets and essential actions to meet those goals is identified in the White Paper, including the Government's commitment to achieve 20% energy savings by 2020.

The Programme for Government, published in June 2007, builds on the commitments set out in the White Paper and identifies important new elements of Ireland's sustainable energy response. These responses are set out in this Action Plan.

The National Development Plan (NDP) 2007 – 2013 also contains key sustainable energy policy objectives in two Priority areas: the Economic Infrastructure Priority; and the Enterprise, Science and Innovation Priority.

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 Enterprise, Science and Innovation Priority aims 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 10 of this Action Plan.

The Government published *Building Ireland's Smart Economy: A Framework for Sustainable Economic Renewal* in December 2008. It places energy and energy efficiency in particular, at the heart of efforts to implement a 'new green deal' for Ireland, recognising the valuable contribution that energy efficiency can play in job creation and economic development.

While the energy policy framework establishes the overarching objectives for the long-term development of the energy sector in Ireland, the *National Climate Change Strategy 2007 – 2012* draws together the Government's collective efforts, across all sectors, to tackle climate change. The Strategy outlines how measures and actions taken across the economy will work in tandem to reduce Ireland's GHG emissions during the Kyoto period, 2008 – 2012. It also demonstrates how measures currently being pursued will position Ireland for the post-Kyoto period, and identifies which further measures are being researched and developed to enable us to meet our 2020 commitment.

The National Climate Change Strategy and the energy policy framework are complementary parts of Ireland's integrated and cohesive response to the challenges of energy sustainability and climate change. Achieving our targets for renewable energy – 40% of electricity from renewables, 10% of transport fuels as biofuel and 12% renewable share in the heating sector – will be significantly supported by contributions from the energy efficiency actions detailed in this plan. Essentially, by using less energy, we reduce the need to generate energy from any source, fossil or renewable.

It is estimated that actions outlined in this plan will contribute approximately 5.7Mt CO_2 reduction in 2020. Based on current emissions factors,[20] these savings accrue at a rate of approximately 600 tonnes of CO_2 for every GWh of electricity saved, 205 tonnes per GWh of gas and 260 tonnes per GWh of oil.

Energy Use in Ireland: the Imperative for Efficiency

Ireland's demand for energy has grown by nearly 84% over the period 1990 – 2007, with usage increasing in every sector of the economy. Energy demand is projected to grow by about 24% in the period 2007 – 2020[21] unless actions are taken now to reduce demand and usage. This is illustrated in Figure 7 overleaf, which shows historical trends in energy demand and future projections in the absence of further action.

20 Ratio of CO_2 produced per unit of energy used.

21 Based on revised baseline projections produced by SEI for ESRI using the HERMES macroeconomic model. Further details are available in SEI (EPSSU) *Energy in Ireland 1990 – 2007.*

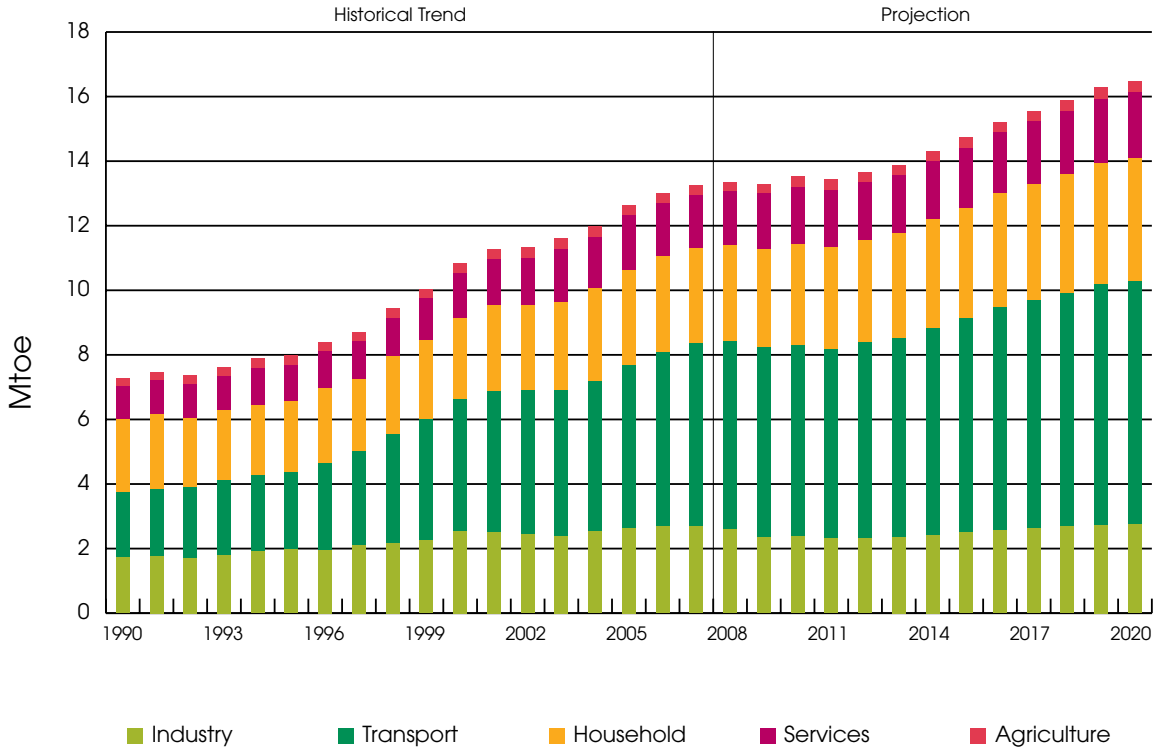


Figure 7: Total Final Demand for Energy, by Sector, 1990 – 2020 (Final Energy Consumption)[22]

The projected growth in Ireland's energy demand over the period 1990 – 2020 stems from increased economic activity. Future predictions are based on macro-economic assumptions adopted in light of the current economic climate.

A key challenge will be to decouple future economic development from energy demand. Given our current trend of increasing energy use in all sectors this represents a significant challenge. Nonetheless, progress has been made to improve the level of energy efficiency in Ireland. While overall demand continues to grow, energy intensity (measured by the energy usage per unit of GDP) has fallen by 36% between 1990 and 2007 (see Figure 8 opposite), which represents a 36% increase in energy productivity.

This increase in energy productivity is the result of a number of factors, including structural changes in the economy (the trend towards higher value-added, less energy-intensive activity in industry and commerce, in particular), fuel mix changes and energy efficiency improvements. While this progress is encouraging, significant potential remains to increase the efficiency of energy use in Ireland and thereby reduce demand.

22 Source: SEI.

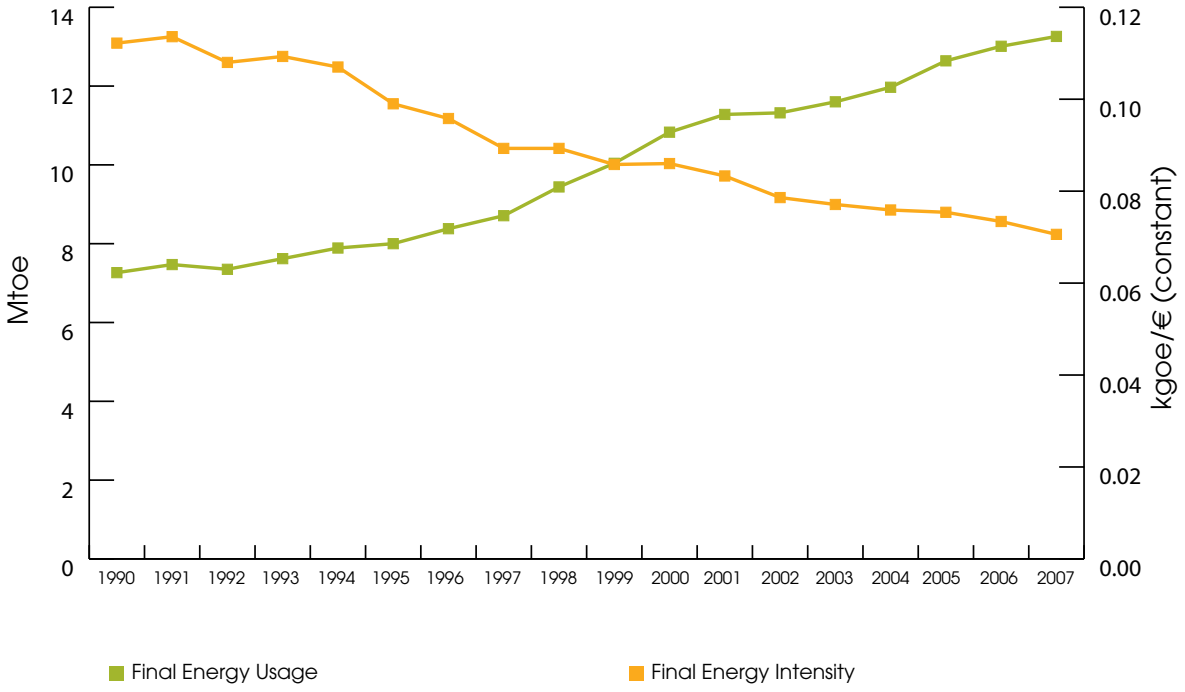


Figure 8: Energy Usage 1990 – 2007 (Final Energy Consumption)[23]

Potential for Improved Energy Efficiency

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 will ultimately result in a net long-term positive financial gain to the economy.

The IEA's *Energy Use in the New Millennium* (IEA, 2007) noted that improvements in energy efficiency in 14 major economies from 1990 effectively reduced energy demand by 14% by 2004. While this is a positive trend, numerous international studies have pointed to the huge potential energy usage savings that could be realised through behavioural changes and adoption of more efficient technologies already on the market. For example, an IEA report entitled *Cool Appliances* (IEA, 2003) highlighted that current energy efficiency policies exploit only about one-third of the cost-effective energy savings potential from improving the efficiency of household appliances. In a similar report on lighting, *Light's Labour's Lost*, the IEA estimated a global lighting energy savings potential of 38%.

According to the EU,[24] energy demand could be reduced by 20% through currently available efficient technologies. Importantly, this could be achieved economically, with the cost to society of delivering the improvements less than the value of the energy savings. These savings equate to approximately 390 Mtoe and should reduce CO_2 emissions by 780 Mt[25] – more than twice the EU's reduction stipulated under the Kyoto Protocol. The additional investment required to spearhead more efficient and innovative technologies will be more than compensated for by the Member States' estimated €100 billion annual fuel savings.

23 Source: SEI.

24 EU Green Paper on Energy Efficiency, *Doing More With Less* (2006).

25 With respect to the baseline scenario.

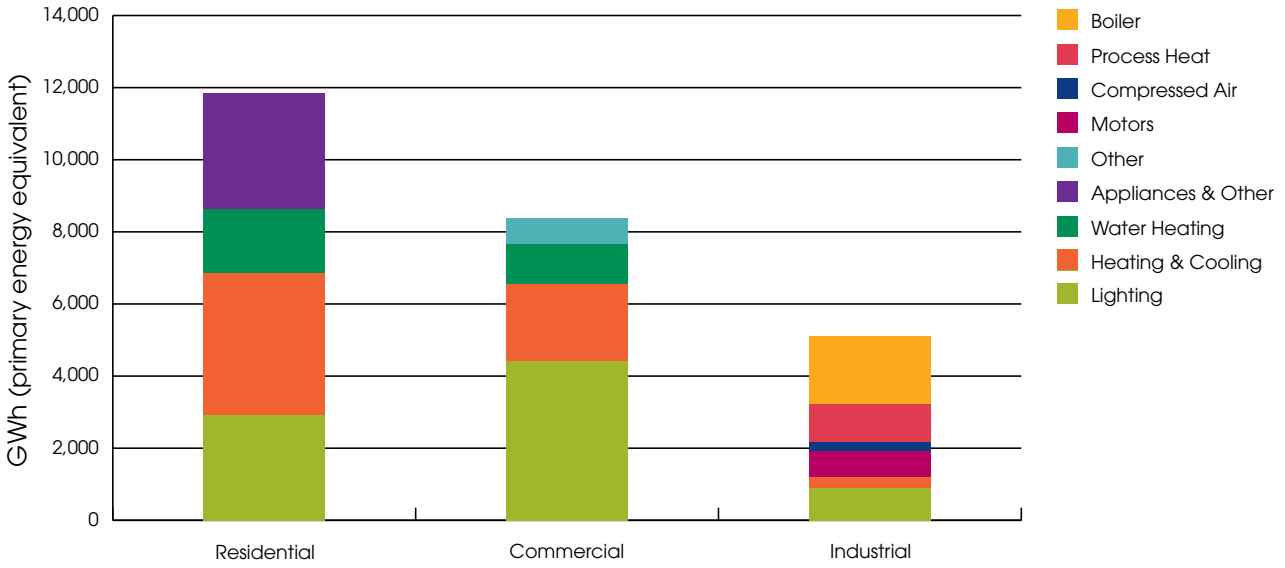


Figure 9: Economic Efficiency Savings Potential by Sector and by Technology.

Sustainable Energy Ireland (SEI) has undertaken extensive modelling work on the Irish energy economy,[26] which has provided us with estimates of the significant 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 (see Figure 9, above) suggests that potential gains on the basis of fully economical investments and currently available technologies are equivalent to approximately 24% of current demand.[27]

Importantly, this potential is based on the widespread adoption of existing energy-efficient technologies that are proven and that make sound financial sense. Economic modelling of the Irish energy economy has shown that there is considerable economic opportunity for investment in energy efficiency[28] – opportunity that offers a positive private net present value, even before societal benefits are taken into account. The example provided opposite (Figure 10) demonstrates the present value of investment under three different scenarios. In the base programme, investment of approximately €52 million per annum on energy efficiency and demand management programmes is leveraged to return benefits to the economy of over €260 million. The other two scenarios, which consider annual spends of €66 million and €148 million respectively, return even more significant benefits.[29]

Increasing the rate and breadth of energy efficiency improvements is a crucial factor in achieving stretching national targets for energy and emissions reductions. All governments must learn from the best practices of others and act now to develop and implement the necessary mix of market and regulatory policies, including stringent national efficiency standards. This process

26 *Demand Side Management in Ireland: Evaluating the Energy Efficiency Opportunities* (January 2008).

27 In the sectors examined, i.e. industrial, commercial and public, and residential. Similar work is ongoing to determine savings in other sectors.

28 Including two major studies conducted recently for SEI: *Demand Side Management in Ireland* (January 2008, Kema) and *Public Finance Mechanisms to Support Investment in Energy Efficiency in Ireland* (June 2007, Indecon).

29 Note: this analysis only considered costs and benefits relating to the industrial, commercial and public, and residential sectors.

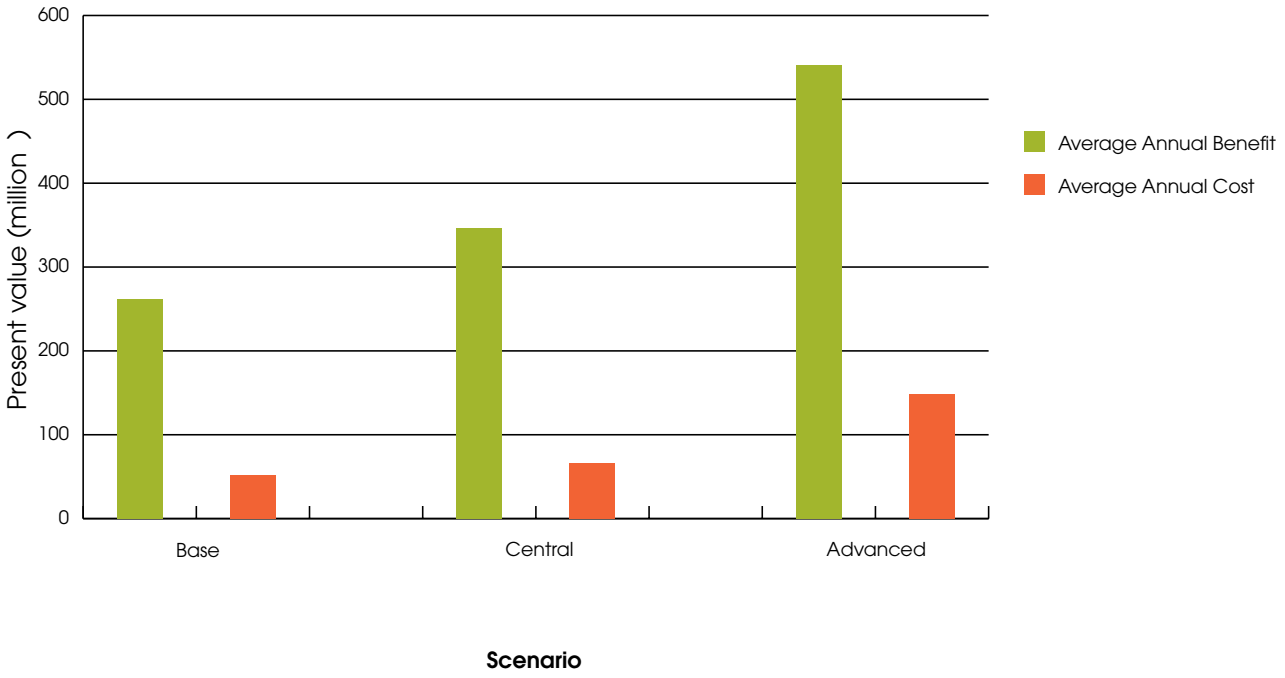


Figure 10: Average Annual Total Economy Costs and Benefits (2007 – 2020).[30]

must be complemented by the introduction of measures designed to drive down the CO_2 intensity of electricity production through the adoption of a more diverse energy mix. Ireland has abundant wind, wave and tidal resources that have the potential to substantially meet our energy needs, if harnessed appropriately.

Overcoming Barriers: Challenges and Solutions

Measures for stimulating increased energy efficiency involve technology, infrastructure, behaviour, legislation and, of course, Government policy. There is a wide variety of technologies, across all sectors of the economy that are highly efficient and minimise running costs over their operational lifetime. It is important that this information is communicated effectively to potential buyers to allow rational, economic decision-making and that the 'natural' trend towards more efficient technology is greatly accelerated.

It is the task of Government to set market and policy conditions so that everyone recognises their best interest and behaves accordingly. This means that 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 must be supportive and stable so that people can make decisions that will continue to deliver benefits. The long-term commitments of the energy policy framework, and of this Action Plan, set the context for informed, pro-efficiency decisions and actions that will deliver benefits to individuals and to society as a whole.

This Action Plan, and Government policy more generally, has a role to play in raising awareness of the benefits of energy efficiency, as well as removing any barriers that may exist in the market. There are a number of widely recognised market barriers to energy efficiency, not least price. Energy prices, or

30 Source: SEI (2008).

the costs and benefits of efficiency actions, often do not fully reflect their true societal impact; the costs to society of climate change is a prime example. The proposal in the Programme for Government to consider a carbon tax recognises the importance of giving appropriate market signals.

The Action Plan

The purpose of the Action Plan is to chart a path towards achieving a 20% (33% for the public sector) reduction in energy demand by 2020.[31] The Action Plan also reaffirms Ireland's commitment to contributing to the 20% energy savings target set out in the EU Energy Efficiency Action Plan.

Fundamental to delivering our national and European targets is our ability to create a vision for the Action Plan that underpins each action and measure designed to improve Ireland's energy efficiency. To this end we have identified seven key goals:

Public Sector

The public sector will improve its energy efficiency by 33% and will be seen to lead by example — showing all sectors what is possible through strong, committed action.

Business Sector

Irish business will be known internationally for embracing energy-efficient practices, innovation and competitiveness.

Residential Sector

All new Irish housing will be carbon neutral. Efficiency standards in older homes will be significantly improved through retrofitting actions.

Transport Sector

A sustainable transport system will be delivered for Ireland. The way we travel and transport goods will be transformed for the benefit of communities, the environment and the economy.

Energy Supply Sector

The Irish energy sector will deliver competitively priced, low carbon energy to all customers and assist them to use it as efficiently as possible.

Research and Development

Ireland will be at the forefront of energy research, supporting the development of energy efficiency and renewable technologies in order to accelerate their contribution to Ireland's energy supply.

Cross-Sectoral

We will transform the use of energy in Ireland, centred around informed consumers, providing appropriate market signals and active development of business, services and technologies.

The Action Plan is structured to facilitate easy reference to actions and measures. The next section, 'Sectoral Measures' comprises seven chapters, each focusing on a specific sector of the economy. At the start of each chapter we set out our vision for that particular sector, along with a list of actions and measures that will contribute to the achievement of that vision. Chapter 12 provides a summation of actions and measures listed in the Action Plan, along with details of the organisations responsible and a timeframe for delivery.

31 Compared to average energy use over the period 2001 – 2005.

Chapter 02

Outcome of the National Consultation Exercise

Introduction

Following the submission of the EAAP to the European Commission in September 2007, the Department of Communications, Energy and Natural Resources (DCENR) initiated a national consultation exercise to inform the preparation of the National Energy Efficiency Action Plan. Forty-two submissions were received from a variety of sources, although, perhaps unsurprisingly, the majority came from the energy sector. As well as submissions from large energy organisations, many also came from local energy agencies and from local and regional authorities in support of the submission from the Association of Irish Energy Agencies (AIEA). Other notable submissions were received from business representative groups and promotion agencies. A full list of the respondents is given in Annex 01.

General Comments

The Action Plan was widely welcomed by respondents as being a comprehensive approach to promoting greater energy efficiency across the economy. Energy efficiency was recognised as holding enormous potential for energy savings. However, respondents stressed the need for greater urgency in turning the undoubted potential of energy efficiency into a reality.

Public Sector

The submission from the AIEA called for local energy agencies to be used to deliver energy efficiency policy actions at a local level. Specifically, the AIEA stated that local energy agencies were well placed to deliver energy efficiency awareness initiatives and energy advice at a local level. The Minister is committed to development of the energy services sector, including the local energy agencies, and will seek to significantly increase the involvement of the sector in delivering energy efficiency measures and programmes.

A number of submissions commented that water and sewerage treatment and pumping accounts for the highest proportion of energy use in local authorities and called for targeted actions to address this matter. Further consideration will be given to this important issue in the context of the development of proposals for achievement of the 33% energy efficiency savings target for the public sector.

The integration of micro-renewables, such as solar-voltaic and micro-wind turbines, into public street lighting was proposed. Sustainable Energy Ireland is trialling such applications in its Dundalk 2020 Sustainable Energy Zone, and the outcome of these trials will inform Government policy in this area.

The Irish Business and Employers Confederation (IBEC) commented on the budgetary implications of the level of investment required to achieve the 33% energy efficiency savings target for the public sector and, in particular, its potential effect on the level of Exchequer funds available for other policies. This issue will be borne in mind in the context of the development of proposals for achievement of the energy savings target for the public sector. After that process it will be clearer whether or not large-scale investment is required to achieve the target or if it can be achieved through certain business decisions and behavioural change programmes. It should also be noted that the Government's targets are for 2020, over a decade hence, and that investment to achieve these targets will take place over a number of years.

Business Sectors – Commercial and Industrial

Many submissions commended the suite of support programmes for business provided through SEI and urged their continuation and expansion. A number of contributors felt that these and other actions listed in the business chapter were insufficient to achieve the Government's targets. As stated above, the Government's targets are for 2020 and investment to

achieve these targets will take place over a number of years. A number of new supports were introduced in 2008 and further measures will be brought forward over the lifetime of this Action Plan and will be informed by relevant studies in this area.

Several submissions commented that for businesses, energy efficiency investments must compete with other investment possibilities and that rational businesses will choose those investments with the highest rate of return. Demand Side Management in Ireland established that energy efficiency investments have a very attractive return on investment and that this is likely to increase, given the trend in world oil prices.

Comhair, the Sustainable Development Council, suggested the establishment of a business energy efficiency forum, involving suppliers of energy efficiency goods and services, to maximise business opportunities locally and globally. While existing forums include SEI's Large Industry Energy Network and Sustainable Energy in Buildings Network (SEBnet), the role that the suggested forum could play in promoting energy efficiency and, in particular, how it could contribute to the development of the energy services sector will be examined.

A number of submissions recommended the provision of low interest or interest free loans for energy efficiency investments by businesses. This issue was examined as part of a study commissioned by SEI, Public Finance Mechanisms to Support Energy Efficiency Investments in Ireland, which assessed a range of options for encouraging businesses to invest in greater energy efficiency. While the study found merit in the soft loans option, it favoured accelerated capital allowances because of the likelihood of higher take-up rates. The Finance Act 2008 provided a legislative basis for these allowances. The success of this tax allowance will be closely monitored and the merits of soft loans as a policy option will be kept under review in this context.

A number of submissions suggested that greater use be made of business representative bodies and industrial development agencies to promote the benefits of energy efficiency to businesses. This suggestion has much merit and the DCENR and SEI will seek to increase the use of these channels.

Residential Sector

The significantly higher energy efficiency standards that are imposed by the new residential building regulations, which came into force in 2008, were widely welcomed. There was also a general consensus that even higher efficiency standards are both desirable and achievable. The draft Action Plan flagged the intention of Government to further improve the residential building regulations in 2010.

Several submissions called for minimum efficiency requirements for boilers and this has since been provided for in the Buildings Regulations (S.I. 854 of 2007). These regulations require that all oil and gas boilers installed after 31 March 2008 have a seasonal net efficiency of 86% – a standard that can be met by highly efficient condensing boilers. This requirement also applies to existing dwellings where an oil- or gas-fired boiler is being replaced.

Gluaiseacht questioned whether there was sufficient focus in Government energy efficiency policy on the 21% of dwellings that are occupied by tenants. The difficulties for policymakers of the 'split incentives' of the landlord/tenant relationship are well documented: landlords who, by and large, do not pay the energy costs of heating are not motivated to invest in the energy efficiency of the property, while tenants, who pay the energy bill, are not motivated to invest in the fabric of a building they do not own. Government will continue to monitor international policy developments in this area of residential energy use, which is becoming ever more significant for Ireland.

Transport Sector

There was a general consensus that the growth in transport energy use is unsustainable. Equally, there was widespread agreement that the contribution of the transport sector to Government's energy efficiency targets, as set out in the draft Action Plan, was low relative to its share of energy use. Respondents called for more policy measures to be adopted to curtail the growth in energy use in the transport sector.

Government is fully conscious of the unsustainable growth pattern of transport energy use. This is recognised in the Smarter Travel Policy (STP) Framework. A number of significant new measures have been introduced since the consultation document was published, and these are detailed in the Transport chapter of this document.

A number of submissions highlighted the importance of aligning land-use planning with provision of high-quality public transport. The Government fully supports this principle and the Programme for Government undertakes that all future Local Authority development plans must be 'sustainability proofed' and that appropriate criteria should be developed, particularly for transport and land-use planning. In addition, the Dublin Transport Authority Act facilitates the establishment of an Authority to develop a transport strategy for the Greater Dublin Area (GDA) that will ensure a greater integration of land use and transport planning in the GDA. The new Authority will also have a role in the development of regional planning guidelines.

Many submissions proposed that motor vehicle taxation be linked to vehicle energy use and CO_2 emissions in order to reverse the trend of increasing engine size and to incentivise consumers to choose more efficient vehicles. This system was announced in the Government's first Carbon Budget and entered into force on 1 July 2008.

Many submissions were supportive of Government plans to introduce new measures in the area of eco-driving. This area has significant energy savings potential not only for cars but also for commercial fleets and heavy goods vehicles.

Energy Supply Sector

Many submissions welcomed the Government's plans to install smart meters for all electricity consumers, but were concerned that the meters should allow householders to export to the national grid. Various terminology is used to describe such meters, which can lead to confusion or lack of clarity as to what is intended. The Government recognises the potential of distributed generation, therefore its smart meter plans will facilitate export to the grid; a feed-in tariff for such export was set in 2008. It was also submitted that it is essential that realistic estimates of initial and ongoing costs of smart meters are developed as the implementation plan is progressed. This issue is being examined as part of the pilot phase that was initiated in 2008. Furthermore, a number of submissions suggested that smart meters should be installed for oil and gas consumers. As a result, the possibility of the smart meter project covering natural gas consumers is being examined; the case for using smart meters for oil is less clear.

Concerning the proposal in the draft Action Plan for a supplier obligation scheme (Energy Demand Reduction Target), it was suggested that the structure and scale of the Irish electricity market might make it impractical to adopt the UK model. The UK model is but one of many examples internationally, and this issue will be considered in detail before any particular model is adopted for the Irish market.

Several submissions encouraged the imposition of demand side management targets on oil and gas suppliers, similar to those that apply to ESB Customer Supply. This issue is being considered in the context

of the transposition into Irish law of the ESD, which places requirements on Member States in this regard. Indeed, the requirements of the ESD also apply to suppliers and distributors of other forms of energy, such as LPG, peat, coal and transport fuels.

Research & Development

Many submissions called for increased research and development funding for energy efficiency and renewable energy, in particular wave and tidal energy. Several major developments have taken place in this area since the consultation phase of this Action Plan. An Ocean Energy Development Unit has been established within SEI and was allocated a €7 million budget in 2009. The energy sector, including energy efficiency and renewable energy, has been selected as a third research pillar by Science Foundation Ireland. This initiative will deliver significant additional research funding in the years ahead.

Several submissions specifically called for more research and development in the area of micro-generation. A new pilot Micro-generation Programme was launched in 2008 and supported approximately 50 test sites in that year. The findings of this pilot programme will inform future Government policy concerning micro-generation.

Cross-Sectoral

There was widespread support for the introduction of a revenue neutral carbon tax. It was argued that a carbon tax would have to be structured so that it would deliver maximum impact on fuel switching and energy use reduction, without forcibly closing energy-intensive installations whose energy demand is inelastic.

The Programme for Government commits to introducing measures to lower carbon emissions further and to phase in, on a revenue neutral basis, appropriate fiscal measures, including a carbon levy, over the lifetime of the current Government. A Commission on Taxation was established on 14 February 2008, with Terms of Reference to investigate fiscal measures to protect and enhance the environment, including the introduction of a carbon tax. The Terms of Reference ask the Commission to report to the Minister for Finance no later than 30 September 2009.

Conclusions

The consultation process has proved very useful and informative in the development and finalisation of this Action Plan. The existing measures that it highlighted and the new measures it suggested will lead to additional energy savings being included in our calculations.

Much has happened since the publication of the draft Action Plan for consultation, with many new programmes and initiatives already launched. Given the importance attached to energy efficiency internationally, this dynamic environment is not surprising. As a result of this push for change, many of the measures suggested in the consultation process were introduced before this document could be finalised. This trend is likely to continue as energy efficiency considerations become embedded across Government and, indeed, across the economy.

Chapter 03

Affordable Energy

Introduction

High energy prices (home heating oil, solid fuel, gas, electricity) can have serious consequences for vulnerable members of society, in particular lone parents and older people. If a person is unable to heat their home because they cannot afford the price of energy, the risk of marginalisation from society is increased and, in extreme instances, the likelihood of illness or death. The DCENR is committed to ensuring that it is actively involved in efforts to tackle this difficult issue. This Action Plan presents an ideal opportunity to build on the undertakings previously given in the energy policy framework.

One of Government's key priorities is to ensure that all members of society can afford an adequate energy supply and can heat their homes to an appropriate level. In this context, the DCENR is working closely with other Government Departments, Agencies (including the Office for Social Inclusion), Utilities and NGOs to tackle this issue in a co-ordinated and unified manner, with a particular focus on ensuring that energy efficiency initiatives are poverty-proofed to protect vulnerable members of society.

The Affordability Challenge

Although the term fuel poverty is in widespread use in the UK, it is not commonly found in other European Member States.[32] Poverty, and in particular income poverty, is undoubtedly a significant factor in a person's ability to meet fuel and other energy costs. However, wider social inclusion objectives – with a view to full participation in the social, economic and environmental aspirations/goals of the country – must also inform a strategic approach to addressing the issues that arise on account of energy affordability. One challenge is to find an appropriate terminology that will enable the effective identification of those in difficulty on account of energy costs and thereby enable targeted interventions as part of the Government's broader strategic objective to build a fully inclusive society.

Some definitions in use describe fuel poverty as pertaining when a household needs to spend more than 10% of income on energy in order to maintain an acceptable level of heat throughout the home.[33] The Energy White Paper and the National Action Plan for Social Inclusion 2007–2016 cite the definition of fuel poverty as 'the inability to afford adequate warmth in a home or the inability to achieve adequate warmth because of the energy inefficiency of the home'. Most descriptions of fuel poverty, if not all, fail to reference other essentials, such as hot water provision, cooking, household appliances or lighting.

Measurement

There are three main methods, or combinations of methods, used to measure fuel poverty (DEFRA 2006): the expenditure method, or share of income spent on household fuels; subjective measures on the part of occupants; and objective measurement of residence condition and comfort levels in relation to needs.

While the expenditure share method is an arbitrary and, in many cases, unsatisfactory measure, it does give an indication of the level of household resources taken up in obtaining home heating and transport. It also helps to give an indication of potential vulnerability, especially in the event of an energy price rise. Boardman (1991) advocates a 10% threshold, based on net income and excluding housing costs; this threshold is used in the UK's fuel poverty strategy. If we apply the 10% threshold to Ireland, the number of Irish households that were classified as experiencing fuel poverty, is as shown in Table 2, overleaf.[34]

32 A more common term is energy poverty.

33 Department for Social Development: *Towards a Fuel Poverty Strategy for Northern Ireland.*

34 *The Household Budget Survey* (CSO, 2008), strictly speaking, covers nearly five quarters, from mid-October 2004 to the fourth quarter of 2005.

Year	Share of households	No. of households
2005	15.9%	228,522
2008 est.[35]	19.4%	301,368

Table 2: Fuel Poverty Rate (Expenditure Measure) for 2005 and Estimate for 2008.[36]

Alternatively, if subjective measures are used, i.e. self-reported indicators based on householders' statements made in response to survey questions, the fuel poverty rates show a striking pattern of decline from the earliest available data through to 2001/2002, followed by a gradual increase thereafter. The decline corresponds to a period of very rapid growth in employment and GNP in Ireland; during the subsequent period GNP grew more slowly and consumer prices grew more quickly. The results of these indicators for the period 1994 – 2006 are presented in Table 3, below.

Year	% of households reporting that they cannot afford to heat their homes adequately	Households	Survey[37]
1994	8	n/a	ECHP
1995	5.9	n/a	ECHP
1996	6.5	n/a	ECHP
1997	5.1	n/a	ECHP
1998	4.2	51,738	LII
1999	3.1	38,749	LII
2000	3.9	50,671	LII
2001	3.3	42,604	LII
2002	n/a	n/a	n/a
2003	3.5	47,947	EU-SILC
2004	3.7	51,719	EU-SILC
2005	4.0	58,201	EU-SILC
2006	4.6	68,050	EU-SILC

Table 3: Self-Reported Estimates of Fuel Poverty in Ireland between 1994 and 2006.[38]

A further survey, which was undertaken by the Urban Institute in 2001, reported a figure of 42,000 households (4.7% of households) stating that they were 'usually not' or 'never' 'able to adequately heat the home' (Healy and Clinch, 2002). This is similar to the 2001 figure of 42,604 given in Table 3, below. However, an additional 165,000 households (12.7% of households) said they had intermittent difficulties, which gives a total that is closer to the expenditure measure.

At present, there are no statistics available for Ireland under the objective measurement of residence condition and comfort levels.

The main observation is that the subjective measure indicates that the numbers of 'fuel poor' are significantly lower than the numbers obtained by the expenditure measure above.

Policy Landscape

Government policy in recent years has focused on significantly increasing primary social welfare rates in order to ensure that people reliant upon social welfare payments can meet their basic living costs, including heating costs, throughout the year. There are also specific allowances intended to supplement the payments system, such as the fuel allowance scheme and the electricity or gas allowance, which is paid as part of the household benefits package.

The Office for Social Inclusion (OSI) is the Government Office with overall responsibility for developing, co-ordinating and driving Ireland's National Action Plan for Social Inclusion 2007 – 2016 (NAPinclusion). The NAPinclusion sets out a wide-ranging and comprehensive programme of action to address poverty and social exclusion, with an overarching poverty goal to 'reduce the number of those experiencing consistent poverty to between 2% and

35 Fuel costs are adjusted for price rises during the period 2005 – 2008. Incomes are adjusted by means of the national rise in incomes, which may not accurately reflect experience in households with low incomes.

36 Source: Analysis of CSO 2005 Household Budget Survey (anonymised microdata file).

37 Note: precise question asked varies by survey. ECHP = European Community Household Panel; LII = Living In Ireland Survey; EU-SILC = EU Survey of Income and Living Conditions.

38 Source: ESRI.

4% by 2012, with the aim of eliminating consistent poverty by 2016'. This goal is based on a measure of deprivation, developed by the Economic and Social Research Institute (ESRI), that reflects current living standards and, in particular, focuses (to a greater degree than earlier measures) on items reflecting social inclusion and participation in society. [39]

The energy policy framework commits to an integrated, cross-Government approach to tackling affordable energy challenges. The DCENR has responsibility for the energy portfolio within Government and has adopted a leadership role in relation to energy affordability. Our commitment, which is set out in the Energy White Paper, is to:

- Deliver, under the National Action Plan for Social Inclusion 2007 – 2016, sustained collective action by all relevant Departments and Agencies to systematically tackle fuel poverty through effective delivery of existing schemes and the introduction of new measures, as required;
- Ensure the full involvement of all agencies and Local Authorities in programmes for fuel poverty at national, regional and local level;
- Establish a fully representative Inter-Departmental/Inter-Agency Group to oversee and drive co-ordinated delivery of all fuel poverty initiatives and programmes.

The DCENR provides funding for SEI's Low Income Housing Programme (LIHP), which was established to assist with the development of a national plan of action to address fuel poverty in low-income households in Ireland. The focus of the programme has been on establishing the systems and building a nationwide capacity to deliver capital energy efficiency investment measures in low income housing.

The Commission for Energy Regulation (CER) plays a statutory role in protecting vulnerable customers in the energy markets. The CER has set out guidelines for the protection of household electricity and gas customers, particularly older people, of customers relying on life-support equipment and of those with disabilities. Electricity and gas suppliers have put in place their own customer charters and codes of practice in line with these guidelines.

The Department of Environment, Heritage and Local Government (DEHLG) is responsible for the provision of social housing. The National Climate Change Strategy identifies the requirement for social housing to be of a high energy efficiency standard and further outlines a strategy to which the DEHLG will work, along with SEI, to achieve this. A Central Heating Programme has been funded by DEHLG since 2004. In conjunction with the provision of central heating, eligible works must also include, where necessary, measures to ensure the energy efficiency of the dwelling, such as attic insulation to Building Regulations standards, draught-proofing to existing windows and external doors, the lagging of exposed pipework and hot water storage cylinders and the installation of a mains-operated smoke alarm.

Existing Activities

The provision of weekly income support payments, such as the state pension (contributory/non-contributory), is the main method by which the Department of Social and Family Affairs (DSFA) supports individuals and families. However, the DSFA also has a role in assisting those in receipt of social welfare and HSE payments, and others (notably older people), with their energy costs. These supports are: the electricity/gas allowance element of the household benefits package; the national fuel scheme; and the supplementary welfare allowance – heating supplement.

In addition to the administration and monitoring of these schemes, the DSFA is also responsible for the development of policy options in relation to the qualifying conditions and the level of support provided.[40]

39 Two of the 11-item Deprivation Index relate to heating or warmth.

40 The SWA heating supplement is administered by the HSE through the community welfare service.

Measure	No. of homes deficient	Measures made to 2008	Potential measures post-2008
Wall insulation	60,836	3,807	16,269
Roof insulation	54,752	17,982	36,770
Lagging jacket	47,148	12,802	34,346
CFLs	39,036	16,655	22,381
Draught-proofing	74,524	13,401	61,123
Homes		18,465	44,949

Table 4: Scale of Measures Applicable to Lowest Income Quintile.[41]

Action is critical to support structural improvements, such as appropriate insulation and equipment, in vulnerable, energy inefficient households. SEI's allocation for the Warmer Homes Scheme (WHS), which provides funding to community-based organisations for the installation of energy efficiency measures in households, was doubled to €5 million in 2008. The total amount available to the WHS in 2009 is €20 million.

The WHS seeks to address the energy efficiency of the home, mainly by upgrading the fabric of the building. The scheme is targeted at those in receipt of the fuel allowance, and recipients of invalidity and/or disability benefits (excluding those who live in Local-Authority homes). These are estimated to represent around two-thirds of homes at risk. This programme is seen as complementary to initiatives taken separately by local authorities, with DEHLG funding, in relation to their own rental housing stock.

The Scheme does not currently meet the demand for energy efficiency improvements and is not available nationwide. In order to address the scale of fuel poverty within a short to medium timeframe, SEI undertook a review of the estimated scale of outstanding measures, which is outlined in Table 4, above.[42]

The DEHLG currently operates the Housing Aid for Older People Scheme, administered by Local Authorities, and which provides funding to assist older people living in poor housing conditions to have necessary repairs or improvements carried out. Provision of central heating or insulation as part of an overall suite of works may be allowable under this scheme.

The Money Advice and Budgeting Service (MABS) is a national, free, confidential and independent service for people on low incomes who are over-indebted or are having difficulties in managing their household budgets. The MABS is funded by the DSFA.

Current Research

Current ESRI research focuses on estimating the extent of fuel poverty in Ireland, using both expenditure-based and self-reported measures, and identifying the characteristics of households that tend to be most vulnerable to this form of poverty. The quantitative analysis is based on the most recent available data from the CSO Household Budget Survey and the EU Survey of Income and Living Conditions (EU-SILC). The research, which was published as a working document in November 2008, outlines the policies applied in selected foreign jurisdictions and discusses current and possible future policies for Ireland.

SEI and Combat Poverty recently led an action research project to review the effectiveness of the WHS; other groups involved in this project include the DSFA and the DEHLG. This project involved carrying out insulation on a total of 300 houses in counties Cork and Donegal. The research

41 Source: SEI.

42 The assumption is that target recipients for such services are in the lowest income quintile.

component involves detailed questionnaires being completed before intervention and then again 12 months later in order to ascertain the thermal, economic and health benefits gained as a result of the insulation. The methodology is consistent with that used for other projects so that it will be possible to compare improvements in relation to monies spent. A final report is expected in 2009.

In addition to the review of the WHS, DSFA provided a grant of €2 million to SEI for fuel poverty research. SEI has used the grant to undertake a project for owner-occupied dwellings in Waterford city and county that are regarded as vulnerable to fuel poverty. The work carried out included both insulation and heating measures (a 'whole house' approach) and is broader in approach than the current WHS, which provides insulation, draught-proofing, energy-efficient lighting plus energy advice. The grant was used to cover the cost of setting up the project, arranging for remedial work to be carried out on approximately 400+ houses, conducting research surveys, analysing the resultant data and compiling and submitting a formal report. The remedial work aspect of the project has been completed and an initial report on the project is expected in 2009.

A New Approach

In the summer of 2008 the DCENR convened an Inter-Departmental/Agency Group on Affordable Energy to co-ordinate and drive policy in this area. The Group comprises the Departments of Communications, Energy and Natural Resources, Social and Family Affairs/Office of Social Inclusion, Taoiseach, Finance, Environment, Heritage and Local Government, along with the CER, SEI, ESB, BGE and the Institute of Public Health (IPH).

The DCENR is committed to the WHS as the primary energy efficiency intervention tool for vulnerable members of society. In 2009, funds totalled €20 million which comprises of an Exchequer contribution €15 million plus €5 million from ESB and BGE. This represents a quadrupling of the amount available to the Scheme and will ensure that there will be a substantial increase in the number of households that can benefit from energy efficiency improvements in 2009.

As the level of funding has increased substantially in recent years, the WHS needs to ensure that its strategy is fully aligned with the potential for alternative delivery mechanisms to achieve complementary goals. The DCENR has requested that SEI review the operation of the Scheme and chart a strategy for delivering energy efficiency interventions over the long term. To date, the Scheme has focused on improving the energy efficiency of households where relatively non-intrusive interventions can be made. As we move forward, the number of deficient households in this area will decrease and the Scheme will be able to address households with more fundamental inefficiency issues, such as central heating. This poses a number of challenges for both the delivery model and householders, which the review will seek to address.

As part of the National Insulation Programme for Economic Recovery, the Department of Environment, Heritage and Local Government has prepared a new grant scheme to facilitate the retrofitting of insulation and other energy efficiency improvements in vacant Local Authority dwellings and, where there is no requirement to relocate households, in apartment complexes. A fund of €20 million has been set aside in 2009 and allocations for each Local Authority will be announced shortly. Funding will be conditional on dwellings achieving a minimum BER of C1 following works. In addition, the Department has identified a number of retrofitting 'demonstration projects' to achieve a minimum BER of B1. It is envisaged that the results of these demonstration projects will inform future years of the programme to ensure even higher standards of energy efficiency.

The provision of timely and easily understood information is essential to allow citizens to manage their energy usage. The Inter-Departmental/Agency Group have worked with SEI to refresh and republish the *Keep Well & Warm* booklet in January 2009. This hugely successful booklet, of which over 300,000 copies were previously circulated, not only provides important advice and guidance to householders but also includes an extremely useful room temperature guide. In support of this initiative, SEI have also developed a website that gives citizens access to information, including income supports and structural improvement schemes, and how to keep a home warm over the winter months.

Conclusion

Collective working will continue over the coming months, via the Inter-Departmental/Agency Group, co-chaired by DCENR and OSI, with the aim of identifying additional measures and initiatives that can be brought to Government. Account will be taken of ongoing developments at both national (Social Partnership) and EU level. Close attention will also be paid to actions taken in Northern Ireland.

Developments in this area will be reported to the Cabinet Committee on Social Inclusion, Children and Integration and to the Cabinet Committee on Climate Change and Energy Security.

Chapter 04

Projected Savings and Assumptions

National Target

The national 20% energy efficiency target is calculated on the basis of Gigawatt Hours, converted to Primary Energy Equivalent (PEE). This takes into account conversion losses in electricity generation and makes units of different energy streams more comparable. The target is calculated as 20% of the average final energy used over the period 2001 – 2005[43] and reflects the methodology used for calculating our ESD targets (but also encompasses the whole economy i.e. including EU ETS participants). Based on our energy usage over the 2001 – 2005 period our energy savings target for 2020 is equivalent to 31,925GWh.

Projected Savings

Our existing and committed actions at this time (which are outlined more fully in the following chapters of this Action Plan) are projected to deliver 23,730GWh of energy savings in 2020, which is equivalent to a 15% saving on the baseline period or reference energy consumption.[44] We will also reduce our CO_2 emissions by approximately 5.7 million tonnes. These figures are detailed in Table 5, below:[45]

	GWh PEE[46]	$ktCO_2$
Business and public sectors		
SEI Public Sector Building Demonstration Programme – support for new and retrofit public sector building initiatives	140	40
Building Regulations 2005 – improved efficiency of non-residential buildings	560	133
Building Regulations 2010 – 30% improvement on energy performance of non-residential buildings relative to 2005 building regulations	1,360	322
SEI Large Industry Programmes (Energy Agreements IS393 and Large Industry Energy Network)	4,070	887
SEI small business supports – Energy MAP and training for small businesses	565	141
Existing ESB demand side management initiatives	435	96
Renewable Heat Deployment Programme (ReHeat)	410	92
Accelerated Capital Allowances for Energy-Efficient Equipment	800	143
Sector Total	8,340	1,854
Residential sector		
Building Regulations 2002 – improved energy performance of residential buildings	1,015	266
Building Regulations 2008 – 40% improvement on energy performance of residential buildings relative to 2002 building regulations	2,490	615
Building Regulations 2010 – 60% improvement of residential buildings relative to 2002 building regulations	1,100	272

43 Refer to Annex for further information.

44 Estimates of the impact of future actions are based on available economic forecasts and informed by relevant national and international studies and experience. Actual impact figures may vary considerably and will therefore be adjusted in the next and subsequent National Energy Efficiency Action Plans, the first of which is due no later than 2011.

45 Estimates have been adjusted to account for current economic conditions where appropriate.

46 The conversion to primary energy equivalent takes into account the conversion losses in electricity generation and makes units of different energy streams more comparable.

Low Carbon Homes 2013 – 70% improvement of residential buildings relative to 2002 building regulations	395	98
House of Tomorrow Programme – developer support for buildings exceeding existing building regulations	30	7
Warmer Homes Scheme	170	42
Home Energy Saving scheme – improving current residential building stock in Ireland	600	157
Smart meter installation – estimated efficiency gains among domestic users	690	120
Greener Homes Scheme	265	64
Ecodesign for Energy-Using Appliances (Lighting)	1,200	210
Efficient Boiler standard	2,400	585
Sector Total	10,355	2,436
Transport sector[47]		
Improved fuel economy of private car fleet	1530	412
Efficient driving measures	655	176
Electric Vehicle Deployment	955	350
Mobility management – Travel Plans	1090	294
VRT / Motor Tax changes	200	54
E-Working	150	40
More sustainable public transport fleets	90	24
Sector Total	4,670	1,350
Energy supply sector		
Transmission and distribution efficiencies improvement – reaching loss target of 7.5%	310	72
Winter Peak Demand Reduction Scheme	55	10
Sector Total	365	82
Total Projected Savings	23,730	5,722
National 20% Savings Target	31,925	
Additional Savings to be Captured	8,195	

Table 5: Projected Energy Savings 2020.

Savings from existing and committed actions detailed above account for approximately 75% of our 2020 target. Additional savings potential known to exist in the residential, commercial, industrial and transport sectors has been identified, and will require further specific measures and programmes to be realised. Further detail on this aspect is provided in Chapter 13 – The Challenge Ahead.

47 Savings estimates relating to transport measures are based on analysis undertaken by Department of Transport (DoT). Results have been calibrated to reflect latest methodologies developed at EU level for the purpose of estimating savings against EU Energy Services Directive (ESD) targets. A full range of potential savings from transport is included in the Government's Smarter Travel policy, which includes additional measures not referenced here.

Projected CO_2 Emissions Reductions

Estimated CO_2 savings resulting from the measures detailed in this Action Plan have been calculated on the basis of projected fuel mix of energy saved and emissions factors as determined in the 'Baseline' energy forecast.[48]

This method has been adopted since publication of the consultation draft of this plan to ensure consistency with EU methodology, as defined in the Communication from the EU Commission on a first assessment of national energy efficiency action plans, Moving forward together on energy efficiency (COM (2008) 11 final).

Projected Savings Against ESD Targets

The ESD sets EU Member States a national energy savings target of 9% by 2016, with an interim target to be set by Member States for the end of 2010. Given the time taken to establish new programmes to achieve the longer-term targets, this interim target, which is informed by expected achievements from existing and committed programmes, has been set at 6,500GWh PEE. The ESD target excludes businesses within the EU Emissions Trading Scheme, aviation sector and marine bunker fuels. As such the savings estimates below have been adjusted to remove any portion of savings achieved from EU ETS participants.

	2010 GWh PEE	2016 GWh PEE
Business and public sectors		
SEI Public Sector Programme	140	140
Building Regulations 2005	185	370
Building Regulations 2010	0	630
SEI Large Industry Programmes	465	685
SEI small business supports	160	330
Existing ESB demand side management initiatives	380	410
Renewable Heat Deployment Programme (ReHeat)	360	410
ACA for Energy-efficient equipment	100	400
Sector Total	1,790	3,375
Residential sector		
Building Regulations 2002	1,015	1,015
Building Regulations 2008	130	1,425
Building Regulations 2010	0	570
Low Carbon Homes 2013	0	130
SEI House of Tomorrow Programme	30	30
SEI Warmer Homes Scheme	115	155
Home Energy Saving scheme	450	600
Smart meter installation	0	650

48 Projections produced for SEI by ESRI using the HERMES macroeconomic model. Further details are available in Energy in Ireland 1990 – 2007 (2008 Report), SEI, (EPSSU).

Greener Homes Scheme	265	265
Ecodesign for Energy-Using Appliances (Lighting)	200	1,200
Efficient Boiler Standard	400	1,600
Sector Total	2,605	7,640
Transport sector		
Improved fuel economy of private car fleet	255	1,020
Efficient driving measures	110	435
Electric Vehicle Deployment	160	635
Mobility management – travel plans	180	725
VRT / Motor tax changes	30	130
E-working	25	100
More sustainable public transport fleets	15	60
Sector Total	775	3,105
Energy supply sector		
Transmission and distribution efficiencies improvement	275	300
Total Projected Savings	5,445	14,420
ESD Target	6,500	13,117
Additional Savings to be Captured	1,055	

Table 6: Projected Savings against ESD Targets

Table 6 above sets out the projected savings from existing and committed actions against the interim and 2016 ESD targets. Savings of 5,445GWh PEE are expected in 2010. This represents approximately 84% of the ESD interim target of 6,500GWh. With consideration of further identified potential savings known to exist in the residential, business and transport sectors, as well as Ireland's CHP targets, it is expected that this target will be surpassed in 2010.

Measurement of Savings

Methods to precisely measure and verify energy savings from actions are complex and not yet fully developed. It is important that, where possible, methods are clear and transparent and can confidently establish the contributions of all actions and measures. The methods used to arrive at the above estimates of savings potential for each action are discussed in more detail in Annex 02. It should be noted that the projected savings 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. Development at EU level to harmonise calculation methodologies for the ESD will also inform this process. As circumstances change, the Implementation Group will report back to Government on progress towards Ireland's ESD and national target.

SEI's Energy Policy and Statistical Support Unit (EPSSU)

SEI (EPSSU) has a leading role in developing and maintaining comprehensive national and sectoral statistics for energy production, transformation and end use. The data output from EPSSU is essential for informed policy formation. Its uses include the

annual production of the national energy balance, satisfying Ireland's international energy reporting obligations, being a key data provider for the national emissions inventory system and informing investment decisions.

SEI (EPSSU) publishes regular reports and analysis on overall energy patterns, as well as sectoral analyses and energy price data. It has also published a report on security of supply metrics, which will be updated regularly. In 2007, SEI published its first *Energy Efficiency in Ireland* report, a new annual report that forms the basis for the monitoring of progress on energy efficiency and on the targets discussed in this Action Plan. This is the first SEI publication to focus solely on energy efficiency in Ireland. The report aggregates a range of metrics and indicators relating to energy efficiency.

The full range of documents produced by the EPSSU, including sector-specific reports for the residential, business, transport and services sectors, together with other energy statistics resources can be found at www.sei.ie/epssu

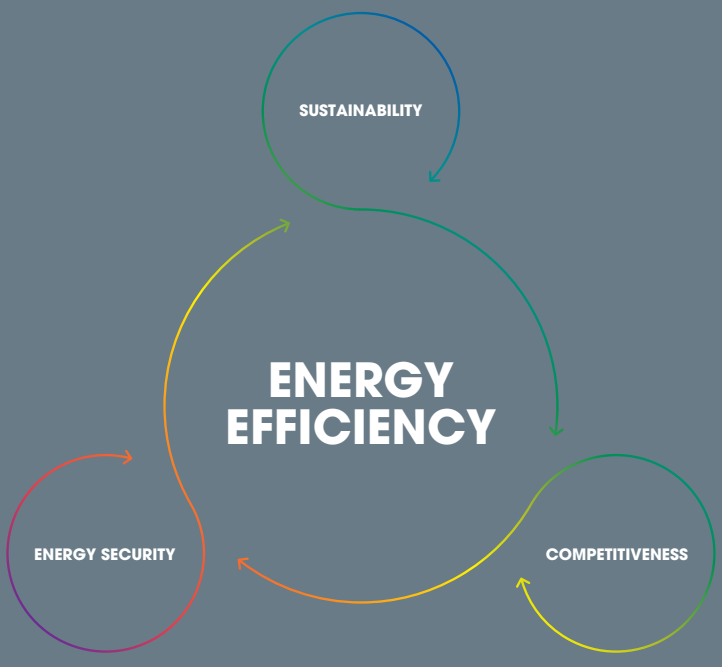
Modelling of Future Trends

Ireland's modelling and measuring capability is being enhanced through work undertaken by the EPSSU, particularly in the development of efficiency indicators and more advanced modelling systems. New analysis has 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 to offer timely and comprehensive data on energy efficiency in order to provide context and background to discussions surrounding future policy options.

Utilising the EPPSU, SEI will also continue to build its capacity to model energy usage and efficiency, to enhance the data and analysis available and to assist the Government in measuring and reporting energy savings achieved over the course of this plan. 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 term (up to 2010), medium term (up to 2020) and long term (up to 2050) energy demand and supply growth, using various measures. The monitoring process required by the ESD and by this Action Plan emphasises this need. In addition, energy forecasts and an assessment of the impact of different policies and measures will underpin the development of GHG emissions projections, required under the EU monitoring mechanism, and of transboundary air emissions projections, which are required under the National Emissions Ceiling Directive.

Section 02

Sectoral Measures



Chapter 05

The Public Sector

2020 Vision

The public sector will improve its energy efficiency by 33% and will be seen to lead by example – showing all sectors what is possible through strong, committed action.

Chapter 05

The Public Sector

Achieving the Vision

- Central advice and monitoring services will be established to support all public bodies in their efficiency efforts.
- Public procurement Guidelines will be developed to encourage purchase of energy-efficient equipment.
- Public sector experiences will be used to publicise innovations and actions that others can take to improve their efficiency.

Current Action

1. We are supporting exemplary design and energy management practice by public sector organisations through SEI's Public Sector Building Demonstration Programme.
2. We are localising the delivery of energy efficiency measures through the Local Energy Agencies.
3. We have rolled-out an energy rating system to public buildings from January 2009.

Planned Actions

4. We will establish in 2009 a high-level Working Group, involving key Departments and agencies, to draw up an Action Plan for achievement of the 33% energy savings target for the public sector.
5. We will investigate the feasibility of a public sector obligation scheme to facilitate achievement of the 33% target.
6. We will require all public sector bodies to produce annual reports setting out their energy efficiency actions and progress towards the 33% target for the sector.
7. We will introduce energy efficiency programmes for Government Departments, State Agencies, Local Authorities, the Health Service and all other areas of the public sector.
8. We will assist public sector agencies with buildings over 1,000m^2 to improve their BER as displayed on their Display Energy Certificates initially to a D1 level or better.
9. We will investigate the feasibility of applying a minimum standard beyond building regulations for new buildings (including significant renovations) intended for use by public sector bodies.
10. In 2009, we will put in place mechanisms to facilitate and enable the exchange of energy efficiency best practice between public sector bodies at local, national and international level.
11. In 2009, we will introduce Guidelines for Green Public Procurement.
12. We will require public bodies to purchase only energy-efficient lighting when installing or replacing lighting.
13. We will require that all street-lights and traffic-lights are energy efficient.

Introduction

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, thereby demonstrating its importance to Government. Article 5 of the EU Energy Services Directive (ESD) further requires the public sector to fulfil this leadership role in relation to energy efficiency.

For the purposes of the target, the public sector is considered to encompass the Civil Service, commercial and non-commercial state bodies, the Defence Forces, An Garda Síochána, Health Service Executive hospitals and other facilities, Local and Regional Authorities, schools and universities.

The public sector represents a hugely significant part of the total economy through its purchasing of over €10 billion of goods and services each year. This considerable purchasing power can be used to leverage the market to provide goods and services with the highest energy efficiency standards. If approached systematically, the public sector has the potential to act as an early user and pioneer of new and efficient technologies, thereby demonstrating their feasibility to the private sector. In addition, the behaviour of the public sector sends a very important leadership signal. Government, in leading by example, can demonstrate its commitment to the energy efficiency agenda and offer confidence to others in the market that there is an exciting and profitable future for technologies and services that emphasise energy efficiency. The performance of the public sector is, therefore, critical.

The public sector consists of 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 do 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, including costs and other impacts; therefore motivating efficient behaviour is of the utmost importance.

Many exciting initiatives are already underway throughout the public sector to improve energy efficiency. An essential component of the Action Plan will be to capture these initiatives in a manner that allows for the savings to be reflected in the calculation of progress towards 2020. To this end a Public Sector Energy Efficiency Working Group will be established in 2009, comprising representatives of the public sector bodies responsible for large elements of public sector energy use. The Group will be chaired by the DCENR and will be tasked with drawing up an Action Plan for submission to Government, setting out the actions that will be necessary to achieve the 33% public sector target.

Energy Usage in the Public Sector

There is no definitive data available at present for public sector energy usage, although the EPSSU (SEI) is working to develop a set of robust criteria. Best available data for the public and commercial sectors is derived from services sector data, based on an estimated ratio of commercial and public sector energy use within the services (tertiary) sector. Services sector data is provided in the Energy Balance (produced annually by EPSSU) as a residual, following definition of the final energy use within the industrial, residential and transport sectors.

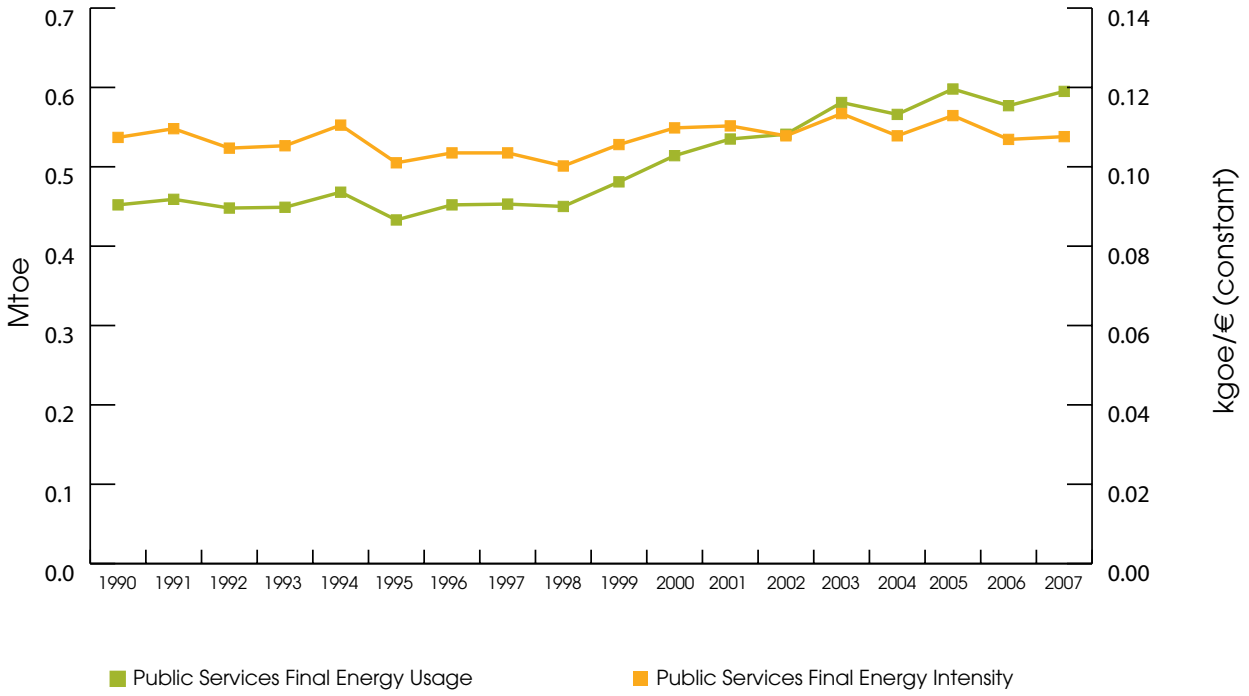


Figure 11: Estimated Energy Usage in the Public Sector, 1990 – 2007[49]

On this basis, energy use in the public sector in 2007 is estimated at 6,920GWh (final energy consumption). Energy usage has increased in the sector by an estimated 32% during the period 1990 – 2007, as illustrated in Figure 11.

The 33% public sector target represents savings of approximately 3,240GWh PEE[50] by 2020, which is more than 10% of the energy saving required by 2020 for the entire economy under the national 20% target. This is clearly an ambitious target and will require radical action by the public sector to achieve it.

Current Action

Public Sector Energy Management Initiatives

A range of initiatives are currently being undertaken in the public sector by Government Departments, Local Authorities and other State Bodies. Substantial efforts to improve energy management, reduce building energy use, establish monitoring and targeting systems and develop standard solutions for energy savings are being made. Experience from the following examples, together with existing industry and business programmes (as detailed in chapter 6) will form the basis of a comprehensive plan of action being developed for the public sector in 2009.

49 Note that these trend diagrams report final energy usage, not the primary energy usage quoted in discussions of targets and action impacts. (Source: SEI).

50 Based on 33% of the average energy use over the period 2001-2005 of the public sector converted to Primary Energy Usage.

Office of Public Works

Following a pilot programme in ten public buildings, which showed that energy savings of 20% could be achieved by educating and motivating staff, the Office of Public Works (OPW) launched an energy awareness campaign: 'Optimising Power At Work'. The aim of the campaign is to achieve a 15% reduction in carbon emissions across 250 State buildings located throughout the country. The campaign aims to achieve the reduction over an 18-month period.

The 250 buildings in the programme were divided into three lots and, following a public procurement process, contracts were awarded to two companies with specialist expertise in the energy and facilities management sectors. An energy officer has been appointed to each building and liaises directly with the OPW's service providers, who run workshops, lectures and staff competitions in each building. League tables will be formulated for comparison of different buildings of similar type.

The OPW operates 'web-based' energy-monitoring equipment in each of the State's larger public buildings. The system monitors and records both electrical and heating fuel consumption and the data is accessible from a dedicated website — an important factor for assessing current energy usage and determining optimum solutions for energy efficiency.

Health Service Executive

SEI is currently providing support to the Health Service Executive (HSE) in considering the development of a national strategy on sustainable energy. This process will seek to map out the HSE's energy vision (using the 33% energy savings by 2020 target for the public sector as a basis), assess its current status and discuss options, timeframes and resources to achieve the vision.

To date, SEI has provided sections of the HSE with Energy MAP training and supports (see Action 19), as well as undertaking, through third-party consultants, energy assessments and providing advice to a number of hospitals across the country.

Department of Education and Science

The Department of Education and Science is at the forefront of design with respect to sustainable energy efficiency in school buildings and has been recognised at both national and international level with sustainable energy awards for excellence in design and specification.

For the past 12 years the Planning and Building Unit within the Department of Education and Science have been using the DART approach to develop sustainability and energy efficiency in educational buildings. This approach focuses on four key areas, namely; Design, Awareness, Research and Technology. The policy is informed by the Building Unit Professional and Technical staff, driven by its technical guidance documents and updated by continued energy research and development.

It has been demonstrated that all schools designed and built in line with the above policy and the technical guidance documents can have an energy performance that is more than twice as efficient as international best practice. All schools in the 2009 building programme must achieve an A3 BER rating. A hybrid approach is taken with respect to sustainable design in schools based on maximising natural resources and energy-efficient technologies.

The Department's Technical Guidance Documents set the benchmark for sustainable design in school buildings with a clear focus on energy efficiency; supported by a strong research programme with 35 research projects at various stages. These projects include investigation of renewable and energy efficiency opportunities in existing schools and

sustainability awareness programmes for school children.

Dublin Universities/IT

Four Dublin-based colleges — Dublin Institute of Technology (DIT), Trinity College Dublin (TCD), Dublin City University (DCU) and University College Dublin (UCD) — joined together in 2003 to form an Energy Management Bureau called 'e3' (Energy – Environment – Economy).

Working together with a common focus, the colleges upgraded existing energy-monitoring systems and shared the system set-up costs of an Energy Monitoring and Targeting (M&T) system. Through information-sharing the institutions learned from one another about sustainable energy use and management, and have achieved a 12% reduction in energy use, exceeding the original target. It is expected that these savings will continue to accrue in future years, with limited further investment of resources.

Defence Forces

The Defence Forces implemented a strong energy efficiency programme in 2007, covering all 34 barracks and centred around a specifically designed energy awareness campaign. The campaign included a competition among barracks for the best energy initiative, as well as several renewable energy projects. The success of the initiative saw the Defence Forces reduce electricity consumption by 4.5% and gas consumption by 19% in 2007. The Defence Forces were recognised for this effort in SEI's Sustainable Energy Awards 2007. Following from this success, an Energy Management Plan is currently being developed incorporating energy profiling, awareness and technical improvement options.

As part of the development of the plan and to ensure that continuous savings are achieved, the Defence Forces recently launched the Defence Forces Energy Register. The purpose of the register is twofold:

1. It aims to gather and collate specific energy consumption data at an end-use level throughout the Defence Forces; and
2. It aims to undertake practical measures to reduce energy consumption. The Register is based on IS393, the Irish National Standard for Energy Management, in order to establish a systematic approach for continuous improvements in energy performance.

Local Authorities

Local Authorities are undertaking a range of actions with a view to improving the energy efficiency of their operations. A number of Local Authority offices have been built utilising sustainable energy principles, providing an example to the community of best practice in energy-efficient design.

SEI's Public Sector Building Demonstration Programme has to date supported over 20 capital projects for Local Authorities. Major projects supported include the extension and refurbishment of Cork County Hall and new county offices in Kildare, Limerick and Offaly. Demonstration projects included new and refurbished sports and leisure centres incorporating improved building envelope design and the use of renewable energy heating technologies, such as solar panels and heat pumps.

Dublin City Council/Codema

A variation to the Dublin City Development Plan 2005 – 2011 was adopted by Dublin City Council in November 2007 with the aim of achieving improved energy efficiency in new buildings throughout the city. The variation requires that for residential developments greater than ten dwellings, and for non-residential and mixed developments greater

than 1,000m^2 floor area (effective from 1 July 2008), an average Building Energy Rating (BER) of at least B1 must be achieved. From 1 January 2009 a collective (per sq.m.) average BER rating of at least A3 will be required.

Dublin City Council, in association with Codema, is in the process of preparing an Action Plan on Energy for Dublin, with targets for energy efficiency, renewable energy and clean urban transport. The Action Plan defines the impact and economic costs of a range of measures in the residential, commercial and transport sectors.

MINUS 3% Project

Codema is leading a project called MINUS 3%, which aims to reduce Dublin City Council's energy use by 3% per year. This will result in a total reduction in energy use of 33% by 2020, in support of the Government's energy efficiency target for the public sector.

Currently, Dublin City's energy use for public lighting, water and waste water treatment, heating, lighting and office equipment and its fleet of 1,400 vehicles amounts to 233GWh per year. The associated emissions are 87,551 tonnes of CO_2 per year. The planned 33% reduction amounts to 77GWh, which corresponds to an estimated reduction of 125GWh in primary energy use and a reduction of 29,000 tonnes of CO_2 per year in emissions.

Codema plans to extend the benefits of the MINUS 3% project to other cities, such as Cork, Galway and Derry.

SEI Public Sector Building Demonstration Programme

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

The Public Sector Building Demonstration Programme 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 – 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.

In 2007, the programme supported major new and refurbishment projects undertaken by Local Authorities, including headquarter buildings for Limerick, Offaly and Cork County Councils. Wicklow County Council completed the refurbishment and extension of a three-storey, 4,000m^2 building in Wicklow town. The model solution included the following: replacing single-glazing with double-glazing in the existing building; conversion to efficient gas-fired boilers incorporating optimising controls; replacement of individual electric water heaters with centralised gas-fired hot water heater; upgrade of light fittings and installation of automatic lighting controls. The introduction of natural ventilation measures improved occupant comfort and further reduced energy use.

The programme will be reviewed in light of the forthcoming Public Sector Energy Efficiency Programme (See Action 7).

Local Energy Agencies

2. We are localising the delivery of energy efficiency measures through the Local Energy Agencies.

Government is committed to the development of the Local Energy Agency concept. There are currently 13 Local Energy Agencies in Ireland. The principal functions of these Local Authority-Funded Agencies are to:

- assist the Local Authorities and other local stakeholders in delivering energy efficiency solutions;
- stimulate the increased uptake of renewable energy sources;
- promote clean and sustainable transport.

Building Energy Rating

3. We will roll out an energy rating system to public buildings from 2008.

As required by the Energy Performance of Buildings Directive (Directive 2002/91/EC), all public sector buildings over 1,000m^2 must now display certificates providing detail on the building's actual energy use and Building Energy Rating (BER); known as a 'Display Energy Certificate'.

Planned Actions

4. In 2009, we will establish a high-level Working Group, involving key Departments and agencies, to draw up an Action Plan for achievement of the 33% energy savings target for the public sector.

The public sector is diverse, involving Government Departments, multiple Agencies, the Defence Forces and An Garda Síochána, among others. The only way to achieve sufficient energy efficiency savings to reach the target is by co-ordinated action.

To ensure this co-ordination and to determine the radical actions necessary, the DCENR will establish a high-level Working Group in 2009, chaired by a senior official from the Department and involving senior representatives from relevant Departments and State Agencies. This Group will be charged with the task of drawing up an Action Plan for submission to Government, setting out the actions that will be necessary to achieve the 33% public sector target.

5. We will investigate the feasibility of a public sector obligation scheme to facilitate achievement of the 33% target.

The public sector Working Group will consider the applicability of such a scheme in the context of the Irish public sector. This will be in the context of ensuring the most cost-effective energy savings measures are deployed, with consideration of the role of Energy Service Companies (ESCO). This concept is further discussed in Chapter 11.

6. We will require all public sector bodies to include in their annual reports a statement setting out their energy efficiency actions and progress towards the public sector 33% savings target.

In order to facilitate reporting on progress towards our target we will require all public bodies to report their individual actions and associated energy savings. This will be co-ordinated by SEI and DCENR and based on reporting templates to ensure quality and standardisation of reports. Specific actions undertaken by Government bodies will be provided, together with their expected impact

Energy Efficiency Programmes

7. 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 2009, building on the work of SEI within the sector. A number of public sector bodies are already actively addressing their energy efficiency as detailed above.

SEI is already working with the public sector in several ways, principally through some involvement in energy management training and supports through the business programmes, and through the Public Sector Building Demonstration Programme capital supports for innovative buildings and practices. The programme will build on the success of these programmes, and will incorporate the following actions tailored for the public sector:

- Widespread energy assessments, advice and Energy MAP training to public sector bodies to identify key energy saving opportunities.
- Promotion of IS393, the Irish Energy Management Standard, among large energy-using bodies.
- Direct supports to address energy management of buildings, operations, service provision and public sector transport fleets.
- Development of a bureau service for remote energy monitoring.
- Demonstration projects (including for nascent technologies).
- Awareness campaigns tailored for the public sector.

A primary focus will be to provide support for assessments of current energy usage and efficiency opportunities in public bodies. Technical supports and advice will include standard solutions, networking, workshops, surveys and assessments. Focus areas will include lighting (office, architectural, street & amenity), water treatment (purification and waste water treatment), ICT (from desktops to data centres), building control optimisation and data collection and analysis.

Delivery

In addition to support by SEI, there is considerable potential for much of this work to be driven through ESCO models. 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. 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.

Aggressive efficiency service provision to public sector bodies could deliver strong, immediate energy savings. Recent work undertaken by SEI through the SME programme with the Irish Naturalisation & Immigration Service (INIS), Department of Justice, identified 720,000kWh of savings equating to approximately €75,000 and 525,000kgCO_2. This represents an approximate reduction of 20% of their total annual energy use, and was delivered within a period of three months through adjustments to building energy management systems, boiler controls, air-conditioner and PC power management.

SEI has worked with a number of National Schools through their Energy MAP programme. Through fitting extra insulation, and installing heating controls (thermostats, timers etc.) one school reduced oil use by over 20% over a three-year period.

Louth County Council with the support of an energy manager identified a 5% financial saving simply by examining their energy bills, switching to applicable tariffs and avoiding unnecessary penalties.

New Initiatives in Public Sector Buildings

8. We will assist public sector agencies with buildings over 1,000m² to improve their BER as displayed on their Display Energy Certificates initially to a D1 level or better.

Existing Public Sector Buildings

Through the programmes mentioned above we will assist public agencies with buildings over 1,000m² to improve their operational rating as displayed on their Display Energy Certificates initially to a D1 level or better.[51]

In recognition that ongoing improvement will be needed between now and 2020 in order to achieve the 33% energy savings target for the public sector, the D1 level will be revised upwards over time to drive building energy use in the public sector towards ever increasing levels of efficiency. Consideration is also being given to reducing the 1,000m² threshold which could increase the number of buildings covered by the initiative.

Linking this process to the Display Energy Certificate will enable success to be measured by comparison with previous certificates. Improvements made in energy efficiency will be reported in annual reports as required by NEEAP Action 6 above. It should be noted that this action is additional to that currently being undertaken by the OPW.

Demonstration of significant savings available

Significant potential exists in the public sector building stock greater than 1,000m², estimated by SEI to exceed 3,000. The estimated breakdown of large public sector buildings is as follows:

Building category	Estimated number of buildings > 1,000m²
Health Sector	500
Education	1,163
State Sponsored Bodies	1,000
Local Authorities	200
Central Government	200
Prisons	20
Total	3,083

Table 7: Estimated Number of Large Public Sector Buildings

Experience gained through SEI's Public Sector Building Demonstration Programme (see Action 1) has demonstrated significant savings are available through measures and solutions such as natural ventilation, improvement to building fabric, building energy management systems, heat recovery and renewable energy systems.

The e3 energy management bureau has also demonstrated that savings of 10% against a background trend of increasing energy usage are achievable over a three-year period through improved building energy management. This level of savings would result in an average improvement of 1 grade on the BER scale. The energy management bureau undertook an energy survey of each building to identify opportunities for low-cost energy saving measures including improved lighting and heating control.

In 2008, Údarás na Gaeltachta established an Energy Management Bureau with support from SEI. This three-year pilot project involves 5 Údarás-occupied buildings and 10 buildings occupied by community organisations or SMEs. The project targets are to reduce energy consumption and carbon emissions for these 15 buildings by 4% consecutively each year, i.e. 12% by Year 3.

51 Typical buildings can expect to achieve on average a D2/E1 BER. A building with a D1 uses on average 12.5% less energy than an equivalent building with a D2

9. **We will investigate the feasibility of applying a minimum standard beyond building regulations for new buildings (including significant renovations) intended for use by public sector bodies.**

New and renovated/refurbished buildings

Development of new buildings intended for use by public sector bodies, and major renovation or refurbishment of existing public sector buildings must currently comply with existing non-residential building regulations. These are currently being revised and new regulations are expected to apply from mid-2010. The revised regulations will seek a similar level of ambition as the recent residential building regulation review that improved the minimum energy performance of buildings by 40%.

Existing Department of Education policy requires new school buildings to be constructed to a minimum standard equivalent to an A3 BER rating. This standard is beyond current building regulations (currently around a B3/C1 rating) and further demonstrates the ability of public sector bodies to exceed existing standards. We will investigate the feasibility of applying a similar minimum standard to all public sector agencies.

Once set, these minimum standards will be periodically adjusted to ensure the public sector is leading by example by doing business in efficient buildings at the forefront of energy-efficient design.

Communication

10. **In 2009, we will put in place 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. The process will draw on SEI experience with the Large Industry Energy Network (LIEN), which has proven that through facilitating networking, discussion and information sharing on cost-effective energy savings measures significant additional savings beyond those gained through normal programme interventions can be achieved.

Green Public Procurement

11. **In 2009, we will introduce Guidelines 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 publish Green Public Procurement Guidelines that will aim to achieve a level of green public procurement equal to that achieved by best performers in the EU. The Guidelines 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 Guidelines will be the importance of training in green procurement, especially in the concept of life-cycle costing.

International experience with green public procurement has demonstrated the energy savings and environmental benefits. A research project co-funded by the European Commission to assess the potential benefits of green public procurement suggests that if all public authorities across the EU were to require more energy-efficient computers and this led the whole market to move in that

direction, it would produce savings of 830,000 tonnes of CO_2 annually.[52]

Following inclusion of full life-cycle costing requirements in Public Procurement Guidelines and subsequent installation of energy-efficient lighting systems in 1,500 public buildings in the city and state of Hamburg, Germany, substantial expansion of the market for new, energy-efficient lighting systems and related services was observed. Benefits from the new market have subsequently translated to the private sector, with many companies now making similar investment decisions.[53]

We will set up a Working Group, reporting to the Public Sector Working Group, to drive the production of Green Public Procurement Guidelines.

Lighting

12. We will require public bodies to purchase only energy-efficient lighting 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).

As part of the Carbon Budget 2008, Government announced its intention to bring forward legislation to remove inefficient lighting products such as incandescent bulbs from the Irish market. During the course of the consultation period, the European Commission published its proposals for an EU-wide phasing out of incandescent light bulbs, to begin in September 2009. Rather than having to introduce primary legislation, the elimination of inefficient incandescent light bulbs will now take place under the 2005 EU Ecodesign of Energy-Using Products Directive.

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

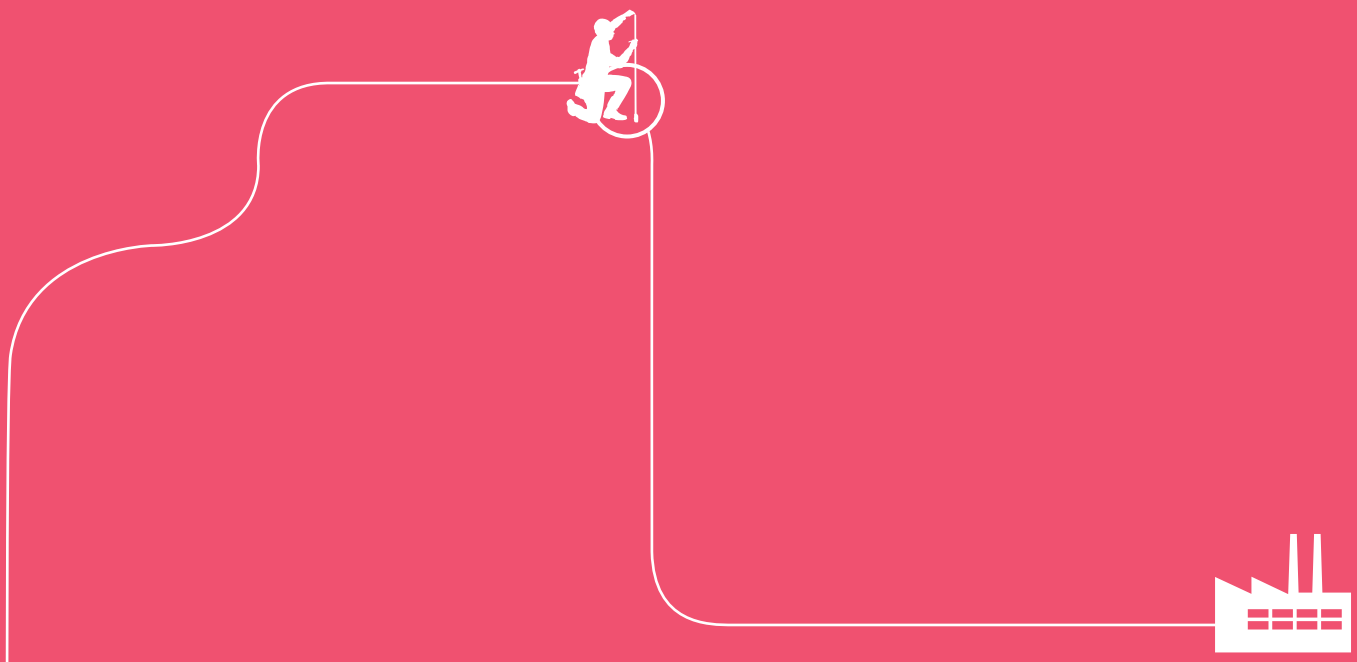
There are over 400,000 street lights and approximately 15,000 traffic light signal heads in Ireland, representing a significant energy load. A programme of replacement of inefficient street and traffic lighting will be developed involving Local Authorities.

52 Figures as reported from the European RELIEF project: www.iclei-europe.org/relief.

53 ftp://ftp.cordis.europa.eu/pub/innovation-policy/studies/full_study.pdf.

Chapter 06

Business Sector – Industrial & Commercial



2020 Vision

Irish business will be known internationally for embracing energy-efficient practices, innovation and competitiveness.

Chapter 06

Business Sector – Industrial & Commercial

Achieving the Vision

- We are providing tax incentives to encourage companies to buy the most efficient equipment.
- SEI offers networking, training and advisory services to all businesses seeking to reduce energy usage.
- The Irish Energy Management Standard, IS393, is bringing the largest energy users to best international practice in efficiency.

Current Action

14. We are providing tax incentives to encourage companies to buy the most energy-efficient equipment.
15. We are supporting the growth of sustainable energy enterprises.
16. We are supporting the networking and exchange of best energy efficiency practice by the largest industrial energy users through the Large Industry Energy Network.
17. We are supporting businesses in maximising their energy efficiency through adoption of IS393, the Irish Standard for Energy Management.
18. We are assisting smaller businesses with limited resources to improve their energy management through the Energy MAP initiative.
19. We are assisting the SME sector with a targeted scheme that provides assessments of energy use and advice on energy management.
20. We are recognising and rewarding best achievements in energy efficiency through the Sustainable Energy Awards.
21. We are requiring developers of new buildings of over 1,000m^2 to investigate the feasibility of using renewable energy systems.
22. We are supporting the Energy Star initiative in Ireland to promote energy efficiency in office equipment.
23. We have rolled out a Building Energy Rating system to business premises from 2008.

Planned Actions

24. We will take steps to ensure the provision of advice to end-users on the efficient use, maintenance and replacement of boilers and other heating systems, and on alternative solutions.
25. We will initiate a programme to maximise the energy efficiency of commercial new buildings through encouragement of best practice/exemplar designs that far exceed the energy performance standards of current building regulations.
26. We will work with State enterprise and business promotion agencies and industry representative bodies to promote the benefits to business of greater energy efficiency.

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

28. We will review Non-Domestic Building Regulations in 2010.

29. We will demonstrate the significant potential available through ICT efficiencies, working closely with the industry, utilising technological solutions such as virtualisation, co-location, efficient IT hardware, optimised cooling technologies, and energy management controls.

30. We will plan for the development of energy efficient cloud computing and co-location of data centres.

31. We are investigating the use of advanced optical switching technology in advanced communication networks.

Introduction

In no sector is the case for energy efficiency more compelling than in business, where scale, intensity and competitiveness pressures combine to drive energy savings and awareness of environmental impacts. Indeed, many businesses, especially the larger energy users, have been addressing issues of efficiency in recent years and demonstrating the gains that are possible. In 2007, some 1,753GWh were avoided by large energy users through participation in the Large Industry Energy Network (LIEN). Existing actions are anticipated to provide approximately 8,200GWh 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.[54]

For the majority of businesses that have taken little action on energy efficiency, the potential for their own efficiency and consequent 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 intensity and also a tendency for ownership and usage of buildings and equipment to be separated. Energy price rises in 2008 stimulated a renewed interest in energy efficiency, as a result of which many new actions are being taken by the commercial sector to reduce energy usage.

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 policy framework, 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 online as quickly as possible and by doing so to 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 two key challenges. The first is to make information about energy efficiency solutions and their benefits available and widely known to decision-makers in business. The second challenge is to ensure businesses make investment decisions based on the life-cycle costs of equipment (where the true cost of inefficiency emerges) as opposed to the initial capital costs. There is an important role for public intervention to build knowledge and confidence through real experiences and success stories. This is best achieved with an aim to develop both supply and demand efficiency solutions and services, leading to a more complete and mature market. The Accelerated Capital Allowances for certain classes of energy-efficient equipment, introduced in the Finance Act 2008 and extended in the Finance No.2 Act 2008, are an important policy intervention and will help overcome both the information deficit and life-cycle cost problems.

Energy Usage in the Industrial Sector

Energy use in the industrial sector amounted to 31,296GWh (final energy consumption) in 2007. Energy usage grew by 56% in the industrial sector between 1990 and 2007, as illustrated in Figure 12, opposite. 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 intensity of the industrial sector. Over the same period the level of energy intensity of industry overall fell by 58%, reflecting these structural changes and some improvement in energy efficiency.

54 Comparative research on industrial energy efficiency commissioned by SEI in 2006.

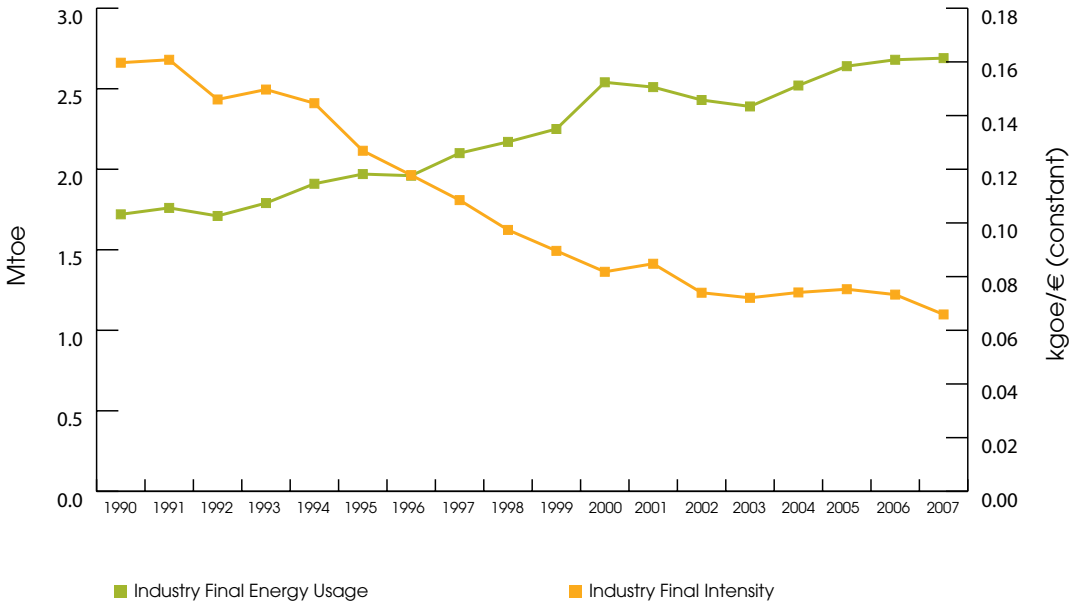


Figure 12: Energy Usage in Industry 1990 – 2007 (final energy consumption)[55]

Energy Usage in the Commercial Sector

There is no definitive data available at present for energy usage in the commercial sector. Best available data for the public and commercial sectors is derived from services sector data, based on an estimated ratio of commercial and public sector energy use within the services (tertiary) sector. Services sector data is provided in the Energy Balance (produced by EPSSU (SEI) annually) as a residual, following definition of the final energy use within the industrial, residential and transport sectors.

On this basis, energy usage in the commercial sector is estimated to have amounted to 12,514GWh (final energy consumption) in 2007, and displayed significant growth between 1990 and 2007 (estimated at 90%), as illustrated in Figure 13, overleaf. Electricity use demonstrated particularly strong growth in this period, possibly reflecting the changing structure of the sector and the general increase in the use of ICTs and air-conditioning. The energy intensity (measured as energy usage per unit of added value in the sector) decreased by an estimated 28%, reflecting significant improvement in energy efficiency overall and increasing added value for a given energy input.

Current Actions

ACA Tax Incentives for Energy-Efficient Equipment

14. We are providing tax incentives to encourage companies to buy the most energy-efficient equipment.

There can be a wide variance in the energy use of products that perform the same basic function. Sometimes the most energy-efficient model can be more expensive to buy, but its lower energy use over the course of its useful life more than compensates for its higher initial capital cost. Despite the sound economic arguments for choosing the more efficient model, many companies choose the cheaper, less efficient model for cash-flow or other short-term reasons.

55 Source: SEI.

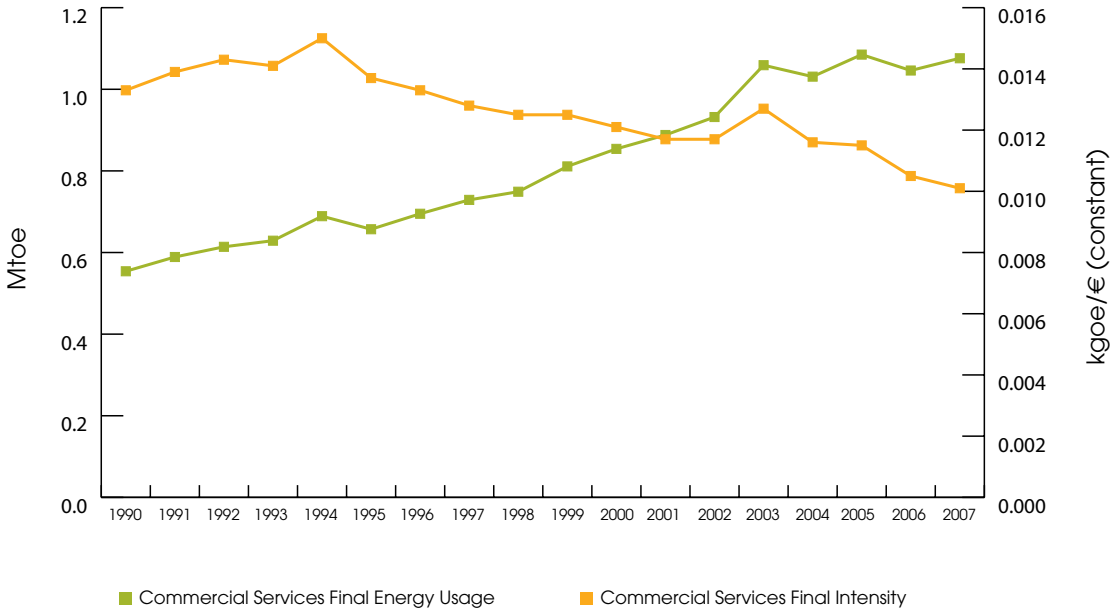


Figure 13: Estimated Energy Usage in Commerce 1990 – 2007 (final energy consumption)[56]

Section 46 of the Finance Act 2008 introduced Accelerated Capital Allowances (ACA) for certain classes of energy equipment. These classes of technology are lighting, lighting controls, motors, variable speed drives and building energy management systems. The ACA enables businesses to write off the entire cost of such equipment in the year of purchase.

The Finance No. 2 Act 2008 provided for an increase in the number of qualifying categories, to include: electric and part-electric vehicles and associated charging equipment; biofuel conversion kits; IT infrastructure hardware and associated cooling equipment; electricity-generation equipment (for company's own use), e.g. Solar PV, wind turbines, CHP and anaerobic digestion equipment; boiler equipment and control and recovery systems; heating, ventilation and air-conditioning systems (HVAC); and advanced liquid- and gas-handling equipment. The increased number of ACA categories will generate added opportunities for investment in energy-efficient equipment across all major technology sectors and will create further potential for companies to achieve far-reaching energy savings.

Sustainable Energy Incubator Programme

15. We are supporting the growth of sustainable energy enterprises.

The Sustainable Energy Incubator Programme has been established to foster energy and environmental business development and to bridge financing gaps in the area of sustainable energy. The programme is managed by SEI and is aimed at supporting business development of clean energy technologies and achieving energy and carbon emission savings and fossil fuel displacement. In meeting these aims the programme will support ventures by:

- bridging financing gaps for high potential ventures;
- producing durable business models capable of replication;
- providing networking and capacity building opportunities for participating ventures.

A pilot programme was undertaken in 2007, as a result of which funding was provided to seven companies in 2008.

56 Source: SEI.

The following actions (16, 17, 18 and 19) relate to SEI's Programmes for Business.[57] These programmes will be expanded from their current level in 2009 to include increased levels of support, advice and mentoring for small business and expansion of advanced Working Groups and a graduate placement initiative for large industry.

Large Industry Programmes

16. We are supporting the networking and exchange of best energy efficiency practice by the largest industrial energy users through the Large Industry Energy Network (LIEN).

The LIEN, facilitated by SEI, is a well-established networking and information programme for large industrial energy users. Now in operation for 14 years, it engages over 100 of the largest energy users in ongoing relationships, including site visits, workshops and annual performance reporting.

LIEN members share information on energy-saving technologies and techniques to maximise savings and maintain competitiveness. Energy spend across the LIEN is approximately €900 million. The LIEN membership accounts for almost two-thirds of all industrial energy usage and for more than 10% of national primary energy usage.

In 2007, the LIEN reported an improvement in energy efficiency equating to €40 million in savings on the previous year. Cumulative savings, relative to the year in which members join the Programme, are 30%.

We will continue the work of the 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.

In 2009, a graduate placement initiative will be launched. This will provide firms with a technical graduate for three months to deliver energy efficiency initiatives. The programme will seek to overcome a key barrier of junior-technical resources in this sector.

IS393 – Irish Standard for Energy Management

17. We are supporting businesses in maximising their energy efficiency through adoption of IS393, the Irish Standard for Energy Management.

IS393 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, which will bring immediate profitability benefits, while also 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.

The Energy Agreements Programme offers a range of supports to companies leading the way on energy management by developing an IS393 Energy Management System and acting to capture the efficiency opportunities generated. The early successes emerging in the implementation of IS393 are generating wider interest and confidence. The programme will continue to support firms and will aim to widen participation. To date, over 70 sites (industrial and commercial) are pursuing certification to IS393.

57 More detail at www.sei.ie/Your_Business/

The Programme will stimulate significant energy efficiency activity by developing initiatives yearly, in line with a strategic roadmap for the Programme that is focused on significant energy end-users and specific requirements of large industry. In 2009, an expanded programme of special initiatives will be implemented through the establishment of additional Special Working Groups. Special initiatives active are Energy-Efficient Design, Heating Ventilation and Air Conditioning (HVAC), Refrigeration Optimisation and Alternative Methodologies.

Energy MAP

18. 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 sizes 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 IS393 and is geared towards smaller or less technically resourced firms. It centres on a large web resource that offers advice, training and an interactive energy efficiency opportunities generator.

Training courses are also available, offering 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.[58] SEI's Energy MAP web resource is designed as a toolkit for SMEs on both the managerial and technical aspects of energy efficiency and is aligned with the IS393 standard, embodying the same principles but for a wider audience.

Small and Medium Enterprises

19. We are assisting the SME sector with a targeted scheme providing assessments of energy use and advice on energy management.

In 2007, SEI launched new support and assessment programmes for all businesses, placing 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.

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, and the market, for energy advisory services.

Further expansion in 2009 will offer follow up support on specific actions to save energy and reduce costs. This will include consideration of the ESCO model for achieving cost-effective energy savings.

Sustainable Energy Awards

20. We are recognising and rewarding best achievements in energy efficiency through the Sustainable Energy Awards.

Through the Sustainable Energy Awards, which are held annually, SEI recognises and publicly acknowledges the best achievements in energy efficiency and renewable energy. The awards are 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.

58 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

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.

Assessment of Alternative Energy Systems at Design Stage

21. We are requiring developers of new buildings of over 1,000m² to investigate the feasibility of using alternative energy systems.

From 2007, any person who commissions the construction of a new building with a floor area exceeding 1,000m² 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 alternative energy systems in the proposed building. Options for consideration include the use of renewable energy systems and combined heat and power (CHP).

Compliance with the requirement for the consideration of alternative energy systems may be demonstrated either by completion of a feasibility study or by reference to a software tool, which assesses the appropriateness or otherwise of the alternative energy systems that might be technically, environmentally and economically feasible for large buildings or particular types of large building.

The environmental training unit at FÁS, in consultation with SEI and other organisations, has developed a training course for the evaluation of alternative energy systems. The target audience includes technicians, planners, consultants, facility managers, builders, contractors and consultants operating in both the public and private sectors. This action should see a significant growth in interest and in awareness of alternative heat options. It will also complement the Reheat and Combined Heat and Power (CHP) grant schemes operated by SEI.

Energy Star

22. We are supporting 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 co-ordination of energy-efficient labelling programmes for office equipment under the Energy Star programme.

The programme was initiated by the US Environmental Protection Agency (EPA) and has since matured into a worldwide energy efficiency programme, run in partnership by the US EPA, the EU, Japan, Australia, New Zealand, Taiwan and Canada, to promote energy-efficient office equipment.

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.

Building Energy Rating

23. We have rolled out a Building Energy Rating system to business premises from 2008.

Since July 2008, in line with the requirements of the Energy Performance of Buildings Directive (Directive 2002/91/EC), we have required all new business premises to have their energy efficiency assessed and certified by a registered Building Energy Rating (BER) assessor. This was 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.

Planned Actions

Boiler Efficiency in the Industrial and Commercial Sector

24. We will take steps to ensure the provision of advice to end-users on the efficient use, maintenance and replacement of boilers and other heating systems, and on alternative solutions.

As part of our requirements under the Energy Performance of Buildings Directive (EPBD), it is proposed that the EPBD Implementation Group will design an effective information campaign aimed at encouraging regular inspection of residential and commercial boilers and replacement of inefficient boilers or heating installations. This approach is set within a goal of accelerating market change in favour of more energy-efficient products and practices relating to boilers/heating systems in Irish buildings.

Measures proposed are expected to include: establishment of a national appliance efficiency database; delivery of accredited training courses in energy efficiency installation and service maintenance practices; establishment of competent persons schemes for installers working to agreed codes of practice; development and delivery of a targeted nationwide campaign to stimulate building owners to commit to regular boiler-servicing practices and replacement of older or less efficient boilers/heating systems; monitoring of the effectiveness of these measures.

The details of these measures to meet the requirements of the EPBD in relation to Article 8 will be drawn up by the DCENR and SEI in consultation with interested parties.

Commercial New Building Programme

25. We will initiate a programme to maximise the energy efficiency of commercial new buildings through encouragement of best practice/exemplar designs that far exceed energy performance standards of current building regulations.

The programme will demonstrate best practice in commercial building design through selectively supporting developers to design and build commercial (non-residential) buildings that are at the forefront of energy-efficient design. Subsidies will be made available for eligible expenditure on design and incorporation of energy-efficient technologies to meet this objective.

The programme will build on the success of SEI's House of Tomorrow scheme, rolling out in a similar manner as the current residential programme, but with a focus on non-residential buildings. Benefits will flow from the demonstration of exemplar design and innovative use of energy efficient and renewable energy technologies. Experience with the residential scheme (SEI House of Tomorrow Programme) demonstrates significant input to future revision of relevant building regulations flowing from programme results/assessment.

Raising Awareness through Trusted Channels

26. We will work with State enterprise and business promotion agencies and industry representative bodies to promote the benefits to business of greater energy efficiency.

State enterprise and business promotion agencies, such as Enterprise Ireland, county enterprise boards and Leader Groups, along with business representative bodies, such as IBEC, ISME and local chambers of commerce, have established strong and trusted relationships with the business community over many years. We will encourage these entities

to use their standing to raise awareness among the business community of the commercial advantages to be achieved by those firms that actively manage their energy use and of the strongly positive returns on investment in energy efficiency.

Air-Conditioning Systems

27. We will ensure all air-conditioning systems with a rated output of 12kW are regularly inspected by trained experts 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 12kW is 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 to 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 20,000MWh of electricity per annum.

28. We will review Non-Domestic Building Regulations in 2010.

A Working Group of the Building Regulations Advisory Board has been established to review the energy performance requirements for non-domestic buildings, with the view to introducing new standards from 2010. As with the review of the energy performance standards of domestic buildings in 2007, it is intended that the new standards will result in a significant energy efficiency improvement over existing building regulations. It is expected that this will result in significant energy performance gains in the commercial building sector between 2010 and 2020.

Energy use in the ICT sector

The ICT (Information and Communication Technologies) sector is identified as a significant growth sector both worldwide and in Ireland. The IEA has indicated that energy use in the ICT sector grew at approximately 7% per annum between 1990 and 2008 and now represents a major cause of electricity growth internationally. It is projected that without further policy intervention, total electricity consumption of the sector could increase by a further 250% by 2030.

The European Commission[59] has indicated the use of ICT products and services in EU Member States represents about 7.8% of electricity consumption in the EU and may grow to 10.5% by 2020. In highlighting the untapped opportunity for energy saving through utilisation of ICTs, the European Commission suggests that energy consumption of buildings in the EU could be reduced by up to 17% and carbon emissions in transport logistics reduced by up to 27%. According to a recent McAfee report, *The Carbon Footprint of Email Spam Report*,[60] spam consumes globally 33,733 million kWh per year of energy. This compares with 120,115 million kWh per year of energy for legitimate email. There are massive gains to be made through improved and/or different work practices

An IDA Ireland (Industrial Development Agency) study on the worldwide data centre market indicated the following trends in ICT:

- Data is doubling every 18 months.
- The number of devices accessing data over networks doubles every 2.5 years.
- Bandwidth consumed doubles every 1.5 years.
- Server processing consumption doubles every 3 years.
- The costs of managing systems have doubled since 2000.

59 COM(2009) 111 final.

60 McAfee (2009).

It is estimated that data centre energy costs range from approximately €30 – 100 per square foot per annum. On this basis a 25,000ft^2 data centre can use up to €2.5 million in energy per annum. This would be indicative of the case for a large number of facilities of this size in Ireland.

A number of technological solutions are available to reduce energy usage by ICT technologies. The following actions will be pursued to realise energy savings in this sector.

29. We will demonstrate the significant potential available through ICT efficiencies, working closely with the industry, utilising technological solutions such as virtualisation, co-location, efficient IT hardware, optimised cooling technologies, and energy management controls.

We will work with the ICT industry to develop an energy efficiency assessment method for data centres based on Power use Efficiency (PuE) metric. This will allow the industry to provide accurate and verifiable quantification of its own energy impact and to validate savings.

We will promote training in ICT energy efficiency methods to IT managers, system administrators, purchasers, ICT owners and IT consultants. This will be facilitated through the development of standard solutions tailored for specific applications and through demonstration.

Our work in this sector will seek to co-ordinate with representative organisations such as ICT Ireland, IT@Cork and IDC in order to disseminate energy management information to industry.

The potential for a study of the ICT sector in Ireland is being considered with the intention of identifying the scale of energy use within the various subsidiary areas of the ICT industry.

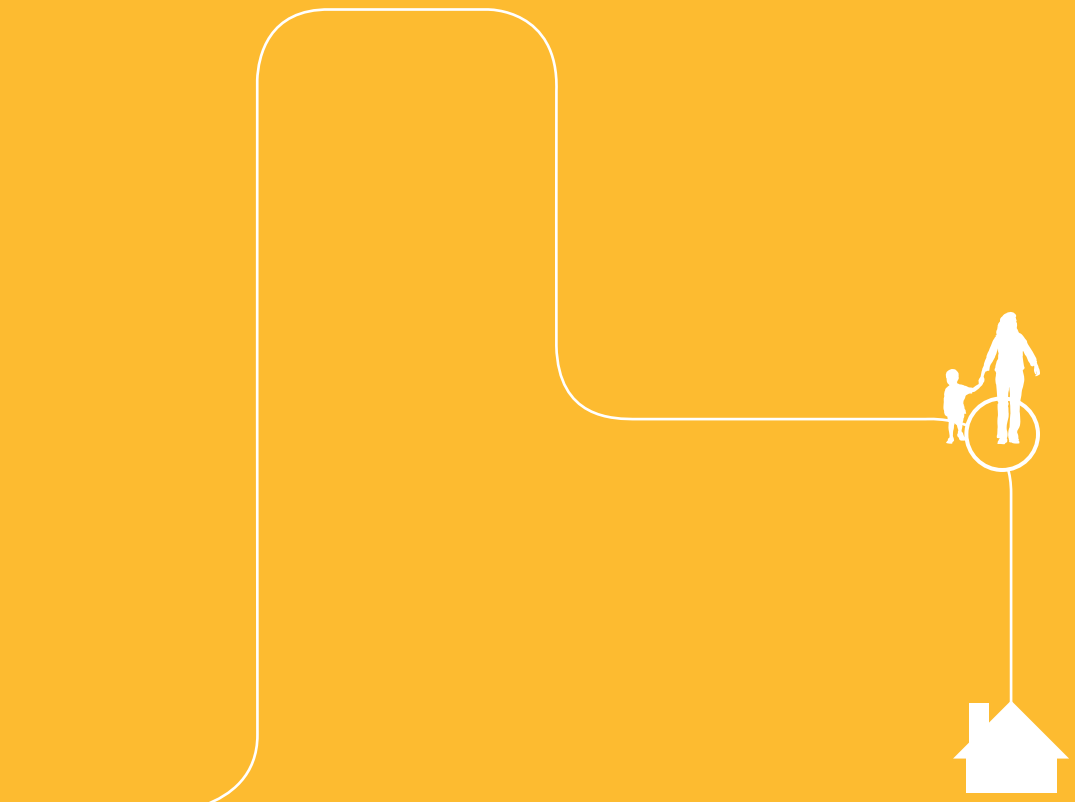
30. We will plan for the development of energy-efficient cloud computing and co-location of data centres.

We will plan the development of energy-efficient data and cloud computing centres as an important feature of our Knowledge Society strategy. A workshop on data centre design and management has been organised in order to define energy efficiency standards and the means to achieve them. This involves the use of virtualisation and other techniques.

Cloud computing refers to virtualisation of software resources where a third party owns and manages the hardware and software on which an application such as a website runs. It is scalable to suit demand, with providers able to optimise their servers for maximum utilisation (and hence efficiency).

Chapter 07

Residential Sector



2020 Vision

All new Irish housing will be carbon neutral. Efficiency standards in older homes will be significantly improved through retrofitting actions.

Chapter 07

Residential Sector

Achieving the Vision

- Building Regulations amended to dramatically improve efficiency in new homes.
- €100 million grant programme to support efficiency upgrades in older homes.
- Building Energy Ratings required for all homes sold or rented from 2009.
- Introduction of smart meters to encourage energy-efficient behaviour by householders.

Current Action

32. We are providing grant assistance to householders to upgrade the energy efficiency of older homes through the Home Energy Saving scheme.

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

34. We are upgrading the energy performance of homes occupied by those on low incomes through the Warmer Homes Scheme.

35. We are providing grants to older people through the Housing Aid for Older People Scheme, including grants for works that will improve the energy efficiency of their homes.

36. We are providing grants to householders to install renewable energy technologies under the Greener Homes Scheme.

37. We are ensuring a move to highly efficient condensing boilers through Regulations setting a minimum efficiency standard for all new and replacement oil and gas boilers.

38. We have been steadily improving the energy performance requirements for housing since 1992.

39. We have made Building Regulations that deliver a 40% improvement in new housing energy efficiency standards.

40. We are preparing the house-building sector and wider society for the adoption of ever higher building energy standards by supporting developers who build to standards well above those prescribed by law.

41. We are promoting higher standards of energy efficiency in social housing.

42. We rolled out a Building Energy Rating system to new houses in 2007 and have extended this to existing houses from 2009.

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

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

Planned Actions

45. We will create an awareness campaign to encourage householders and other building owners to maximise the energy efficiency of their boilers through regular servicing and, where necessary, replacement.

46. We will investigate the feasibility of applying a minimum standard for dwellings occupied by those in receipt of rent supplement.

Introduction

The two major energy efficiency challenges that must be met by Ireland's residential building sector in the period to 2020 are:

A To create a generation of buildings that meet expectations of comfort and functionality while significantly reducing energy usage and CO_2 emissions; and

B To address the legacy of older housing with poor energy and CO_2 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 house built in 2007 typically has a 70% lower energy demand for space and water heating than its counterpart built 20 years ago. However, as new and more recent homes will have an extended lifetime, it is important to ensure that efficiency performance standards are set at the maximum level achievable.

Building Regulations are important in setting the standard and driving performance improvements. The Minister for the Environment, Heritage and Local Government made new Building Regulations in 2007 that make new homes 40% more energy efficient than those built to the standard prescribed in the 2002 Building Regulations. Greenhouse gas emissions will also be 40% lower. Government has signalled its intention to review the Regulations again in 2010, with a view to improving energy performance by 60% (relative to the standards prescribed in the 2002 Building Regulations). The trend in the energy performance of housing is illustrated in Figure 14, below.

The Minister for Communications, Energy and Natural Resources launched a Home Energy Saving (HES) scheme in February 2009 to address the energy efficiency and CO_2 emissions of older housing. The scheme provides grants of up to 40% of the cost of energy efficiency measures, such as insulation, high efficiency boilers and heating controls. Those on low incomes can benefit from the Warmer Homes Scheme.

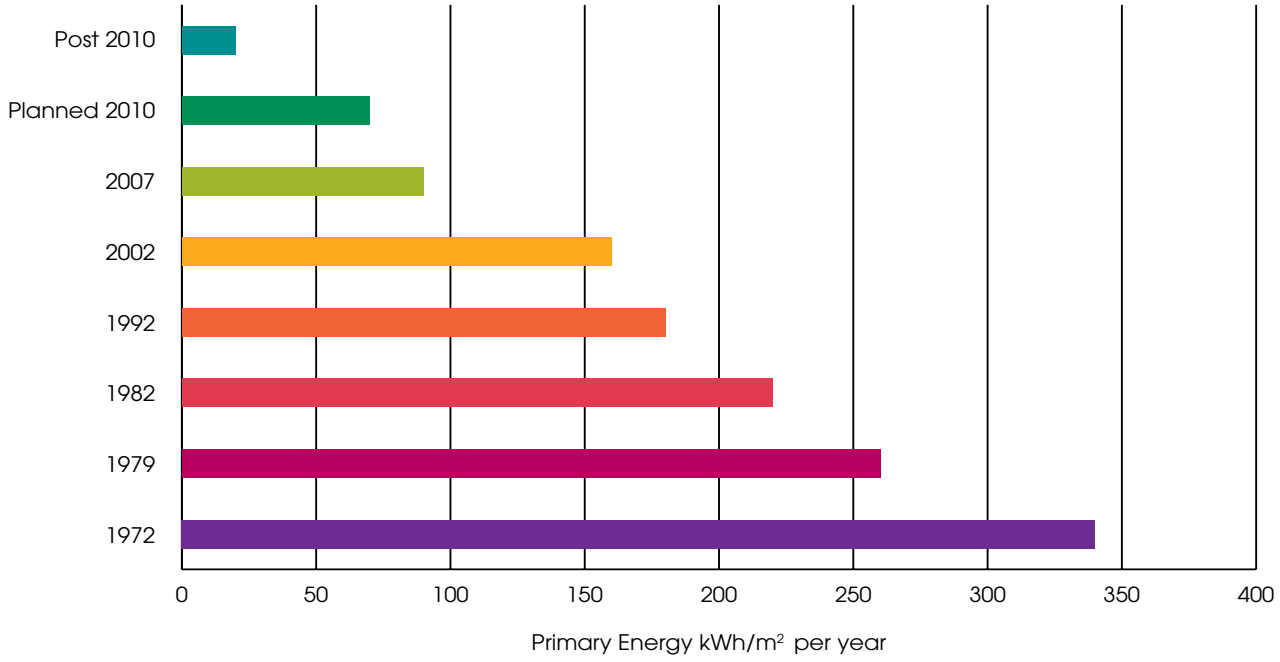


Figure 14: Trend in Energy Performance of Housing (Primary Energy kWh/m²/year)

Beyond the many aspects of building fabric that influence energy performance, the nature of the energy services provided and the 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 an important area, accounting for a significant proportion of electricity usage. The Minister for the Environment, Heritage and Local Government introduced a minimum efficiency standard for new and replacement oil and gas boilers in 2008.

Building Energy Rating (energy labelling of buildings) will allow everyone to understand relative performance and to make appropriate purchase or rental decisions accordingly.

Energy Usage in the Residential Sector

Energy usage in the residential sector amounted to over 33,936GWh (final energy consumption) in 2007. Energy usage grew by 29% in the residential sector over the period 1990 – 2007, as illustrated in Figure 15, below, with the number of households increasing by 49%. Energy intensity (average energy usage per household) decreased by 13% over the period, reflecting an improvement in energy efficiency of the housing stock, much of it due to higher efficiency standards of new housing. Not all of the improvements in energy efficiency resulted in lower energy usage; in some cases, higher standards of heating and comfort levels followed from the deployment of central heating.

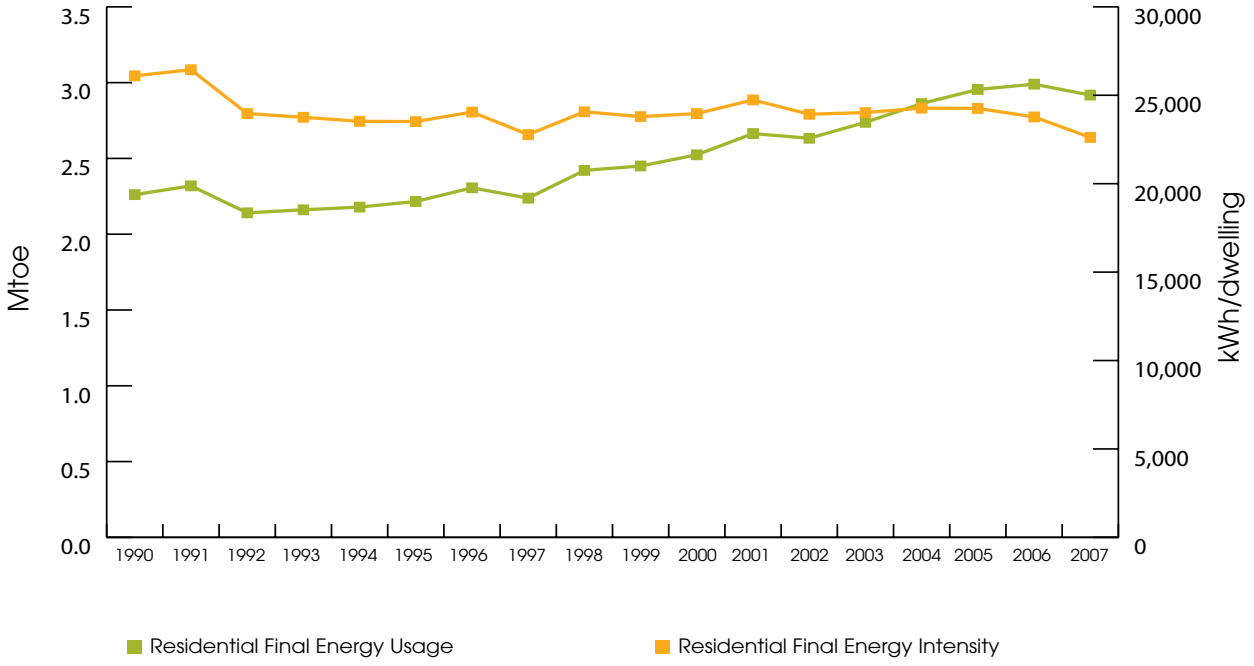


Figure 15: Energy Usage in the Residential Sector 1990 – 2007 (Final Energy Consumption)[61]

61 Source: SEI.

Current Action

Home Energy Saving scheme

32. We are providing grant assistance to householders to upgrade the energy efficiency of older homes through the Home Energy Saving scheme.

Of the 1.7 million homes in Ireland, it has been estimated that up to 1 million require investment to improve their energy efficiency. Much of pre-1981 private sector housing was built with no energy efficiency features. Of these, over 300,000 units remain with low efficiency standards. In the absence of any significant level of investment by private home owners to improve the energy efficiency of their homes, a scheme of incentives was deemed necessary, together with provision of information to promote the benefits of such investment.

The Minister for Communications, Energy and Natural Resources launched a pilot Home Energy Saving scheme on 24 April 2008. The pilot scheme, for which funding of €5 million was provided, was designed to support investment in improved wall and roof insulation, low emissivity double-glazing and heating controls and other energy efficiency improvement measures. The scheme made use of BER as a measure of the energy efficiency improvement before and after works took place.

Estimates from SEI show that a household participating in the pilot scheme could save up to €700 in energy bills annually as a result of the energy efficiency investments undertaken.

The National Insulation Programme for Economic Recovery, announced on 8 February 2009 by the Ministers for Communication, Energy and Natural Resources and Environment, Heritage and Local Government, has made €49 million available for a national rollout of the Home Energy Saving scheme in 2009.

Smart Metering

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

Smart meters, which 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 make clear the opportunities for change and improvement. Smart meters can also include features such as net-metering, which allows users to sell micro-generated power to the national grid, and active control functions, which allow operators to control peak demand remotely.

The Programme for Government commits to ensuring the installation of a smart meter in every household. In 2008, the CER commenced an extended trial of smart metering for electricity, to be followed by a full national roll out to all homes. Concurrently, a trial of smart metering for gas will be conducted, on a smaller scale than that for electricity. 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, based on usage and 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.

In the case of electricity, smart metering can also be linked to the design of appropriate tariffs to reflect the costs of electricity usage at all times of the day and the year, a feature designed to influence the behaviour of consumers. The CER regulates tariffs offered to final customers

by ESB Public Electricity Supply (and BGS for gas consumers). 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 tariffs will be facilitated by the wider installation of appropriate interval or smart metering.

International experience suggests that smart meters can prompt behaviour change, leading to electricity savings of at least 3%.[62] This conservative figure suggests a direct savings contribution from smart metering in the residential sector of 690GWh PEE in 2020.[63] There are, of course, wider benefits to smart metering, such as the accommodation of micro-generation through export to the grid.

Warmer Homes Scheme

34. We are upgrading the energy performance of homes occupied by those on low incomes through the Warmer Homes Scheme.

The Warmer Homes Scheme (WHS) is the primary delivery mechanism of SEI's Low Income Housing Programme, which was established to address the issue of energy affordability. One of the root causes of an inability to afford to heat one's home is the legacy of older housing with poor energy efficiency standards. The Warmer Homes Scheme addresses this problem by providing attic insulation, draught-proofing, lagging jackets, energy-efficient lighting, cavity wall insulation and energy advice at little or no cost to eligible households. These measures can significantly reduce the amount of energy required to heat and light the home.

Up to end-2008 some 20,881 homes had been upgraded by the WHS. The National Insulation Programme for Economic Recovery, announced on 8 February 2009 by the Ministers for Communication, Energy and Natural Resources and Environment, Heritage and Local Government, made €20 million available in 2009, which consists of an Exchequer allocation of €15 million and an additional €5 million from the ESB and BGE.

Housing Aid for Older People Scheme

35. We are providing grants to older people through the Housing Aid for Older People Scheme, including for works that will improve the energy efficiency of their homes.

The Minister for the Environment, Heritage and Local Government introduced a new Housing Aid for Older People Scheme in November 2007. The Scheme aims to provide targeted support to improve conditions in the existing housing of older people. The Scheme may assist with works that can improve the energy efficiency of homes, such as insulation, provision of central heating and repair or replacement of windows and doors. The Scheme is administered by local authorities, which assess applicants on the basis of household means. The maximum grant available is €10,500, which may cover up to 100% of the cost of approved works.

Greener Homes Scheme

36. We are providing grants to householders to install renewable energy technologies.

The Greener Homes Scheme, launched in 2006, provides grants to home owners to install new renewable energy heating systems in their homes. The technologies supported by the scheme are Biomass, Heat Pump and Solar Thermal.

62 'Smart Meters – Costs and Consumer Benefits; report to Energywatch', Eoin Lees, in *Energy* (July 2007).

63 Additional savings will accrue to the business sector via the rollout of smart meters. These savings will be incorporated into future iterations of the Action Plan.

The scheme aims to develop a sustainable market for domestic renewable energy technologies by increasing their uptake in the domestic market, thereby reducing greenhouse gas 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 house-building. The scheme has surpassed its original targets and over 21,000 householders have availed of grant aid to convert or install renewable heating systems in their homes, with a consequent saving of 265GWH and 64,000 tonnes of CO_2 per annum.

The number of registered renewable heat products on the market has 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 was launched on 1 October 2007. The second phase is focusing strongly on quality standards and training.

Condensing Boilers

37. We are ensuring a move to highly efficient condensing boilers through Regulations setting a minimum efficiency standard for all new and replacement oil and gas boilers.

From 31 March 2008, all oil- and gas-fired boilers installed in new dwellings must meet a minimum seasonal net efficiency of 86%. For existing dwellings, if a boiler is replaced with an oil- or gas-fired boiler, it must also meet this efficiency standard, where practicable. The only boilers currently achieving this performance level are condensing boilers.

In some instances, for technical reasons, it is not practicable to install a condensing boiler in an existing dwelling. The DEHLG and SEI have jointly published a Condensing Boiler Installation Assessment Procedure as part of a guidance document on *Heating and Domestic Hot Water Systems for Dwellings – Achieving Compliance with Part L*.

Building Regulations 2002

38. We have been steadily improving the energy performance requirements for housing since 1992.

Since the first thermal performance requirements in national Building Regulations came into force in 1992, significant improvements have been made to thermal performance requirements for new and refurbished dwellings.

In our Building Regulations 2002 we focused on conservation of fuel and energy for new dwellings by greatly improving requirements (through lower U-values) for building fabric elements, including roofs, walls, floors, doors and windows. It is estimated that these changes resulted in typical dwellings constructed with a primary energy requirement of approximately 160kWh per m^2 per annum, compared to an estimated 200kWh per m^2 per annum previously.

Consolidated Building Regulations 2008

39. We have made new Building Regulations, delivering a 40% improvement in new housing energy efficiency standards.

The Minister for the Environment, Heritage and Local Government amended the Building Regulations in December 2007 to require that new homes be 40% more energy efficient than those built to the standard prescribed in the Building Regulations 2002. Greenhouse gas emissions will also be 40% lower in homes built to the new standard.

The new Regulations require that a mandatory minimum level of renewable energy technologies be installed to deliver a minimum of 10kWh per sq.m. per annum of delivered energy. This can be facilitated through implementation of technologies such as solar panels, heat pumps, biomass heating systems, photovoltaic and/or micro wind technologies.

The new Regulations came into force from July 2008. Government has committed to reviewing the Building Regulations again in 2010, with a view to improving energy performance by 60% (relative to the standards prescribed in the Building Regulations 2002).

Driving Further Innovation in Building Energy Standards

40. We are preparing the house-building sector and wider society for the adoption of ever higher building energy standards by supporting developers who build to standards well above those prescribed by law.

The House of Tomorrow Programme, managed by SEI, has for a number of years been demonstrating to the market the deployment of energy-efficient building and renewable energy technologies. The Programme successfully prepared the market for the revised residential Building Regulations 2007. These new Regulations will result in a 40% improvement in the energy performance of new houses built to this new standard, compared to those built to the Building Regulations 2002.

Government has signalled its intention to revise the residential Building Regulations again in 2010, with a view to achieving a 60% improvement in the energy performance of new houses built to this new standard as compared to those built to the 2002 Building Regulations.

Best Practice Design for Social Housing

41. 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 that 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%.

Building Energy Rating

42. We have rolled out a Building Energy Rating system to new houses from 2007 and extended this to existing houses from 2009.

Since January 2007, in line with the Energy Performance of Buildings Directive (Directive 2002/91/EC), the energy efficiency of all new houses and apartments is assessed and certified by a registered Building Energy Rating (BER) assessor. From 2009, we have extended this requirement to existing dwellings, when they are offered for sale or lease. The BER provides 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 BER certificate is accompanied by an Advisory Report, with recommendations for cost-effective improvements to the energy performance of the

building. This will enable householders to improve the energy efficiency of their homes and save money on their energy bills.

Spatial and Planning Policies

43. 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, cycling and settlement patterns that reduce distances between home, work, services and leisure.

Other supporting policies in this area include the Smarter Travel Policy (STP), 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 Sustainable Energy Zone Programme being developed by SEI seeks to stimulate a national move towards sustainable energy practice through demonstration in exemplar communities. More detail on this Programme is available in Chapter 10, 'Research and Development'.

Awareness Campaign: Power of One

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

Launched in September 2006, the Power of One campaign has achieved significant impacts in terms of brand recognition and reach of its message. The Power of One campaign provides consumers with key energy efficiency tips and information that allows them to reduce energy costs at home, on the move and at work. Power of One messaging has been delivered through various media, including television, radio, internet and print. A particularly successful component has been The Power of One Street (www.powerofonestreet.ie), which has tracked and shared the real experiences of families across Ireland who 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. Further information on the Power of One campaign is included in Chapter 11, 'Cross-Sectoral and Underpinning Measures'.

Planned Action

Boiler Efficiency Campaign

45. We will create an awareness campaign 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 and will seek to 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.

Rent Allowance

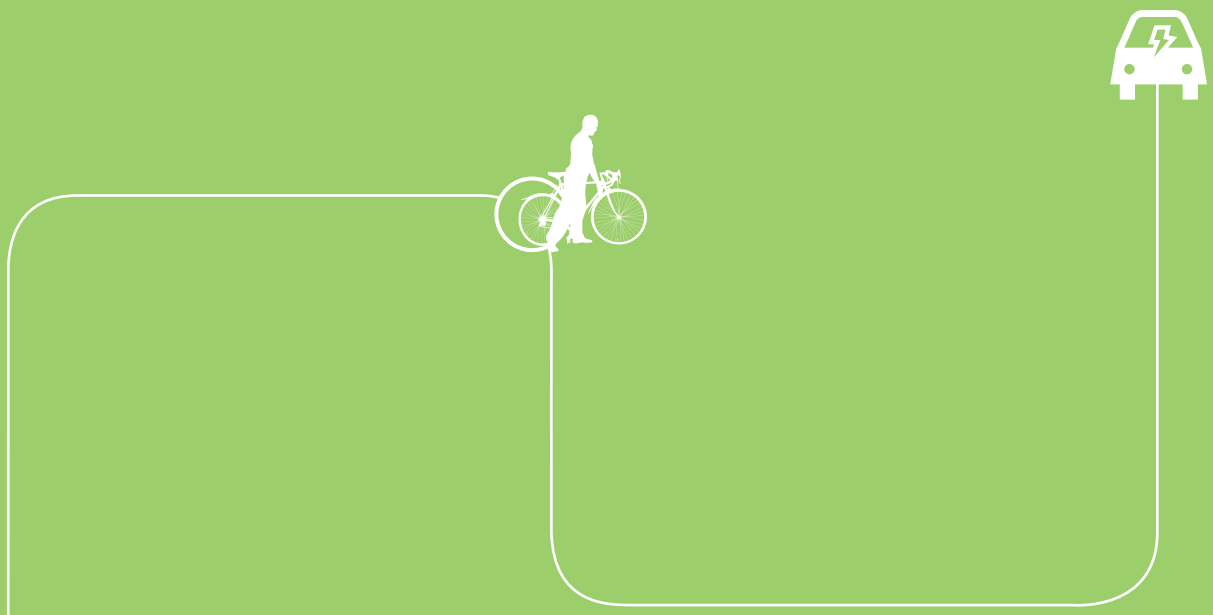
46. We will investigate the feasibility of applying a minimum standard for dwellings occupied by those in receipt of rent supplement

From 1 January 2009, all domestic dwellings offered for sale or lease are required to have a Building Energy Rating (BER). The BER provides information on the dwelling's energy performance and informs rental decisions. The BER certificate is accompanied by an Advisory Report which provides recommendations to enable landlords to improve the energy efficiency of their properties. Conferring a minimum standard for properties occupied by those in receipt of rent supplement would allow Government to ensure that those most in need are in a position to minimise unnecessary expenditure on energy, while driving the market to provide more cost-efficient rental accommodation.

Once set, these minimum standards will be periodically adjusted to maximise alignment with best practice generally.

Chapter 08

Transport Sector



2020 Vision

A sustainable transport system will be delivered for Ireland. The way we travel and transport goods will be transformed for the benefit of communities, the environment and the economy.

Achieving the Vision

- Significant investment in public transport to enable a reduction in the number of car journeys.
- We will ensure future development occurs alongside appropriate development of transport infrastructure.
- We will promote alternative forms of transport, including the use of electric vehicles.

Current Action

47. We will develop an electric vehicle deployment strategy that will result in a minimum of 10% of our passenger car and light commercial fleet being electrically powered by 2020.
48. We have restructured the VRT and motor tax systems to incentivise the purchase of more energy-efficient vehicles.
49. We are enhancing the labelling system for cars to provide more information on CO_2 emissions and on fuel economy.
50. We have provided a web-tool called *How Clean is your Car?* to assist and encourage car buyers to choose the most energy-efficient model.
51. We are promoting modal shift through investment in our public transport services under Transport 21.
52. We are encouraging use of public transport through tax incentives under the TaxSaver Commuter Ticket Scheme.
53. We are providing transport-specific advice on energy management to fleet managers.
54. We are maintaining the fuel efficiency of older private cars through the National Car Test service.
55. We are enabling more fuel-efficient, inter-urban freight and private car movements through improved road infrastructure.
56. We will work at an EU level to extend emissions trading to the aviation sector and to progress the Single European Sky initiative.

Planned Actions

57. We will implement a demand management strategy as part of our Smarter Travel and Transport 21 initiatives and co-ordinate public transport with park and ride. We will seek to encourage integrated ticketing and intelligent transport systems.
58. We will strengthen the relationship between land-use and transport planning for new developments and retrofit existing urban settlements.
59. We will introduce mobility management initiatives including support for workplace travel plans, school travel plans and personalised travel planning.
60. We will take steps to promote achievement of the EU proposals for emission performance standards for new passenger cars.
61. We will raise public awareness of the benefits of eco-driving.
62. We will implement the National Cycle Policy Framework and publish a National Walking Policy to encourage modal shift.
63. We will introduce a Sustainable Travel and Transport Bill to complement the proposed Public Transportation Regulatory Bill.
64. We will continue to rollout the use of real-time data as part of a smart transport system. Iarnród Éireann and DART already have real-time information systems in place. Bus Éireann are introducing real-time information systems in 2009. Bus Átha Cliath and Dublin City Council will begin using complementary real-time information systems in 2010.

Introduction

The energy load of transport depends on the system (the mode of transport), the technology (the vehicle) and the user (driver behaviour). The major contributions towards energy savings for this sector will arise as a result of measures detailed in the Government's Smarter Travel Policy (STP) Framework, the recently published National Cycle Policy Framework, and Transport 21, which is the current investment programme for transport infrastructure for the period 2006 – 2015.

The STP highlights the current, unsustainable trends influencing the increasing energy use of the transport sector. These trends are closely linked to recent, unprecedented economic growth and include higher employment, rising population, an increase in the amount of road freight and a dramatic rise in the number of vehicles on Ireland's roads. Despite recent changes to the economic climate, projections still suggest that without sustained action between now and 2020 greenhouse gas emissions from the transport sector could increase to between 18 and 20Mt CO_2; an increase of up to 46% on 2006 levels. When considered together with rising fuel prices, it is clear that strong action is required to reverse these unsustainable trends.

Government's vision for Ireland's transport system is summarised in five key goals that form the basis of the STP:

A To reduce overall travel demand;

B To maximise the efficiency of the transport network;

C To reduce reliance on fossil fuels;

D To reduce transport emissions;

E To improve accessibility to transport.

The plan details a range of actions and targets that act on these goals, and together with significant investment in infrastructure, planned through Transport 21, forms the basis for how Government will seek to deliver a sustainable transport system for Ireland by 2020.

With a focus on the supply-side, Transport 21 – which aims to invest €34 billion in the provision of infrastructure, with a major investment of €15.8 billion towards public transport – will deliver significantly improved public transport infrastructure and services. Together with supporting demand-side policies, the Government will attempt to deliver a modal shift from private car journeys to attractive alternatives, including public transport.

Government policy has the aim of diversifying the modal and fuel mix of the transport sector, as well as maximising efficient use of energy. Planned measures will seek to decouple energy use from growth in activity and demand in the sector. A major expansion of rail infrastructure and rolling stock will transform public transport in Dublin, and between Dublin and the other major urban centres. The inter-urban motorway programme will work towards facilitating more energy-efficient long-distance driving.

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 CO_2 per kilometre in new passenger cars by 2012. The restructuring of the VRT and motor tax systems in Ireland, which came into being in July 2008 to incentivise the purchase of more energy efficient vehicles, will expedite this change (see Action 48). Already, in the time since its introduction, a shift towards purchase of more efficient vehicles (i.e. towards the A and B CO_2 emissions bands) is evident.[64]

Electric vehicles offer exciting opportunities to shift energy usage patterns in the transport sector. While Ireland has no domestic producers of electric vehicles, it can take the lead in demonstrating their feasibility and promoting ancillary technology. Likewise, the Government is committed to ensuring that the public sector takes an early adoption role

64 For more information, refer to *Energy In Ireland 1990 – 2007*, 2008 Report, section 5.2.3.

in relation to electric vehicles. The Government is further committed to develop an electric vehicle deployment strategy, which will result in a minimum of 10% of our passenger car and light commercial fleet being electrically powered by 2020. Provision has been made within SEI's 2009 budget for demonstration projects.

A key goal of current Government policy is to align transport investment with spatial planning. Actions outlined in the STP include full integration of transport plans with the development plan process, and requirements to include key sustainable transport principles in future planning guidelines.

Projected energy savings from our existing and planned actions for the transport sector are 4,670GWh PEE in 2020.

Energy Usage in Transport

Energy usage in the transport sector amounted to over 66,117GWh, or 5,685ktoe (final energy consumption), in 2007. Energy usage in the transport sector grew by 181% between 1990 and 2007, with the highest growth in the 2005/2006 period, as illustrated in Figure 16, below. The fastest growth rates were in road transport, with energy usage in freight increasing even more rapidly than private cars. Energy intensity 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.

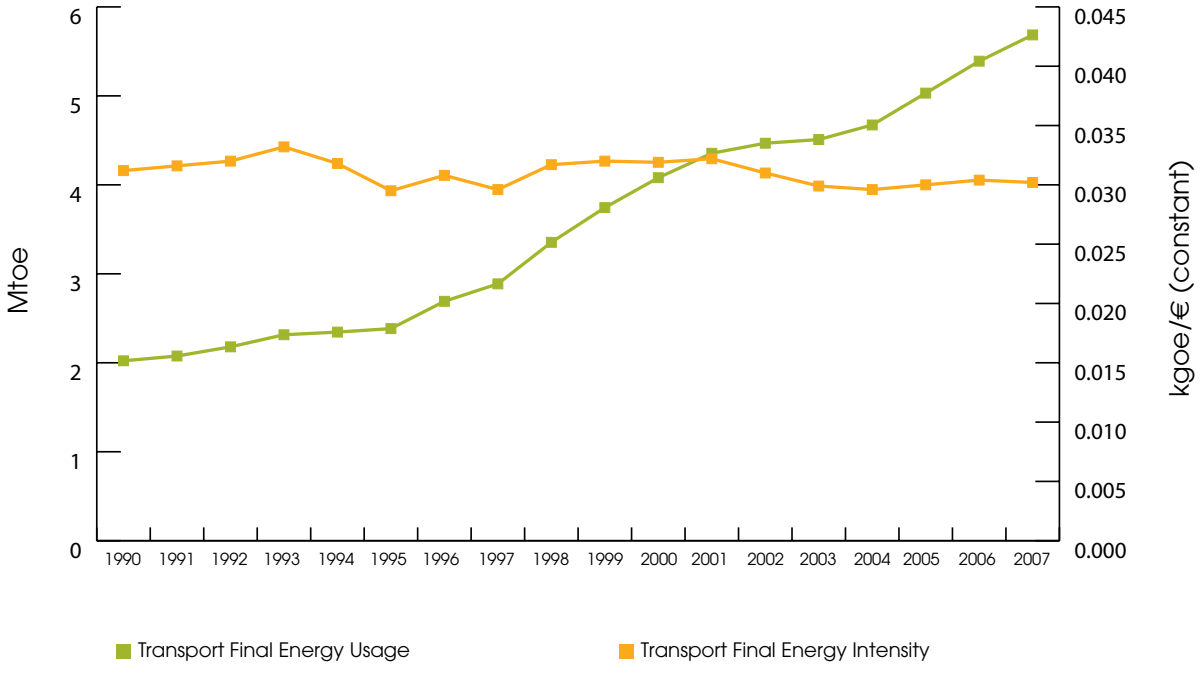


Figure 16: Energy Usage in Transport 1990 – 2007 (Final Energy Consumption)[65]

65 Source: SEI.

Current Action

Electric Vehicles

47. We will develop an electric vehicle deployment strategy that will result in a minimum of 10% of our passenger car and light commercial fleet being electrically powered by 2020.

The DCENR has established an inter-agency project steering group – consisting of representatives from the Department of Transport, Department of Finance, DEHLG, SEI, ESB and other relevant stakeholders – to put in place a comprehensive strategy to quickly advance deployment of electric vehicles into the road transport fleet. The group will examine international best practice in incentivising the use of electric vehicles.

On 3 April 2009, a Memorandum of Understanding (MOU) was signed between Ireland, ESB and the Renault-Nissan alliance to promote the introduction of electric vehicles in Ireland. Under the MOU, Renault-Nissan have committed to providing electric vehicles for sale in this country by 2011. ESB will provide the necessary infrastructure to support the rollout.

Sustainable Energy Ireland has published a report that considers the contribution electric vehicles can make in helping Ireland to reduce emissions of CO_2 from the road transport sector.[66] The report demonstrates that replacement of 10% of cars, vans and buses in Ireland with currently available models of hybrid and battery electric vehicles could reduce national CO_2 emissions by 0.35 million tonnes annually – the equivalent of removing emissions from over 100,000 cars on Irish roads.

A second report considering a range of measures to stimulate uptake of hybrid and battery electric vehicles[67] will inform the inter-agency project steering group strategy on deployment of electric vehicles. A number of demonstration projects are being considered for 2009.

Increasing the use of hybrid electric vehicles (HEVs) and/or battery electric vehicles (BEVs) has the advantage of reducing average vehicle energy consumption, and hence reducing CO_2 emissions, air pollutants and noise. The alterations made to the motor tax code (vehicle registration tax and annual motor tax), whereby taxation is linked to a car's CO_2 emissions, further support these actions.

Energy-Efficient Vehicles

48. We have restructured the Vehicle Registration Tax and motor tax systems to incentivise the purchase of more energy-efficient vehicles.

The number of vehicles on Irish roads more than doubled over the period 1990 – 2007, reaching over 2.4 million. Final energy use in the transport sector grew by 181% over that period, the fastest growth rate of all sectors of the economy. Over the same period the average engine size of the private car fleet has increased by 15%. Private cars with engines greater than 1.7 litres have increased their share from 13% in 1990 to 30% in 2007. The dominant share of private cars has shifted from the 0.9–1.2 litre engine-size category in 1990 to the 1.2–1.5 litre category in 2007.

Clearly this trend is not sustainable and requires action from Government to reverse the pattern of increasing engine size. As part of its 2008 Carbon Budget, the Government announced the restructuring of the VRT and motor tax codes from 1 July 2008.

All new cars registered from 1 July 2008 have their motor tax and VRT levied on the basis of their CO_2 emissions level, which is an indicator of their energy efficiency. Tax is payable based on seven bands: A–G. The CO_2 emissions for each band and the corresponding tax payable are set out in Table 8, overleaf.

66 *Hybrid Electric and Battery Electric Vehicles – Technology, Costs and Benefits* (November 2007).

67 *Hybrid Electric and Battery Electric Vehicles – Measures to Stimulate Uptake* (February 2008).

Band	CO_2 emissions: grams/km	Motor tax € p.a.	VRT tax % of OMV[68]
A	<120	104	14
B	121–140	156	16
C	141–155	302	20
D	156–170	447	24
E	171–190	630	28
F	191–225	1,050	32
G	>225	2,100	36

Table 8: New CO_2-Based Car Taxation Rates

Series-production electric vehicles and electric motorcycles are exempt from VRT. Provision also exists for a remission of up to €2,500 in VRT for hybrid-electric vehicles and flexi-fuelled vehicles, i.e. vehicles capable of operating on an E85 bio-ethanol mix.

Figure 17 below shows the dramatic effect that the new taxation system has had in the period July – December 2008. The combined share of bands A and B had grown to 22.5% in 2007 and 24.8% in 2008 up to July. During July – December 2008 this share increased to 59% of new registrations, with the combined bands A, B & C accounting for 84% of registrations since the introduction of the changed taxation system compared with 41% of registrations in 2007. Conversely, sales of bands E, F and G were 33.4% in 2007 and 28.7% up to July 2008. After July these bands accounted for just 6.1% of new cars. However, it won't be until a full year's data on the new system is available that the lasting effect can be analysed.

49. We are enhancing the labelling system for cars to provide more information on CO_2 emissions and on fuel economy.

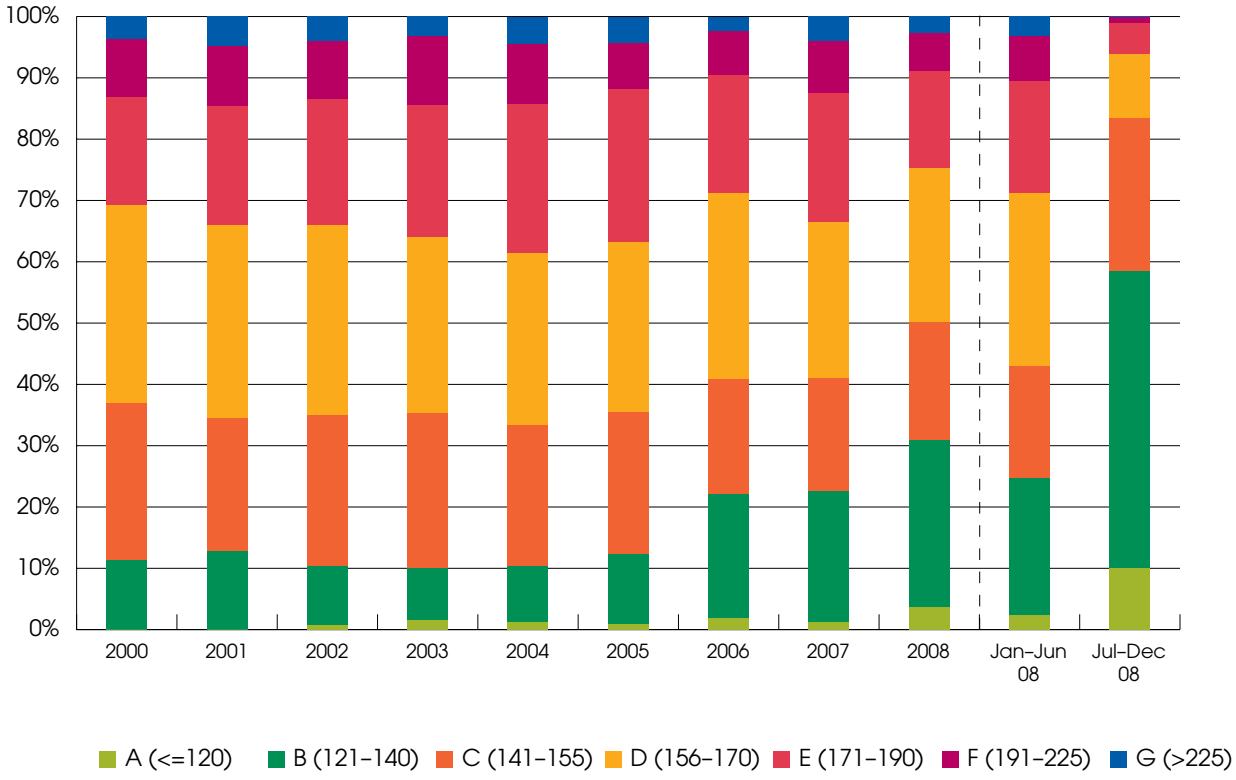


Figure 17: Shares of New Private Cars in Each Emission Band 2000 – 2007 (+2008 YTD)[69]

68 Original Market Value.

69 Source: Based on Vehicle Registration Unit data.

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 an energy label detailing the vehicle's fuel efficiency and CO_2 emissions. The Regulations also require that car showrooms display such information in a prominent position at all points of sale.

In the context of the new CO_2 based motor tax and VRT system, which came into effect on 1st July 2008, the Minister introduced, in co-operation and with the agreement of the Society of the Irish Motor Industry, a revised labelling system for new cars. The new labelling system will strengthen the existing EU requirements under Directive 1999/49/EC.

The new label is designed to be more consumer-friendly and to assist buyers in evaluating the environmental impacts of different cars, as well as providing guidance on purchase and running costs. The label is displayed at point of sale and applies to all new cars offered for sale or lease from 1 July 2008. The label contains information on a car's fuel economy and CO_2 emissions. It also provides information in relation to the VRT payable and running costs.

The Commission has indicated that it has started work amending Directive 1999/49/EC relating to the availability of consumer information on fuel economy and CO_2 emissions for new cars. The amendments will aim, *inter alia*, at harmonising the design of the label.

50. We have provided a web-tool called *How Clean is your Car?* to assist and encourage car buyers to choose the most energy-efficient model.

Sustainable Energy Ireland has developed a website called *How Clean is Your Car?* (www.sei.ie/howcleanisyourcar) to help car-buyers make an informed choice. The site lists the fuel consumption, CO_2 and other performance figures of cars produced since 2000 and currently on the market in Ireland. The site also provides general advice and guidance on ways to reduce the impact of cars on the environment.

Figures are listed for most new petrol and diesel cars on sale in Ireland, as well as for cars powered by alternative fuels (Liquid Petroleum Gas/Compressed Natural Gas) and hybrid vehicles, which use both electric and internal combustion engines. This tool is being promoted through links from motor sales websites and www.change.ie

Public Transport Investment – Transport 21

51. We are promoting modal shift through investment in our public transport services under Transport 21.

Under Transport 21 we will be investing nearly €16 billion over the ten-year period 2006 – 2015 with the aim of transforming public transport in the Greater Dublin Area and greatly improving public transport nationally, in line 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 and will seek to accommodate up to 175 million additional trips by public transport every year. This equates to around 160,000 extra passengers at morning peak hour each day.

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

Further development of the Quality Bus Corridor (QBC) 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.

TaxSaver Commuter Ticket Scheme

52. We are encouraging use of public transport through tax incentives under the TaxSaver Commuter Ticket Scheme.

As an incentive to encourage the use of public transport, legislation was introduced in the Finance Act 1999 that allowed an employer to incur the expense of providing an employee with a monthly or annual bus/rail pass, without the employee being liable for benefit-in-kind taxation. This has become known as the Travel Pass or TaxSaver Commuter Ticket Scheme.

The Scheme involves employers providing employees or directors with public transport tickets while saving on employer PRSI payments. Employees participating in the Scheme benefit from reduced tax and PRSI payments. Employees receive tickets either as part of their salary package (salary sacrifice) or in lieu of an annual bonus.

Advice to Fleet Managers

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

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.

National Car Test

54. We are maintaining the fuel efficiency of older private cars through the National Car Test service.

The National Car Test (NCT) service 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.

More Efficient Road Traffic Movement

55. We are enabling more fuel-efficient, inter-urban freight and private car movements through improved road infrastructure.

Motorways and other high-quality road infrastructure allow long-distance inter-urban vehicle movements to take place in a more fuel-efficient manner. As vehicles can maintain higher gears and therefore lower revolutions for prolonged periods, with less need for braking/re-acceleration, fuel economy is maximised. This is particularly the case for heavy goods vehicles.

The major inter-urban motorways, Atlantic Corridor and M50 upgrade works being constructed under Transport 21, along with other recent major road infrastructure investments completed prior to Transport 21, such as the M50 and Dublin Port Tunnel, contribute to more energy-efficient Heavy Goods Vehicle and car movements.

Aviation

56. Extend emissions trading to the aviation sector through the transposition of the Aviation Directive.

In recognition of the need to reduce aviation emissions the Aviation Directive, adopted in 2008, provides for the inclusion of emissions from aviation in the EU Emission Trading System from 2012. We will work towards transposing this Directive over the coming year.

We will continue to work with the EU to progress the Single European Sky initiative to enhance capacity and promote efficiency through the restructuring of the air navigation system in Europe. A central objective of the initiative is to provide for optimal routing and profiling of flights in order to minimise fuel use and the associated negative environmental impacts.

Ireland entered into an agreement with the UK in June 2008 to work towards the integration of the existing, fragmented arrangements for the provision of air navigation services. A Functional Airspace Block (FAB) will be developed, the first of its kind in Europe, to improve the capacity of the air-traffic management system and provide for optimal flight paths for airlines.

Planned Actions

The Government's Smarter Travel Policy (STP) framework 2009 – 2020 sets out a strategy for enhancing the energy efficiency and wider sustainability of the transport sector with the overall aim of achieving a sustainable transport system by 2020.

A range of actions and key targets relevant to both rural and urban living are detailed in the plan. These are grouped in four overarching themes:

- reducing travel demand;
- providing alternatives to car travel;
- improving the efficiency of motorised transport;
- strengthening institutional arrangements to deliver targets.

Reducing Travel Demand

57. We will implement a demand management strategy as part of our STP and Transport 21 initiatives.

Demand Side Management (DSM) includes soft support measures for influencing behavioural change and achieving greater energy efficiency from the transport sector. Our Demand Management strategy will be phased in progressively as the infrastructure and services under Transport 21 are delivered. Actions detailed in the STP include 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, car clubs, flexible working (e-working), travel blending and individual workplace and school travel plans. Fiscal measures, such as road pricing or congestion charges, will be considered towards the end of the ten-year investment timeframe of Transport 21, when high-quality public transport alternatives to private car commuting are in place.

A specific freight Action Plan will be developed to consider the significant volumes of energy and emissions associated with road freight. Targets will be set to reduce environmental impacts and improve the efficiency of freight movement.

Spatial and Planning Policies

58. We will strengthen the relationship between land-use and transport planning for new developments and retrofit existing urban settlements.

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 enhance existing legislative provisions to 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. A range of specific measures for inclusion in future planning guidelines are outlined in the STP.

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. Through the STP a requirement will be placed on local authorities to produce 'retrofit' plans for the further promotion of public transport, cycling and walking.

59. We will introduce mobility management initiatives including support for workplace travel plans, school travel plans and personalised travel planning.

Travel planning seeks to encourage individuals and groups to change to more efficient and sustainable means of travel. This could include shifts to public transport, car sharing, and identification and promotion of safe walking and cycling routes. Examples of current initiatives in this area include the Dublin Transportation Office's One Small Step programme which promotes alternatives to car travel and efficient vehicle use, and An Taisce's Green Schools Travel Module which promotes alternative modes of travel and car sharing with school children.

Improving the Efficiency of Motorised Transport

60. We will take steps to promote achievement of the EU proposals for emission performance standards for new passenger cars.

As detailed in a position paper of the European Parliament the EU is seeking to set emission performance standards for new passenger cars as part of the Community's integrated approach to reduce CO_2 emissions from light-duty vehicles.

The EU has published legislative proposals to achieve an average emissions level of 130g of CO_2 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. The current EU proposal sets a target, for the new car fleet, of average emissions of 95g CO_2/km from 2020.

The first measure supporting this goal is the restructuring of the VRT and motor tax systems in Ireland.

Eco-driving

61. 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 vehicle's energy performance by as much as 20%. A public awareness campaign, which will be rolled out as part of the proposed STP and the National Climate Change Awareness Campaign, will focus on disseminating information and stimulating behavioural change. This will include advice on optimising mileage through vehicle maintenance, avoiding drag by minimising mass and car luggage, using air-conditioning sparingly, keeping windows and sunroofs closed, switching demisters off, optimising 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 the driver education curriculum, in order to raise awareness about fuel consumption savings associated with eco-driving. A module on efficient driving is proposed as part of the Rules of the Road and national driver test.

Providing Alternatives to Car Travel

62. We will implement the National Cycle Policy Framework and publish a National Walking Policy to encourage modal shift.

The Government announced in Budget 2009 a benefit-in-kind tax incentive to encourage cycle commuting. Our vision is to create a strong cycling culture in Ireland and ensure that all cities, towns, villages and rural areas will be cycling-friendly. Cycling will be a normal way to get about, especially for short trips. Next to walking, cycling will be the most popular means of getting to school, be it for primary or secondary.

A culture of cycling will be developed so that by 2020 it is envisaged around 160,000 people will cycle as their daily commute, up from 35,000 in 2006. Cycling will be encouraged as a mode for other purposes so that by 2020 10% of all our trips will be by bike.

The Government is also committed to creating a culture of walking in Ireland. We will ensure that urban walking networks are strengthened by increasing opportunities for walking and removing constraints as part of planning for more attractive public realms. We will publish a National Walking Policy, which will draw on the lessons and principles already developed in the context of tourism and recreational trails development. We will ensure that the policy combines the development of the national trails system with local recreational trails and include links to urban centres.

Strengthening Institutional Arrangements to Deliver Targets

63. We will introduce a Sustainable Travel and Transport Bill to complement the proposed Public Transport Regulatory Bill.

A number of institutional and legislative changes needed to support the delivery of the STP are proposed to draw together national, regional and local level actors in the transport sector. A Sustainable Travel and Transport Bill will be introduced to complement the proposed Public Transport Regulatory Bill to support the Government's vision.

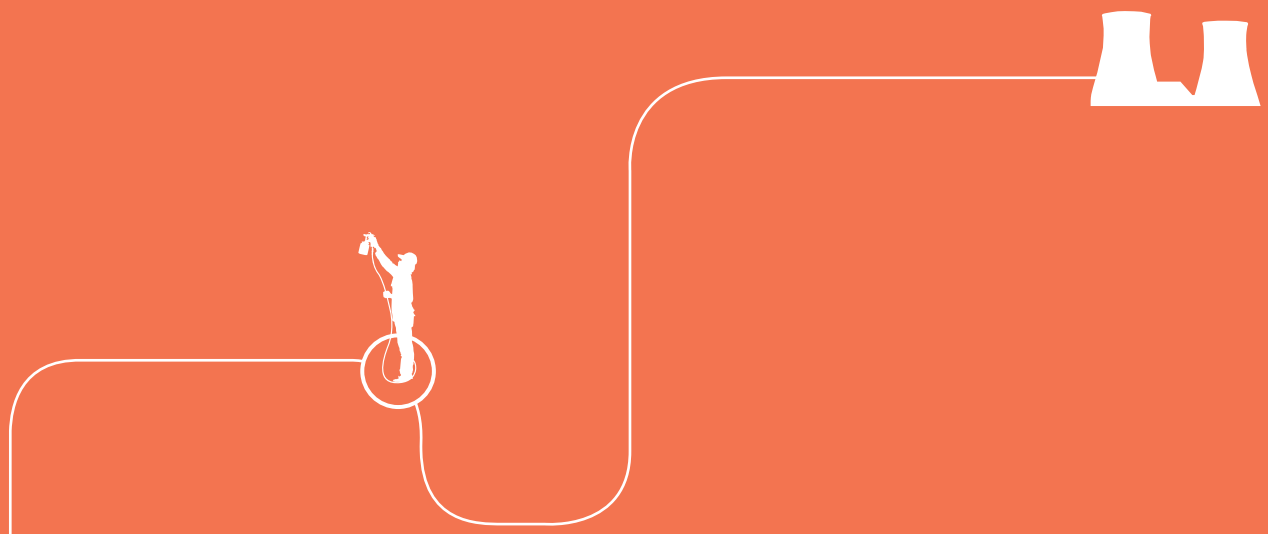
Smarter Transport

64. We will continue to rollout the use of real-time data as part of a smart transport system. Iarnród Éireann and DART already have real-time information systems in place. Bus Éireann is introducing real-time information systems in 2009. Bus Átha Cliath and Dublin City Council will begin using complementary real-time information systems in 2010.

State transport operators and some local authorities are rolling out real-time data as a basis for a smart transport system where commuters can avoid peak morning and evening traffic congestion leading to considerable savings in time, fuel and carbon emissions.

Chapter 09

Energy Supply Sector

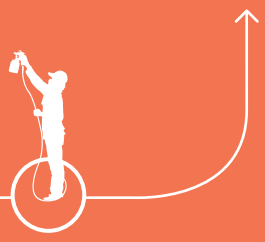


2020 Vision

The Irish energy sector will deliver competitively priced, low-carbon energy to all customers and assist them to use it as efficiently as possible.

Chapter 09

Energy Supply Sector



Achieving the Vision

- Users will be empowered to monitor and regulate energy use through the roll out of smart meter technology.
- Market actors will contribute to demand side energy savings through an obligation scheme.
- Competition and choice will be promoted through the development of the all-island energy market.

Current Action

65. We are promoting competition and choice and continuing to develop the All-Island Energy Market Framework across a range of energy priorities, building upon the establishment in 2007 of the Single Electricity Market, leading to a more efficient supply sector.

66. We are providing incentives to encourage large energy users to reduce peak energy use.

Planned Actions

67. We will work towards the introduction of an Energy Demand Reduction Target for energy suppliers.

68. We will prioritise energy efficiency in investment decisions for new generation plant.

69. We will complete a comprehensive cost-benefit review in 2009 of the potential for distributed generation.

70. We will reduce electricity distribution losses to 7.5% in 2010.

71. We will investigate the scope for reducing energy transmission and operational losses.

72. We will significantly expand our Demand Side Management initiatives.

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

74. We will implement a wide-ranging programme to fully investigate the opportunities and long-term policy options for the micro-generation of electricity via small-scale technologies.

75. We are examining the convergence of communications and electricity generation and distribution networks in order to develop a smart grid.

Introduction

Success in achieving our national 20% target is dependent on substantive efficiencies being leveraged from this sector. Energy efficiencies are envisaged from two perspectives: how energy is used to generate, distribute and supply final customers, and through supporting efficiency of end-use by final customers.

Addressing the overall efficiency of energy production in Ireland is of high importance: the addition of more energy-efficient plant and improvements in infrastructure have already resulted in a steadily upward trend in efficiency in recent years. 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. 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 energy industry continuously invests to meet increased demand, to replace ageing assets and to reduce losses. These factors often go together in any particular investment. For example, substantial improvements have been made in energy efficiency of electricity supply, as illustrated by Figure 18, below, which shows an increase in efficiency of from 33% in 1990 to 44.9% in 2007.

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.[70]

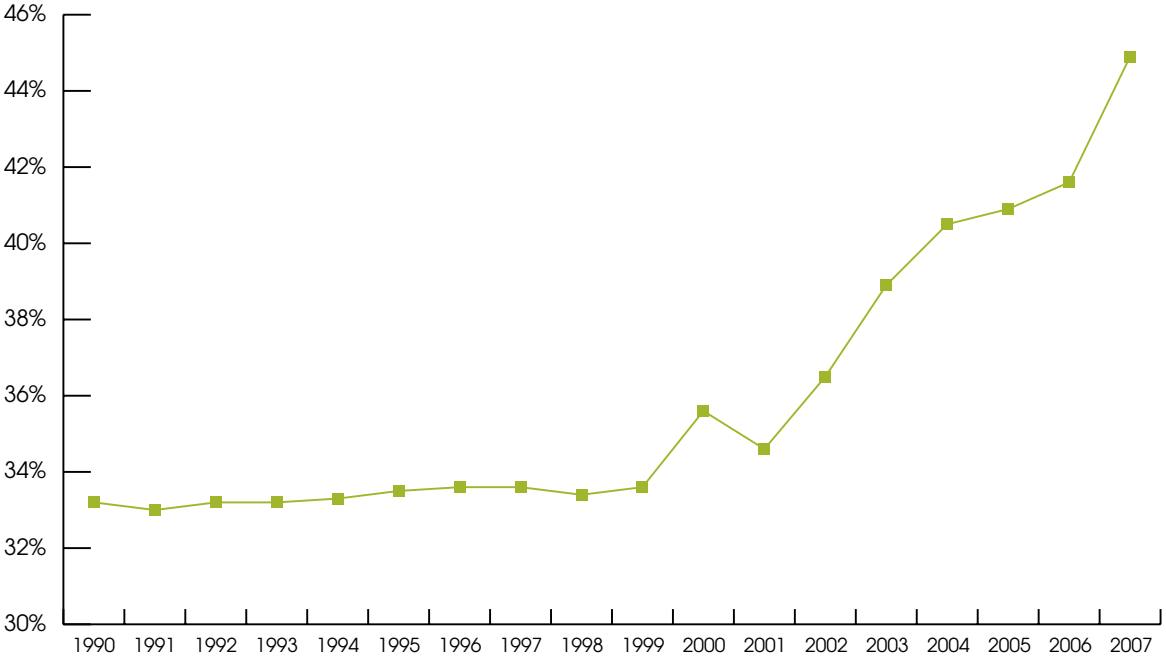


Figure 18: Energy Efficiency of Electricity Supply 1990 – 2007[71]

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

71 Source: SEI.

The current generation mix in Ireland comprises some 30% new, efficient, Combined Cycle Gas Turbine (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 seven years, 1,300MW of older plant will potentially be replaced by about 850MW of efficient CCGT and increased wind capacity.

A strategy for the Development of Ireland's Electricity Grid – *GRID25* was published in 2008 and sets out the roadmap for Ireland's electricity transmission network for the next 17 years. GRID25 provides an outline design for how the transmission network will be developed in the long-term to meet the challenges ahead. As outlined in the plan, EirGrid will double the capacity of the national grid by 2025. Investment of €4 billion in the infrastructure will allow for major increases in the amounts of renewable energy on the national grid.

There is still considerable scope for increasing efficiency further in the generation, transmission and distribution of electricity. 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.

Within the gas supply sector, scope for increased operational efficiencies is not as far-ranging as within the electricity sector. Nonetheless, a strategy of continuous operational efficiency improvements exists to maintain present efficiencies and implement necessary technological efficiencies for future operations.

An exciting initiative to support efficiency of end-use by final customers is the roll out of smart meters. Following on from a commitment in the Programme for Government and re-iterated in the energy policy framework to improve management of demand for electricity and achieve greater energy efficiency through use of the latest technology, the smart meters project aims to reduce electricity demand at peak times through Time of Use (ToU) tariffing. Smart metering is also being introduced on a pilot level within the gas supply sector. This all-encompassing approach to energy metering aims to improve overall energy efficiency through changes in customer behaviour resulting from increased awareness of energy usage. The smart metering project also aims to facilitate micro-generation as smart meters will also be able to record electricity exported to the grid.

Smart meters have the potential to make people aware of how much energy they are using and, in the case of electricity, how much it will cost them at any given time. As a result, they can prioritise their energy needs and benefit accordingly. The pilot phase of the Electricity Smart Metering programme was launched on 15 September 2008. It is anticipated that this phase will last for 18 months and will consist of both consumer behaviour and technology trials. The technology trial will look at meter functionality, supporting information and communications systems. In parallel, work is well advanced on the design of the customer behaviour and tariff aspects of the pilot phase. The trial will determine the potential of smart meters to effect measurable change in consumer behaviour and the potential of this to effect reductions in energy use.

As well as the efficiency of generation itself, the energy supply sector has a role in supporting efficiency among its customers, i.e. the end-users of the energy supplied. 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. Such an approach can be delivered via regulatory approaches, such as licence conditions or obligation schemes, with additional flexibility available through tradeable obligations (so-called White Certificates). Several EU

states have already placed such energy efficiency obligations on energy supply companies.

Current Action

All-Island Energy Market

65. We are promoting competition and choice and continuing to develop the All-Island Energy Market Framework across a range of energy priorities, building upon the establishment in 2007 of the Single Electricity Market, leading to a more efficient supply sector.

The key factor in influencing correct investment decisions is that prices at which energy is bought and sold should appropriately reflect long- and short-term costs. The All-Island Energy Market Framework has the overall aim to provide a more competitive energy market of better scale, improved security of supply and reduced energy costs in the interest of consumers both North and South. Launching the Single Electricity Market (SEM) in November 2007 was a major step. The SEM is the wholesale electricity market operating in Ireland and Northern Ireland.

The SEM provides for a competitive, sustainable and reliable wholesale market in electricity, aimed at delivering long-term economic and social benefits that are mutually advantageous to Northern Ireland and Ireland. The market encompasses approximately 2.5 million electricity consumers – 1.8 million in Ireland and 0.7 million in Northern Ireland.

The Single Electricity Market Operator (SEMO) facilitates the continuous operation and administration of the Single Electricity Market. The SEM 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.

We are working with Northern Ireland to progress common arrangements for gas as another strategic goal of the All-Island Energy Market Framework which would constitute an important step towards achieving improved security of supply and reduced energy costs in gas provision.

Winter Peak Demand Reduction Scheme

66. We are providing incentives to encourage large energy users to reduce peak energy use.

The Winter Peak Demand Reduction Scheme (WPDRS) was introduced in winter 2003/2004 as an incentive to encourage medium and large electricity customers to reduce electricity consumption during the power system's peak hours (5 – 7pm) in the winter months (November – March). Many industrial and commercial customers have taken advantage of the scheme.

Participants are rewarded for demand and consumption level reductions via payments based on pre-approved demand reduction and peak consumption reduction rates. Customers who reduce their demand and consumption according to their committed levels are rewarded. Customers who significantly deviate from committed levels do not receive payments, or receive a lower payment. Payments are made to participants by their respective supplier.

The scheme has delivered approximately 100MW of demand reduction in the years since it was set up, the equivalent of at least two existing low merit peaking units.

Planned Actions

Energy Efficiency Obligations

67. We will work towards the introduction of an Energy Demand Reduction Target for energy suppliers.

Energy efficiency obligations placed on suppliers or distributors of energy represent a very efficient and cost-effective option to achieve Demand Side Management by final customers. They are established through a legal obligation on suppliers or distributors, to achieve energy savings and peak load reduction from their customers through a range of approved measures.

Supplier or distributor obligations have a number of advantages. They utilise the expertise, large resources and customer relationships of the largest stakeholders in the market. They can be funded directly by the final customers through tariffs rather than the tax base and, since the measures applied will be amongst the most cost-effective, will offer customers a high economic return.

Successful schemes internationally have proven to be very cost-effective for both electricity and gas, with the cost of saving a unit of electricity significantly lower than the consumer cost of the fuels. An evaluation of the UK Carbon Emissions Reduction Target (CERT),[72] formerly the Energy Efficiency Commitment (EEC), reports the ratio of cost of gas to cost of savings per unit as approximately 3:1, and cost of electricity to cost of savings per unit as approximately 5:1.

The CERT, which came into effect in the UK on 1 April 2008 and will run until 2011, is expected to deliver CO_2 savings equivalent to the emissions from 700,000 homes each year, and stimulate about £2.8 billion of investment by energy suppliers in carbon-reduction measures. Obligations are also driving market transformation towards increasing proportions of highly efficient products for sale, and development of the skills base for their installation.

Article 6 of the Energy End Use Efficiency and Energy Services Directive (Directive 2006/32/EC) requires that Member States place one or more energy efficiency obligations on energy distributors, distribution system operators and/or retail energy sales companies. This applies to all forms of commercially available energy, including electricity, natural gas, LPG, coal and lignite, peat, transport fuels (excluding aviation and maritime bunker fuels) and biomass. The Directive specifies a number of options for these energy efficiency obligations from which Member States may choose.

Bearing in mind these options and the nature of the obligation scheme already in operation in Northern Ireland and the Single Electricity Market, the DCENR will work towards developing proposals for the introduction of an obligation scheme that will best suit the Irish energy market and that could maximise energy efficiency gains, while taking account of the diverse range of energy suppliers.

Investment in New Generation Plant

68. We will prioritise energy efficiency in investment decisions for new generation plant.

In the next few years 1,300MW of older plant will potentially be replaced by efficient Combined Cycle Gas Turbine (CCGT) and increased wind capacity.[73] Installing the more efficient CCGT plant typically increases electricity production efficiencies from 30–35% to 50–55%. This shift towards more efficient gas-fired plant could also reduce the primary energy conversion factor applied to electricity production.

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. It is foreseen that gas will constitute about 46% of the fuel mix for electricity generation by 2020, with oil being phased out as a primary fuel type. Development of clean coal technology for use with CCS will be monitored for application in Ireland in the medium to long-term.

72 *Evaluation of the Energy Efficiency Commitment 2002-05*, E. Lees (2006).

73 Source: *The Generation Adequacy Report 2008 – 2014* (EirGrid, 2007).

69. We will complete a comprehensive cost-benefit review in 2009 of the potential for distributed generation.

The energy policy framework sets a target of 33% of electricity consumption to be met by renewable energy by 2020, which has subsequently been increased to 40%. 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 2020 target 800MWe 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 that 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.

Transmission, Distribution and Operational Efficiencies

70. We will reduce electricity distribution losses to 7.5% in 2010.

71. We will investigate the scope for reducing energy transmission and operational losses.

The Commission for Energy Regulation (CER) has placed a target on the electricity supply 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 the Grid25 Strategy,[74] 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.

Bord Gáis Networks has implemented an energy efficiency strategy, with dedicated resources, that will be responsible for the development and implementation of ongoing efficiency improvement in overall network system operations. This strategy is also intended to maintain present efficiencies in the gas supply system as well as developing more efficient technology for future installations.

Demand Side Management

72. We will significantly expand our Demand Side Management initiatives.

We have a range of programmes already in operation that are designed to reduce electricity 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

74 Source: *GRID 25: A Strategy for the Development of Ireland's Electricity Grid for a Sustainable and Competitive Future* (EirGrid, 2008).

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 435GWh PEE in 2020. This estimate makes no assumptions about expanded DSM measures. Potential savings from an enhanced programme may be considerably higher.

A number of programmes are also in operation to target the reduction of energy consumption for heating and would typically provide incentives to decrease the dependency on fuels such as oil, gas and biomass.

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 and informed by *Demand Side Management in Ireland: Evaluating the Energy Efficiency Opportunities*, a study published by SEI in 2008.

Support for Combined Heat and Power (CHP)

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

Combined Heat and Power (CHP) is the simultaneous generation of power (electricity) and usable heat in a single process, at the point of use. CHP utilises the heat from electricity generation that would otherwise be wasted and also reduces electricity transmission losses. This process leads to a reduction in overall primary energy usage of 20–40% compared with use of the electricity generated at power stations, together with heat produced separately by on-site boilers. CHP can result in savings of up to 50% of CO_2 emissions compared with conventional sources of heat and power. Existing capacity of operational CHP is over 300MWe.

The SEI CHP Deployment Programme provides grant support to assist the deployment of small-scale (<1MWe), fossil-fired CHP and biomass (anaerobic digestion and wood residue) CHP systems. At present, the programme provides funding for feasibility studies (to assist investigation into the application of CHP across all size ranges and technologies) and investment grant support for small-scale, fossil-fired CHP and biomass CHP. The programme is expected to achieve savings of 30GWh per year from an additional capacity of up to 20MWe.

A study is underway to consider the current market barriers to broader uptake of CHP in Ireland. The report, due for release in 2009, will further consider options to achieve the 2020 target.

Electricity Micro-generation Programme

74. We will implement a wide-ranging programme to fully investigate the opportunities and long-term policy options for the micro-generation of electricity via small-scale technologies.

Micro-generation can provide a sustainable, reliable and affordable alternative to the traditional methods of power generation. In 2008, Government made available some €2 million to fund a pilot grant scheme to investigate the potential for on-site generation of electricity for own use.

Under this scheme, electricity was generated via small-scale technologies, such as wind turbines and solar power, with the potential to sell excess power back to suppliers. Grant support to meet 40% of the initial start-up costs was made available for the installation of micro-generation systems in approximately 50 trials to be conducted nationwide. Much of the programme comprised studies on technical, economic and market issues. Some examples of the technologies are Solar Photovoltaic (PV), Wind and Micro-Hydro (Water turbine).

The programme follows a change in regulations in 2007 allowing people to sell electricity back to the grid, which it is hoped will empower electricity users to take action. In 2009, this was followed by the announcement of a regulated public electricity supply tariff for micro-generator exports to the network and a supplementary payment for micro-generator exports to be provided by ESB Networks.

In further support of this measure, an 'inform and fit' connection policy has been introduced by ESB Networks to facilitate easy connection to the grid, and planning exemptions have been introduced by the Department of the Environment for certain categories of small-scale generation from low-carbon sources.

Along with the roll out of smart meters, this action aims to enable our farms and households to generate electricity for themselves and be paid for the excess they don't use.

75. We are examining the convergence of communications and electricity generation and distribution networks in order to develop a smart grid.

We are examining the convergence of communications and electricity generation and distribution networks in order to develop a smart grid which can increase the overall electricity network efficiency and incorporate a high input of renewable energy.

A smart grid is one which can automatically control energy demand by signalling connected equipment to power down at times when increased demand might cause the system to exceed its optimum efficiency. This can improve continuous matching of supply to demand and allow seamless integration of intermittent renewable energy sources into a power grid.

Smart grids can also facilitate the introduction of variable pricing tariffs, to incentivise users to use energy only at times when it is more available (e.g. lower price energy offered at off-peak times when there are high winds). Smart grids reduce the need to store energy generated by renewable sources.

Chapter 10

Research and Development Sector

2020 Vision

Ireland will be at the forefront of energy research, supporting the development of energy efficiency and renewable technologies in order to accelerate their contribution to Ireland's energy supply.

Chapter 10

Research and Development Sector

Achieving the Vision

- Adopting a strategic and integrated approach to developing our energy research capacity.
- Targeting a world-class research capacity in sustainable energy and energy efficiency technologies through Science Foundation Ireland.
- Provision of significant funds for research on energy efficiency, renewable energy sources, end-use technologies and related capacity building.

Current Action

76. We are ensuring a strategic and integrated approach to developing our energy research capacity.

77. We are targeting a world-class research capacity in sustainable energy and energy-efficient technologies through Science Foundation Ireland.

78. We have provided substantial funds for research, development and demonstration in energy efficiency, renewable energy sources, end-use technologies and related capacity building through Sustainable Energy Ireland.

79. We are supporting capacity development within third-level institutions through masters, doctoral and post-doctoral research fellowships in energy efficiency and demand reduction, renewable energy, energy modelling, sustainable transport and building energy use.

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

81. We are demonstrating and promoting, through Sustainable Energy Zones, the range of technologies, techniques, policies and behaviours that will help to deliver a sustainable energy future for Ireland.

82. We are co-ordinating Ireland's involvement in the Energy theme of the European Commission's Seventh Framework Plan (FP7), including implementation of projects funded under the CONCERTO activity area of FP7.

83. We are developing a Greenhouse Gas Abatement Cost Curve for Ireland.

Introduction

The Government's Strategy for Science, Technology and Innovation 2006 – 2013 has set a vision that by 2013 Ireland will be internationally renowned for the excellence of its research and be at the forefront in generating and using new knowledge for economic and social progress, within an innovation-driven culture. Energy research, development and demonstration (RD&D) forms an integral part of the Strategy and has never been more extensive in Ireland than it is at present, with considerable State and private sector investment, mainly through academic institutions and development companies. We consider research to be central to support the long-term movement 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 long-term 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 have put in place a structure that will ensure targeted and strategic spending on research and that will support continued growth whilst improving energy efficiency in transport, energy supply systems, buildings and industry for the island of Ireland. 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. The remit of Science Foundation Ireland (SFI) has been amended to develop a world-class research capability in the areas of sustainable energy and energy-efficient technologies.

Sustainable Energy Ireland (SEI) is leading the development of energy RD&D in a number of sector-specific fields, including ocean, infrastructure energy in buildings and sustainable bioenergy. SEI has also commenced the development of a research capacity for energy systems modelling and analysis. 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 (EPSSU) is charged with collecting, processing and publishing energy statistics to support policy analysis and development in line with national needs and international obligations. EPSSU conducts statistical and economic analyses of energy services sectors and sustainable energy options and contributes to the development and promulgation of appropriate sustainability indicators. SEI is supporting policymakers and the energy research community through the development of an annual inventory of Irish Energy Research Development and Demonstration activity.

Enterprise Ireland (EI), as part of its industrial development remit, supports the research and development of technologies, products and processes in companies and commercially focused applied research in academia. The following EI support schemes are underway:

- EI's R&D Fund supports several companies to undertake energy research.
- An Industry Led Research project researching energy management in commercial buildings has been funded in UCC/Tyndall.
- An Industry Led Research Programme in Ocean Energy is being developed to address the needs of the Wave and Tidal Energy Generator developers.
- EI in partnership with IDA Ireland has recently initiated two Competence Centres relevant to the sustainable energy industry, one in Energy Efficiency in Industrial Plants, the other in BioRefinery and BioEnergy. Industry has set the research agenda and will oversee Centre management.

At EU level, significant funding is available under the Seventh EU Framework Programme for Research and Technological Development (FP7 2007 – 2013). Energy is identified as one of ten themes within the Co-Operation Programme, which seeks to support transnational research in the fields of energy and environment. The majority of this energy research funding is targeted at collaborative research, with the objective of establishing excellent research projects and networks able to attract researchers and investments from Europe. The energy budget for 2007 – 2013 (€2.3 billion) will be targeted at developing a more sustainable energy system for Europe. Cross-cutting themes, such as Environment, Transport, Agriculture, ICT and Nanotechnology all have significant energy research dimensions. From an energy efficiency perspective, FP7 supports research into the optimisation, validation and demonstration of new concepts, optimisation of proved and new concepts and technologies for buildings, transport, services and industry. The European Strategic Energy Technology Plan (SET-Plan), adopted by the Commission in November 2007, aims to develop a European Area for Energy Research in order to overcome the fragmentation of Energy research in Europe.

Current Action

An Integrated Approach to Research & Development

76. We are ensuring a strategic and integrated approach to developing our energy research capacity.

The Irish Energy Research Council's strategy, in line with the energy policy framework 2007 – 2020, was published in May 2008. It reflects the three-way split for public support for energy research. SFI has responsibility for investing in academic researchers and research teams who are most likely to generate new knowledge, leading edge technologies and competitive enterprises in the fields of science and engineering which underpins three broad areas of biotechnology, information and communications technology, sustainable energy, and energy efficient technologies. The implementation of applied research and demonstration activities and programmes are the responsibility of SEI, with existing support schemes, such as those operated by EI, continuing to be available for commercial stage R&D activity.

The Strategy envisages five priority areas, termed strategic lines, for key energy research activity:

1. Research focused on energy systems modelling and analysis.
2. Fundamental frontier and multi-disciplinary research.
3. Applied research, development and demonstration in five priority, sector-specific fields.
4. Research support for mapping Ireland's energy resources.
5. Maintaining a 'watching brief' for technologies of potential application in Ireland.

Developing a World-class Research Capacity

77. We are targeting a world-Class research capacity in sustainable energy and energy-efficient technologies through Science Foundation Ireland.

On 7 May 2008, the Minister for Enterprise, Trade and Employment made Regulations (S.I. No. 134/2008) under section 7(3) of the Industrial Development (Science Foundation Ireland (SFI)) Act 2003 amending the remit of SFI to include sustainable energy and energy-efficient technologies. The Regulations fulfil the commitment in the Programme for Government to amend the remit of SFI to include a third research pillar in these

areas. The signing of the Regulations builds on the announcement at the Energy Forum on 6 March 2008 of targeted expenditure of €90 million to build a world-class research capacity through SFI in the area of sustainable energy and energy-efficient technologies over the period to 2013.

National Development Plan (NDP) 2007 – 2013

78. We have provided substantial funds for research, development and demonstration in energy efficiency, renewable energy sources, end-use technologies and related capacity building through Sustainable Energy Ireland.

As part of the NDP 2007 – 2013 funds are being directed at research on energy efficiency, renewable energy, end-use technology applications and demonstration and related energy research capacity building. The investment programme will also be used to leverage further funding from related EU programmes.

Sustainable Energy Fellowship Research Programme

79. We are supporting capacity development within third-level institutions through masters, doctoral and post-doctoral research fellowships in energy efficiency and demand reduction, renewable energy, energy modelling, sustainable transport and building energy use.

We are continuing to support, through SEI, the Sustainable Energy Doctoral Scholarship (doctoral and post-doctoral) research programme with the Irish Research Council for Science, Engineering and Technology (IRCSET). The scholarship programme for Sustainable Energy Doctoral and Post-Doctoral funding is the first of its kind in Ireland. Its aim is to support the development of capacity in Ireland for the understanding and delivery around the crucial topic of sustainable energy for the future. The programme is in its sixth year (2009) and is undertaken in co-operation with IRCSET's Embark Initiative. Scholars have been funded under the programme for work in energy efficiency, renewable energy and energy modelling. The emphasis is on innovative, original and exploratory research that is aimed at generating new knowledge and energising Ireland's future growth, development and national competitiveness. Research topics are in the areas of wind, solar and ocean energy, emerging technologies and building energy use.

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-term (up to 2010), medium-term (up to 2020) and long-term (up to 2050) energy demand and supply growth, using 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 are supporting a Post-doctoral Fellowship in Energy Analysis and Modelling. SEI is also supporting a Doctoral Fellowship in examining the link between energy efficiency indicators and energy policy measures.

We are supporting an energy research project that will develop, calibrate, test and run a partial equilibrium energy system optimisation model focusing on TIMES energy modelling. This energy modelling is being supported by SEI and the EPA and will draw on modelling tools currently being used in more than 100 institutions in over 50 countries. The core objective of this project is to model the Irish energy sector with a view to estimating the effect of policy decisions on the energy market and mix. The model results will provide energy system pathways to 2050, but the focus will be on the results in 2020 to inform energy and environmental policy, with a particular focus on the EU Burden Sharing Directives on renewable

energy and greenhouse gas emission.

Charles Parsons Energy Research Awards

80. 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 long-term sustainable research capacity in priority areas of energy research. The awards provide funding for early-stage researchers for extended periods of up to seven years, and have been widely welcomed by the research community. In 2006, the sum of €20 million over seven years was committed to the initiative, supporting the efforts of nearly 200 researchers and students (composed of 20 senior researchers, 34 PhD students with funding for 4 years and 124 undergraduate summer placements).

Sustainable Energy Zones

81. We are demonstrating and promoting, through Sustainable Energy Zones, the range of technologies, techniques, policies and behaviours that will help to deliver a sustainable energy future for Ireland.

The Dundalk 2020 Project aims to stimulate a paradigm shift in energy efficiency and the use of renewable energy technologies by supporting innovation, demonstration and deployment within an exemplar community.

Dundalk 2020 is being co-ordinated by SEI, and will demonstrate how a transformation to more sustainable living patterns can be initiated. Dundalk 2020 exemplifies the Sustainable Energy Zone (SEZ) concept, which recognises that energy is used in communities where housing, industry, public sector and transport exist side-by-side and are linked via the community rather than on a sectoral axis. The Dundalk community will act as a test bed for technologies, techniques, policies and measures that will lead to a more sustainable energy future. Various renewable technologies and a range of technologies for the rational use of energy, and for managing supply and demand, will be demonstrated. The actions in Dundalk involve all elements of the community – residential, commercial, educational, leisure, medical and industrial. Direct actions in Dundalk include:

- installation of a 1.8MW wind turbine on an industrial site;
- building a biomass district heating system;
- refurbishing over 100 houses to upgrade energy performance;
- building 100 new houses with an energy performance at least 30% above national building regulations;
- installation of wood-chip boilers in both new and old houses;
- building one commercial building (office block) with an energy performance 30% above building regulations;
- rolling out the new national programme of voluntary agreements with industry;
- establishing an energy bureau within the energy zone;
- using an Energy Services Company (ESCO) to build, operate and manage the output of the district heating and large wind-turbine systems and the demand of their users.

Increasing energy efficiency and increasing the proportion of electricity and heat from renewable sources will reduce the CO_2 emissions from the Dundalk Sustainable Energy Zone by 10,000 tonnes every year from 2010. National targets have been set for many facets of sustainable energy use, but the project is considerably more ambitious in that it is driving towards a carbon-neutral position. It

is envisaged to expand the SEZ initiative in future years to other areas in the country.

Sustainable Energy Projects

82. We are co-ordinating Ireland's involvement in the Energy theme of the European Commission's Seventh Framework Plan (FP7), including implementation of projects funded under the CONCERTO activity area of FP7.

The SERVE Project (Sustainable Energy for the Rural Village Environment) in North Tipperary aims to demonstrate sustainable energy use in rural communities. The project encompasses retrofit and new build development work and, together with strong local community support, will raise awareness of rational use of energy and renewable energy services.

The project will promote advanced retrofit technology and renewable energy services, to reduce heat demand in a cluster of villages by 40%. It aims to develop a sustainable region in North Tipperary through the implementation of actions in the field of sustainable energy. Actions will include energy upgrades for existing dwellings, installation of renewable energy heating systems, development of an eco-village in Cloughjordan and the development of a district heating system.

The SERVE consortium teams local actors with EU experts to facilitate technology transfer and to ensure best practice. Tipperary Institute is the co-ordinator of this project and is working in partnership with North Tipperary County Council, Sustainable Projects Ireland, Tipperary Energy Agency, Renewable Energy Management Services, Circa and Surface Power Technology. The consortium will upgrade 500 buildings.

The project will deliver Ireland's first district heating system, which will incorporate a state-of-the-art plant integrating wood-chip boilers with solar panels while achieving a balance between energy supply and energy demand. Smart metering and intensive monitoring will provide detailed performance data. The total project expenditure is €10.6 million, with an EU allocation of €4.1 million.

The HOLISTIC Project (Holistic Optimisation Leading to Integration of Sustainable Technologies In Communities) in Dundalk aims to integrate sustainable technologies into development by stimulating a paradigm shift in energy investment and use in three communities to more sustainable patterns. Together with Dundalk, the project is to be realised in two other selected zones: Mödling in Austria and Neuchâtel in Switzerland.

The HOLISTIC project will be co-ordinated by SEI, working in partnership with the lead Irish organisations of Dundalk Town Council and Louth County Council. Also participating are the Dundalk Institute of Technology, ESB Networks and Xerox. Wind, biomass and photovoltaic renewable technologies, plus a range of technologies for the efficient use of energy, will be demonstrated within the project.

This Project will cement Dundalk's status as an innovative gateway and is a demonstration of sustainable energy best practice. It is stimulating a change in energy investment that can be used as a model across communities in Ireland and the European Union. A number of different modelling techniques to help plan future community sustainable energy developments will also be explored. The project results will be energetically disseminated and promoted to the associated communities of Newry (Northern Ireland), Bratislava (Slovakia) and selected communities in Italy and the Mediterranean area. The total project expenditure is €31.66 million, with an EU allocation of €12.33 million.

Greenhouse Gas Abatement

83. We are developing a Greenhouse Gas Abatement Cost Curve for Ireland.

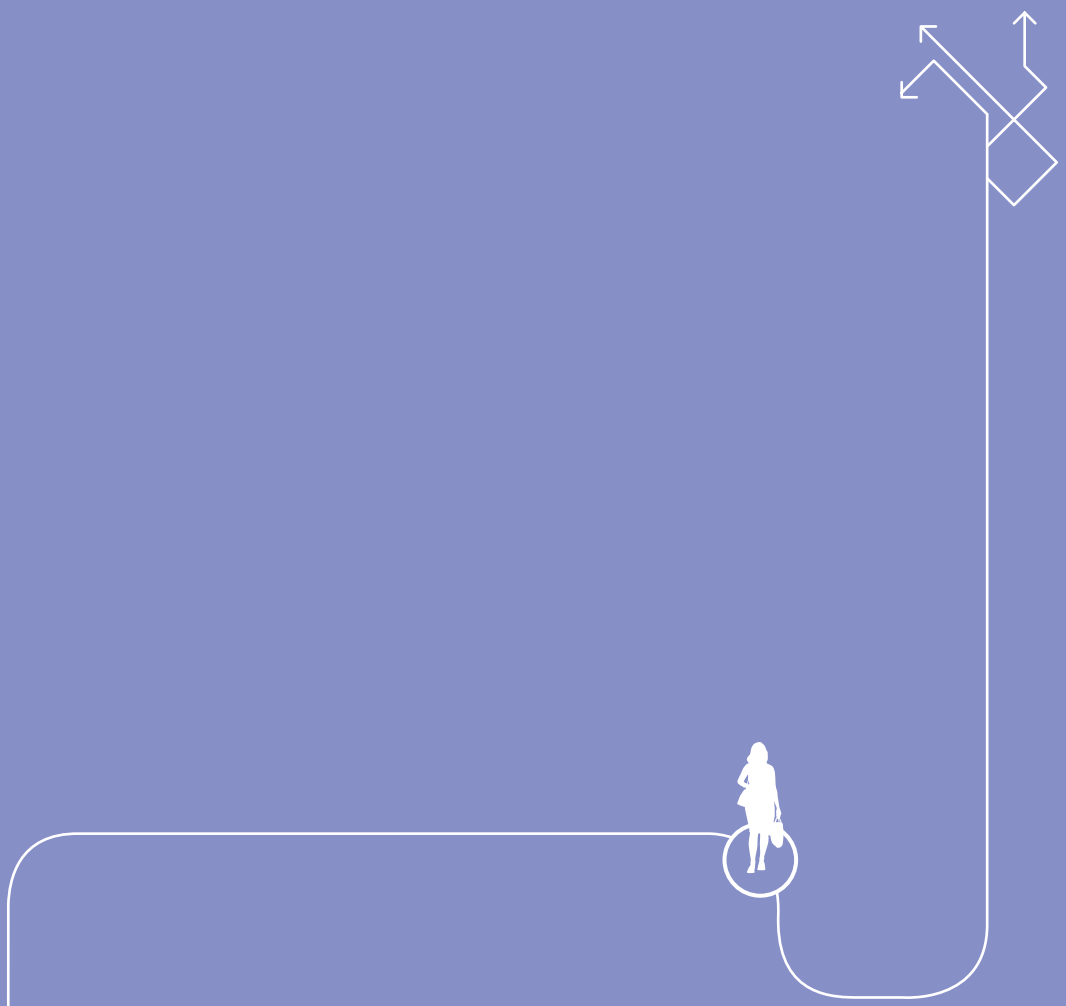
In order for Ireland to meet its GHG commitments for 2020 and beyond, it will be necessary to identify and pursue all of the abatement opportunities which are technically and economically feasible. Many such measures are believed to have a low marginal cost. Indeed, some (such as improved energy efficiency) are expected to generate net financial savings, implying that the marginal abatement cost is negative, as demonstrated by Figure 5 (Chapter 01). Other types of measures are more technically challenging and are expensive to implement, which has obvious implications for policymaking.

In this context, an abatement cost curve is a chart which quantifies the potential (within a specified country or region) arising from all feasible options for emissions reduction, up to and including a specified level of marginal cost. The cost curve is constructed as a series of rectangular segments, each of which represents a fully costed abatement option. These are sorted into ascending marginal cost.

Sustainable Energy Ireland has recently initiated a review of current and prospective options for GHG mitigation in Ireland over the period to 2030. This project, which is being financially supported by the ESB, is intended to provide an objective fact-base which will contribute to the ongoing policy discussion. As part of the review, an international team of consultants from McKinsey & Company has been engaged to analyse the available opportunities across each sector of the Irish economy, and to develop a GHG abatement cost curve. The work will be guided by an advisory group. In this regard, SEI has invited a range of stakeholders to participate, including public sector bodies, private sector organisations and academic institutions.

Chapter 11

Cross-Sectoral and Underpinning Measures



2020 Vision

We will transform the use of energy in Ireland, centred around informed consumers, providing appropriate market signals and active development of business, services and technologies.

Chapter 11

Cross-Sectoral and Underpinning Measures

Achieving the Vision

- Comprehensive campaigns to raise awareness of energy efficiency and contribution of inefficient use of energy to climate change.
- Implementation of a range of fiscal measures to protect and enhance the environment and examination of other measures, including the introduction of a carbon tax.
- Stimulate market actors, such as ESCOs, to deliver cost-effective energy efficiency measures to the market.

Current Action

84. We are raising awareness of energy efficiency and providing advice on how to be more energy efficient through Power of One, the National Energy Efficiency Awareness Campaign, and other initiatives, such as Green Schools.

85. We are raising awareness of the significant contribution of inefficient use of energy to climate change through our Climate Change Awareness Campaign – CHANGE.

86. We are implementing many fiscal measures to protect and enhance the environment and are examining other measures, including the introduction of a carbon tax.

87. We are involved in negotiations at EU level to advance higher energy efficiency standards for energy-using products.

88. We are promoting the development of training and accreditation schemes in the area of energy efficiency and renewable energy.

89. We will develop and publish a model contract template and Guidelines for Energy Service Companies (ESCOs).

90. We are publishing an annual report, *Energy Efficiency in Ireland*, which monitors progress on energy efficiency.

Introduction

Cross-sectoral measures are vital to creating the conditions for change and supporting all the sector-specific actions discussed in this Action Plan. Energy efficiency encounters barriers across various sectors, including lack of awareness, behaviour, motivation, competing priorities, hidden costs, finance and access to information. Encouraging a shift to energy-efficient choices requires a combination of awareness-raising, regulation and fiscal supports. Multimedia information campaigns like Power of One and CHANGE seek to raise awareness and change behaviour while creating and increasing demand for efficient products and services. Strong policy signals are also important to create 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 form 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.

Current Action

Power of One

84. We are raising awareness of energy efficiency and providing advice on how to be more energy efficient through Power of One, the National Energy Efficiency Awareness Campaign.

Since its launch in 2006, the Power of One has built a strong national presence and achieved wide recognition. We are building on this success to develop stronger and more cost-orientated messages. The campaign involves raising awareness of the impact of inefficient use of energy in terms of increased costs to the user, the economy and the environment. It informs and empowers energy users on how best to use energy efficiently at home and at work. The campaign also involves targeting individual sectors, such as homeowners, SMEs and schools, with specific energy efficiency initiatives.

Dedicated Website

The Power of One website, www.powerofone.ie, acts as a central hub for all campaign activity. To date, there have been almost 800,000 page impressions on Power of One web pages. Online users can take an interactive energy survey, get energy efficiency tips for the home and workplace, enter competitions, view the TV ads, etc. A Bebo site has also been developed to target a younger audience. To date, 30,000 Bebo members have viewed the Power of One page.

Power of One Street Project

The Power of One Street project tracked the energy use of families, a convenience store, a sport and leisure club and a school to highlight key Power of One energy efficiency messages. Each month, the participants were set a challenge to improve energy efficiency in their homes. Progress was reported on Ireland's national primetime news programme, online and across national and regional press. The families saved on average €500

in energy costs and reduced their CO_2 emissions by over 2 tonnes each. The school reduced its energy bill by almost €2,000 per year. Full details are available on www.powerofonestreet.ie.

Power of One at Work Project

Launched in September 2007 in partnership with SEI, Power of One at Work targets employees and employers across all sectors, including the public sector. Relevant energy efficiency advice and tips along with posters and information packs are available on www.powerofoneatwork.ie.

Campaign Impact

Consumer research 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 each of us makes can have a significant impact on the energy we use.

Green Schools Initiative

The Green Schools Initiative is an international environmental education programme and award scheme that promotes and acknowledges long-term, whole-school action for the environment. Unlike a once-off project, it is a long-term programme that introduces participants (students, teachers, parents and the wider community) to the concept of an environmental management system. The aim of Green Schools is to increase students' and participants' awareness of environmental issues through classroom studies, and to transfer this knowledge into positive environmental action in the school and in the wider community. Schools that have successfully completed all the elements of the programme are awarded the 'Green-Flag'. This award has now become a well-recognised Eco-Label. The award has to be renewed every two years.

Green Schools (Eco-Schools) is an initiative of, and co-ordinated on an international level by, FEE (Foundation for Environmental Education). There are currently over 23,000 schools in 43 countries in Europe, Africa, Asia, Oceania and South America taking part in the programme.

CHANGE

85. We are raising awareness of the significant contribution of inefficient use of energy to climate change through our Climate Change Awareness Campaign – CHANGE.

The Taoiseach and the Minister for the Environment, Heritage and Local Government launched the National Climate Change Awareness Campaign, CHANGE, in late 2007. The CHANGE campaign has two distinct phases: Challenge and Numbers.

Challenge

The launch phase focused on creating a shared understanding across Irish society. It sets out to motivate a change generation. The creative idea aims to inspire the nation by reference to a number of past generational challenges that we, as a nation, have overcome.

Numbers

The second phase is a 'Know Your Number' advertising and information campaign. This is based on the insight that each and every one of us has a carbon number that can be measured.

At the core of the CHANGE campaign is the online Carbon Calculator, which enables individuals and families to better understand their contribution to climate change. By simply filling in the online tool, users can calculate their personal carbon number. The calculator will then provide tailored advice and goals on how they can reduce their number, while also helping to save them money. The site also includes strong links to the Power of One energy-savings tips.

The Power of One and CHANGE campaigns have natural synergies and will be aligned with emphasis placed on ensuring that the message of each

campaign supports and reinforces the message of the other. It is critical to our ongoing efforts to reach our energy efficiency and carbon emissions targets that there is a consistent and mutually reinforcing approach to public awareness.

Price Signals and Financial Supports

86. We are implementing many fiscal measures to protect and enhance the environment and are examining other measures, including the introduction of a carbon tax.

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

- VRT remission, up to a maximum of €2,500, is available on Hybrid and Flexi Fuel vehicles registered between 1 July 2008 and 31 December 2010. This relief is limited, on a sliding scale, depending on the age of the vehicle;
- all new cars registered from 1 July 2008 have their motor tax and VRT levied on the basis of their CO_2 emissions level;
- 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.

Product Efficiency Standards

87. We are involved in negotiations at EU level to advance higher energy efficiency standards for energy-using products.

Most, if not all, energy-using products available on the Irish market are manufactured for the EU and possibly world markets. In general, it is not appropriate to set national energy efficiency standards for internationally traded goods that differ from those of our EU partners.

Together with other Member States, we have agreed the Framework Directive on Ecodesign of Energy Using Products (EuP Directive) (Directive 2005/32/EC, amended by Directive 2008/28/EC). In its EU Energy Efficiency Action Plan, the European Commission announced its intention to adopt minimum performance requirements for 14 priority product groups by the end of 2008 through the mechanisms of the EuP Directive. These included consideration of products under the categories of heating and water-heating equipment, electric motor systems, lighting in the domestic and tertiary sectors, domestic appliances, office equipment in both the domestic and tertiary sectors, consumer electronics and HVAC (heating ventilating and air conditioning) systems. To date, measures have been adopted for standby and off mode controls, simple set-top boxes, domestic lighting, office and street lighting, and external power supplies.

Preparatory studies are proposed for products under the following (indicative) categories from 2009 onwards. The product groups will be prioritised in order of the estimated potential for energy savings within Europe:

- air-conditioning systems and heat pumps;
- electric and fossil-fuelled heating equipment;
- food-preparation equipment;
- in-house networking and data-processing, storing and providing equipment;
- industrial and laboratory furnaces and ovens;
- machine tools;
- refrigerating equipment;

- sound- and image-processing machines and equipment;
- transformers;
- water-using equipment.

We are analysing proposals for each product group as they emerge and, in consultation with industry, we are working in the Consultation Forum established under the EuP Directive to maximise energy efficiency standards for all products.

Qualification, Accreditation and Certification schemes

88. 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 (ESD) 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 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 Warmer Homes Scheme;
- 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;
- SEI's Renewable Energy Installer Academy – promoting the development of accredited training courses for installers of domestic renewable energy sources.

Developing the Energy Service Sector (ESCOs)

89. We will develop and publish a model contract template and Guidelines for Energy Service Companies (ESCOs).

As detailed in the public sector chapter, 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. The ESCO benefits from an income stream based on receiving a pre-determined portion of the value of energy saved, and the client from ongoing reduced energy bills.

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.

A study was commissioned by SEI in 2005 to provide a review of the existing Irish and EU ESCO market, to consider barriers and to determine the potential for its future development, with a view to formulating policy to encourage the uptake of energy services via the ESCO model. A number of key imperatives were identified, namely, the need for flexible, performance-based contract arrangements providing guarantee of energy savings, plant performance and/or energy cost rates. 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 also 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 2009, 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.

Information-gathering

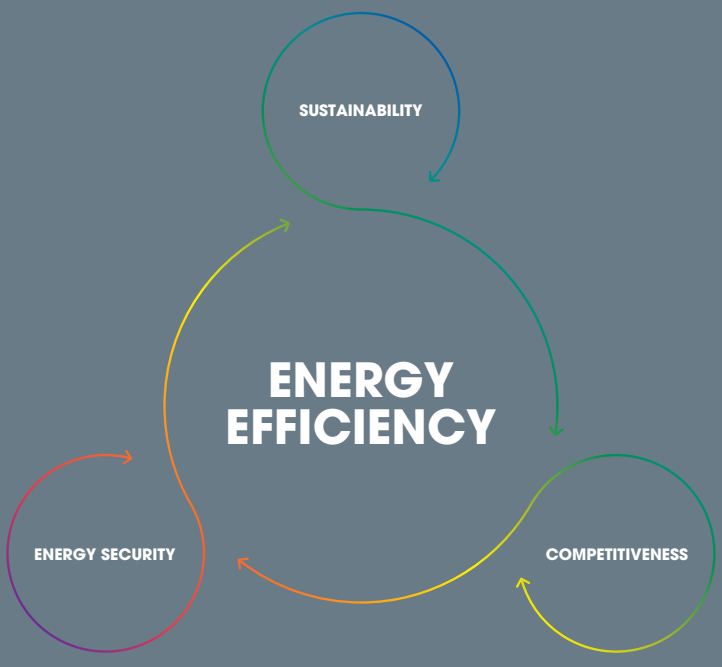
90. We are publishing an annual report, Energy Efficiency in Ireland, which monitors progress on energy efficiency.

Since 2007, we have commenced publishing a new annual *Energy Efficiency in Ireland* report. This new annual report forms the basis for the monitoring of progress on energy efficiency and on the targets discussed in this Action Plan. This is the first SEI (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 behind the statistics. 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.

Section 03

Implementation, Reporting and Review



Chapter 12
Delivery

Achieving the targets for energy savings in 2016 (ESD) and 2020 (national target) represents a significant challenge and will require major programme investment, best-practice design and implementation of policy interventions from Government, as well as a change in the way we all think about using energy on a day-to-day basis. We believe that delivery of the actions outlined in this plan, and those that evolve in future iterations, are essential components of delivering a sustainable energy future for Ireland.

Delivery of Actions

There are 90 actions identified in this Action Plan, with multiple agencies involved in their implementation. Many of these actions are already being implemented, while others are in the process of being formulated by the relevant agencies. Further actions will be developed over the lifetime of this plan that will contribute significantly to the achievement of our savings targets.

Details of the organisation(s) responsible for delivery of each measure listed in this Action Plan, together with an indicative commencement date, are contained in Table 9. As new actions are identified and results for active programmes become available, the Action Plan will be updated at regular intervals to take account of this new information. Clearly, in order to maintain a focus and to drive the achievement of our targets, a co-ordinated effort will be needed to monitor the implementation of actions, identify corrective or alternative actions, where necessary, and ensure that the contribution of actions to our targets is being recorded accurately.

Monitoring and Reporting

In order to ensure that this Action Plan is delivered, an inter-departmental group is being established which will involve the key delivery organisations. This Group will be responsible for the achievement of the actions and measures contained within this Action Plan and will report to Government as appropriate.

In addition to co-ordinating the overall achievement of the targets contained within this Action Plan, the Implementation Group will be tasked with preparing an annual report for Government on the progress in implementing this Action Plan and towards the achievement of our targets. The Implementation Group's report will be informed by the *Energy Efficiency in Ireland* report, which will be published annually by SEI (EPSSU).

Given the broad scope of the actions and measures contained within this Action Plan, there will be a requirement to set up a number of other Working Groups focused on identifying and bringing into existence new initiatives, such as for Green Procurement and an Energy Demand Reduction Target. Likewise, it is recognised that the public sector will play an important role in achieving the 20% national target. A Public Sector Energy Efficiency Group will be convened after the publication of this Action Plan in order to co-ordinate and drive actions and measures in the public sector. Work has already commenced on creating guidelines for public sector organisations to enable them to produce effective energy efficiency Action Plans.

Energy Services Directive

A fundamental element of the Action Plan is its iterative nature. The ESD provides a timetable by which second and third National Action Plans must be submitted to the European Commission (2011 and 2014). The Implementation Group will work to these timetables.

No.	Action	Responsible agency	Commencement date
Public sector			
1	We are supporting exemplary design and energy management practice by public sector organisations through SEI's Public Sector Building Demonstration Programme.	Sustainable Energy Ireland (SEI)	Ongoing
2	We are localising the delivering of energy efficiency measures through the Local Energy Agencies.	Department of Communications, Energy and Natural Resources (DCENR), Department of Environment, Heritage and Local Government (DEHLG), Local Energy Agencies	Ongoing
3	We have rolled out an energy rating system to public buildings from 2008.	SEI, Office of Public Works (OPW), all public sector organisations	2008
4	We will establish in 2009 a high-level Working Group involving key Departments and Agencies to draw up and oversee implementation of an Action Plan for achievement of the 33% energy savings target for the public sector.	DCENR	2009
5	We will investigate the feasibility of a public sector obligation scheme to facilitate achievement of the 33% target.	DCENR, SEI	2009
6	We will require all public sector bodies to produce annual reports setting out their energy efficiency actions and progress towards the 33% target for the sector.	DCENR	2009
7	We will introduce energy efficiency programmes for Government Departments, State Agencies, Local Authorities, the Health Service and all other areas of the public sector.	DCENR, SEI, Office of Public Works (OPW)	2009
8	We will assist public sector agencies with buildings over 1,000m^2 to improve their BER as displayed on their Display Energy Certificates initially to a D1 level or better.	DCENR, SEI, OPW	2009
9	We will investigate the feasibility of applying a minimum standard beyond Building Regulations for new buildings (including significant renovations) intended for use by public sector bodies.	DCENR, SEI, OPW	2009

No.	Action	Responsible agency	Commencement date
10	We will put in place in 2009 mechanisms to facilitate and enable the exchange of energy efficiency best practice between public sector bodies, at local, national and international level.	SEI	2009
11	In 2009, we will introduce Guidelines for Green Public Procurement in the Public Sector.	DEHLG	2009
12	We will require public bodies to purchase only energy-efficient lighting when installing or replacing lighting.	DCENR, SEI, Local Authorities	2007
13	We will require that all street-lights and traffic-lights are energy efficient.	DCENR, SEI, Local Authorities	2009
Business sectors – industrial & commercial			
14	We are providing tax incentives to encourage companies to buy the most energy-efficient equipment.	DCENR (Lead), SEI, Department of Finance, Revenue Commissioners	2008
15	We are supporting the growth of sustainable energy enterprises.	SEI	Ongoing
16	We are supporting the networking and exchange of best energy efficiency practice by the largest industrial energy users through the Large Industry Energy Network.	SEI	Ongoing
17	We are supporting businesses in maximising their energy efficiency through adoption of IS393, the Irish Standard for Energy Management.	SEI	Ongoing
18	We are assisting smaller businesses with limited resources to improve their energy management through the Energy MAP initiative.	SEI	Ongoing
19	We are assisting the SME sector with a targeted scheme providing assessments of their energy use and advice on their energy management.	SEI	Ongoing
20	We are recognising and rewarding best achievements in energy efficiency through the Sustainable Energy Awards.	SEI	Ongoing
21	We are requiring developers of new buildings of over 1,000m^2 to carry out a feasibility assessment of using renewable energy systems for the building.	DEHLG	2007

No.	Action	Responsible agency	Commencement date
22	We are supporting the Energy Star initiative in Ireland to promote energy efficiency in office equipment.	DCENR	Ongoing
23	We have rolled out a Building Energy Rating system to business premises from 2008.	SEI	2008
24	We will take steps to ensure the provision of advice to end-users on the efficient use, maintenance and replacement of boilers and other heating systems, and on alternative solutions.	DCENR, SEI	2009
25	We will initiate a programme to maximise the energy efficiency of commercial new buildings through encouragement of best practice/exemplar designs that far exceed the energy performance standards of current building regulations.	SEI	2009
26	We will actively work with State enterprise and business promotion agencies and industry representative bodies to promote the benefits to business of greater energy efficiency.	SEI, DCENR	2008
27	We will ensure all air-conditioning systems with a rated output of 12kW are regularly inspected by trained experts to ensure that they operate to maximum energy efficiency.	DCENR, SEI	2009
28	We will review Non-Domestic Building Regulations in 2010.	DEHLG	2010
29	We will demonstrate the significant potential available through ICT efficiencies, working closely with the industry, utilising technological solutions such as virtualisation, co-location, efficient IT hardware, optimised cooling technologies, and energy management controls.	DCENR, SEI	2009
30	We will plan for the development of energy efficient cloud computing and co-location of data centres.	DCENR, SEI	2009
31	We are investigating the use of advanced optical switching technology in advanced communication networks.	DCENR, SEI	2009

No.	Action	Responsible agency	Commencement date
Residential sector			
32	We are providing grants and other incentives to householders to upgrade the energy efficiency of older homes through the Home Energy Saving scheme.	SEI; DCENR	2009
33	We will encourage more energy-efficient behaviour by householders through the introduction of smart meters.	CER, SEI, DCENR, ESB Customer Supply	2007 – 2012
34	We are upgrading the energy performance of homes occupied by those on low incomes through the Warmer Homes Scheme.	SEI (Lead), DCENR	Ongoing
35	We are providing grants to older people through the new Housing Aid for Older People Scheme, including grants for works that will improve the energy efficiency of their homes.	Local Authorities (lead), DEHLG	Ongoing
36	We are providing grants to householders to install certain renewable energy technologies through the Greener Homes Scheme.	SEI (Lead), DCENR	Ongoing
37	We are ensuring a move to highly efficient condensing boilers through Regulations setting a minimum efficiency standard for all new and replacement oil and gas boilers.	DEHLG (lead), SEI	2008
38	We have been steadily improving the energy performance requirements for housing since 1992.	DEHLG	1992
39	We have made new Building Regulations that deliver a 40% improvement in new housing energy efficiency standards.	DEHLG	2007
40	We are preparing the house-building sector and wider society for the adoption of ever higher building energy standards by supporting developers who build to standards well above those prescribed by law.	SEI (lead), DCMNR	2008
41	We are promoting higher standards of energy efficiency in social housing.	DEHLG	Ongoing
42	We rolled out a Building Energy Rating system to new houses from 2007 and have extended this to existing houses from 2009.	SEI, DEHLG, DCENR	2007, 2009

No.	Action	Responsible agency	Commencement date
43	We are encouraging more energy-efficient communities through our spatial and planning policies.	DEHLG	Ongoing
44	We are promoting the need for efficient energy use in the home through the National Energy Efficiency Awareness Campaign – Power of One.	DCENR	Ongoing
45	We will create an awareness campaign to encourage householders and other building owners to maximise the energy efficiency of their boilers through regular servicing and, where necessary, replacement.	SEI, DCENR	2009
46	We will investigate the feasibility of applying a minimum standard for dwellings occupied by those in receipt of rent supplement.	DCENR, SEI, DSFA	2009
Transport sector			
47	We will develop an electric vehicle deployment strategy that will result in a minimum of 10% of our road transport fleet being powered electrically by 2020.	DCENR, DOT, DEHLG, SEI, ESB	2009
48	We have restructured the VRT and motor tax systems to incentivise the purchase of more energy-efficient vehicles.	Department of Finance, Revenue Commissioners	2008
49	We are enhancing the labelling system for cars to provide more information on CO_2 emissions and on fuel economy.	DEHLG	2008
50	We have provided a web-tool called *How Clean is your Car?* to assist and encourage car buyers to choose the most energy-efficient model.	SEI	2008
51	We are promoting modal shift through investment in our public transport services under Transport 21.	DOT, Railway Procurement Agency, Iarnród Éireann, Dublin Bus, Dublin City Council, Dublin Transportation Office (DTO)	2006 – 2015
52	We are encouraging use of public transport through tax incentives under the TaxSaver Commuter Ticket Scheme.	Department of Finance, Revenue Commissioners	Ongoing
53	We are providing transport-specific advice on energy management to fleet managers.	SEI	Ongoing

No.	Action	Responsible agency	Commencement date
54	We are maintaining the fuel efficiency of older private cars through the National Car Test system.	DOT	Ongoing
55	We are enabling more fuel-efficient, inter-urban freight and private car movements through improved road infrastructure.	DOT	Ongoing
56	We will work at an EU level to extend emissions trading to the aviation sector and to progress the Single European Sky initiative.	DOT	Ongoing
57	We will implement a demand management strategy as part of our Smarter Travel and Transport 21 initiatives and co-ordinate public transport with park and ride. We will seek to encourage integrated ticketing and intelligent transport systems.	DOT, Dublin City Council, National Roads Authority, DTO	TBC
58	We will strengthen the relationship between land-use and transport planning for new developments and retrofit existing urban settlements.	DEHLG	Ongoing
59	We will introduce mobility management initiatives including support for workplace travel plans, school travel plans and personalised travel planning.	DOT	TBC
60	We will take steps to promote achievement of the EU proposals for emission performance standards for new passenger cars.	DOT	TBC
61	We will raise public awareness of the benefits of eco-driving.	DOT	TBC
62	We will implement the National Cycle Policy Framework and publish a National Walking Policy to encourage modal shift.	DOT	TBC
63	We will introduce a Sustainable Travel and Transport Bill to complement the proposed Public Transportation Regulatory Bill.	DOT	2009

No.	Action	Responsible agency	Commencement date
64	We will continue to rollout the use of real-time data as part of a smart transport system. Iarnród Éireann and DART already have real-time information systems in place. Bus Éireann are introducing real-time information systems in 2009. Bus Átha Cliath and Dublin City Council will begin using complementary real-time information systems in 2010.	DOT, SEI	2009
Energy supply sector			
65	We are promoting competition and choice and continuing to develop the All-Island Energy Market Framework across a range of energy priorities, building upon the establishment in 2007 of the Single Electricity Market, leading to a more efficient supply sector.	CER, DCENR	2007
66	We are providing incentives to encourage large energy users to reduce peak energy use.	CER, EirGrid	Ongoing
67	We will work towards the introduction of an Energy Demand Reduction Target for energy suppliers.	DCENR, SEI, CER	2009
68	We will prioritise energy efficiency in our investment decisions for new generation plant.	DCENR	2007 – 2013
69	We will complete a comprehensive cost-benefit review in 2009 of the potential for distributed generation.	DCENR	2009
70	We will reduce electricity distribution losses to 7.5% by 2010.	CER	2010
71	We will investigate the scope for reducing energy transmission and operational losses.	CER	TBC
72	We will significantly expand our Demand Side Management initiatives.	DCENR, SEI, ESB, CER	2008
73	We will achieve at least 400MWe of CHP by 2010 and aim to achieve at least 800MWe by 2020.	DCENR, SEI	2010, 2020
74	We will implement a wide-ranging programme to fully investigate the opportunities and long-term policy options for the micro-generation of electricity via small-scale technologies.	SEI	2009

No.	Action	Responsible agency	Commencement date
75	We are examining the convergence of communications and electricity generation and distribution networks in order to develop a smart grid.	DCENR, SEI, EirGrid	2009
Research and development sector			
76	We are ensuring a strategic and integrated approach to developing our energy research capacity.	DCENR	2007
77	We are targeting a world-class research capacity in sustainable energy and energy-efficient technologies through Science Foundation Ireland.	Science Foundation Ireland (implementation lead), Department of Enterprise, Trade and Employment, DCENR	2008
78	We have provided substantial funds for research, development and demonstration in energy efficiency, renewable energy sources, end-use technologies and related capacity building through Sustainable Energy Ireland.	SEI	Ongoing
79	We are supporting capacity development within third-level institutions through masters, doctoral and post-doctoral research fellowships in energy efficiency and demand reduction, renewable energy, energy modelling, sustainable transport and building energy use.	SEI	Ongoing
80	We are providing funding to early-stage researchers in priority areas of energy research through the Charles Parsons Energy Research Awards.	DCENR (transfer to SEI in progress)	Ongoing
81	We are demonstrating and promoting, through Sustainable Energy Zones, the range of technologies, techniques, policies and behaviours that will help to deliver a sustainable energy future for Ireland.	SEI, DCENR	Ongoing
82	We are co-ordinating Ireland's involvement in the Energy theme of the European Commission's Seventh Framework Plan (FP7), including implementation of projects funded under the CONCERTO activity area of FP7.	SEI, DCENR and DETE	2008

No.	Action	Responsible agency	Commencement date
83	We are developing a Greenhouse Gas Abatement Cost Curve for Ireland.	SEI (Lead)	2009
Cross-sectoral measures			
84	We are raising awareness of energy efficiency and providing advice on how to be more energy efficient through Power of One, our National Energy Efficiency Awareness Campaign, and other initiatives, such as Green Schools.	DCENR	Ongoing
85	We are raising awareness of the significant contribution of inefficient use of energy to climate change through our Climate Change Awareness Campaign – CHANGE.	DEHLG	2008
86	We are implementing many fiscal measures to protect and enhance the environment and are examining other measures, including the introduction of a carbon tax.	Department of Finance, DEHLG, DCENR	Ongoing
87	We are involved in negotiations at EU level to advance higher energy efficiency standards for energy-using products.	Department of Enterprise, Trade and Employment (lead), DCENR, SEI and Enterprise Ireland	Ongoing
88	We are promoting the development of training and accreditation schemes in the area of energy efficiency and renewable energy.	SEI	Ongoing
89	We will develop and publish a model contract template and Guidelines for Energy Service Companies (ESCOs).	SEI	2009
90	We are publishing an annual report, *Energy Efficiency in Ireland*, which monitors progress on energy efficiency.	SEI	2007

Table 9: Timetable for Delivery

Chapter 13

The Challenge Ahead – Realising Potential Savings

Mind the Gap

Our existing and committed actions are projected to deliver 23,730GWh PEE of energy savings in 2020. Our national target of 20% is equivalent to an energy saving of 31,925GWh PEE in 2020. We are therefore projecting that a further 8,195GWh PEE in energy savings will need to be captured by programmes or policy measures that have not been identified or commenced at this point, or by additional policy measures and programmes.

This chapter discusses the extent of potential further energy savings that have been identified in recent studies or through SEI's modelling, and the programmes or measures that have been recommended for implementation. Given that there is over a decade until our 2020 target date, it would be surprising if many new possible avenues for achieving further energy savings did not open up. In particular, there are huge potential savings from an extension of the Home Energy Saving scheme, the Accelerated Capital Allowances, CHP deployment and an Energy Demand Reduction Target, not to mention electric vehicles and the potential of the transport sector generally.

While we may have set ourselves a challenging target, we are not alone in recognising the potential of energy efficiency to reduce our dependence on fossil fuels and contribute to our national climate change strategy. Energy efficiency is a priority for all members of the European Union and of the International Energy Agency. Ireland will continue to study policy developments in our fellow Member States in order to ensure that we are pursuing all appropriate avenues to maximise our energy savings.

Studies of Potential Savings

13.1 Public Finance Mechanisms to Support Investment in Energy Efficiency Investments in Ireland.[75]

This study examines public finance mechanisms aimed at supporting investment in energy efficiency measures. It illustrates the potential financial and economic implications of the adoption of energy-efficient technologies, and the justification and scope that exists for Government intervention in encouraging such investment by end-users. The study examines a range of policy options that might be used to encourage energy-efficient investments. It seeks to identify and evaluate financial mechanisms that will help to alleviate gaps and market barriers currently being faced by the sustainable energy industry. The mechanisms identified are appraised using cost-benefit and sensitivity analyses.

For the residential sector, the report recommends a policy that provides a capital grant equal to a certain percentage of the capital costs of the energy efficiency investments. This is the policy being pursued through the Home Energy Saving scheme.

For the business sector, the report recommends tax credits of a percentage of capital expenditure on selected products/technologies, offset against tax liabilities in the first year in which expenditure is incurred and/or soft/discounted loans. This former is the policy being pursued through the Accelerated Capital Allowances for Energy-Efficient Equipment, which were introduced in the Finance Act 2008.

The Report also recommends the establishment of Green Funds. It describes the basic features of Green Funds as follows:

- tax breaks are provided for individual taxpayers to invest in green investment funds;
- funds are invested in energy efficiency developments/products that have clear carbon abatement targets;
- returns on funds are lower than would otherwise be the case, as investors would be willing to accept a lower rate of return on investments given the tax break;

75 Source: SEI (2007) Unpublished.

- companies receive the benefit of reductions in the cost of capital.

The Report notes that Green Funds have been successful in the Netherlands and have attracted significant involvement from commercial banks. The scheme has changed the behaviour of the top Dutch banks, which have been motivated to set up a green bank, or green fund, in their product portfolio as a result of pressure from their customers who wish to invest in environmental projects. The Dutch scheme's popularity is illustrated by the €1.5 billion allocated project capital in 2005. Carbon dioxide savings under the Dutch scheme amounted to 818,000 tonnes in 2005.

Further analysis of the Green Fund concept is clearly warranted, in particular the potential for take-up in Ireland, the cost to the Exchequer in tax forgone and the energy efficiency and carbon abatement benefits that such a scheme could bring.

13.2 Demand Side Management in Ireland – Evaluating the Energy Efficiency Opportunities.[76]

This report considers the energy efficiency potential in the residential, commercial and industrial sectors for oil, gas and electricity. It offers important information as to where the greatest and most cost-effective opportunities for energy usage and demand reduction lie. It also assesses the likely costs of capturing this potential, as well as the environmental and financial benefits of doing so.

The report estimates that economic energy savings totalling 25,640GWh PEE are available in the three sectors examined. Table 10 shows a breakdown of the energy-saving potential identified in the Report.

	Economic saving potential GWh PEE (Primary energy equivalent)			
	Electricity	Oil	Gas	Totals
Residential	6,590	3,420	1,850	11,860
Commercial	6,000	1,560	1,000	8,560
Industrial	2,170	2,290	760	5,220
Total	14,760	7,270	3,610	25,640

Table 10: Potential for Economic Savings by Energy Form[77]

The Report analyses best practice internationally in energy efficiency policies and programmes and recommends a number of programmes for implementation. The following recommendations were made for the residential sector.

Residential Online Audits

The Report recommends the provision of an online tool that would allow householders to estimate their usage by end-use and to identify measures to save energy in their homes. A number of similar tools are already available. The effectiveness of these existing tools and the potential benefits will be further assessed.

Lighting and Appliance Programmes

Marketing and financial incentives to increase the number of installed energy-efficient lights and appliances are recommended. This issue is being considered in the context of existing and planned activities as well as part of the Power of One energy efficiency awareness campaign.

Residential Retrofit

Development of an audit and installation programme for a range of energy-efficient technologies to increase the efficiency of existing housing stock. The Minister for Communications, Energy and Natural Resources introduced just such a programme in 2008, namely the pilot Home Energy Saving (HES) scheme. Nationwide roll-out of this programme began in 2009.

76 Source: SEI (January 2008).

77 Source: SEI.

Residential New Construction
The provision of financial incentives for developers who go beyond the standards of the Building Regulations. The Minister for Communications, Energy and Natural Resources launched a pilot Low Carbon Housing Programme in 2008. This programme builds on the success of SEI's House of Tomorrow Programme, and has the same key programme aim: to inform future revisions of the residential building regulations envisaged for 2010 and 2013.

The following recommendations were made for the commercial and industrial sectors.

Business Financial Support Programme
Financial incentives for new equipment or retrofits, identified by audits or other assessments, to seek energy-saving and peak-load reduction for business customers. The Accelerated Capital Allowances for Energy Efficient Equipment introduced by the Finance Act 2008 is the first step in addressing this issue. The potential for future expansion of the scheme into new areas will be considered in light of its success.

Commercial New Construction Programme
Financial incentives for savings in new buildings for energy efficiency measures that exceed the building regulations for non-residential buildings.

The Report also makes recommendations on the level of programme spend necessary to achieve the national 20% energy efficiency savings target for 2020. It estimates that an investment level of approximately €37 million per annum will be necessary to achieve this target. This relates only to the residential, commercial and industrial sectors and to electricity, oil and gas. However, the net benefits of this level of investment greatly outweigh the costs and are estimated in the report as €280 million per annum.

The Report does not address the level of investment needed in the transport sector.

Identified Sectoral Potential

This section examines the main areas of potential within each sector, taking into account the results of SEI's modelling of the energy economy and the quantified estimates of potential energy savings available from this modelling.

Potential in the Public Sector

Under the energy policy framework, Government has committed to achieving 33% energy efficiency savings in the public sector by 2020. This is estimated to represent approximately 3,240GWh PEE of identified savings in 2020, but is subject to revision when SEI's EPSSU has collected more precise data.

Although the energy savings potential will vary from one public sector body to another, every public sector body will be expected to contribute significantly to meeting the Government's ambitious target. Many initiatives are underway throughout the public sector to improve energy efficiency, some of which are detailed in Chapter 05, 'The Public Sector'. SEI has been tasked with ensuring that Ireland's statistical modelling capability is among the most advanced in the world.

This Action Plan acknowledges only 140GWh PEE of energy savings arising from a programme that can be identified directly as relating to the public sector, SEI's Public Sector Building Demonstration Programme. Thus, in the absence of other identified savings, some 3,100GWh PEE of energy savings in the public sector remain to be captured in order to achieve the 33% target. A Public Sector Energy Efficiency Working Group will be established in 2009, comprising representatives of the public sector bodies responsible for large elements of public sector energy use. This Group will be tasked with drawing up recommendations for Government on the actions that can be undertaken in the public sector to achieve the 33% target, including the potential of placing energy efficiency obligations on public sector bodies.

A key part of the initial work of the Group will be to quantify the extent of existing energy efficiency initiatives within public sector bodies, share experience of best practice, co-ordinate action and, most importantly, develop and implement, subject to Government approval, the detailed measures for achievement of the 33% public sector target. Proposed actions in this regard are detailed in Chapter 05.

Potential in the Business Sector

The report *Demand Side Management in Ireland – Evaluating the Energy Efficiency Opportunities*[78] identified 8,560GWh PEE of economic potential in the commercial sector and 5,220GWh PEE in the industry sector (total 13,780GWh PEE). This Action Plan identifies 8,200GWh PEE savings in 2020 for business (industry and commercial) sector programmes.

Business (industry and commercial) sector programmes	Estimated GWh PEE savings in 2020
Building Regulations 2005 – improved efficiency of non-residential buildings	560
Building Regulations 2010 – 30% improvement on energy performance of non-residential buildings relevant to current building regulations	1,360
SEI Large Industry Programmes (Energy Agreements (IS393 and Large Industry Energy Network))	4,070
SEI small business supports – Energy MAP and training for small businesses	565
Existing ESB demand side management initiatives	435
Renewable Heat Deployment Programme (ReHeat)	410
ACA for energy-efficient equipment	800
Sector Total	8,200

Table 11: Identified savings in the business sector.

If all these savings are taken into account (including the impact of new building regulations), a remaining potential of 5,580GWh PEE (13,780 – 8,200GWh) is indicated.

SEI experience in the business sector 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. Extensions have been made to the current suite of energy management business support programmes operated by SEI in 2009 and new support programmes and mechanisms will be considered in the future.

Modelling by SEI considers one mechanism by which some of this remaining potential could be achieved. Consideration is given to a hypothetical programme providing fiscal supports to 5,000 small, 1,500 medium and 250 large companies to a value of €60 million. At a 30% Exchequer contribution per company towards the cost of an energy audit and implementation of its recommendations for energy efficiency improvements, it is estimated that savings in the order of 2,300GWh PEE could be achieved.

Section 46 of the Finance Act 2008 introduced Accelerated Capital Allowances for purchases by companies of energy-efficient equipment within specified categories and was subsequently extended in Budget 2009. Estimates of the savings potential of this measure have been included in this Action Plan. We will be actively assessing the success of this scheme and the potential for future expansion. We are confident that this measure can deliver further significant energy efficiency savings.

78 (SEI, January 2008)

Potential in the Residential Sector

Modelling of potential savings in the residential sector suggests 11,860GWh PEE of economically achievable energy savings are achievable with an aggressive set of measures. These savings will come from both retrofitting of existing homes and construction of new homes to an ever improving standard of energy performance.

Savings from these and other actions identified in this plan which focus on existing residential dwellings are summarised below.

Residential sector	Estimated GWh PEE savings in 2020
Building Regulations 2010	1,100
Low Carbon Homes 2013	395
SEI House of Tomorrow Programme	30
SEI Warmer Homes Scheme	170
Home Energy Saving scheme	600
Smart meter installation	690
Greener Homes Scheme	265
Ecodesign for Energy-Using Appliances (Lighting)	1,200
Efficient Boiler Standard	2,400
Sector Total	**6,850**

Table 12: Identified Savings in the Residential Sector (Subset)

The economic potential modelled for the residential sector (11,860GWh PEE) is equated with a subset of identified actions for the residential sector to give an indication of remaining potential. The subset includes all actions except the expected impacts of the 2008 and preceding Building Regulation reviews, given that expected savings from these measures had already been accounted for in the modelling. This results in expected savings of 6,850GWh PEE for known actions, which can be equated with the potential for the sector identified by the modelling.

This methodology indicates that 5,010GWh PEE (11,860–6,850GWh), of potential energy savings exist in the residential sector even after existing proposed measures are considered.

SEI has given further consideration to where this potential exists. Based on an analysis of the existing housing stock, it is estimated that the ultimate energy saving potential for attic, cavity wall and wall-lining insulation technologies is 2,690GWh PEE, as detailed in Table 13, below.

Technology	Number of insulations	Efficiency potential (GWh/year) PEE
Attic insulation	500,000	1,250
Cavity wall insulation	62,000	380
Wall-lining insulation	120,000	1,060
Total		2,690

Table 13: Potential Energy Savings in the Residential Sector

A portion of this potential will be achieved by the HES scheme and Warmer Homes Scheme, however it is clear that even for the limited number of technologies considered here, significant savings potential is achievable by further retrofitting existing dwellings.

The Energy Demand Reduction Target, which is described in Chapter 09 is one such new programme that is being considered at present and which could be leveraged to capture some of the remaining insulation potential.

SEI's modelling of the residential sector in Ireland also provides an estimation of the potential electricity savings available through a range of selected appliance upgrades. The potential is based on an assumed penetration and efficiency of existing appliances being replaced by more energy-efficient appliances. The technologies considered include fridges, freezers and other domestic electrical appliances. The economic

potential for such measures has been estimated at approximately 1,150GWh PEE in 2020.

Potential in the Transport Sector

In 2006, the transport sector accounted for 34% of primary energy demand and 41% of final energy demand, consuming more than twice as much energy as industry.[79] Final energy use has grown by 181% between 1990 and 2007 – the fastest growth rate of all sectors. As such, energy efficiency improvements in this sector would be particularly welcome.

The Minister for Transport recently published the Smarter Travel Policy (STP) Framework 2009 – 2020. This initiative identifies the policy measures that can yield significant energy savings. The STP is based upon a consultation document, *2020 Vision: Sustainable Travel and Transport*. The policy document sets out a strategy for enhancing the energy efficiency and wider sustainability of the transport sector.

In developing the STP, the Department of Transport (DoT) reviewed existing and potential policy interventions, with the overall goal of an immediate reduction in the annual increase in energy demand and emissions. The document proposes a vision of a sustainable transport system by 2020, which aims for a significant shift towards the use of public transport, car sharing, cycling, walking and reduced travel, as well as improved access to transport services. It also provides an outline of how the transport system could be complemented by travel demand measures, including soft measures or information on travel choices, fiscal measures and regulatory instruments.

The Action Plan identifies 4,670GWh PEE of savings associated with measures considered most likely to be delivered between now and 2020. This estimate is based on an analysis undertaken by the Department of Transport for the purpose of the STP and has been adjusted by SEI to enable equation of these estimates with savings from other sectors identified in the Action Plan and the overall target. This included adjustments for potential double counting between measures and alignment with current EU methodologies for calculating savings (i.e. for 'efficient driving measures').

Transport sector	Estimated GWh PEE savings in 2020
Improved fuel economy of private car fleet	1,530
Efficient driving measures	655
Electric vehicles deployment	955
Mobility management – travel plans	1,090
VRT / Motor tax changes	200
E-working	150
More sustainable public transport fleets	90
Sector Total	4,670

Table 14: Identified Savings in the Transport Sector

In addition to the list of current and committed measures accounted for in Chapter 04 (Table 4: Projected energy savings 2020), the STP identifies additional potential within the transport sector. This includes options such as reduced speed limits, congestion charges, and further alignment of spatial land-use and transport planning. A conservative estimate of savings for these measures of 3,800GWh PEE is identified as additional potential not currently linked to committed actions.

Projected energy savings from any programmes or measures arising from these initiatives will be evaluated and incorporated into the next iteration of this Action Plan.

Potential in the Energy Supply Sector

Energy efficiency obligations placed on suppliers or distributors of energy represent a very efficient and cost-effective option to reduce final energy

79 *Energy in Transport* (SEI, December 2007).

consumption. Such obligations could make a significant contribution to our national energy efficiency target.

Further, as detailed in the Sustainable Energy White Paper, targets have been set of 400MWe of installed CHP capacity by 2010 and 800MWe by 2020. Based on analysis of results of a survey of existing CHP installations in Ireland in 2006, and an assumed mix of biomass and fossil fuel CHP installations sufficient to reach these targets, energy savings of approximately 1,130GWh are available in 2020 should the targets for CHP deployment be realised. SEI's CHP Deployment and ReHeat Programmes provide significant market demonstration of CHP technology, however only a small contribution towards the targets is expected from these measures. Requirements on developers of new buildings over 1,000m^2 to investigate alternative energy supply sources includes giving consideration to CHP. A study is underway to consider the current market barriers to broader uptake of CHP in Ireland. The report, due for release in 2009, will further consider options to achieve the 2020 target.

Cross-Sectoral Potential

A Commission on Taxation was established on 14 February 2008 to review the structure, efficiency and appropriateness of the Irish taxation system. As part of its terms of reference, the Commission was asked specifically to investigate fiscal measures to protect and enhance the environment, including the introduction of a carbon tax. The Commission is required to report on the results of its examination and consideration and to make such recommendations to the Minister for Finance no later than 30 September 2009. The next iteration of this Action Plan will take account of developments on this issue.

Conclusions

The extent of realisable potential energy efficiency savings available in the energy supply sectors and from a carbon tax cannot be estimated at this time. However, the situation will become clearer in the next few years as ongoing analysis and programme development is completed. Table 15, below, summarises the identified energy efficiency saving potential for the business, residential and transport sectors discussed above.

Sector	Identified potential GWh PEE
Business Sector	5,580
Residential Sector	5,000
Transport Sector	3,800
Total	14,380

Table 15: Summary of Identified Potential Savings

Based on savings identified in Chapter 04 there remains an additional 8,195GWh PEE of savings yet to be captured. This will need to be made up from a combination of identified potential (14,380GWh PEE), achievement of the remainder of the public sector 33% target and expected savings required to reach the CHP target for 2020.

Targets	Savings GWh PEE
Public sector target (remaining)	3,100
CHP potential	1,130
Total	4,230

Table 16: Savings Required to Achieve Targets

International experience has shown that this potential will not be realised without appropriate supports and incentives which will require additional Exchequer investment in energy efficiency over the period up to 2020. Future Action Plans will reflect new programmes and measures adopted over the coming years and consequent energy savings estimated from those programmes.

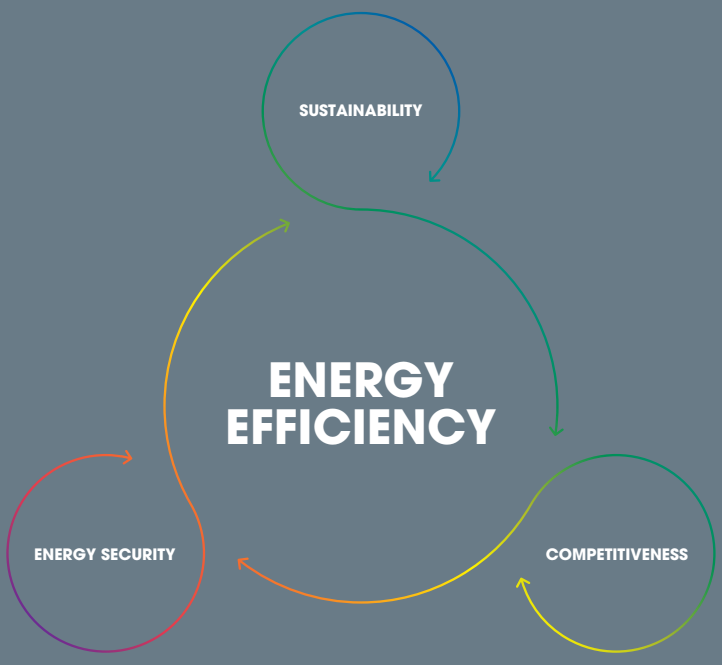
Section 04

Annexes

Annex 01
Submissions Received during the Consultation Process

Annex 02
Methodology

Annex 03
Glossary of Terms



Annex 01

Submissions Received during the Consultation Process

Organisations

Airtricity

Association of Irish Energy Agencies

Aughinish Alumina Ltd

Bord Gáis

Bord na Móna

Carlow Kilkenny Energy Agency

Carlow LEADER Rural Development Company Ltd

Cavan County Council

Comhar – Sustainable Development Council

Cork City Energy Agency

Cork County Energy Agency

Cúram

Department of Agriculture

Department of Finance

Department of the Taoiseach

Development Agencies

EirGrid

ESB

Ethos Ltd

Fingleton White & Co. Ltd

Galway Energy Agency

Gluaiseacht (for Global Justice)

Irish Business Employers Confederation (IBEC)

Irish Exporters Association

Irish LP Gas Association

Limerick Clare Energy Agency

MacArdle McSweeney Associates

Mid-West Regional Authority

North Tipperary County Council

SERVE, Tipperary Institute

South-East Regional Authority

South Tipperary County Council

South West Regional Authority

Tipperary Energy Agency

Viridian Power and Energy

Wexford County Council

White Young Green

Individual Submissions

Mr Dave Deighan

Mr Shane McLoughney

Annex 02

Methodology

The Energy Services Directive requires the calculation of an energy savings target (Annex 1 of the ESD) and a harmonised methodology for estimating actual savings against that target (Annex 4 of the ESD). The methodology for the savings will be developed progressively by the European Commission and individual Member States in the coming years through a technical Working Group. For now, we have assumed the current understanding of the methodology in Annex 1 of the ESD.

The ESD specifies that the 9% target is to be calculated as 9% of a baseline Reference Energy Consumption (REC). The REC is calculated as the average of the most recent five-year period (2001–2005) of unadjusted final energy consumption, expressed as 'primary energy equivalent'. 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 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:

Primary energy equivalent PEE = (Total Final Consumption (TFC) – Electricity TFC) + (Electricity TFC x 2.5)

Thus, in adopting the ESD approach for the national target, this is calculated as 20% of the average of unadjusted final energy consumption 2001 – 2005, expressed as 'primary energy equivalent'. Given that the policy measures and programmes outlined in this document must also serve to contribute to the ESD target, it makes sense to adopt the ESD approach for the higher national target. Although the national target covers the whole economy, excluding aviation and marine bunker fuels, the ESD is required to exclude the emissions trading sector; this means that REC differs for the national and ESD targets.

Only monitored contributions from specified programmes can contribute towards the achievement of the ESD target. This rule will also be adopted for the national target.

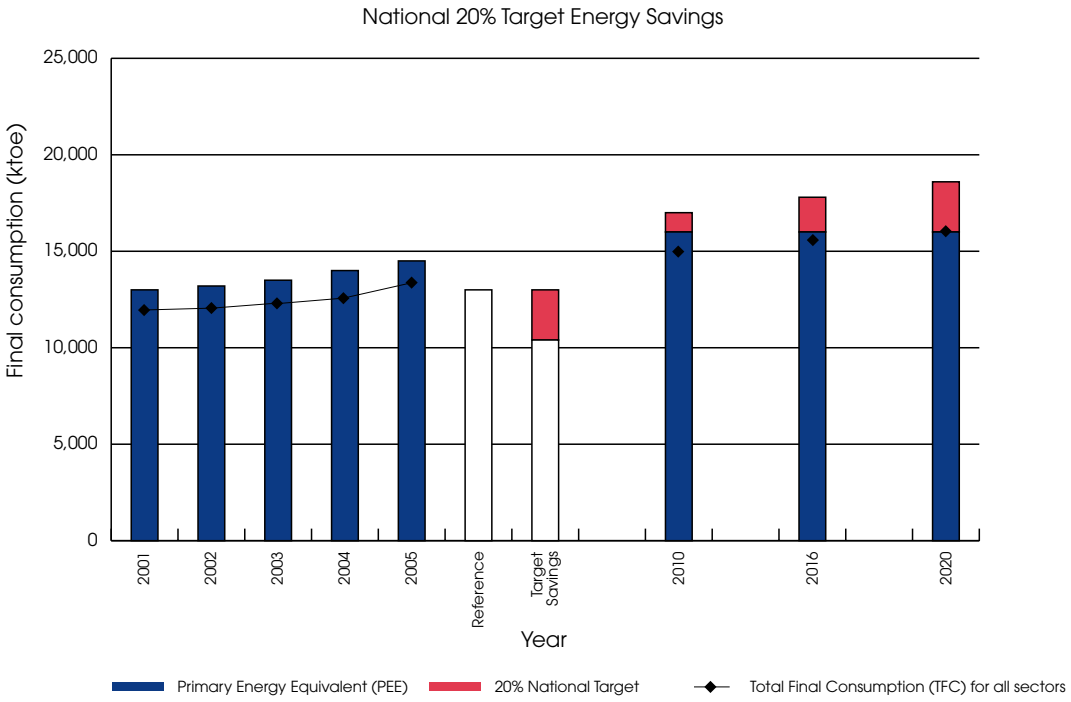


Figure 19: Illustration of Target Energy Savings against Final Consumption

Methods and Assumptions

Table 17, below, details methods and assumptions used in calculating potential energy savings on a measure-by-measure basis for each sector in the Action Plan.

Business sector	Calculation
SEI Public Sector Building Demonstration Programme – support for new and retrofit public sector building initiatives	Savings resulting from SEI's Public Sector Building Demonstration Programme (2001 – 2006), including the OPW Energy Management Bureau. Data relates to savings achieved for all projects approved at the end of 2006. (The expected completion date for all projects is end 2009.)
Building Regulations 2005 – improved efficiency of non-residential buildings	Savings resulting from changes to Part L of the Building Regulations, providing for improved energy performance of non-residential buildings. (Source: 2010 data; National Climate Change Strategy 2007 – 2012 (NCCS), extrapolated to 2020.)
Building Regulations 2010 – improved efficiency of non-residential buildings	Savings resulting from projected changes to Part L of the Building Regulations, assuming 30% improved energy performance of non-residential buildings. Based on estimated energy spend of non-residential building cohort growing at 2% new-build rate and 1% replacement rate to account for proportion of buildings assumed to be constructed to new regulations. Savings accruing from 2012 to 2020.
SEI Large Industry Programmes (Energy Agreements (IS393 and Large Industry Energy Network, LIEN)) savings accruing from programme participants	Based on SEI data collected from LIEN participants as reported in LIEN annual reports. For ESD estimates, overall savings reduced by 50% to account for savings from Emissions Trading Scheme (ETS) companies. Potential savings for the Energy Agreements Programme target market as determined for SEI by Byrne Ó Cléirigh Consulting (2006, unpublished). Based on a ramp-up in number of companies in 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. Savings adjusted for 2010 and 2016 to account for savings accruing from non-ETS entities only.

SEI small business supports – Energy MAP and training for small business	Savings estimate based on programme experience to date (2007/2008). Key assumptions: • potential savings per participant growing from 3.69% in 2007 to 7% by 2020; • 500 firms in programme in 2007, 540 new entrants in 2008; • approximately 6,400 participants by 2020 (400 new participants per year); • payback period of 1.5 years on energy efficiency investments; • an attribution factor of 60% of savings attributable to programme intervention included (i.e. assumed the remaining 40% may have occurred without programme intervention); • primary energy consumption of new firms entering programme reducing by 5% per annum to account for smaller-sized firms entering programme over time.
Existing ESB demand side management initiatives	Conservative estimate, assuming no programme extension, with savings achieved through the programme to date growing at commensurate rate with baseline projections of total final consumption of electricity to 2020, produced for SEI by ESRI. (Source for base figures: ESB Customer Supply.)
Renewable Heat Deployment Programme (ReHeat)	Estimated savings based on extrapolation of results from 84 installations completed since programme inception in 2006 (formerly Bioheat Boiler Deployment Programme). Projection based on an assumed mix of installed technologies, including boilers fuelled by wood chips and/or wood pellets (40%), solar thermal systems (40%) and heat pumps (20%), to a total of approximately 580 installations. Assumed programme duration to 2010, with allowance for savings accruing after this period following time-lag to installation and commissioning of applications supported in 2010.

Accelerated Capital Allowance (ACA) Scheme	Consideration given to economic potential identified within the industrial and commercial sectors for technologies qualifying for an ACA (source: *Demand Side Management in Ireland – Evaluating the Energy Efficiency Opportunities* (January 2008)). For the purpose of a first-pass estimate of programme potential, an assumption is made that the ACA scheme captures 10% of the identified potential (converted to primary energy equivalent). A reduction factor is included to account for potential double-counting with industry programmes. Given that actual uptake of the scheme cannot currently be determined, the results are indicative only. Better estimates of impacts should be possible once the scheme has been running for some time.
Residential sector	
Building Regulations 2002 – improved energy performance of residential buildings	Based on 2002 changes 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 Regulations standard, converted to energy savings based on the *Share of energy related CO_2* for the residential sector (sources: *Energy in Ireland 1990 – 2005,* NCCS). *NB: Number of new dwellings projection ramping down to account for incremental change to 2008 Building Regulations.*

Building Regulations 2008 – 40% improvement on energy performance of residential buildings relative to 2002 Building Regulations	Savings derived from the construction of new dwellings to an improved energy efficiency standard, as determined by revised Building Regulations requiring a 40% improvement on 2002 standards. To calculate projected savings in 2020 assumptions are made in relation to: • average floor area per dwelling; • estimated average energy use per dwelling; • number of new dwellings estimated at 20,000 in 2009, 22,500 in 2010 and 25,000 in 2011, 30,000 in 2012, 35,000 in 2013, 40,000 in 2014 and 45,000 per annum in 2015 – 2020; • no savings assumed in 2008 to allow for time-lag from planning approval to completed construction, 25% of new dwellings built to standard in 2009, 75% in 2010 and 100% in 2011 – 2020. Note: Estimate does not currently account for direct rebound or multiplier effects. This reflects current methodology available to EU Member States for evaluating savings in the context of the Energy Services Directive.[80] This methodology will be adapted to reflect any final decision by the European Commission.
Building Regulations 2010 – 60% improvement of residential buildings relative to 2002 Building Regulations	Savings deduced, as above, for the 2008 Building Regulations review. Based on a subsequent review in 2010 requiring a further 20% efficiency gain for new dwellings beyond 2008 regulations (i.e. equiv. to 60% improvement on 2002 Building Regulations). New dwelling size, quantity projections and phase in (time lag) included, as above.
Low Carbon Homes — Building Regulations review anticipated in 2013; 70% improvement of residential buildings relative to current Building Regulations	Savings deduced, as above, for the 2008 Building Regulations review. Based on a subsequent review in 2013 requiring a further 10% efficiency gain for new dwellings beyond 2010 Regulations (i.e. equiv. to 70% improvement on current Building Regulations). New dwelling size, quantity projections and ramp-up factor included, as above.

80 Refer to EMEEES project, which is seeking to develop harmonised methods for evaluating savings from energy end-use efficiency and energy services measures implemented through the Energy Services Directive (2006/32/EC): http://www.evaluate-energy-savings.eu/

SEI House of Tomorrow Programme – developer support for buildings exceeding 2002 Building Regulations	Based on SEI projection of savings resulting from the House of Tomorrow Grant Scheme to private and social housing developments in support of features that deliver energy performance 40% superior to 2002 Building Regulations. Estimate includes direct savings that are due only to the programme. Wider replication impact accounted for in Building Regulations, above.
SEI Warmer Homes Scheme	Savings accruing from a range of installed energy efficiency measures in low income households. Projected savings based on programme experience, with regard to average savings per dwelling for a given mix of installed technologies, adjusted for 60% rebound effect. Average of 1,900 homes addressed 2002 – 2007. Based on recent increased commitment of funds: 15,000 homes addressed in 2009, 10,000 in 2010 then 5,000 per annum to 2020.
Home Energy Saving scheme – improving current residential building stock in Ireland	Estimated savings based on efficiency improvements resulting from installation of approved building fabric and heating system upgrades in existing dwellings. Savings per dwelling estimated on the basis of the HES scheme pilot phase data. Expected improvements to elemental u-values flowing from installation of an assumed mix of measures converted to energy savings. Result reduced by 20% to account for potential rebound effects. Total programme budget of €100 million modelled to determine number of dwellings addressed on basis of an average 30% SEI grant.
Smart meter installation – estimated efficiency gains among domestic users	Based on estimated savings attributed to the installation of smart meters as described in 'Smart Meters – Costs and Consumer Benefits, Report to Energywatch' (Eoin Lees, *Energy*, July 2007). Report considers a 3% saving of annual consumption as a conservative estimate. Energy saving resulting from the implementation of smart meter functionality. Estimated savings based on 3% (PEE) of baseline projections for total final consumption of household electricity to 2020, produced for SEI by ESRI.

Greener Homes Scheme	Based on savings from installations of heat pump, solar thermal, and biomass boiler/stove technologies supported through the Greener Homes Scheme. Energy savings based on fossil fuel use offset by installation of renewable heating systems.
Ecodesign for Energy-Using Appliances (Lighting)	Savings based on replacement of incandescent bulbs in existing residential dwellings with equivalent CFL technology. The estimate considers the number of existing incandescent bulbs per dwelling, varying hours of use per room/application and is adjusted to account for existing penetration of CFLs for a typical house. This results in an indicative number of replaceable bulbs nationwide of approximately 10.3 million. The potential for other efficient lighting technologies could further increase this estimate.
Efficient Boiler Standard	Savings resulting from improved efficiency of boiler stock in Ireland's residential dwellings. Baseline efficiency of existing (oil and gas) stock estimated at 70%. Replacement boiler efficiency set at the minimum required by Building Regulations for replacement boilers (86%). Fuel savings (based on average house fuel usage) applied to an estimated stock of 800,000 boilers replaced by 2020 (given an estimated average product lifetime of 20 years, and consideration of the age of existing boiler stock).
Transport sector	
Estimates relating to transport measures are based on analysis undertaken by Department of Transport (DoT). Methodologies have been amended where appropriate to reflect proposed EMEEES methodology for estimate savings for the EU Energy Services Directive (ESD), and to address double counting with other measures.	
Efficient driving measures	Savings calculated using current EMEEES methodology for eco-driving measures. Measures for eco-driving as detailed in *Smarter Travel – A Sustainable Transport Future,* DoT, February 2009. Includes savings from direct driver training, eco-driving as part of licensing requirements, in-car devices and simulator training for passenger and freight vehicle operators.
Improved fuel economy of private car fleet	Savings resulting from the progressive replacement of the Irish private car fleet with more efficient vehicles to 2020.

Electric Vehicles Deployment	Based on replacement of 10% of vehicles (approx. 240,000) with electric vehicles by 2020.
Mobility management – travel plans	Savings estimate by DoT considering benefits of development of workplace travel plans for business, school travel plans, 'Safe Routes to School' and personalised travel plans.
VRT / Motor tax changes	Savings based on a model developed by DoT estimating the impact of changes to VRT and motor tax to favour lower CO_2 emitting vehicles.
E-working	Assessment of potential benefit of e-working programme leading to reduced need to travel to work.
More sustainable public transport fleets	Estimate of potential savings from a more fuel efficient public transport fleet. Limited to savings potential in existing bus fleets.
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 by 277GWh PEE in 2010 (ESB). Savings increasing at a commensurate rate with baseline total primary energy projections to 2020 derived for SEI by ESRI.
Winter Peak Demand Reduction Scheme (WPDRS)	Based on data provided by EirGrid. Estimated peak reduction (meter point, daily MW) for WPDRS period winter 2007/2008, converted to equivalent avoided generation GWh (including 9.3% transmission losses and 4% average losses from generation point to exported point). Converted to primary energy equivalent based on 40% generation efficiency.

Table 17: Methods and Assumptions employed in calculating energy savings

Public Sector Target

The Government's Sustainable Energy White Paper specifies an energy efficiency improvement target for the public sector of 33% by 2020. The White Paper does not specify a definition of the public sector, nor does the ESD. For the purposes of the target, the public sector is considered to encompass the Civil Service, commercial and non-commercial State Bodies, the Defence Forces, An Garda Síochána, Health Service Executive hospitals and other facilities, Local and Regional Authorities, schools and universities.

Using the same basis as for the national target, the target is calculated as 33% of the average of unadjusted final energy consumption in the public sector over the reference period, 2001–2005, expressed as 'primary energy equivalent'.

Precise data for energy use in the public sector is not currently available. Best available data for the public and commercial sectors is derived from services sector data, based on an estimated ratio of commercial and public sector energy use within the services (tertiary) sector. Services sector data is provided in the Energy Balance (produced annually by SEI (EPSSU)) as a residual, following definition of the final energy use within the industrial, residential and transport sectors.

On this basis, SEI estimates the reference energy consumption to be approximately 9,820GWh PEE. Thus, the 33% target is estimated to equate to a saving of 3,240GWh PEE in 2020. This saving figure may be revised as more precise data becomes available.

Annex 03

Glossary of Terms

BER	Building Energy Rating
BGE	Bord Gáis Éireann
CCGT	Combined Cycle Gas Turbine
CER	Commission for Energy Regulation
DSM	Demand Side Management – measures that influence the quantity or patterns of energy use 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
ESB DSO	Electricity Supply Board (ESB) Distribution System Operator
ESD	Directive 2006/32/EC on Energy End Use Efficiency and Energy Services
ESB PES	ESB Public Electricity Supplier
GDP	Gross Domestic Product
GWh	Gigawatt Hours
IEA	International Energy Agency
LIHP	Low Income Housing Programme
MPRN	Meter Point Reference Number – the unique identifier for each Service Delivery Point on the network
Mt	Mega tonne – a measurement of mass equal to 1,000 kg
MWe	Megawatt electrical – refers to power produced as electricity
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
TFC	Total Final Consumption
TPER	Total Primary Energy Requirement
WHS	Warmer Homes Scheme

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