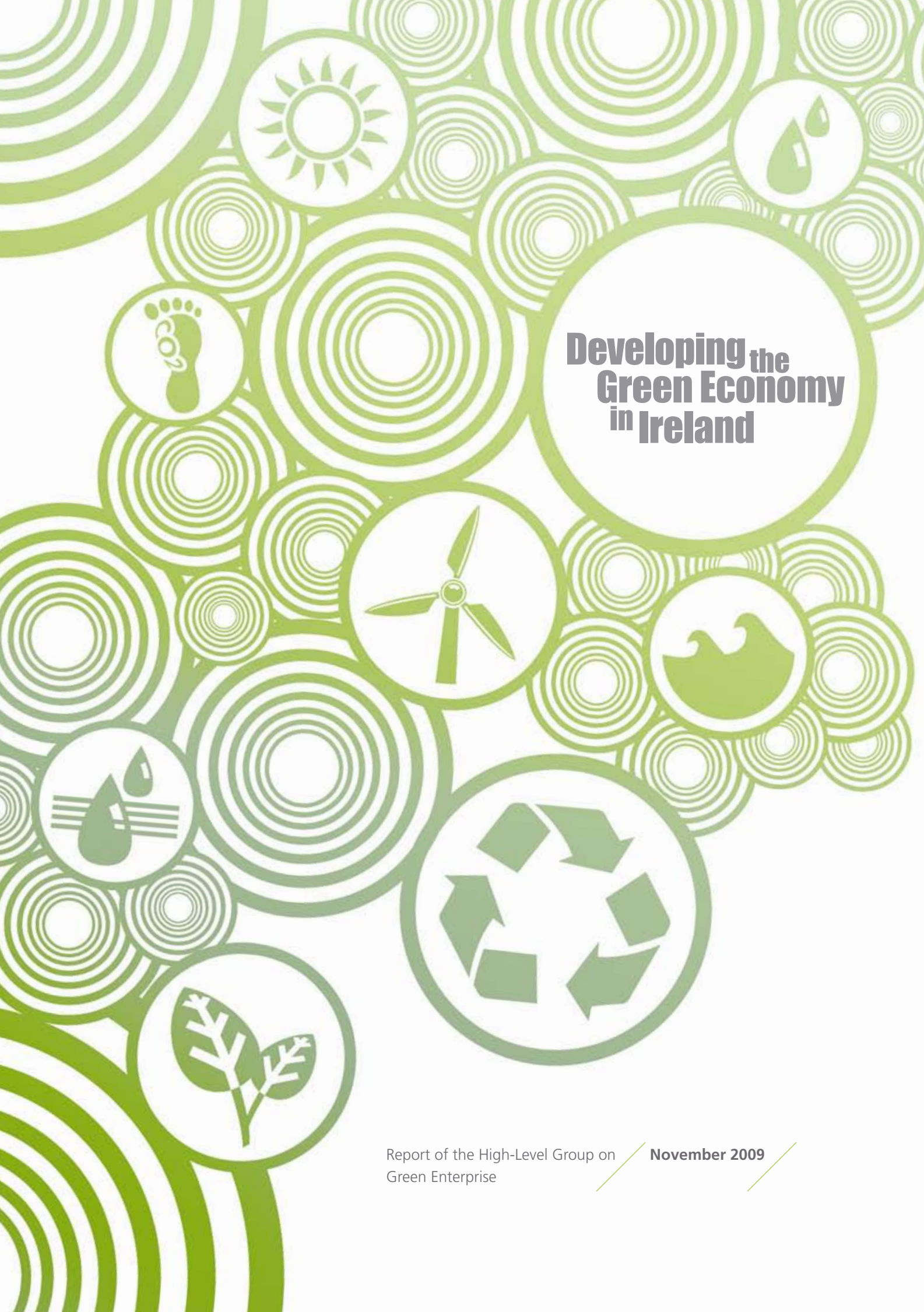

Developing the Green Economy in Ireland

Report of the High-Level Group on Green Enterprise

November 2009

Message from the Tánaiste and Minister for Enterprise, Trade and Employment, Mary Coughlan, T.D., and Minister for Communications, Energy and Natural Resources, Eamon Ryan, T.D.

The Government views the potential of the green enterprise sector as central to the development of the smart economy and has designated it as one of Ireland's target sectors for investment and job creation.

Governments across the world are now working to reduce greenhouse gas emissions and to tackle climate change. It is also clear that the future supply of fossil fuels will be less certain and more expensive. As a result, governments and businesses across the globe are searching for new solutions and driving the development of new technologies. The rapid increase in the demand for "green" goods and services has continued even in the midst of the current global recession. The demand for change is clear.

Ireland can be the engine of this change. We have the natural resources, the talent and the Government commitment necessary to become a hub for green enterprise. The sector already provides strong employment and export opportunities. We want to build on that potential, attract further investment, further grow our indigenous base, and ensure that it becomes an engine for future job creation and economic growth.

This report lays out the actions that must be taken for Ireland to realise our potential in this regard. Its publication is a significant milestone that firmly marks out the sector as a key plank of our industrial and economic platform.

We would like to take this opportunity to thank Mr Joe Harford, the Chair of the High Level Action Group on Green Enterprise for his sterling work. Joe gave of his time freely and generously with a view to developing this important sector for Ireland. We would also like to thank the Group members, many of whom came from the private sector and also gave freely and generously of their time.

This report is only the beginning; its success will be in implementation. Government will ensure this report is acted upon swiftly and decisively in order that Ireland can extend its international reputation as an exciting and dynamic location for innovation and job creation to embrace the green enterprise sector.

Mary Coughlan, T.D., Tánaiste and Minister for Enterprise, Trade and Employment

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

November 2009

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Foreword

The Government's framework for sustainable economic renewal (Building Ireland's Smart Economy) incorporates a commitment to establish a High-Level Action Group on Green Enterprise. In May 2009, the Tánaiste and the Minister for Communications, Energy and Natural Resources established a High-Level Action Group mandated with developing an action plan within four months to foster the growth of the green economy in Ireland.

The Terms of Reference for the Group emanated from previous Forfás and InterTradeIreland research assessing the all-island enterprise opportunities in the environmental goods and services sector. We as a Group were mandated to identify areas where Ireland could succeed in the green economy, fast. Our focus has been on subsectors with high potential to export and create jobs. We were also charged with identifying key road blockages for the green economy and ways to overcome these. The following report attempts to represent a balanced and consolidated overview of actions required to promote the growth of the green economy in Ireland. These actions are based on Group Members' views identified over the course of the plenary meetings, with research provided by Forfás.

The green economy has been growing globally at great pace over the past five years. This is all the more impressive considering the severe global downturn of 2008/09. Ireland has, in recent times, gained a presence in this exciting sector, with enterprise opportunities in a wide variety of areas. I believe Ireland is well placed to capture a significant slice of the EU and international green economy market in several niche areas — many of which are likely to yield very substantial employment creation with varying skills requirements.

Ireland needs to play to its strengths to win these niche opportunities. These strengths include:

- Our strong science and technology, finance, construction and food sectors which can help attract foreign-owned companies into the Irish green economy;
- Our indigenous R&D base (particularly in energy) which is strong and capable of competing at an international level;
- Leveraging Ireland's significant investments in improving environmental performance and creating the infrastructure and capabilities to support green enterprises; and
- Building on our strong international reputation as a Green Island.

The green economy is very wide. It encompasses subsectors such as waste management, water and wastewater, renewable energies, energy efficiency and consultancy. There is a high degree of technological convergence occurring, especially in key nexus points like energy and ICT. Given Ireland's strong track-record in the ICT sector, I firmly believe we are well placed to capture a large chunk of the existing and future enterprise opportunities. This is most evident in areas such as sensor technologies, wind and ocean energy deployment, and other domains in which a strong ICT capability is a prerequisite.

I wish to thank the members of the High-Level Group on Green Enterprise, which included the private sector, civil society, Government, and the development agencies, for their invaluable contributions. Through open discussion and great enthusiasm, we came to a shared understanding of the real challenges and opportunities facing the green economy. We also identified a number of actions for Government, the vast majority of which can be implemented at zero or minimal cost to the exchequer.

We must regain our ability to respond quickly and flexibly to capture new opportunities. Together we agree that implementation of these actions is essential in order to maximise the potential for Ireland Inc. to seize the array of opportunities in the green economy — both indigenous and export-focused, as well as those coming in the form of foreign direct investment.

Ireland has developed a world-class reputation in key growth 'pillars' of the economy such as the lifesciences and ICT. I am confident that we can repeat this success again with the green economy. No major shifts in policy are required in order to capture the green wave, but significant hurdles remain. With a concerted whole-of-Government effort, as described in this report, I am certain the green economy will become a major driving force of the Irish economy.

Joe Harford

Chair of the High-Level Group on Green Enterprise

Executive Summary

The development of the green economy can make a significant contribution to restoring Ireland's economy to growth by creating employment and export opportunities in green enterprises. It can also help existing companies in all sectors to improve their competitive position through adopting innovative environmental goods and services.

The global market for environmental goods and services is vast and it continues to grow quickly. Ireland is well placed to capture a significant share of this growing market in niche areas. We have strong capabilities in key areas such as energy, electronics, software, and waste/ recycling. Our commitment to research and development and the export focus of indigenous industry, in addition to a considerable track record as a base for overseas investment, are key to capturing the potential of this sector. The value of the Irish market was conservatively estimated by Forfás at €2.8 billion in 2008 with over 6,500 people employed. The Group believes that the green economy and associated employment opportunities in Ireland will continue to grow rapidly. There is significant potential for the sector to expand its activities, employment and target new export markets. A range of reports suggest that there is potential to create over 80,000 jobs in the coming years. Developing the green economy and the competitiveness of our existing company base can play a central role in returning the Irish economy to growth.

To realise these opportunities, Government and public service generally will need to be agile and effective in building a business environment that will give Ireland competitive advantages. We believe that timely and decisive implementation of the recommendations set out in this report is necessary to achieve the rapid development of an internationally competitive environmental goods and services sector in Ireland. Progress to date has been slow in a range of areas.

The actions in this report will not only assist in developing new green markets and fostering new entrants; they can improve the competitiveness of the existing enterprise base through the implementation of actions to improve energy efficiency, enhance energy security of supply, and minimise and utilise waste (e.g. anaerobic digestion), etc. We have also endeavoured to minimise the exchequer cost of implementing this report. The key recommendations of the High-Level Group are:

1. Promote key sectors that can drive exports and job creation

Opportunities to create and sell environmental goods and services globally exist across many sectors. The Group believes that the following sectors have the most substantial export and employment potential and have therefore set out specific actions to drive their development.

- **Renewable Energy**: Ireland is one of the most favourable locations for wind and wave energy in the world. A strong enterprise and research base is emerging, and significant potential exists to create sustainable employment. However, delays in planning and foreshore licensing approvals are a severe constraint on growth. The interface of energy and ICT also offers significant opportunities for Ireland given our existing strength in ICT hardware and software.
    - Reform the planning and foreshore licensing regime for grid connections and introduce the required legislative changes to transfer responsibility and

resources to the Department of the Department of Environment, Heritage and Local Government;
    - Continued development of the electricity grid will be required if Ireland is to realise these renewable opportunities — both internationally (interconnection with the UK and potentially continental Europe) and domestically. (Department of Communications, Energy and Natural Resources)
    - Developing the ICT capabilities of the grid can leverage Ireland's existing ICT skills base and support the development of new competencies and activities. Subject to a positive outcome to the ongoing trial, Ireland should adopt an ambitious national programme for smart meters in terms of coverage and technology levels. (Department of Communications, Energy and Natural Resources)

- **Efficient Energy Use and Management (including Eco-Construction)**: Energy efficiency is one of the most effective tools to improve the cost competitiveness of all enterprises and support green enterprises. This also presents significant opportunities for the construction related goods and services sector.
    - Energy-efficiency standards should be progressively strengthened and extended to include all buildings. (Department of Environment, Heritage and Local Government)
    - Consideration should be given to reducing stamp duty on low-carbon homes. (Department of Finance)
    - There is potential to use some of the revenues from auctioning of emissions allowances in the EU Emission Trading Scheme from the commencement of Phase III in 2013, and a carbon tax if introduced, to support the development of the green economy. (Department of Finance)

- **Waste Management, Recovery and Recycling**: Waste represents an under-utilised resource of considerable value. The minimisation and better utilisation of waste can also enhance the competitiveness of existing sectors such as agri-business. Given the need to reduce landfill use in Ireland, new infrastructure and services are being developed across other forms of waste management.
    - A decision on the future regulatory structure for the waste sector needs to be made quickly. Ireland also needs to move from a regional approach to waste management to a national model. (Department of Environment, Heritage and Local Government)
    - Further actions are required to promote composting and anaerobic digestion including rolling out brown bins to all households and businesses. (Department of Environment, Heritage and Local Government)
    - The Trans-Frontier Shipment of Waste Regulation is acting as a barrier to north/south trade in recyclable material. Scope exists to ease the regulatory burden by classifying certain waste streams, particularly brown bin waste, as non hazardous at a European level and by reducing the administration and

charges associated with the compliance regime. (North South Ministerial Council, Department of Environment, Heritage and Local Government, National Trans-Frontier Shipments Office, Dublin City Council)

- **Water and Wastewater Treatment**: High levels of public investment and dwindling water sources and availability of potable water throughout the world are driving the development of the international water/wastewater sub-sector.
    - Levels of allowable unaccounted-for water (which are relatively high in Ireland) should be progressively reduced towards best practice. Fixing leaks would improve efficiency and help develop Irish expertise in leak control, monitoring and supply networks which are significant areas of opportunity internationally. (Department of Environment, Heritage and Local Government)
    - The introduction of volumetric water charges would create a domestic market for water services. The establishment of a single water authority, with overall responsibility for system planning, delivery and maintenance, would support the development of deeper public and private sector capabilities in the water sector and the development of projects of greater scale. (Department of Environment, Heritage and Local Government)

2. Deliver green zones and a green IFSC

The green economy in Ireland remains highly dispersed across various sectors (e.g. ICT, engineering, finance, energy, waste, water, etc.) and across various supporting State organisations (e.g. infrastructure/ service suppliers, education and research institutions, Government, etc.). Ireland needs to develop one or more green zones in order to create an environment that can support the development of green enterprise and be used to market Ireland overseas.

- The Group welcomes the range of proposals for green zones and green clusters as exemplars of sustainable planning and technologies, ranging from initiatives such as Dundalk 2020 to retrofitting existing business parks and larger scale initiatives. IDA Ireland plans to develop one of its planned strategic sites as a ‘green’ park, designed and built to the highest green building standards and to retrofit an existing IDA business park to leading energy-efficiency standards as demonstration projects of latest available sustainable technologies, design and planning. Potential also exists for other actors to progress green zone developments of scale. For example, the Dublin Airport Authority is proposing to develop Dublin Airport City as an ‘international clean-tech services centre’.

Developing a ‘green IFSC’ brand and capability for Ireland presents an immediate opportunity. Ireland is already an attractive location for international financial services. Potential exists to develop a green IFSC cluster and brand incorporating green investment vehicles (e.g. investment funds of energy companies, banks and VCs), the administration of funds managed under green principles, and carbon trading and associated professional services. The Group welcomes the recent establishment of a sub-group of the IFSC Banking and Treasury Group

which is exploring the options for a green IFSC. We would strongly encourage the IFSC Clearing House Group to progress recommendations which emerge.

3. Create world-class research centres

The challenge for Ireland is to develop a small number of world-class centres for research and development in niche green areas. R&D in the Irish green sector is fragmented and is not generally at the scale necessary to be internationally competitive.

- The pooling of research expertise and/or the development of formal (national, all-island and international) research alliances must be advanced to develop scale and critical mass in energy and environmental research. Initiatives focused on merging existing activities and/or the creation of an umbrella group as a networked European Energy Centre need to be progressed quickly. This is critical to enhance Ireland's attractiveness as a test bed for innovative environmental applications.
- Given the multi-disciplinary nature of green R&D, Irish Government funding in this area comes from a multitude of sources. An assessment should be carried out on the merits of consolidating and aligning the range of R&D funding programmes. (Inter-Departmental Committee on Science, Technology and Innovation)
- Irish research in the green sector lacks an over-arching strategy. Much of the focus to date in the green area has been on energy research and development. Areas such as waste and water have received less focus in terms of their potential to create commercial products and services with export opportunities. A R&D research strategy for the wider environmental goods and services sector which includes a strong focus on waste and water is required. (Inter-Departmental Committee on Science, Technology and Innovation)

4. Remove basic hurdles to the development of the green economy

Before Ireland can advance to becoming a leading player in the green economy, a number of basic hurdles need to be addressed without delay. In addition to being practical problems for existing firms, the lack or slow pace of progress damages Ireland's credibility as a base for the green sector. Delays in addressing these hurdles are hindering investment and job creation. The Group highlights the need to:

- **Address technical, regulatory and planning barriers that are delaying the development of renewable energy projects**. Despite high levels of investment in the grid, the length of time required for renewable energy projects to connect to the grid has acted as a major impediment to market development. Ideally, large projects or those with a strategic contribution to the green economy (e.g. exemplar projects, those that progress Ireland's renewable targets at least cost, promote competition, etc.) should be prioritised as they are likely to have the scale and expertise to be commercially successful. Other major hurdles that need to be addressed quickly include developing cost effective mini-grids (single premises rule)/ developing new distribution lines (traverse lands condition), and conditions for eligibility and application of the strategic infrastructure act.

(Department of Environment, Heritage and Local Government/ Department of Communications, Energy and Natural Resources / Commission for Energy Regulation)

- **Implement green public procurement**. Ireland is well behind European best practice in relation to green procurement. The Group recommends that, given the scale of government spending in the economy (annual public expenditure on goods and services amounts to circa €10 billion with a further €7 billion on works), that work underway be urgently progressed with a view to the earliest possible attainment of the 50 percent EU target by the Irish public sector. The Group wishes to emphasise the importance of implementation of this action plan, in a manner that supports innovative firms, as a matter of priority. (Department of Environment, Heritage and Local Government, Office of Public Works / Department of Finance)
- **Ensure that green firms can access finance**. Access to finance is a challenge for all businesses including green enterprises. The potential to offer reduced interest rate loans for a limited time period to companies investing in producing environmentally friendly products should be considered given recent changes to EU state aid rules. Funds could be channelled through the development agencies or programmes with the banks.
- **Develop Ireland's brand**. Few businesses of scale will succeed by simply serving the home market. Ireland has a strong reputation as a 'green island' which has been used extensively to market Ireland's tourism and agricultural industries. Potential now exists for IDA Ireland, Enterprise Ireland and others to extend this brand into the environmental goods and services sector. One particular initiative that could be used to market Ireland would be to introduce an annual prize for green innovation. This could be awarded annually on St Patrick's Day in an effort to showcase Ireland's commitment to the green sector and to create opportunities for green enterprises to network.

Making it happen

One of the most important factors to realising green enterprise opportunities is ensuring that there is the appetite, courage and leadership at senior public service levels to implement and facilitate the reforms outlined in this report to drive growth in the sector. We believe that strong structures, clear processes and lines of accountability must be put in place to advance the recommendations set out in this report and realise the potential for strong employment growth in the environmental goods and services sector.

The Group recommends that a Minister or a Minister of State be charged with responsibility for implementation of this report's actions. A Cabinet Committee, chaired by the Taoiseach and supported by the Senior Officials Group, should oversee and ensure timely cross-departmental and state agency responses to the actions required to develop the green economy, commencing with the recommendations set out in this report.

1. Introduction

1.1 What is the green economy?

Human beings depend on ecological systems for survival. This is evident in the context of climate change and the challenges and opportunities it provides. It also holds true in relation to water, waste, soil, agriculture, fisheries, and every human and economic endeavour.

The Government's Framework for Economic Renewal (Building Ireland's Smart Economy) incorporated a commitment to establish a High-Level Action Group on Green Enterprise[1]. The Group was requested to 'prepare an implementable action plan on green enterprise development in Ireland with specific actions for each stakeholder in a time-bound framework'.

The Group has taken the 'green economy' to encompass the wide range of goods and services that fall within the scope of environmental and natural-resource use, management and protection[2].

The global market for environmental goods and services is vast and it continues to grow quickly. Ireland is well placed to capture some of that growth in niche areas. Ireland has significant capabilities in key areas such as water, electronics, software and waste/ recycling that position us well in this sector. Ireland's commitment to research and development and the export focus of indigenous industry, in addition to a considerable track record as a base for overseas investment are also key to growing this sector. Domestic investment in environmental goods and services is also significant. The global market was approximately €1,100 billion in 2007 and is expected to grow by 35 per cent to €1,500 billion by 2012. It is a sector attracting considerable investment and is now the third largest sector for venture capital after life sciences[3].

The value of the Irish market was conservatively estimated at €2.8 billion in 2008[4]. An Ernst & Young report on behalf of the European Commission estimated the Irish environment market at €1.2 billion in 2004. While not directly comparable, it is clear that the sector has grown rapidly in Ireland in recent years. The key sub-sectors are:

- Renewable energies (€700 million);
- Eco-building and construction materials (market value is not available);

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[1] Department of the Taoiseach (2008). Building Ireland's Smart Economy: A Framework for Sustainable Economic Renewal, Stationery Office: Dublin.

[2] The OECD defines the environmental goods and services sector as consisting of activities which "produce goods and services to measure, prevent, limit, minimise or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems. This includes cleaner technologies, products and services that reduce environmental risk and minimise pollution and resource use."

[3] Enterprise Ireland

[4] Forfás and InterTradeIreland (2008). Environmental Goods and Services on the Island of Ireland: Enterprise Opportunities and Policy Recommendations, Forfás/InterTradeIreland: Dublin.

- Water/wastewater treatment (€1,000 million[5]);
- Waste management (€550 million); and,
- Environmental services and other green technologies (€560 million).

A best estimate suggests that there are more than 6,500 people directly employed in the green economy in Ireland. The Group believes that the green economy and associated indirect employment opportunities will continue to grow rapidly. Its development can also promote the competitiveness of existing sectors of the Irish economy (e.g. agri-business, ICT, clean manufacturing, etc.)

1.2 What is driving the green economy forward?

Firms in OECD countries account for about 90 percent of the global green economy with Western Europe, the USA and Japan being to the fore in the import and export of environmental goods and services[6]. At the same time, transition and developing countries, in particular China and India are now seeing strong growth in the sector in response to environmental problems such as air and water quality, arising from their rapid industrialisation and urbanisation. Eastern and Central European countries are also a key target market, as many of these countries are facing legacy clean-up costs associated with weaker environmental protection laws and outdated production processes and technologies.

A number of factors are driving growth in the environmental goods and services sector including:

- Compliance with EU Environmental Directives and Regulations (such as the Integrated Pollution Prevention Control, Waste Electrical and Electronic Equipment, Restriction of Hazardous Substances, Energy End-use Efficiency and Energy Services and Water Framework Directives). The strategic implementation of impending EU and international environmental legislation can play an important role in developing markets for indigenous green companies and creating first-mover advantages. Key directives are outlined in appendix 5;
- Rising energy and other natural resource costs are encouraging companies to adopt efficiency initiatives and are significantly increasing opportunities in the renewable energy sector;
- Increases in public and private investment in environmental services and infrastructure[7] will continue to be important in stimulating growth, particularly in energy, waste management and water supply;

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[5] Based on Department of Environment, Heritage and Local Government Water Services Investment Programme 2007-2009 capital costs.

[6] Environment Business International, San Diego, California, 2003. See also Bijit Bora and Robert Teh, 'Tariffs and Trade in Environmental Goods', WTO Seminar (October 2004).

[7] Some examples of such investment include ESB's planned €22 billion expenditure in renewable energies to 2035 and NTR's ongoing investment in a number of renewable energies.

- Increases in investment in research and development: Investment in R&D is fundamental to the identification and widespread application/ uptake of new and improved environmental technologies;
- Green public procurement: The specifying of environmental criteria in public tenders can significantly increase the market and provide spin-offs through the whole product chain. A range of countries have already adopted green procurement processes;
- Green consumerism: The making of consumer decisions based on environmental concerns, and the increase in societal and business demands for firms to behave in an environmentally responsible way are also contributing to the growth of the sector; and
- Growing understanding of the value of bio-diversity for agriculture, forestry, fisheries, water and human health and the inter-relationship between food, energy and waste[8].

1.3 What opportunities does this sector offer for Ireland?

Ireland already has significant strengths in the environmental goods and services sector. There is already a significant existing base of companies operating in the environmental goods and services sector. These can be categorised as follows:

- A small number of major players — e.g. NTR which owns waste management firm Greenstar, water treatment joint venture Celtic Anglian Water and a number of solar, wind and biofuel companies in the USA, One51 which owns Cedar and Techrec, DCC which owns Enva, and other key firms such as Glen Dimplex and Kingspan;
- A high proportion of indigenous SMEs (the largest proportion of which fall within waste management and recycling) — e.g. Celtic Composting Systems Ltd, ACE Compaction Systems Ltd, JF Moulding Eco Tanks Ltd, Treatment Systems Ltd, Southern Scientific Services Ltd.;
- A number of subsidiaries of UK and EU parent companies competing in key sectors such as environmental consultancy and waste management — e.g. Siemens, RPS;
- A number of State-owned enterprises in the energy and waste sectors — e.g. ESB, Bord Gáis, Bord na Mona;

A range of indigenous and overseas firms in sectors from ICTs to food to financial services are also developing products, services and processes to capture emerging green-related opportunities and to improve the competitiveness of their existing businesses.

This sector offers very significant enterprise opportunities and has substantial export potential. While the enterprise opportunities are diverse, they may be broadly categorised under:

- Renewable Energy;
- Efficient Energy Use and Management (including Eco-Construction);

[8] The Economic and Social Aspects of Biodiversity, Benefits and Costs, Department of Environment, Heritage and Local Government 2008.

- Waste Management, Recovery and Recycling; and
- Water and Wastewater Treatment.

However, it should be noted that opportunities will arise in a wider range of sectors including eco-tourism, agriculture (e.g. organic farming, forestry, bio-energy, etc.), retail and leisure, transport, etc. While many of the recommendations in this report will benefit these wider sectors, it is notable that some of these subsectors already have specific strategies in place (e.g. the Organic Farming Action Plan 2008-2012, the National Sustainable Transport Plan, etc.).

1.4 The potential of green growth in Ireland

Developing the green economy and the competitiveness of our existing company base can play a central role in returning the Irish economy to growth.

The Group believes that the green economy offers significant potential to generate economic activity and employment. There are currently at least 6,500 people directly employed in the sector in Ireland[9]. This equates to approximately one third of one percent of all those in employment in Ireland. There is significant potential for existing firms in the sector to expand their activities, employment and target new export markets.

Many countries, including Ireland, are looking to green growth as the way out of the current economic crisis. UN research indicates that green investment programmes create more jobs per Euro or Dollar spent than many other stimulus programmes[10]. The Pew Charitable Trust[11] estimates that 750,000 jobs, which represent 0.5 percent of all jobs in the United States, are in the clean energy sector[12] – a key sector of the green economy. Pew also notes that employment in the clean energy sector grew by 9.1 percent, while total jobs grew by 3.7 percent per annum over the period 1998-2007. While the bulk of current US green employment is in conservation and pollution mitigation, Pew expects jobs in environmentally friendly production, clean energy and energy efficiency to grow much faster in response to new market demands.

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[9] Forfás /InterTrade Ireland (2008). Environmental Goods and Services on the Island of Ireland. Assessing current employment levels in the green economy is difficult. Furthermore, estimating future employment potential is highly speculative. It is dependent on how green economy jobs are defined and expectations as to how these sectors will develop. This is hampered by a lack of adequate statistical data.

[10] SEF Alliance (2009). Why Clean Energy Public Investment Makes Sense – The Evidence Base. UNEP: Basel.

[11] The Pew Charitable Trusts is an independent non-profit think-tank which applies an analytical approach to public policy matters to inform the public and stimulate civil society.

[12] http://www.americanprogress.org/projects/energy_hub/briefs/clean_jobs_brief.html

PEW employs a wide definition of the clean energy sector – it includes clean energy; energy efficiency; environmentally friendly production; conservation and pollution mitigation; and training and support.

Other countries have undertaken partial assessments of employment growth[13]:

- The Danish wind industry employs 28,400 people and contributes an annual €5.7 billion to their economy;
- The German renewable energy sector employed 278,000 people in 2008 (up from 160,000 in 2004), and contributed €28.7 billion to the economy. A further 1.8 million work in environmental protection more generally[14].

While is it difficult to estimate potential jobs growth, a number of countries have set ambitious targets in recent stimulus plans. Korea hopes to create one million new jobs over the next four years in green technology and industry as a result of its 'Green New Deal' stimulus plan. In Japan, employment in environmental industries is expected to double to 2.8 million people by 2020. Internationally, approximately $436 billion (about 16 percent of the total committed stimulus plans to address the current global recession) can be characterised as a green stimulus. This creates major opportunities for Irish exporters. Private sector investment is also strong. Investment has developed to such an extent that industrial/ energy clean technology was ranked the fourth largest venture capital investment category in North America in quarter one of 2008[15].

The group believes that significant potential exists to grow employment and wealth creation in Ireland. For example[16]:

- A report on the Irish renewable energy sector (e.g. small scale hydro, other hydro, wind energy, biomass, ocean energy, solar energy, geothermal and micro wind) estimates that the sector has the potential to create over 50,000 direct jobs by 2020[17];
- A report on the construction sector estimates that meeting the energy-efficiency requirements of the residential sector could generate approximately €600 million in output per year as well as 7,000 sustainable jobs, if we are to meet the 2007 building energy efficiency regulations[18].
- A new report by the Institute for International and European Affairs indicates that a national energy-efficiency retrofit programme in Ireland, to bring the entire dwelling stock up to a C1 BER, would create 23,000 – 32,000 direct new green jobs in the construction sector. The higher employment figure relates to the more ambitious

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[13] http://www.oecdobserver.org/news/fullstory.php/aid/2928/The_green_growth_race.html

[14] Federal Ministry for the Environment, 2009, Development of Renewable Energies in Germany in 2008.

[15] PricewaterhouseCoopers/National Venture Capital Association MoneyTree Report, Q1 2008 US results. https://www.pwcmoneytree.com/MTPublic/ns/moneytree/filesource/exhibits/08-0486%20MoneyTree%20-%20Q1%202008%20final.pdf

[16] The Group is not endorsing these employment numbers and it should be noted that all the job gains may not be cumulative. Nonetheless, they provide an indication of the potential of the sector to support economic growth and employment.

[17] Renewable Energy Generation in Ireland; Job Creation and Emission Savings. http://www.biopowerplc.com/

[18] DKM (2009). Economic Importance of Engineers in Ireland, DKM: Dublin.

programme detailed in the IIEA report, with an annual investment in retrofits of between €1 and €1.5 billion[19]; and,

- A report on the composting and anaerobic waste sector estimates that the sector has the potential to create 1,500 direct jobs[20].
- Employment forecasts are not available for other parts of the waste sector or for the water / waste water sector.

While care must be taken in aggregating these figures, they suggest that there is potential to create over 80,000 sustainable jobs in the coming years. This estimate is similar to UK targets (i.e. green jobs to account for 4 percent of total UK employment by 2020). Jobs in the green economy will also support indirect employment in other sectors of the economy.

As highlighted earlier, the development and adoption of environmental goods, services and processes also has the potential to sustain and create new employment across a wide range of other sectors including ICT, food, tourism, transport and financial services.

[19] IIEA (2009). Greenprint for a national energy efficiency retrofit programme: jobs, growth and reduced energy costs. IIEA: Dublin.

[20] Market Report on the composting and anaerobic digestion sectors, InterTradeIreland, May 2009.

2. Promote Green Sectors That Drive Exports And Job Creation

The Group believes that the following sectors have the most substantial export and employment potential and have therefore set out specific actions to drive their development. They were selected based on their growth potential, attractiveness to investors, burgeoning critical mass, and fit with Ireland's resources (natural resources, skills, existing research, etc.) and advantages. They are

- Renewable Energy;
- Efficient Energy Use and Management (including Eco-Construction);
- Waste Management, Recovery and Recycling; and
- Water and Wastewater Treatment.

2.1 Renewable energy

Renewable energies are defined as products, systems and services for the generation and collection of energy from renewable sources such as biomass/ biofuels, solar, photovoltaic, wind, hydro, tidal and geothermal sources. Examples include the manufacture of equipment, design, construction, installation, management and operation of renewable energy facilities, including micro-generation. Ireland currently has an established base of firms operating in this sector. Indigenous examples include Kedco Power, 3NRG, SWS Natural Resources and Open Hydro.

Significant opportunities exist for Ireland in the following areas:

- **Wind energy**: Ireland has among the best wind energy endowments in Europe. Wind energy is one of the most well established, cost effective and mature renewable technologies[21]. Investment in wind generation capacity is continuing to grow internationally. While wind turbine design and manufacture is dominated by large global players, opportunities for Ireland primarily arise for technology-driven companies which can provide more efficient and innovative mechanical and software based components for wind turbine design and manufacture (such as software systems). There may also be opportunities for companies installing, maintaining small scale turbines and providing consultancy engineering services for the design, installation and management of wind farms. The IWEA estimates that potential exists to create up to 16,000 new jobs by 2020[22].

[21] There is a distinction within the industry between land based and off-shore wind installations. Presently the market for on-shore wind is more advanced than that for off-shore. This is due to the higher costs, more complex operation and lengthy planning process involved in off-shore installations. The market for off-shore wind is expected to experience rapid growth in the coming years as the technology becomes more advanced and energy costs increase.

[22] www.iwea.com, Irish Wind Energy Association

- **Marine (wave and tidal) energy**: The island of Ireland is one of the most favourable locations for wave energy in the world[23]. Third-level research expertise[24] is developing in the areas of turbine design, wave tank model testing and wave energy modelling. Three wave energy prototype developers are currently in operation[25]. While tidal energy in Ireland is more limited geographically to where it can be applied, there are also significant developments (such as the world's first commercial tidal turbine in Strangford Lough) which may also provide opportunities for companies developing technologies to produce energy from tidal streams. In light of the strong natural advantages that exist and the fact that marine energy is in its infancy, the potential for significant early mover advantage exists in this sub-sector to develop environmental goods and services and to meet Ireland's long term energy needs. However, as the sector is at an early stage of development, it also entails significant risks. The Programme for Government sets a target of 500 MW of ocean energy connected by 2020. Potential exists to create 1,900 jobs by 2020[26].
- **Bioenergy (biofuels and biomass):** Bioenergy is energy which is derived from renewable organic material otherwise known as biomass. Irish companies have significant capabilities in developing biomass as a sustainable source of energy. The industry is developing rapidly and opportunities exist for companies across the sector. The industry can be broken down into companies that process raw biomass material (e.g. municipal/commercial waste, agricultural waste, dedicated energy crops, food crops, wood waste, human/animal waste, wastewater sludge, etc.) into a fuel (e.g. wood pellets, refuse derived fuel, biogas, biodiesel and bioethanol) or energy (heat, power). The sector is also comprised of companies that develop/ supply technologies and equipment used for processing biomass into fuel or energy (e.g. biomass boiler, anaerobic digestion systems, gasification units, etc.) There is concern that the support mechanism in Northern Ireland is more attractive than the feed-in tariff in the Republic of Ireland.
- **Renewables and ICT:** the interface of energy and ICT (e.g. solar technologies, electric vehicles) offers significant opportunities for Ireland. Managing energy requires a combination of ICT hardware (e.g. sensor technologies) and software, areas of existing strength in Ireland. Smart meters are still in the early stages of development in terms of their full potential for real-time energy management in homes and businesses, as are efforts to upgrade the ICT capabilities of the grid.

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[23] It has been estimated that the total wave energy resource could yield 48 TeraWatt Hours (TWh) if all of the Irish coastline alone were developed. Source: http://www.oceanenergy.ie/market.html

[24] For example the Irish government is designating over €26 million for the sector over the next three years. This ocean energy programme of R&D is aimed at activity, grants, and support over three years to develop the sector. (http://www.hydroworld.com/index/display/article-display/357148/s-articles/s-hydro-review-worldwide/s-volume-16/s-issue-2/s-departments/s-new-hydro.html)

[25] Namely Ocean Energy, Hydam and Wavebob (who recently received an investment of €2m from Chevron).

[26] A Marine Institute & Sustainable Energy Ireland study in 2005 calculated that 1,900 jobs could be created by 2020 if Ireland continued to invest in marine energy technology. Source: Analysis of the Potential Economic Benefits of Developing Ocean Energy in Ireland, Marine Foresight Series No. 3, December 2005.

Developing the ICT capabilities of the grid can leverage Ireland's existing ICT skills base and support the development of new competencies and activities. Smart meters are driving convergence between energy and ICT. In 2008, employment in the ICT sector stood at 70,000 people

The Group believes that Ireland has significant opportunities to develop domestic companies in energy and related areas (e.g. ICT hardware, software, business services, agriculture, etc.) that can export overseas and reduce our dependency on imported carbon producing energy sources. There is already a growing indigenous and FDI presence. The sector has been valued at over €700 million in Ireland. As stated, recent research estimates that the sector has the potential to create over 50,000 direct jobs by 2020[27].

The Group recommends:

1. Continued development of the electricity grid will be required if Ireland is to realise these renewable opportunities[28]. It also creates opportunities for construction/ engineering firms, equipment manufacturers and providers of ICT control systems[29]. This will require continued investment in the grid and international interconnection both to the UK[30] and potentially the continental Europe. (Eirgrid/ Department of Communications, Energy and Natural Resources)
2. Subject to a positive evaluation of the national pilot underway, the adoption of an ambitious national programme for smart meters in terms of coverage and technology levels. Consideration should be given, as part of the cost-benefit study, as to whether smart metering of energy and water can be integrated into the same platform (potentially with advanced broadband) which would allow for economies of scale and cost savings in any future deployment. (Department of Communications, Energy and Natural Resources)
3. The introduction of electric vehicles offers opportunities for Irish enterprise, including the provision of ICT software to manage payment systems and customer transfer across different energy providers. A pilot programme to test technologies and behavioural response of participants should be considered. (Department of Communications, Energy and Natural Resources)
4. Alignment of the feed-in tariff for renewable electricity derived from bio-energy with that available Northern Ireland. (Department of Communications, Energy and Natural Resources)

The creation of scale in Irish energy research (section 4) and improving the regulatory and planning system to remove delays (section 5) will also play a key role in driving the sector.

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[27] Op. cit.

[28] The Economic and Social Research Institute has estimated that interconnection of at least 1,700 MW would be necessary to make a competitive Irish generation market and between 2,000 and 4,000 MW (up to 50 percent of total generation capacity) of interconnection would be required to make a single market between the island of Ireland and Great Britain. ESRI Working Paper No 232, Welfare and competition effects of electricity interconnection between Ireland and Great Britain, November 2008

[29] According to the International Energy Association, over $6.8 trillion dollars will be spent on transmission and distribution systems globally to 2030. If the opportunities in the domestic market are realised it could act as a springboard for internationalisation.

[30] An East-West Interconnector to Wales is currently being progressed. It is scheduled to be in place by 2012.

2.2 Energy efficiency and management

Energy efficiency is one of the most effective ways to improve the cost competitiveness of existing enterprises and support green enterprises. Increasing energy prices, which are damaging the competitiveness of existing enterprise and the existence of ambitious national targets in Ireland and overseas are driving demand in this sector[31]. Ireland has some established companies in this sector, including: Cylon Controls, Environmental Management Services Ltd., Kingspan, Glen Dimplex and Liberator.aero. Significant opportunities exist for Ireland in the following areas:

- Eco-Construction: Eco-construction involves using smart design and integrating technologies within new and existing buildings for the purposes of minimising energy loss and maximising energy efficiency and use of ambient energy sources. This sector has grown significantly over the past decade as new technologies for increasing building efficiency have been developed and stricter building regulations have been introduced. Forecasted investment levels to 2020 in retrofitting buildings to comply with Building Energy Rating (BER) standards in Ireland could be worth up to €25 billion. Given that the compliance burden of reducing greenhouse gas emissions from the built environment will be applied across the EU, relevant companies with scale will have internationalising opportunities. A number of companies based in Ireland are already providing products for the construction sector which increase building efficiency such as thermal heat insulation products and building integrated systems (including solar panels, geothermal and air heat pumps, under-floor heating systems, etc.) which facilitate the more efficient and sustainable use of energy in buildings. Given the size of the construction sector in Ireland and the adjustment that has been taking place in recent times, resulting in many unemployed construction workers, the Group believes there is substantial opportunity to train/up skill workers in this sector so that they are qualified to work in eco-construction practices and techniques.
- Energy management/ efficiency services: Measuring and managing resource efficiency requires a combination of ICT hardware (e.g. sensor technologies) and software, areas of existing strength in Ireland. In energy, it is estimated that the integration of ICT could lead to €600 billion in global energy cost savings, providing significant new revenue streams for energy users and ICT service providers[32]. Rising energy costs and full roll-out of the Business Energy Rating /Energy Performance Certificate (EPC) system are expected to make this sector an area of potential high growth. Services such as the design and supply of energy saving systems for buildings across all sectors and BER/EPC verification, inspection and monitoring of buildings during construction are areas of opportunity. The application of energy management/ efficiency services can also improve the competitiveness of existing firms. It is notable that the multinational companies that have participated in the certified energy management schemes (e.g. IS-393) operated by SEI have been able to improve their energy

[31] For example, the Irish government has set ambitious targets for a 20 percent energy efficiency improvement across the economy by 2020. A higher target of 33 percent is in place for the public sector.

[32] The Climate Group on behalf of the Global eSustainability Initiative (GeSI), Smart 2020: Enabling the Low Carbon Economy in the Information Age, 2008

efficiency significantly and are now advising other facilities within their parent companies on how to reduce energy consumption[33].

- Combined heat and power: Co-generation or combined heat and power (CHP) systems are used to produce electricity and heat simultaneously from a single fuel source. CHP systems can play a key role in meeting the energy needs of existing commercial, industrial and domestic sectors in a cost effective fashion, in addition to creating new employment opportunities. Opportunities exist for companies who specialise in designing, building and installing combined heat and power systems. Many companies involved in developing CHP systems could also build and design biomass boilers and district heating systems.

The Group believes that energy efficiency and management is one of the most effective ways to improve the cost competitiveness of existing enterprises and support environmental enterprises, including the construction sector. The Group recommends that:

5. Energy-efficiency standards should be progressively strengthened and extended to include all building types. The public sector, as a major property owner, should lead in procuring and retrofitting buildings to advanced standards. There is a commitment in the National Energy Efficiency Action plan to renovate the existing stock of public buildings over 1,000m2 to a BER rating of D1 or above. The Group recommends that public procurement of new buildings should specify a very high energy rating on the BER and that the retrofitting of existing public buildings above 1,000m2 should be to a higher level than D1 where economically and technically feasible. Potential also exists to improve energy efficiency in other public services (e.g. public lighting, water treatment, etc.). (Office of Public Works, Department of Environment, Heritage and Local Government)
6. As the initial construction costs of highly efficient green buildings can be more expensive than traditional designs[34], mirroring developments in the UK[35], consideration should be given to reducing stamp duty on low-carbon homes[36]. (Department of Finance)

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[33] Targets have been set for 2010 including: 20 percent of Heat used from Renewable sources; 20 percent of the Electricity from renewable sources; and 40 percent more energy efficient within selected buildings.

[34] Current estimates of the additional costs of green building construction (including energy savings, water efficiency, and ecological impact) from the US Green Building Council (http://www.usgbc.org/) are as follows: 4 star has a zero price premium; 5 star has a 3-5 percent price premium; and, 6 star has a 9-11 percent premium. A similar study on an office building designed to meet a BREEAM Excellent rating reports a 6 percent premium due to sustainable design features for the building.

[35] Since October 2007, all UK new homes valued under £500,000 which meet the zero carbon standard pay no stamp duty, and zero carbon homes costing in excess of £500,000 receive a reduction in their stamp duty bill of £15,000.

[36] It is acknowledged that the impact of this would be limited as most new houses do not attract stamp duty. If the recommendations of the Commission on Taxation are implemented (i.e. a property value

7. In accordance with the Commission on Taxation, a carbon tax should be introduced at the rate approximating the international price for carbon and should exempt firms already engaged in EU-ETS or alternative binding energy-efficiency agreements (e.g. IS-393) (Department of Finance)
8. Consideration should be given to using some of the revenues from auctioning of emissions allowances the EU Emission Trading Scheme during Phase III, and the carbon tax if introduced, to support the development of the green economy[37]. (Department of Finance)
9. The implementation of an energy demand reduction target programme would make a substantial contribution to improving commercial and industrial energy efficiency and creating demand for environmental goods and services. (Department of Communications, Energy and Natural Resources[38])

More broadly, every business consumes energy, water and other natural resources whilst also producing waste. Minimising natural resource use and utilising waste streams more effectively can lower costs, improve productivity and better equip Irish enterprise to compete internationally. The Group believes that setting and meeting world-class resource-efficiency targets can improve the competitive position of existing enterprises and create new markets for those specialising in resource-efficiency services.

10. The development agencies should work to offer an integrated suite of efficiency programmes encompassing energy, water and waste. The programme needs to be offered as a single environmental service to companies. Sustainable Energy Ireland's work with enterprises could be expanded in this regard. Once re-designed, an environmental audit should be systematically promoted for client companies of the development agencies within a 2-3 year timeframe. (IDA/ Enterprise Ireland/ Sustainable Energy Ireland/ EPA)

2.3 Waste management

Waste represents an under-utilised resource of considerable value. Compliance with environmental regulations and public demand for more environmentally sustainable solutions

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tax replaces stamp duties), potential to charge a lower land value tax to zero carbon homes should be considered. While the stamp duty land tax relief for new zero-carbon homes which operates in the UK is available in relation to new homes only, any rebalancing of stamp duty in Ireland could be based on carbon emissions in the same manner in which motor tax and VRT was rebalanced in 2008.

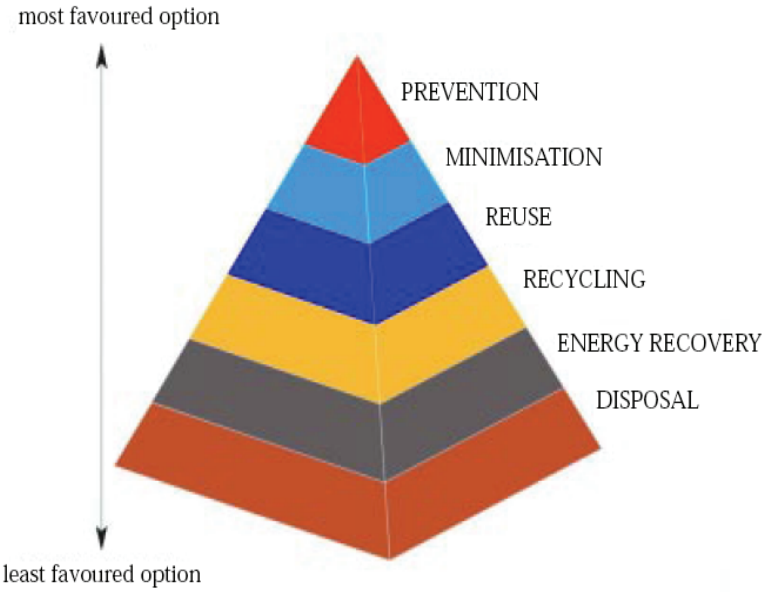
[37] It is difficult to estimate the likely revenues from EU ETS in the post-2012 period owing to the uncertainty around exemptions of sectors to carbon leakage. However, Forfás research indicated that there is likely to be a minimum revenue yield of €370m per annum with potential for as much as €600m depending on carbon prices and the rules regarding implementation of auctioning of emissions allowances.

[38] The Department of Communications, Energy and Natural Resources is currently progressing a consultation paper on the matter.

for waste will provide the key stimulus for growth in the sector. There is a strong indigenous base of firms developing management and technical capabilities in the market, and the sector is valued at more than €550 million currently. Examples of key companies in Ireland include: Greenstar, Enva Ireland Ltd., Celtic Composting Systems Ltd., Mac-Fab Systems Ltd. and Techrec Ireland Ltd. The minimisation and better utilisation of waste (e.g. waste to energy) can also enhance the competitiveness of existing sectors such as agri-business.

Given the need to reduce landfill use in Ireland, new infrastructure and services are being developed across the rest of the waste hierarchy[39]. The most preferred options for waste management are the prevention, minimisation and reuse of waste at source which can reduce business costs and benefit the environment. Recycling covers material recycling - the sorting and (re)processing of material such as paper, plastics, card, metals and glass into new materials. Recycling also covers the biological treatment of food and green waste, which is processed into new products such as compost. The term energy recovery is best described as an umbrella term covering a range of technical processes for treating residual wastes. These technologies often fall into two categories: thermal treatment or mechanical biological treatment. The least favoured treatment option is the disposal of untreated waste in landfill facilities.

Figure 1: EU Waste Hierarchy



Significant opportunities exist for Ireland in the following areas, all of which have the potential to create green jobs and enhance existing enterprises' competitiveness:

- **Waste collection, transfer and disposal:** There are a number of Irish engineering companies that supply vessels (bins, skips, bottle banks, etc.) for collecting and storing waste. Opportunities exist to provide sturdier, more space efficient containers which allow for the easier collection, weighing and transfer of waste and for the integration of identification technology into containers allowing for the easy implementation of pay-by-weight and direct customer invoicing by waste collection companies. Opportunities also exist to cater for specific waste categories (e.g. medical, organic, electrical and electronic equipment, batteries, etc).

[39] The waste management hierarchy has been adopted in Ireland as the basis of our waste policy via the Waste Management Acts, 1996 – 2001 and the 1998 Government policy statement, Changing Our Ways and the 2004 paper, Taking Stock and Moving Forward.

- **Trading and processing**: Opportunities exist for companies with scale to produce higher quality final material for recycling. The value of recoverables can only be fully realised if it can be processed (i.e. segregated, graded, cleaned, shredded, etc.) into a uniform fraction allowing a high-quality bulk material to be produced. As Ireland lacks the infrastructure to reprocess recovered waste the bulk of this material is exported, predominantly to the UK, China, Germany and Denmark for recycling. Further opportunities exist in the processing of materials beyond sorting and grading (e.g. food grade plastics can be upgraded into milk cartons and glass beads for road reflectors).
- **Anaerobic digestion:** Under controlled conditions anaerobic digestion is now a proven technology. Irish companies have developed their capabilities in this area and now offer full turnkey solutions for the anaerobic digestion of wastewater sludge. Research from InterTradeIreland estimates that the composting and anaerobic digestion sector can create 1,500 new direct jobs. Anaerobic digestion of the organic fraction of municipal solid waste has the potential to produce biomethane. Various Irish cities have the potential to produce sufficient biomethane to supply all the transport fuel for their bus services.
- **Recycling of organic waste:** the removal of wet organic waste at source is critical to the development of high quality waste products. The recycling of organic waste through composting is a key growth area and is creating opportunities for companies providing equipment and services in this area. Opportunities exist for companies which can provide more efficient systems for composting which use less space, produce a higher quality final product and have a shorter processing period. The development of the composting industry has created opportunities for companies to provide ancillary services and equipment to the main operators in it. InterTradeIreland estimates that, in addition to 1,500 direct jobs, some 10,000 indirect jobs could be created in this subsector[40]. EU regulations are playing a key role in promoting this sub-sector[41].
- **Developing an agri-business resource:** we need to redefine waste as a resource. Ireland performs poorly in terms of the processing of waste to energy. The development of agri-food waste and/or crops grown on a rotational basis as an energy feedstock[42] have the potential to reduce Ireland's dependency on imported fossil fuel, convert a very expensive waste disposal cost to an energy related revenue for the agri-food sector, and reduce the environmental impact /carbon footprint associated with primary agriculture and food and drink processing and distribution.
- **Waste consultancy:** More stringent environmental regulations regarding the handling, transport, storage, treatment and disposal of waste are being continuously

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[40] InterTradeIreland (May 2009) Market Report on the Composting and Anaerobic Digestion Sectors

[41] EU Landfill Directive 1999/31/EC, draft Food Waste Regulation, Environmental Protection Agency Guidance Document on Pre-treatment & Residual Waste Management at Landfills.

[42] Energy feedstocks include meat, bone meal and tallow from cattle production which can be used as source of bio diesel (tallow) or as a combustible 'carbon lifecycle neutral' fuel (MBM) for co-firing in energy generation, rapeseed oil crops as a source of pure plant oil, and food processing waste/by products which can be used in aerobic and anaerobic digestion processes.

introduced. A services sector has developed which provides technical assistance for waste companies who must meet these regulations and the specific terms of their operating licences. Such companies are also becoming involved at the design stage of many products to ensure waste minimisation.

The Group recommends:

11. Consistent enforcement and implementation of waste legislation is central to driving the sector. Timely enforcement of environmental legislation allows for certainty that is needed for enterprises to invest in potential opportunities. A decision on the future regulatory structure for the waste sector needs to be made quickly which clarifies the relative roles and responsibilities in the regulation and management of the waste sector at national, regional, and local level. (Department of Environment, Heritage and Local Government)
12. Regional waste management plans need to be coordinated at national level to attract investment in waste infrastructure in a way that maximises potential economies of scale, competition and enables the market to pass on the benefits to businesses and households.
13. Further efforts should be made to promote composting and anaerobic digestion by rolling out brown bins to all households and businesses and promoting their use. Potential exists to build on the EPA National Waste Prevention Programme (NWPP) project to assist householders with home composting and the correct use of the brown bin.
14. The implementation of the draft Food Waste Regulations, which will require businesses to separate food waste at source, is also important. (Department of Environment, Heritage and Local Government)
15. Consideration be given to expanding the scope of the Accelerated Capital Allowances Scheme (currently limited to energy-efficiency products) to include technologies that minimise waste streams (Department of Finance/ Sustainable Energy Ireland).
16. Practical issues remain with the development of the all-island market in key areas. For example, the Trans-Frontier Shipment of Waste Regulation is acting as a barrier to north/south trade in recyclable material. Scope exists to ease the regulatory burden on business operating in this area: first, in relation to the classification of certain waste streams, particularly brown bin waste, as non hazardous at a European level; second, by seeking to reduce the administration and charges associated with the compliance regime. (North South Ministerial Council, Department of Environment, Heritage and Local Government, National Trans-Frontier Shipments Office, Dublin City

Council)

17. Efforts to develop additional reprocessing capacity for recovered materials (e.g. paper, glass, plastic, metal recycled materials) should be prioritised[43]. (Department of Environment, Heritage and Local Government)

18. Efforts to seize the opportunity to support the farming community to produce green energy and sell this on should be supported e.g. locally generated biogas. Challenges exist to promote the uptake of green technologies and processing facilities (e.g. bio-digesters[44]). (Department of Agriculture, Food and Forestry**).**

2.4 Water/Wastewater

Over the past decade significant investment has been allocated to upgrading water supply and wastewater treatment infrastructure in Ireland. This market is expected to experience continued growth over the coming years due to the level of public investment in the sector, as set out in the Water Services Investment Programme (€500 million in 2009) of the National Development Plan in Ireland and the Northern Ireland Water Strategic Business Plan (2007-10). This investment is aimed specifically at guaranteeing high quality water for consumers and protecting the aquatic environment. It is also essential to ensuring that Ireland and Northern Ireland meets their requirements under a number of EU Directives. Indigenous companies have experienced significant growth as a result of public investment in water services. Key firms include Acorn Water, Butler Manufacturing Services Ltd., EPS Pumping & Treatment Systems Ltd. and Pollution Control Systems Ltd. Dwindling water sources and availability of potable water throughout the world are driving the development of the international water/wastewater sub-sector. The forecasted water shortages in the Greater Dublin Area also act as a driver in this sector.

Some specific opportunities in the sector are set out below:

- **Leak control, monitoring and supply networks:** Water distribution in Ireland suffers from high losses in water supply due to leakage from damaged and old pipelines and unknown and illegal connections[45]. Replacing and upgrading existing supply/collection networks is one of the key growth areas within the water industry as it is vital for ensuring security of supply and for reducing treatment and pumping costs for water providers. Opportunities are also emerging for companies developing more innovative

[43] Ireland has traditionally had very limited levels of waste reprocessing infrastructure but recent developments in the form of the collapse in the prices on world markets for recovered materials, have further focused efforts in developing the market here. A market development implementation team was appointed in late 2008 to develop markets for recyclables in Ireland. It is important that its work is progressed quickly.

[44] Bio-digesters break down organic materials in an oxygen free (anaerobic) environment producing gas that can then be combusted to produce heat, electricity or both. Feedstock materials include food processing waste and agricultural slurry.

[45] Unaccounted-for water (UFW) is the term given to losses in water supply distribution networks which cannot be accounted for through known usage. According to the recent Forfás study Assessment of Water and Waste Water Services for Enterprise, UFW accounts on average for 43 percent of the volume of treated drinking water produced in gateways and hubs in Ireland. This study is available at http://www.forfas.ie/publications/forfas080902/forfas080902_water_waste_water.pdf

and robust piping products which have a longer lifespan, a greater flow capacity, are easier to install and maintain and which are more resistant to corrosion. There is a developing niche area within the sector for companies supplying services and technologies for the monitoring and detection of leakages along networks.

- **Advanced water solutions:** Current problems with treated water quality (e.g. cryptosporidium) and resource security are forcing the sector to examine the role advanced technologies, such as membrane systems and ultra-violet treatment, can play. These technologies are already in existence, but further development and deployment will be required.
- **Processing wastewater sludge**: Significant opportunities exist for companies providing advanced technologies for processing wastewater sludge. There are opportunities for companies developing technologies which can remove contaminants rendering the material less harmful, increasing its range of applications and final value. The high organic and energy content of wastewater sludge means opportunities exist for companies which can process this sludge into energy or who can recover nutrients (e.g. nitrogen, phosphorous) from it. There are also opportunities for companies offering a recycling service for wastewater sludge.
- **Integrated greywater recycling (indoor wash water) and rainwater harvesting systems (the collection and use of rainwater)**: The need to conserve water in the residential and commercial sectors as a means of reducing water costs for businesses and ensuring security of supply has created opportunities for companies providing integrated greywater recycling and rainwater harvesting systems for use in commercial and residential building developments.
- **Water analysis:** The introduction of more stringent regulations regarding treated water quality is driving the market for water analysis technologies and services. Greater vigilance is required for the monitoring of potable water quality while in the wider scientific community monitoring instruments are needed to assess water quality in the natural environment. There are opportunities for companies developing equipment which can provide more accurate real-time data for a range of water quality parameters. There is also a demand for technologies which can monitor contaminants that are difficult to detect.

The above outlines a range of potential opportunities for companies operating in the water sector. While these opportunities are expected to arise on the island of Ireland, it is also anticipated that developing markets including China, India and Eastern Europe have strong potential due to the demand for modern water services in these regions.

The Group recommends:

19. Levels of allowable unaccounted-for water should be progressively reduced towards best practice. Fixing leaks would improve efficiency, reduce the need for further investment in water treatment, and help develop Irish expertise in leak control, monitoring and supply networks. This needs to be the first course of action taken by local authorities to increase capacity levels. In this context, no Exchequer funds should be allocated to provide additional capacity to any urban centre until action plans to reduce leakages to an acceptable level are being implemented (Department

of Environment, Heritage and Local Government / Department of Finance);

20. A single national water authority should be introduced with overall responsibility for system planning, delivery and maintenance. This would support the development of deeper public and private sector capabilities in the water sector and the development of projects of greater scale (Department of Environment, Heritage and Local Government);
21. The introduction of volumetric treated water charges for domestic users and more transparent, fully reflective charges for non domestic consumers would create incentives to use water more efficiently and thereby create a market for water efficiency goods and services with future export potential. In conjunction the 'tap tips' awareness campaign could be expanded to communicate the importance of water conservation. (Department of Environment, Heritage and Local Government/ Department of Finance);
22. Consideration be given to expanding the scope of the Accelerated Capital Allowances Scheme (currently limited to energy-efficiency products) to include technologies that minimise water/wastewater utilisation (Department of Finance/Sustainable Energy Ireland);
23. Measures to encourage rainwater harvesting and the re-use of grey water should be encouraged. (Department of Environment, Heritage and Local Government, and Department of Finance);
24. The monitoring and enforcement of standards relating to septic tanks requires greater priority. Such a regime could be similar in form to the BER scheme and delivered by the private sector. This would drive the indigenous market by developing expertise in advanced water solutions, water analysis and the processing of wastewater, in addition to improving water quality. (Department of Environment, Heritage and Local Government); and

Developing a strong base in commercial research and development is also critical (Section 4).

3. Deliver Green Zones and a Green IFSC

The green economy in Ireland, while small, is growing rapidly. To date, it remains highly dispersed across various sectors (e.g. ICT, engineering, finance, energy, waste, water, etc.) and across various state organisations that both drive and support the sector (e.g. infrastructure/ service suppliers, education and research institutions, Government departments and agencies, etc.). There is an opportunity for greater clustering and brand development of green economy activities and facilities both as demonstration initiatives and for stimulating additional private sector investment and innovation. In addition to supporting the development of the sectors highlighted in section two of this report, these zones should be open to all exporting firms operating in the wider green economy sector. Consideration could be given to encouraging industries to locate within green zones on the basis of "industrial ecology", where the waste streams from one industry can be converted into usable materials in another industry (e.g. Kalundborg Industrial Park in Denmark).

The identification and designation of green zones can support the development of the green economy by:

- Providing state-of-the-art environmentally friendly buildings and infrastructures (energy, water, waste treatment, etc.) in a green business park;
- Encouraging the development of a critical mass of private sector support services (e.g. environmental science, ICT, legal, accounting, consulting, etc.) to support the clustering of Irish and international green companies. In some sectors, potential will exist to leverage existing resources (e.g. a 'green' IFSC);
- Providing a test-bed, perhaps led by Science Foundation Ireland, and showcase for innovation through supporting easier access to environmental research and development, information on technological developments, and the creative, educational and community sectors in developing environmental products and services;
- Supporting entrepreneurship through the provision of incubation space for start-up companies;
- Creating a flagship development which becomes a 'reference seller' to support the marketing of the sector and international linkages (e.g. overseas marketing, access to EU research funds, etc.);
- Creating a focal point for the development of polices to support the future development of the green sector through the development of industry led networks;
- Assisting in technological convergence across sectors, reducing information gaps and transactions costs and associated risks for green companies through the development of industry led networks;
- Promoting investment in knowledge and people and wider public interest in environmental goods and services; and
- Demonstrating the benefits to companies of best practice in resource efficiency.

The establishment of green zones need not necessarily result in construction of new office buildings. The Group sees potential to retrofit existing stock where possible or use existing state-of-the-art high-efficiency stock for this purpose. Both the public and private sector will

be responsible for the delivery of individual green zones. It may also be possible to co-locate a zone with a R&D institute and other national assets (e.g. airports, dockland-seaport). It is critical that green zones are not simply viewed as property developments. Their success will ultimately depend on the success of the businesses/organisations that inhabit them. The development agencies will have a key role in attracting companies to green zones and supporting their growth.

The identification and development of one or more green zones that bring together enterprises and existing green initiatives and provide an environment that is conducive to the development of green enterprise can play a key role in developing the green economy.

The IDA has proposed to:

25. Develop one of IDA's planned strategic sites into a Flagship Green Business Park which will be designed and built to the highest level on the internationally recognised US LEED green building standard[46]; and
26. Retrofit an existing IDA Business Park to a high level on the LEED standard in collaboration with existing occupants, service providers and authorities as a demonstration and test site for new technologies and sustainability.
27. Engage in an awareness programme with the construction sector and other suppliers on the requirements necessary to meet the LEED standard (Sustainable Energy Ireland/IDA/Enterprise Ireland).

The group agrees that potential exists to:

28. Build on existing demonstration projects for sustainable working and living; e.g. Dundalk 2020 setting strict targets to achieve a more sustainable energy future[47]. Potential may exist to expand on this initiative to develop a 'smart town' (e.g. piloting smart electricity meters, water meters, and electric vehicles plug-in, setting high energy efficiency standards, etc.) in tandem with green business zones. (Department of Communications, Energy and Natural Resources)

    Advance other promising public and private sector initiatives of scale. For example, the Dublin Airport Authority is proposing to develop Dublin Airport City as an 'international clean-tech services centre'.

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[46] The Leadership in Energy and Environmental Design (LEED) Green Building Rating System, developed by the U.S. Green Building Council (USGBC), provides a suite of standards for environmentally sustainable construction. Since its inception in 1998, LEED has grown to encompass more than 14,000 projects in the United States and 30 countries covering 1.062 billion square feet (99 km^2) of development area.

[47] Targets have been set for 2010 including: 20 percent of Heat used from Renewable sources; 20 percent of the Electricity from renewable sources; and 40 percent more energy efficient within selected buildings. The Dundalk project to date has achieved 50 percent of targets thorough primarily energy efficiency measures €1M savings per annum and 5000 tonnes of carbon.

3.1 Green international financial services sector (IFSC)

In addition to developing new environmental goods and services sectors, potential exists to promote green activities in existing sectors. Existing competitive advantages (e.g. skills, legislation, tax regime, etc.) can be leveraged to serve new and potentially less contested sub-sectors. The development of a green international financial services sector is one clear example.

Green investment funds and carbon trading markets are growing in size and sophistication[48]. Potential exists to develop a green IFSC cluster and brand incorporating green investment vehicles (e.g. investment funds of energy companies, banks and VCs), the administration of funds managed under green principles, and carbon trading and associated professional services. The carbon offset market is likely to grow given the likelihood of the EU Commission reducing the permissible use of flexible mechanisms in Phase III of EU ETS. This gives Ireland an opportunity to gain a foothold in the carbon trading market, which has been led by the UK thus far[49].

The Group welcomes the recent establishment of a sub-group of the IFSC Banking and Treasury Group (supported by the Department of the Taoiseach) which is exploring the options for a Green IFSC. They are assessing the scale of the opportunity and the size of the existing green base within the IFSC, and what changes (e.g. legislative, skills, tax, physical building, etc.) may be required to attract new green activities to the IFSC.

[48] In 2007, green investment funds invested $148 billion in sustainable energy. In 2008, $30 billion was under management in clean energy funds, with a further $26.4 billion in funds with a significant exposure to clean energy. Analysis by New Carbon Finance highlights that the world's carbon markets grew by 84 percent in 2008 to $118 billion. Many banks are currently developing the resources (financial and skills) to expand into carbon trading and to provide associated services (e.g. carbon auditing and offsetting services).

[49] With the more stringent post-Kyoto greenhouse emission targets envisaged for 2013-2020, Ireland could formulate a proposal to other member states for the facility to adopt a domestic offset market as a mechanism to reach greenhouse gas targets. Such a market would enable Irish firms that abate emissions to generate domestic carbon credits, and subsequently sell these credits to other Irish businesses who are either unable to reduce their emissions, or where the purchase of such domestic credits is a more economically efficient way of reducing their emissions.

The Group welcomes the work of the IFSC Banking and Treasury Group examining green finance opportunities. The Group:

29. Strongly encourages the IFSC Clearing House Group, supported by the Department of the Taoiseach to consider and progress recommendations which emerge. Consideration should be given to assess how wider public and private sector bodies, with an existing interest in the green economy, could play a key anchor role in developing the 'green IFSC' (ESB, Bord Gáis, Irish financial institutions with green funds, etc.) [50]; and

30. Recommends speedy implementation of EU Directive 2009/29/EC which allows installations in the EU Emissions Trading Scheme (ETS) below the 25,000 tonne p.a. *de minimus* threshold to, *inter alia*, opt out of EU ETS and join a secondary domestic offset market. (Department of the Environment, Heritage and Local Government).

[50] Existing semi-state green investment funds could locate these activities in the IFSC (e.g. ESB €200 million[50], Bord Gáis €10 million). Relevant private sector funds such as Bank of Ireland's €100 million green fund could be encouraged to do likewise.

4. Create World-Class Research Centres and Human Capital

R&D in the Irish green sector is fragmented and is not generally at the level necessary to be internationally competitive[51]. The challenge for Ireland is to develop a small number of world-class centres for research and development in the green area[52]. Combining Environmental Protection Agency, Science Foundation Ireland and Sustainable Energy Ireland funding for energy and environmental research and development, there is approximately €200 million in dedicated public funding up to 2013[53]. In addition, a number of other State organisations are also involved at different stages on the continuum from research to demonstration and commercialisation. For example, in the area of energy research, a range of additional funding agencies includes Teagasc, LEADER organisations, County Councils and local energy agencies.

Fragmentation in the research base and the associated lack of scale is cited as a common challenge across many sectors of the Irish economy. These issues are more acute in the environmental goods and services sector for a number of reasons:

- The green sector has only emerged as a distinct sector in recent years. It is notable that the sector typically requires significant inter-disciplinary knowledge of scientific and engineering principles, including chemistry, materials science, mechanical and electrical engineering, biotechnology, environmental sciences and ICT.
- Given the multi-disciplinary nature of green R&D, Irish Government funding in this area comes from a multitude of sources. Despite cross-agency initiatives, there appear to be some areas of omission and duplication. There is a need to ensure that there is an adequate focus on the commercialisation of technologies and processes with the goal of developing products and services for export markets. There needs to be a better continuum between scientific research, policy/applied research and technology commercialisation and deployment. There is also a need to better align green research funding opportunities in Northern Ireland and the Republic of Ireland given that some research funds are accessible researchers in one jurisdiction only. Enterprises have also expressed confusion with respect to how, and where, to access R&D supports.
- Despite progress, particularly in energy research, Irish research in the green sector lacks an overarching strategy. Much of the focus to date in the green area has been on energy research and development. Areas such as waste and water have received less focus in terms of their potential to create commercial products and services with export opportunities[54].

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[51] Forfás/InterTradeIreland (2008). An assessment of enterprise opportunities in the environmental goods and services sector on the island of Ireland, Forfás: Dublin.

[52] Appendix 3 given details of twenty significant green research centres on the island of Ireland.

[53] Appendix 4 contains more information on the individual research programmes. Funding is subject to change.

[54] EPA STRIVE programme does fund research into water and waste. However, this research is not aimed solely at developing the commercialisation potential of the technologies, as it has a strong focus in supporting policy development and implementation.

- As a young R&D system, the processes for ensuring the rapid commercialisation of ideas are under-developed.

As market opportunities are continuing to evolve, research and development, innovation and creativity in product and services development by green enterprises is essential. Recent successes such as the 'Smart Bay' project in Galway demonstrate Ireland's potential to attract overseas investment and stimulate green enterprises with high potential in applying new technology. The Group believes that convergence in green technologies highlights the need for consolidation in the research base and the development of world-class multi-disciplinary research teams.

The Group strongly supports the creation of world-class research centres in Ireland capable of competing with the best international research institutes pioneering the development and deployment of green technologies.

The group recommends that:

31. In the context of the current constraints on public finances, the pooling of research expertise and/ or the development of formal (national, all-island and international) research alliances must be advanced[55]. This could entail the merging of existing initiatives or the creation of an umbrella group to develop a networked European energy centre, bringing together the best of Irish capacities to create critical mass. The challenge for Ireland is to create research centre(s) which will be recognised at a European and global level.
32. Green research is funded through a range of agencies. An assessment should be carried out on the merits of consolidating and aligning the range of R&D funding programmes. (Inter-Departmental Committee on Science, Technology and Innovation)
33. It is necessary to develop an R&D research strategy for the wider environmental goods and services sector which builds on the work of the Irish Energy Research Council and the EPA research programmes and includes a strong focus on waste and water[56]. It is important that any overarching strategy take cognisance of export and employment potential in key green sectors and target Irish-based companies to exploit commercial benefits. Consideration also needs to be given to how other research streams can build environmental sustainability into their research agenda — from ICT to food to transport. (Inter-Departmental Committee on Science, Technology and Innovation)

[55] The Group acknowledges that a number of significant projects in the green economy area are being considered under the Programme for Research in Third-Level Institutions 'Cycle 5' process. This programme seeks to build capacity in areas of national priority on a national or cross-institutional basis.

[56] The Group acknowledges that HERG already includes members from the relevant "green" departments/agencies and its remit provides for oversight and responsibility for the coherent development of policy and funding initiatives arising under the SSTI. However, the remit of Technology Ireland in particular should be specifically extended to support the implementation of a broader green R&D strategy.

34. A whole-of-Government drive is required to market Ireland as a test-bed centre in those areas (such as wind and marine renewable energies) where Ireland demonstrates a clear competitive advantage[57].

35. The Innovation Task Force and Department of Enterprise, Trade and Employment ensure that appropriate structures and incentives are in place to maximise the commercial applications from publicly funded research.

Skills Needs

Many people working in traditional sectors have the potential to transfer into environmental goods and services industries without having to undertake wholly new qualifications — for example plumbers, electricians and construction workers. It is also notable that FAS, the third-level education sector, and ESB are very active in skills development for this sector. However, there is still a challenge for the education and training system to respond rapidly to ensure that individuals seeking to up-skill have access to courses which are tailored to meet emerging industry needs.

New skills requirements are also being driven by new building regulations and emissions targets that require dedicated specialists; examples include carbon auditing and management, protection of intellectual property assets from new energy technologies[58], building energy efficiency, project management and risk analysis. Development of relevant expertise in key engineering disciplines such as computing, electronics, environmental, electrical and mechanical engineering are also required. While more third-level engineering degrees in Ireland are providing environmental engineering modules, and theoretical and practical exposure to project management are standard components in all relevant undergraduate engineering programmes, further development is required. However, the vision of a green economy and society also provides a powerful marketing tool to encourage potential students to study engineering and related disciplines.

While the Group recognises that much is already being done in the skills/ training area already (e.g. new programmes and modules developed by the third-level sector, including specific programmes targeted at unemployed people, as well as FAS conversion courses), skills needs of enterprises in this emerging sector are constantly changing. Opportunities for continuous professional development for employees are essential to ensure that emerging skills requirements or shortages are met swiftly. This can be done through part-time courses, internal training in companies, or self-learning.

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[57] A test bed is a platform for experimentation of large development projects. Test beds allow for rigorous, transparent and replicable testing of scientific theories, computational tools, and other new technologies.

[58] While the intellectual property regime for the green economy is seen as often complex, with long, expensive R&D lead-in times to development of technologies and international joint ventures common, such issues pertain to most sectors. However, SFI has stated that official guidelines on Irish IP rights are in need of an overhaul to modernise them so that they cover issues such as digital rights management, data and software, etc.

There are a number of ways that stronger industry-academic links can help meet the skills needs of the sector:

- Education providers should continue to involve industry in the development of course curricula to ensure relevance of skills to employers. There is scope for more structured engagement between providers and industry, particularly as Irish industry becomes more involved in green issues.
- Companies will need to identify their human resources needs and engage with education providers in the design of course provision and content;
- Structured graduate placements within enterprises operating in the sector can help to ensure that students receive appropriate first-hand experience; and
- Research and development within the higher education sector has potential to link in with enterprise to design, develop and commercialise environmental goods and services. Mobility of researchers between academia and 'green enterprises' could be encouraged through mechanisms such as developing doctoral programmes in partnership with industry and provision of entrepreneurship training for researchers.

The Group recommends that education and training providers in collaboration with business should (where applicable continue to):

36. Re-design existing, and introduce new, accredited courses (and/or modules) to meet new and emerging skills needs of enterprise operating in the green economy;
37. Provide continuing professional development, full-time / part-time and distance opportunities for professionals to update existing knowledge and acquire new skills; and
38. Promote recognition of formal and non-formal learning and prior experience within programmes

5. Remove Hurdles to the Development of the Green Economy

Before Ireland can advance to become a leading player in the green economy, a number of basic hurdles need to be addressed without delay. In addition to being practical problems for firms, the lack or slow pace of progress damages Ireland's credibility as a base for the green sector. Many of the recommendations can be implemented immediately. While some hurdles are a consequence of the complexity and technical nature of a given policy, the Group highlights the need to:

- Urgently address technical, regulatory and planning barriers that are delaying the development of renewable energy projects;
- Address the lack of progress on green public procurement in Ireland as a matter of priority; and
- Develop Ireland's brand and ensure that green firms can access finance.

5.1 Technical, regulatory and planning barriers to the development of renewable energy projects

Ireland has significant opportunities to develop domestic companies in energy and related areas (e.g. ICT hardware, software, business services) that can export overseas and reduce our economic dependency on imported carbon-producing energy sources. With an ambitious 40 percent renewable electricity generation target by 2020, supported by subsidies (feed-in tariffs) and major investment of over €10.5 billion in the transmission and distribution network, domestic opportunities are being created across the supply chain. There are also international opportunities as Irish enterprises can compete for the estimated $26 trillion that will need to be spent on global energy infrastructure to 2030[59].

In an emerging market, appropriate regulation can positively influence investment decisions. Ireland has adopted a Renewable Energy Feed-In-Tariff (REFIT) scheme, effectively guaranteeing renewable energy prices for 15 years. Given the high-quality of Ireland's wind resources, the Irish REFIT rate is lower than those in other EU countries. Nonetheless, interest in renewable electricity generation in Ireland is strong. Under the Gate 3 process (which determines how generation is added to the grid in Ireland), a total of 3,900 MW of renewable energy, mostly wind-based, will be offered grid connection in 2010-11.

Despite high levels of investment in the grid, the length of time required for renewable energy projects to connect to the grid has acted as a major impediment to market development. Despite improvements, a number of issues remain that need to be addressed immediately.

[59] International Energy Agency (2008). *World Energy Outlook*, IEA: Paris.

Grid Connection Timing

Grid connection is currently awarded on a 'first come, first connect' basis through Gate 3 procedures. On examination of the Gate 3 queue, there are a number of large onshore and offshore wind projects that are down the list and will, therefore, be offered grid connection towards the end of the anticipated 18-month processing period commencing in December 2009. Ideally, large projects or those with a strategic contribution to the green economy (e.g. exemplar projects, those that progress Ireland's renewable targets at least cost, promote competition, etc.) should be prioritised as they are likely to have the scale and expertise to be commercially successful. As the applications have been received and the offers under Gate 3 will commence December 2009, it seems unlikely this situation can be changed.

39. The Group recommends that the Commission for Energy Regulation expedites the 18-month processing period for new connections to the grid, and that, in future, preference is given to projects of scale and/or those with a strategic contribution. (Commission for Energy Regulation)

The research and development of ocean energy technologies and devices is continuing apace, and a number of trials are underway in Ireland and internationally. While ocean energy offers huge opportunities for Ireland given our natural advantages, the foreshore licensing regime has not supported enterprise and research projects[60]. If the delays experienced in applying for foreshore licences are not swiftly addressed, it is likely that companies will locate projects abroad – costing investment and jobs in Ireland.

40. The Group welcomes recent developments in legislation that will transfer responsibility for granting foreshore licences from the Department of Agriculture and Marine to the Department of the Environment, Heritage and Local Government. The transfer should be implemented immediately and a dedicated unit should be responsible for putting in place the necessary regulatory regime as soon as possible. In the course of the transfer, the foreshore licensing regime must be reviewed to ensure that it supports enterprise and research projects that require foreshore licences.

Single Premise/ Traverse Lands Rule

Distributed generated power has significant potential to promote local green enterprise opportunities and the creation of green zones. Enterprises wishing to partner with a local renewable energy source, such as a wind turbine or CHP facility, are dis-incentivised from doing so by the 'single premises' rule. Currently the electricity from such a facility would have to be exported to the grid and then purchased through the single electricity market which increases costs. Creating a mini-grid on a business park or green zone would lower costs and potentially act as a test bed for certain ICT energy management applications. Any excess capacity could be sold back to the grid providing some base load generation capacity to balance intermittent renewables.

[60] Government policy envisages grid investment to support up to 500 MW for ocean energy over the medium term.

Other European countries allow firms other than the incumbent network company to design, build, and operate new distribution lines subject to agreed regulatory standards (e.g. health and safety standards, integrity of the grid, etc). The 'traverse lands' condition in Ireland prevents the running of an electricity supply line (other than Eirgrid/ESB Networks) over third-party lands or roads, making it harder to supply companies directly from proximate generation facilities. This restriction can act as a barrier to a company or group of companies that wish to establish direct links to an electricity generation facility, backed up by national grid connection.

41. The Group recommends that the 'single premise' regulation should be amended to allow for multi-user renewable energy installations, and the third-party provision of power lines be allowed subject to agreed standards. (Department of Communications, Energy and Natural Resources)

Delivering on-shore wind projects is becoming more challenging due to local objections in the planning process. This is unfortunate as renewable energy projects offer the potential to create sustainable local employment (construction and maintenance). It is also notable that the best opportunities are available on the west coast where the existing enterprise base is generally less developed, offering potential for regional development. Given the abundance of onshore wind opportunities in Ireland, the development of offshore wind driven by fewer planning objections is sub-optimal. Given the extra complexity of delivering offshore projects, the energy produced is considerably more expensive which increases costs for energy consumers and reduces the potential to export cost-competitive power in the future.

As citizens have a clear democratic right to participate in the planning process, the Group recommends that efforts be made at all levels, particularly at local level, to:

42. Emphasising the 'common good', develop greater public understanding of the economic, environmental and social advantages of local renewable energy projects, and encourage communities to join together to develop and promote renewable energy projects[61]. (Eirgrid / Central and Local Government)

43. Continue to communicate the need to re-enforce the grid to allow for greater renewable energy penetration and to support secure power to existing industry, for example through the 'power of one' campaign. More renewable energy requires more high-tension electricity cables which for cost reasons need to be overhead[62]. (Eirgrid / Local Government)

[61] For example, the proposed West Clare Renewable Energy project involves a co-operative approach to maximise economic and environmental benefits for 30 local farming families together with the wider community.

[62] Eirgrid estimates the incremental cost of using underground cables to strengthen the transmission grid (circa 650 km of transmission cables and 100 km for the North-South interconnector) would be €6 billion — costs that would be borne by all customers. These costs are prohibitive and underground cables would be technically inferior from the perspective of guaranteeing security of supply and supporting the rapid connection of new renewable resources.

The Strategic Infrastructure Act, 2006 can play an important role in fast-tracking planning for large projects. Under the Gate 3 process, only three applications for onshore wind meet the Act's criteria (wind farms of over 100 MW). It is also noted that the planning process requires the specification of the exact type of turbine at the outset of the planning process. This risks 'manufacturer lock-in'. It also means that more efficient technologies that may have been developed in the interim cannot be substituted.

The Group recommends that:

44. Consideration be given to a lower threshold for wind farm approvals under the Strategic Infrastructure Act to facilitate faster processing. (Department of Environment, Heritage and Local Government)
45. The specification of the exact type of wind turbine should not be necessary for the initial planning application for a wind farm. (Department of Environment, Heritage and Local Government)

5.2 Implementing green public procurement in Ireland

The roll-out of green procurement in the public service in Ireland and internationally can create significant opportunities for green enterprises in Ireland[63]. By taking environmental criteria into account in procurement procedures, the State can promote environmentally friendly production and stimulate employment in this emerging sector, while maintaining transparency and ensuring value for money[64]. Annual government expenditure on goods and services by the Irish Government amounts to circa €10 billion with a further €7 billion on works.

Ireland is well behind European best practice in relation to green public procurement. The European Commission requested that all Member States publish ambitious National Action Plans on Green Public Procurement by December 2006. Ireland has not yet done so. In September 2008, the European Council adopted a political indicative target of 50 percent green public procurement to be reached by EU Member States by the year 2010. Ten priority sectors were identified based on their importance in terms of the scope for environmental improvement, public expenditure, potential impact on the supply side, existence of relevant and easy-to-use criteria, market availability and economic efficiency. These are: construction, food and catering services, transport and transport services, energy, office machinery and computers, clothing, uniforms and other textiles, paper and printing services, furniture, cleaning products and services and health sector equipment. The Group is disappointed with the progress that Ireland is making in developing a national action plan to meet the 50 percent target[65].

A National Action Plan on green public procurement should highlight existing best-practice cases of green public procurement (both by the Irish public sector and internationally), which provide significant learning potential. In formulating the National Action Plan consideration should be given to the appropriate monitoring and accountability of public bodies. Care will also be needed to ensure that SMEs are capable of accessing green public procurement opportunities. The Group welcomes the Report of the Procurement Innovation Group and the 10 Step Guide to Buying Innovation which highlighted actions that can be taken to make better use of the innovative potential of SMEs and to facilitate improved access for SMEs to public contracts[66].

Internationally, approximately $436 billion (about 16 percent of the total committed stimulus plans to address the current global recession) can be characterised as a green stimulus. While

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[63] Green public procurement is a process whereby States meet their needs for goods, services, works and utilities by seeking and choosing outcomes and solutions that have a reduced impact on the environment throughout their whole life-cycle, as compared to comparable products/ solutions. A procurement procedure will be considered as 'green' only if it has led to the purchase of a substantively 'greener' product, and only if the environmental characteristics of this product go beyond compliance with European or national environmental legislation. 'Collection of statistical information on Green Public Procurement in the EU: Invitation to tender', May 2007. Reference ENV.G.2./SER/2007/0038.

[64] Evidence from the EU highlights that, by taking a life-cycle cost approach, green public procurement saves money and protects the environment at the same time.

[65] See http://ec.europa.eu/environment/gpp/pdf/national_gpp_strategies_en.pdf

[66] Source: http://www.entemp.ie/publications/trade/2009/buyinginnovation.pdf

some national plans have a minimal green component, others — notably China (38 percent of the stimulus plan), the broad EU package (59 percent) and South Korea (81 percent) — incorporate significant green investment plans. It will be critical that Irish companies are well-positioned to take advantage of these domestic and international opportunities and that Enterprise Ireland continues to identify international opportunities in other countries' green public procurement activities and stimulus packages that could be accessed by Irish companies.

The Group recommends that:

46. The work being undertaken by the Department of the Environment, Heritage and Local Government, in co-operation with both the National Public Procurement Operations Unit and the National Public Procurement Policy Unit, should be urgently progressed with a view to the earliest possible attainment of the 50 percent target by the Irish public sector. The Group wishes to emphasise the importance of implementation of this action plan, in a manner that supports innovative firms, as a matter of priority. (Department of Environment, Office of Public Works / Department of Finance)[67]
47. Progress towards these targets needs to be monitored and made publicly available and that weak-performing Departments/Agencies are held to account. (Department of Environment, Office of Public Works / Department of Finance)
48. Enterprise Ireland continues to identify and prepare Irish companies for public procurement opportunities domestically and internationally.
49. While aid should remain completely untied and focused on developing country needs, potential may exist for the Department of Foreign Affairs to work with Enterprise Ireland to alert companies to possible export opportunities for environmental goods and services in developing countries. The Irish Aid programme has, as its absolute priority, the reduction of poverty, inequality and exclusion in developing countries, and works with other countries to achieve the Millennium Development Goals. In tandem with improving health and educational outcomes, the millennium goals also support ensuring environmental sustainability. (Department of Foreign Affairs/Enterprise Ireland)

[67] Work being undertaken by the National Public Procurement Operations Unit of the Office of Public Works (Department of Finance) in co-operation with the Department of the Environment Heritage and Local Government and the National Public Procurement Policy Unit in the Department of Finance represents an important start. Over 460 procurement units exist across the public sector from local authorities to central government and agencies. As a first step, the actual procurement spend is being quantified, from which consolidation, co-ordination and the transfer of best practice can occur. Once the data has been collected it should also be possible to identify areas that are particularly suited for green procurement. The policy of the NPPOU is to make available green procurement solutions where they exist and are feasible. Ultimately the decision to purchase the product lies with the purchasing authority but could be facilitated by a strong Green Public Procurement policy.

5.3 Ensuring that green firms can access finance and developing Ireland's brand

A number of financial institutions have recently launched 'green' loans specifically aligned with SEI's Greener Homes Scheme and Home Energy Saving Scheme targeted at residential homes. Measures aimed at improving the general finance environment will also benefit green enterprises. As part of the bank recapitalisation scheme, Bank of Ireland has launched a €100 million fund for renewable energy projects. It appears that investment will be orientated towards project financing of proven technology, such as wind, rather than pre-commercial R&D. ESB (€200 million) and Bord Gáis (€10 million) have also introduced renewable investment funds. Nonetheless, potential may exist to specifically assist green enterprises:

To improve access to early-stage finance, Enterprise Ireland should promote the development of a green business angel network that would help address the gap in the market for early-stage finance.

Traditionally the venture capital industry in Ireland has concentrated on the ICT and life sciences sectors with limited investments going to environmental technology. However, in 2008, €5.5 million in venture capital funding went to seven environmental technology SMEs[68]. In the first half of 2009 this increased to €10.9 million although 77 per cent of this went to just two companies[69]. Continued efforts are required to encourage increased participation from international green VC funds in the Irish market. In particular, there may be opportunities for Enterprise Ireland to attract international VC funds to co-invest with generalist domestic funds. Recent changes to state aid laws may assist in this regard. For instance, to increase the availability of risk capital, the European Commission will temporarily allow the 'safe harbour threshold' to rise to €2.5 million and the minimum private sector participation to drop to 30 percent.

The European Commission has introduced a temporary community framework for state aid measures to support access to finance in the current financial and economic crises. Reduced interest rate loans can be given to companies to invest in producing environmentally friendly products. Under the scheme, state or regional authorities will be permitted to grant reduced-interest loans with a maximum term of two years until the end of 2010. The reduction in the interest rate may not exceed 50 percent for SMEs and 25 percent for large businesses. Potential exists to provide lower cost finance to green enterprises. Care would be required to design a scheme that would avoid deadweight and displacement.

The Group recommends that:

50. The potential to offer reduced interest rate loans to companies investing in producing environmentally friendly products be considered. Funds could be channelled through the programmes with existing banks or the development agencies.

[68] IVCA, Venture Pulse 2008

[69] IVCA, Venture Pulse, Quarter 2 2009

Given the size of the Irish economy, few businesses of scale will succeed by simply serving the home market. As in other sectors, it is critical that businesses in Ireland trade internationally.

The Group recommends that:

51. In future trade talks, Irish/ EU negotiators press for further reductions in tariff and non-tariff barriers to trade in environmental goods and services. The further development of the all-island and European single market (e.g. inter-operable European and global standards, etc.) can form the basis for one of the largest single markets in the world, where innovative green products and services can be commercialised on a large scale. (Department of Enterprise, Trade and Employment/ Department of Foreign Affairs)
52. Ireland has a strong reputation as a 'green island' which has been used extensively to market Ireland's tourism and agricultural industries. Potential now exists for IDA Ireland, Enterprise Ireland and others to extend this brand into the environmental goods and services sector. One particular initiative that could be used to market Ireland would be to introduce an annual prize for green innovation. This could be awarded annually on Saint Patrick's Day in an effort to showcase Ireland's commitment to the green sector and to create opportunities for green enterprises to network and connect with customers and funders. (Enterprise Ireland/IDA/ Department of Foreign Affairs)

6. Making Implementation Happen – Ensuring Accountability

The Group believes that the development of the green economy in Ireland can make a valuable contribution to future economic growth by creating sustainable employment and export opportunities. A range of reports suggest that there is potential to create over 80,000 sustainable jobs in the coming years[70]. This estimate also correlates with UK targets (i.e. green jobs to account for 4 percent of total UK employment by 2020).

To realise these opportunities, government and public service will need to be agile and effective in building a business environment that will give Ireland competitive advantages whilst also engendering an environment in which entrepreneurs with good ideas can be assisted and allowed to take calculated risks, and also to see failure as part of the acceptable risk of the developmental process. The new and diverse nature of this sector means that responsibility for the development of the sector is dispersed across Government. The Group is concerned that, without clear responsibilities and accountability, the report's recommendations will not be advanced with urgency.

As the activities of a wide range of Government departments and agencies will critically impact on the success of the Irish green economy, we need to have structures and processes that ensure Government departments and agencies act quickly in mutually complementary and supportive ways. We believe that the timely, decisive and complete implementation of the recommendations set out in this report is necessary to achieve the rapid development of an internationally competitive environmental goods and services sector in Ireland.

Many are concerned that Ireland has lost its former ability to respond quickly and flexibly to capture new opportunities. Many of the recommendations in this report are not new and the barriers they seek to address are well known. However, significant elements of these recommendations await action. Specifically, addressing a number of the key barriers require cross-departmental co-operation to progress. The provisions of the Public Services Management Act, 1997 allow for the appointment of a senior official with cross-departmental responsibility. This is a mechanism which could be used to ensure effective implementation of the key actions recommended.

We believe that strong structures, clear processes and lines of accountability must be put in place to advance the recommendations set out in this report and realise the potential for strong employment growth in the green economy.

[70] See footnotes 15, 17, 18, 19 and 20.

The Group recommends:

53. A Minister or Minister of State be mandated with the implementation of this report's recommendations and monitoring progress;
54. A Cabinet Committee, chaired by the Taoiseach and supported by the Senior Officials Group, should support cross-departmental and state agency responses to the actions required to develop the green economy, commencing with the recommendations set out in this report;
55. An annual progress report on implementation should be prepared with the potential for the Group to review this document.

Table 1 provides a summary of the key recommendations from the report, the party responsible for their implementation and an approximation of the likely cost and timeline for action. A timeline of 'immediately' implies action should be taken within 3 months. Short-term refers to an implementation period of 12 months, medium-term of 1-2 years and long-term of over two years.

The recommendations are classified broadly as cost neutral, low-cost and high-cost; where appropriate it has been indicated that funding may come from existing budgets. Given current budgetary constraints, the Group have endeavoured to minimise additional demands on the exchequer. Many of the recommendations can be implemented at little or no cost. Where recommendations have cost implications, we believe that the incremental costs of these recommendations are critical to leveraging the significant investments we are already making in the green area (e.g. grid development, water treatment, R&D, etc.) to support the development of the green economy and associated employment opportunities. It should be noted that, while every policy decision involving either an exchequer outlay or a regulatory change has an opportunity cost, no actions in this report should add significantly to the cost base or damage the competitiveness of existing enterprises in Ireland.

Table 1

Recommendations of the High-Level Action Group on Green Enterprise

Recommendation	Actor[71]	Exchequer Cost	Timeline
Sectors: Renewable Energy			
1. Continued development of the electricity grid to realise renewable opportunities (including interconnection to the UK and potentially continental Europe).	Eirgrid / DCENR / CER	High Cost	Long-Term (immediate focus on projects justified by existing demand and renewable opportunities)
2. Subject to a positive evaluation of the pilot scheme underway, adopt an ambitious national programme for smart meters in terms of coverage and technology levels.	DCENR / CER	High Cost	Short-Term
3. A pilot programme to test electric vehicle technologies and behavioural response of participants should be considered.	DCENR	To be determined	Long-Term
4. Alignment of the feed-in tariff for renewable electricity derived from bio-energy with that available Northern Ireland.	DCENR	Low Cost	Short-Term
Sectors: Energy Efficiency			
5. Energy-efficiency standards should be progressively strengthened and extended to include all building types.	DCENR / OPW	Initial Costs but stream of Exchequer	Short- to Medium Term

[71] CER = Commission for Energy Regulation, DAFF = Department of Agriculture, Fisheries and Food, DCENR = Department of Communications, Energy and Natural Resources, DEHLG = Department of the Environment, Heritage and Local Government, DES = Department of Education and Science, DF = Department of Finance, DFA = Department of Foreign Affairs, EI = Enterprise Ireland, EPA = Environmental Protection Agency, HEIs = Higher Education Institutes, IDA = Industrial Development Authority (Ireland), OPW = Office of Public Works, SEI = Sustainable Energy Ireland, SFI = Science Foundation Ireland.

The public sector should lead in procuring and retrofitting buildings to advanced standards where economically and technically feasible.		savings	
6. Consideration should be given to reducing stamp duty on low-carbon homes.	DF	Low Cost	Immediately (Budget 2010) if a suitable definition of low carbon homes is available
7. The Group concurs with the Commission on Taxation that a carbon tax should be introduced at the rate approximating the international price for carbon and should exempt firms already engaged in EU-ETS or alternative binding energy-efficiency agreements (e.g. IS-393).	DF	Cost Neutral (Exchequer Revenue gain of circa €500 million)	Immediately (Budget 2010)
8. Consideration should be given to using some of the auctioning revenues from the EU Emission Trading Scheme during Phase III, and the carbon tax if introduced, to support the development of the green economy.	DF	To be determined	Short-Term (from 2013 onwards in the case of ETS revenue)
9. Implementation of an energy demand reduction target.	DCENR / Energy suppliers	Low Cost	Short-Term
10. Offer an integrated suite of efficiency programmes encompassing energy, water and waste. Programmes need to be offered as a single environmental service to companies. Once re-designed, an environmental audit should be systematically promoted for client companies of the development agencies within a 2-3 year timeframe.	IDA/ EI/ SEI / EPA	Cost Neutral	Short- to Medium-Term
Sectors: Waste Management			
11. A decision on the future regulatory structure for the waste sector needs to be made quickly.	DEHLG	Cost Neutral	Immediately
12. Regional waste management plans need to be coordinated at national level.	DEHLG/Local Authorities	Cost Neutral	Short-Term

13. Promote composting and anaerobic digestion by rolling out brown bins to all households and businesses and promoting their use.	DEHLG	To be determined	Short-Term
14. Implementation of the draft Food Waste Regulations, which will require businesses to separate food waste at source.	DEHLG	Low Cost	Short-Term
15. Consider expanding the scope of the Accelerated Capital Allowance Scheme to cover waste technologies to help offset higher initial costs.	DF	Low Cost	Immediately (Budget 2010)
16. The Trans-Frontier Shipment of Waste Regulation is acting as a barrier to north/south trade in recyclable material. There is scope to ease the regulatory burden on business operating in this area.	DEHLG / Trans-Frontier Shipments Office, Dublin City Council, North South Ministerial Council	Cost Neutral	Immediately
17. Efforts to develop additional reprocessing capacity for recovered materials (e.g. paper, glass, plastic, metal recycled materials) should be prioritised.	DEHLG		Short- to Medium-Term
18. Efforts to support the farming community to produce green energy should be supported e.g. locally generated biogas.	DAFF	Low cost (existing Budgets)	Immediately
Sectors: Water/Waste water			
19. Levels of allowable unaccounted-for water should be progressively reduced towards best practice. No Exchequer funds should be allocated to provide additional capacity until action plans to reduce leakages to an acceptable level are implemented.	DEHLG/ /Local Authorities	Exchequer Saving	Long-term (with an immediate reorganisation of investment priorities)
20. A Single Water Authority should be	DEHLG	Low Cost	Short- to

established with responsibility for system planning, delivery and maintenance.			Medium-Term
21. Introduce volumetric water charges. This would create incentives to use water more efficiently and create a domestic market for water services with high export potential.	DEHLG	Initial capital cost of meters set against predictable stream of future revenue	Immediately (Budget 2010) Flat charge in the short term with a shift to volumetric charging as water meters are rolled out.
22. Consider extending the scope of the Accelerated Capital Allowance Scheme to cover water/wastewater utilisation.	DF	Low Cost	Immediately (Budget 2010)
23. Measures to encourage rainwater harvesting and the re-use of grey water should be actively promoted.	DEHLG	Low Cost	Medium-Term
24. Improve monitoring and enforcement of standards relating to septic tanks (similar in form to the BER scheme and delivered by the private sector).	DEHLG	Low Cost (based on the assumption that owner pays)	Short-Term
Deliver green zones and a green IFSC			
25. Develop one of IDA's planned strategic sites into a Flagship Green Business Park built to the highest level on the internationally recognised US LEED green building standard.	IDA	High (funding from existing budgets)	Short- to Medium-Term
26. Retrofit an existing IDA Business Park to a high level on the LEED standard.	IDA	High (funding from existing budgets)	Short- to Medium-Term
27. Engage in an awareness programme with the construction sector and other suppliers on the requirements necessary to meet the LEED standard.	IDA / EI/ SEI	Low (funding from existing budgets)	Short- to Medium-Term
28. Potential may exist to develop a 'smart town' (e.g. piloting smart electricity meters, water meters, and electric vehicles plug-in, setting high energy efficiency standards, etc.) in tandem	DCENR / SEI	To be determined	Medium-Term

with green business zones.			
29. Promote Ireland as a location for green financial services.	IFSC Clearing House Group/EI/IDA	Low	Short-Term
30. Implement EU Directive 2009/29/EC allowing small ETS installations to opt out in favour of a secondary domestic carbon offset market.	DEHLG	Cost Neutral	Short-Term
Create world-class research centres			
31. Pooling of research expertise and/ or the development of formal (national, all-island and international) research alliances must be advanced. This could entail the merging of existing initiatives or the creation of an umbrella group to a develop a networked European energy centre	R&D Funding Bodies / HEIs	Cost Neutral	Short- to Medium-Term
32. An assessment should be carried out on the merits of consolidating and aligning the range of R&D funding programmes.	Inter-Departmental Committee on Science, Technology and Innovation	Cost Neutral	Immediately
33. Develop an R&D research strategy for the wider environmental goods and services sector that includes a strong focus on waste and water.	Inter-Departmental Committee on Science, Technology and Innovation	Cost Neutral	Short-Term
34. A whole-of-Government drive is required to market Ireland as a test-bed centre in those areas (such as wind and marine renewable energies) where Ireland demonstrates a clear competitive advantage.	Government	To be determined	Short- to Medium-Term
35. Innovation Taskforce and DETE to ensure that appropriate structures and incentives are in place to maximise the commercial applications from publicly funded research.	Innovation Task Force/DETE/ R&D Funding Bodies / HEIs	Cost Neutral	Immediately
36. Continue to re-design existing, and	DES / DETE /	Low	Short- to

introduce new, accredited courses (and/or modules) to meet new and emerging skills needs of enterprises operating in the green economy.	HEIs / Businesses		Medium-Term
37. Provide continuing professional development, full-time / part-time and distance opportunities for professionals to update existing knowledge and acquire new skills.	DES/ DETE / HEIs / Businesses	Low	Short- to Medium-Term
38. Promote recognition of formal and non-formal learning and prior experience within programmes.	DES	Cost Neutral	Short- to Medium-Term
Remove basic hurdles to the development of the Green Economy			
39. Expedite the 18-month processing period for grid connections and give preference to projects of strategic importance or of large scale in future.	DCENR / CER	Cost Neutral	Short- to Medium-Term (post Gate 3 process)
40. The transfer of responsibility for granting foreshore licences to the Department of the Environment should be implemented immediately and a dedicated unit should be responsible for putting in place the necessary regulatory regime as soon as possible.	DAFF / DEHLG	Cost Neutral	Immediately
41. The 'single premise' regulation should be amended to allow for multi-user renewable energy installations, and third-party provision of power lines should be permitted subject to agreed standards.	DCENR/CER	Cost Neutral	Immediately
42. Develop public understanding at local level of the economic, environmental and social advantages of local renewable energy projects	Eirgrid / Central and Local Government	Cost Neutral	Immediately
43. Continue to communicate the need to reinforce the grid with overhead electricity cables.	Eirgrid/Central and local Government	Low Cost (existing Budgets)	Immediately
44. Consider a lower capacity threshold for wind farms to facilitate eligibility for faster processing under the Strategic	DEHLG	Cost Neutral	Immediately

Infrastructure Act.			
45. The specification of the exact type of wind turbine should not be necessary for the initial planning application.	DEHLG	Cost Neutral	Immediately
46. The work being undertaken by DEHLG, in co-operation with both the National Public Procurement Operations Unit and the National Public Procurement Policy Unit, should be urgently progressed to develop and implement a national action plan on green public procurement.	DEHLG / National Public Procurement Operations Unit (within the OPW)	Cost Neutral	Immediately
47. The Group also advocates that progress towards these targets needs to be monitored and made publicly available and that weak-performing Departments/Agencies are held to account.	DEHLG / OPW	Cost Neutral	Immediately
48. Prepare Irish companies for green public procurement opportunities domestically and internationally.	EI	Low Cost (existing Budgets)	Immediately
49. Potential may exist for the Department of Foreign Affairs to work with Enterprise Ireland to alert companies to possible export opportunities for environmental goods and services.	DFA/EI	Cost Neutral	Medium- to Long-Term
50. The potential to offer reduced interest rate loans to companies investing in producing environmentally friendly products should be considered.	Funds could be channelled through the development agencies or programmes with existing banks.	To be determined based on schemed developed	Immediately
51. In future trade talks, Irish/ EU negotiators should press for further reductions in tariff and non-tariff barriers to trade in environmental goods and services.	DFA/DETE	Cost Neutral	Medium- to Long-Term
52. Potential exists for IDA Ireland, Enterprise Ireland and others to extend Irelands' strong reputation as a 'green	IDA/EI/DFA	Low (funding from existing budgets)	Immediately

island' into the environmental goods and services sector – an annual St. Patrick's Day prize for green innovation can support this.			
Making Implementation Happen			
53. A Minister or Minister of State should be mandated with the implementation of this report's recommendations and monitoring progress.	Government	Low Cost	Short-Term
54. A Cabinet Committee, chaired by the Taoiseach should support cross-departmental and State agency responses to the recommendations set out in this report.	Government	Cost Neutral	Immediately
55. An annual progress report on implementation should be prepared with the potential for the Group to review this document.	Government	Cost neutral	Short-Term

Appendix 1: Group Membership

Joe Harford, Chairperson

Mary Doyle, Department of the Taoiseach

Clare Dunne, Department of Enterprise Trade and Employment

Martin Eves, Enviro Grind Ltd.

Mike Feeney, Enterprise Ireland

John Fitzgerald, ESRI

Colin Gordon, Glanbia

Declan Hughes, Forfás

Richard Kennedy, Kedco Ltd.

Colm Lavery, Department of Environment, Heritage and Local Government

J Owen Lewis, Sustainable Energy Ireland

Rosheen McGuckian, NTR PLC

David Moloney, Department of Finance

Denis Molumby, IDA

Declan Murphy, The Ecology Foundation

Eddie O'Connor, Mainstream Renewable Power Ltd.

Clare O'Grady-Walsh

Brendan Tuohy

Sara White, Department of Communications, Energy and Natural Resources

Secretariat:

Adrian Devitt, Forfás

Jonathan Healy, Forfás

Alan Quirke / Christopher Ryan, Forfás[72]

Nina Brennan, Department of Enterprise, Trade and Employment

[72] Alan Quirke provided secretariat support during June and July 2009. Christopher Ryan provided secretariat support during August and September 2009.

Appendix 2: Consultations

Comhar (Sustainable Development Council)

Commission for Energy Regulation

Department of Agriculture, Food and Fisheries

Department of Communications, Energy and Natural Resources

Department of Enterprise, Trade and Employment

Department of Finance

Department of the Environment, Heritage and Local Government

Dublin Airport Authority

Eco-Cem

Eirgrid

Enterprise Ireland

Environmental Protection Agency

FCStone

FIT

GCO2

IDA

IFSC Clearing House Sub Group

InterTradeIreland

Irish Academy of Engineering

Marine Institute

Office of Public Works

Science Foundation Ireland

Spirit of Ireland

Appendix 3: Green Research Centres in Ireland[73]

Institute/Centre		Area of Focus	Application
Charles Parsons Initiative (CPI)	Based in UL, the CPI is a merger of several research centres focussed on sustainable forms of energy - across the areas of electrochemistry, physics, electronic, mechanical and aeronautical engineering, computer science, maths & statistics	Energy and sustainable environment - research focus: • Energy generation using renewable natural resources • Bio-fuels and advanced conversion • Energy conservation, storage, energy efficiency • Environmental sensors; thermal, emissions, gases, radiation, distributed environment monitoring • Life-cycle engineering	Renewable energy capture, storage & use Sustainable production processes Environmental monitoring
Microbial Bio-energy (MB) Group	Research centre based in NUI Galway	Anaerobic digestion Microbiology Bioreactor technology Biological hydrogen production Bio-electrochemistry Electrochemical technology	Biologically-mediated renewable energy research and development
Bio-resources Research Centre (BRC)	Research Centre based in UCD	Projects relating to biologically mediated renewable energy: Bio-resource utilisation Biomass to bio-fuel production Peat land utilisation Carbon sequestration and risk assessment	Biologically mediated renewable energy Sustainable production
Centre for Sustainability	Research centre based in Sligo IT	Environmental monitoring and analysis Advanced environmental analysis Wastewater treatment Remediation of contamination Sustainable development Sustainable tourism Environmental economics	Sustainable production
Centre for Renewable Energy at Dundalk IT (CREDIT)	Research centre based in Dundalk IT. CREDIT is a partner in the Cross Border	Storage and usage of renewable energy. In August 2005 CREDIT installed	Development of optimal flow batteries for transmission of electricity generated from renewable energy

[73] It should be noted that the Higher Education Authority, through the Programme for Research in Third-Level Institutions, and the Irish Research Council for Science, Engineering and Technology, also fund this area.

	Sustainable Energy Partnership, an alliance established between DkIT, DCU, and QUB.	the world's first large commercial turbine to be located on a college campus, which will be used in the MSc programme and will generate half of Dundalk IT's electricity needs.	
Electricity Research Centre (ERC)	The ERC is a collaboration between Electrical Engineering at UCD, Economics at TCD, Electrical Engineering at UCC and the electricity industry.	Industry partners are Airtricity (SSE), Bord Na Mona, Bord Gáis, Commission for Energy Regulation, Cylon Controls, EirGrid, Electricity Supply Board (ESB) Networks, ESB Power Generation, Siemens, SWS Group and Viridian Group.	Grid integration of renewable energy in particular wind
ESRI	The ESRI is ranked among the top 5% research institutes in energy economics in the world. The ESRI also collaborates with for example the ERC, EPA and other bodies in energy modelling and research.	The operation of energy markets and implications for competitiveness. Security of energy supply. The environmental implications of energy use	
Marine Institute	The Marine Institute, an agency of the Department of Agriculture, Fisheries and Food, is responsible for marine research, technology development and innovation.	Fisheries science services Aquaculture and catchment management Ocean science services Marine environment and food safety Strategic planning and development	Aquaculture & fisheries yield management Functional foods
National Maritime College of Ireland (NMCI)	Part of Cork IT the NCMI is Ireland's designated maritime education and training college	Ocean wave energy	Ocean wave energy capture, storage and usage
Hydraulics and Maritime Research Centre (HMRC)	Research centre based in UCC	Wave energy technology; specific expertise in instrumentation and data acquisition at a number of scales from tank tests through to full scale deployment	Wave energy capture, usage and storage

Centre for Applied Marine Biology (CAMBIO)	Research centre based in Letterkenny IT	Applied research in: Biomedical marine research Marine food processing Aquaculture & fisheries Waste remediation	Waste remediation
Information and Communication Technology for Sustainable and Optimised Building Operation (ITOBO)	This SFI Strategic Research Clusters is based in UCC.		New network and management protocols Develop frameworks and algorithms to support mixed-initiative configuration for energy efficient buildings Support seamless end-to-end network composition and service operation through sensor and RFID hardware with dynamic features
Advanced Biomimetic Materials for Solar Energy Conversion Cluster	This SFI-funded strategic research cluster is based in UCD. It combines expertise from UCD, UL, DCU and industry partners Airtricity, OBD-Tec and Celtic Catalysts.	Development of commercially viable solar energy conversion modules by mimicking the steps involved in natural photosynthesis.	Inexpensive photovoltaic swhich will convert sunlight into power (Strand 1) which can be harnessed by catalysis to produce hydrogen via water-splitting (Strand 2), and carbon capture and fixation (Strand 3).
Energy Research Centre	National University of Ireland, Galway	Bioenergy Energy Efficient Technologies Renewable Resources Energy and Society	Microbial fermentations; digestion of organic feedstocks; biocatalytic fuel cells; combustion chemistry; energy efficient wastewater treatment and power conversion technologies, energy and buildings; energy and solar capture.
Environmental Research Institute	UCC	Sustainable Energy and Environmental Engineering; Environmental Chemistry; Biodiversity and Ecotoxicology; Marine and freshwater biology; Environmental law	
Earth Systems Institute (formerly Environmental Institute)	UCD	Better efficiency in developing, delivering and distributing renewable energy, capturing and storing carbon, reducing emissions of greenhouse gasses; More energy and carbon efficient buildings and transport; Land use planning; and Prediction of future biological change by better understanding the past and present	
EPA/NUIG	Full scale and	Environmental Engineering,	Wastewater treatment

Facility	pilot scale facilities based at Tuam, Co. Galway	Environmental Microbiology	Water Treatment Sludge Treatment
Clean Technology Centre	Research Centre linked with CIT funded by EPA/EI	Chemical Engineering Pilot Scale Membrane Testing	Management of Solvents Pharmaceutical Waste
Environmental Change Institute	National University of Ireland, Galway	Biodiversity, Climate Change, Biodiversity, Environment and Health, Social and Economic Impact, Environmental Technologies, and Environmental Informatics	
Martin Ryan Institute	National University of Ireland, Galway	Marine	

Appendix 4: Scientific Research and Development Funds

Enterprise Ireland: Enterprise Ireland provides R&D grants for up to €650,000. The Enterprise Ireland R&D Fund is designed to provide support for research, development and technological innovation relevant at all stages of company development, and which will enable companies to progress from undertaking an initial research project to high level innovation and R&D activity. Some €500 million has been made available to companies across all sectors including manufacturing and services over the remainder of the Strategy for Science, Technology and Innovation (2008-2013). In 2008 Enterprise Ireland made total financial payments of €55.1 million in R&D to companies. This figure excludes support for High-Potential Start-Ups (HPSUs), where much of the investment relates to the development of products but in the context of the development of the company itself rather than just a new product stream. The latter funding was approximately €23 million in 2008. The figure above relates to payments in 2008; actual approvals during that period were €61.42 million.

There is no ring-fencing of the R&D Fund for clean-tech project proposals but Enterprise Ireland is currently supporting proposals that are based on a diversification strategy into clean/green areas and it prioritises projects which have the highest benefit for companies and the biggest impact on the Irish economy.

Environmental Protection Agency: The general objective of the EPA STRIVE Programme is to protect and improve the natural environment by addressing key environmental management issues through the provision of world-class scientific knowledge generated through a vibrant, competitive programme of research supported and co-ordinated by the EPA in areas such as climate change, waste management, waste/wastewater, noise pollution, etc. €93 million of this total is provided in the Environmental Research Sub-programme of the National Development Plan (NDP). An additional €8 million is provided for research in aspects of climate change, trans-boundary pollution and earth observation under the Inter-Departmental Committee for the Strategy for Science, Technology and Innovation (IDC-SSTI). Other sources of funding for environmental research under the programme continue to be developed as appropriate.

Science Foundation Ireland: In May 2008, the remit of Science Foundation Ireland (SFI) was amended to include the support of research on sustainable energy and energy-efficient technologies. This 'third research pillar' prescribes sustainable energy and energy-efficient technologies as strategic areas of scientific endeavour in addition to the areas of ICT and biotechnology. This third pillar is seen as a vital component of long-term economic development for Ireland and aims to build a world-class research capacity in these areas that will provide a solid basis to address Ireland's challenges in the sustainable energy field.

SFI's Strategy for Science, Technology and Innovation (2006-2013) contains funding to a total of €1.4 billion for research creating new knowledge, leading-edge technologies and competitive enterprises in the fields of science and engineering underpinning the SFI pillars of Biotechnology, Information and communications technology, and Sustainable energy and

energy-efficient technologies. The third pillar for SFI is currently active, with circa €45 million already committed to energy research in areas such as early-warning systems, electricity grid development, combustion, climate change, sensor networks, and SmartBay development. Furthermore, SFI is now responsible for administering the Charles Parson Energy Research Awards (about €20 million out of the €45 million spend on energy). SFI is currently initiating a strategic research call in this area aimed at consortia funding for up to €7 million over 5 years. On extension of SFIs remit in May 2008, it was anticipated that the SFI investment in energy research activities would amount to €90m over the period 2008 - 2013, to include a transfer of €44m from DCENR. The amount of investment by SFI in energy related research over this period will be subject to the annual funding allocations to SFI as approved by the Department of Finance as well as the volume of research applications received which successfully come through a rigorous and highly competitive process across SFIs portfolio of programmes.

Sustainable Energy Ireland: SEI, through the Renewable Energy Research, Development and Demonstration programme (RERD&D), provides supports to industry to accelerate the deployment rate of renewable-energy technology and thus improve implementation of renewable energy in the Irish market. This goal is achieved by providing support for product R&D, market demonstration activity and studies to investigate market barriers. SEI established the Ocean Energy Development Unit (OEDU) to advance the deployment of ocean energy technologies in Ireland by increasing the capacity for relevant research and development both in academic institutions and commercial entities in Ireland.

SEI supports emerging green business opportunities in the sustainable-energy sector through its Sustainable Energy Industry Incubator programme. The programme encourages innovation in the sustainable-energy sector by supporting new small ventures focusing on clean-energy technologies and services in Ireland. The programme was designed to help new businesses bridge the financing gaps that often hamper the growth of small companies.

Higher Education Authority (HEA): The HEA, through the Programme for Research in Third-Level Institutions (PRTLI), supports research capacity building in the Irish higher education system. Launched in 1998, some €865 million has been committed to date under the PRTLI into strengthening national research capabilities via investment in human and physical infrastructure. It supports the building of strategic institutional research capacity, enabling the establishment of research centres and facilities, and joint research programmes and national initiatives. There have been four cycles of funding to date, with projects supported across all disciplines including science, technology, humanities and the social sciences.

The PRTLI has been key to the development of a number of centres, collaborations and programmes in the environmental and marine areas including the Environmental Research Institute in UCC, the Centre for Sustainability in Sligo IT and the Martin Ryan Institute in NUIG. It also has been a key driver in establishing an inter-institutional graduate research programme in environment and marine research. Some €70 million has been allocated to environment and marine projects under cycles 1-4. Cycle 5 of the Programme, which was launched in 2009, has specifically sought proposals in the Green economy area. In this regard two national shared infrastructures for which proposals were sought were included in the call on behalf of the EPA and the Marine Institute. The area of energy research has also been

highlighted in the call as an area of national priority. This step was strategically supported and agreed with the Department of Communications, Energy and Natural Resources and SFI.

Other State Research and Development Funds

In addition, a number of other State organisations are also involved at different stages on the continuum from research to demonstration and commercialisation. For example, in the area of energy research, these include Teagasc, LEADER organisations, County Councils and local energy agencies (City of Dublin Energy Management Agency, Cork City Energy Agency, Cork County Energy Office, East Connacht Energy Agency Ltd, Donegal Energy Action Team, East Connacht Energy Agency Ltd, Galway Energy Agency Limited, Kerry Energy Agency, Mayo Energy Agency Ltd, and Tipperary Energy Agency Ltd).

Appendix 5: Proposed Legislative Requirements in Environmental Policy

The combination of a significant body of existing commitments, changes in the Lisbon Treaty and international acceptance of the need for action can be expected to give rise in the future to legislative changes in this field.

This appendix presents future legislative and non-legislative initiatives that the European Union is in the process of preparing or has adopted to reduce greenhouse gases and abate other environmental impacts. This does not represent a comprehensive list. The legislative and non-legislative acts which are outlined above are a small sample of the work that is ongoing at EU level. As the proposed Directives move through the various institutional phases of the European Union, they may be subject to revision and may or may not be agreed at political level by the European Council.

1. EU Initiatives planned in the Commission Work Programme

1.1 European Commission Climate Change Package and Copenhagen Conference

The European Commission's post-Kyoto climate change package sets a target of a 20 percent reduction in greenhouse gases compared to 1990 levels for the EU as a whole - equivalent to a 14 percent reduction on 2005 levels

The UN Copenhagen conference in December 2009 will seek agreement as regards 'effort-sharing' of environmental targets between developed and developing nations for the post-Kyoto Protocol period. The magnitude of action by developing countries will largely depend on the effective delivery of finance and clean technologies through international co-operation. If an agreement is to be struck, developed countries are likely to have to contribute significant financial resources in order to help developing countries both limit the growth of their emissions and adapt to the effects of climate change.

A deal on financing will be central to achieving any agreement at the forthcoming UN Copenhagen. Developing countries want to see a clear position from developed countries on finance for mitigation and adaptation. While the EU and other developed economies have agreed on the need to help defray the costs of reducing greenhouse gases emitted by developing countries, there is still no consensus on what those costs are and how much should be borne by developed nations.

The European Commission estimates that developing countries will need €100bn a year by 2020 to prevent average global temperatures from rising more than 2°C. That threshold would minimise the risk of dangerous climate change consequences.

The commission calculates that between €22bn and €50bn in international public funding will be needed, with each country's contribution based on its responsibility for emissions and its ability to pay. In the EU's case, the contribution could be between €2bn and €15bn a year by

2020. The rest would come from other industrialised nations and advanced developing nations like China and India.

> If an agreement in Copenhagen is struck, the likely impact for Ireland will be increasingly stringent environmental emissions targets and renewable energy targets given that the EU has committed to cut greenhouse gas emissions by 30 percent compared to 1990 levels if other developed countries commit to comparable reductions and advanced developing countries contribute adequately, according to their capabilities. Ireland may also face potentially higher compliance costs, given the need for developed countries to share the burden of compliance in developing economies.

1.2 Strategy for the internalisation of external costs of transport[74]

The Commission has developed a common framework to assess the external costs of transport. Currently transport-users impose costs on society which are borne by others. The aim of the work is to propose a strategy to internalise external costs according to the principle of the "polluter pays". While European Council Ministers failed to take a strong position on charging, they broadly supported the principle of internalisation of external costs in all modes of transport. However, they stressed that such measures must take into account the specificities of member states and of each mode of transport and the different possible policy measures and their environmental and economic effects.

If European Commission proposals are implemented, which is likely given planned transposition of the Aviation Directive 2008/101/EC in February 2010, aviation will be included in the EU ETS scheme from 1 January 2012. EU ETS rules will apply to emissions from all domestic and international flights between EU airports. This will cover all international flights from and to anywhere in the world that arrive or depart from an EU airport.

Given Ireland's status as a peripheral island which implies a disproportionate reliance on air travel for both tourism and trade, there is a concern that the impact on tourism and trade will be disproportionate for Ireland. Some concessions to island nations may need to be considered in implementing the Commission Directive for aviation.

> Given that Ireland is heavily reliant on the use of the cars, trucks for freight and an inadequate public transport infrastructure, any future EU measures to internalise transport externalities could be expensive.

[74] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0435:FIN:EN:PDF

1.3 Communication and Action Plan on Sustainable Industrial Policy

In July 2008 the European Commission presented the Sustainable Consumption and Production and Sustainable Industrial Policy (SCP/SIP) Action Plan. The European Council endorsed the Action Plan in its conclusions adopted on 4 December 2008. It includes a series of proposals on sustainable consumption and production that will contribute to improving the environmental performance of products and increase the demand for more sustainable goods and production technologies. It also seeks to encourage EU industry to take advantage of opportunities to innovate.

The strategy sets out a series of voluntary and obligatory actions to support a coherent policy in the EU and internationally, helping to define eco-friendly products, informing the consumer through improved labelling and supporting their purchase through public procurement and fiscal incentives.

The action plan includes:

- A proposal for a regulation revising the eco-label scheme
- A proposal for a regulation revising the European Management and Audit Scheme (EMAS)
- A Communication on the implementation of green public procurement
- A proposal for a revised eco-design products directive

This communication can be a driver for opportunities in relation to the sustainable use of natural resources and the production of eco-products, processes and services and could provide opportunities for the enterprise base in Ireland in this regard.

1.4 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 [COM (2008)778]

The aim of the Commission proposal is to extend the scope of the Energy Labelling Directive (92/75/EEC) beyond household appliances and to use it in coordination with additional instruments, such as public procurement and incentives, in order to achieve a shift in the market towards more efficient products.

The "A-G" label displayed on appliances such as washing machines, dishwashers, refrigerators or ovens has permitted consumers to be informed at the point of sales on the energy consumption hence the running costs of the product, driving the demand for the best-performers. The aim of the Commission proposal is to build on the success of the current Directive in improving the energy efficiency of appliances.

The proposal would extend the scope of the directive to (a) energy-using products used in the industrial and commercial sectors and (b) other energy-related products commercial and industrial sectors and those having an impact on energy consumption during use, like insulated windows (means of transport are excluded);

The label will indicate both energy consumption/savings and other relevant and important environmental parameters of products during usage.

The proposed legislation offers the potential to benefit consumers (lower energy bills), manufacturers (clear and predicable regulatory framework throughout the internal market, with potential for returns on investments for technology development), and the environment (reduction of CO2 emissions).

2. EU Initiatives already adopted by the European Council and/or Parliament.

This section highlights some initiatives to tackle environmental challenges that have been adopted by the Commission and are making their way through the institutional system.

2.1 Recasting of Directive 2002/91/EC of 16/12/02 on the Energy Performance of Buildings Directive (EPBD)

The European Parliament voted to support the Commission proposal to lift the 1000m2 threshold for subjecting existing buildings to minimum energy performance requirements. The Commission has proposed to reduce from 1000m2 to 250m2 the area above which energy performance certificates have to be displayed in a public building.

All buildings undergoing major renovations (which cover more than 25 percent of the building's surface) would also have to meet minimum energy performance requirements. The proposed Directive also introduces minimum energy performance requirements for systems, such as boilers, water heaters and air conditioning installed in buildings.

The Commission has also proposed more specific requirements concerning the content of energy performance certificates. Under the Draft proposal, the certificate must be provided every time there is a property transaction. It would require the certificate to provide information about the actual impact of heating and cooling on the energy needs of the building, on its primary energy consumption and on carbon dioxide emissions.

The directive provides for regular inspection and maintenance of boilers, heating and of air-conditioning systems by qualified personnel. The proposal would extend the requirement on Member States to set up regular inspections of the boiler heating systems, which presently applies to those with an output between 20kW and 100kW, to include all boilers with an output greater than 20kW.

The Commission proposed that member states should draw national plans to identify targets for increasing the minimum percentage of buildings which consume low or zero energy. Zero-energy buildings were defined by the MEPs as buildings "where, as a result of the very high level of energy efficiency of the building, the overall annual primary energy consumption is equal to or less than the energy production from renewable energy sources on site." The European Parliament has voted for EU Member States to be required to ensure by 31 December 2018 that all new buildings produce as much energy as they consume on-site. According to the European Parliament Member States should also set intermediate national targets for minimum percentages of zero-energy buildings for existing buildings, by 2015 and by 2020.

In June 2009, the European Council of Energy Ministers discussed a progress report on the recast directive. Several Member States were concerned that the draft directive will substantially increase administrative burden and that owners might be discouraged to carry out renovations due to the stricter rules.

This could be an opportunity for the building industry. Currently 72 percent of EU building stock is less than 1000m2, so extending the directive to smaller buildings could provide opportunities for the enterprise base in Ireland.

2.2 Communication "Offshore Wind Energy: Action needed to deliver on the energy policy objectives for 2020 and beyond" [COM(2008)768]

Although land based energy will remain dominant in the immediate future, offshore wind will become increasingly important in many EU countries. The Communication examines the need for increased cross-border cooperation to share experiences and better coordination in the fields like electricity grid and maritime spatial planning, regulatory practices in relation to interconnector investments and environmental impact assessments of wind farms.

The Commission will:

- seek to facilitate regional cooperation on offshore energy site-and grid planning between Member States, energy regulators, transmission system operators (TSOs) and other relevant stakeholders;
- encourage TSOs and energy regulators to step-up cooperation to urgently put in place more favourable regulatory conditions for investments in transnational offshore grids, for cross-border trade and for the development of efficient balancing power markets;
- emphasise offshore related research under the Seventh Framework Programme for research, technological development and demonstration (FP7) and review the possibilities for stepping up support to accelerate the development and market deployment of offshore wind and other marine renewables in the light of the EU's new energy policy objectives ;
- emphasise in future calls under the Intelligent Energy-Europe programme actions to tackle the main non-technological barriers to the use of offshore wind energy;
- consider the large-scale integration of offshore wind in the electricity grids as one of the key issues for the follow-up of the Green Paper on European Energy Networks, taking into account ongoing studies and work by the European TSOs.

The EU Economic Recovery Plan intends to tackle the financial crisis by encouraging investments in offshore wind, coal (carbon capture and storage - CCS) and electricity and gas infrastructure. A total of € 3.5 billion is proposed for investment in carbon capture and storage (financial envelope: €1,250 million), offshore wind projects (€500 million), and gas and electricity interconnection projects (€1,750 million). A number of interconnector projects around Europe, including the one between Ireland and Wales, which will get €100 million, will benefit from the funds.

€565 million will go to funding offshore wind projects, €150 million of which will go to funding the North Sea grid linking the UK, the Netherlands, Germany, and Ireland. The Offshore Wind Programme focuses on providing support to large-scale offshore new demonstration projects in various locations in different Member States and possibly up-scaling the existing ones. Support is given to projects already at a reasonable state of development on the basis of the

ability for the EU to bring real added value to them. The selected projects should have a cross-border significance, be situated in deeper waters (up to 50m) and further from shore (up to 100km) to reap benefit from high wind resources potential.

> The European Parliament's energy committee agreed in March 2009 to dedicate €565 million for the development of offshore wind projects as part of the EU Economic Recovery Plan.

2.3 Amendment to the Directive on Biofuels[75]

In April 2009, the European Parliament voted to amend the 2003 biofuels Directive. Under Directive 2003/30/EC Europe established the goal of reaching a 5.75 percent share of renewable energy in the transport sector by 2010. Under the new directive on the promotion of renewable energy, this share rises to a minimum 10 percent in every Member State in 2020. Whether it is electricity or hydrogen from renewable energy sources, or first- or second-generation biofuels, there is an urgent need to ensure we meet this goal. The new directive on renewable energy also aims to ensure that as we expand the use of biofuels in the EU we use only sustainable biofuels, which generate a clear and net GHG saving and have no negative impact on biodiversity and land use.

> Ireland has not historically been a large bioenergy producer, although the agricultural nature of the country, along with its forestation capacity, holds the potential for growth in this energy related industry. However the issue of competition between land uses must also be addressed.

2.4 Soil Directive (2006/0086 (COD))

The proposed Directive aims to protect soil and preserve its capacity to perform its environmental, economic, social and cultural functions through a common framework which will preserve soil functions, prevent soil degradation or mitigate its effects, restore degraded soils and integrate soil protection into other sectoral bodies.

2.5 Restriction of Hazardous Substances (RoHS) and Waste Electrical and Electronic Equipment (WEEE) Directive

On 3 December 2008 the Commission adopted two proposals, one recasting the Directive on waste electrical and electronic equipment (the "WEEE Directive") and another recasting the Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment (the "RoHS Directive").

The Directives have been in place for five years and have helped to reduce the environmental impact of electronic appliances. Despite the current legislation, however,

[75] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:EN:PDF

there are still substantial amounts of electronic waste that undergo substandard treatment and are illegally exported to third countries, causing environmental harm. The aim of the new Directives is to remedy this.

Restriction of Hazardous Substances (RoHS) Directive (2008/0240 (COD)) repealing Directive 2002/95/EC

The new Directive aims to address a number of issues arising under the existing Directive but the basic objectives and mechanisms are not changed. Directive 2002/95/EC aims to restrict hazardous substances in electrical and electronic equipment so as to contribute to the protection of human health and the environmentally sound recovery and disposal of waste electrical and electronic equipment.

Achievement of the RoHS Directive's objectives is hindered and made more costly by problems related to uncertainties in implementation such as lack of harmonisation in interpretation of definitions and diverging requirements for demonstration of product compliance; problems with enforcement such as sub-optimal market surveillance activities; and problems related to perceived inconsistency with other Community legislation or technical/scientific progress, such as potential overlaps with REACH (Chemicals) or EuP (Energy-using Products) and need for extending the scope to cover medical devices and control and monitoring instruments.

It is proposed that the enforcement of these Directives should be strengthened. National market surveillance mechanisms have been introduced for assessing product conformity. This directive is being negotiated in the environment working party. It may be possible to reach political agreement at the December 2009 Environment Council.

Waste Electrical and Electronic Equipment (WEEE) Directive (2008/0241 (COD))

The WEEE Directive aims to tackle improper treatment of waste electrical and electronic equipment (WEEE). This is the fastest growing waste stream in the EU, producing 8.3-9.1 million tonnes in 2005, growing to 12.3 million tonnes of WEEE by 2020.

The Commission contends that experience with the Directive, gathered from stakeholders and Member States during a 3 year review, points to the Directive not working as effectively as intended. The recast directive is aimed at addressing these issues.

In order to reduce the administrative burden for the industry, the Commission has proposed harmonising the registration and reporting obligations for producers and making national producer registers inter-operational in the WEEE Directive. This means that producers would only need to register and report in one Member State, reflecting their activities in the EU.

It is proposed that the enforcement of the Directive should be strengthened. Minimum inspection requirements for Member States are proposed, as well as minimum monitoring requirements for shipments of WEEE. This directive is being negotiated in the environment working party. It may be possible to reach political agreement at the December 2009 Environment Council.

Revised Waste Framework Directive

In October 2008, the Council of the European Union adopted the revised Waste Framework Directive which set a revised framework for waste management in the European Union. This Directive, which is required to be transposed into national law within two years, will provide the legal basis for much of Irish national waste management policy. It will have direct implications for the waste management industry in Ireland and also wider indirect implications for enterprises in Ireland.

The Revised Waste Framework Directive:

- Sets new recycling targets to be achieved by Member States by 2020, including recycling rates of 50 percent for household and similar wastes and 70 percent for construction and demolition waste.
- Strengthens provisions on waste prevention through an obligation for Member States to develop national waste prevention programmes and a commitment from the European Commission to report on prevention and set waste prevention objectives.
- Clarifies a number of important definitions, such as recycling, recovery and waste itself. In particular, it draws a line between waste and by-products and defines when waste has been recovered enough – through recycling or other treatment - to cease being waste.
- Gives a legislative base for the waste management hierarchy.

The Landfill Directive requires significant reductions in the rate of biodegradable waste going to landfill. The first of these obligations will come into place in 2010. The targets and existing levels of landfilled biodegradable municipal waste are set out below:

Current position		**Quantity landfilled (tonnes)**
2004		1,304,426
2005		1,307,570
2006		1,412,581
2007		1,475,077
Targets	Landfill Directive Target	Maximum quantity allowed to be landfilled (tonnes)
2010	75% of quantity generated in 1995	967,433
2013	50% of quantity generated in 1995	644,956
2016	35% of quantity generated in 1995	451,469

The Directive also has provisions covering location of landfills, and technical and engineering requirements for aspects such as water control and leachate management, protection of soil and water and methane emissions control.

These requirements present major commercial opportunities for the waste management industry across the EU. There is potential for Irish firms to provide waste producers with innovative solutions to help them manage their wastes and reduce costs.

Notes

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November 2009

An Roinn Fiontar, Trádála agus Fostaíochta
Department of Enterprise, Trade and Employment

Forfás

Wilton Park House
Wilton Place
Dublin 2

T: +353 1 607 3000
F: +353 1 607 3030
W: www.forfas.ie