

# Renewable Energy in Northern Ireland

*Realising the Potential*



**DETI**

Department of Enterprise,  
Trade and Investment



Consultation Document

# Renewable Energy in Northern Ireland

*Realising the Potential*



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## Foreword



**by Sir Reg Empey, MLA**  
*Minister for Enterprise, Trade and Investment*

As Minister responsible for energy matters my objective is to achieve a secure, diverse, competitive and efficient energy market which meets our energy needs as economically as possible. I aim to set the strategic context and framework within which the industry can operate efficiently and in a manner which ensures benefits for both the consumer and the environment.

Energy systems throughout the world continue to rely heavily on fossil fuels as their primary energy source. Yet, as we enter the new millennium it is clear that sound energy policy must encourage a clean and diverse portfolio of domestic energy supply which helps meet our economic, social and environmental aims in a sustainable manner and also prepares us to rely less on fossil fuels.

Renewable energy has an important role to play in that it can help provide for our future needs by harnessing 'nature's power' such as heat and light from the sun, wind power and energy from crops and water. These resources are domestically abundant and should be capable of providing a reliable source of energy at a stable price whilst also offering significant job creation opportunities and agricultural diversification.

The UK Government is working towards a target of renewable energy providing 10% of electricity supplies by 2010 and I have undertaken that Northern Ireland will contribute as much to that target as is feasible and practicable. We are already focused on providing 45 megawatts (about 3% of peak winter demand) by 2005 and I firmly believe that Northern Ireland is capable of at least matching the 10% target adopted by the UK.

I fully recognise that this level of uptake by 2010 imposes a significant development rate on the energy industry. However, I am equally confident that with an appropriate market which offers suitable trading arrangements and continued technological advancement we can bring renewables firmly into the mainstream of electricity supply in Northern Ireland.

Energy in Northern Ireland is a fully devolved matter and we have the ability to bring together a blueprint for meeting our energy needs in the 21st century. Significant impetus for renewables is provided by the proposed EU Directive on renewable energy which will require Member States to implement programmes to promote new and renewable sources of electricity.

We cannot therefore develop our energy policy in isolation. Recent developments within the UK, Ireland and Europe will impact on actions which Northern Ireland may take on the energy front and indeed the desire to create a “joined up” energy market at national and European level could provide a number of attractive trading opportunities for Northern Ireland renewable generators. On that basis, I wish to ensure that a framework is now put in place which encourages and supports the implementation of the broadest mix possible of renewable technologies supplying electricity to the grid and also for local consumption.

The various approaches being taken throughout Europe to take the renewables agenda forward have been outlined in this paper. The diversity of approach demonstrates that we must cast our policy to maximise the potential for Northern Ireland to gain competitive advantage on the deployment and operation of sustainable energy programmes, to reduce the impact of having few indigenous energy sources and to alleviate the disadvantages of a relatively small and isolated energy market.

I am confident that together we will create an energy system capable of meeting our needs well into the next century and renewables will be a key component. This consultation begins the process of determining the role which sustainable energy sources will play in the future of the electricity market in Northern Ireland and I would encourage you to offer your vision and ideas on how best to **Realise the Potential**.



**Sir Reg Empey, MLA**  
**Minister for Enterprise, Trade and Investment**



## Executive Summary

1. The aim of United Kingdom Government policy for renewable energy is that it should make an increasing contribution to United Kingdom energy supplies in the years up to 2010 and beyond. To this end, targets have been set for 5% of licensed electricity supplies to be generated from renewable sources by 2005 and for 10% by 2010.
2. Northern Ireland is required to contribute to the achievement of the United Kingdom targets. This Consultation Document seeks to consider and invite views on the options for, and the implications of, increasing the amount of licensed electricity supplies to be generated from renewable sources in Northern Ireland by 2010.
3. Section 1 of the Consultation Document defines renewable energy. It examines the existing electricity market. Section 2 reviews current policy on renewable energy at international level and in the European Union, the United Kingdom, Northern Ireland and the Republic of Ireland.
4. Section 3 looks at the amount of electricity being generated at present from renewable sources in Northern Ireland, in particular under the Non-Fossil Fuel Obligation Orders (NFFOs) and Northern Ireland Electricity plc's Eco Energy arrangements. The amount is calculated to be 25.2 MWs which represents approximately 1.7% of Northern Ireland's current peak winter demand or approximately 1.2% of available electricity. The potential for increasing the amount of electricity from renewable sources is considered and it is concluded that in practical terms, Northern Ireland has the potential to generate between 240 and 330 MWs from these sources (that is, between 16% and 22% of peak winter demand). Wind power is likely to be the major source of renewable energy but because of its intermittent nature, there may be grid control problems. Comments are sought on any problems which may arise, on how these might be addressed and whether there are any cost implications for consumers in resolving these problems.
5. Section 3 goes on to consider what Northern Ireland's target for renewable energy generated electricity should be and on what the target should be based (that is, whether it should be based on electricity used or electricity available). Views are invited on (1) the basis for any target, (2) the target for 2010, (3) the desirability of breaking down any 2010 target for specific renewable energy technologies, (4) the desirability of setting a target beyond 2010, for example, for 2020 and (5) the nature and extent of extra mechanisms and interventions necessary to achieve the target and the effect these might have on electricity prices.

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- 6. Section 4 considers the potential economic benefits a successful renewable energy industry in Northern Ireland might bring. Views are invited on (1) how the renewable energy industry in Northern Ireland might best be stimulated, (2) how the potential economic development opportunities might be realised and (3) how the industry might be served by a single representative body.
- 7. Section 5 examines the rationale for supporting the development of renewable energy generated electricity and the essential and desirable features of any support mechanisms. Views are sought on these and on whether community groups should be facilitated to develop and own renewable energy projects. A wide range of primary support mechanisms is considered. These include:  
Open Market which takes in the role of the Private Finance Initiative in the public sector; the previous Non-Fossil Fuel Obligation Orders (NFFOs) in Northern Ireland; modifications to NFFO arrangements; the Renewables Obligation being introduced in Great Britain; Green Pricing Systems; Renewable Energy Feed in Tariffs – REFITs; Green Credits Trading and the Republic of Ireland’s Alternative Energy Requirement (AER) arrangements. Views are sought on the detailed aspects of each of these. A range of secondary support mechanisms is examined and again views are invited on these.
- 8. Section 6 considers the way forward. The views of existing and potential renewable energy developers and financial institutions are invited on the need for a statement by the Executive on the importance attached to an increased uptake of renewable energy as well as the level of investor confidence needed to attract the necessary investment and the means of obtaining such confidence.
- 9. Respondents are invited to submit views or comments on not only the issues dealt with in the Consultation Document but on any other issues which they consider relevant.
- 10. Responses to this consultation must be received by 14 December 2001.

# Introduction



section **1**



## 1.1 Scope and Aims of the Consultation

This document seeks to consider the options for, and the implications of, increasing the uptake of renewable energy for the generation of network connected electricity in Northern Ireland.

*It does not deal with the use of renewable energy for:*

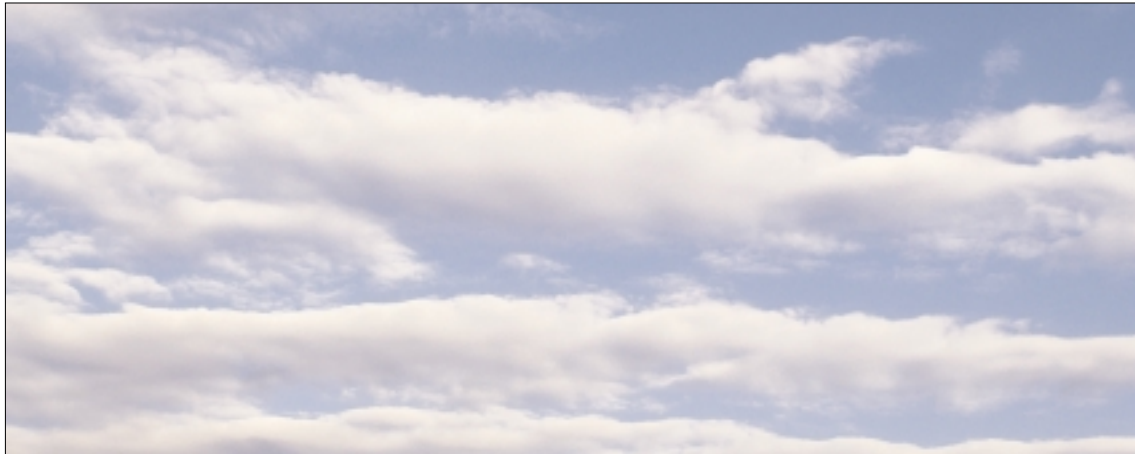
- the generation of electricity which is not network connected, or heating (such as domestic solar water heating, passive solar design and biomass heating); or
- transportation.

*Nor does it deal with:*

- energy efficiency; or
- demand reduction options.

The exclusion of these matters from the scope of this consultation exercise is not intended to underplay the importance they have in reducing CO<sub>2</sub> emissions, particularly in the case of energy efficiency and demand side reduction measures. An effective climate change programme must embrace a wide portfolio of measures including fuel switching and combined heat and power as well as renewable energy.

Increasing the uptake of renewable energy for the generation of grid connected electricity has significant implications for a large number of people in Northern Ireland. It is for this reason that it is deemed to warrant a focussed consultation process which is also by way of honouring a commitment given in 1999 in the then Department of Economic Development's document 'Vision 2010 – Energy Action Plan'. (This will be considered more fully later).



**Views are now being sought on the issues dealt with (as well as other related issues which respondents think should be considered).**

Responses to this consultation must be received by 14 December 2001 ideally by e-mail (giving name and postal address please) to [anthony.mooney@detini.gov.uk](mailto:anthony.mooney@detini.gov.uk) or by post to:

**Mr A Mooney  
Department of Enterprise, Trade and Investment  
Energy Division  
Netherleigh  
Massey Avenue  
BELFAST  
BT4 2JP**

This document can be found on the DETI website at <http://www.detini.gov.uk/energy/>

All written responses to this consultation will be published, along with a summary, and put on the internet in due course. Any responses not for publication should be marked 'Confidential'.

Any enquiries about this consultation should be directed to the above e-mail address.

Should the document be required in an accessible format please contact Mr Mooney at telephone: (028) 9052 9574 or at the e-mail address given above and appropriate arrangements will be made as soon as possible.

On completion of the consultation exercise, a report on the views and comments received will be made to the Minister for Enterprise, Trade and Investment who, as appropriate, will include recommendations in a draft energy strategy for Northern Ireland to be published early in 2002.



# Policy Perspectives on increasing Exploitation of Renewable Energy



section **2**



## 2.1 International Policy

In December 1997, the United Nations Framework Convention on Climate Change was signed in Kyoto, Japan by 171 countries, including the United Kingdom.

The Kyoto Protocol sets out a series of targets for reductions in greenhouse gas emissions for individual nations as well as groups of nations such as the European Union.

The greenhouse gases include carbon dioxide, methane, nitrous oxide, hydro fluorocarbons, perfluoro carbons and sulphur hexafluoride.

The deployment of renewable energy is seen as being a significant instrument in the overall approaches available to signatories in reducing greenhouse gas emissions.

## 2.2 European Union Policy

The European Union is committed to reducing greenhouse gas emissions by 8% by 2008 - 2012 in relation to 1990. Greater exploitation of renewable energy is seen as having a major role to play in the overall strategy in achieving these reductions.

Following the publication of a Green Paper, the European Commission in 1998 issued a White Paper for a Community Strategy and an Action Plan entitled 'Energy for the Future – Renewable Sources of Energy'. This proposed a target of doubling the contribution of renewable energy from 6% to 12% of the EU's total primary energy needs by 2010. The Council of Ministers has adopted a Resolution agreeing that there is a need to promote a sustained and substantially increased use of renewable sources of energy throughout the EU and urging Member States to pursue national strategies for the promotion of renewable energy with a view to achieving a substantial increase guided by the White Paper indicative target of 12%. The White Paper proposed a series of subsidiary targets for individual renewable energies such as wind, hydro, biomass and photovoltaics.

In May 2000, the Commission presented to the Energy Council its proposal for a Directive on the promotion of electricity from renewable sources in the internal market. Published in late June, detailed discussions began in July. Key features of the Directive are:

- Member States are required to adopt national targets for renewable energy consistent with reaching the Commission's target of 12% of energy from renewables by 2010 – the indicative target set for the UK is 10% of electricity by that date;
- a European system of 'certification of origin' for renewable energy will be introduced; and



- support schemes for renewable energy are left to Member States but the Commission may propose harmonisation at a later date.

The UK expressed support for the objective of promoting increased use of renewable energy and for the general thrust of the draft Directive. However the UK's position differed from the Commission's in some respects – for example, unlike the Commission's proposal, the UK wanted the achievement of national targets to be subject to the costs of being acceptable to the consumer but no conditions were attached to the targets proposed in the Directive. There was also the issue of electricity from municipal waste and landfill gas being excluded from targets.

Political agreement on the proposed Directive was reached at the Energy Council in December 2000, namely:

- indicative targets for all EU Member States regarding the amount of electricity from renewable sources by 2010;
- the introduction of a system of certification of origin for renewable energy generated electricity; and
- measures to facilitate access for such electricity to the grid.

The Commission supported the Council's view that targets should be non binding. However adoption of the Directive is dependent on Council and European Parliament co-decision. At its first reading, the European Parliament adopted 55 amendments. The main issues outstanding concern the binding nature of the targets and the treatment of energy from waste. These and other differences of opinion are expected to be resolved shortly probably through conciliation.

The Directive is likely to come into force either later in 2001 or early 2002. Once adopted, EU Member States will have 2 years to implement the Renewables Directive.

### 2.3 United Kingdom Government Policy

The United Kingdom Government is committed to develop renewable sources of energy.

As part of this commitment, it undertook a review of the status and prospects for renewable energy. A UK wide consultation paper reporting on the outcome of the review '*New and Renewable Energy – Prospects for the 21st Century*' was published in March 1999.



Later an analysis of the responses to the consultation Paper was published and this was followed by a report entitled 'Conclusions on the Public Consultation'.

The latter report confirmed the aims of Government policy for new and renewable energy as:

- assisting the UK to meet international and national targets for the reduction of emissions including greenhouse gases;
- helping to provide secure, diverse, sustainable and competitive energy supplies;
- stimulating the development of new technology necessary to provide the basis for continuing growth of the contribution from renewables in the longer term;
- assisting the UK renewables industry to become competitive in home and export markets and in so doing, provide employment in a rapidly growing sector; and
- contributing to rural development.

The report re-affirmed the targets of:

- 5% of UK electricity requirements to be met from renewables by end of 2003; and
- 10% by 2010, subject to the cost to the consumer being accepted.

It also stated that the Government, by stimulating the market for renewable energy, would among other things:

- introduce a new and long term renewable energy obligation on suppliers of electricity in England and Wales; and
- provide exemption from the Climate Change Levy for electricity and heat from renewable energy sources (except large scale hydro).

The targets adopted and the measures proposed reflected the report of the Royal Commission on Environment Pollution (2000) 'Energy – the Changing Climate' which stated that

- greenhouse gas abatement is a key future role for renewable energy; and
- **increasing the uptake of renewable energy has to be a non-negotiable element of future energy use.**



## 2.4 Northern Ireland Policy

The strategic energy objectives of Northern Ireland were set out in a document entitled 'Energy in the 90's and Beyond', published by the then Department of Economic Development in 1992. These objectives can be summarised as follows:

- energy efficiency and the clean production and use of energy;
- lower costs and the protection of consumer interests;
- diversification of supply; and
- security of supply.

Renewable energy was and is regarded as a means of achieving the objectives of 'clean production ... of energy', 'diversification of supply' and contributing to 'security of supply'. The document went on to state that the continued identification and development of commercially viable renewable resources in Northern Ireland was essential.

In 1999, following a major review of the Northern Ireland economy, the Economic Development Strategy Review Steering Group published a report entitled 'Strategy 2010'. This made a number of recommendations regarding energy, proposing among other things an all island of Ireland energy market and the setting of targets for the use of non-fossil fuels for electricity generation.

By way of response, the then Department of Economic Development published a consultation document entitled '*Vision 2010 – Energy Action Plan*'. It stated that there would be consultation on the implications of the sustained promotion of renewable energy, following the outcome of the UK National Review on New and Renewable Energy. The document referred to renewable energy bringing about new business opportunities and stimulating regional competitiveness and innovation. The responses received to the proposals in '*Vision 2010 – Energy Action Plan*' were largely supportive.

## 2.5 Republic of Ireland Policy

It is appropriate to review the policy in the Republic of Ireland in view of the acceptance by both Governments of the rationale for the creation of an all island of Ireland energy market.



The main objectives of the Republic of Ireland's energy policy are:

- the supply of a choice of fuels to consumers as efficiently as possible, at internationally competitive prices, taking account of supply, security, social, economic and environmental considerations;
- the consumption of this energy as efficiently as possible; and
- the production of as much of the national energy requirements from indigenous sources as is economically possible.

In 1996, the then Department of Transport, Energy and Communications published a document entitled *'Renewable Energy – A Strategy for the Future'*. This advocated:

- energy efficiency measures;
- production of electricity from renewable resources; and
- production of electricity from alternative sources such as combined heat and power.

In 1999, the Department of Public Enterprise published a paper entitled *'The Green Paper on Sustainable Energy'*. This set a target of 500MW of electricity from renewable sources for the period 2000-2005. It was envisaged that the bulk of this would come from wind energy. It proposed achieving this target by means of recurring competitions (Alternative Energy Requirements – AER), direct sales to final customers (as provided for by the Electricity Regulation Act 1999) and successful projects under the European Union 5th Framework Programme. Provision was made for developers of projects grant aided under EU Energy Programmes such as THERMIE to obtain the same price for electricity generated as was paid for electricity generated by the same technology under the most recent AER competition. Access to the national grid was also guaranteed.

The 5th round of the AER competition is currently underway, the results of which are expected to be announced early in 2002.



Current Uptake of Renewable Energy in Northern Ireland;  
the Potential for further Exploitation; and Northern Ireland's  
Contribution to the United Kingdom Target



section

3



**3.1** At present, electricity from renewable sources (sometimes referred to as ‘green’ electricity) supplied to the Northern Ireland grid is provided either under the Northern Ireland Non-Fossil Fuel Orders or under the Northern Ireland Electricity plc’s Eco Energy arrangements.

Additionally, a modest but important amount of green electricity is generated for mainly private on-site use.

### **3.2 Northern Ireland Non-Fossil Fuel Obligation Orders (NFFOs)**

In 1993, the then Department of Economic Development announced its intention to make under the provisions of the Electricity (NI) Order 1992 a first Non-Fossil Fuel Obligation Order legally requiring NIE to secure initially 16MWs (Declared Net Capacity), rising through successive Non-Fossil Fuel Orders to 45MWs by 2005.

NFFOs involve a competitive tendering process. Bids received are assessed with regard to financial and technical viability. Successful bidders are subsequently offered a 15 year contract to supply electricity at a specific site using the stated renewable energy technology. Bid prices are index linked during the 15 year contract period.

In 1994, under the first Northern Ireland NFFO, 20 contracts representing just under 16MWs were awarded to 12 companies.

In 1996, under the second NFFO, 10 contracts representing over 16MWs were awarded to 10 companies. The average bid price paid to successful generators under NFFO 1 was 6p/kWh while the average bid price paid under NFFO 2 was 4p/kWh. The latter lower bid price reflects the improvement in technology between NFFO 1 and NFFO 2 (a period of under 3 years) mainly in wind energy technology. The comparative price of electricity from thermal power stations in Northern Ireland is 3p/kWh.

However, while NIE has contracts for 31.896MWs of renewable power, only 17.5MWs are being generated at present and it is unlikely that there will be no further renewable energy generated under NFFOs 1 and 2. This ‘follow through’ rate of some 31MWs contracted and 17.5MWs being produced, while being rather disappointing, is no worse and in some cases is better than the follow through rates under the similar competitions in England, Wales and Scotland. Nonetheless the present amount of electricity being produced under NFFOs from renewable sources represents a shortfall of approximately 61% on the target of 45MWs by 2005.

**A Summary of United Kingdom NFFOs is at Appendix 1.**



### 3.3 NIE's Eco Energy Tariff

NIE introduced its Eco Energy Tariff on 20 October 1998. This provides consumers with the option of purchasing electricity from renewable sources. NIE has pledged to match Eco Energy users' consumption with an equivalent amount of 'new' renewable energy fed into the grid.

Consumers can choose to have 10%, 50% or 100% of their electricity from renewable energy. The additional weekly charge for an average user (that is, using 3800 units per year) is respectively 4.4p, 22p and 44p. Thus the average user opting for 100% Eco Energy can expect to pay an extra £22.88 a year.

Up to the present, approximately 3000 domestic consumers have signed up to the Eco Energy Tariff. This number of domestic consumers makes NIE's Eco Energy Tariff, in pro rata terms, the most successful green electricity tariff in the UK. In the public sector, almost 200 schools and 2 District Councils have signed up to Eco Energy. More recently, it has been announced that the Civil Service Office Estate will take 16 GWh a year of Eco Energy.

In the commercial and industrial sectors, an increasing number of small to medium enterprises are also signed up for Eco Energy. Under the Climate Change Levy arrangements which came into effect from the beginning of April 2001, for industrial and business customers only, electricity and heat from renewable sources are exempt. This has served to focus attention on Eco Energy as the exemption from the Levy means that the additional cost of electricity under the Eco Energy is reduced to 0.17p per unit.

In 2000, the Director General of Electricity Supply agreed with NIE an increased target of 25GWh a year by 2005 under the terms of revised Price Control arrangements. NIE is currently more than half way towards meeting this obligation.

NIE have contracted 2MWs of new renewable energy capacity from a windfarm at Lendrum's Bridge and has recently agreed a further 3.6MWs from a wind farm at Owenreagh.



### 3.4 Non Grid Connected Renewable Energy

While consideration of non grid connected renewable energy projects is not part of this consultation exercise, nonetheless the electricity produced can be taken into account when totalling the amount of electricity in Northern Ireland obtained from renewable sources.

There are currently some 35 projects involving wind energy, hydro power, solar and energy from waste. It is estimated that together these produce just over 2MWs.

**Details of the Northern Ireland NFFO 1 and 2 Schemes and the Non Grid Connected Projects are given at Appendix 2**

### 3.5 Potential for Further Exploitation of Renewable Energy in Northern Ireland

In 1999, the then Department of Economic Development, in association with NIE plc, published an assessment of the renewable energy potential in a document entitled 'Renewable Energy in the Millennium – the Northern Ireland Potential'. (This updated a 1992 report on the prospects for renewable energy.)

This indicated that the maximum estimated contributions from the various technologies by 2010 were:

	GWh/y
Land-based wind energy	160
Forest waste residues	57
Willow coppice	80
Biogas – sewage and farm wastes	29
Energy from wastes – municipal solid, industrial and specific wastes	222
Small scale hydro	25
	<b>573</b>

The total of 573GWh/y represents approx 115MWs. **It should be noted, however, that experts in a number of the technologies would regard these estimates as conservative, particularly as some technologies have developed at a rate beyond that envisaged in 1999.**



In 2000, the Department of Enterprise, Trade and Investment and the Republic of Ireland's Department of Public Enterprise published the conclusions of a study on Ireland's offshore wind energy resources entitled 'Assessment of Offshore Wind Resources in the Republic of Ireland and Northern Ireland'.

This indicated that Northern Ireland had a practical offshore wind resource of –

- (1) 126MWs (ie 7% of total consumption of 1800MWs by 2005) at a maximum depth of 20m and a minimum distance from land of 5km deploying 1.65MW wind turbines at 500m grid spacing, or
- (2) 216MWs (ie 12% of 1800MWs by 2005) at the same maximum depth and the same minimum distance from land but deploying 3MW wind turbines at 500m grid spacing.

Determining the practical resource relied on a number of assumptions and subjective judgements, particularly in relation to the commercial attractiveness of the opportunities available.

The combined results of the 2 assessments suggest that Northern Ireland has in practical terms the potential to generate between 240MWs and 330MWs of electricity from renewable sources by 2010.



### 3.6 Grid Control Issues

Wind energy is likely to be the biggest contributor to Northern Ireland's potential. It is frequently stated that a significant limitation on the contribution from wind is the amount of intermittent or non firm power that the grid can accept. NIE have in the past indicated that at times of minimum demand (such as at 3 a.m.), generation of more than 10% (30MWs) of intermittent electricity can cause grid control problems. During periods of high demand (more than 800MWs) a greater proportion of wind power can be accommodated.

Given that Northern Ireland is committed to increasing the amount of electricity generated from renewable sources by 2010 and that much of this increase is likely to be generated from wind power, we are particularly interested in receiving comments on:

- (1) any perceived grid control problems which may arise;**
- (2) how these problems might be addressed; and**
- (3) any cost implications for consumers in resolving any grid control problems.**

### 3.7 Northern Ireland's Contribution to the United Kingdom's 10% Target of Electricity from Renewable Sources by 2010

Setting a target for the amount of electricity Northern Ireland should generate from renewable sources by 2010, as a contribution to the United Kingdom target of 10%, is a matter for the Minister for Enterprise, Trade and Investment and the Executive.

**However in view of the financial implications of any target, against the background of the already high electricity prices in Northern Ireland, comments are invited on what consultees consider to be a sufficiently demanding yet feasible target.**



Whatever target is set for 2010, it will have to take account of the amount of electricity already generated by renewable sources. At April 2001, this amounted to just over 25MW made up as follows:

NFFO 1 } NFFO 2 }	17.5MW
NIE Eco Energy – actual/about to be committed	5.6
Non Grid Connected	2.1
<b>Total = 25.2MW</b>	

This total represents approx 1.7 % of Northern Ireland's current peak winter demand.

A target can be based on the total amount of electricity available or on peak winter demand. As regards the former, Northern Ireland has some 2100MWs available from conventional power stations. A 10% target would therefore mean an additional 184.8MWs being sought from renewable sources by 2010, representing an increase of more than seven times the present amount being produced.

The Department of Trade and Industry in its document 'The Renewables Obligation – Preliminary Consultation', bases the 10% target on the estimated electricity available in the UK. It assumes a Northern Ireland contribution of 2.5% towards the UK target of 38 Terawatt hours, that is 0.95TWh which is around 190MWs requiring an additional 165MW.

The other basis for a target is the peak winter demand for electricity which in Northern Ireland is 1500MWs. A 10% target would be 150MWs less 25.2MWs already in place which is 124.8MWs.

Using peak winter demand creates some linkage between renewable energy and consumption and this in turn could encourage demand side control through energy efficiency measures. It is widely accepted that energy efficiency has a major part to play if consumption and related costs are to be reduced.



### 3.8 Conclusions

Views are invited on:

- (1) the basis on which any target for the amount of electricity to be generated from renewable sources, should be set. Should a target be set on the amount of electricity available in Northern Ireland or should it be set on the amount of electricity consumed?**
- (2) the target for the amount of electricity to be generated from renewable sources by 2010;**
- (3) the desirability of breaking down the target proposed for 2010 for specific renewable energy technologies; and**
- (4) the desirability of setting a target beyond, for example for 2020.**

## Potential Benefits of a Successful Renewable Energy Industry in Northern Ireland





**4.1** Renewable sources of energy are recognised as making an important contribution to secure, sustainable and diverse energy supplies as well as being an essential element in any climate change programme. Perhaps less well recognised are the potential economic development opportunities renewable energies can bring.

An emerging renewables industry will encourage the development of new technologies, create new jobs and tackle global environmental challenges.

The potential economic development opportunities suggest that setting a target for increasing electricity from renewable sources should not be regarded as a burden or imposition or indeed as purely an 'energy' matter.

**4.2** In Northern Ireland there is presently a small number of companies involved in the renewables industry. Thermomax, with a factory in Bangor, Co Down, produce state of the art evacuated tube solar collectors. They export over 90% of their products and over 2 million of their tubes are used worldwide, including the CIA Headquarters in Washington, USA. B9 Energy Ltd, based in Larne, Co Antrim, have developed wind farms in Northern Ireland, the Republic of Ireland and as far afield as Canada. They operate and maintain over 80% of the large wind farms in Ireland, North and South. Rural Generation Ltd and B9 Energy Biomass Ltd, both based in Londonderry, are European leaders in the development of small scale wood gasifiers, a number of which have been exported, including one to Sweden. Another supplier and installer of small scale wind turbines and solar systems, Renewable Energy Services of Crumlin, Co Antrim is currently undertaking similar work in Africa.

**4.3** At The Queen's University of Belfast, there is considerable expertise in wave energy and gas turbine engines. At the University of Ulster there is leading edge research and work on solar power and the University's Northern Ireland Centre for Energy Research and Technology (NICERT) facilitates the transfer of the latest energy technology to local industry. Harland & Wolff, with their considerable experience in ship building and offshore oil drilling, is ideally positioned to diversify into the offshore wind industry.

**4.4** The list of those mentioned in the preceding paragraphs is by no means exhaustive. There are a number of other companies, individuals and community groups that have developed renewable energy projects, both within and outside the NFFO arrangements, and derive an income from producing renewable energy generated electricity.

Given the extent of the present involvement in renewable energy and the existing engineering skills and technical know-how, it is reasonable to conclude that a thriving renewable energy industry in Northern Ireland could be achievable as part of a broader economic development policy.



**4.5** A thriving renewables industry could lead to the creation of more businesses and high skill level employment. Comment is often made that large scale wind farms using Danish turbines do nothing for the local economy. This ignores the rental income which the local land-owner receives, the contracts awarded to local construction companies for completion of the tower platforms and access roads and the contracts awarded locally for operation and maintenance.

Emerging renewable technologies such as energy crops (short rotation willow coppice), energy from waste and biogas (from farm wastes) offer significant new and alternative employment opportunities in the agri-food sector.

Extrapolation of the results of a study conducted in Great Britain suggests that between 250 and 1,125 additional new jobs could be created in Northern Ireland by a successful renewable energy industry.

**4.6** A renewable energy industry by its nature is a fragmented one and this can give rise to problems in getting representative or collective feedback on relevant issues. In the Republic of Ireland, there are various associations which serve to reduce the problems. These include the Irish Wind Energy Association, the Irish Hydropower Association and the Irish Bio-energy Association. While these operate on an all-island basis (and this is to be encouraged) the feedback on Northern Ireland issues is often insufficiently focused to authoritatively contribute to policy formation.





#### **4.7 Views are invited on:**

- (1) how the renewable energy industry in Northern Ireland might best be stimulated and expanded;**
- (2) how the potential economic development opportunities might be realised; and**
- (3) how the renewable industry in Northern Ireland might be served by a single representative body to advise Government, contribute to policy formulation and develop implementation frameworks.**

**Respondents are also invited to identify any barriers to the creation of an enlarged, successful renewable energy industry in Northern Ireland and to put forward suggestions as to how these barriers might be overcome.**

# Possible Support Mechanisms for Renewable Energy in Northern Ireland





**5.1** The rationale for supporting the development of renewable energy in Northern Ireland may be summarised as follows:

- the potential contribution of renewable energy to diversity and security of energy supply;
- the role of renewable energy in reducing the emissions of greenhouse gases, thereby contributing to current and longer term climate change targets;
- the recognition that support provided now will help overcome financial and other barriers and will accelerate the market competitiveness of renewable energies; and
- in terms of local economic development, the benefits which a vibrant renewable energy industry could bring by the creation of new businesses, employment and export sales.

**5.2** It is important that any support mechanism or range of mechanisms must have regard to the already high electricity prices in Northern Ireland.

A comparison of Northern Ireland Electricity prices with those in the rest of the UK and elsewhere is at Appendix 3.

High prices of electricity should not however provide a basis for Northern Ireland being exempted from making a contribution to the UK's target for electricity to be generated from renewable sources and to the UK's overall climate change programme.

**5.3** Over recent years there has been a significant decrease in the cost of electricity from renewable sources, particularly from wind power. In the 2½ years between the 2 Northern Ireland NFFOs, the average bid price fell by 33.3% to 4p/kWh. In England and Wales, the cost of renewable energy generated electricity under the NFFOs has almost halved on average since 1990. Under the most recent NFFO there, the average price of most contracts was 2.71p/kWh for the 1998 calendar year. Costs of renewable energy generated electricity in Northern Ireland should continue to fall, most obviously with mature technologies, some of which may already be approaching competitiveness.

**5.4** In order for any support mechanism to be effective, it must:

- (1) implement Government policy and ensure that the amount of electricity generated from renewable sources will meet the required target by 2010; and
- (2) encourage competition and deliver renewable energy electricity at the least possible cost to consumers.



Furthermore it is considered desirable that any support mechanism:

- (3) encourages maximum penetration of all relevant renewable technologies (this might require separate support for immature technologies, with those previously used in Northern Ireland being stimulated by alternative approaches);
- (4) stimulates innovation and development of the Northern Ireland economy through extension of existing businesses, new business start up and, ultimately, job creation;
- (5) encourages local community groups to become involved in the ownership of renewable energy projects. The term 'community groups' refers in this context to people who form associations by virtue of their locality and/or shared interests and/or common occupations - in other words, groups over and above the more usual 'not for profit' type of community groups; and
- (6) offers the potential for exceeding any 2010 target.

#### 5.5 Views are sought on:


- (1) the rationale for supporting the development of renewable energy electricity in Northern Ireland;**
- (2) the need for and characteristics of support mechanisms; and**
- (3) the extent to which support mechanisms can and should facilitate community groups to develop and own renewable energy projects and how this can best be achieved.**

#### 5.6 Possible Support Mechanisms:

##### **(1) Open Market**

Since 13 March 2000, the electricity market for renewable energy has been fully open to competition. As a result, renewable energy developers can supply their own customers.

Since 30 September 1999, the generation of not more than 10MWs and the supply of up to 1MW from renewable sources, are exempt from electricity licensing requirements.



To some extent, the opening of the market for renewable energy generated electricity to competition, can be viewed as a support mechanism. As such it has the distinct advantage of not imposing any direct additional cost on consumers (other than the customers contracted). It has the potential to assist local economic development. It can be argued that the open market situation (and to a lesser extent, the exemption from licensing), the high electricity prices and, since April 2001, the introduction of the Climate Change Levy together represent significant market opportunities for all renewable energy developers. At the present time, however, there is no evidence to indicate that these opportunities are being taken up to any significant extent or indeed are likely to be taken up in the near future.

There is an absence of common agreement as to whether Northern Ireland should rely entirely on market opportunities. Those who consider that it should not do so, make a number of claims. Firstly, it is claimed that there is no guarantee that direct sales of renewable generated electricity would meet any target that is set for 2010. Secondly, there is insufficient evidence at present of there being a critical mass of customers in the commercial, industrial and public sectors willing to take enough renewable electricity to justify significant capital investment by renewable energy developers. Thirdly, it is contended that the contracts that customers are likely to enter into would be of a relatively short duration, that is, 5 years or less. Developers who have to secure third party finance would generally find that financial institutions might regard this period of contract as being too short for security of loan purposes. Fourthly, it is suggested that there is an absence of any incentive to utilise immature technologies. In fact there are some indications that only commercially proven technologies would be utilised. Finally, it is suggested that the relatively small market for electricity presented by the Northern Ireland customer base may not be capable of encouraging real competition.

**(2) Views are sought on:**

- (a) whether an open market through direct sales can operate as a stand alone mechanism and deliver the amount of electricity from renewable energy to meet a target by 2010;**
- (b) whether there are any changes to legislation or regulations which would enable an open market to operate more effectively as a support mechanism; and**
- (c) whether there are barriers outside of legislation and regulations which prevent an open market from being effective and, if so, how might these be addressed.**

The Office of the Director General of Electricity Supply (OFREG) has recently issued a consultation paper considering action which may need to be taken to fully facilitate renewable electricity generation within the arrangements for trading electricity in Northern Ireland.



The outcome of that consultation will be taken into account when considering the way forward.

(3) An open market with direct sales of renewable energy generated electricity could assist the wider public sector to explore the role which the **Private Finance Initiative (PFI)** might play in the advancement of renewable energy. Although the scope for developing renewable energy projects while pursuing statutory public duties is limited, there may be opportunities for:

- (a) local authorities to consider energy from certain forms of waste and landfill gas projects in fulfilling the duty to ensure the disposal of municipal waste (with power generation a by-product which enhances project economics and reduces disposal costs); and
- (b) the Northern Ireland Housing Executive and Hospital Trusts to consider Combined Heat and Power facilities fuelled by certain wastes and biomass where such projects assist in maintaining and servicing public housing stock and other public buildings such as hospitals.

There may be some uncertainty as to whether the requirement on local authorities to obtain 'Best Value' rules out the development of renewable energy projects. If so, there is perhaps a need to address this and for guidance to be provided.

At the end of 2000, in Great Britain, contracts for 3 local authority renewable projects financed under PFI had been signed. (Two were Integrated Waste Management schemes and the third was a Circulating Fluidised Bed scheme). A further 5 schemes are close to being finalised.

A full review of PFI in relation to renewable energy projects is outside the scope of this document but there are useful publications available from: The New and Renewables Enquiries Bureau, ETSU, Harwell, Didcot, Oxon, OX11 0QJ. The e-mail address is: [NRE.enquire@aeat.co.uk](mailto:NRE.enquire@aeat.co.uk). The telephone number is 01235 432450/433601 and fax number is 01235 433066.

(4) **The views of bodies and organisations in the Public Sector are sought as to:**

- (a) **the scope for developing renewable energy projects within their areas of statutory responsibility; and**
- (b) **if there is scope, what are the barriers to developing relevant renewable energy projects and how these might be addressed.**



**5.7** Up to now the main support mechanisms in Northern Ireland have been the 2 Non-Fossil Fuel Obligation Orders (see Section 3, paragraph 3.2 and Appendix 1). The NFFO arrangements have been successful in achieving the key objective of introducing renewable energy into the Northern Ireland energy mix. They stimulated a renewable energy industry moving it from an embryonic to a fledgling status. They assisted immature technologies such as small scale biomass gasification. They contributed to local economic development with small businesses being set up and some new employment being created which in turn enhanced export sales. They have resulted in some greenhouse gas savings.

Central to the success of the NFFOs has been the provision of a guaranteed market for the renewable energy generated electricity and the premium price paid. This premium which is borne by consumers has led to complaints about the cost of NFFOs. The present amount of electricity supplied under NFFOs is just under 1.2% of peak winter demand and approximately 0.83% of available electricity. The additional cost to the average domestic consumer using 3,300 units a year is approximately 1% a year which is less than some are opting to pay voluntarily under the NIE Eco-Tariff scheme.

Renewable energy developers have been known to counter this by pointing out that renewable energy is not responsible for the high costs of conventionally generated electricity in Northern Ireland. There are some who would claim that future rounds of NFFO would result in lower priced electricity from renewables and that the high costs associated with the first 2 rounds of NFFO were due to the zero base starting point when start up costs tend to be higher.

Aside from cost issues, a number of weaknesses or drawbacks with NFFO can be identified. There is the 'Stop/Go' nature of NFFO arrangements which makes it difficult for developers to make medium to long term plans. There is the matter of over a third of contracts awarded not being followed through to implementation. This is coupled with the lack of any provision to re-award these unfulfilled contracts to the next lowest bidder. There are significant costs, especially for small businesses, in putting forward bids under NFFO, which might explain in part why there is a much smaller number of bids compared to the number of initial expressions of interest.

**5.8** It is suggested that the majority of the weaknesses with NFFO could be addressed through modification of the arrangements. The competitive bid process and the guaranteed market elements would continue but the modifications *could include*:


- (1) a continuous rolling programme over a fixed period with either fixed bid prices or prices being adjusted regularly. Alternatively there could be a regular programme over a given period with bids being sought at fixed intervals;



- (2) in view of technological developments and the increasing competitiveness of renewable energies, a guaranteed market for between 10 and 12 years instead of 15 years;
- (3) bids being sought on a capped price basis, adjusted for each technology. This would serve to prevent the submission of unrealistic bids and would give signals as to the perceived competitiveness of any technology;
- (4) with more advance notice of competitions, only bids in respect of projects with outline planning permission could be considered;
- (5) provision could be made to allow contracts not taken up to be awarded to the next lowest bidder. All successful bidders would be required to lodge a bond (the value of which would be calculated by reference to the total amount of electricity being offered and the likely costs of accepting the next lowest bid) and this bond would be forfeited if the first successful bidder did not proceed with the project;
- (6) specific arrangements could be put in place for small-scale, community based projects to encourage such projects and to avail of the advantages these could offer (eg better public understanding and acceptance of renewable energy development; local ownership with local benefits etc). The arrangements could include simpler bid procedures, thereby reducing the costs for small scale (under 2MWs) projects; and
- (7) the introduction of a system of certification which meets EU requirements and ensures compatibility with any system in England, Scotland, Wales and the Republic of Ireland.

### 5.9 Views are invited on:

- (1) the general effectiveness of NFFO arrangements in achieving increases in the amounts of electricity from renewable sources;**
- (2) whether or not the costs to consumers are considered reasonable and sustainable in the future;**
- (3) whether the modifications to the NFFO arrangements suggested address the weaknesses identified and, if not, what other changes are needed; and**
- (4) whether modified NFFO arrangements are best suited to achieving the original target of 45MWs by 2005 having regard to the other support mechanisms referred to later in this document.**



**5.10** In England and Wales, the Government is replacing the NFFO arrangements with a Renewables Obligation which it is proposed will come into effect shortly after 1 January 2002. The Scottish Executive is introducing a similar Obligation.

- (1) The Renewables Obligation (RO) will place a legal obligation on all licensed electricity suppliers to supply a specified percentage of their total electricity sales to customers in England and Wales from renewable energy sources. The percentages specified will be at a level consistent with increasing the contribution from renewables from around 3% of sales by 31 March 2003 to 10.4% by 31 March 2011; it is proposed that the Obligation will remain constant at 10.4% of sales until 31 March 2027 but may be increased to meet more ambitious targets beyond 2010. The first RO period will run to 31 March 2003 and thereafter for periods of one year until 31 March 2027. The target for 2010 is 'subject to the cost to the consumer being acceptable'.
- (2) To meet their obligation, licensed suppliers must either supply a specified amount of their electricity sales from accredited renewable energy sources or buy Renewables Obligation Certificates (ROCs) from generators or third party traders or by paying the buyout price. ROCs will be issued by the Office of Gas and Electricity Markets (Ofgem) in units of 1 MWh. If a supplier fails to comply with their obligation, Ofgem is empowered to impose a financial penalty.
- (3) The buyout price has been set initially at £30/MWh but, for later RO periods, will be adjusted in line with the RPI. The proceeds from the buyout will be returned to suppliers by reference to the number of ROCs they present to discharge their obligation compared to the total number of ROCs presented by all suppliers. If a supplier chooses to buy out all or part of the Obligation, it will not receive any recycling of the buyout funds for the proportion that it has bought out. Up to 25% of a supplier's obligation can be met by ROCs issued in a previous RO period.
- (4) Eligible renewable sources of energy are:

offshore and onshore wind; landfill and sewage gas; energy crops; wave power; tidal power; photovoltaics and geothermal power. Biomass eg agricultural and forest residues are eligible but co-firing of biomass will only be eligible until 31 March 2011 for up to 25% of a supplier's obligation and, from 1 April 2006, at least 75% of the biomass fuel must be energy crops. In the case of energy from waste, only non-fossil derived energy will be eligible along with the energy from non-fossil derived element of mixed waste using advanced technologies such as pyrolysis, gasification and anaerobic digestion. In the case of hydro, plants with 20 MW or less Declared Net Capacity (DNC) will be eligible but plants with more than 20 MW (DNC) will only be eligible if first commissioned after the RO Order is made. Renewable energy generated outside the UK or its territorial waters or the Continental Shelf will not be eligible for the RO. Also, electricity generated from eligible GB renewable sources but exported elsewhere including Northern Ireland will not be eligible.



- (5) Licensed electricity suppliers are expected to increase their prices to meet the additional costs of complying with the Obligation. The cost to the consumer is estimated to be around £780 million by 2010/11. If unlicensed suppliers also increase their prices, the overall cost will be around £872 million.
- (6) Further information on the Renewables Obligation is available on the DTI website – <http://www.dti.gov.uk/consultations/>  
Responses to the previous consultation exercise are at – [http:// www.dti.gov.uk/renewable/response.pdf](http://www.dti.gov.uk/renewable/response.pdf)  
It should be noted that the Renewables Obligation proposals are likely to be considered a State Aid by the European Commission and therefore will require clearance. A decision is expected later this year.
- (7) With the Renewables Obligation not yet in operation and the process at the statutory consultation stage (which closed on 12 October 2001), it is only possible to look at it in theoretical terms and in the light of feedback received from consultations in GB and the changes proposed as a result. Both the long term nature of the Obligation (that is, 25 years) and the fact that the Obligation is on suppliers, have been broadly welcomed. Concern has been expressed about the buyout price and the possible costs to consumers. On the latter, it has been acknowledged that there is uncertainty about costs as these are dependent on, amongst other things, the actual demand for electricity, the price and availability of fossil fuels and the level of inflation. Any significant increase in fossil fuel prices and/or the level of inflation could compromise the achievement of the Obligation's objectives. Opinion appears to be divided on whether the Obligation represents a major improvement on the NFFO arrangements.
- (8) There is a lack of evidence that the Obligation will assist immature technologies to play a part in any future energy mix. Banding of the Obligation (that is, setting different buyout prices for different sources of renewable energy) has been rejected. The view is that banding would require the Government to dictate the contribution of each renewable energy and such an approach would be contrary to the market-led basis of the Obligation. Opinion also appears to be divided on the crucial question of the Obligation being able to bring about increases in the amount of renewable energy generated electricity necessary to meet the 2010 target.

**5.11** As the Renewables Obligation has not yet gone live, it is difficult to predict with any certainty how a similar scheme would operate in Northern Ireland. However it is possible that the smaller Northern Ireland energy market which features a very much smaller number of suppliers may not effectively host a Renewables Obligation similar to the England and Wales model without significant adjustment. There is also a need to ensure that Northern Ireland generators of renewable energy electricity are not



disadvantaged in relation to similar generators in England, Wales and Scotland. Furthermore, there may be a need to ensure compatibility with any new arrangements introduced in the Republic of Ireland as a result of the forthcoming EU Directive on Renewable Energy.

**Details of holders in Northern Ireland of Second Tier Electricity Supply Licences are at Appendix 4**

#### 5.12 Views are invited on:

- (1) the Renewables Obligation in general;
- (2) the appropriateness and suitability of a similar support mechanism in Northern Ireland - the views of licensed suppliers in Northern Ireland on this issue would be particularly welcome;
- (3) whether a GB type Renewables Obligation would assist Northern Ireland to achieve the original target of 45MWs renewable energy generated electricity by 2005; and
- (4) whether there is merit on waiting until, say, 2005 to review the operation of the GB Renewables Obligation and then decide on whether it is appropriate for Northern Ireland. Respondents may wish to consider this proposal in relation to the matters raised at paragraph 5.8.

**5.13** The direct sales of electricity from renewable energy at a premium price (sometimes referred to as **Green Pricing Systems**) represent a support mechanism for renewable energy. They are based on the principle that consumers are voluntarily willing to pay more for electricity from renewable sources. Consumers can usually choose to purchase all or a percentage of their electricity from renewable sources and it usually attracts a premium price. The volume of green electricity demanded is then procured from a renewable source.

The Netherlands was the first European country to adopt the idea of marketing electricity from renewable sources for its environmental benefits. All utilities there offer a green electricity scheme. In Sweden, demand for renewable energy generated electricity is outstripping supply with prices being forced upwards. In Germany, the largest utility introduced that country's first green pricing scheme in 1996. The proceeds from environmental premiums charged are matched by the utility and invested into supporting wind and photovoltaic plant.

In Northern Ireland, NIE plc introduced their Eco Energy Tariff in 1998 – details of this are at Section 3, paragraph 3.3.



The advantages of Green Pricing Schemes or direct sales of electricity from renewable sources at a premium price, are:

- they involve the consumer in issues of electricity supply;
- they serve to raise awareness of renewable energy;
- they are an attractive option for utilities as they encourage customer loyalty which is important when customers have choice of utility; and
- they can provide a market for renewable energy when no other markets exist.

The disadvantages are:

- they operate in a manner counter to the 'polluter pays' principle;
- they can make renewable energy appear more expensive than it actually is;
- they require customers to pay more for a product which many would contend is cheaper than the internalised costs associated with generation from fossil fuels;
- they can be open to abuse because of the difficulty in establishing the 'greenness' of the energy used in generation;
- contracts tend to be short term and therefore carry risk for the utility and/or the renewable developer; and
- in some circumstances they can delay more fundamental energy policy changes such as pro-renewables market incentives.

#### 5.14 Views are invited on:

- (1) whether the advantages of a Green Pricing System outweigh the disadvantages and whether there are advantages or disadvantages not identified; and
- (2) whether a Green Pricing System, in conjunction with an open market, could bring about sufficient electricity from renewable sources to meet a significantly enhanced target.

**5.15** Another support mechanism is the **Renewable Energy Feed In Tariff (REFIT)**. In European terms, it is the longest standing form of a market mechanism. In this type of scheme, utilities are obliged to purchase electricity from renewable energy generators at a guaranteed price.

In Germany, for example, grid operators are obliged to purchase electricity from renewable sources within their specific areas at prices which are fixed at national level and apply throughout the year. If the amount of electricity from renewable sources exceeds 5% of



the total electricity produced in an area, the utilities are exempted from the obligation to purchase any excess under this threshold. Under the 'feed law' as it is known, the renewable energy generators receive a payment in the range of 65% to 90% of the retail price for electricity. The actual price is fixed on the basis of the average revenue 2 years previously; thus, the price for the year 2000 is determined by the average revenue in 1998.

In Denmark, the price paid for electricity from renewable sources is calculated as a percentage of the net price to a consumer of 20,000kWh a year, less the costs for using the grid. For electricity from wind power, 85% of the net price is paid. However, Denmark is moving to the Green Market based on certificates which can be traded. This market will be fully implemented in 2003.

The advantages of REFIT schemes are:

- they can stimulate high growth rates of renewable energy. In Germany for example the installed capacity of wind energy rose from 450MWs in 1990 to 2,875MWs by 1998;
- they provide for continuous development which was a key factor in the success of the Danish wind industry; and
- they tend to be fairly easy to introduce and to administer.

The disadvantage is:

- the price paid for electricity from renewable sources does not reflect both market and technological developments. In the case of wind energy, advances in turbine development and efficiencies have reduced costs but this does not trigger downward pressure on the prices paid under REFIT schemes.

It is considered that in the light of the experiences in Germany, Denmark and elsewhere, it is possible to effectively address this disadvantage.

#### **5.16 Views are invited on the suitability of a REFIT scheme for Northern Ireland.**

**5.17** The newest type of support mechanism is **Green Credits Trading**. This was introduced for the first time in 1998 in the Netherlands. Essentially it separates price for the electricity from renewable energy and the 'green' benefit associated with this electricity.



Under this mechanism each unit or kWh of electricity produced is sold at the market price for electricity. In the Netherlands, this price on its own would not make the development of a renewable energy project economically viable. Consequently, as well as the market price, the generator receives from the utility a label or credit for every unit sold. These credits represent the perceived added value to society of the green or environmental benefits of the renewable energy generated electricity and are then sold in a secondary market. This secondary market is the result of the Renewable Energy Resolution, passed in late 1997, in which the utilities committed themselves to a specific targeted amount of units of renewable energy up to the year 2000. The targets may be met by the utility producing the renewable generated electricity itself or by purchasing the credits from a renewable energy generator who has fed electricity into its own or one of the other utilities.

In Denmark where the target for renewable energy electricity is 30% by 2010 (the target for 2005 is 10% but the amount being produced at end of 2000 was 14%), there are plans to have a Green Market fully operational by 2003. As in the Netherlands, the producers of renewable energy generated or green electricity will receive certificates according to the actual amount of electricity produced. The producers will have 2 products to sell – the electricity and the certificates – and the certificates will be a financial security which can be sold independent of the electricity sale on a type of stock exchange for green certificates. Through this stock exchange, producers will receive a supplementary income and it is considered that this income will effectively replace the existing publicly financed subsidies.

The demand for green certificates is secured through a compulsory quota on the purchase of green electricity which all electricity consumers have to fulfil. Quotas will have to be fulfilled each year and only consumers with an annual consumption above 100GWh are exempted. The first quota will reflect the target of 20% of renewable energy generated electricity by 2003, when a new quota will be set.

It has been recognised that the price of certificates will fluctuate and to address this, a Renewable Energy Fund will be established. Certificates will have a minimum price (DKK 0.10/kWh) and a maximum price (DKK 0.27/kWh) – approximately 11.68 DKK equal £1 Sterling – and if the market fixes the price below the minimum, the Fund will buy up certificates. If the price rises above the maximum, the Fund will provide more certificates through the installation of more renewable energy capacity. If the distribution companies do not fulfil their quota, they will be obliged to pay a fee equivalent to the maximum price of DKK 0.27. All fees will be passed to the Renewable Energy Fund.

The Danish Government is aware that its Green Certificates system will not, at least in the near future, assist less mature renewable energy technologies. It is examining ways of integrating less mature technologies into the market so that their weaker competitive position is taken into account. Consideration is being given to: issuing certificates at a higher value; giving running cost and capital investment subsidies; and supporting research



and development costs. For small scale projects, consideration is being given to ‘net sale of electricity’ which currently applies to photovoltaics – ie the electricity meter runs ‘backwards’ when production exceeds consumption.

Tradeable Green Credits or Certificates schemes are attracting significant interest across the EU, prompted possibly in part by the proposed EU Directive for the Promotion on Renewable Energy which will require Certificates of Origin for renewable energy generated electricity. These schemes are seen as drawing on the positive elements of competitive bidding processes like NFFO by reducing the cost of renewable energy. They also draw from feed in tariff schemes (REFITS) by looking at the amount of electricity actually produced rather than the installed generating capacity.

However an EU wide internal market in green credits is still some years away. At present EU Member States do not have an agreed definition of renewable energies. They have different national subsidy schemes. There are no common rules on approval of renewable energy producers, on the registration and trade in certificates, on the period of validity of certificates or on public access to information on market prices. There is also perhaps the requirement for the country of export to have liberalised its market and to meet the obligations of the internal electricity market – without these, trade in certificates would be one way.

**5.18 Views are invited as to whether a Green Credits or Certificates Scheme for Northern Ireland is worthy of consideration and if it should be the subject of further and more detailed research.**

**5.19** In the Republic of Ireland, the main support mechanism for renewable energy is the Alternative Energy Requirement (AER) scheme. This scheme is broadly similar to the Non Fossil Fuels Order (NFFO) arrangements in Northern Ireland in that there is a competitive bidding process with successful bidders securing a 15 year contract to supply electricity from renewable or alternative sources. The prices paid to these bidders with 15 year contracts with Electricity Supply Board are increased annually in line with the Consumer Price Index.

For each competition round, a quota is set for the amount of electricity to be sourced from each renewable technology such as wind, hydro, biomass, waste, wave and combined heat and power. While the emphasis is on more mature technologies – in order to promote cost effectiveness in sourcing renewable energy – the arrangements are considered to provide incentives for the development of less mature technologies.



Four AER competitions were held between 1995 and 1998. In AER 1, the unit price was fixed and bidders were entitled to apply for a capital grant under the 1994-99 Economic Infrastructure Operational Programme which was financed by the European Regional Development Fund (ERDF). In the event bids were made on the basis of the fixed prices alone. As a result, it was decided for subsequent competitions to have a price cap for each technology rather than a fixed price but still retaining the capital grant scheme under ERDF. In 1995 the AER 1 bid price per kWh for all technologies was 4p (IR). In 1998 the weighted average price for AER 111 was 2.748p (IR) – a drop of 31%.

The AER competitions like NFFO in Northern Ireland have experienced disappointing follow through rates to implementation. Under AER 111, launched in March 1997, 279 expressions of interest (compared to 168 under AER 1) were received; of these 92 projects passed the technical and commercial evaluation stages but only 30 contracts were awarded. At the end of 2000, of the 17 wind farms offered power purchase agreements, 1 was commissioned.

As well as AER competitions, Section 62 of the Republic's Finance Act 1998 introduced tax relief from March 1999 for corporate equity investments in wind, hydro, biomass and solar renewable energy projects. This takes the form of a deduction for tax purposes from a company's profits for an investment in new ordinary shares in a qualifying company. It is capped at 50% of all capital expenditure, excluding land, net of grants, on a single project of up to £IR7.5 million. Investment by any one company or group of companies in more than 1 qualifying energy project is capped at £IR10 million. Qualifying projects are certified by the Department of Public Enterprise and the Revenue Commissioners administer the tax relief.

## 5.20 Views are invited on any aspects of the AER arrangements which if adopted in Northern Ireland might create an effective support mechanism.

5.21 The support mechanisms outlined in the previous paragraphs are usually referred to as 'primary' ones. They fall into 4 categories:

- competitive bidding schemes;
- feed in tariff schemes;
- green credits trading; and
- green pricing schemes.

All EU Member States generally have one of these mechanisms supplemented by a number of 'secondary' mechanisms.



## 5.22 Secondary Support Mechanisms

The distinction between primary and secondary mechanisms is based on the fact that secondary mechanisms would not in isolation encourage the development of renewable energy projects.

Direct Capital Grant Support is a commonly used means to support new industries in the pre-competitive phase. Denmark was the first European country to offer direct support for private investment in electricity generation from wind energy in 1979. The programme lasted for 10 years and initially offered 30% grant on total investment costs, reducing to 10% in later years. Germany took a similar approach whereas the Netherlands and the Republic of Ireland based grant support on an amount per kWh of installed capacity, similar to what was offered in the USA in the mid-1980s.

Financial and tax incentives are another secondary mechanism and take a number of forms. For example, in the Netherlands, there are 4 different mechanisms in this category:

- Green Funds which provide loans at lower than usual rates (about 1.5% on average) for 'green' or renewable energy projects;
- the VAMIL scheme which allows accelerated depreciation leading to quicker write-off on the equipment which is on the VAMIL list;
- the Regulatory Energy Tax (2.5 cents/kWh) which is payable by households and SME's on electricity and natural gas when consumption exceeds a threshold demand. The tax is paid to the utility which passes it on to the tax authorities. In the case of wind energy generated electricity, the utility pays the tax to the generator instead of the tax authorities; and
- the Energy Investment Relief scheme which allows investments in certain environmentally sustainable technologies to be offset against taxable profits at a rate varying from 40% to 52% of the total investment. In the Republic of Ireland, the Finance Act 1998, Section 62 allows a partial offset of corporate investment in renewable energy projects against profits.

Research, Development and Demonstration programmes have been the most common means of stimulating renewable energy projects in the EU. These initiatives, whether instigated under the various EU programmes such as ALTERNER, JOULE and THERMIE or under national programmes, have greatly assisted in the development of many renewable energy technologies and related expertise.

**Views are invited on whether the renewables industry in Northern Ireland would be stimulated by the secondary support mechanisms mentioned above or alternatives. Account should be taken of the fact that taxation is a reserved matter.**



### 5.23 UK and Northern Ireland Secondary Mechanisms

(1) On notice of the intended introduction of the Renewables Obligation in England, Wales and a similar one in Scotland, the Government announced a new, expanded programme for research, development and demonstration. The Department of Trade and Industry (DTI) R, D&D programme has revised priorities for the development of renewable energy technologies in terms of likely cost effectiveness in the home and export markets, the contribution to reducing greenhouse gases on differing timescales, and the scale and timing of any contribution. The priorities have been classified as follows:-

- NEAR TERM – that is, those technologies closest to being competitive in the UK, namely: wastes and some biomass residues, landfill gas, onshore wind, hydro and passive solar.
- MEDIUM TERM – (by 2010) that is, those which could contribute to the 10% target by 2010, namely: some biomass residues, offshore wind and energy crops;
- LONGER TERM – (after 2010) that is, those with longer term potential if pursued via the R, D&D programme, namely: fuel cells, photovoltaics, wave and photoconversion; and
- VERY LONG TERM – (after 2025) that is, those requiring fundamental research, namely: tidal barrage, hydrogas, geothermal hot rock and ocean thermal currents.

A number of technologies primarily for export markets were identified over the different terms.

A number of Northern Ireland companies and organisations have already received offers of financial assistance (in excess of £2.1 million) under the programme. A further 6 companies have made application for assistance in respect of 8 projects and these are currently being evaluated. Further calls for proposals will be made under the programme.

More information on the DTI R,D&D programme and the other support schemes is available from: The New and Renewable Enquiries Bureau, ETSU, Harwell, Didcot, Oxon, OX11 0QJ

Telephone Number: 01235 432450/433601 Fax Number: 01235 433066

or by e-mailing: [NRE.enquiry@aeat.co.uk](mailto:NRE.enquiry@aeat.co.uk)

Information is also available on the DTI 'Programmes' website at:

[www.dti.gov.uk/renewables/indes.html](http://www.dti.gov.uk/renewables/indes.html)

(2) As well as the DTI R,D&D Programme, a support programme for offshore windfarms in UK waters is in place. The Government is committed to pursuing the removal of non-technical barriers to renewable energy. Key areas for attention include embedded generation issues and green markets for renewables.



- (3) In the 2001 Budget, the Chancellor of the Exchequer announced the Green Technology Challenge. This offers 100% tax relief in the first year on capital investment on energy saving, environmentally friendly technologies. 'Good quality' combined heat and power plants (which could be fuelled by, for example, biomass) qualify for the tax relief.
- (4) In March 2001, the Prime Minister announced an additional £100 million to support the development of renewables in the UK. The allocation of these funds will be informed by a Performance and Innovation Unit (PIU) report on renewable energy. The PIU has made a fact finding visit to Northern Ireland.
- (5) The New Opportunities Fund, under a strand of the new 'Transforming Communities' programme will provide £50 million for renewable energy. At least £30 million will be committed to electricity generating capacity fuelled by energy crops. At least £10 million will be committed to offshore wind and at least £3 million to small scale biomass heat and combined heat and power projects.
- (6) In Northern Ireland, financial assistance was available for renewable energy projects up to the end of December 1999. Funded under ERDF, the Department of Enterprise, Trade and Investment's Energy Demonstration Scheme and the Energy Measure of the EU INTERREG 11 Programme provided financial assistance for a number of grid connected and non-grid connected renewable energy projects. If the necessary approvals are obtained from the European Commission, similar programmes could be introduced either later this year or early in 2002.

Information and advice on renewable energy is provided by the Renewable Energy Information Office under the auspices of the Western Regional Energy Agency and Network (WREAN) through funding from the Department of Enterprise, Trade and Investment WREAN's address is – 1 Nugents Entry, Off Townhall Street, Enniskillen BT 74 7DF. The telephone no is (028) 6632 8269; fax no is (028) 6632 9771 and the e-mail address is: [all@wrean.co.uk](mailto:all@wrean.co.uk)

#### 5.24 Views are sought on:

- (1) the accessibility of UK's R,D&D funds and their appropriateness as a means of addressing the specific characteristics and needs of the NI renewables industry; and**
- (2) the need and appropriateness for capital and or revenue grant support as a means of encouraging renewables.**

## Weighing up the Options – A Possible Way Forward





**6.1** It is clear that increasing the uptake of renewable energy has to be ‘a non-negotiable element of future energy use’ in Northern Ireland.

Equally, in order to ensure that any increase is in fact achievable, the existing renewable energy industry and those seeking to enter the industry, as well as financial institutions likely to be involved, must have confidence in there being a medium to long term market for electricity from renewable sources. Without this confidence, developers could find difficulty attracting the necessary capital investment to renewable energy projects. In many cases the capital investment required will be substantial although payback periods vary greatly between technologies and specific projects.

**The views of existing and potential renewable energy developers and financial institutions are invited on:**

- (1) the need for a clear statement by the Executive on the importance it attaches to an increased uptake of renewable energy; and**
- (2) the level of investor confidence needed to attract necessary investment and the means by which such confidence can be obtained.**

**6.2** Following on from the responses to this consultation exercise, it will be for the Minister for Enterprise, Trade and Investment and the Executive to decide on the amount of Northern Ireland’s contribution to the UK target of 10% of electricity from renewable sources by 2010. Also it will be necessary to decide whether the Northern Ireland contribution or target should be based on the amount of electricity consumed or on the amount of electricity available.

**6.3** Experience has shown that there is almost always quite a long lead in time before any renewable energy project is actually implemented. In all cases, there can be delays outside the control of the renewable energy developers. In some cases there is a further delay on account of the technology being deployed; with an energy crop such as short rotation coppice, for example, it is at least 3 years before harvesting can take place.

Because of lead in times and the step change needed to ensure development takes place at a rate which will achieve a 2010 target, it is necessary to spur on action as soon as possible to secure a substantial increase in renewable energy generated electricity by 2005. It seems reasonable to determine the size or amount of this increase by reference to the target originally set for 2005, (45MWs) less the amount being generated from renewable sources since the target was set (that is, the electricity generated under the NFFO 1 and NFFO 2 contracts, the electricity commissioned under the NIE ECO TARIFF arrangements and



the electricity from non grid connected projects). This would indicate a target of an additional 20MWs by 2005.

A renewed commitment to this target and the introduction of the support mechanism(s) necessary to bring about the achievement of the target would send a positive signal to renewable energy developers and other interested parties.

**Views are sought on the endorsement of a target of a further 20MWs of electricity from renewable sources by 2005.**

**6.4** When targets are set for 2005 and 2010, the next step will be to decide which primary support mechanism(s) should be deployed in future over what timescales. There are a number of important factors to consider in order to make such a decision:

- **In considering the objective of support mechanisms, is delivery of the targets more important than delivery of renewable energy generated electricity at the least possible cost?** If target delivery is deemed the main concern or focus, then a Renewable Energy Feed In Tariff (REFIT) would appear to provide the means to achieve this. This is on the basis that the higher price would create added interest and would perhaps assist less mature technologies gain a quicker foothold in the market. In the case of a mature technology like onshore wind, it would allow the use of less than optimum sites by making them economically viable. It could be contended that, against the background of the present price of electricity in Northern Ireland, target delivery might only at best be given equal weighting with delivery of renewable energy electricity at the least possible cost. Consequently a REFIT scheme would fall short of meeting the criteria for a key objective of an appropriate mechanism for Northern Ireland.
- **Is there a way in which a flexible mechanism can be developed in order to take best account of market developments and the regulatory framework?** These developments include those arising out of the single EU market for electricity and the proposed EU Directive for the Promotion of Renewable Energy which would require the eventual harmonisation of renewable energy support mechanisms and the introduction of a scheme to certify the origin of renewable energy.



## 6.5 Possible ways forward might be to:

- announce as soon as is practicably possible a scheme similar to NFFO as a 'one-off', to have 20MWs in place by 2005 and sponsor similar arrangements to meet targets beyond 2005. Projects would need to be commissioned by the end of 2005 and special provision might be made to encourage local community groups to bring forward renewable energy projects.
- investigate Green Certificates or Credits schemes with a view to having a suitable scheme introduced into Northern Ireland as soon as possible.

With regard to Green Certificates or Credits, it will be necessary to ensure that any scheme meets the requirements of what is proposed in the forthcoming EU Directive. It will also be necessary to ensure that it facilitates trading between Northern Ireland and the rest of the UK as well as the Republic of Ireland and that Northern Ireland is not in any way disadvantaged. The development of Renewables Obligation Certificates under the GB Renewables Obligation will need to be closely monitored and an assessment made of their effectiveness.

- implement a mirror of the GB obligation ensuring compatibility within the UK, or monitor and evaluate the operation of the GB Renewables Obligation over the period from its introduction to 2004/2005 and assess the support mechanisms in other EU Member States including the Republic of Ireland, with a view to deciding what represents the most suitable primary mechanism for Northern Ireland. In this scenario we would still need to declare targets for 2010 as soon as possible.

**Views are invited on the options detailed above in addition to any alternatives respondents may wish to offer.**

**6.6** Previous mechanisms used to stimulate renewables in Northern Ireland have ensured that additional costs associated with contracts have been passed on to the consumer. In framing forward plans, full regard must be given to the fact that consumers in Northern Ireland are already paying high prices for their electricity and that passing on the added costs of any new NFFO type scheme or other support mechanism to the consumer should only be considered a base of last resort.

**Respondents are invited to consider and wherever possible detail models which might meet the objective of stimulating the renewables industry to achieve targets without burdening consumers with increased electricity charges.**



**6.7** On receipt of views and comments to this consultation paper, detailed research will be carried out on the full cost implications of the support mechanism(s) which appear to be most favoured.

**6.8** Respondents are welcome to submit views and comments not only on issues raised in this paper but also on matters which they consider should be included.



## Appendix 1

### Summary of UK Non Fossil Fuel Obligation Orders

Orders	Contracted Projects		Projects Operational in mid 2000	
	<i>Number</i>	<i>Capacity MW</i>	<i>Number</i>	<i>Capacity MW</i>
<b>England &amp; Wales</b>				
NFFO 1 (1990)	75	152	61	145
NFFO 2 (1991)	122	472	82	174
NFFO 3 (1995)	141	627	73	251
NFFO 4 (1997)	195	843	51	113
NFFO 5 (1998)	261	1177	16	24
<b>Scotland</b>				
SRO 1 (1994)	30	76	13	22
SRO 2 (1997)	26	114	3	7
SRO 3 (1999)	53	145	-	-
<b>Northern Ireland</b>				
NI NFFO 1 (1994)	20	16	13	15
NI NFFO 2 (1996)	10	16	5	3
<b>TOTALS*</b>	<b>933</b>	<b>3639</b>	<b>317</b>	<b>762</b>

*\*(Totals may not add due to rounding)*

## Appendix 2

### Commissioned NFFO Schemes

**NFFO 1**                      **Declared Net Capacity kW**

#### *Hydro:*

Benburb	75
Blackwater	100
Carrickaness	155
Cullybackey	250
Park Mills	30
Randalstown	500
Sion Mills	780

#### *Wind:*

Corkey	2,142
Elliott's Hill	2,142
Rigged Hill	2,142
Bessey Bell	2,098
Owenreagh	2,054
Slieve Rushen	2,086

### NFFO II

#### *Hydro:*

Blackwater	75
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#### *Biomass:*

Londonderry	100
Benburb	204

#### *Wind:*

Lendrum's Bridge	2,141
Slievenahanaghan	408

**TOTAL**                      **17.6MWs**

### Non Grid – Connected Renewable Energy Projects

**kW**

#### **WIND**

Rathlin Island	100
Craigavon	12
Londonderry	2.5
Crumlin	2
Loughgiel	50
Larne	6
Newtownards	6
Warrenpoint (2)	5
Newcastle	6
Ballygawley (2)	6
Dungannon	6
Roslea	5
Omagh	2.5
Kircubbin	2.5
Dungannon	6
Ballymena (2)	5

#### **HYDRO**

Upperlands, Co Londonderry	110
Castlewellan	110
Dunadry (5)	119
Clady Mill	50
Annsborough	120
Gleno	5

#### **SOLAR**

Larne	0.6
Loughgiel	3.3
Newcastle	0.1
Ballymena	13

#### **ENERGY FROM WASTE**

Lisburn	30
Antrim	600

*The above list is not exhaustive.*



## Appendix 3

### Comparison of Northern Ireland's Electricity Prices with rest of United Kingdom and Other EU Member States

Domestic Electricity Prices in Pence/kWh inc VAT as at 1 January 2000 (Total kWh – 3300)		Industrial Electricity Prices in Pence/kWh inc non recoverable taxes as at 1 January 2000 (Annual Maximum Demand – 100kW: 60% load factor)	
Northern Ireland	9.45	Northern Ireland	6.03
Rest of UK		Rest of UK	
England and Wales		England and Wales	
<i>North</i>	7.67	<i>North</i>	5.29
<i>Central</i>	7.97	<i>Central</i>	4.80
<i>South</i>	7.23	<i>South</i>	4.89
Scotland	8.03	Scotland	4.86
Republic of Ireland		Republic of Ireland	4.14
<i>Urban</i>	6.98		
<i>Rural</i>	7.33		
Rest of Europe		Rest of Europe	
Austria	8.78	Austria	6.92
Belgium	10.55	Belgium	4.46
Denmark	12.21	Denmark	3.59
Finland	5.47	Finland	2.76
France	8.79	France	3.65
Germany		Germany	
<i>North</i>	10.76	<i>North</i>	7.09
<i>West</i>	9.01	<i>West</i>	4.37
<i>South</i>	8.48	<i>South</i>	4.60
Greece	4.72	Greece	3.25
Italy	9.81	Italy	5.67
Luxemburg	8.20	Luxembourg	4.05
Netherlands	9.32	Netherlands	4.25
Norway	5.84	Norway	3.38
Portugal	8.39	Portugal	3.70
Spain	8.02	Spain	3.76
Sweden	no data	Sweden	no data

*Source: Electricity Association – International Electricity Prices – Issue 27*

*Source: International Electricity Prices – Issue 27 [NB: prices are also given for 20%, 40% and 80% load factors and where the annual maximum demand is 500kWh]*

## Appendix 4

### (1) Second Tier Electricity Supply Licence Holders in Northern Ireland

Eastern Group plc  
Ipswich  
Suffolk

Powergen UK plc  
Coventry

Nigen Supply Ltd  
Carrickfergus

Electricity Supply Board  
Dublin 2

Premier Power Ltd  
Larne

Viridian Energy Supply Ltd (Energia)  
Belfast

E Power Ltd  
Dublin 8

Eirtricity Holdings Ltd  
Dublin 18

Northern Electricity & Gas Ltd  
Newcastle upon Tyne

Scottish Power Energy Retail Ltd  
Glasgow

Npower Ltd  
Worcester

Scottish & Southern Electricity Ltd  
Perth

### (2) Second Tier Licence Holders supplying electricity at October 2001

Only six licence holders were supplying electricity at October 2001, with two of these understood to account for significant proportions of the customer base.





## Appendix 5

### Glossary of Terms

<b>GW</b>	gigawatt	1,000,000,000 Watts
<b>GWh</b>	gigawatt-hours	1,000,000 kilowatt-hours
<b>GWh/y</b>	gigawatt-hours per year	number of gigawatt-hours generated each year
<b>kW</b>	kilowatt	1000 Watts (approx 1.3 horsepower)
<b>kWh/y</b>	kilowatt-hours per year	number of kilowatt hours generated or used each year
<b>MW</b>	megawatt	1,000,000 Watts
<b>MWh</b>	megawatt hours	1000 kilowatt-hours
<b>Biomass</b>	Any organic material such as wood, straw, poultry litter etc.	
<b>CHP</b>	Combined Heat and Power - a plant that generates both heat and electricity	
<b>DCN</b>	Declared Net Capacity - the power capacity that takes into account the intermittent nature of some technologies such as wind and hydro.	
<b>Energy Crops</b>	Plants grown specifically for use as a fuel e.g. willow coppice.	
<b>Hydro Power</b>	Turbines powered by water to drive generators to produce electricity.	
<b>Landfill Gas</b>	Methane-rich gas produced by anaerobic digestion of waste in landfill sites and combusted to produce energy.	
<b>MSW</b>	Municipal solid waste - waste products collected from households.	
<b>SME</b>	Small and Medium sized Enterprises.	
<b>Solar Energy</b>	Solar radiation is the ultimate source of energy for most renewable energy sources. The term "solar energy" is usually taken to refer to those sources that derive directly from the sun's light and heat.	
<b>Wind Power</b>	With a wind turbine, wind flows over the blades creating a turning force on the rotor assembly which can be used to generate electricity.	