Energy Green Paper Submission

To

Department of Communications Marine and Natural Resources

From

Dalkia Limited

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1 Introduction

This submission has been prepared by Dalkia in response to the green paper published by the Department of Communication Marine and Natural Resources on the 1st October 2006: "Towards a Sustainable Energy Future for Ireland".

Dalkia is an Energy Services Company (ESCO) operating in Ireland with a staff of some 440, and is part of the Veolia Environment group. Dalkia is, by turnover, the largest energy services company in Europe with a total of 47,000 employees and a turnover of €6.1bn. Veolia Environment also operates in the fields of water management, transportation and waste management and employs some 300,000 people worldwide. In addition to Dalkia's response to the green paper, we have also included comments from our sister organisations relating to energy usage in the transport and water sectors.

2 Background

Arguably two of the greatest challenges facing mankind today are the how we can alter the course of climate change, and how future generations will meet their energy demands considering the eventual decline of fossil fuels. The green paper attempts to addresses both of these challenges, and recognises that the solutions to these challenges are interdependent. Since the time of the industrial age, the production and consumption of energy has been a major contributor to past and future greenhouse gas production.

The last 100 years has seen a global temperature increases of some 0.7°C, however future predictions for climate changes are more severe. If current trends continue, by the end of the century global temperatures could rise on average by 5.8°C[1], while sea levels could rise by as much as 0.4m with devastating consequences for future generations. Individually, as organisations, as nations and as a global community we have an obligation to ensure that the prosperity and welfare of future generations can be assured through the actions we take today, particularly in relation to the way we produce and use energy. This points to a need to view all aspects of energy in terms of sustainability, one of three pillars of energy policy considered in the green paper.

At the same time, some debate exists as to the potential timing of global peak oil production. While the timing of this event is unsure, its occurrence is assured, and with it is likely to come an end to an era of cheap and plentiful supply of energy. While in the past the abundant and cheap energy supply has been the bedrock of economic growth, its anticipated decline introduces concerns over competitiveness - the second pillar of energy policy considered in the green paper.

[1] UN International Panel on Climate Change

The challenges facing Ireland in terms of climate change are not unique, in that our contribution to global warming cannot be considered in isolation. However as an island nation and with limited conventional energy sources of its own, Ireland is particularly exposed to any interruptions or restrictions in energy supplies. Currently Ireland is the seventh most oil dependant nation on earth, with over 60% of its primary energy currently supplied from oil, which underlines the nation's vulnerability. This highlights the need for Ireland to reduce its dependence on oil, and to address our vulnerability in terms of security of supply – the third and last pillar of energy policy considered in the green paper.

3 Challenges

In Dalkia's viewpoint, the main challenges to be addressed in the formulation of an Irish sustainable energy policy are:

Category	**Challenge**	
Energy Supply	(a)	Efficiency of the energy conversion and distribution process – *How to "produce" more energy at the point of use, from less input energy?*
	(b)	Increasing the amount of energy delivered from renewable energy sources – *How to decrease our reliance on fossil fuels and increase renewable penetration?*
Energy Consumption	(c)	Efficiency in energy consumption – *How to alter the way we use energy so that demand is reduced?*
	(d)	Reduction or elimination of energy consumption – *How to alter or manipulate our environment so that energy consumption is no longer necessary or desired?*

All of the proposals put forward by Dalkia will attempt to address one or more of the above challenges.

4 Dalkia Perspective on the Green Paper

Dalkia broadly welcomes the proposals put forward by the Department in the green paper as a cohesive and integrated long-term policy framework tool. As an ESCO, Dalkia has expertise in certain areas, which naturally influences our response to the green paper, and as an energy practitioner we have identified potential improvements in energy policy and implementation. Our response to the green paper has focused on

these areas. Dalkia also recognises that the most appropriate response to energy challenges lies in a multi faceted, multi dimensional approach, therefore any Dalkia proposals should be considered in a wider context of solutions proposed by other stakeholders.

Dalkia ESCO areas of expertise are as follows:

- Conversion of primary energy into useful heat
- Conversion of primary energy into heat and electricity, or heat, electricity and cooling (Combined Heat and Power/co-generation or tri-generation)
- Operation and Maintenance of utilities as consumers of energy (boilers, chillers, compressors etc.)
- Operation and maintenance of biomass boilers (over 60 such boilers)
- Operation and maintenance of district heating and cooling systems (over 650 currently under operation)
- Guaranteed commitment on energy consumption
- As investors in energy facilities (under design, build, finance, operate and maintain contracts)
- Installation and maintenance of lighting systems under the Parkersell brand name

5 Dalkia Green Paper Proposals

5.1 Uptake of Combined Heat and Power Plants

The benefits of Combined Heat and Power (CHP) are well understood, namely that they can produce heat and electricity more efficiently than centralised electricity production (distributed through a grid with accompanying losses) and localised heat production. Typically, CHP's can achieve 25% energy saving[2] compared to Centralised CCGT electrical generation and separate production of heat.

CHP uptake in Ireland over the last 5 years is widely acknowledged as a failure, although there was the doubling of installed CHP in 2006 from 145MW to 295MW, through the commissioning of a CHP at Aughinish Alumina. This change reflected on specific CER intervention in the electricity market, and was not specifically targeted at CHP development. Ireland continues to be ranked among the lowest in the EU in terms of CHP uptake, and lags well below the current EU average of 10% of installed electrical capacity.

Dalkia does not believe that the CHP capital grant support scheme introduced in 2006 will address this market failure in any significant manner, which we believe is related to long-term investment uncertainty. Dalkia proposes the following actions to promote and accelerate the uptake of CHP in Ireland.

[2] CHP Policy Group Report, Options for a National Policy to 2010

5.1.1 CHP Targets

The targets proposed in the green paper, namely growth to 400MW by 2010, while welcome, are not considered by Dalkia to be ambitious or sufficiently effective. Dalkia propose that a ***target of 900MW of installed CHP capacity by 2010*** be established (additional 500MW). This target equates to 18% of installed electrical capacity and corresponds with EU wide targets in the corresponding periods.

The advantages of an ambitious CHP growth target in the context of Ireland are:

- It addresses the generation shortfall anticipated by 2009
- Reduces the required electricity infrastructure investment, including potentially the proposed east-west electrical interconnector
- Increases the efficient use of primary energy

The sectors within which Dalkia have identified CHP growth potential are industry, hospitals, commercial/retail and district heating.

5.1.2 CHP Electricity Power Purchase Agreements

Dalkia considers that the market uncertainty surrounding the spark spread (difference between the cost of electricity and gas) is the single biggest detractor to potential CHP investors since it makes them incapable of taking a long-term perspective on potential CHP investments.

The suggestion from the CHP Policy Group to provide a subvention as a means of stimulation for CHP investment does not protect the profitability of a CHP project from adverse fluctuations in the spark spread. Ireland needs to provide a stable market outlook for potential CHP investors to allow them to view the economic benefit for the full lifecycle of a project. This can be achieved by introducing an energy policy that offers CHP investors purchase contracts that include a variable pricing component designed to isolate the profitability of the investment from deviations in the spark spread. This approach led to a rapid uptake of CHP (1000 MW/year) in France between 1997 and 2000. By offering an additional incentive within the policy that was based on efficiency targets, the French government also ensured that CHP plants were sized and operated optimally. Should such a policy be implemented in Ireland another benefit would be the clarification of the roles for each of the key market players in promoting the development of CHP in Ireland.

In the green paper, the Government committed itself to addressing current barriers to the deployment of CHP in Ireland. By implementing the above policy, the Government would be sending a clear message of its intention to follow through on this commitment.

This issue is not a new one and solutions have been previously implemented with good effect. The Irish approach could be based on the French experience in response to the same problem. In 1997, France introduced a policy giving CHP developers the opportunity to sign a 12-year contract with EDF (French power generator) whereby the latter were obliged to purchase CHP electricity at a premium rate. The rate was structured such that any variation in the spark spread was absorbed by a variable cost component that was based on the ratio of the current gas price to a reference gas price. This effectively fixed the profit margin of the CHP investment and passed on the financial risk to the market under a PSO levy. At the same time, since the reference prices are benchmarked against efficient CCGT electrical generation (accounting for transmission losses), value for money for the end user is assured. The rate also addressed the issue of heat dumping from CHP installations by offering a subvention that was payable in cent per kWh of CHP electricity produced at high efficiencies. This made CHP facilities more profitable if they were sized based on the heat demand of the site as opposed to its electricity demand thereby maximising the overall efficiency of the plant. In the three years that followed, over 3000 MWe of CHP plant was developed in France.

This approach offers the Irish government the opportunity to promote CHP by providing a stable market outlook for potential CHP investors. Not only does it ensure CHP profitability, the policy also clarifies the role of each of the key market players in developing CHP uptake in Ireland:

- The government must first of all set the standard agreement with the CER
- With the policy in place, ESCO organisations can safely invest in CHP schemes and sell electricity to the ESB under the terms laid out in the agreement
- The CER would have the responsibility of ensuring that the CHP plants are being operated (in terms of both utilisation and efficiency) within the requirements of qualification for the additional subvention
- The ESB would finance the agreement before recovering any costs incurred through a public service obligation levy controlled by the CER

5.1.3 CHP Community Electricity Supply

The basis of CHP operation is that both heat and electricity are generated on a distributed basis i.e. localised generation. In CHP applications where there is more than one energy off-taker (e.g. multi-user commercial or residential development), the sale of heat to those multiple users is possible. However, under current legislation, due to the need to provide choice of electricity supplier, CHP electricity cannot be sold directly to those multiple users without the establishment of a supply company, which is usually economically unjustifiable.

While Dalkia fully support the concept of protecting consumers interests, the above restriction is preventing the maximisation of CHP applications, and due to the lost efficiency opportunity, is resulting in increased but avoidable costs to the end user. Dalkia proposes that this restriction be removed, and that such systems are subject to CER review to ensure that sufficient cost savings are indeed being passed on to consumers.

5.2 Heating of Buildings

Considering that 46% of all secondary energy in Ireland is consumed through the construction and operation & maintenance of buildings[3], Dalkia is of the opinion that insufficient focus on this, the single largest sector of energy consumption, has been given in the green paper.

The ongoing heating of buildings provides substantial opportunities to address heat production efficiencies, heat consumption efficiencies and increasing the renewable content.

5.2.1 Nationwide Implementation of "Fingal Initiative"

Over the past decade there has been an unprecedented boom in the construction of houses in Ireland. One third of the housing stock is now less that 10 years old and we are adding to our housing stock at twice the rate of increase at the population annually[4]. In 2005 alone, over 5% was added to the housing stock, the highest rate of residential building in the in EU. This construction boom gives Ireland an unprecedented opportunity to improve the energy efficiency of the housing stock.

[3] Irish Academy of Engineering, Future Energy Policy in Ireland, March 2006
[4] www.cif.ie

The construction industry is driven by commercial interests and the objective to maximise profit. Because of the discontinuity between construction profit maximisation, and ongoing energy costs, there is no incentive on the developer/constructor to reduce energy and address sustainability requirements, which require additional capital costs. Dalkia believes that this continuity can only be addressed through policy intervention and the setting of minimum standards.

Such a policy has already been adapted in certain local area plans of Fingal County Council and is currently being considered by Dun Laoghaire County Council. The two key mandatory requirements within these area plans are:

- Achievement of 60% energy reduction from current building regulations base case
- 30% of energy from renewable energy sources

Dalkia propose that the above ***Fingal mandatory planning requirements be immediately applied to all new housing developments***. An example of how a local policy requirement such as the one above has been rolled out on a national basis can be seen in the recent successful introduction of solar heating panels as a mandatory requirement in all new Spanish buildings. This policy was initially introduced in the Barcelona urban area and subsequently adopted nationally.

Through the introduction of the above requirement, Dalkia estimate that the total energy savings would amount to over 6TWh per annum.

5.2.2 Biomass District Heating Systems

The concept of a District Heating System (DHS) is a simple one – the centralised production of heat, and the distribution of that heat through a network of insulated piping, usually underground. In Ireland the most notable application of DHS was in Ballymun tower blocks. Widely considered as a failure, this Ballymun DHS was poorly managed and poorly operated. A more recent DHS scheme at Dublin Civic Offices, fed from a gas fired CHP has achieve a more successful operation, otherwise there has been no other significant uptake of DHS in Ireland.

While DHS uptake in Ireland has been very poor, it is widely used on the European continent. In a European context, over 3% of total heat sales (400TWh) are delivered through DHS networks to a total of 100 million end users.

In a study commissioned by SEI in 2002[5], it's authors evaluated the potential of the market for DHS in Ireland. In the opinion of Dalkia, this report contained three fundamental flaws. Firstly, it assumed that DHS without a CHP is "not normally cost effective". This is not the case, and through analysis of multiple projects, Dalkia have evaluated that the optimum DHS solution is usually in combination with biomass, or in some cases with CHP if the requirement suggested in 5.1.3 is implemented.

Secondly the report indicates that the economic potential of CHP fed DHS is 50MWe, with a market potential of zero. Dalkia has evaluated and undertaken feasibility studies for projects substantially in excess of the quoted economic potential, hence we consider that the real market potential has been grossly underestimated.

Thirdly, the report states that the lack of market potential is caused by the mild Irish climate and quotes this as a factor for successes in the more northerly Nordic countries. In the case of Dalkia, we are operating over 400 DHS plants in France, many of which have a lower heating requirement than that in Ireland.

Dalkia believe that a realistic target for the department to set is ***300MWth of heating delivered through biomass DHS by 2010***.

5.3 Capital Allowances for District Heating Systems

DHS projects as described in section 5.2.2 above are highly capital intensive. In many cases these projects are justifiably economic on their own merits. However there is opportunity for the DCMNR, in conjunction with the department of Finance to significantly increase the scope of DHS projects through the introduction of a capital allowance scheme.

A scheme were investors can invest in a project with a guaranteed return has been very successful in developing some key sectors such as rural housing and hotels in Ireland. A similar scheme whereby investors put in the initial amount of money and a loan is taken to fund the scheme could be introduced. The scheme would provide a rent to the investors, which would cover the cost of the investment. The investment would be bought back by the scheme developer at a cost of approximately 50% of the initial cost. The investors would receive a tax break at the higher rate of tax on all income ideally.

5.4 Tradable Energy Savings Certificates

Dalkia welcomes the green paper target to deliver cumulative improvements in energy efficiency of 20% by 2020. The introduction of energy awareness and

[5] Assessment of the Barriers and Opportunities facing the Deployment of District Heating in Ireland

energy efficiency campaigns, and the implementation of various SEI schemes such as the greener homes scheme to promote efficiency are very welcome, however Dalkia believes that such measures alone will not deliver the required energy efficiency targets. A significant market / policy intervention is required to deliver such a target.

As a mechanism to drive substantial energy efficiency targets Dalkia propose the introduction of ***tradable energy savings certificates*** (ESC). An ESC system places a binding energy saving obligation on a specific market party to deliver defined targets. Through the delivery of those energy saving targets, parties earn certificates, which are required to demonstrate compliance with their obligation. Parties with a surplus of certificates can trade them on an open market basis to parties with a shortage, otherwise a penalty will apply for failure to achieve the required number of ESC's.

5.4.1 Existing International ESC Systems

Details of existing energy savings certificate systems currently under operation:

Country	**Operational Date**	**Description**
United Kingdom	2002 - 2005	62TWh savings through electricity and gas companies with > 15,000 customers
United Kingdom	2006 - 2008	Savings targets more than doubled to 130TWh through electricity and gas companies with > 50,000 customers
Italy	2005 – 2009	Obligations on electricity and gas distributors to implement 45.5TWh savings through tradable energy saving certificates issued to distributors and ESCOs. Cost recovery mechanism via electricity and gas tariffs.
France	2006 – 2009	"C2E" scheme – 54TWh reduction obligation on electricity, gas, domestic fuel, cooling and heating. Eligible sectors are residential, tertiary and industry and can be implemented by obliged

		parties and local authorities
Australia (NSW)	2003	Greenhouse Abatement Certificates – CO2 reduction used, rather than energy efficiency

5.4.2 Proposed ESC System for Ireland

A potential ESC system for Ireland could look like the following:

1. Energy saving obligation to lie with gas and electricity suppliers.
2. Percentage target energy saving to be set by DCMNR. Dalkia suggests that a target reduction of 4% cumulative savings over 3 years be set
3. Energy savings can be delivered by ESCO's or other third parties and traded with energy suppliers, through long term guaranteed savings agreements with end users
4. CER to validate the implementation of the savings
5. Surplus or shortfall of savings can be carried forward within the 3 year period
6. The value of the ESC will be capped by the level of penalty to be applied (e.g. €40/MWh)
7. Cost recovery for successful implementation of energy savings shall be made through a Public Service Obligation (PSO levy). Penalty revenues shall be fed directly in to the ESC system to reduce the PSO burden.

5.5 Biomass Combined Heat and Power

The green paper recognises the contribution of wind energy as a mature technology, and one which can currently deliver the greatest impact on meeting the target of 15% renewable electricity by 2010, and 30% by 2020. The green paper also recognises that this implies a flexible and diversified electricity portfolio, reflecting the variability of wind availability.

Biomass CHP has the potential to address this portfolio diversification, and also has the advantage of being a mature technology. The benefit of CHP (as outlined in Section 5.1 above) addresses the green paper efficiency objectives, while biomass CHP addresses of both sustainability and efficiency objectives.

The Renewable Electricity Feed in Tariff (REFIT) scheme introduced in May 2006 was designed to support, in addition to other renewable electricity production, biomass CHP. The introduction of a 15 year Power Purchase

Agreement (PPA) under the REFIT scheme as a mechanism to address the biomass CHP investment uncertainty must be commended, however a tariff rate of 7.2c/kWh is considered too low to impact on investors decision making.

In France, a similar scheme to the Irish REFIT scheme was introduced in 2006. Under a 15 year PPA for biomass CHP, the objective of this policy is to add a cumulative of 300Mwe of biomass CHP by 2009. Under this scheme, the feed-in tariff electricity rate has been set at 11c/kWh. It is also noteworthy that both industrial and residential tariffs in France are considerably lower than that in Ireland. Dalkia recommends revising the ***biomass CHP feed in tariff rate to >10ckWh*** in order to stimulate investment in this area. Dalkia also recommends that the department adopt a ***biomass CHP target of 50MWe by 2009***.

5.6 Post-Occupancy Research & Development

The green paper highlights the critical role that Research and Development (R&D) plays in establishing and implementing sustainable energy policies for Ireland. While the green paper highlights technological breakthroughs as the main focus of R&D in Ireland, Dalkia's view is that ***research on energy consumption and behaviour patterns*** would deliver more immediate benefits, especially in the area of post-occupancy consumption.

The current deficit in quality information and research into verifiable consumption patterns of apartments, residential housing, commercial buildings and retail areas in an Irish context is currently very weak. The lack of this information comes partly from that fact that many of the organisations involved in the design and construction of buildings (e.g. designers, architects and consultants) hand over a finished product to investors / occupiers, and they have little or no involvement in the performance of the buildings post occupancy. Very seldom do such designers or consultants monitor the performance of their designs in real life so that the results can be fed back into to the improvement of the design process. For organisations such as ESCO's who are intimately involved in post occupancy operation, maintenance and energy consumption, such issues are highly relevant.

5.7 Lighting Efficiency

An estimated 20% of global electrical energy production today is used for lighting[6]. As a specific electricity appliance consumer, lighting offers enormous efficiency savings potential. While in the future high efficiency Light Emitting Diode (LED) technology has the potential to save 30% of today's consumption for general lighting by 2015, a substantial savings potential exists with existing technologies such as Compact Fluorescent

[6] European Commission Action Plan for Energy Efficiency, 2006

Lighting (CFL). Dalkia recommends that consideration be given to the ***phasing out of the sale of low efficiency lighting*** where other higher efficiency alternatives exist. This phasing could be achieved over a 5 year period.

5.8 Delivery of Consumer Efficiency Targets

The EU action plan for energy efficiency[7] identifies that the "largest cost-effective savings potential" lies in the households and commercial buildings sectors, where the savings potential is estimated to be around 27% and 30% respectively.

Of these two sectors, households are the most difficult to influence through policy, and governments have traditionally relied on energy awareness and information campaigns such as the power of one campaign currently being run by the department. At the same time, another government objective highlighted in the green paper is how to address fuel poverty for sectors of Irish society who earn moderate to low income levels. To address both of these objectives, Dalkia recommends a 3-step approach as follows:

1. Immediate implementation of ***improved building efficiency standards*** – see section 5.2.1 – nationwide implementation of Fingal initiative.

2. Subsequent implementation of a ***household energy carbon tax***. The objective of the carbon tax is to discourage the use of CO_2 intensive energy (e.g. coal, which would have a high level of taxation), and encourage the use of low carbon energy sources (e.g. natural gas, which would have a lower level of taxation, or biomass which would have no taxation). Dalkia propose that the funds from the carbon taxation be specifically re-invested in household efficiency initiatives (e.g. capital allowances for residential DHS schemes – see section 5.3, or residential CHP project capital grants)

3. Finally, the introduction of a ***household CO2 quota policy***. In the proposed scheme, a household quota would be calculated by multiplying the number of occupants by the per-capita household CO_2 estimate. An obligation would be placed on major retailers of primary household energy (electricity, gas, oil, LPG etc.) to identify all energy sales against individual households, which would be monitored by the system administrator (e.g. CER). If a household exceeds its quota, then an additional energy tariff is applied. At the end of the reconciliation period (e.g. yearly), if a household has emitted less CO_2 than its quota, the tariffs collected from other users are proportionality distributed to the low carbon intensity consumers, thereby rewarding and lowering their energy costs and thus alleviating fuel poverty.

[7] White Paper: Realising the Potential, 19/10/2006

6 Veolia Environment Responses to Green Paper

6.1 Public Transport

Veolia Transport considers that there are two dimensions behind energy in Public Transport. The first one is the public transport energy requirement, the second one is the savings provided by public transport compare to individual transport.

Looking at the first issue, public transport requires either fuel or electricity to operate. On the fuel side, biodiesel is a key sustainability driver and its production and/or import and distribution should be facilitated through a favourable tax regime. On the electricity side, consider a system like LUAS. Its electricity demand during the day is quite flat (still with a morning and afternoon peak) but increases significantly at winter time due to the heating of vehicles. LUAS is an integral part of the city and passes hospitals, stations, residential buildings etc., all of which require space heating. Combined Heat and Power with electricity production could advantageously replace some of the 13 sub-stations currently supplying LUAS and at the same time efficiently provide heat to the buildings along its route.

The second dimension is to try to convince people to leave their car at home and use public transport. LUAS is a good example, whereby if you provide the infrastructure and a customer focused service, people will buy into it. LUAS extensions and Metro are on their way and should play a major part in developing public transport in Dublin. Buses have also a key role to play. The introduction of a regulator should allow both integration of modes of transport and customer focused services through competition and set quality of service criteria. An efficient, fully integrated and customer orientated Public Transport system should significantly contribute toe energy conservation and carbon emission reduction.

6.2 Water Industry

Wastewater and sludge treatment requires power and heat but can also generate fuels (biogas, sludge). Many technologies (Digestion, CHP, etc) exist to meet part of the energy demand for the treatment using the treatment outputs and/or optimising the energy requirements. However they are capital intensive and still require a connection to the grid to meet the peak and also to replace the on site generation in case of breakdown because one main dimension of the water/wastewater industry is continuity of service. Without a defined grant scheme, these technologies are not competitive, except for some very large-scale projects, which are quite rare.

Veolia Water proposes that consideration be given to specific targeting of grants for energy recovery and energy efficiency technologies for the water industry.

7 Queries on this Submission

Dalkia would be delighted to discuss any aspect of this submission with the department. Queries on this submission should be forwarded to:

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