To whom it may concern,

I would be grateful if you will please provide me with the following information under the Freedom of Information Acts:

A copy of the department’s risk register for 2015

A copy of all internal audits carried out by or for the department since 1 June 2015

All correspondence between the Department and the ESB and any internal briefing material or reports generated by or for the department since 1 January 2015 in relation to the potential future uses of the Moneypoint power plant.

Regards,

Disclaimer: The information in this e-mail is confidential and may be legally privileged. It is intended solely for the addressee. Access to this e-mail by anyone else is unauthorised. If you are not the intended recipient, any disclosure, copying, distribution, or any action taken or omitted to be taken in reliance on it, is prohibited and may be unlawful. Please note that emails to, from and within " may be subject to the Freedom of Information Act 1997 and may be liable to disclosure. Tá an t-eolas sa riomhphost seo faoi rún agus d'hféadfadh sé a bheith faoi phribhléid chlíthiúil. Is ar an seoláid amháin atá sé dírithe. Nil cead ag aon duine eile rochtáin a fháil ar an riomhphost seo. Mura tá an fáighteoir beartaith, tá cosc ar aon ndóigh, cóipéail, dáileadh, nó aon gníomh a dhéanamh nó a fhágáil ar lár i dtaca leis an riomhphost agus d'hféadfadh sín a bheith midhleathach. Tabhair ar aird le do thoil, d'hféadfadh riomhphost chuig, ó agus laistigh de an bheith faoi réir an Achte um Shaoráil Faisnéise 1997, agus d'hféadfadh go ndéanfaí é a nochtadh.
14 December 2015

Re: FOI/2015/128c

Dear,

I refer to the request which you made under the Freedom of Information Act 2014 for records held by the Department of Communications, Energy and Natural Resources:

"All correspondence between the Department and the ESB and any internal briefing material or reports generated by or for the department since 1 January 2015 in relation to the potential future uses of the Moneypoint power plant."

I, Enda Gallagher, Assistant Principal, have now made a final decision to part grant your request on 14th December 2015.

The purpose of this letter is to explain that decision. This explanation has the following parts:

1. a schedule of all of the records covered by your request;
2. an explanation of the relevant findings concerning the records to which access is denied, and
3. a statement of how you can appeal this decision should you wish to do so.

This letter addresses each of these three parts in turn.

1. Schedule of records

A schedule is enclosed with this letter, it shows the documents that this body considers relevant to your request. It describes each document and refers to the sections of the FOI Act which apply to prevent release, where release has been denied. The schedule also refers you to sections of the detailed explanation given under heading 2 below, which
are relevant to the document in question. It also gives you a summary and overview of the decision as a whole.

2. Findings, particulars and reasons for decisions to deny access

The sections of the Act which can apply to deny access to documents are known as its exemption provisions.

The records, as indicated, in the attached schedule that are being withheld come under section 29 (1) of the Act which relates to the deliberative processes of a public body.

Also relevant is section 15 (1) of the Act where the information is already in the public domain.

3. Rights of appeal

In the event that you are unhappy with this decision you may appeal this it. In the event that you need to make such an appeal, you can do so by writing to the Freedom of Information Unit DCENR, Elm House, Cavan or by e-mail to FOL.UNIT@dcenr.gov.ie. You should make your appeal within 4 weeks from the date of this notification, where a day is defined as a working day excluding, the weekend and public holidays. However, the making of a late appeal may be permitted in appropriate circumstances. The appeal will involve a complete reconsideration of the matter by a more senior member of the staff of this body.

Should you have any questions or concerns regarding the above, please contact me by telephone on 01 678 2941.

Yours sincerely,

[Signature]

Enda Gallagher
Assistant Principal
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Future of Moneypoint: 2015 material
Final Aggregation of Material released

1. Brief for Joint Oireachtas Committee on Transport and Communications

Moneypoint Power Station

27 March 2015

Grant in full

Coal is currently abundant and internationally traded and provides energy at a cost that has remained relatively low over the past number of years. Coal plants can provide significant onshore energy storage, fuel diversity and energy security benefits. However, electricity generation from coal has a relatively high carbon intensity and associated impact on Ireland’s GHG emissions targets.

ESB’s Moneypoint power station in County Clare is Ireland’s only coal fired power station and has provided reliable baseload electricity for Ireland for the past 30 years. It has contributed significantly towards the national energy goals of maintaining fuel diversity, competitive wholesale electricity prices and security of supply. Its total output of 915 MW supplied about 17% of electricity demand in 2013. The plant typically holds 6 weeks of coal supply, which enhances our energy security. Moreover, a recent study has shown that during the period from 2008 to 2014, generation from coal has reduced the wholesale cost of electricity for the Irish consumer by, on average, €260m per annum.

Moneypoint is the youngest operational coal plant in these islands and has invested in the latest emissions abatement technology ensuring compliance with the Industrial Emissions Directive along with NOX and SOX emission limits. The plant can foreseeably continue to support the Irish electricity system out to 2030 and perhaps beyond, as the country transitions to a low carbon electric future.
Active consideration has been given by ESB to conversion of part or all of Moneypoint to biomass. Such a conversion is considered to be technically feasible and would deliver significant reductions in carbon intensity. However it would be very costly and have knock-on impacts in terms of future subsidy, renewables policy (RES-E & RES-H), security of supply (level of biomass required) and land use requirements.

Firstly, generation from biomass is not currently cost competitive and full conversion would result in additional costs of the order of the current PSO to the Irish consumer. There are strong arguments that in order to decarbonise at least cost, the optimum initial utilisation of biomass is in the provision of industrial heat and co-firing in existing peat stations. Moreover, reductions in fuel stocks together with a less robust fuel supply chain would somewhat reduce the energy storage and system security benefits.

The optimal future low carbon technical solution for Moneypoint over the long term is not yet clear and is ultimately a commercial decision for ESB but it is being considered by DCENR in the development of the Energy Policy Framework. If any policy decision was to be taken to replace Moneypoint's power generation it would have to be done in a timely manner to allow time for replacement planning and delivery.
2. Q & A on Moneypoint

Grant in full

Why is Moneypoint important?

Moneypoint is Ireland’s only coal-fired power station

Unless repowered, it is due to come to the end of its operating life by 2025.

A decision on what to replace it with will have to be taken and implemented within the time period of this White Paper.

What are the options for repowering Moneypoint?

1. Replace it with a new coal station, incorporating carbon capture and sequestration
2. Replace it with a gas-fired station
3. Incorporate full or partial biomass firing
4. Replace it with a nuclear station.

Not having generation on the site is not sensible; the grid system is configured around there being generation at the site.

Which is the best option?

The answer depends on which of cost-competitiveness, environmental sustainability or security of supply is most valued.

A detailed examination of the options will be proposed in the White Paper.

CTA – May 2015
What is the position on converting Moneypoint to biomass?

A. The choice of technology is ultimately a commercial decision for individual project developers and the fuel used in the plant at Moneypoint is a matter for the operator and I have no role or function in this regard. Notwithstanding this, I am advised that there are a number of important issues that would demand further consideration before biomass could be used at Moneypoint. These include the following:

- the conversion of Moneypoint to biomass would require significant levels of capital investment by the operator;
- support tariffs substantially higher than those available for wind, which has been the most cost effective renewable technology in the Irish electricity market, would also be required which could lead to increased electricity prices;
- substantially more biomass than is available domestically would be required with large amounts of the resource having to be imported leading to questions in relation to sustainability and security of supply;
- the commitment of substantial amounts of biomass to Moneypoint would divert scarce biomass away from the renewable heat sector, where biomass can be used more efficiently and where fewer alternative technologies exist.

Q. What are you going to do about Moneypoint?

Obviously the future of Moneypoint is very important. The small number of responses we received in the consultation by and large envisaged a continuing role for Moneypoint. Given its importance to electricity generation, further study is still needed to tease out the issues in relation to the type of plant and or fuels would be most desirable. Any decision on Moneypoint will have to take into account the implications for fuel mix, emissions and energy security.

I should add however, that people should not take the lack of an announcement as any lack of intent or willingness to make a decision. It's just we need to have more information.
Q. Why is Moneypoint important?
Moneypoint is Ireland’s only coal-fired power station
Unless repowered, it is due to come to the end of its operating life by 2025.
A decision on what to replace it with will have to be taken and implemented within
the time period of this White Paper.

Q. What are the options for repowering Moneypoint?
- Replace it with a new coal station, incorporating carbon capture and
  sequestration;
- Replace it with a gas-fired station;
- Incorporate full or partial biomass firing;
- Replace it with a nuclear station;

Not having generation on the site is not sensible; the grid system is configured
around there being generation at the site.

Q. Which is the best option?
The answer depends on which of cost-competitiveness, environmental sustainability
or security of supply is most valued.

A detailed examination of the options will be proposed in the White Paper.
4_MONEYPOINT – An Overview

This Week show preparation, Aug 2015

Grant in full

The importance of Moneypoint

Moneypoint is Ireland’s only coal-fired power station. Unless repowered, it is due to come to the end of its operating life in the 2020s. A decision on what type of plant should replace it will have to be taken and implemented within the time period of this White Paper.

Value of Moneypoint to the Irish Economy

(GUI Local Economy

- Supports 900 full time jobs
- Moneypoint’s payments to Clare CC accounts for 31% of their budget

(GUI Electricity Prices

- Irish consumers save €220m per year on average 2008-20

(GUI Fuel Diversity

- Reliance on imported gas reduced by 16%

(GUI Flexibility

- Lowers system operational costs
- Reduces curtailment of wind

(GUI Emissions

- Part of European Emissions Trading Scheme (ETS)
- 90% reduction in SOx & NOx emissions

The future of Moneypoint

In examining the optimal fuel mix for Ireland in the coming years, consideration of the future of Moneypoint is a matter for ESB but is also important in the context of wider energy policy. While it is too early to make a decision about the plant, such a decision will need to be carefully considered, taking into account the implications for fuel mix, emissions and energy security.
Government will examine all options concerning our future power generation requirements and energy mix out to 2050 - this will be supported by appropriate modelling of fuel mix options and impacts on power generation, to allow adequate time for replacement planning and delivery of the required infrastructure.

Given its importance to electricity generation, further study is still needed to tease out the issues in relation to the type of plant and or fuels would be most desirable.

I should add however, that people should not take the lack of an announcement as any lack of intent or willingness to make a decision. It is a matter of needing more information and analysis.

Options for Repowering Moneypoint

- Replace it with a new coal station, incorporating carbon capture and sequestration;
- Replace it with a gas-fired station;
- Incorporate full or partial biomass firing;
- Replace it with a nuclear station;

Not having generation on the site is not sensible; the grid system is configured around there being generation at the site.

Which is the Best Option?
The answer depends on which of cost-competitiveness, environmental sustainability or security of supply is most valued.

The White Paper will propose that a detailed examination be undertaken of the various options, so as to support a sound decision.

Consideration of Converting Moneypoint to Biomass

The choice of technology is ultimately a commercial decision for individual project developers and the fuel used in the plant at Moneypoint is a matter for the operator and I have no role or function in this regard. Notwithstanding this, I am advised that there are a number of important issues that would demand further consideration before biomass could be used at Moneypoint. These include the following:

- the conversion of Moneypoint to biomass would require significant levels of capital investment by the operator;
- support tariffs substantially higher than those available for wind, which has been the most cost effective renewable technology in the Irish electricity
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• substantially more biomass than is available domestically would be required with large amounts of the resource having to be imported leading to questions in relation to sustainability and security of supply;
• the commitment of substantial amounts of biomass to Moneypoint would divert scarce biomass away from the renewable heat sector, where biomass can be used more efficiently and where fewer alternative technologies exist.
Consideration of Nuclear Power in Irish Context

Proponents of nuclear energy often cite its low costs and advances in reactor technology in recent years. Nonetheless, nuclear energy continues to prove expensive to build, as illustrated by the on-going development of a nuclear plant in Finland greatly above budget, and UK incentives for nuclear on a similar basis to renewable energy.

Consideration of nuclear power options must also take account of Ireland’s existing generation plant and grid system size. Moneypoint is a baseload coal-fired power station with large set sizes (300 MW). Such stations are not suited to mid-merit order running, where regular output changes are required. Moreover, much of the new large gas-fired generating plant in the system also prefers to run at constant output. The addition of a relatively large nuclear plant, also designed to run at constant output, would unbalance the system, with too much inflexible baseload and not enough flexible plant for a system with limited interconnection to other systems. On the other hand, when ‘fourth generation’ nuclear reactors become commercially available, it is technically possible that smaller reactors could be accommodated on the Irish grid.

As Ireland considers additional interconnection with the UK and France (which derives nearly 80% of electricity from nuclear generation), imported power from nuclear sources may become a small but increasing element of the all-island fuel mix.

Submissions to Consultation Process on the Energy Green Paper 2014

The Green Paper posed the question whether, in light of considerations on the future of the Moneypoint coal plant, the time is right to consider in greater depth the potential economic and technical implications. The question posed was also an
opportunity to test public acceptance of nuclear generation located on the island of Ireland.

As in the 2007 consultation process submissions were received that were both for and against nuclear power.

Given that there are no plans to rescind the legislative prohibitions on nuclear power and the current technical constraints on the grid, the introduction of nuclear power is not an option at this time.
Grant in full - 1.5 relevant pages of 16 page doc. This briefing summarised feedback from regional seminars on the various priority areas of the White Paper. Here we include section that referenced Moneypoint even if all the other bullets are not really relevant to FOI

Priority 4 – Ensuring a Balanced and Secure Energy Mix

- Agreement on the need to move towards a low carbon energy system.
- The importance of ensuring security of energy supply was acknowledged.
- Demand reduction and energy efficiency measures should be a priority.
- Multiple measures addressing all aspects of energy supply and demand are required.
- Remove barriers to active engagement with the energy sector both on the demand and the supply side.
- There was no consensus on the future of Moneypoint, but the point was made that Biomass should not be imported.
- Clear market signals are required to incentivise any investment in the energy sector.
- An updated national spatial strategy is needed.
- A more integrated approach from Departments with responsibility for energy, environment, agriculture and planning is required.
- If the electricity sector was to achieve 100% renewable penetration, storage and interconnection is required. It was argued that wind farms and pylons have a negative impact on the landscape, but also argued that pylons are required for both supply and demand of electricity and new infrastructure would be required even in the absence of wind development.
- A clear model of future demand levels should be formulated to determine generation requirements before any further investment is made in wind.
• Wind energy has been highly effective at reducing the carbon intensity of the electricity sector.
• Given Ireland's abundant wind resource, it would be irresponsible to 'opt out' of wind and allow other nations to carry the burden of decarbonisation.
• Micro-generation has a role to play in Ireland's security of energy supply.
• General consensus that energy efficiency and demand reduction should be the first priority of energy policy, in particular in the heating sector.
• Deep retrofitting measures are required, but the 'payback' economics are not strong enough.
• A new national energy efficiency strategy is required including measures using the 'passive house' model for new build; BER regulations to eliminate the worst; improved compliance with building regulations.
• The role for smart metering for heat loads was highlighted.
• Biogas has potential but a capital programme would be required to support the industry.
• Increases in electric heating should be combined with smart meters and a strengthening of the electricity grid.
• There is a high capital investment required for district heating, which is a barrier for local authorities.
• Indigenous and sustainable biomass (rather than imported biomass) has a role to play, but the economics may not stack up in the electricity industry – biomass should be used in the sectors in which it is most effective.
• CNG is most appropriate for fleet transport – for example large vehicles such as buses, trucks and large vans - and may be an alternative to diesel in this sector.
• Opinion divided on the likely role of EVs in Ireland's future transport mix.
• General consensus that a reduction in transport demand is crucial.
Overview

*Purpose of the Review of Grid25* initiated in May 2014: to examine the most up-to-date information available.

39. What does EirGrid think of the proposal to convert Moneypoint to biomass, making Grid25/wind energy redundant?

The upgrade of Ireland's transmission system is not just to increase the amount of renewable energy on the grid, but to strengthen Ireland's electricity network to ensure we can meet the demand for electricity now and in the years to come.

It is important to appreciate that EirGrid is the Transmission System Operator and has no role in the generation of electricity. EirGrid's role involves connecting all energy sources as part of facilitating competition and to ensure a secure, reliable and economic supply of electricity to homes and businesses throughout Ireland.

There have been recent suggestions that the conversion of Moneypoint generating station to biomass would negate the need for wind energy and, consequently, the need for the development and upgrading of our transmission grid. There are no plans to convert Moneypoint generating station to biomass.
8. Meeting with Environment Pillar Briefing

3. Fossil Fuels

_Brief: April 2015_

_Same as Record 1 – but part of bigger brief so Grant 1.5 pages out of 8_

a. **Moneypoint**

Coal is currently abundant and internationally traded and provides energy at a cost that has remained relatively low over the past number of years. Coal plants can provide significant onshore energy storage, fuel diversity and energy security benefits. However, electricity generation from coal has a relatively high carbon intensity and associated impact on Ireland’s GHG emissions targets.

ESB’s Moneypoint power station in County Clare is Ireland’s only coal fired power station and has provided reliable baseload electricity for Ireland for the past 30 years. It has contributed significantly towards the national energy goals of maintaining fuel diversity, competitive wholesale electricity prices and security of supply. Its total output of 915 MW supplied about 17% of electricity demand in 2013. The plant typically holds 6 weeks of coal supply, which enhances our energy security. Moreover, a recent study has shown that during the period from 2008 to 2014, generation from coal has reduced the wholesale cost of electricity for the Irish consumer by, on average, €260m per annum.

Moneypoint is the youngest operational coal plant in these islands and has invested in the latest emissions abatement technology ensuring compliance with the Industrial Emissions Directive along with NOX and SOX emission limits. The plant can foreseeably continue to support the Irish electricity system out to 2030 and perhaps beyond, as the country transitions to a low carbon electric future.

Active consideration has been given by ESB to conversion of part or all of Moneypoint to biomass. Such a conversion is considered to be technically feasible and would deliver significant reductions in carbon intensity. However it would be very costly and have knock-on impacts in terms of future subsidy, renewables policy (RES-E & RES-H), security of supply (level of biomass required) and land use requirements.

Firstly, generation from biomass is not currently cost competitive and full conversion would result in additional costs of the order of the current PSO to the Irish consumer. There are strong arguments that in order to decarbonise
at least cost, the optimum initial utilisation of biomass is in the provision of industrial heat and co-firing in existing peat stations. Moreover, reductions in fuel stocks together with a less robust fuel supply chain would somewhat reduce the energy storage and system security benefits.

The optimal future low carbon technical solution for Moneypoint over the long term is not yet clear and is ultimately a commercial decision for ESB but it is being considered by DCENR in the development of the Energy Policy Framework. If any policy decision was to be taken to replace Moneypoint’s power generation it would have to be done in a timely manner to allow time for replacement planning and delivery.

10_Energy Council – 8 June 2015

Nuclear Energy, Safety and Research Briefing note

Grant in full - this one paragraph of a two pager

In light of considerations on the future of the Moneypoint coal plant, it may be questioned whether the time is right to consider in greater depth the potential economic and technical implications, or indeed to test public acceptance of nuclear generation located on the island of Ireland.

Record 11 is granted – Minister’s address (11 page speech although on the day he had to deliver a much summarised version) to Energy Ireland conference in June.

Record 12 is granted – the Poyry report on the Value of Moneypoint to Irish economy.
13. Green Paper Written Consultation Process

Assessment of the written consultation submissions

Grant in full: this relevant half page out of 54

**Question 26**

Given that Moneypoint will approach the end of its life by 2025, is there a role for coal in the future power-generation fuel mix, taking into account cost, security of supply and environmental issues? If coal generation does not continue at Moneypoint, what are the alternatives? Should options such as biomass or nuclear power be considered?

- Positive towards having generation at Moneypoint. Different fuel options discussed
  - Biofuels – possible adverse issues (e.g. environmental aspect (due to scale), land substitution for food production, questions sustainability of biomass as an option). One respondent suggests partial conversion to biomass
  - Nuclear – negative issues highlighted (incl. possible adverse public reaction) but others say we should re-examine it
  - Coal plus Carbon Capture and Storage (CCS) – difficulties in CO₂ storage highlighted. Some favour leaving at coal as plant still has life left. Others questioned environmental aspects and speed of response to variable renewable generation
  - Gas – one respondent [of those I’d reviewed] favoured gas though others highlighted issue of overdependence on gas
  - Renewables – would require investment in cross-border interconnection, storage, smart grid, and demand side measures
- Questions whether ESB should develop Moneypoint – dominance issue
- CBA needed
- Moneypont – early planning needed
Would converting Moneypoint to biomass be a cost effective alternative to wind?

- Moneypoint’s capacity is 915MW and its demand for biomass would far exceed the available biomass and indeed the biomass even potentially available in Ireland [Some estimates suggest that 260,000 hectares of energy crops would be required whereas to date 3,000 have been planted under the Bioenergy Scheme run by DAFM]. In reality the plant would be heavily reliant on imported biomass and such large scale levels of imports would raise considerations as to the environmental sustainability of such operations, e.g. transport emissions and possible land use change issues.

- The current facility at Moneypoint cannot burn biomass and would require significant levels of investment to do so. Any support for biomass at Moneypoint would also require State Aid approval to take account of the specifics of the project. Were tariffs similar to those for biomass combustion (€85-€95 per MWh) under REFIT 3 to apply to electricity from the facility, the cost to the PSO would significantly exceed the cost of 310MW supported under the REFIT 3 scheme without making any contribution to renewable heat targets.

- In reality, however, it is likely that the supports needed would exceed those currently available under REFIT as the Drax facility in the UK will be the price-setter for the biomass needed to be burned in a coal plant. Drax is currently eligible for supports between €125 and €130 per megawatt hour.
To ask the Minister for Communications, Energy and Natural Resources if a review of the north-south interconnector is planned considering changes made to the GridWest and GridLink projects.

- Michael Colreavy.

For ORAL answer on Tuesday, 28th April, 2015.

39. What does EirGrid think of the proposal to convert Moneypoint to biomass, making Grid25/wind energy redundant?

The upgrade of Ireland's transmission system is not just to increase the amount of renewable energy on the grid, but to strengthen Ireland's electricity network to ensure we can meet the demand for electricity now and in the years to come.

It is important to appreciate that EirGrid is the Transmission System Operator and has no role in the generation of electricity. EirGrid's role involves connecting all energy sources as part of facilitating competition and to ensure a secure, reliable and economic supply of electricity to homes and businesses throughout Ireland.

There have been recent suggestions that the conversion of Moneypoint generating station to biomass would negate the need for wind energy and, consequently, the need for the development and upgrading of our transmission grid. There are no plans to convert Moneypoint generating station to biomass.
a) Biomass for Moneypoint?
Currently the REFIT schemes are the primary means through which electricity from a range of renewable sources is supported. Although wind energy is expected to contribute most towards the achievement of the 2020 target, diversification of the renewable generation portfolio in the longer term will be important for creating a sustainable, carbon free, electricity system. In this regard, biomass will have a role to play and, depending on electricity demand, the full implementation of current policies could mean that up to 5% of electricity may be generated from biomass in 2020.

In this regard, electricity from biomass, including co-firing with peat, is already supported through REFIT. The draft Bioenergy Plan recommends the continuation of REFIT for electricity generated from biomass and that the scheme would be kept under review to assess the most cost-effective way to support co-firing of biomass with peat.

The choice of technology is, however, ultimately a commercial decision for individual project developers and the fuel used in the plant at Moneypoint is a matter for the operator. The Minister has no role or function in this regard. Notwithstanding this, there are a number of important issues that would demand further consideration before biomass could be used at Moneypoint. These include the following:

- the conversion of Moneypoint to biomass would require significant levels of capital investment by the operator;
• support tariffs substantially higher than those available for wind, which has been the most cost effective renewable technology in the Irish electricity market, would also be required which could lead to increased electricity prices;

• substantially more biomass than is available domestically would be required with large amounts of the resource having to be imported leading to uncertainty in terms of security of supply. The sustainability of transporting large amounts of imported biomass would also be a cause for concern;

the commitment of substantial amounts of biomass to Moneypoint would divert scarce biomass away from the renewable heat sector, where biomass can be used more efficiently and where fewer alternative technologies exist
Minister's Address to Energy Ireland Conference

16th June, 2015

9.00 – 9.30

Croke Park

Check against delivery
Minister’s Address to Energy Ireland Conference  
17th June, 2015

Good morning ladies and gentlemen. I am delighted to have this opportunity to address you today at this key annual energy family event, in what is a pivotal year for energy policy at the national, EU and international levels.


Before I turn to the substance of my address, I would like to thank the many contributors to our extensive consultation process on the Energy Green Paper since May 2014, whether through written submissions, and or participation in the subsequent workshops and seminars and I would like to acknowledge and thank you for your valuable input to the policy development process. Having listened carefully to all views, my Department is now working on further refining our approach to finalising the framing components of an energy policy that will serve Ireland for a generation or more. Most energy commentators recognise that there is no silver bullet to solve the range of complex and interrelated challenges we face in developing policy - instead, a multiplicity of approaches will be essential for us to make the progress we all need to make for Ireland’s transition to a low carbon future.

The 2007 Energy Policy Paper, ‘Delivering a Sustainable Energy Future for Ireland’ was the first comprehensive Irish energy policy document in several decades. It provided policy certainty and a cohesive vision for Irish energy markets up to 2020, and underpinned some very significant achievements over the past eight years. The implementation of relevant 2007 White Paper commitments will continue, where appropriate, over the period of this new White Paper. The new Paper will build on the work undertaken since 2007 and set out how Ireland will make the necessary transition to a low carbon future. It will guide and inform our collective approach and actions to 2030, with a view to 2050.

Since publication of the 2007 White Paper, the Irish, EU and international energy landscapes have undergone profound change as new technologies unlock new sources of fossil fuels as well as low-carbon alternatives, and as the global economy regains a positive momentum.

The Energy Trilemma

We are developing the new White Paper on the transition to a low carbon future at a time when the development of energy policies is caught up in an ever more complex framework of competing and interconnected priorities across all economic and social sectors. The three pillars of energy policy at national, European and international levels are the provision of secure and sustainable energy supplies on a competitive basis. Finding the right balance between the three pillars is the perennial energy trilemma and is critical in terms of the central role played by energy policy in encouraging the right conditions for economic recovery and job creation.
Making the Centrality of the Citizen to Energy Policy a Reality - "My 2050" Citizen Tool

One of the key principles that I set very early on in the evolution of the new policy was to place the citizen at the heart of energy policy. I was glad to have substantial citizen participation in our consultation workshops, and I want ordinary people as well as industry to feel that they have a part to play as we roll out the White Paper on Ireland's Transition to a Low-Carbon Future later this year. This will include ensuring that access to information on energy matters is facilitated in a real way.

So I am pleased to announce that my Department will be supporting the development of a new tool called "My 2050" which will allow people to, effectively, design their own energy system, thus providing a simple gateway into, what can sometimes seem to be, very complex energy issues. This new tool originated in the UK Department of Energy and Climate Change, and is being customised for Irish conditions by the Energy Institute. The ultimate aim is make it available to run on mobile devices, thereby making it very accessible.

Thanks are due to the Energy Institute for this very worthwhile project which will be a very practical way of putting the citizen at the heart of energy policy. I look forward to following its development over the coming months.

Dynamic Nature of the Global Energy Market

We face much uncertainty due to the dynamic nature of the global energy market, as is evidenced by the collapse of oil prices; increased and now decreasing use of hydraulic fracturing in the United States; cheap exports of US coal; increasing geopolitical instability and the imperative to secure agreement on climate change mitigation and adaptation measures at the Conference of the Parties in 2015. All these factors underline the degree of uncertainty currently being experienced in energy markets. Against that constantly shifting energy landscape, it is critical that we maintain stability in our energy policy, in tandem with meeting our responsibilities in addressing climate change.

Stability is needed for Investors and to Facilitate Technological Innovation

Everyone here will agree that stability, certainty and predictability of energy policy and the regulatory environment are important for new investors and existing market participants. Such a steady environment will facilitate technological developments which can help to reduce our carbon footprint, reduce costs, improve our energy security, and promote national and regional economic and social development. In framing our future energy policy squarely in terms of the incremental steps we must take towards a low carbon economy, Government intends to provide that level of assurance. Our ongoing engagement with all stakeholders means that they will be part of the process and there should be "no surprises" as individual policy instruments are developed, adopted and implemented.

Duty to Comply with EU and International Obligations

Our strategy for the future must be seen in the context of the EU and international developments, most especially in relation to climate change, energy security, costs and the geopolitical situation. Along with all EU Member States, in developing domestic energy policy in the new White Paper, Ireland must comply with its EU obligations and align with the on-going development of the Energy Union Policy, as well as complying with Ireland's international obligations. Our actions will be guided and supported by the frameworks and commitments agreed on the international stage.
Importance of Alignment of Energy Policy with Climate Change Policy – Placing Sustainability at the heart of Ireland's Energy Policy

Today, we stand at a climate change crossroads. 2015 is a most important year for decisions for energy, climate change and sustainable development. There are no less than three critical discussions taking place at UN level, and Ireland has been the co-chair of the recent discussions concerned with new sustainable development goals. The main purpose of the Conference of the Parties to the United Nations Framework Convention on Climate Change, meeting in Paris in December 2015, is to seek agreement on post 2020 collective action to limit emissions so that average global temperature will rise by less than two degrees centigrade.

The Intergovernmental Panel on Climate Change (IPCC), published its Fifth Synthesis Report, which will inform the COP21 decisions, in November 2014. The report concluded that “human influence on the climate system is clear, and recent anthropogenic emissions of green-house gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems”. The warning contained in this report that we must ensure “substantial and sustained reductions in greenhouse gas emissions….together with adaptation” to limit the serious risks associated with climate change is clear.

We must put sustainability at the very centre of our energy policy to counter the impact of global warming. The transition to a low carbon future lies at the heart of this Government’s energy policy and reflects the paradigm shift which energy systems across the world are currently undergoing. Ireland remains engaged and committed, both domestically and internationally, to advance this work, including through participation at the United Nations Framework Convention on Climate Change (UNFCCC) where negotiations towards a new global deal on climate are underway and due to conclude in Paris in December 2015. In this regard, Ireland has consistently supported the EU’s pro-active leadership on climate policy, both in relation to framing the internal agenda and also the positive influence which the EU seeks to bring to the wider international agenda under the UNFCCC.

Ireland has a progressive position on climate protection, but we still have a long way to go in terms of recovering from the recent economic and banking crises, particularly in the context of the very challenging greenhouse gas mitigation target for 2020 set for us under EU law. It is important that we balance our economic and environmental objectives. Economic development and low-carbon transition are not mutually exclusive and can be progressed in parallel, provided we advance on an informed and sensible course. As we make the transition to a low-carbon economy, we will require a balanced and secure energy mix that creates the framework and market conditions for investment, stability and growth. The severity of the adverse impacts of extreme climate change events and their abatement is the greatest challenge the world faces at this time. It is essential that we take the necessary abatement and mitigation measures now- lack of action or the postponement of difficult decisions are not options.

In looking out to 2030, Government Departments, including my own, are currently working together to ensure that specific targets for Ireland are technically feasible, cost effective, and fair in terms of burden sharing across all EU Member States.
European Union Intended Nationally Determined Contributions and G7 Commitment
At the Conference-of-the-Parties at Lima in 2014, agreement was reached on the technicalities and timing of countries pre-Paris emission reduction pledges. The EU submitted its Intended Nationally Determined Contributions amounting to Union-wide reductions of 40% by 2030 and a long-term goal of 80% by 2050, both compared to 1990 levels. There is no decision as yet on how the actions necessary to meet these targets will be shared among EU Member States. On 8th June 2015, the Group of Seven (G7) leading industrial nations agreed to cut greenhouse gases by phasing out the use of fossil fuels by the end of the century. The G7 made a commitment to the need to decarbonise the global economy by 2100 which bodes well for reaching agreement at the Paris COP 21.

IEA World Energy Outlook 2015 Special Report on Climate Change in advance of COP 21, launched on 15 June 2015
I note the statements made by the IEA in the World Energy Outlook 2015 Special Report on Climate Change in advance of COP 21, which was launched on Monday, that to ensure success at the December talks, four key pillars are needed from a global energy perspective:
- Ensuring we achieve an early peak in energy related emissions;
- Regularly reviewing national climate targets to test the scope for raising ambition;
- Locking in a global long term emissions goal; and
- Establishing a process to monitor achievements in the energy sector.

Ireland’s Energy Policy Vision for a Low Carbon Future – Costs and Benefits
Ireland’s vision for a low carbon transition is equally clear and equally ambitious. We will transform Ireland’s energy production and consumption patterns so that, by 2050, our system will be largely decarbonised. We are aiming to reduce CO2 emissions by at least 80%, compared to 1990 levels, by 2050 across the electricity generation, built environment and transport sectors and are aiming for a carbon neutral approach in the agriculture and land-use sector, including forestry, while at the same time ensuring that our capacity for sustainable food production is not compromised. Food security presents a particular challenge as food production can be both a contributor to climate change and a victim of it.

Achieving a low carbon future is not cost free, but there are benefits in terms of the costs avoided by making the transition, such as, for example, the huge expense of trying to remediate habitat degradation. Our national circumstances are an important factor in the measures we develop to mitigate the effects of climate change. These include our geographical peripherality and inadequate interconnection, transportation costs and logistics, small scale, low population density and an economy where agriculture also plays a large role. Ireland has specific vulnerabilities, including threats to coastal assets due to rising sea levels, increased and more intense precipitation with consequent flooding risks, and changes in storm tracks. In combination, these will result in social and economic costs as well as the loss of ecologically and culturally significant sites.

Changing our lifestyles, behaviour and culture are inextricably linked to our capacity to reduce our carbon footprint. Social acceptance of measures necessary to limit GHG emission plays a central role in how we can transform our energy landscape. In particular, Ireland needs to invest to find solutions tailored to our own particular set of circumstances and these solutions can also provide global opportunities.
Irish Scottish Links on Energy Study - ISLES Project

I am also glad to announce today the formal close of the ISLES ("Irish Scottish Links on Energy Study") Project, this week. The study is the second phase of an EU INTERREG project which has been examining the feasibility of interconnecting the grid systems of Scotland, Northern Ireland and Ireland in such a way as to facilitate the development of offshore marine renewable energy sources, such as offshore wind, wave and tidal, in the waters between the three countries. My Department has been working with its Northern Ireland and Scottish counterparts to commission expert consultancy to better inform developers, grid owners and operators, regulators and the three relevant Energy Departments on how best to tackle the cross-jurisdictional work required for such a regional approach, particularly in the areas of regulation and marine spatial planning. ISLES offers the prospect of minimising the infrastructure required for connecting offshore marine renewable energy projects, compared to multiple point-to-point grid connections that would be inevitable if such projects were solely developer-led.

The project has attracted wide interest across Europe; just yesterday the project partners and consultants held a dissemination event in Brussels to inform people there of the learnings from the project. As a result of the work, ISLES has PCI (Project of Common Interest) status in Europe, which should prove of benefit to those who are interested in developing projects in the relevant marine areas.

Two papers on the project will be given here tomorrow afternoon, and there is a stand featuring the project in the exhibition area. The ISLES project has been an excellent example of sensible collaboration between the three jurisdictions, and, accordingly, I did arrange for invitations to be issued to my counterparts in Northern Ireland and Scotland to be here with me today; unfortunately, neither could be. I congratulate all concerned on undertaking such an important piece of "public good" work, the value of which will become evident in years to come.

Renewable Energy and Energy Efficiency

Ireland's location, abundant sources of renewable energy, and relatively isolated electrical network, has presented us with a unique challenge and valuable economic opportunities to develop our technical ingenuity, enterprise, third level education and R&D programmes. The desire to improve energy efficiency, to move to renewable generation and to improve the experience of energy customers is driving the development and adoption of smart metering and smart grids and new technologies across Europe. The excellent progress made by EirGrid and SONI on the DS3 infrastructure programme "Delivering a Secure, Sustainable Electricity System", will ensure Ireland can securely operate the power system with increasing amounts of variable non-synchronous renewable generation over the coming years. Together with the on-going work on infrastructure development, Grid25, and the addition of renewable generation capacity, the DS3 programme is critical to meeting the renewable electricity targets by 2020.

Among the other projects being undertaken on a collaborative basis is the ESB Networks-led North Atlantic Green Zone Smart Grid Project: have been approved for Project of Common Interest (PCI) status by the High-Level Decision Making Body for European Projects of Common Interest in Energy Networks and Regional Initiatives. This is a tremendous endorsement of both the project and the project team from the four utility companies involved.

As I have mentioned, I am absolutely determined that community involvement will be at the heart of our new energy policy.
The success of programmes like the Better Energy Communities scheme, which I was pleased to launch last week, shows that communities can lead the way and have a genuine stake in our transition to a low-carbon society. The SEAI administered scheme, focusses on property supporting and empowering communities so as to avail of opportunities. The 2015 call for applications saw a record number of applications from which 29 community projects have been selected for €18.6 million in funding.

The projects receiving funding will see community co-operatives all over the country, collaborating with local authorities, businesses and sports clubs to improve homes and local community facilities. By rolling out these energy efficiency improvements at local level, we are showing people that energy efficiency technologies work and that they deliver real benefits in saving money while helping the environment. This will be crucial to persuading more people to undertake energy efficiency improvements in their homes or businesses, and will also support jobs in the local areas where these projects are delivered.

This Government is firmly committed to the ambitious goal of improving the energy efficiency of Ireland’s economy by at least 20% by 2020. The SEAI report on Energy Efficiency Investment Pathways for Ireland, which I launched last week, explores the potential for unlocking energy efficiency gains, and shows that this goal is achievable, and confirms that reaching our energy efficiency targets can lead to a sustained long-term increase in incomes, employment and economic activity.

One of the key barriers to energy efficiency is that customers respond differently to policy interventions based on their knowledge, level of engagement and financial constraints. Even then, the timing of their decisions frequently plays a key role. What this means in practice is that any future policy measures must be consumer-focussed and take account of this real world decision cycle. Last week, I spoke at the launch of new research commissioned by SEAI on the potential for energy efficiency in Ireland. This research provides rigorous technical and economic evidence, based on original field work to support energy efficiency, but also incorporates the behaviour and decision-making process of consumers in the real world. The analysis will play a critical role in our future policy development in this area.

This research also notes the significant progress we have already made on energy efficiency in Ireland. It confirms that the policy foundation for energy efficiency is strong. Over the coming months and years this strong foundation needs to be strengthened and enhanced as we place energy efficiency at the heart of a citizen focused sustainable energy transition.

Substantial progress is also being made in relation to renewable energy and the contribution it will make to our energy transition. My Department will be undertaking public consultation processes in the coming weeks in respect of the Renewable Heat Incentive and the provision of New Support Systems for renewable electricity. In addition, the draft Bio Energy Plan will be finalised over the next 12 months following a Strategic Environmental Assessment and an Appropriate Assessment. Work is also continuing on implementation of the Offshore Renewable Energy Development Plan.
Ireland as an Ideal Location for Energy Research

Ireland’s geographical circumstances and position as a locus for technical ingenuity means that it has become the perfect place to undertake smart energy systems development work and, in particular, testing the application of information and communication technologies to electricity grid management in order to more efficiently and effectively deliver energy services. Our status as an island on the periphery of Europe, inadequately interconnected with neighbouring energy supply systems, requires us to be creative in how we manage our energy systems, and in particular, our electricity supply systems.

Impact of Irish Firms on Clea Tech Innovation [Summary of Irish Independent Report]

As was reported in the media last week, Ireland has attracted and developed large and small companies in the information, communications and control sectors which are engaged in leading edge activities. In addition, our good third level education and research system is improving the manner in which it harnesses the talent of our young people in areas which are of strategic importance to our economic development. We are already seeing innovative Irish firms moving to the forefront of the clean technology industry where they are making a real impact not just at home but across the globe.

I am tremendously encouraged by the fact that there are some 640 Irish companies working on at least 10 different aspects of clean technology, including such diverse areas as offshore renewable technologies, renewable power generation, utility scale energy, marine turbines, converting waste heat to electrical power, energy efficiency, street lighting, waste and recycling, energy storage, including at domestic level, e-vehicles, CNG to fuel Irish fleets, smart aeration technology, data analytics to drive resource efficiency, critical power solutions for industry, biomass appliance of core technology and GSI skills, air carbon control and the delivery of sustainable research environments.

By any standards this is an impressive range of technological development and innovation and I would like to congratulate and commend all the companies involved and encourage other home produced entrepreneurs to follow their lead.

Green Financing

Moreover, I am pleased to note the recent report that banks are continuing to develop their green finance packages. Access to seed funding is essential for entrepreneurs bringing their innovations to the market place. The move towards clean technology is irreversible and this is clearly recognised by banks which have and are continuing to develop long term strategies in the provision of funding for green energy solutions. The International Sustainable Investment Centre, also called Ireland’s financial sustainability hub, is a global leader with an important role to play in keeping Ireland at the forefront of innovation in green technology globally.

Closing remarks

Before I bring my remarks to a conclusion I would like to refer briefly to two further key elements of energy policy as we make the transition to a low carbon future. They are energy security and costs.

Energy Security

Energy Security is essential to Ireland, an inadequately interconnected peripheral country so heavily dependent of fossil fuel imports, and we remain hugely vulnerable to price shocks and potentially supply disruptions. Energy security is also one of the key pillars of the EU’s energy policy and an important dimension of the EU’s Energy
Union initiative. Ireland is fully supportive of initiatives at EU level, such as fostering regional cooperation, which complements our already close cooperation with the UK. There are a range of oil, gas and electricity infrastructure projects that could enhance our energy security. European electricity market integration and increased interconnection are essential to achieve security of supply and compliance with our EU obligations. However, the costs of integration must not outweigh the benefits, particularly in peripheral regions with small markets, where the costs of both infrastructure and compliance with market changes are proportionately much higher than in larger continental markets.

Even as we incorporate increasing renewable energy and greater energy efficiency measure in making the transition to a low carbon future and greater security of supply, it is important to recognise that fossil fuel imports will continue to play an important role in Ireland’s consumption especially in the transport and heat sectors. Oil represented 57% of total final energy consumption in Ireland in 2013 and consequently oil security remains a key pillar of energy policy. The oil market is completely privatised, liberalised and decentralised. Oil underpins the transport sector (98%) and is still the most significant fuel in home heating.

While we unquestionably need to move to a lower carbon economy, oil will continue to remain an extremely important fuel to the Irish economy and society in the medium term. As such, oil resilience and investment in oil infrastructure is critical.

In examining the optimal fuel mix for Ireland in the coming years, consideration of the future of Moneypoint is a matter for ESB and is also important in the context of wider energy policy. While it is too early to make a firm decision about the timing of introduction of a policy on the appropriate role for coal in the electricity generation mix, such a decision will need to be carefully considered, taking into account the implications for fuel mix, emissions and energy security. Government will examine all options concerning our future power generation requirements and energy mix out to 2050 - this will be supported by appropriate modelling of fuel mix options and impacts on power generation, to allow adequate time for replacement planning and delivery of the required infrastructure.

We will continue to assess the need for new infrastructure, and facility upgrades, with robust, evidence based informed analysis. Lessons have been learned on the need to citizen involvement. The recent EirGrid publication, ‘Your Grid, Your Views, Your Tomorrow’ is a welcome sign of change in this regard, and one that can inform others in the sector.

An application has been lodged with An Bord Pleanála in respect of the North South transmission line project. This project is of critical importance to the effective functioning of the all-island electricity market, to security of supply in Northern Ireland, and to support the deployment of renewable energy.

Greater interconnection would be welcome but our options are limited (in terms of interconnection opportunities to the UK or France being the primary options) and the cost dimension has to be carefully considered – we cannot expect consumers to pick up the tab for otherwise unviable projects, no matter how well intentioned. New items on the EU agenda include a forthcoming LNG and storage strategy which is welcome - there was a lunch discussion on this at the TTE Council on 8 June. I would also emphasise the importance of collaborative approaches within our regions of the integrated energy market, which might mean, for example, having Storage and LNG facilities in some, rather than all, Member States with appropriate interconnection where needed, with the mechanism of EU Projects of Common Interest playing an important role. From an Irish perspective,
Government will assess the level and type of strategic energy storage that is appropriate for Ireland over the coming years, building on work already underway.

Publication of a National Framework on Emergency Management later in 2015

In terms of emergency management, later this year, a National Framework on Emergency Management will be published which will mean my Department will have a lead role across seven different emergency incident 'types', including in relation to oil supply and gas/electricity supply disruption. Arising from this Framework, we will need to strengthen and build our capacity in emergency management with a particular focus on critical energy infrastructure protection and we will do this in a strategic, coherent way with industry and key stakeholders.

Markets and Regulation

One of the key objectives of EU energy policy is the establishment of the Internal Energy Market (IEM). The objectives of the IEM are the achievement of better outcomes for EU citizens through contributing to economic growth, jobs, secure energy at affordable prices, and sustainability in energy use. In line with the IEM, the Irish electricity and gas markets, at wholesale and retail levels, have been completely liberalised. In 2007 the all-island Single Electricity Market (SEM) was successfully established and has been hailed as an exemplar of regional cooperation by the EU. It has provided cost reflective wholesale electricity, competition, transparency, greater consumer choice, diversity of generation, security of supply and increased renewable penetration. It has exerted downward pressure on electricity prices and has also attracted new market entrants. Market changes are occurring in the context of the 2009 Third Energy Package and the requirement for all Member States to implement the Target Model for cross-border trade in electricity is imperative. Most EU Member States have already successfully achieved market coupling at the day-ahead market timeframe, so neither Ireland nor any other Member State has a "do nothing" option.

I am pleased to say that we have managed to secure key parts of SEM in its integration with ISEM. I commend the SEM Committee on the work it has done to develop a design for the new wholesale market – and I encourage the Committee, and all stakeholders, to continue this work. We in Government are ready to support the new market with relevant legislation, as necessary, for the benefit of electricity consumers.

While the liberalised market has exerted downwards pressure on prices, Ireland is a price taker on the international energy market. Electricity, gas and oil costs in Ireland are influenced by various drivers, including global gas and oil prices, the costs of capital, exchange rate fluctuations, the small size of the Irish market, geographical location, low population density and inadequate interconnection with the significantly larger EU market due to our peripherality and the costs of interconnection. Therefore we must focus on continuing to address controllable cost factors, to increase the penetration of indigenous secure renewables in the Irish electricity system and to take action on energy efficiency in homes and businesses. I have already mentioned the exciting technological innovations been developed by Irish firms in this regard.
Conclusion
The White Paper will be a critical instrument of navigation towards the energy transition that we must make in Ireland and all citizens, Government, the energy sector, business, academia, regulators and bodies have a responsibility and role to play in this transition.

We must expedite this transition. There are many challenges ahead as we learn to adapt to a low carbon future and to take the measures necessary to mitigate the effects of climate change, including changing our lifestyles and behaviour. The transition to a system based on clean technologies will be a process, not an event. The policies we adopt in the short, medium and long term, especially in relation to climate change abatement, together with the measures being adopted globally, will determine the future of the generations to come.

Thank You

ENDS
Moira McAuliffe

From: Kenneth Spratt
Sent: 08 June 2015 19:13
To: Una NicGiollaChoille; Mairead McCabe; Bob Hanna; Eamonn Confrey; Rebecca Minch; Brian Carroll (Renewable Energy); Fergal McNamara; Stephen.Hill
Subject: FW: Moneypoint
Attachments: 282_ValueOfMoneypointToTheIrishEconomy_v400.pdf

All, FYI.

Bob, Eamonn, for consideration.

Stephen, could you schedule a 30 minutes meeting with Bob and Eamonn to discuss, including ant implications for White Paper text, please? Please also print (colour).

Ken.

Ken Spratt | DCENR | 29 Adelaide Rd | Dublin 2 | Tel: +353 1 6783177 | Mob: +353 87 9882119 |
kenneth.spratt@dcenr.ie

From: Paddy Hayes
Sent: 08/06/2015 19:03
To: Kenneth Spratt
Cc: Declan O'Brien
Subject: Moneypoint

Dear Ken,

When we met in March, I mentioned that we had commissioned Poyry to carry out an evaluation of the impact of Moneypoint, and I provided some indicative information on its value to the Irish electricity consumer over recent years.

I now enclose a copy of the full report for your information.

Declan will follow up to make sure that Eamonn has a copy and an opportunity to discuss the contents if required.

Kind regards,

Paddy.

Paddy Hayes | Executive Director, Generation & Wholesale Markets | ESB
Mobile: +353-87-2079837 | Tel: +353-1-7026078 | www.esb.ie

From: Hayes. Paddy (ESB GWM)
Sent: 23 March 2015 12:10
To: Kenneth Spratt (Kenneth.Spratt@dcenr.gov.ie); 'eamonn.confrey@dcenr.ie'
Subject: Discussion of 18th March 2015
Dear Ken,

Further to our meeting on Wednesday, I attach some summary notes which I hope capture our discussion on Moneypoint.

Apologies for not getting these to you sooner.

I am, of course, available to discuss this or to clarify or amplify at any stage.

Separately, I will put Eamonn in touch with our team who have considered nuclear, carbon capture, clean coal and so on.

Kind regards,

Paddy.

When examining the role of coal in the Irish electricity sector, it is important to take into consideration the factors of carbon intensity, security of supply and cost competitiveness.

Coal is currently abundant and internationally traded and provides energy at a cost that has remained relatively low over the past number of years. Coal plants can provide significant onshore energy storage, fuel diversity and energy security benefits. They are dispatchable and can provide both baseload and flexibility. However, electricity generation from coal has a relatively high carbon intensity.

ESB's Moneypoint power station in County Clare is Ireland's only coal fired power station and has provided reliable baseload electricity for Ireland for the past 30 years. Over this time it has contributed significantly towards the national energy goals of maintaining fuel diversity, competitive wholesale electricity prices and security of supply. A recent study has shown that during the period from 2008 to 2014, generation from coal has reduced the wholesale cost of electricity for the Irish consumer by, on average, €260m per annum.

Moneypoint is the youngest operational coal plant in these islands (Ireland and the UK) and has invested in the latest emissions abatement technology ensuring compliance with the Industrial Emissions Directive. This plant can foreseeably continue to support the Irish electricity system out to 2030 and perhaps beyond, as the country transitions to a low carbon electric future.

Active consideration has been given to conversion of part or all of Moneypoint to biomass. Such a conversion is considered to be technically feasible and would deliver significant reductions in carbon intensity. Reductions in fuel stocks together with a less robust fuel supply chain would somewhat reduce the energy storage and system security benefits. However, generation from biomass is not currently cost competitive and full conversion would result in additional costs of the order of the current PSO to the Irish consumer. There are strong arguments that in order to decarbonise at least cost, the optimum initial utilisation of biomass is in the provision of industrial heat and co-firing in existing peat stations.

Given its favourable geographical and infrastructural attributes, Moneypoint is a suitable location for the development of low carbon, dispatchable, synchronous generation that will facilitate the increasing deployment of renewable electricity in Ireland. The optimal future low carbon technical solution for Moneypoint and the nation is not yet clear. In the interim, and at current commodity prices, a business as usual approach appears to deliver the appropriate balance between carbon reduction and the provision of electricity cost and security benefits to the Irish consumer.
An timpeallacht? - Smaoinigh air sula bpriontáileann tú an r-phost seo.
Please consider the Environment before printing this email.

* *** *** *** *** *** *** *** *** ***
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Is tuairimí nó deartháí an údair amháin aon tuairimí nó deartháí ann, agus ní gá gurb ionann iad agus tuairimí nó deartháí ESB.
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* *** *** *** *** *** *** *** *** ***
THE VALUE OF MONEYPOINT TO THE IRISH ECONOMY

May 2015
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SYNOPSIS

Moneypoint is a central part of the Irish electricity system, with the potential to supply more than 20% of total Irish electricity demand. For the last 30 years, the station has provided affordable, reliable electricity to Irish consumers and supported 900 full time jobs within the Irish economy. It can continue to deliver these benefits to the Irish energy sector and wider economy for the foreseeable future.

As Ireland continues along the path to a low-carbon energy system and economy this claim may appear counterintuitive. However, the benefit Moneypoint confers on cost to consumers, reliability and security of supply has been assessed in a system where the Irish government’s commitment to achieving 40% renewable electricity generation by 2020 is realised. While meeting renewable targets, a system with Moneypoint at its core:

- delivers more affordable electricity – Irish consumers save €220m on average per annum, lowering household electricity bills and improving Ireland’s industrial competitiveness;
- increases fuel diversity – the reliance on imported gas is reduced by 16%;
- lowers system operation costs – the flexibility of Moneypoint helps EirGrid, the system operator, to manage the system more cost effectively;
- reduces wind curtailment – the same flexibility enables EirGrid to reduce wind curtailment by around 1%; and
- improves the energy balance of payments – fuel import costs are more than offset by the net electricity exports Moneypoint enables Irish generators to capture.

Environmental emissions from Moneypoint cannot be ignored. The station is a relatively high point source emitter of carbon and its NOₓ and SOₓ emissions affect local air quality, however:

- recent investment has already reduced Moneypoint’s impact on air quality, with further decreases in air emissions required to comply with the Industrial Emissions Directive from 2016; and
- Moneypoint operates within the European Emissions Trading Scheme (‘ETS’) – its closure would have no impact on the ETS emissions cap meaning Ireland would forgo the benefits from Moneypoint without securing a reduction in European carbon emissions.

While the focus of many discussions on the Irish energy sector is about the problems of fossil-fuel generation, the contribution that stations such as Moneypoint play in delivering a low-cost, secure energy system is often overlooked. This study highlights that the value of this contribution is as important in the near future as it has been historically.
EXECUTIVE SUMMARY

Context

Moneypoint coal station

Moneypoint has been a central part of the Irish electricity system for the last 30 years. The 855MW coal-fired power station is the second largest electricity production facility in Ireland, with the potential to supply more than 20% of total Irish electricity demand.

Irish energy policy

The Irish government is committed to transforming Ireland's economy from one based on predominantly imported fossil fuel to a more indigenous low carbon economy centred around energy efficiency, renewable energy and smart networks.

Ireland's energy policy is heavily influenced by European energy policy. There are two legally binding European targets which are shaping the future market:

- **2020 EU renewable energy target**: Ireland is legally obliged to ensure that by 2020 at least 16% of all energy consumed is from renewable sources. As a result, Ireland has a target that 40% of electricity consumption in 2020 should be from renewable sources.

- **2020 EU carbon target**: The EU has a target of reducing greenhouse gas emissions by 20% from 1990 levels. The EU Emissions Trading Scheme ('ETS') covers emissions from power generation alongside some other sectors.

The ambitious target of 40% renewable electricity generation by 2020 is likely to be achieved through continued expansion in onshore wind generation.

Further to the decarbonisation agenda significant change is expected in the SEM market design. New energy trading arrangements and a new capacity payment scheme (I-SEM) are expected to be in place by the end of 2017. This will pose challenges, but also opportunities, for market participants that will have to learn to operate in a much different market environment. The detailed design of the I-SEM has now commenced and there will be much activity and consultation in the coming three years.

Approach

In the longer term, the role of unabated coal generation in a low carbon world will be limited. We do not attempt to determine the longer-term role of Moneypoint. Instead, the focus is placed on the role that Moneypoint has played in the recent past and the potential role it can play in the medium term to 2020. This study is therefore answering the following two questions:

- What has been the contribution of Moneypoint to the Irish economy in the recent past?
- What future value can Moneypoint provide between now and 2020?
In order to answer these questions we have modelled the Irish electricity system over the period 2008-20 using BID3, Pöyry’s electricity market modelling platform. The scenarios modelled are:

- ‘Status quo’: Moneypoint remains in place throughout the whole modelled period.
- ‘Moneypoint closes’: Moneypoint closes and future build is driven by market investment signals. Given the high level of capacity margin in the Irish market, no new capacity is commissioned in the period to 2020, but some existing capacity which would otherwise retire stays online.
- ‘Gas world’: Moneypoint closes and is replaced by two CCGTs with an equivalent capacity to Moneypoint.

Other than the treatment of Moneypoint, all other assumptions are common across all three scenarios and reflect current policies. Demand is common across all scenarios and based on the 2015 Eirgrid/SONI Generation Capacity Statement. Renewables targets are assumed to be met with 40% of electricity consumption coming from renewable resources in 2020. Commodity prices are based on the forward curves of early January 2015. In terms of market arrangements, we model the new market arrangements (I-SEM) that are expected to apply from Q4 2017 onwards based on Pöyry’s standard modelling assumptions.

We assess Moneypoint in four ‘value areas’, largely based on Irish energy policy objectives:

- electricity affordability;
- security of supply;
- environmental impact; and
- impact on the wider economy.

The assessment is done by comparing results from the modelled scenarios. This is supplemented by further qualitative and quantitative analysis for effects not directly captured by the electricity market modelling.

**Moneypoint delivers benefits to the Irish economy**

**Electricity affordability**

*Moneypoint is the cheapest thermal generator in Ireland and saves Irish consumers €220m on average per annum*

Moneypoint is currently the cheapest thermal generator in Ireland. This is unchanged even with the recent fall in oil prices which has led to a decrease in gas prices. Coal’s advantage is expected to persist in the short to medium term.

Without Moneypoint annual consumer bills would be €220m higher on average over the period 2008-20. This is because the shortfall of generation in the absence of Moneypoint would have required more expensive gas and oil plants to operate in its place, as well as imports from GB.

In 2008, the increased cost would have been particularly pronounced (at €517m more) as capacity margins were tight and gas and oil prices reached a peak. Higher capacity margins in the recent past and the short term future (2013-17) would have reduced the
impact from the closure of Moneypoint but without it average annual cost to consumers would still be over €100m higher.

With the introduction of I-SEM, Moneypoint will deliver even more significant savings to consumers by keeping capacity payments lower and protecting consumers from price spikes in the wholesale market that may occur in a tighter electricity system. Moneypoint lowers annual cost to consumers by €269m on average over 2018-2020.

The impact of not having Moneypoint on the system would have been less pronounced if it was replaced by new and efficient CCGT capacity of the same size. Irish consumers would still realise an average annual saving of €9m. However, this relatively small saving does not reflect the additional capex associated with the new CCGT units or the increase in variable production costs when switching from using coal to gas. Consumers may not face a substantial increase in consumer bills, but the electricity system becomes significantly less efficient with an increase in average annual wholesale market costs of €119m.

Savings for consumers from the presence of Moneypoint are expected even with relatively low gas prices. It is only the combination of low gas prices persisting and replacement gas capacity that would deliver lower cost to consumers when compared to a world with Moneypoint in place.

**Security of supply**

*Moneypoint lowers Ireland’s reliance on gas by 16% on average per annum*

Ireland is heavily reliant on gas to meet its energy needs, including electricity production. Around 50% of total electricity demand has been met by gas-fired generation in recent years. Moneypoint delivers fuel diversity by reducing annual gas demand by 6TWh on average, equivalent to a 16% reduction in gas reliance for electricity production. Were Moneypoint to be replaced with additional gas capacity, gas demand would increase even further with an additional 11TWh of gas needed on average every year.

*Coal is supplied by a more flexible infrastructure than gas and is less susceptible to supply chain risks*

Over 90% of Ireland’s gas currently comes from GB via interconnection with Scotland. The commissioning of the Corrib field in 2015/16 will add to diversity of gas supply in Ireland for some years. However, Corrib has a short production profile and even with Corrib online, gas still comes from a limited number of transportation routes. Coal, on the other hand, can be procured and transported from multiple sources. This makes coal generation less susceptible to supply chain disruptions.

Ireland does not have any significant gas storage facilities with all the required gas flexibility being provided by the gas interconnection. Unlike gas, coal can be stored at an onsite area at Moneypoint with a capacity of 600,000 tonnes. This translates to roughly 100 days of the station needs for running at full output. Moneypoint can continue to produce electricity for an extended period of time without the need of resupply, providing for an additional layer of security in the unlikely event of a coal supply chain disruption.

*Moneypoint’s flexibility is a significant benefit to system operation*

Flexibility of thermal generation is an increasing concern given the increase in wind capacity expected in the medium term. In addition to delivering bulk energy, Moneypoint also contributes to the flexibility of the Irish electricity system.
The future system will need to maintain generation spinning reserve and inertia even with lower levels of thermal generation. At 35%, Moneypoint has the lowest minimum stable generation level of any baseload or mid-merit generator. This means it can deliver more spinning reserve and inertia at a lower level of output.

The Moneypoint site occupies a unique position in the Irish electricity network. It sits on the end of the 400kV network that runs from the west of Ireland to the major load centre in Dublin. Moneypoint is used by EirGrid to provide stability to the 400kV network.

**Environmental impact**

*Moneypoint is a relatively high point source emitter of carbon, emitting on average 4.2Mt CO₂ per annum, but its closure would not have a significant impact on European carbon emissions or Ireland’s non-ETS emissions*

Coal is one of the most carbon intensive forms of electricity production. Moneypoint alone accounts for around 30% of Ireland’s power sector carbon emissions with average annual CO₂ emissions being higher by 4.2Mt when compared to a world without Moneypoint. Assuming Moneypoint was replaced by new and efficient CCGT plant of the same capacity, average annual CO₂ emissions would be lower by 3.3Mt.

CO₂ emissions reduction in the power sector is achieved through the EU Emissions Trading Scheme (EU-ETS). The EU-ETS functions through a Europe-wide cap on carbon emissions from large stationary sources. Participants (including Moneypoint) purchase and trade allowances to keep overall emissions below the cap. The closure of Moneypoint would reduce Irish carbon emissions but at a European level there would essentially be no impact on carbon emissions. This is because Moneypoint’s closure would mean more carbon allowances would be available for use elsewhere in Europe. The overall level of carbon emissions in Europe is determined by the EU-ETS cap and not individual power station closure decisions.

Not all sectors responsible for GHG emissions are covered by the ETS. In Ireland, GHG emissions from the non-ETS sectors account for around 60% of the overall emissions. The ‘effort sharing’ decision requires a 20% reduction in non-ETS GHG emission by 2020 when compared to the 2005 levels. This national target is not affected by Moneypoint and reductions need to come from sectors other than power generation.

*Moneypoint has invested significantly to reduce its impact on air quality*

In 2008, a major environmental equipment upgrade took place to ensure compliance with strict environmental air emission limitations, necessitating the requirement for flue gas desulphurisation (‘FGD’) and selective catalytic reduction (‘SCR’). Moneypoint may still be the largest point source of nitrogen oxides (NOₓ) and sulphur dioxide (SO₂) emissions, but has drastically reduced its impact on air quality and is fully compliant with all environmental standards with regards to transboundary gas emissions.

National NOₓ emissions decreased by 32% in 2013 when compared to the 2008 levels and SO₂ emissions have decreased by 43% over the same period, primarily as a result of the abatement reductions achieved by Moneypoint. With the FGD and SCR retrofitting at Moneypoint SO₂ emissions also dropped below the National Emissions Ceilings for the first time in 2009 and have remained below that limit ever since.

With the introduction of the Industrial Emissions Directive (‘IED’), Moneypoint’s air emissions will see another step reduction from 2016 onwards.
Moneypoint’s technical characteristics help reduce wind curtailment

Moneypoint’s technical characteristics will allow for more instantaneous wind generation and help reduce curtailment. Eirgrid’s analysis indicates that in the absence of Moneypoint, overall wind curtailment could increase by 1% in 2020 as a result of the need for higher output from CCGT generators to deliver an equivalent amount of inertia and spinning reserve.

Wider economic benefits

Moneypoint supports 300 jobs directly and 900 jobs in the wider economy

Moneypoint contributes to Ireland’s gross employment. Using external estimates for employment effects of different types of generation, it is estimated that Moneypoint supports 300 jobs directly and an additional 600 within the wider economy (indirect and induced). According to the same sources, gas-fired generation has a relatively lower ‘employment factor’ with an estimated 120 jobs less assuming Moneypoint is replaced by comparable gas capacity.

Lower cost of electricity helps improve Ireland’s industrial competitiveness

In addition to direct benefits though lower consumer bills, reductions in electricity prices can also improve Ireland’s industrial competitiveness. Industrial output and competitiveness is directly linked to the cost of energy. All other things being equal, a higher cost of electricity would make Ireland a less attractive country for industrial players.

Based on data published by Eurostat, in 2013, Ireland had the 9th most expensive electricity tariffs for medium-sized industrial consumers amongst the EU 28 countries. This was still ‘cheaper’ than countries such as Germany and the Czech Republic. Without Moneypoint, Irish industrial electricity prices in 2013 would have been higher by 4.3€/MWh, moving Ireland to the 7th most expensive country. When considering the entire modelled period, without Moneypoint, average industrial electricity prices would be 6.4€/MWh higher, whereas with gas replacement capacity the average increase in electricity prices would be in the order of 0.3€/MWh.

Without Moneypoint the energy balance of payment deficit would be greater

Moneypoint leads to a reduction in the total energy balance of payments deficit. The fossil fuel import bill would drop to €615m from €631m, but Ireland would no longer have a positive net income from electricity trading and the annual net energy balance of payments position would be adversely impacted, by €188m on average.

If gas capacity replaced Moneypoint, annual average fossil fuel import costs would rise from €631m to €712m. At the same time net income from electricity trade would remain unchanged, resulting in a worsening of the energy balance of payments deficit of €82m on average per annum.

Summary of key quantified findings

Table 1 summarises the quantified key findings of this study, as described above, comparing the change in the main indicators when moving from the ‘Status quo’ scenario to the two alternative scenarios without Moneypoint.

May 2015
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<th>Value area</th>
<th>Indicator</th>
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<th>‘Gas world’</th>
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<td>Security of supply</td>
<td>Increase in annual gas demand</td>
<td>+ 6TWh</td>
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<td>Wider economy</td>
<td>Number of jobs</td>
<td>900 less</td>
<td>120 less</td>
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<td></td>
<td>Increase in industrial electricity tariffs</td>
<td>+ €6.4/MWh</td>
<td>+ €0.3/MWh</td>
</tr>
<tr>
<td></td>
<td>Increase in energy balance of payments deficit</td>
<td>+ €186m</td>
<td>+ €82m</td>
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1. BACKGROUND TO THE STUDY

1.1 Introduction

This report assesses the value of Moneypoint to Ireland's energy system and economy. We do not attempt to determine the longer-term role of Moneypoint and its possible replacements in this study. We focus on the role Moneypoint has played in the recent past and the potential role it can play in the medium term to 2020 by answering the following two questions:

- What has been the contribution of Moneypoint to the Irish economy in the recent past?
- What future value can Moneypoint provide between now and 2020?

We have assessed Moneypoint in four value areas:

- electricity affordability;
- security of supply;
- environmental impact; and
- impact on the wider economy.

The report is structured as follows:

- Section 1 provides a brief overview of Moneypoint and Irish energy policy;
- Section 2 describes the approach used to model the Irish electricity market and defines the scenarios developed to quantify the impact of Moneypoint on the Irish economy;
- Section 3 presents the impact Moneypoint has on the cost of electricity;
- Section 4 discusses the issues faced by Ireland with regards to security of supply and the role of Moneypoint in enhancing it;
- Section 5 outlines Moneypoint's environmental impact; and
- Section 6 discusses Moneypoint's benefits to the wider Irish economy.

All data has been based on publicly available sources from acknowledged institutions and organisations, including SEMO, EirGrid, SEAI, Eurostat and the Irish Valuation Office. All analysis was carried out by Pöyry Management Consulting and unless otherwise stated all quantified results should be attributed to Pöyry.
1.2 Moneypoint

Moneypoint has been a central part of the Irish electricity system for the last 30 years. It is a coal-fired power station, the second largest generating station in Ireland with a capacity of 855MW. It is located near Kilrush in County Clare. The station consists of 3 units of 285MW each, with the first unit commissioned in September 1985 and being fully operational by June 1987. The plant is capable of generating up to 6.5TWh of electricity a year, equivalent to 24% of total Irish electricity demand.

There have been significant movements in the underlying commodity prices and generation mix in recent years. Increasing imports of US coal to Europe due to increasing US shale gas production have led to a drop in coal prices. In contrast, European gas prices have remained high driven by oil prices and strong Asian demand for gas. Carbon prices have fallen during this time due to an oversupplied market and weak European energy demand.

This combination of commodity prices has meant that Moneypoint is the cheapest thermal generator in Ireland and has operated at a high load factor in recent years (2012-14). Figure 1 shows the evolution of Moneypoint’s load factor over the last seven years.

![Figure 1 – Historical annual load factors* for Moneypoint](image)

* This relates to the 'market schedule' load factor and is based on the MSQ as published by SEMO

1.3 Irish energy policy

1.3.1 Overview

The Irish government is currently reviewing its energy policy. A new White Paper expected to be issued mid2015 along with a low-carbon roadmap to 2050. As part of the consultation process, a Green Paper was issued in May 2014 and the introductory text provides some illustration of the government’s current thinking in relation to energy policy.
Ireland faces significant inter-related challenges in relation to climate change, energy security and competitiveness. These can be addressed by transforming Ireland’s economy from one based on a predominantly imported fossil fuel to a more indigenous low carbon economy centred around energy efficiency, renewable energy and smart networks. This transformation lies at the heart of this Government’s energy policy.

Ireland’s energy policy is heavily influenced by European energy policy. There are two legally binding European targets which are shaping the future market:

- **2020 EU renewable energy target**: Ireland is legally obliged to ensure that by 2020, at least 16% of all energy consumed is from renewable sources. As a result, Ireland has a target that 40% of electricity consumption in 2020 should be from renewable sources.

- **2020 EU carbon target**: The EU has a target of reducing greenhouse gas emissions by 20% from 1990 levels. The EU Emissions Trading Scheme is designed to deliver the power sector’s contribution to this target.

EU energy policy is also under review at present. In February 2015, the European Commission published its ‘Energy Union’ package which outlined its strategic framework for European energy policy. Its stated goal is ‘a resilient Energy Union with an ambitious climate policy at its core is to give EU consumers secure, sustainable, competitive and affordable energy’. Key elements of the package that are relevant are:

- diversification of European supply of gas and increased resilience to supply disruptions;
- 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990;
- 27% of EU energy consumption to be from renewable sources by 2030; and
- 45% of EU electricity consumption to be from renewable sources by 2030.

The Energy Union package is being considered by the European Council and directives will need to be bought forward to give it legislative force.

### 1.3.2 The future of coal in Ireland

In the longer term, the role of coal generation in a low carbon world may be limited. There has been ongoing debate on what could be the replacement capacity with studies having investigated what the most cost-effective option may be. There have also been calls recently to convert Moneypoint to a biomass generator.

However, electricity affordability is an important aspect of energy policy and in relation to coal, the Green Paper stated that:

‘Coal plants have environmental drawbacks due to high emissions and implications for climate change, though they run on an abundant fuel source at relatively low cost and provide useful baseload and fuel diversity in generation. A decision on the role of coal in the Irish fuel mix needs to be seen in the broader context of sustainability, competitiveness and security of supply’

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2. APPROACH AND SCENARIO DEFINITION

2.1 Approach

The Irish electricity system is modelled with and without Moneypoint over the period 2008-20. The modelling platform used is a state of the art electricity market model, BID3, capable of accurately capturing the mechanics of the SEM and the way the I-SEM is currently expected to work from 2018 onwards. The GB market is also modelled and therefore flows with GB are determined as part of the modelling. This means changes in electricity trade as a result of differing market conditions can be captured.

The current long-term price-based CRM is assumed to be in place until and including 2017. The proposed CRM, reliability options, commence operation in 2018. Modelling the new CRM is important as the capacity price is expected to be determined through a competitive process and the amount and type of capacity will be key for the price formation\(^3\). Further details regarding the electricity market model, BID3 are provided in Annex B.

2.2 Scenario definition

All scenarios modelled in this study reflect current policies. Renewables targets are assumed to be met with 40% of electricity consumption coming from renewable resources in 2020. Commodity and carbon prices are common across all scenarios with future prices based on the current forward curves. Demand is also common across all scenarios and based on EirGrid’s latest Generation Adequacy Report. More details on the assumptions used are provided in Annex A.

It is only the treatment of Moneypoint that differs between scenarios. The scenarios modelled are:

- **‘Status quo’:** Moneypoint remains in place throughout the whole modelled period;  
- **‘Moneypoint closes’:** Moneypoint is assumed to decommission in 2008 and there is no immediate replacement capacity\(^4\). This means no additional capacity is imposed on the system, but future build is driven by market investment signals to meet the system security standard; and  
- **‘Gas world’:** Moneypoint is assumed to be replaced by two CCGTs\(^5\) with an equivalent capacity to Moneypoint.

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\(^3\) In contrast, under the long-term CRM the total pot is fixed and therefore the amount of capacity does not affect the payments faced by consumers.

\(^4\) There is no experience with operating the network without at least one Moneypoint unit on the system in the recent past. A scenario where Moneypoint (or no other unit connected on the 400kV line leading to Dublin) is not in place may be possible but would possibly require ‘sectionalising’ the network.

\(^5\) Each CCGT has a total installed capacity of 400MW and similar technical characteristics to the Aghada CCGT.
2.2.1 Commodity price sensitivities

To capture the effect of higher gas prices, as well as more favourable conditions for gas we have also modelled all scenarios under the following sensitivities:

- ‘30% High Gas’: gas prices are assumed to be higher by 30% when compared to the baseline; and
- ‘30% Low Gas’: gas prices are assumed to be lower by 30% when compared to the baseline.

2.3 Results from the ‘Status quo’ scenario

Before looking at differences between the scenarios with and without Moneypoint, it is beneficial to understand the key results from the ‘Status quo’ scenario6, which represents the most likely outcome for the Irish electricity market. The Irish electricity market is expected to continue with strong wind deployment. Increasing levels of wind should strengthen Ireland’s electricity export position and result in CO₂ emissions reductions. Despite this growth in wind output we see only marginal reductions in coal and gas output to meet a steadily growing electricity demand. In terms of the cost of electricity, prices remain linked to gas price movements. A sharp drop in the cost faced by consumers is expected with the introduction of I-SEM, and in particular with the replacement of the existing CRM with the reliability options scheme.

2.3.1 Electricity generation, net electricity trade and gas demand

In this scenario increasing renewables generation to meet the 40% renewable electricity target in 2020, displaces some gas-fired generation out to 2017. Ireland starts exporting to GB which, combined with ‘exports’ to Northern Ireland, results in a strong net export position. Coal generation (from Moneypoint) is relatively stable, maintaining baseload operation out to 2020.

A step increase in exports to GB is expected once the current CRM is replaced with the proposed reliability options scheme. The current CRM allows for capacity payments to feed into the prices used for electricity trading across the interconnectors even when there is little scarcity. Under the reliability options scheme it is expected that Irish generators will no longer include a mark-up on their short-run marginal costs over periods when capacity is abundant and this will tend to reverse flows.

Figure 2 shows projected Irish generation alongside demand and net electricity trade.

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6 When it comes to historical years, the ‘Status quo’ scenario is effectively similar to the outturn market outcomes.
The evolution of gas demand for electricity generation remains relatively flat in the short to medium term, around 30TWh per annum. This is also shown in Figure 2, where gas generation ranges from 14.5TWh to 15.2TWh across the whole modelled period.

### 2.3.2 CO₂ emissions from the electricity sector

Increasing levels of wind output in Ireland result in future carbon emission reductions with CO₂ emissions dropping from 14Mt CO₂ in 2015 down to 12.6Mt CO₂ in 2020. Part of the CO₂ saving delivered by wind are expected to the offset by a continuously rising electricity demand. The introduction of I-SEM may bring a step increase in CO₂ emission in line with greater exports to GB, but from 2019 onwards we expect CO₂ emissions to continue dropping. Figure 3 shows the projected evolution of power sector carbon emission for Ireland in the 'Status quo' scenario.
2.3.3 Wholesale electricity prices and capacity payments

Cost to Irish consumers drops in the short to medium term as a result of lower gas prices and a depressed EU ETS carbon price. Further reductions in the cost faced by consumers are expected with the introduction of I-SEM, primarily from lower capacity payments.

In the past the SMP closely followed movements in the gas price. This link is expected to persist in the future with a gas-fired unit continuing to be the marginal source of generation in the vast majority of periods. Demand-weighted average ("DWA") wholesale electricity prices (labelled as SMP in Figure 4) remain around €52/MWh out to 2017.

From 2018, a small increase in electricity prices takes place as the short-run marginal cost ("SRMC") bidding is assumed to be removed and generators include a small mark-up in their bidding over tight periods in order to recover fixed costs.

This small increase in electricity prices comes with a sharp drop in capacity payments. Figure 4 shows the demand-weighted average ("DWA") wholesale electricity prices (SMF) and capacity payments, as faced by the demand.

The introduction of a competitive process for determining the capacity payments combined with the level of capacity on the All-Island system are expected to deliver a price much lower than the current one, which reflects the long-run costs of a peaking generator.

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7 This does not include use of system charges, payments for system services and PSOs.
Figure 4 – Historical and projected DWA wholesale market price (SMP and capacity payments)

Note: The term SMP in the I-SCM period (2010-2020) is used to describe the electricity market price.
3. **ELECTRICITY AFFORDABILITY**

Retail electricity prices include the cost of electricity production, transporting electricity over the transmission and distribution networks and supplying it to consumers. They can be broken down to following cost components:

- wholesale market cost;
  - electricity (energy) costs;
  - capacity payments; and
  - other energy balancing costs and make whole payments.
- network charges;
  - transmission use of system charges (‘TUoS’);
  - distribution use of system charges (‘DUoS’); and
  - system support services (‘SSS’).
- supply costs;
  - operating expenditure; and
  - net margin.
- taxation and levies;
  - Public Service Obligations (‘PSO’); and
  - VAT.

There are different drivers for each of the cost component ranging from policy decisions to wider economic factors. The focus of this paper is how Moneypoint impacts retail prices. The main components affected are wholesale market costs:

- energy costs are influenced by the electricity supply mix; and
- capacity payments under the new CRM are impacted by the amount and type of capacity in the market.

Network charges are primarily driven by the topology of the network and the TSO’s and DSOs’ efficiency in operating the electricity network. This means they remain largely unaffected by the presence (or absence) of Moneypoint. Similarly, supply costs are dictated by operating expenditure and the required supplier net margin, remaining unaffected by changes in the capacity mix and the wholesale market costs.

The level of taxation is a policy decision, again not linked to the underlying commodity prices. However, taxation is typically expressed as a percentage of the underlying commodity and will be higher in absolute terms as the cost of electricity increases (and lower if the cost of electricity decreases). The PSO covers additional levies for supporting some types of generation, ensuring either a minimum overall income or a minimum

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8 However, an impact would be expected on the cost of system support services.
income per unit of production. An indirect impact on the PSC takes place as the wholesale market revenue for supported technologies changes.\(^9\).

### 3.1 Cost to consumers

#### 3.1.1 Understanding movements in wholesale electricity prices

The cost of fossil fuelled power generation is driven primarily by commodity and carbon prices. Over the last years, increasing import of US coal to Europe due to increasing US shale gas production has led to a drop in coal prices. In contrast, European gas prices have remained high driven by oil prices and strong Asian demand for gas. This means Moneypoint has been the cheapest thermal generator in Ireland between 2012 and 2014. However, this was not the case prior to 2012, when higher carbon prices and lower gas prices made gas-fired generation more favourable. The relative cost competitiveness of gas- and coal-fired generation over the last seven years is presented in Table 2.

#### Table 2 – Average variable production cost for a typical CCGT and a typical coal plant

<table>
<thead>
<tr>
<th>€/MWh</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCGT</td>
<td>66</td>
<td>34</td>
<td>45</td>
<td>54</td>
<td>57</td>
<td>59</td>
<td>61</td>
</tr>
<tr>
<td>Coal</td>
<td>76</td>
<td>44</td>
<td>52</td>
<td>58</td>
<td>45</td>
<td>37</td>
<td>36</td>
</tr>
</tbody>
</table>

The trend of relatively ‘cheaper’ coal-fired generation is expected to persist in the short term based on the current forward curves. As a result, coal is expected to be a baseload form of electricity production with gas acting as the marginal generator. Under the ‘Status quo’ scenario Moneypoint will continue to baseload with an annual average load factor of 85\(^\text{a}\). Removing Moneypoint would mean that its output has to be replaced by more expensive sources, resulting in higher prices over some or all periods.

The changes in generation patterns and electricity trade can help inform the change in wholesale electricity prices and cost to consumers. Figure 5 shows the change in generation end net flows in the case where Moneypoint is replaced with domestic gas-fired capacity (‘Gas world’).

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\(^9\) Lower revenue from the markets means there is an increased need for support in the form of PSOs, whereas higher revenues from the market result in a reduced need for out-of-market support.

\(^{10}\) This is the load factor of the market schedule (MSQ). Actual dispatch may differ and will depend on the TSO’s needs for covering for system services and network constraints.
Over the period 2008-11 the additional gas generation would have not only replaced coal generation, but also increased 'net flows' to Northern Ireland. From 2012 onwards, the displaced coal would start to be covered by domestic gas, but there would also be a drop in 'exports' to Northern Ireland and greater reliance on electricity imports from GB (upon EWIC commissioning in 2013). In the future, the trend remains constant across all years. Baseload coal generation is replaced by gas and electricity flows to GB and Northern Ireland are reduced.

Assuming no replacement CCGT capacity there would be a significant reduction of 'net flows' to Northern Ireland and even a reversal in some years with Northern Ireland 'exporting' to Ireland. Gas and limited oil-fired generation would cover for the remainder of the displaced coal generation. Again, in the future, the trend remains constant with lower exports to GB and Northern Ireland and greater gas production as a result of Moneypoint's closure. This is shown in Figure 6.
3.1.2 Impact of Moneypoint on cost to consumers

Moneypoint saves Irish consumers €220m on average per annum. In its absence we would expect a strong increase in the cost of purchasing electricity from the wholesale markets. This increase is partially offset by a significant drop in the required PSO as there is less of a need for out-of-market support for renewables and other ‘subsidised’ generation. The impact on capacity payments is lower with an increase in capacity payments expected only under the I-SEM.

Replacing Moneypoint with new, efficient, gas capacity of the same size results in a higher average annual cost to consumers, but the increase is relatively small (€9m). Consumers may not be facing a significant increase for purchasing electricity, but overall wholesale market costs increase.

Table 2 shows the breakdown of the average annual change in the total cost faced by consumers under the two scenarios ('Gas world' and 'Moneypoint closes').

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11 The total cost of operating the electricity system including capex, opex and variable production costs.
Table 3 – Change in average annual cost to consumers

<table>
<thead>
<tr>
<th></th>
<th>'Moneypoint closes'</th>
<th>'Gas world'</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholesale electricity price</td>
<td>239</td>
<td>13</td>
</tr>
<tr>
<td>Capacity payments</td>
<td>6</td>
<td>-1</td>
</tr>
<tr>
<td>PSO</td>
<td>-50</td>
<td>-4</td>
</tr>
<tr>
<td>VAT</td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
<td>9</td>
</tr>
</tbody>
</table>

Note: The above values relate to average annual values over the entire modelled period 2008-2020

3.1.2.1 Focus on historical cost to consumers

Assuming Moneypoint was completely removed from the market, lower efficiency CCGTs, peaking plants running on oil and imports would need to be used in its place. In years prior to 2013, this would have resulted in an increase in the SMP and consequently in the cost of purchasing electricity from the SEM pool. In particular, in 2008 when oil prices spiked this would have translated into a €517m increase. Over 2013-14, the increase in cost to consumers would be less pronounced as newer, more efficient CCGTs had been commissioned.

However, the impact on cost to consumers from replacing Moneypoint with gas-fired capacity would be much smaller. In years prior to 2011 this would have actually meant a small reduction as the replacement gas capacity would effectively have a lower variable cost. Over the period 2012-14 average annual savings for consumers would be around €30m.

Figure 7 shows the additional cost to consumers under the two scenarios without Moneypoint over the last seven years.
3.1.2.2 Focus on projected cost to consumers

In the future, we would expect Moneypoint (and the ‘Status quo’ scenario) to consistently deliver electricity cost reductions compared to alternative scenarios. Over 2015-17, removing Moneypoint would lead to an increase in average annual cost to consumers of €117m. If Moneypoint was, however, replaced by gas capacity, the increase in annual cost to consumers would be much lower, averaging at €13m over that same period.

A more substantial increase is expected if Moneypoint is not in place when the new CRM is introduced. In order to ensure sufficient capacity on the system a higher clearing price will be needed. In addition, as capacity margins are tighter, wholesale market prices become peakier. Without Moneypoint average annual cost to consumers over 2018-20 would be €269m higher. Any replacement gas capacity is likely to diminish the impact of not having Moneypoint on the system over 2018-2020 with just a marginal increase in average annual cost to consumers of €1m.

Figure 8 shows the change in cost to consumers under the two scenarios without Moneypoint out to 2020.
3.2 Sensitivity to gas prices

Future commodity prices are uncertain. It is important to test future scenarios against more ‘extreme’ sets of assumptions. We have therefore modelled all three scenarios with higher and lower expectations for the evolution of gas prices.

Assuming 30% higher gas prices, Moneypoint offers additional protection, further decreasing cost to consumers when compared to a world without Moneypoint. If, on the other hand, gas prices are 30% lower, Moneypoint still continues to deliver substantial savings to consumers in the ‘Moneypoint closes’ scenario. In the ‘Gas world’ scenario, lower gas prices would actually deliver an improvement in the cost of electricity faced by consumers.

Table 4 shows the change in average annual cost to consumers under the gas price sensitivities.
### Table 4 – Change in average annual cost to consumers

<table>
<thead>
<tr>
<th>m€, real 2013 money</th>
<th>‘Moneypoint closes’</th>
<th>‘Gas world’</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30% higher gas</td>
<td>30% lower gas</td>
</tr>
<tr>
<td>Wholesale electricity price</td>
<td>277</td>
<td>172</td>
</tr>
<tr>
<td>Capacity payments</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>PSO</td>
<td>-59</td>
<td>-35</td>
</tr>
<tr>
<td>VAT</td>
<td>30</td>
<td>19</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>251</strong></td>
<td><strong>163</strong></td>
</tr>
</tbody>
</table>

Note: The above values relate to the average annual values over the entire modeled period 2008-2020

#### 3.2.1.1 Focus on historical cost to consumers

The two fuel sensitivities explore a hypothetical market outcome assuming gas prices were 30% higher and 30% lower when compared to the actual historical levels. All other commodity prices and physical characteristics remain the same and equal to the outturn values.

In the ‘Moneypoint closes’ scenario cost to consumers is significantly higher across a wide range of gas prices. Even with 30% lower gas prices Moneypoint would still reduce cost to consumers by €169m per annum. In the ‘Gas world’ scenario, however, even lower gas prices in the past would signal a significant drop in cost to consumers over the period 2008-10. Over 2012-14, even with a combination of low gas prices and replacement gas capacity, Irish consumers would still have paid more for their electricity in the absence of Moneypoint.

The sensitivity of historical additional cost to consumers to gas prices under the ‘Gas world’ and the ‘Moneypoint closes’ scenarios is presented in Figure 9.
3.2.1.2 Focus on projected cost to consumers

Higher gas prices when compared to our central view would only mean a marginal increase in Moneypoint’s load factor in the future, as the plant is expected to be baseloaded in both cases. As a result, the merit order effect is less pronounced. Higher gas prices would not result in further savings for Irish consumers in the ‘Moneypoint closes’ scenario. However, when moving to lower gas prices and Moneypoint is in some periods displaced by gas in the merit order, Moneypoint still delivers more affordable electricity, saving Irish consumers an average of €168m per annum.

Future low gas prices combined with gas replacement capacity under the ‘Gas world’ would only deliver a marginal average saving to consumers of €1m per annum. If gas prices ended up being higher than expected, on the other hand, Irish consumers would have to pay on €30m more on average per annum for their electricity assuming Moneypoint had been replaced by new, efficient same-size gas capacity.

The sensitivity of projected additional cost to consumers to gas prices under the ‘Gas world’ and the ‘Moneypoint closes’ scenarios is presented in Figure 10.
3.3 Wholesale market costs

Policy makers tend to focus on electricity affordability, rather than economic efficiency. Lower cost to consumers, however, does not necessarily mean greater economic efficiency of the system. Economic efficiency is achieved when optimal use of scarce resources takes place (and the total economic surplus is maximised) and not always when prices are minimised. When electricity affordability is similar in two alternative systems, which is the case with the ‘Status quo’ and ‘Gas world’ scenarios, another differentiating factor may be the wider economic efficiency of the system.

The economic surplus is maximised when wholesale market costs are minimised and the impact on wholesale market costs of removing or replacing Moneypoint can show which case delivers the most economic efficient outcome. In the context of this analysis, wholesale market costs are defined as:

- annualised capital expenditure on generation and interconnection;
- fixed operating costs for generation and interconnection;
- variable production costs, primarily fuel and carbon; and
- cost of net imports (i.e. the total payments for imports minus the revenue received for exports).

The wholesale market costs calculations presented in this section do not include costs of investing in and operating the transmission and distribution network.

Replacing Moneypoint with new gas capacity comes with the associated additional capital expenditure. As gas-fired generation has been more expensive in the past and is expected to remain more expensive in the short term future, variable production costs also
increase when Moneypoint is replaced. Cost to consumers may not be significantly higher but the total average annual economic surplus is reduced by €119m\(^{12}\).

Without Moneypoint, domestic variable production costs drop by €69m per annum and there are additional savings from the fixed costs associated with operating Moneypoint. Ireland becomes more reliant on imports (and limits exports to Northern Ireland and GB) having to pay an additional €200m on average per annum for purchasing electricity from neighbouring countries. Average annual wholesale market costs increase in the ‘Moneypoint closes’ scenario by €79m, again resulting in a less economically efficient system.

**Figure 11 – Change in average annual wholesale market costs**

![Chart showing change in wholesale market costs]

- **Variabe production costs**
- **Capex & opex**
- **Cost of net exports**
- **Net position**

### 3.4 Summary of conclusions

- **Moneypoint saves Irish consumers €220m on average per annum.**
- Replacing Moneypoint with new, efficient gas capacity of the same size results in a higher average annual cost to consumers, but the increase is relatively small (€9m).
- Lower cost to consumers from the operation of Moneypoint is expected under a wide range of gas prices.
- Savings for consumers in a gas-dominated world are only expected if Moneypoint is replaced by new and efficient same-size gas capacity and gas prices remain consistently low. Even in such a case, the drop in cost to consumers when compared to a world with Moneypoint on the system is not high, averaging at €25m per annum.

\(^{12}\) Equivalent to a corresponding increase in wholesale market costs.
4. SECURITY OF SUPPLY

Energy security of supply has recently been a major area of concern at a European level in light of the potential gas supply interruptions from Russia. Energy security of supply covers a wide range of issues including import dependency, fuel diversity and the integrity and capabilities of the energy supply chain.

4.1 Energy dependence

Ireland has traditionally been heavily reliant on imported fuels to meet its energy needs, ranking in the bottom 4 of the most energy dependent countries in the EU28, trailing only behind Malta, Luxembourg and Cyprus. An energy dependence rate of 89% sees Ireland lagging 32% off the EU average of 53%\textsuperscript{13}, as shown in Figure 12.

![Figure 12 – Energy dependence of EU 28 for 2013](image)

Source - Eurostat

Imported oil and gas accounted for 76% of primary energy use in 2013. Indigenous gas production is currently limited to a small quantity of gas sourced off the south coast of Ireland, which enters the transmission network at Inch. Over 90% of gas is sourced from the GB National Balancing Point (NBP) via the National Grid system exit point at Moffat and then through either the Scotland Northern Ireland Pipeline (SNIP) to NI or through one of the 2 interconnectors (IC1 and IC2) to Ireland.

The introduction of Corrib, expected to commence production in late 2015, will somewhat reduce Ireland’s energy dependence for the next ten years. It is expected to supply Ireland with 28 TWh of gas on average per annum, covering more than 40% of Irish gas

\textsuperscript{13} European Economy: Member States’ Energy Dependence. An Indicator-Based Assessment, Occasional Papers 145, April 203, European Commission.
demand. This will significantly reduce Ireland’s energy dependence from 89% down to 75%. Coal used for electricity production in Ireland is also imported, being part of Ireland’s energy dependence on foreign resources.

4.1.1 Electricity trade balance

Prevailing conditions in the GB market and the SEM have in the past resulted in predominantly electricity flows from GB to the SEM. Prior to EWIC commencing operation in 2013, flows across Moyle have also taken place in the ‘wrong’ direction with imports against the actual price differential.

This is expected to change in the future as the SEM moves to the new energy trading arrangements where market coupling will take place at the Day-Ahead stage (and electricity is expected to flow in the ‘right’ direction) and as prices in the SEM are expected to drop below those in GB as a result of the Carbon Price Support in GB and increasing levels of wind generation in Ireland and Northern Ireland.

Ireland and Northern Ireland operate a single electricity market and effectively share capacity resources. There are no actual physical boundary flows of electricity trade. That said, there is still a transfer of energy between the two countries, which is not subject to the physical characteristics of the link between them.

When considering Ireland in isolation, there is a strong export position as a result of ‘flows’ to Northern Ireland. Figure 13 presents the total historical and projected net electricity trade balance, alongside the breakdown of ‘flows’ to Northern Ireland and GB. Ireland is expected to have a strong export position in the short to medium term continuing to ‘export’ electricity to Northern Ireland and assuming exports to GB.

Figure 13 – Historical and projected Irish net electricity trade balance

![Figure 13](chart.png)

Source – Poyry Management Consulting

14 Network Development Plan 2014, Gaslink
4.1.1.1 Focus on historical net electricity trade balance

Moneypoint had an important role over the last three years in enhancing Ireland’s export position, limiting imports from GB and increasing ‘exports’ to Northern Ireland. Removing Moneypoint and assuming no capacity replacement would result in a strong change in the net electricity trade balance. Ireland would have been a net importer over the majority of the past seven years, excluding 2011 and 2012.

Replacing Moneypoint with gas would have actually meant strengthening Ireland’s export position in years prior to 2012. Between 2012 and 14, however, imports from GB would have increased and ‘exports’ to Northern Ireland would have dropped. Figure 14 shows the historical net energy balance under the two modelled scenarios without Moneypoint (‘Moneypoint closes’) and with gas replacement capacity (‘Gas world’). The historical electricity trade balance is also presented for comparison.

Figure 14 – Change in historical Irish net electricity balance

[Graph showing net electricity trade balance from 2008 to 2014]

Source – Poyry Management Consulting

4.1.1.2 Focus on projected net electricity trade balance

In the short to medium term Ireland is expected to maintain a strong net ‘export’ position. This is supported by the presence of Moneypoint. Without Moneypoint exports to GB and Northern Ireland would be reduced. Assuming gas replacement capacity, this export reduction would be somewhat tempered. Figure 15 shows the net energy balance under the two modelled scenarios without Moneypoint (‘Moneypoint closes’) and with gas replacement capacity (‘Gas world’). The electricity trade balance under the ‘Status quo’ scenario is also presented for comparison.
4.2 Value of fuel diversity

The Irish fuel mix is highly undiversified, which combined with a high import dependence makes Ireland vulnerable in terms of security of energy supply, as highlighted by the European Commission\textsuperscript{15}.

Use of oil and gas to meet primary energy requirements has been increasing over the last two decades. However, energy efficiency measures and the impact of the economic recession have put an end to that growth and there has been a steady decline in oil and gas use since 2008. In terms of their share in the primary fuels used, oil and gas are still the main fuel sources, accounting for around 50% and 30% of the total primary energy requirements over the period 2008-13 respectively\textsuperscript{16}.

Despite the drop in gas demand for electricity production over the last four years, gas is still the main fuel used for electricity generation, having accounted for 55% of fuels used for electricity production over the period 2008-13.

Figure 16 shows the share of each fuel for meeting Ireland’s total primary energy requirement and for electricity production.

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\textsuperscript{15} European Economy: Member States’ Energy Dependence: An Indicator-Based Assessment, Occasional Papers 145, April 203, European Commission.

\textsuperscript{16} Based on SEAI statistics.
4.2.1 Impact of Moneypoint on fuel diversity

Coal offers fuel diversity in Ireland. In the past it had the second largest share (20% over 2008-13) in fuels used for electricity production. Ireland would further increase its dependence on gas and would become even more exposed to the risks arising from a gas supply disruption without coal. This is shown in Figure 17. Over the entire modelled period (2008-2020) the share of gas for electricity production would increase to 76% and 73% respectively under the two scenarios without Moneypoint. This is equivalent to an annual increase of gas demand of 5.6TWh and 11.2TWh respectively.

Note: The output from RES does not increase across scenarios in absolute terms. The relative increase when moving away from the ‘Status quo’ is a result of a lower overall production and hence lower electricity exports.

Source – Pöyry Management Consulting & SEAI
4.3 Integrity of the energy supply chain

4.3.1 Fuel delivery infrastructure

Over 90% of Ireland’s gas currently comes from GB via interconnection with Scotland. The commissioning of the Corrib field in 2015/16 will add to diversity of gas supply in Ireland. However, even with Corrib online, gas still comes from a limited number of transportation routes. Coal, on the other hand, can be procured from multiple sources and transported from more than one route. This makes coal generation less susceptible to supply chain disruptions.

Ireland does not have any significant gas storage facilities with all the required gas flexibility required being provided by the gas interconnection. Unlike gas, coal can be stored at an onsite area at Moneypoint with a capacity of 600,000 tonnes. This translates to roughly 100 days of the station needs for running at full output. Moneypoint can continue to produce electricity for an extended period of time without the need of resupply, providing for an additional layer of security in the unlikely event of a coal supply disruption.

4.3.2 Electricity system capacity adequacy

Ireland and Northern Ireland have been operating a Single Electricity Market (‘SEM’) since 2007. The electricity system of the island of Ireland is a small isolated system. It is only connected to GB via two DC interconnectors. The small size of the synchronous system of the island of Ireland combined with the relative size of generating units creates concerns about the impact of capacity entry and exit on the system capacity margin. Removing just a single unit could mean a move from overcapacity to a capacity shortage and vice versa.

This has supported the use of an explicit Capacity Remuneration Mechanism (‘CRM’) in the SEM to deliver investment signals to attract new entry, support existing capacity on the system and ultimately ensure adequate installed capacity on the system. The current CRM has delivered capacity even beyond the required level and there is currently no concern regarding generation adequacy (having sufficient capacity to meet peak demand).

Without Moneypoint, however, Ireland would have faced issues in the past (2008-9) when demand was still high and some newer CCGTs had still not come online. This means Ireland would be more reliant on imports from GB (via Northern Ireland) to meet peak demand. Were Moyle to be offline or be operating at part of its rated capacity supply over that period there would have been a high risk of supply disconnections.

In years post 2011, the commissioning of additional CCGT and wind capacity combined with demand falling below the expected level resulted in a ‘looser’ system and capacity adequacy has become less of a concern.

In the short to medium term there appears to be no need for new entry on a SEM-wide basis or when looking at Ireland in isolation despite some generating units retiring out to 2020. This is also supported by evidence provided by EirGrid in the 2015-2024 All-Island Generation Capacity Statement, where both Ireland and Northern Ireland are expected to have a surplus of capacity out to 2020.

Given the relative size of Moneypoint to Irish peak demand the impact of its decommissioning may pose a threat. The current long-term price-based CRM means that it is unlikely other capacity will decommission purely based on economics until end of 2017. Moving to the proposed CRM, expected to be introduced end of 2017, some units
are likely to come offline as capacity payments may not be sufficient for them to cover their annual avoidable fixed costs.

In the absence of Moneypoint part of that capacity, which would otherwise retire over the period 2018-20 based on economics, would need to stay online to meet the capacity requirement. At the same time, Ireland would also become more reliant on imports from GB to meet peak demand. Greater reliance on interconnectors may not be politically acceptable and may be perceived as a threat to the security of the system.

4.3.3 Operational security of the electricity system

Non-energy factors, including the management of the transmission system and other system constraints, are an important aspect of the SO dispatch in the SEM. Differences between the ex-post market schedule, which does not include non-energy constraints, and the SO dispatch have historically been high. This reflects the importance of system inertia and frequency response in managing small island systems such as the SEM and more importantly one with high levels of wind penetration.

Ireland has a relatively low level of industrial load. Industrial demand typically presents a 'flat' profile throughout the day and contributes strongly to overnight demand. Countries with a strong industrial output typically present a lower ratio between daytime and overnight demand and a less pronounced morning swing. The demand profile of the All-Island system however presents a sharp swing when moving to peak hours and there is therefore a stronger need for plants to turn off or part-load overnight and turn on or ramp up during the day. Figure 18 compares the average hourly demand profile of Ireland against some selected EU countries.

Figure 18 – Average hourly within-day demand for selected markets for 2013

![Figure 18](image)

Source: Poyry Management Consulting analysis
This sharp morning swing\textsuperscript{17} points towards the need for a more ‘flexible’ generation fleet with relatively low technical minimum output. Generating units have to be able to reduce output overnight and ramp up in line with the demand, which has historically been the case with Moneypoint as shown in Figure 19.

\textbf{Figure 19 – Average hourly output from a Moneypoint unit in January 2012}

Each Moneypoint unit is able to reduce and operate at an output equal to 99MW. This is equivalent to 35\% of its maximum net output, with Moneypoint ranking amongst the units with the lowest technical minimums in the SEM and in Ireland. More importantly, most units with a lower minimum stable generation are older units, expected to retire in the near future, which are typically not utilised as a result of the higher costs. Figure 20 shows a comparison of the minimum stable generation of all units in the SEM with a capacity greater than 100MW.

\textsuperscript{17} Data centres, which currently account for over 200MW of demand, are expected to play a significant role in demand side management in Ireland in the future. Several multinational IT companies including Apple and Yahoo have recently revealed plans to build data centres in Ireland. This type of load may result in a ‘flattening’ of the demand profile in the future.
4.3.3.1 Network constraints

The Moneypoint site occupies a unique position in the Irish electricity network. It sits on the end of the 400kV network that runs from the west of Ireland to the major load centre in Dublin. Moneypoint is used by EirGrid to provide stability to the 400kV network.

4.4 Summary of conclusions

- Ireland’s reliance on gas would have been even stronger in Moneypoint’s absence with an additional average annual gas demand of 5.5TWh.
- Replacing Moneypoint with new, efficient gas capacity would further increase gas demand, with additional annual gas demand averaging at 11.2TWh.
- Coal is supplied by a more flexible infrastructure than gas and is less susceptible to supply chain risks
- Moneypoint’s flexibility is a significant benefit to system operation
5. ENVIRONMENTAL

Environmental impact and sustainability are high on the energy policy agenda. Ireland is attempting to reduce its carbon emissions and move to a low-carbon energy system, largely relying on widespread wind deployment. All thermal power plants have an impact on the environment. Moneypoint, in its turn, is a relatively high point source of both carbon and transboundary gas emissions, but still operates under the environmental limitations imposed by its IPPC license issued by the Environmental Protection Agency ('EPA').

5.1 Transboundary gas emissions

The energy sector has been the dominant sector responsible for emissions to air in Ireland. Transboundary gas emissions (SO\(_2\) and NO\(_x\)) are associated with acid rain, smog, acidification and eutrophication, also known as air quality issues. In order to limit the impact of such gases, an EU directive was introduced, the Industrial Emissions Directive ('IED'), aimed at reducing pollution from various industrial sources throughout the EU. Under the IED fossil fuel power plants must either comply with strict emissions levels or opt out and run limited hours.

In 2008, a major environmental equipment upgrade took place at Moneypoint to ensure compliance with environmental requirements for sulphur dioxide (SO\(_2\)) through flue gas desulphurisation (FGD) and nitrogen oxides (NO\(_x\)) through selective catalytic reduction (SCR). Since then, Moneypoint operates under a National Emissions Reduction Plan. It may still be the largest point source of NO\(_x\) and SO\(_2\) emissions, but has drastically reduced its impact on air quality and is fully compliant with all environmental standards with regards to transboundary gas emissions.

According to EPA data, national NO\(_x\) emissions decreased by 32% in 2013 when compared to the 2008 levels, primarily as a result of the abatement achieved by Moneypoint. Over this same period Moneypoint decreased NO\(_x\) mass emissions by 61% from 12.5kt to 4.9kt.

Similarly, national SO\(_2\) emissions decreased by 43% in 2013 when compared to the 2008 levels again driven by increased abatement at Moneypoint which reduced emissions by 60% from 18kt to 7.2kt over the same period.

From 2016 onwards, Moneypoint will operate under the IED. This allows for the selection of two options:

- complying with specific Emissions Level Values ('ELVs'); or
- operating temporarily under a Transitional National Plan until 2020.

Under both options, Moneypoint will further significantly decrease its mass air emissions and associated impact on air quality.

5.2 Carbon emissions and the EU Climate and Energy package

The single biggest driver of change in the energy sector in recent years was the Kyoto protocol and related EU decisions for its implementation. The Kyoto protocol is an international agreement that sets binding targets for industrialised countries and the EU for reducing greenhouse gas ('GHG') emissions. In the EU, reduction of GHG emissions is being targeted through:
a 21% reduction in emissions covered by a market-based scheme for trading carbon emissions, the EU ETS; and

an effort for reducing emissions in sectors not covered by the ETS ('non-ETS') by 10% when compared to 2005 levels.

5.2.1 The EU ETS

The EU Emissions Trading Scheme ('ETS') is a cap and trade scheme that covers carbon emissions from large stationary installations and (since 2012) aviation. These installations are required to submit sufficient carbon allowances to cover their emissions during the previous calendar year. At the heart of the scheme is the ability of companies to trade EU Allowances (EUAs). Companies for whom it is relatively costly to reduce emissions can purchase allowances from companies that can achieve emissions reductions at little or no cost. Through this mechanism, emissions reductions can in theory be achieved at least cost to Europe overall.

Operators are required to submit a verified report of their previous calendar year’s emissions by the end of March each year and the allowances are deducted from their accounts at the end of April. Allowances that are not surrendered can be banked and used in subsequent years.

However, each year since 2009, the supply of allowances in the market has exceeded demand, even with very low carbon prices. This has created an increasing surplus of allowances and a sustained fall in carbon prices. Figure 21 shows spot carbon prices since the scheme’s start in 2005.

Figure 21 – Spot carbon prices in the EU ETS
The prospects of a market driven structural deficit arising soon are slim due to the continued weakness in the European economy. This expectation of a sustained surplus of allowances has given rise to more regulatory measures for ‘fixing’ the carbon market. In March 2014, the ‘back-loading’ of some allowances in order to reduce the current surplus and restore price tension in the market was implemented. 900 million allowances will be withheld from auctions in 2014-2016 and their sale will be delayed until 2019 and 2020. This means the overall number of allowances to be auctioned in Phase III will be unchanged, but a larger proportion of allowances will be auctioned towards the back-end of the Phase.

As a result carbon prices have now risen above €5/tonne CO₂ with forward allowances now trading at around €7/tonne CO₂. Carbon prices are expected to be in line with the forward curve out to 2018 and we only forecast some small increase in 2019 and 2020\(^\text{18}\). This may however change as details regarding a newly-introduced ‘Market Stability Reserve’ (‘MSR’) become clearer.

The MSR is intended to adjust the supply of new allowances into the market based on the total number of allowances currently in circulation (the surplus), with the aim of preventing future imbalances between supply and demand. Each year, the MSR will withdraw/inject allowances from/to the market based on the surplus two years previously. The surplus near the MSR start date (~2017-21) is expected to be even larger than today’s and will trigger a withdrawal. This, coupled with the placing of ~900Mt of backloaded allowances into the reserve, represents a significant reduction in the supply of allowances, at least over the timescales considered by the market. The impact on prices may therefore be significant, but this highly depends on the parameters of the mechanism.

5.2.2 The non-ETS sectors

Not all sectors responsible for GHG emissions are covered by the ETS. The main emitters that do not fall under the ETS include transportation (with the exception of aviation), agriculture and buildings. Policy focus has been placed on these activities and an effort sharing decision points towards national targets for carbon reductions in the non-ETS sectors for 2020.

In Ireland, GHG emissions from the non-ETS sectors account for around 60% of the overall emissions. For Ireland, the ‘effort sharing’ decision requires a 20% reduction in non-ETS GHG emission by 2020 when compared to the 2005 levels.

5.3 Irish carbon emissions

Total GHG emissions in Ireland in 2013 were 57.0 Mt CO₂e covering both the ETS and the non-ETS related emissions\(^\text{19}\). Energy-related GHG emissions accounted for 63% of that, making the energy sector one of the dominant drivers. The electricity sector in its turn contributed approximately 32% to overall energy-related GHG emissions and has therefore a major role to play in facing up to the challenge of reducing emissions.

\(^{18}\) For the purposes of this study we have extended the 2018 forward carbon price out to 2020. Our own view is in line with the forward curve out to 2018 but we do see room for a small increase in 2019 and 2020.

\(^{19}\) Based on SEAI statistics.
5.3.1 Impact of Moneypoint on carbon emissions

Coal is one of the most carbon intensive fuels. Moneypoint alone was responsible for around 30% of the total CO₂ emissions in the power sector over the last seven years. As Moneypoint is expected to maintain baseload operation out to 2020, its share of overall power sector CO₂ emissions will continue to be high. Figure 22 shows the average annual CO₂ emissions over the entire modelled period under the three scenarios.

Moneypoint increases CO₂ emissions from the power sector by 4.2Mt on average per annum (‘Moneypoint closes’). Replacing Moneypoint with gas-fired capacity also results in a reduction in CO₂ emissions, 3.3Mt on average per annum (‘Gas world’). This is shown in Figure 22. CO₂ reduction in both cases comes as a result of gas-fired generation replacing more carbon-intensive coal, but also some ‘offshoring’ of emissions to GB and Northern Ireland.

Even though the closure of Moneypoint would reduce Irish CO₂ emissions, at a European level there would essentially be no impact. Moneypoint’s closure would mean more carbon allowances available for use elsewhere in Europe. The overall level of carbon emissions in Europe is determined by the EU-ETS cap and not individual power station closure decisions.

More importantly, the national target for GHG emissions reduction through ‘effort sharing’ does not cover the power sector. This means the closure of Moneypoint would not contribute towards that target.

5.3.1.1 Focus on past carbon emissions

Carbon emissions would, on average, have been 22% lower if Moneypoint was replaced by gas-fired generation. A combination of imports from GB and domestic gas-fired generation would have had to be scheduled to cover for the displaced coal output. The total saving in carbon emissions over the seven year period would have been 20Mt CO₂.
Further carbon reductions would have occurred if Moneypoint closed down and there was no replacement capacity, with an additional average carbon reduction of 10%. Local carbon emission intensity would in this case actually increase when compared to replacing with domestic gas-fired generation, but higher imports from GB would effectively reduce Irish emissions.

Figure 23 shows the annual impact of replacing and closing down Moneypoint on Irish power sector carbon emissions.

**Figure 23 – Impact of Moneypoint on historical Irish power sector carbon emissions**

![Graph showing carbon emissions over time with three scenarios: Status quo, "Gas world", and "Moneypoint closes".]

Note: Actual emissions are based on SEMO generation data and the historical emission intensity as report by SEAI

### 5.3.1.2 Focus on future carbon emissions

In the short term Irish carbon emissions are expected to rise, even though renewables will keep increasing their share in the generation mix. The introduction of the carbon price support in GB is expected to provide Irish thermal generators with a cost advantage and flows are expected to take place from Ireland to GB. This will mean greater Irish thermal generation and an associated increase in carbon emissions.

A combination of low carbon prices and favourable coal prices mean Moneypoint is expected to be running baseload out to 2020. Replacing Moneypoint with gas would deliver future carbon savings of 35% on average per annum. A marginal improvement takes place if there is no replacement capacity in the absence of Moneypoint.

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20 It is important to note that dispatch and investment decisions in the modelling reflect the cost of carbon faced by thermal generators. This means that cost of carbon feeds into the wholesale electricity prices, borne by consumers and affects closures, investment in new build and short term operation.
Figure 24 shows the annual impact of replacing and closing down Moneypoint on future Irish power sector carbon emissions.

![Figure 24 – Impact of Moneypoint on future Irish power sector carbon emissions](image)

### 5.4 Facilitating wind

The ambitious targets for wind deployment pose a significant challenge for managing the All-Island system. Increasing wind generation has led to curtailment and constraints of wind generation by the Transmission System Operators (TSOs) in order to maintain system security. Based on the TSOs’ ‘Annual Wind Constraint and Curtailment Report for 2013’ curtailment (which is the bigger concern in the long term) in the SEM was 2.3% in 2013\(^{21}\) and could increase even further. This is significant for wind generation whose renewable support payments are based on metered output.

EirGrid have specifically investigated the impact on curtailment of not running Moneypoint. Moneypoint’s minimum stable generation not only offers valuable services during the morning ramp up, but can also help facilitate wind. EirGrid’s analysis\(^ {22}\) indicates that were CCGTs to be used instead of Moneypoint overall curtailment would increase by 1% (in absolute terms) in 2020. This means that Moneypoint can help accommodate an additional 100GWh of wind generation in 2020, offsetting part of its carbon emissions.

---

\(^{21}\) Wind dispatched down as a result of constraints is estimated to have been around 0.9% in 2013.

\(^{22}\) Gate 3 Constraints Report – Results overview, Eirgrid, SONI and SEMO April 2013.
5.5 Summary of conclusions

- Moneypoint has reduced its impact on air quality by significantly reducing its NOx and SO2 emissions. Under the IED air emissions will be reduced even further.
- Moneypoint increases carbon emissions from the power sector by 4.2MtCO2 on average per annum.
- Replacing Moneypoint with gas-fired capacity reduces carbon emissions from the power sector by 3.3MtCO2 on average per annum.
- The closure of Moneypoint would reduce Irish carbon emissions but at a European level there would essentially be no impact. This is because Moneypoint’s closure would mean more carbon allowances available for use elsewhere in Europe. The overall level of carbon emissions in Europe is determined by the EU-ETS cap and not individual power station closure decisions. Carbon reductions would need to come from sectors other than power generation to meet national targets through ‘effort sharing’.
- Moneypoint’s technical characteristics help reduce wind curtailment.
6. VALUE TO THE NATIONAL ECONOMY

Moving away from the strict remit of the energy sector Moneypoint has also added value to the Irish economy indirectly through job creation and provision of strong stimulus to the wider economy. Coal being a relatively ‘cheaper’ form of electricity production helps reduce the deficit in the energy balance of payments and improve Ireland’s industrial competitiveness.

6.1 Gross employment

Jobs are created when investment is made in projects, such as power plants, requiring manufacturing, installation, operation and maintenance of equipment. When considering job impacts it is important to understand the extent to which employment can also be created indirectly through an investment, in addition to the direct employment benefits. Jobs can be grouped into:

- Direct;
- indirect; and
- induced.

Direct employment refers to jobs that arise as a direct result of the investment. Indirect employment involves jobs which are part of the supply chain for delivering a specific project. In the case of a power plant this will include, for example, providers of raw material over the construction phase and fuel shippers over the operational phase. Induced employment covers jobs created as a result of increased wages and household expenditure of direct and indirect employees. It can also be argued that if the project delivers household savings (through reduced electricity bills) further induced jobs can be created from an improvement in a household’s disposable income.

One commonly used measure for defining gross employment is the number of jobs per annual unit output from a specific technology. External sources\textsuperscript{23} suggest a relatively narrow range for coal with an average 0.15 jobs/GWh. Coal-fired generation can have a much stronger impact on employment when coal is locally sourced. Extraction and transportation of coal can amount up to an additional 0.3 jobs/GWh. However, coal used at Moneypoint is imported.

This suggests Moneypoint has created and is still supporting 900 jobs in Ireland. This includes direct, indirect and induced jobs. Out of these, 300 jobs are created directly in the energy sector and the remainder are indirect or induced.

More importantly, based on the literature, gas-fired generation has a lower value of jobs per annual unit output, averaging out at 0.12 jobs/GWh. This means there would be 180 less jobs in Ireland if Moneypoint was replaced with gas-fired generation.

6.2 Energy balance of payments

Ireland has traditionally relied on imported fuels for meeting its primary energy needs, including for electricity production. Gas from the Corrib field will somewhat lower the fossil fuel import bill. When it comes to electricity exports, Ireland has been a net importer of

\textsuperscript{23} Low carbon jobs: The evidence for net job creation from policy support for energy efficiency and renewable energy, UKERC.
electricity from GB over the last two years. However, this is expected to change in the future. The combination of an expected increase in the GB Carbon Price Support, increasing levels of wind in Ireland and the introduction of market coupling are expected to lead Ireland to export electricity to GB. Moneypoint helps improve this net export position.

Moneypoint reduces the energy balance of payments\textsuperscript{24} deficit. This is shown in Figure 25.

Without Moneypoint, lower payments for imported fossil fuels do not offset further dependence on electricity imports, leading to a drop in the total energy balance of payments. The average annual fossil fuel import bill would drop to €615m from €631m, but Ireland would no longer have a positive net income from electricity trading and the net energy balance position would be significantly impacted in the ‘Moneypoint closes’ scenario. The net energy balance of payments would decrease by €196m on average per annum.

Average annual fossil fuel import costs would rise from €631m to €712m if gas capacity replaced Moneypoint. At the same time net income from electricity trade would remain unchanged. This would result in an additional total energy balance of payments deficit of €82m on average per annum.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure25.png}
\caption{Change in average annual energy balance of payments}
\end{figure}

Note: Only fuels for electricity generation are shown

6.3 Industrial competitiveness

Industrial output and competitiveness is directly linked to the cost of energy. All other things being equal, a higher cost of electricity would make Ireland a less attractive country

\textsuperscript{24} For calculating the fossil fuel bill we assume that 60% of gas for electricity generation comes from a combination of Corrib and Inch from 2016 out to 2020. This is equivalent to around 18TWh of gas per annum. We have to note that the Corrib field production profile varies from year to year as expected by Gaslink.
for industrial players. As an example of this, we note that Ireland is currently attracting a lot of data centre demand with 200MW online at present and EirGrid, the electricity system operator, has suggested that there is the potential for over 1000MW of new data centre load by 2020. The price of Ireland's electricity relative to other countries will be an important factor in determining whether this pipeline comes to fruition.

Based on data published by Eurostat, in 2013, Ireland had the 9th most expensive electricity tariffs\(^25\) amongst the EU 28 countries for mid-sized industrial consumers, still being 'cheaper' than countries such as Germany and the Czech Republic. Based on our modelled scenarios, Irish industrial electricity prices in 2013 would have been higher by 4.3€/MWh\(^26\) without Moneypoint, moving Ireland into the top 7 most expensive countries. This is shown in Figure 26.

**Figure 26 – EU industrial electricity tariffs in 2013**

The above is an example of the impact of removing Moneypoint on some industrial players, and in particular mid-sized industrial consumers. The tariffs as presented by Eurostat allow for a direct comparison between different EU countries. Figure 26 just shows the impact for a given class of industrial consumers and for a given year and should not be considered as a representation of the average retail tariffs for the entirety of the industrial load.

In this study we do not attempt to capture the evolution of retail prices across the EU out to 2020. Retail prices depend on various parameters, including the underlying generation mix in each country, commodity price movements and national regulatory decisions. In

\(^{25}\) This relates to the industrial band ID tariffs.

\(^{26}\) Assuming a flat load profile throughout the year.
any case, however, any increase in electricity prices in Ireland does present an additional consideration for industrial players and may have an impact on industrial output.

When considering the entire modelled period, without Moneypoint industrial electricity prices would increase by €6.4/MWh on average, whereas with gas replacement capacity the average increase in electricity prices would be in the order of €0.3/MWh.

6.4 Contribution to the local economy

Moneypoint makes a significant contribution to local government funding through commercial rates paid to Clare County Council. It is currently valued at €152,370 and when combined with the ARV annual commercial rates for Moneypoint account for €11.12m. This represents 31% of the Clare County Council budget of €33.2mn as shown in Figure 27 below.

**Figure 27 – Contribution to Clare county council budget**

![Figure 27](image)

Source: Historical Clare County Council Budget Manager’s Report

6.5 Summary of conclusions

- Moneypoint sustains 900 jobs in Ireland.
- Moneypoint can support 120 more jobs when compared to gas-fired capacity of the same size.
- Without Moneypoint the energy balance of payment deficit would be greater.
- Lower cost of electricity delivered by Moneypoint helps improve Ireland’s industrial competitiveness.
- Commercial rates to Clare County Council paid by Moneypoint are equal to €11.32m, accounting for 31% of the council’s budget.
ANNEX A – MODELLED SCENARIOS

A.1 Input assumptions

For modelling historical years (2008-14) with and without Moneypoint, all outturn values of demand and commodity prices have been used. Installed capacities and technical characteristics of generating units are based on data published by the CER and the UR\textsuperscript{27}, whereas plant and interconnector availabilities are informed by data provided by SEMO.

A.1.1 Demand

Table 5 presents projected total annual demand for Ireland and Northern Ireland. We use the EirGrid/SONI Generation Capacity Statement 2015-2024\textsuperscript{28} for projections of total annual demand for Ireland and Northern Ireland out to 2020. We model each future year under 5 different historical weather and demand patterns (2006-2010).

<table>
<thead>
<tr>
<th>Table 5 – Annual volume demand</th>
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<tr>
<td>Ireland</td>
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A.1.2 Commodity and carbon prices

All commodity prices are based on the forward curves as of early January 2015. We have to note that we do not expect an impact on Irish gas prices from the introduction of Corrib. We expect these to continue to be linked to NBP gas prices.

<table>
<thead>
<tr>
<th>Table 6 – Annual commodity and carbon prices</th>
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<tr>
<td>real 2013 money</td>
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<tr>
<td>Gas (€/MWh)</td>
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<tr>
<td>Coal ($/bbl)</td>
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<td>CO₂ (€/tonne)</td>
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\textsuperscript{27} \url{http://www.allislandproject.org/en/market_decision_documents.aspx?article=862348e4-e60f-40e6-b876-d1a34d1c496c}

\textsuperscript{28} All-Island Generation Capacity Statement 2015-2024, Eirgrid\& SONI.
A.1.3 Economic assumptions

Table 7 shows the real exchange rates assumed in the modelling. Real exchange rates are derived from projections of nominal exchange rates and inflation. Nominal exchange rates for 2015 are based on the median composite Reuters forecast from approximately 40 financial institutions as of early January 2015.

Inflation rates for 2015 and 2016 have been derived by using the median composite CPI forecasts from Reuters. In 2017 the inflation rate now trends between the 2016 value and the long-term (from 2018 onwards) assumption of 2% in all three economic areas.

<table>
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<th>Table 7 – Projected inflation and exchange rates</th>
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<td>US$ per € (real FX rate)</td>
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<td>UK inflation</td>
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<td>EU inflation</td>
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ANNEX B – BACKGROUND TO BID3

B.1 Evolution of Pöyry market models

*BID3* is Pöyry’s power market model, used to model the dispatch of all generation on the European network. We simulate all 8760 hours per year, with multiple historical weather patterns, generating hourly wholesale prices for each country for each future year and dispatch patterns and revenues for each plant in Europe.

As illustrated in Figure 28, we have developed *BID3* from our previous power market models: *BID 2.4* which has sophisticated treatment of hydro dispatch, using Stochastic Dynamic Programming to calculate the option value of stored water; and *Zephyr*, which has underpinned our ground-breaking studies quantifying the impacts of intermittency in European electricity markets. *BID3* is highly flexible and incorporates the best aspects of our previous models. Since *BID3* is based upon the same underlying dispatch algorithm as *Zephyr*, there is no fundamental basis shift in projections when moving between the two.

*BID3* is:

- the modelling platform for Pöyry’s *Electricity Market Quarterly Analysis*, providing European power price projections used by major banks, utilities, governments and developers;
- used for bespoke projects for a wide range of clients; and
- available to purchase – deployed in-house by a range of European utilities.

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**Figure 28 – Evolution of Pöyry electricity market models**

- **Zephyr**
  - Electricity Market Model
  - Detailed wind and solar simulation
  - 365 days x 8 weather years
  - Used for NEWSIS and intermittency studies

- **BID**
  - Electricity Market Model
  - Detailed water valuation
  - 365 days/year x 50 hydro years
  - Used extensively in Nordics

- **Eureca**
  - Electricity Market Model
  - Plant-by-plant for all Europe
  - 24 sample days/year
  - Quick and flexible

- **BID3**
  - Electricity Market Model
  - Integrates three highly specialised models into a single flexible platform
B.2 Overview of BID3

Figure 29 presents a diagrammatic overview of BID3 in terms of inputs, dispatch engine and outputs.

Figure 29 – Overview of BID3 electricity market model

As illustrated in Figure 30, BID3 interfaces with our other market models to develop internally-consistent scenarios which show the inter-related impacts of electricity, gas and carbon market developments.

Figure 30 – Interaction of Pöyry market models

The outputs from the model include wholesale electricity prices (incorporating both short run marginal costs and recovery of long run marginal costs), power station load factors, total system dispatch cost, and total investment cost of new build.
# Quality and Document Control

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