Gas and Electricity Interaction

Gas & Electricity Workshop

3rd July 2013

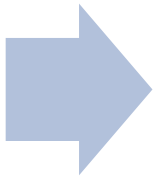
Presentation Objectives

All parties to develop a better understanding of the link between Irelands main energy sources

Outline the Transporters concerns in relation to the Gas & Electricity interaction

Explore recommendations to improve Shipper/Transporter communication

Ensure all Shippers provide timely and accurate Nominations and Renominations.



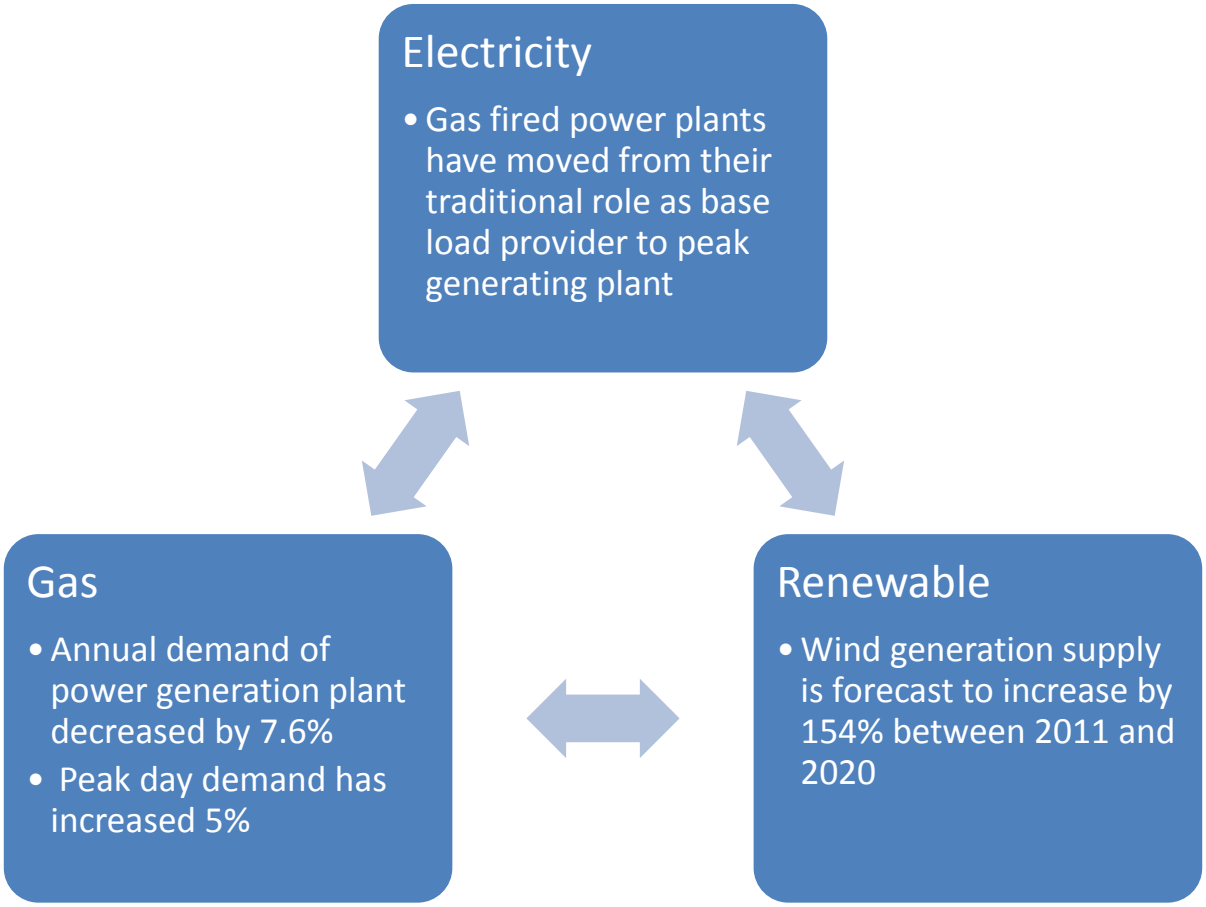
Assist in mitigating the risk of a supply interruption at the Moffat Entry Point over the next two winters.

Presentation Agenda

- Irelands Main Energy Sources Link
- Why study was conducted
- Analysis of Shipper's Nomination / Renomination Behaviour
- Transporter Concerns
- Transporter Recommendations

Irelands Main Energy Sources Link

- The link between the main energy sources in the ROI is of increasing importance in the ever changing energy sector.



Irelands Main Energy Sources Link

- Natural gas plays a very important role in the energy mix of Republic of Ireland;
  - Gas fired power generation plants accounting for 50% of electricity generation in the gas year 2011/12.
  - The Gas Network can provide the flexibility which is vital in supporting the link between renewable energy generation and the electricity sectors
  - The intermittency of the wind generation requires gas fired power plants to be flexible and in a position to fill a void in the electrical grid supply when required

Why study was conducted

- Capacity limits at the Moffat Entry Point are likely to be reached in the coming years:
    - Peak Flows similar to the 1:50 forecasts have been encountered before e.g. 8 December 2012;
    - Forecasts suggest the power sector will experience increased annual demand, peak day demand and increased variability in the coming years.
    - Such flows can be managed effectively, assuming that the Transporter receives accurate and timely information from Shippers at all times
- ***If inaccurate information is provided, The Transporter may need to restrict flows via constraint management procedures such as Restricted Capacity Day or a Supply Emergency***

Moffat Peak Day Forecasts

1-in-50 Peak Day Forecasts at Moffat Entry Point 2011 - 2021			
Year	**Moffat Capacity (mscmd)**	**Forecast Peak Flow (mscmd)**	**% of Capacity utilised (flat flow)**
2011/12	31	30.5	98.4%
2012/13	31	29.4	94.8%
2013/14	31	30.1	97.1%
2014/15	31	**31.8**	**102.6%**
2015/16	29	25.8	89.0%
2016/17	29	26.8	92.4%
2017/18	29	28.9	99.7%
2018/19	**29**	**29.2**	**100.7%**
2019/20	**29**	**29.9**	**103.1%**
2020/21	**29**	**31.1**	**107.2%**

Table 6.2: Network Development Statement 2011/12 – 2020/21

Peak Day: 8 December 2010

- Capacity Limit was approached on 8th December 2010:
  - 30.4 mscmd consumed (98% of Moffat Capacity of 31 mscmd)

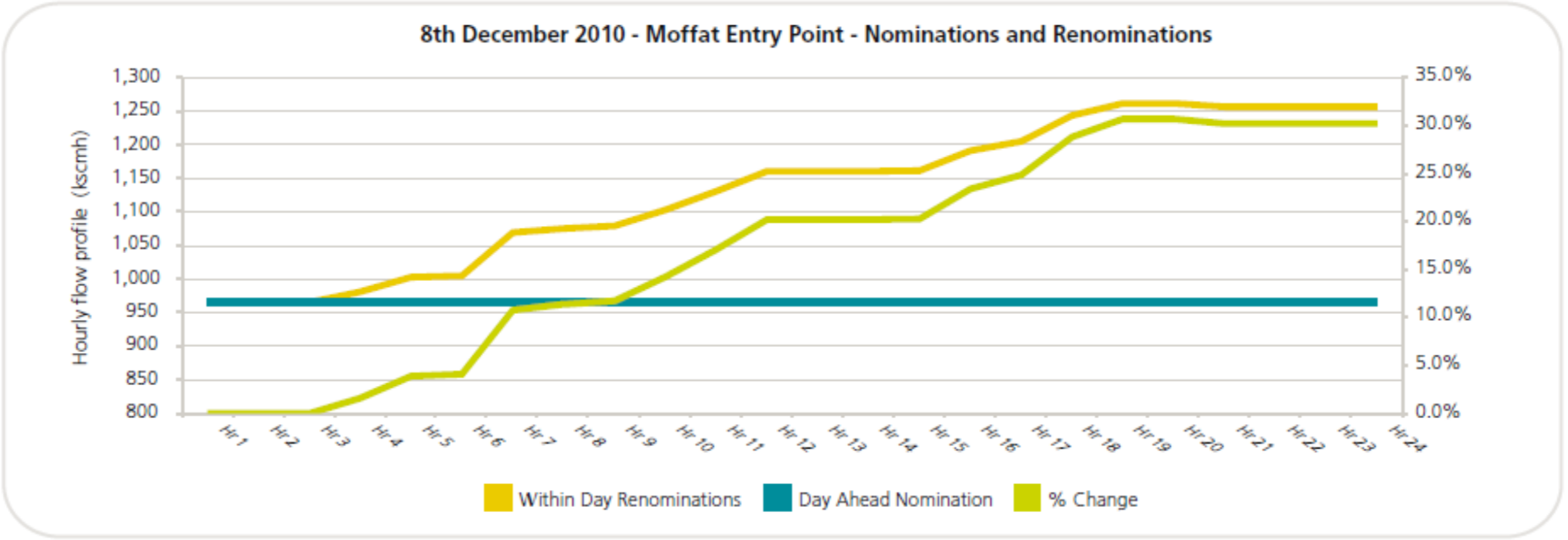


Figure 6.6: Network Development Statement 2011/12 – 2020/21

- Favourable pressures ranging from 50 – 56 barg were available to Beattock Compressor Station on 8 December, hence all End of Day Quantities (EODQ) achieved

Effects of Late Renominations

- Submitting sharp upward Renominations late in the day result in:
  - The Transporter being unable to deliver the requested End of Day Quantity (EODQ)
  - Increased stop/start of compressors, increased maintenance, labour and shrinkage costs as well as the likelihood of a compressor trip.
- Submitting sharp downward Renominations late in the day result in:
  - A quantity of gas in excess of the requested EODQ being delivered at Moffat.
  - Transporter reducing flow rate in the remaining hours of the day such that the low flow limits of the Beattock Compressor Station are breached resulting in poor efficiency and increased shrinkage costs.

Overview of Analysis

Period analysed: **Q1 2013**

- Analysis carried out on the Nominations/Renominations at the PowerGen Exit Points and compared to Q1 2011 & Q2012 data.
- Data analysed consisted of hourly flow data, latest Nomination and effective Nomination for each hour, and the Exit INFR for each power station Exit Nomination.
- 6 checks performed for each power station for each hour of the period to compare Nomination patterns to best practice.
- The main purpose of the analysis was to pick out examples of poor Nomination behaviour and quantify the frequency of this behaviour.

Results of Follow-Up Analysis

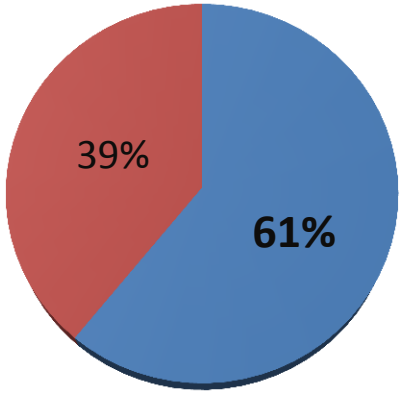
	Profiling			Late Re-nominations		Negative INFR
	Check 1	**Check 2**	**Check 3**	**Check 4**	**Check 5**	**Check 6**
	% Hours Where Difference Between Nom Profile and Metered exceeds 15%	**% Hours Where Difference Between Nom Profile and Metered exceeds 25%**	**% Hours Where Difference Between Nom Profile and Metered exceeds 50%**	**% Days Where Gas Burnt Before Nominated**	**% Days Where Gas Burnt Before Nomination Effective**	**% Days Nomination Submitted With INFR < 0**
Min Q1 2013	1%	0%	0%	0%	0%	0%
Median Q1 2013	8%	5%	3%	7%	12%	18%
Max Q1 2013	18%	18%	14%	33%	47%	100%

Comparison of Analysis: 2011/12 vs. 2013

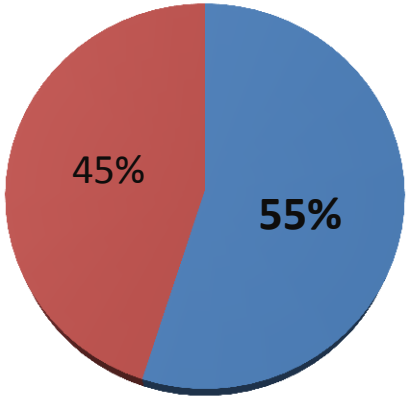
- The general analysis trend indicates:
  - The required change in Nomination behaviour has not been effected, in some instances behaviour has worsened.
  - Shippers are still waiting until late in the Gas Day to Renominate accurately.
  - There is a significant delay between the time the Shipper receives an updated dispatch profile from Eirgrid and when they Renominate same to the Transporter.
  - Only 20% of power plants are Nominating within contractual obligations.

Impact of PowerGen Sector on Gas Network

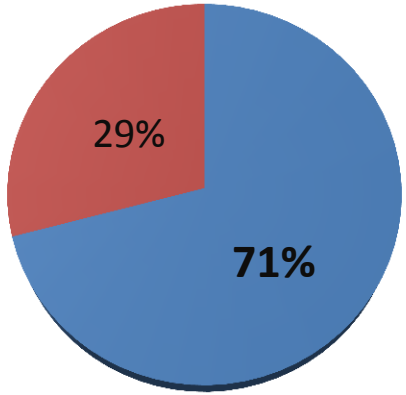
Annual Demand



Peak Day Demand



Summer Minimum Day



Power **I/C & Residential**

Based on 2011/12 demand figures from Network Development Statement 2011/12 to 2020/21

The Power Generation Sector represents a significant portion of the gas demand (on peak days and summer minimum days) and its actions can therefore have a considerable effect on the efficient operation of the system:

Transporter Concerns

Gaslink and BGN have increasing concerns in Shipper behaviour based on results of Nomination behaviour analysis.

These concerns include:

1. Lack of action from the Power Generation Shippers
2. Unnecessary Constraint Management
3. Increased Cost of Gas
4. Increasing Flexibility Requirement
5. Change in Power Generation Plant Profile

Transporter Concerns

Lack of action from the Power Generation Shippers

- Gaslink and BGN presented results from analysis of Nomination behaviour, 01/01/2011 to 31/07/2012, to the Shippers at individual meetings in Q4 2012.
- The aim of these meetings was to emphasise the importance of Nominations to the Transporter.
- Subsequent analysis was carried out on Q1 2013 data.
- The general trend in the analysis indicates that the required change in Nomination behaviour has not been effected, in some instances behaviour has worsened.
- The results also show that there is still a significant delay between the time the Shipper receives an updated dispatch profile from Eirgrid and when they Renominate same to the Transporter.

Transporter Concerns

Unnecessary Constraint Management

- Shippers waiting until late in the gas day to provide accurate Nomination information may result in the Transporter being unable to deliver the requested End of Day Quantity (EODQ).
- The Transporter may be required to impose restricted flows via constraint management or emergency management procedures which in other circumstances would have been avoidable.
- These constraint management procedures would not only have serious effects for the gas industry but also the electricity and renewable energy sectors.

Transporter Concerns

Increased Cost of Gas

- Increased Transporter operational costs, caused by inaccurate Nomination information, are being unfairly cross-subsidised by Shippers that are submitting Nominations in accordance with contractual obligations.
- Inaccurate or late in the gas day Renominations force spikes in the compressor profiles, resulting in inefficient operation of the compressors; increased stop/start of compressors, recycling of gas, increased maintenance, labour and shrinkage costs as well as the likelihood of a compressor trip.
- There needs to be an ethos of ‘Polluter Pays’ throughout all gas Shippers.

Transporter Concerns

Increasing Flexibility Requirement

- Increased flexibility is required in the Gas Network to accommodate the expanding renewable generation sector on the electrical grid.
- Wind generation supply is forecast to increase by 154% between 2011 and 2020.
- The Transporter needs accurate and timely Nominations information from Shippers to be in a position to supply this flexibility.
- Continual late in the Gas Day Renominations will mean there will be limited ability in the Gas Network to accommodate within-day shipper Renominations triggered by wind intermittency.

Transporter Concerns

Change in Power Generation Plant Profile

- Annual demand of gas fired power generation plants for the gas year 2012/13 is 7.6% lower than the same period in 2011/12. In contrast, the peak day demand for the power generation sector in the 2012/13 gas year has increased 5% from the 2011/12 value.
- Typical gas fired power plant profiles have moved from traditional base load providers to supplying peak demand generation and security to the electrical grid.
- This change requires the communication patterns between the Transporter and the Shippers to be reviewed and updated.

Transporter Recommendations

Gaslink and BGN have compiled recommendations they believe are necessary to protect the link between the energy sectors in this changing environment, ensure the future flexibility of the Gas Network and protect all gas users from increased energy prices.

These concerns include:

1. Enforce Code of Operation Rules
2. Transporter provide one hour window of grace
3. Open a line of communication between Eirgrid & Transporter
4. Shipper to Renominate ever three hours
5. Penalty for burning gas in excess of Nominated EODQ
6. Turn flexibility of the Network into a Commercial Product

Transporter Recommendations

Enforce Code of Operation Rules

- Nomination criteria in the Code of Operations include:
  - Nominations may be rejected if the Implied Nomination Flow Rate (INFR) is judged to be too high or negative.
  - Notice periods are also applied to Renominations, meaning the Renomination will not become effective for a given number of hours after it has been submitted.
- At the request of the power generation sector a certain amount of discretion has been applied to the enforcement of these rules.
- Due to the change in the gas/electricity dynamic the Transporter proposes to enforce the Nomination rejection criteria included in the Code of Operations to protect the integrity and flexibility of the Gas Network.

Transporter Recommendations

Transporter provide one hour window of grace

- The Transporter is relying on the Shippers for timely Renominations to communicate when their dispatch profile has changed.
- It is proposed that the Transporter would allow a one hour window, from the time Eirgrid creates a new dispatch order, for the submission of Renominations outside the rules of the Code.
- Outside of this window the rules of the Code would be strictly enforced.
- The onus would be on the Shipper to provide a copy of the relevant dispatch order to the Transporter before approval of the Renomination.

Transporter Recommendations

Open a line of communication between Eirgrid & Transporter

- It is proposed that Eirgrid and Gaslink would open a formal line of communication.
- Eirgrid would provide Gaslink with a copy of all gas fired power plants dispatch orders.
- The availability of the Eirgrid dispatch orders would allow the Transporter to anticipate upcoming Shipper Renominations and provide a comparison for more detailed Shipper Nomination analysis.

Transporter Recommendations

Shipper to Renominate ever three hours

- The analysis of the Shippers' Nomination behaviour clearly indicates that the majority of Shippers are not Renominating regularly enough to comply with the Code of Operations Nomination Rules.
- It is proposed that a requirement be included in the Code of Operations, that every Power Generation Shipper submits at least one Renomination to the Transporter every three hours. This would require Shippers to submit six renominations between the hours of 06:00 and 01:45 on Gas Day D.
- A penalty would be imposed for every incident when a Shipper did not submit a Renomination within the required window.

Transporter Recommendations

Penalty for burning gas in excess of Nominated EODQ

- Under current Code of Operation rules there is no penalty imposed on a Shipper for burning gas before an effective Nomination has been submitted to the Transporter.
- If the Shipper has burned more gas than their EODQ, an alert would the automatically sent to both the Shipper and to the Transporter.
- This alert would prompt both the Shipper and the Transporter as to the immediate requirement of a Renomination.
- A penalty would be charged to a Shipper every time an alert was issued and every hour thereafter until an appropriate Renomination is submitted.

Transporter Recommendations

Turn flexibility of the Network into a Commercial Product

- It is not reasonable to expect that increased operational costs, caused by a small number of Shippers abusing the network line pack, to financially affect all gas users.
- The Transporter proposes to offer the use of the flexibility in the Transmission Network as a commercial product.
- The cost of the line-pack flexibility product would reflect all associated operational costs; increased stop/start of compressors, increased maintenance, labour and shrinkage costs as well as the likelihood of a compressor trip.
- This product would allow Shippers to use the flexibility on the Network without the related costs being burdened unfairly by other gas users.

Conclusion

- Communication between the Shippers and the Transporter is of paramount importance for the efficient operation of the gas Network.
- The general trend in the analysis indicates that the required change in Nomination behaviour has not been effected, in some instances behaviour has worsened.
- It is necessary that Shippers appreciate the challenges poor nomination behaviour can have on the Gas Network and how such behaviour could be to the detriment of flexibility in the system.
- The Transporter believes one or more of the included recommendation must be put in place to enforce the Code of Operation Nomination rules.