Common Arrangements for Gas ("CAG") Network Modelling Assumptions

12th December 2008

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Overview of presentation

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Background to CAG

- Bord Gais Networks (BGN) was requested to validate certain aspects of the preliminary CAG Cost Benefit analysis; namely potential benefits from
  - Fuel gas savings
  - Increased inventory product capacity on an all island network

- The benefits are based on Maximising SNIP's, allowing a portion of ROI demand to be supplied from SNIP via S/N Pipeline
  - This operating configuration allows for potential of benefits in terms of reduced fuel-gas at Brighouse Bay and potentially increased access to inventory product
  - This operating configurations assumes that the two systems are joined at Gormanston

Demand Scenario

- Hydraulic models based on TDS 2008 Central Demand, Base Supply scenarios:
  - Corrib as per CAG model (Year 1 – 2009/10);
  - Shannon (Year 1 – 2012/13);
  - Inch production and storage ceasing in 2013/14;
  - No NI storage or new indigenous production (aside from Corrib);
  - ESB Aghada 430 MW CCGT from October 2009;
  - Whitegate 445 MW CCGT from October 2010;
  - Quinn and AES Kilroot CCGTs from October 2011; *plus*
  - Provision for 2 x 100 MW OCGTs

- Peak day, Median Day and Minimum Summer day analysed to allow for approximation of the annual volume of fuel gas savings using a load duration curve

Demand Scenario – Winter Peak Day Demand

Demand (Gwhr/d)	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**
ROI	247.50	260.34	277.28	280.98	281.75	287.06	289.97	293.93	299.92	304.28
NI	84.85	86.96	89.18	110.13	111.95	113.96	115.96	117.96	119.97	121.97

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Demand Scenario – Winter Median Day Demand

Demand (Gwhr/d)	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**
ROI	184.2	194.0	203.8	199.1	199.8	201.6	203.0	205.8	207.8	209.8
NI	75.5	76.5	78.0	98.3	99.8	101.1	102.5	103.9	105.3	106.7

Demand Scenario – Summer Minimum Day Demand

Demand (Gwhr/d)	**2008/09**	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**
ROI	104.1	105.5	115.7	114.6	103.9	103.9	104.6	105.4	105.7	106.0
NI	61.7	62.1	62.4	81.6	81.9	82.2	82.6	82.9	83.3	83.6

Network Modelling Assumptions

- Developed a reference case for Brighouse Bay usage, both throughput & fuel, based on existing network configuration:
  - Contractual 8.08mscmd limit at Twynholm and;
  - Maximum SNIP's MOP of 75bar-g

- CAG hydraulic modelling analysed the following scenarios:
  - No contractual 8.08mscmd limit at Twynholm, whilst maintaining a flat flow profile, with SNIP's MOP of 75bar-g
  - No contractual 8.08mscmd limit at Twynholm, whilst maintaining a flat flow profile, with increased SNIP's MOP of 85bar-g
  - ROI & NI operated as one system

Network Modelling Assumptions

- Boundary Pressure Conditions:
  - Minimum 2.5Barg drop assumed across Twynholm AGI for station losses
  - 2 pressure regimes analysed upstream of Dublin City Gates
    - Current operational minimum 50Barg
    - Increased minimum upstream pressure of 55Barg
  - Minimum upstream pressure of 30 barg at Coolkeeragh AGI

- Supply Source Flow & Pressure Conditions
  - Flat flow assumed at:
    - Moffat, Beattock, Twynholm & Brighouse Bay
    - Corrib & Shannon
    - Loughshinny, landfall of IC1
  - Pressure set point at Gormanston, landfall of IC2 – Interconnectors absorbing ROI diurnal swing
  - Beattock Discharge pressure set to 85Barg

Result Assumption Details – SNIP's export into ROI

- Annual SNIP's exports were calculated taking a weighted average of the three different demand days analysed
- Fuel gas usage was estimated to be 0.5% of throughput at Brighouse Bay =>Annual Fuel gas savings (GWhr/y) was estimated to be 0.5% of the annual SNIP's export
- Annual fuel gas savings (GWhr/y) was then valued by means of a range from 60p/therm to 100p/therm. Conversion of fuel gas savings into Euros (€/y) assumed an exchange rate of £1 = €1.28, based on the exchange rate at the time.