Energy security: Gas supply security in IEA

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MARKET CONTEXT
MC - Gas market model is evolving

As the gas world starts to globalise...
MC - Global Gas Prices 2007-2016

Natural Gas Prices (USD/Mbtu)

Source: IEA

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World inter-regional natural gas trade

Selected global gas trade flows 2016 vs 2040 (bcm)

Source: WEO 2017, New Policies Scenario, IEA
WHY GAS SECURITY IS INCREASINGLY IMPORTANT?
Why increasingly important?

- Increase in gas-fired electricity generation has strengthened linkages between the power and gas sectors.
- Convergence between gas and electricity, with power companies investing in gas assets and gas companies building gas-fired plants.
- Cleanest and the least carbon-intensive fossil fuel.
- Expected to play a key role in the transition to a cleaner and more flexible energy system.
Why increasingly important?

World gas demand by sector 2000-2022 (bcm)

Source: IEA
Why increasingly important?

World electricity generation by source 2000-2040 (bcm)

Source: WEO 2017, New Policies Scenario, IEA

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SIMILARITIES AND DIFFERENCES TO OIL AND OIL RESPONSE
Similarities and differences

- Oil emergency response policies can be a useful reference for gas
- Gas emergency response measures can differ substantially
- Gas is capacity-bound to a highly capital-intensive transportation and distribution infrastructure
- Oil market more liquid, so a actual shortage more difficult than gas, a disruption would translate into price spikes, for gas there are more capacity constraints
- There is little demand-side response in some large consumer sectors, for example in the household and space heating sector
Similarities and differences

• Transportation/storage
  - Gas, unlike oil/coal difficult to transport, pipelines needed from wellhead to the final destination
  - Gas can also be transported as LNG for long distances but liquefaction/regasification facilities are needed as well as pipelines to transport the gas to the end-consumer
  - Cost of storage considerably more capital intensive

• Trading/contracts
  - Heavy investment required to develop gas infrastructure. Investors need certainty in demand. Redundancy of supply capacity small, exacerbating the impact of even small disruptions
  - Large proportion of gas traded with fixed customers with long-term contracts. Long-term contract provides assurance for the supplier. For LNG contract terms are for 10 to 20 years
  - A destination clause often included in long-term contracts, forbidding LNG buyer to resell it to third party without authorization from the seller. Difficult to establish a LNG trading
GAS SUPPLY SECURITY MEASURES
GSS - Import dependence

Source: IEA
GSS - Well functioning markets

- Diversifying supply sources and routes;
- Improving supply flexibility;
- Improving market liquidity;
- International cooperation;
- Managing demand; and
- Government regulations (e.g. Public Service Obligation) – design of market/enforcement
• 24 able to cope in N-1 situation

• 21 have designed a gas specific NESO (or structure to deal with emergencies).

• 9 have policy promoting interruptible contracts

• 6 have imposed gas stock obligation on industry

• 7 have imposed obligation on gas consuming industry to hold stocks of an alternative fuel.

• 3 government owned emergency stocks (Mexico 2026 - 5 days of demand)
GSS - Gas emergency policy

• For defined emergencies only
• Not for seasonal fluctuations
• Designed for specific situations of country / region
• Set out in Code of Operations or equivalent
GSS - Stocks

• Type of Stocks
  - Industry stocks/Public

• Important considerations
  - Location of stocks
  - Speed of withdrawal

• Storage
  - Underground
  - LNG terminals
  - Linepack
  - Storage within the pipeline network
Gas storage as a percentage of demand
2013

Source: IEA
Send out capacities from storage as a percentage of demand (2013)
## GSS - Stocks

- Government stocks
  - Spain, Hungary and Italy only

### Stockholding obligation on industry

<table>
<thead>
<tr>
<th>Country</th>
<th>Obligated entities</th>
<th>Volume of stocks</th>
<th>basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italy</td>
<td>importers</td>
<td>60 days</td>
<td>imports</td>
</tr>
<tr>
<td>Poland</td>
<td>Traders, importers</td>
<td>20-30 days</td>
<td>imports</td>
</tr>
<tr>
<td>Portugal</td>
<td>importers</td>
<td>15-20 days</td>
<td>consumption</td>
</tr>
<tr>
<td>Slovak Republic</td>
<td>suppliers</td>
<td>30 days</td>
<td>consumption</td>
</tr>
<tr>
<td>Spain</td>
<td>Traders, self-supplied consumers</td>
<td>20 days (2days LNG in winter)</td>
<td>consumption</td>
</tr>
<tr>
<td>Turkey</td>
<td>Importers, wholesalers</td>
<td>10% of yearly imports</td>
<td>imports</td>
</tr>
</tbody>
</table>
GSS - Spare capacity

- Surge production
  - If available, but in reality this is very limited
  - Shale-gas production in US has shown some potential of flexibility (highly reactive to prices)
• Interruptible contracts
  - Pre-negotiated in contracts with key large-users

• Public appeal
  - Government campaign to limit consumption
• More heavy-handed measure...
  - Requires government oversight and control
  - Clear, concise and pre-determined plan: clear to both government actors and consumers

• Pre-determine priority customers
  - Hospitals, schools, etc.
  - Domestic consumers
  - Role of gas in power generation
GSS - Fuel Switching

- From gas to other fuels
  - Notably to diesel / fuel oil

- Breakdown of gas consumption is key
  - More likely to occur for power-generating gas plants

- Ability of power sector to switch
  - Easier for older plants, or plants designed to switch
  - Availability of alternative stocks (stocks on site? Obligation on generators?)
Stockholding obligation of secondary fuels at power plants in some IEA member countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Secondary fuel by type</th>
<th>Volume of stocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>Fuel oil or propane</td>
<td>3 months</td>
</tr>
<tr>
<td>Greece</td>
<td>Diesel</td>
<td>5 days</td>
</tr>
<tr>
<td>Ireland</td>
<td>Diesel or fuel oil</td>
<td>3-5 days</td>
</tr>
<tr>
<td>Portugal</td>
<td>Diesel</td>
<td>5 days</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Heating oil</td>
<td>4.5 months</td>
</tr>
</tbody>
</table>
EU’s new Regulation to improve security of gas supply in the EU (01/11/17)

New rules go further than EU 994/2010, countries: to:
- work in regional groups to assess the potential for disruption to their gas supplies and agree on joint actions to prevent or mitigate the consequences
- stand ready to help neighbouring countries guarantee gas to vulnerable consumers during shortage (‘solidarity principle’)

Gas companies will have to officially notify national authorities about major long-term supply contracts that may be relevant to security of supply (transparency)

ENTSOG to perform EU-wide gas supply and infrastructure disruption simulation
Questions

• Has your country suffered from a severe gas supply disruption?
• How did your country deal with the supply?
• What mechanisms exist in your country to cope with short-term disruptions?
• Do campaigns exist to reduce gas consumption?