(Future) role of natural gas in the Netherlands

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Overview of presentation

- Gas in the Netherlands: facts and figures
- The Dutch gas market: development of the TTF
- Position of gas in the Dutch and Northwest European energy mix
- Factors impacting Dutch gas consumption:
  - demand side developments
  - production side developments
- Northwest Europe: transition from low calorific to high calorific gas
Gas in the Netherlands: facts and figures

• Dutch gas balance 2013:
  - production: 80 bcm  - export: 58 bcm
  - import: 20 bcm  - consumption: 42 bcm
• Exports: Germany, Belgium, Italy, France, UK and Switzerland.
  Imports: Norway, Russia and since mid 2011 LNG.
• NL-production = 47% EU-production and NL-production = 17.5% EU-consumption.
• NL-consumption = 8.5 % EU-consumption (5th largest consumer in EU).
• Consumption:
  - share of gas in energy consumption: 43.2%;
  - 53% of electricity generated by gas-powered installations;
  - almost 100% of households connected to the gas network.
• Remaining reserves: 900 bcm (680 bcm in Groningen field).
  - production will continue for decades;
  - shift from net exporter to net importer around 2025.
  (New development: unconventional gas ??)
Gas in the Netherlands: facts and figures

- Total length of transmission network: 12,050 km.
- Entry – exit system with 50 entry and 1,100 exit points.
  Number of interconnection points: 25.
- GATE LNG-terminal with throughput capacity of 12 bcm/year (can be expanded to 16 bcm/year).
- Gas storages:
  - Norg: 5.6 bcm
  - Grijpskerk: 2.4 bcm
  - Alkmaar: 0.5 bcm
  - Epe (G): 0.5 bcm
  - Zuidwending: 0.2 bcm
  - Bergermeer: 4.1 bcm (operational 2015).
The Dutch gas market: the gas hub TTF

- TTF started 2003: virtual point in gas grid where ownership of gas is handed over.
- Operated by Gasunie Transport Services (Dutch TSO for gas).
- Supports OTC, spot market and futures trading through ICE-Endex. TTF price also used on other trading floors (Germany – EEX).
- Can be used by registered shippers/traders who pay a license fee.
  
<table>
<thead>
<tr>
<th>Year</th>
<th>Total Traded Volume</th>
<th>Net Volume</th>
<th>Churn</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>2.5 bcm</td>
<td>1.5 bcm</td>
<td>1.8</td>
</tr>
<tr>
<td>2008</td>
<td>65.2 bcm</td>
<td>20.2 bcm</td>
<td>3.2</td>
</tr>
<tr>
<td>2011</td>
<td>645.8 bcm</td>
<td>38.3 bcm</td>
<td>16.9</td>
</tr>
<tr>
<td>2013</td>
<td>845.6 bcm</td>
<td>45.8 bcm</td>
<td>18.5</td>
</tr>
<tr>
<td>2014</td>
<td>1.352,8 bcm</td>
<td>44,0 bcm</td>
<td>30.7</td>
</tr>
</tbody>
</table>

- TTF largest hub in continental Europe.
- TTF on par with NBP in ICIS Tradability Index for gas hubs Q1 2014.
Development of the TTF: (towards) a liquid market

Monthly volumes at the Dutch TTF
January 2009 - December 2014

- TTF Net Volume
- TTF Volume Traded: OTC (ICIS Heren) + Exchanges
- TTF Volume Traded: OTC (LEBA) + Exchanges
- Number of active parties (ultimo)
Development of TTF in a European context

- Oldest hub: NBP (UK); followed by Zeebrugge (B) and TTF (NL)
- Delivery point of a number of long term contracts has been moved to a hub => increases flexibility for both buyer and seller.
- Convergence of prices between hubs: TTF, Zeebrugge (B) and NBP (UK).
- In Q1 – Q3 / 2014: delivered volume on NWE continental = 88% of gas demand in involved countries (A, B, Fr, G, IT, NL) (source: IHS)
- However EU market still quite diverse and no uniform picture yet due to:
  - role of long-term supply contracts;
  - relative low number of producers;
  - differences in size of market areas;
  - differences in role of gas in energy mix.

- A liquid market is on its way in the (Northwest) Europe, now it is time to take the next steps.
- But: does not mean the end of long term contracts. They will remain to play a role (security supply – security demand) however price concepts, delivery points, etc. may change, also as a consequence of EU rules and regulations.
Primary energy consumption in the Netherlands (in PJ)

Energieverbruik in Nederland

- Aardgas
- Kernenergie
- Hernieuwbare energie
- Aardoliegrondstoffen en -producten
- Afval en andere energiedragers
- Steenkool en Bruinkool
- Elektriciteit (import)
- Warmte

(CBS, 2014)
# Natural gas consumption in Northwest Europe in 2013

<table>
<thead>
<tr>
<th>Country</th>
<th>Primary gas consumption in bcm</th>
<th>Share of natural gas in primary energy consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>16.9</td>
<td>25.3%</td>
</tr>
<tr>
<td>Denmark</td>
<td>3.3</td>
<td>16.5%</td>
</tr>
<tr>
<td>France</td>
<td>46.0</td>
<td>14.7%</td>
</tr>
<tr>
<td>Germany</td>
<td>88.3</td>
<td>22.5%</td>
</tr>
<tr>
<td>Ireland</td>
<td>4.6</td>
<td>29.1%</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>1.1</td>
<td>20.5%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>39.8</td>
<td>43.2%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>78.5</td>
<td>32.5%</td>
</tr>
<tr>
<td>EU-28</td>
<td>460.4</td>
<td>23.1%</td>
</tr>
</tbody>
</table>

Natural gas consumption in the Netherlands (in bcm)
Factors impacting Dutch gas consumption: demand

- Drive towards more efficient use of energy and use of renewable energy.
- For the small user market and especially for households: switch to large-scale use of heat and electricity (all-electric) when new residential areas and homes are built (?).
- Industrial use of natural gas:
  - reduction due to the economic crisis and the (relative) high price of gas;
  - energy-savings measures lead to additional demand reduction, but this is offset by a growing economy;
  - industries which use gas as feedstock have no alternative in short to medium term.
- Gas-fired power plants:
  - share of electricity generated by gas-fired power plants decreased: more renewables, competition from coal-fired power plants;
  - outlook questionable: coal-fired power plants becoming more flexible and efficient, but less efficient gas-fired power plant already decommissioned.
- Cogeneration (combined heat and power (CHP)):
  - profitability of many CHP installations has deterioriated;
  - outlook questionable: potential for energy savings is there, but how about ETS?
- Transport sector: potential growth sector for gas demand, especially CNG and LNG, depending on the implementation of the Alternative Fuels Directive
Factors impacting Dutch gas consumption: demand

Future gas consumption also impacted by the Energy Agreement (2014) concluded between: employers and unions, nature conservation and environmental organisations, other civil-society organisations, financial institutions and central, regional and local governments.

Ambitions of the Energy Agreement:
- saving on final energy consumption: 1.5% per year;
- increase of share of renewable energy from 4% to 14% by 2020;
- achieving a reduction in CO2 emissions of 80 to 95% by 2050, among others through closure of old (build in the 1980s) coal-fired power plants in next coming years.

Source: ECN, National Energy Survey 2014; data in bcm.
Factors impacting Dutch gas consumption: production

<table>
<thead>
<tr>
<th>Dutch gas production</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>64.5</td>
<td>55.3</td>
<td>35.3</td>
<td>16.2</td>
</tr>
<tr>
<td>- Groningen field</td>
<td>39.4</td>
<td>39.0</td>
<td>26.0</td>
<td>12.0</td>
</tr>
<tr>
<td>- Other fields</td>
<td>25.1</td>
<td>16.3</td>
<td>9.3</td>
<td>4.2</td>
</tr>
</tbody>
</table>

Data in bcm

Declining gas production raises (political) questions on the future role of gas:
- growing imports of natural gas: avoid dependence on limited number of suppliers;
- exploit potential of unconventional sources of gas or strive for other sources of energy (combined with additional efforts on energy efficiency);
- should we phase natural gas out of the energy mix?

Questions influenced by the currently bleak public image of natural gas.

Plus specific for the Netherlands and Northwest Europe: how to deal with the decline of low calorific gas?
Low calorific gas transition in Northwest Europe

- Low calorific gas (L-gas) has Wobbe between 42.7 and 46.9 MJ/m³.
- L-gas is used in Belgium (5 bcm/year), France (5 bcm), Germany (30 bcm) and the Netherlands (30 bcm) => total market size of 70 bcm/year.
- Groningen field is by far the largest source of L-gas. Other sources are:
  - some small fields in the Netherlands;
  - German production (10 bcm/year, but already in decline);
  - quality conversion: turning high calorific gas (H-gas) into L-gas by adding nitrogen.
- Emerging decline of the Groningen field brings new questions:
  - continue to use L-gas and build additional quality conversion facilities?
  - convert market areas from L-gas to H-gas?
  - replace the L-gas supply by other sources of energy, like heat?
- Questions to be addressed by all L-gas using countries as Dutch L-gas supply will be phased out between 2020-2030 (the Netherlands from 2030 onwards).
- Most viable option: converting market areas combined with introducing other sources of energy. Transition requires long and careful preparation: all appliances to be converted or replaced.
- Belgium, France, Germany and the Netherlands working together on this: ministries, regulators and transmission system operators.
To summarize (and generalize)

Gas is currently the most important source of energy for the Netherlands. The Dutch gas market (TTF) is a mature, liquid market.

The future prospects for gas in the Netherlands (and the EU) are impacted by:
- the competitive position of gas compared to other energy sources;
- the role gas can claim in the transition towards a low-carbon energy society and as a desirable partner to accommodate;
- the public image of natural gas;
- confidence in the security of supply;
- the choices that will be made in the L-gas transition.
Further information:

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