Driving forces for European gas import demand

Peter Arp
Saint Petersburg, 10 November 2016
EU 28 gas demand expected to recover due to power generation and transport

Spain and Turkey are main drivers

Source: IHS
EU 28 supplies driven by Russia and LNG

Source: IHS
Significant LNG volumes could find their way into Europe

LNG Supply [bcma]

LNG Demand [bcma]

Surplus Supply to Europe [bcma] and Regas Utilisation [%]

Source: TSO data, projections Woodmac
**EU climate targets**

By the year **2020**

- **20%** Reduction in GHG emissions¹
- **20%** EU energy from RES
- **20%** Improvement in energy efficiency

By the year **2030**

- **>40%** Reduction in GHG emissions¹
- **>27%** EU energy from RES
- **27%** Improvement in energy efficiency

By 2040

- **60%** Reduction in GHG emissions¹

By 2050 (all sector contribution)

- **80-95%** Reduction in GHG emissions¹

¹ GHG emission reduction targets from 1990 levels (Source: Eurogas)
Gas boilers are an efficient way to achieve the EU targets

- Gas-fired boilers for the home are becoming increasingly more efficient compared to old, traditional boilers

Changing to modern gas heating systems today changes tomorrow for the better

- Modern gas-condensing boilers achieve efficiencies approaching 100%.
- These boilers are approx. 30 percentage points more efficient than old traditional oil boilers.
- Approx. 23% of Dutch homes are more efficient now than in 1980 by switching to modern gas-condensing boilers.
- Almost 70% of boilers in Germany are below current technical standards, as of 2015.
- 80% of the European boiler market went on replacing existing boilers in 2012, thus any programs/incentive schemes should be geared toward the upgrade/replacement market.

**CO₂ emissions reductions with modern gas systems**

<table>
<thead>
<tr>
<th>System Type</th>
<th>CO₂ Emissions per annum [kgCO₂/a]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional oil-fired</td>
<td>14,000</td>
</tr>
<tr>
<td>Traditional gas-fired</td>
<td>12,000</td>
</tr>
<tr>
<td>Modern gas condensing</td>
<td>10,000</td>
</tr>
<tr>
<td>Modern gas condensing + solar thermal /heating support</td>
<td>8,000</td>
</tr>
<tr>
<td>Solar thermal + gas HP add-on</td>
<td>6,000</td>
</tr>
</tbody>
</table>

**55% Reduction in CO₂ emissions**

**Fast facts**

New gas heating systems are the most economic way to achieve quick wins towards climate goals

- With 80% of the current building stock expected to be still in place in 2050, gas heating systems will play a crucial role in this retrofitting environment

- Upgrading outdated heating systems can help customers achieve quick, lasting wins between investment costs and energy savings, while requiring no additional structural changes to dwellings

Source: Dekra, 2015
Modern gas power plants are vastly superior compared to other fuel sources

- With greater efficiency and superior ramping capabilities, gas power plants are the ideal partner for intermittent renewable generation

Source: UK DECC, 2014; IEA, 2014; EON, 2015
Gas is both a more efficient and cleaner fuel for power generation

Greater efficiency...

- Improved technology = Greater net efficiency

...less emissions

- 270% less CO₂ emissions

With modern gas power plants, gas heating, and gas in transport, quick wins are possible for the climate.

In Power Gen

In Transport

At Home

42% Reduction in CO₂ emissions

24% Reduction in CO₂ emissions

Gas is an opportunity to decarbonise road and sea transport

Road*: CNG vs. Diesel GHG reductions

- CO2: -25%
- NOx: -49%
- CO: -75%
- PM: -95%

Marine: LNG vs. bunker fuel GHG reductions

- CO2: -25%
- NOx: -90%
- SOx: -100%

*light vehicles and heavy goods vehicles

Source: Volker quaschning; NREL, US DOE, 2002; IGU 2015
Why is the market interested in LNG4Trucks?

**Customer Value**

- **Reduction of emissions** (e.g. green house gases, fine particles or noise) and thus increase of ecological image

- **Competitive advantage** through exception to deliver in low emission zones or at night (depending on countries/cities)

- **Cost savings** by fuel efficiency through use of LNG compared to Diesel

### Emission reduction of LNG compared to Diesel (Euro IV)

<table>
<thead>
<tr>
<th>Emission</th>
<th>LNG vs. Diesel</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx</td>
<td>- 35%</td>
</tr>
<tr>
<td>CO₂</td>
<td>- 10%</td>
</tr>
<tr>
<td>Fine Particles</td>
<td>- 90%</td>
</tr>
<tr>
<td>Noise</td>
<td>- 70%</td>
</tr>
</tbody>
</table>

### Competitive advantage

**Warum Lkw in Zukunft nur noch mit Gas fahren sollten**

In vielen deutschen Städten drohen Fahrverbote

Volkswagen Scandal Puts Spotlight on Europe’s Dirty Air

**Mapped: Europe’s Diesel Pollution Problem**

Umweltbehörde will Dieselautos aus den Innenstädten verbannen

### LNG vs. Diesel supply

<table>
<thead>
<tr>
<th>€ per 100km</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excise tax</td>
<td></td>
</tr>
<tr>
<td>Transport</td>
<td></td>
</tr>
<tr>
<td>Excise tax</td>
<td></td>
</tr>
<tr>
<td>Gasoil FOB</td>
<td></td>
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<tr>
<td>Rdam</td>
<td></td>
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<tr>
<td>Gas hub price</td>
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</tbody>
</table>
Strong development of LNG for heavy-duty transport expected

Development of LNG/CNG as fuel for heavy duty vehicles

- IHS - Rivalry Scenario EU28
- Woodmac - Europe 2015 (CNG + LNG)
Different national subsidy schemes boost LNG 4Trucks business and offer upsides

**Netherlands**
- PIEK programme
  - joint initiative of three ministries to foster low-noise emission distribution of goods
  - LNG trucks are allowed for inner city:
    Goods distribution in the late evening and early morning hours
  - Excise duty advantage is 27,4 ct/kg LNG
  - Direct subsidies of approx. 5k€ per truck

**Belgium**
- Excise tax of 0 ct/kg for LNG
- Excise duty advantage is 25,3 ct/kg LNG

**France**
- Fiscal deduction
  - companies may deduct additional 40% of the LNG truck (in total 140%) purchase price from their taxable income from 1/1/2016 until 12/31/2017
  - Excise duty advantage is 36,2 ct/kg LNG

**Germany**
- Subsidy schemes from ministry for infrastructure 40% (+ 20 % for small enterprises) of additional costs for LNG truck compared to diesel trucks
- Excise duty advantage is 25,8 ct/kg LNG

**Italy**
- Direct subsidies
  - max. 20 TEUR for LNG trucks (unconfirmed)
  - Excise tax of 0,5 ct/kg for LNG
  - Excise duty advantage is 39,8 ct/kg LNG
LNG as a fuel for trucks is a new segment for gas to compete with oil

**Situation**
- LNG is the only alternative to diesel for heavy road transport in the next decades
- European market potential 5-10 mtpa until 2030*
- LNG driven trucks have lower noise and emissions of CO2, Nox, particles
- Uniper found LIQVIS to develop practical business case, first pilot fuelling stations in Germany and France operational
- Cooperation with Iveco launched to develop market in Western Germany

**Partners**
- Uniper/LIQVIS open to team-up with other players for procurement of LNG and construction of fuelling stations
- Meyer Logistik is the upcoming customer for the first LNG fuelling station in Berlin

**Uniper’s Value Proposition**
- Managing a European terminal capacity portfolio and LTCs
- Running a large energy wholesale businesses in Europe
- Uniper/LIQVIS started operations of two fuelling stations, further projects are under development

**Opportunities (Examples)**
- EU and national governments provide substantial support programs
- Diesel-LNG spread supposed to increase again
- LNG for truck market in Europe could absorb 100 LNG cargoes in 2030 if LNG as a fuel develops
- Already today in Europe incl. Turkey around 40,000 trucks a loaded p.a. in European terminals creating a total LNG distribution market of converted 1.5 bcm
- Whole market open for investors

*Source: IHS*