International perspectives on energy prices
Ifiec Energy forum 2017
Matthew Monteverde
31 May 2017
A brief review
Gas prices were higher

Front-month Dutch prices top €20/MWh during cold winter
So were power prices

Front-month base load power prices highest since 2012

€/MWh

Okt 07 Aug 08 Jun 09 Apr 10 Feb 11 Dez 11 Okt 12 Aug 13 Jun 14 Apr 15 Feb 16 Dez 16

Germany
Especially in France

Front-month base load power prices highest since 2012

€/MWh

Okt 07  Aug 08  Jun 09  Apr 10  Feb 11  Dez 11  Okt 12  Aug 13  Jun 14  Apr 15  Feb 16  Dez 16

Germany  France
Demand
Winter gas demand was higher

Winter demand — year-on-year comparison

<table>
<thead>
<tr>
<th>Country</th>
<th>Winter Demand Growth 2016-17 vs 2015-16</th>
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</thead>
<tbody>
<tr>
<td>NL</td>
<td>11.2%</td>
</tr>
<tr>
<td>FR</td>
<td>13.6%</td>
</tr>
<tr>
<td>IT</td>
<td>11.6%</td>
</tr>
<tr>
<td>UK</td>
<td>2.4%</td>
</tr>
<tr>
<td>DE</td>
<td>19%</td>
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Winter gas demand was higher

Winter demand — year-on-year comparison

- NL: 16.7% (Dec-Feb), 11.2% (Full winter)
- FR: 21.3% (Dec-Feb), 13.6% (Full winter)
- IT: 15.8% (Dec-Feb), 11.6% (Full winter)
- UK: 6.4% (Dec-Feb), 2.4% (Full winter)
- DE: 19.8% (Dec-Feb), 19.0% (Full winter)
Germany temperatures since 1881

Average winter temperatures were fractionally above average
Power sector demand was relatively strong

European power-sector demand highest in years
Demand was still lower than in similar years.
Supply

illuminating the markets
Supply did not change much

Composition of western European supply largely unchanged

[Graph showing supply trends from Jan 07 to Jan 17 with various supply types indicated]

iluminating the markets

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Russia maintaining market share
LNG is still finding better places to be

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- **Europe**
- **Japan 2010+**
- **Middle East, Pakistan, Egypt**
- **Argentina, Brazil, Chile**
- **SE Asia**

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**Sendout (mn m³/d)**
Gas prices were higher

Front-month Dutch prices top €20/MWh during cold winter
But European gas rallied slower than others
But European gas rallied slower than others

European gas price rally lags behind other commodities

- TTF
- LNG (spot Asia)
- Henry Hub
- Coal (ARA)
- Crude (Brent)
- Gasoline (Eurobob)
Europe and global gas pricing
European wholesale prices middle of the pack
The LNG market continues to grow
LNG trade flow
LNG trade flow 2015
Australia and the US contribute new LNG

2016 production v 2015

Total +20mn t
Australia +15.4
US +2.3
Export growth by destination

US LNG delivered to 13 countries. None received more than 540,000t

94pc of new volumes went to China, Japan and Korea
Demand up from the newest importers

2016 imports v 2015

Total +8.7mn t
Egypt +4.9
Brazil -3.3
Egypt
Egypt entering a second swing

Egyptian demand

mn m³/d
Egypt entering a second swing

Egyptian demand and power-sector consumption

- Demand
- Power sector

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Egypt entering a second swing

Egyptian demand and production

- **Demand**
- **Production**

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Egypt entering a second swing

Egyptian demand and production

- Export
- Import
- Demand
- Production
Egypt entering a second swing

New fields on the way

- West Nile Delta – commissioning March 2017 – plateau 34mn m³/d
- Zohr – scheduled end 2017 – 34mn m³/d in 4-5 months, 81mn m³/d by end 2018
- Atoll 1 – first-half 2018 - 8.5mn m³/d
Egypt entering a second swing

Egyptian demand and production

- Actual
- Projection
- Demand
- Production

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Global reserves and domestic production
Europe the second-lowest reserve region
European gas production in decline

European gas production (DK, DE, IT, NL, NO, PL, RO, UK)

bn m$^3$/yr


European gas production
The power sector in transition
EU power generation – limited demand growth, renewables push
EU power generation

- limited demand growth, renewables push

- Solid Fuels + waste
- Oil
- Gas
- Nuclear
- Renewables
US power generation – gas displaces coal, but renewables coming
US power generation – gas displaces coal, but renewables coming
US net power generation outlook

US power generation of the future – gas and renewables

Million MWh/yr

2001 2011 2021 2031 2041

Coal Gas Renewable Nuclear Oil/products/pet coke
Retail renewables
Google Project Sunroof

- Analysis complete. Your roof has:
  - 1,487 hours of usable sunlight per year
    Based on day-to-day analysis of weather patterns
  - 1,075 sq feet available for solar panels
    Based on 3D modeling of your roof and nearby trees

- $4,000 savings
  Estimated net savings for your roof with a 25-year lease

Wrong roof? Drag the marker to the right one.
### Google Project Sunroof

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<tr>
<th>Lease / PPA</th>
<th>Loan</th>
<th>Buy</th>
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<td><strong>Instant savings, zero down.</strong> You will make monthly payments to a solar leasing company who owns and maintains your system. You will have small upfront costs and you may have the option to purchase your system outright in the future.</td>
<td></td>
<td></td>
</tr>
</tbody>
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**Lease / PPA**
- **$0**
- **uptfront cost after incentives**

**Loan**
- **$200**
- **average annual savings**

**Buy**
- **$4,000**
- **total 20-year savings**

#### Own your system, pay over time.
A loan is a great way to take advantage of the incentives and long-term savings of a solar system without providing all of the cash up front. Every month, you will make payments to re-pay your loan principal and interest.

**Lease / PPA**
- **$0**
- **uptfront cost after incentives**

**Loan**
- **$400**
- **average annual savings**

**Buy**
- **$8,000**
- **total 20-year savings**

#### Pay up front, largest lifetime savings.
You pay the full cost up front and own the solar system without any additional payments over time. As the outright owner, you may claim any local, state, or federal incentives.

- **$9,000**
  - **uptfront cost after incentives**

- **$21,000**
  - **20-year benefits**

- **$12,000**
  - **total 20-year savings**

- **10**
  - **years until payback**
Trump and coal
Trump and coal

Executive order rolls back policy

• Lifts moratorium on leasing federal lands for coal mining – potentially for more than 1bn short tonnes
• EPA order to re-evaluate CO2 rules
• Rescinds guidance on the use of the social cost of carbon estimate to help measure the effect of greenhouse gas emissions

Reactions have been mixed, even in the industry

• US interior secretary: coal development “is going to be market driven”
• “At the end of the day, coal will still have to compete with a host of other fuels,” Cloud Peak Energy (NYT)
The struggling European utility sector
Profit margins for selected European utilities

- Centrica
- Uniper
- RWE
- EDF
- Engie
- Axpo Holding
- ENI
- Edison
- VNG
- Eon SE
- SSE
- Iberdrola
- Gas Natural
- Dong
- Sector average

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Conclusions
Market development: late-stage commoditization

Non-competitive market

Competitive market

Price formation

Trade type

Markets

+ Short-term contracts
Standard products
Futures

Source: Adapted from Energy Charter Secretariat - 2007 - based on Andrei Konoplyanik
Market development: late-stage commoditization

Non-competitive market

Competitive market

Commodity

Grid

Tax

Price formation

Trade type

Markets

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time

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