European energy markets
a EU regulator’s perspective

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Member of the Board of Regulators, ACER

London, March 19th, 2012
Shale gas potential

EIA estimates of 48 basins in 32 countries
Shale gas forecasts

Share of shale gas on local production
Source: EIA forecasts

OECD America
OECD Europe
OECD Asia
Russia
China
India
Center-South America
World

2008 vs 2035
The importance of LNG is growing

LNG share on total (world) gas export

source: IEA
World’s major LNG exporting and importing countries

Source: BG group
Where does LNG go?

Importazioni di LNG per paese di destinazione
fonte: IEA

<table>
<thead>
<tr>
<th>Paese</th>
<th>2006 (Milioni di metri cubi)</th>
<th>2010 (Milioni di metri cubi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>12</td>
<td>20</td>
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<tr>
<td>Belgium</td>
<td>7</td>
<td>11</td>
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<tr>
<td>Brazil</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Canada</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Chile</td>
<td>3</td>
<td>5</td>
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<tr>
<td>China</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Taiwan</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Dominican Republic</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>France</td>
<td>6</td>
<td>8</td>
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<tr>
<td>Greece</td>
<td>4</td>
<td>6</td>
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<tr>
<td>India</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Italy</td>
<td>5</td>
<td>7</td>
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<tr>
<td>Japan</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Korea</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Kuwait</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Mexico</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Norway</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Poland</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Portugal</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Puerto Rico</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Spain</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Turkey</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>UK</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>USA</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

Note: The chart shows the LNG imports for various countries in 2006 and 2010, with Japan being the largest importer.
Where does LNG come from?

LNG exports by country of origin
Source: IEA (2011)

Billions of cubic meters

Australia  United States  Algeria  Brunei  Egypt  Eq. Guinea  Indonesia  Libya  Malaysia  Nigeria  Norway  Oman  Peru  Qatar  Russia  Trinidad  U.A.E.  Yemen  Non Specified

2006
2010
I prezzi del GNL

Prezzi all'importazione di LNG
fonte: IEA

centesimi di €/smc

EU: 
Japan: 
USA: 
EU_pipe:
WILL EUROPE TAKE ADVANTAGE OF THESE PROCESSES OF CHANGE?

A. BACKGROUND

B. PRICES, CONTRACTS AND A NEW CONCEPT OF SECURITY OF SUPPLY

C. SOME CONTROVERSIAL ISSUES: policy, regulation and firms
The generation mix: gas and renewables are growing for all (and will grow more)

Source: Enerdata
Electricity generation by source

Gross electricity generation by primary energy source, EU

Source: Eurostat

- Natural gas
- Solid fuels
- Nuclear
- Renewables
- Oil
- Other gases
The importance of gas in EU 27, Germany and Italy

Share of gas on total electricity generation
Source: Eurostat, Terna, GSE, BMWi, UBA)
Energy dependence of the EU is strong
(net imports on primary energy consumption, 2010)

- Italy: 86.2%
- France: 50.3%
- Germany: 63.2%
- Spain: 82.1%
- United Kingdom: 29.5%
- European Union: 55.5%
... even stronger for gas

Natural gas dependence
Source: IEA

Italy  Germany  France  Spain  UK

2008  2009  2010

0%  25%  50%  75%  100%  125%
Gas prices: decoupling?

Oil vs gas prices indexes

Gas: Average EU import price (WGI)
Oil: Brent undated - Platt's

Gas Idx (€)  Oil Idx (€)
Hubs and import prices

Hub prices vs average import prices

sources: Platt’s, ISTAT, WGI

€cents/cubic meter

Hub avg  EU import avg  IT import avg
Oil indexed - hub prices spread

Spread development between oil indexed and hub priced gas
(in EUR / MWh)

- Until mid-2009 only very little gas was imported into Germany at other than oil-indexed levels
- Since mid-2009 there has been a clear de-coupling with the contract price increasing more strongly than the import price
- This is a clear sign that already a significant amount of gas is imported to Germany based on hub prices

Classical risk sharing between upstream players and importers based on oil-indexed pricing was pulverized leaving the latter with huge losses behind
Spot vs Oil indexed contracts

Gas supply by type of contract, EU+Switzerland+Turkey.

Source: Carnegie Endowment for International Peace (2011)
La crescita dello spot

Offerta di gas per tipo di contratto, EU+Svizzera+Turchia

percentuale del totale offerto

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
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<tbody>
<tr>
<td>LNG_spot</td>
<td>4%</td>
<td>2%</td>
<td>5%</td>
</tr>
<tr>
<td>LNG_oil_idx</td>
<td>9%</td>
<td>11%</td>
<td>11%</td>
</tr>
<tr>
<td>Pipe_spot</td>
<td>21%</td>
<td>22%</td>
<td>26%</td>
</tr>
<tr>
<td>Pipe_oil_idx</td>
<td>69%</td>
<td>65%</td>
<td>58%</td>
</tr>
</tbody>
</table>

The emergence of gas hubs in Europe

The development of liquid gas hubs

Billion cubic meters

Note: CAGR is compound annual growth rate

Source: A.T. Kearney analysis

With the exception of the United Kingdom, where gas prices are mainly indexed to competitive gas (and less than 20 percent to oil products).
Where does gas come from?

Capacities of gas import pipelines and LNG 2020\(^1\) – EU27
(2011, in bcm)

<table>
<thead>
<tr>
<th>Pipeline</th>
<th>Capacity(^2) (in bcm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medgaz (in operation since Apr11)</td>
<td>8</td>
</tr>
<tr>
<td>Nord Stream</td>
<td>55 (27.5)</td>
</tr>
<tr>
<td>Nabucco</td>
<td>31 (8)</td>
</tr>
<tr>
<td>Galsi</td>
<td>8</td>
</tr>
<tr>
<td>South Stream</td>
<td>63</td>
</tr>
<tr>
<td>ITGI/IGI</td>
<td>12</td>
</tr>
<tr>
<td>TAP</td>
<td>20 (10)</td>
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<tr>
<td>Transmed</td>
<td>6</td>
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<table>
<thead>
<tr>
<th>LNG Terminal</th>
<th>Capacity(^2) (in bcm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Hook LNG (04/10)</td>
<td>21.2 (10.5)</td>
</tr>
<tr>
<td>Grain LNG [Expansion] (12/10)</td>
<td>14.8 (4.4)</td>
</tr>
<tr>
<td>Fos-sur-Mer (Caveau) (09/10)</td>
<td>8.25</td>
</tr>
<tr>
<td>Gate Terminal (Maasvlakte)</td>
<td>12</td>
</tr>
<tr>
<td>Gioia Tauro (Medgas) LNG</td>
<td>12</td>
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<tr>
<td>Krk Island</td>
<td>10</td>
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<tr>
<td>Dunkirk LNG</td>
<td>10</td>
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<tr>
<td>Porto Empedocle LNG</td>
<td>8</td>
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<tr>
<td>Rosignano Marittimo</td>
<td>8</td>
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<tr>
<td>Priolo (Augusta) LNG</td>
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<td>Trieste LNG</td>
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<tr>
<td>El Musel LNG</td>
<td>7</td>
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<tr>
<td>Other projects</td>
<td>25.6</td>
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</tbody>
</table>

1) Doubtful, speculative projects not considered
2) Final expected capacity for EU27 in 2nd phase (capacity 1st phase)
Sources: Wingas, EU, E.ON, King & Spalding, Petroleum Economist, IEA, A.T. Kearney

Source: ATKearney
EUROPE:
SOME CONTROVERSIAL ISSUES

- Policy
- Regulation
- firms
The new ACER’s rules: changing the EU Gas Sector

- **Capacity Allocation Mechanisms for the European Gas Transmission**
  (FG published by ACER on 3/08/2011 – NC presented by ENTSOG on 6/03/2012)

- **The most innovative provision: bundled firm capacity services**
  - the corresponding exit and entry capacity available at both sides of every point connecting adjacent entry-exit systems shall be integrated in such a way that the transport of gas from one system to an adjacent system is provided on the basis of a single allocation procedure and a single nomination
  - Big impact on existing long term ToP contracts

- **Pilot projects already started at regional level to allocate bundled products (often through regional platforms):**
  - North West => creation of booking platforms through a bottom up approach (by TSOs)
  - South => harmonisation at the Spanish and Portuguese IP (Auction to be launched in June 2012)
  - South South East => positive experience of the GATRAC platform
The new ACER’s rules: changing the Electricity Sector


- The most innovative provisions: mandatory market coupling; a new common grid model (EU zonal market)
  - Implicit allocation of day ahead capacity through a common EU algorithm: incentive to efficient capacity allocation and price convergence (to the limit allowed by physical congestions)
  - A new network model will highly effect the current system operation

- Pilot projects already started at regional level:
  - ITVC (*interim tight volume coupling*) project => volume coupling of two regions (CWE+N); form the end of 2012 to be changed into a price coupling
  - MI BEL => Iberian peninsula coupling
Diffusion of EU rules beyond EU borders

- Neighbouring areas interested in the EU energy regulatory framework => important to trade and facilitate investments

- Successful experiences are
  - Set up of MEDREG Association
  - Signing of the Energy Community Treaty

- Cross border projects will benefit from common rules => i.e. ITGI (South corridor) and TAP (South East corridor)
Gas framework guidelines on capacity allocation

The goal is moving from borders to hubs, removing gas frontiers and the need to buy separate entry and exit rights every time gas is traded between countries. With this system, entry and exit rights are “bundled” and sold with gas.
Old gas routes: from Russia to Italy via Austria (TAG)

Source: TAG

30% of the natural gas imported by Italy comes through TAG
New gas routes for Italy?
The effects of change on gas players

Financial performance of major gas players

Selected player and indices (rebased)

Annual EBIT growth rate 2008 - 2010

- Gazprom
- ENI
- Statoil
- E.ON
- RWE
- GDF Suez

Gazprom 37% 26% 20% 31% 46% 48%
ENI -33% -28% -9% 6%
Statoil -35% -12% -6% -9%
E.ON 2% 23% -6% 6%
Gas Natural 46% -9% 48%
RWE 48% 6% 48% 6%
GDF Suez 48% 48% 48% 6%
Focus - Italy

AEEG current regulation stance and .... renewables
AEEG regulation favouring an efficient and integrated EU market / 1

- **Gas sector:**
  - New market based balancing market: providing a transparent price reference for the daily value of natural gas in the system
  - Establishing a regulatory framework able to favour new investments: the TSO foresees 7 billion€ investments in the next 3 years

- **Electricity sector:**
  - Important deployment of smart meters: around 40 million customers – now able to actively respond to energy price signals
  - Establishing a regulatory framework able to favour new investments: the TSO foresees 5 billion€ investments in the next 4 years
AEEG regulation favouring an efficient and integrated EU market / 2

➢ Gas sector:

- Capacity Allocation => coordinated short term capacity services at Tarvisio/Arnoldstein IP
- Promoting competition => reference retail price to take into account spot prices at Italian and EU level

➢ Electricity sector:

- Short term capacity allocation: market coupling IT-SI
- Long term capacity allocation: joint allocation of transmission rights for the entire Central South market region
• The target for Italy coming from the EU directive is: 17% of internal energy consumption by 2020 should come from renewable energies.
  • For electricity, the National action plan indicates a 29% target by 2020.
  • Recent estimates for 2011 show that IT already reached 24.5% of internal energy consumption.
Gas vs renewables

Shares of gas and renewables on power generation, Italy
Source: Eurostat, Terna, GSE
The weight of E-RES

Share of renewables on total generation, Italy
Source: GSE

- Hydro
- Geothermal
- Wind
- Solar
- Biomass

Percentage of gross generation:
- 0.0%
- 5.0%
- 10.0%
- 15.0%
- 20.0%
The growth of solar

Composition of RES generation, Italy
Source: GSE

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
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<tbody>
<tr>
<td>Biomass</td>
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<td>Wind</td>
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<tr>
<td>Hydro</td>
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</table>
...and for users

![Bar chart showing electricity prices by type of user in Eurostat 2011 for Italy, Germany, France, EU-27. The chart compares medium sized industries and medium sized households. The chart indicates that prices are higher for medium sized industries and vary significantly between countries.](image-url)
What price for renewables?

- AEEG estimated (PAS 21/11, May 2011) €100bn incentives for renewables until 2020, paid for by electricity bills.

- New estimates last week (REL 56/12) is €10.5bn for 2012 only: €100bn cumulative by 2020 could be underestimated.

- Between 2008 and 2012 we estimate about €24bn spent in incentives for E-RES.

- Is it sustainable?
  - Incentives have been revised (Solar PV latest revision with Ministerial Decree 5 May 2011 – “Quarto Conto Energia”)
  - The idea is linking incentives to technology
  - But technology is running faster
Electricity interconnection capacity requirements 2020 in MW
THANK YOU FOR YOUR ATTENTION!

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“Im Zweifel für Europa"

Nel dubbio, per l’Europa*