



# Gas fired power stations - obstacles and challenges

2<sup>nd</sup> ACER workshop on GTM

19 March 2014

# Agenda

- The motivation
- Brief overview of economics of gas power plants
- Network access
- Gas – power coordination
- Balancing
- Miscellaneous issues

- Motivation
- Overview of economics
- Network access
- Gas - power coordination
- Balancing
- Miscellaneous

# The motivation

In much of Europe, economics of gas fired plant are disastrous

but

Falling gas demand is a potential problem

- Need to 'help' vulnerable uses

Gas fired power plant is very flexible and relatively clean

- should have role in complementing intermittent RES

What can be done about it ?

- Motivation
- Overview of economics
- Network access
- Gas - power coordination
- Balancing
- Miscellaneous

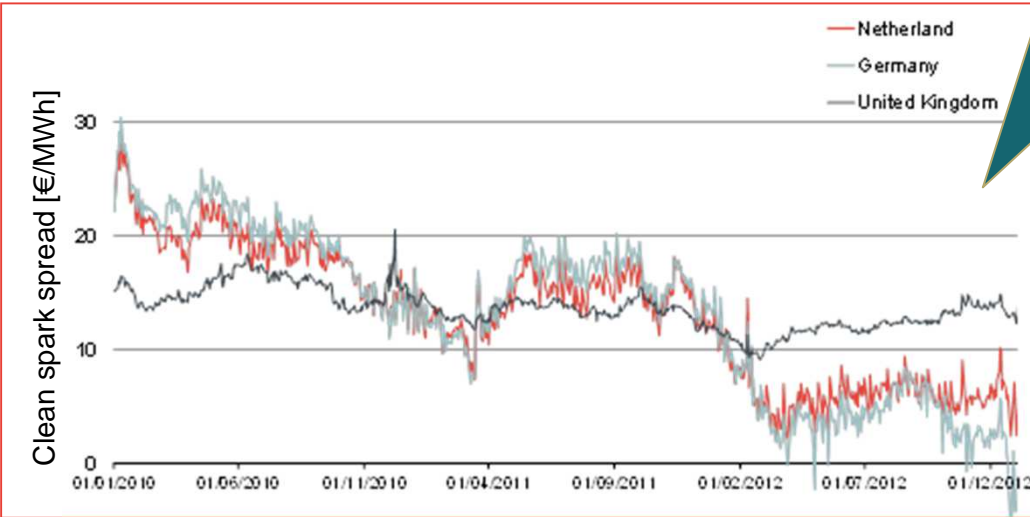
# Declining competitiveness of gas-fired generation

Base



Decline in clean-spark spread, but large differences between countries (largely driven by differences in electricity prices)

Peak

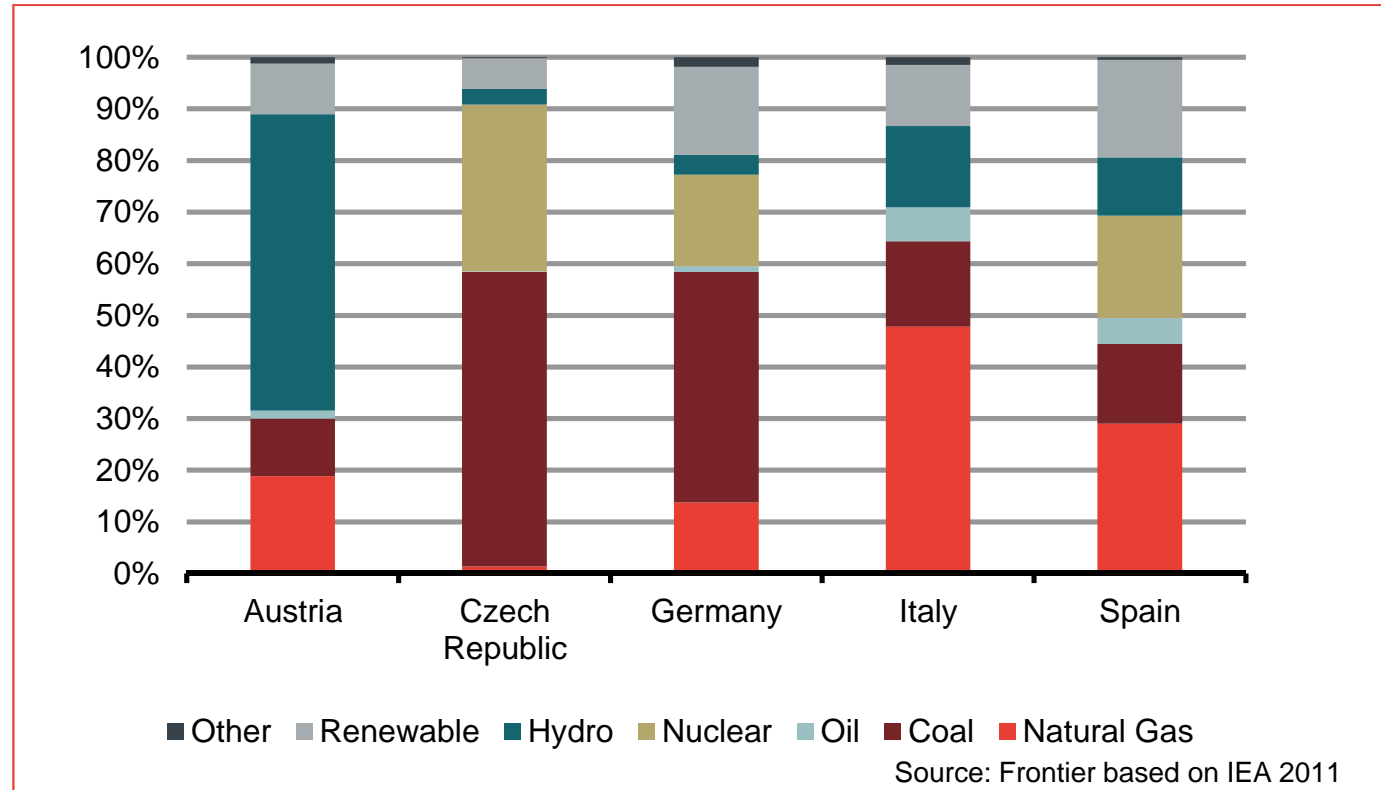


Source: Frontier based on Platts

... in base and peak load generation

# Higher competitiveness in power markets...

Generation mix in five „focus countries“



Impact

- Gas is often the price-setting generation technology in Italy and Spain → less severe economic situation of power producers
- Germany/Austria/Czech Republic: Gas-fired generation only viable as CHP

... where gas-fired capacities are large

- Motivation
- Overview of economics
- Network access
- Gas - power coordination
- Balancing
- Miscellaneous



# Network access (1)

## Tariff structures

- Fixed vs. variable (usage dependent) gas grid tariffs – both have disadvantages:
  - Fixed: increase in fixed costs even if the plant is not running – larger incentive to close the plant irrevocably
  - Variable: adds to marginal cost of the plant and makes it even less competitive relative to coal etc. in merit order
- Currently largely fixed tariffs for power plants. Operators would prefer a relatively larger “variable” part
- Capacity-based tariffs create no incentives for TSOs to offer attractive products for gas-fired power plants (Spain: Formally capacity cannot be booked with one day notice (20 days), though currently practically possible)
  - Capacity tariffs also provide inefficient incentives as „lumpy“ increase from small usage (i.e. discourages using plant for few hours a month)

Holders of capacity at ,co-located‘ multiple exit points would further like to bundle capacity to reduce distortion of incentives from capacity charges

# Network access (2)

## Tariff level

- Significant increases in grid charges in Austria, Germany between 2012 and 2014
  - Vicious circle as higher grid charges reduce further grid usage
- FG TAR and cost reflectivity: Potential further negative impact on power plants in Italy with high capacity, but low average utilisation?

Compared to (near) postalisated tariffs today

## Capacity products

- General desire for more flexible products which can be purchase on an, e.g., daily basis
- Germany: firm capacity for new power plants (also CHP) only with dynamic allocation to virtual trading points, i.e.
  - TSO has the right to restrict power plants ability to nominate at the hub
  - In case of restriction, power plant would need to nominate volume at another allocated entry point, e.g. storage or interconnection point
  - Increases gas sourcing and transaction costs
  - Reduces hub liquidity
  - Transfer of congestion management obligations from TSO to selected grid users (e.g. power plants)

- Motivation
- Overview of economics
- Network access
- Gas - power coordination
- Balancing
- Miscellaneous

# Gas-Electricity coordination

## Interaction with electricity issues

- Gas day starting at 06:00, electricity day at 00:00
  - Spain: gas used to be 00:00 but has to be adjusted to 06:00 as part of EU harmonisation
  - Increases transaction costs
- Gas-fired power plants highly flexible (could react in 15 minutes to requirements by electricity TSO), but renomination lead time of three hours for gas
  - Power plants wish for more flexible products, use of gas balancing regime not a commercially viable option.
  - Idea of gas balancing is to cover short-term deviations from nomination, not deliberate gas flows lasting 2:45 hours for a large power plant
- „Block“ auctions for balancing power (i.e. for a month or 7 days) means market not attractive for gas-fired plants as they would need to commit to running 7 days
  - Introducing short-term block (day or half day) for balancing power procurement

- Motivation
- Overview of economics
- Network access
- Gas - power coordination
- Balancing
- Miscellaneous

# Balancing

## Information deficit

- Imbalance risky as potentially costly: Imbalance prices not known at the time a decision has to be made (e.g. call for plant in power balancing market)
  - Spain: only published two days after respective gas day
  - Germany: prices should already be available but are not published
  - Italy: imbalance price refers to multiple days → does not reflect cost of imbalance

But some power producers acknowledge that determinants of imbalance costs reasonably clear and can be forecast

## “Nomination replacement procedure” as role model?

- Germany: Ex-post nomination (balancing) possible when gas is obtained within balancing zone (e.g. at entry point or storage) instead of at VTP
  - minimises imbalance costs
  - but increases gas procurement costs because only limited number of potential suppliers
- But: In currently oversupplied market (also abundant available storage capacity in some market areas), traders report that only small increase in procurement costs relative to VTP
- Disadvantage: Undermines role of VTP (?)

- Motivation
- Overview of economics
- Network access
- Gas - power coordination
- Balancing
- Miscellaneous

# Miscellaneous (country specific)

## Wholesale market

- Spain: Lack of transparent wholesale market as significant disadvantage (OTC market, but not transparent)
  - Power plants cannot dispose gas on days when gas is not needed in power plants
  - No access to potential „spare volumes“ which could be picked up in times of over supply (and potentially low day-ahead prices)

## LNG regasification (Spain)

- Penalties from a period in time when LNG import capacity was scarce remain in place
  - Power plant operator who has access to LNG import capacity incurs penalty if LNG in tanks (before regasification) exceeds 15 days' regasification capacity

Initially designed to avoid hoarding imported LNG in tanks

## Gas grid limits contribution of power plants

- Especially in difficult economic circumstances for gas-fired power plants, it is of great importance to be operational when electricity market is tight (scarcity situation)
- Germany: high correlation of times with high electricity prices and peak gas demand (with constraints in gas systems)
  - Example of February 2012 when extremely cold weather/low supplies from Russia implied that gas-fired power generation was restricted by TSO during a time when they could have sold power very profitably





Frontier Economics Limited in Europe is a member of the Frontier Economics network, which consists of separate companies based in Europe (Brussels, Cologne, London and Madrid) and Australia (Melbourne & Sydney). The companies are independently owned, and legal commitments entered into by any one company do not impose any obligations on other companies in the network. All views expressed in this document are the views of Frontier Economics Limited.

