

# The Role of Storage for a Power company: EDF's Gas Storage Activities

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## I. Physical needs of additional storage in Europe?

1. Context: current situation of storage capacity in Europe
2. Demand and supply drivers
3. Key uncertainties

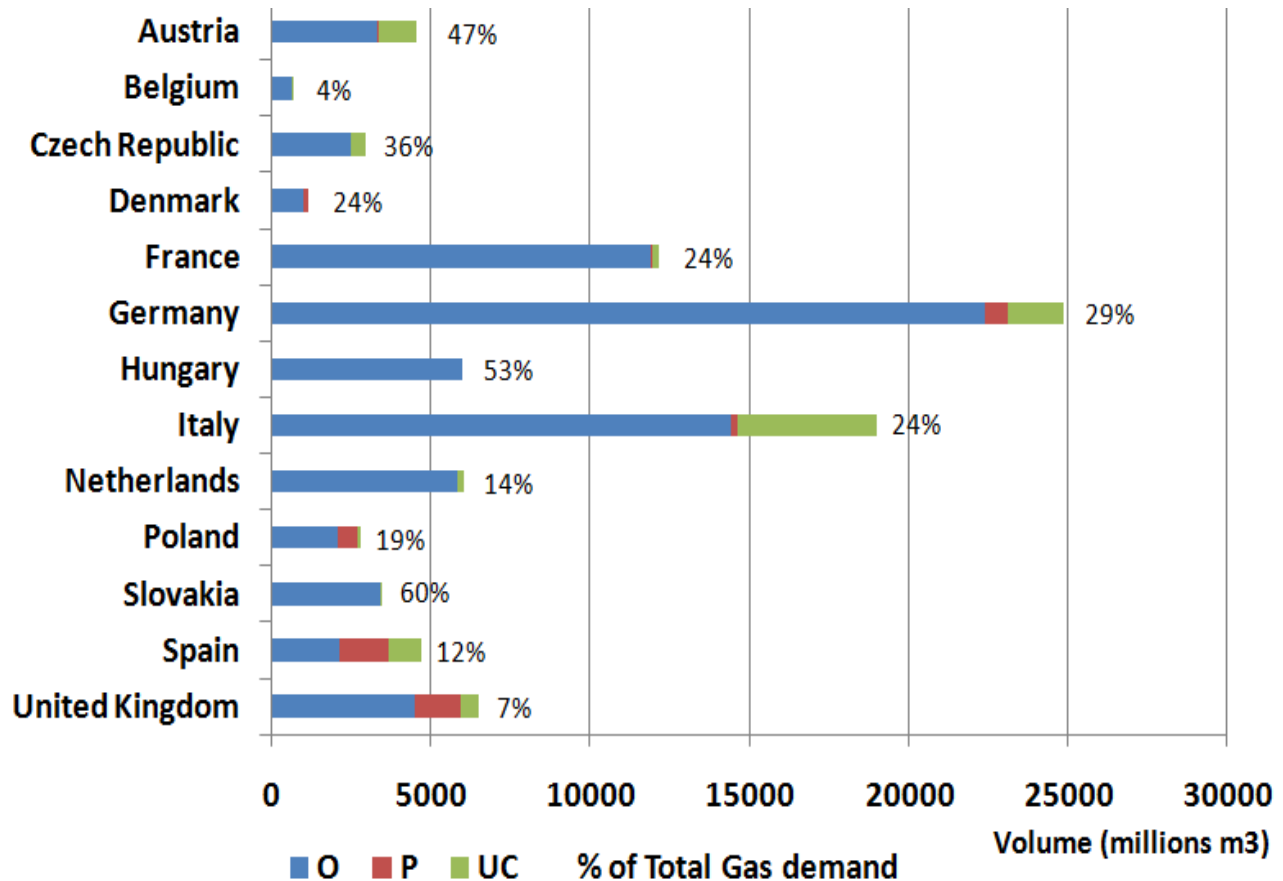
## II. Need for a stable regulatory environment:

1. to optimise the access to the existing capacity
2. to prepare investment

## III. EDF's gas storage activities

# Comfortable level of storage capacity in Europe but differences across countries

- ▶ Current situation shows a rather quite comfortable level of storage to cover modulation needs across Europe, except few countries
- ▶ Modulation needs covered through different flexibility sources in those countries
- ▶ Europe is more provided with seasonal storage than with short term storage : 87% of the working volume come from facilities that need over 30 days to deplete



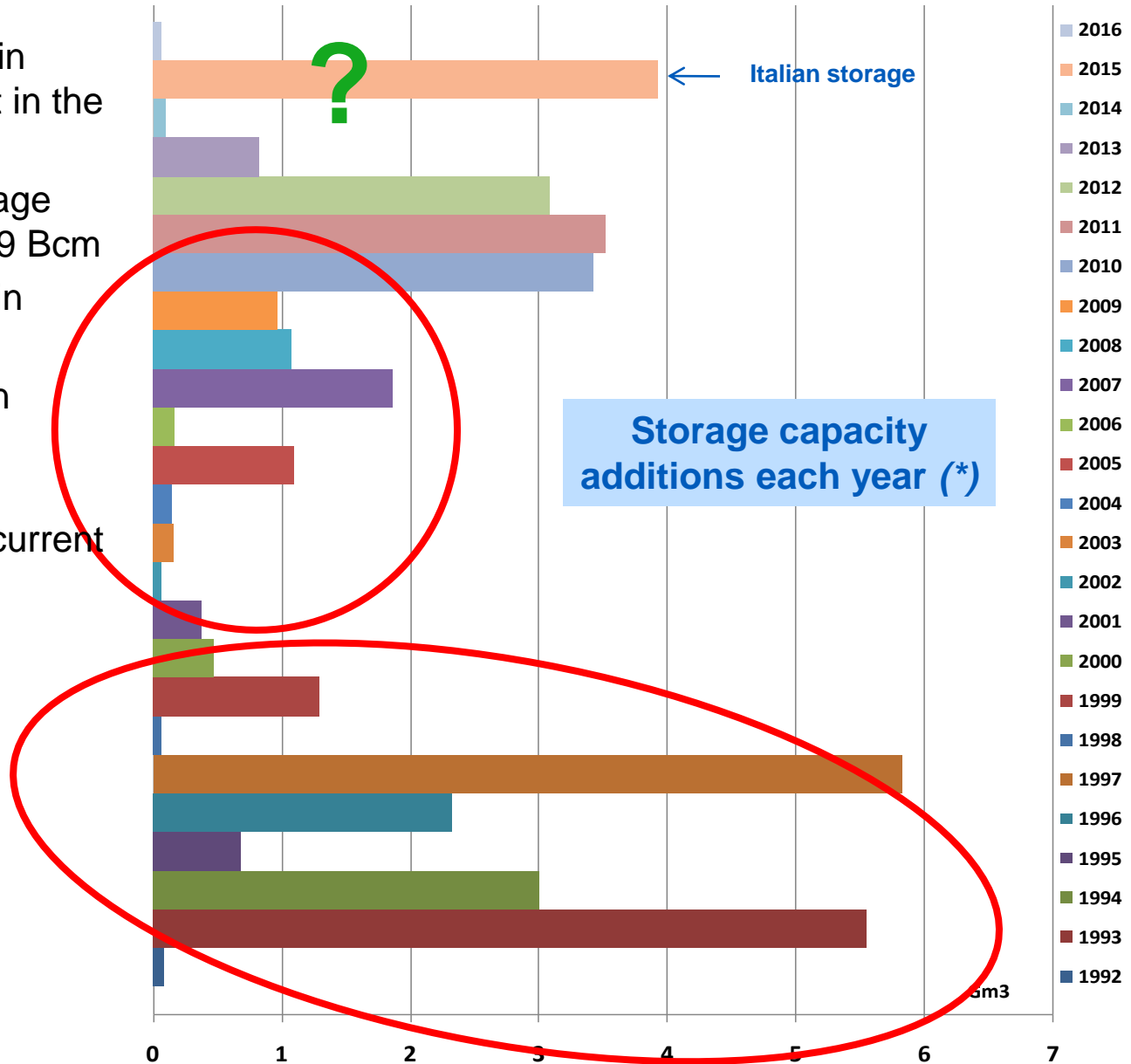
*Remark : Percentage figure represents ratio of total storage capacity to country annual demand*

→ Evolution on the demand and supply side for storage needs?

# Situation in investment: decline in commissioning of capacity

- ▶ Significant decline in storage investment in the past decade
- ▶ In 1990-2000, storage capacity grew by 19 Bcm
- ▶ But only by 9 bcm in 2000-2010
- ▶ Among recent main storage projects → strategic storages
- ▶ Good start for the current decade, but to be confirmed yet

→ **Appropriate incentives for investment**



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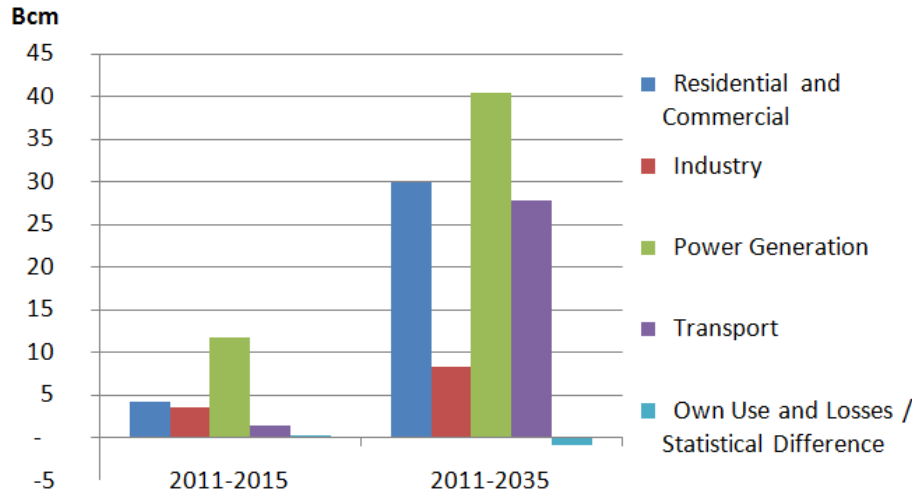
## **III. EDF's gas storage activities**

# Limited additional needs on the demand side

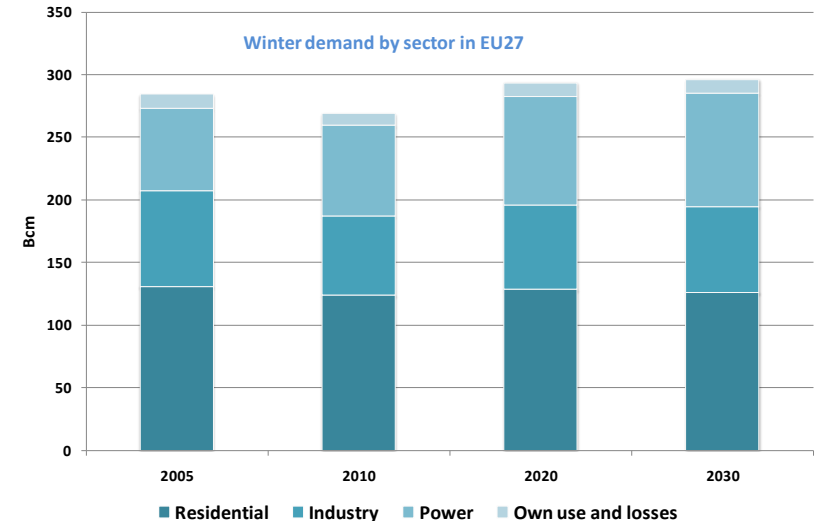
## ◆ Growth in demand is limited in the long term

- Around 0.7% of growth rate between 2011-2035. For 2011, European demand (527.1 Bcm) is estimated to be 9-10% down on the previous year, and even falling below the recessionary lows of 2009.

Incremental gas demand in Europe by type of use



Source: IHS CERA



Source: IHS CERA

## ◆ Additional demand will come mainly from power generation

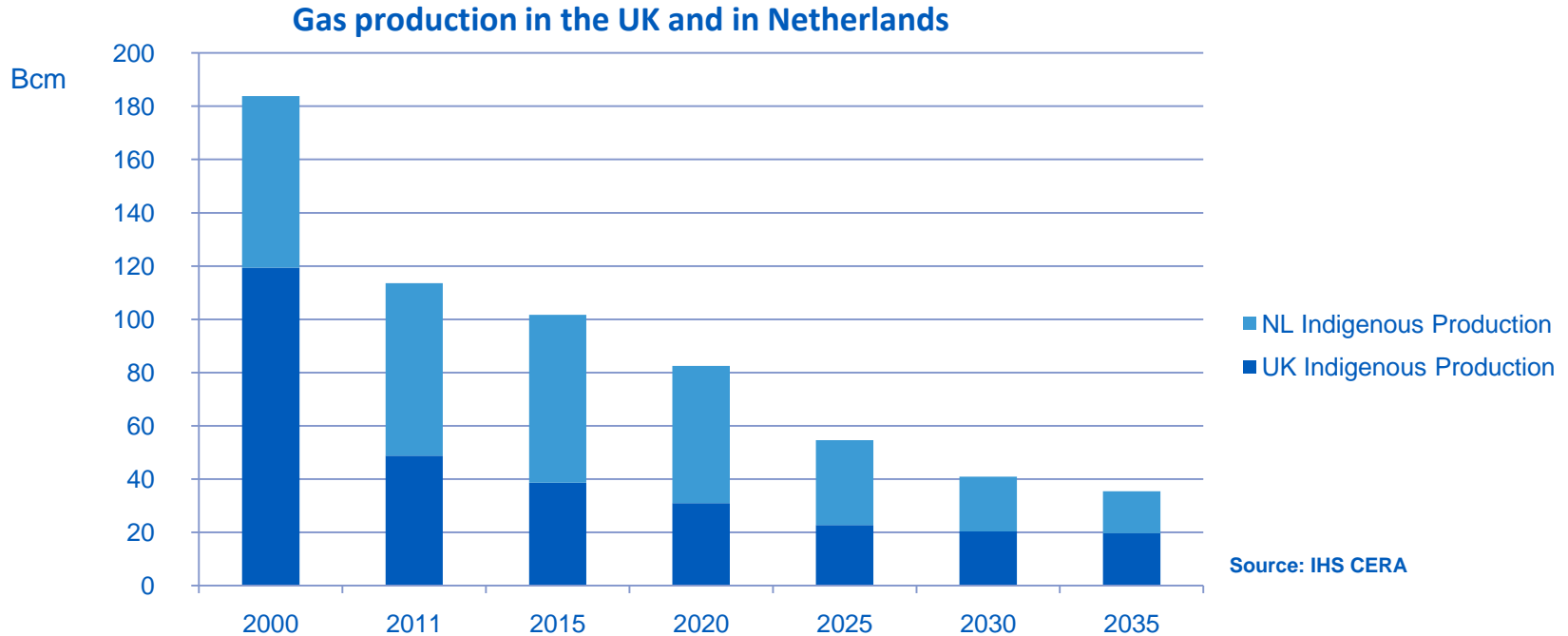
- 50 GW of net addition in gas fired capacity by 2020 in Europe (40 GW in EU27) (Source: CERA)
- But utilization rates might fall with the increasing role of renewables in Europe's power production
- Share of power demand in total gas demand is likely to remain stable at 32% until 2030
- How much seasonal might the power sector demand be?

## ◆ Additional demand in residential demand is concentrated in Eastern and Southern countries

- NWE : slight decline in residential & commercial consumption : -0.5% in 2020 and 2030 (vs. 2011)
- While Turkey : +47% by 2020 and + 103% by 2030 (vs. 2011) and other Eastern Europe: +13% by 2020 and + 29% by 2030 (vs. 2011)

# Decline in flexibility from indigenous production...

## Declining domestic production



## More expensive and limited shale gas development perspectives than on the US market

- Main shale gas discoveries in Poland (0.4 to 5.3 Bcm), France (5.1 Bcm), Ukraine (2.8 to 3.5 Bcm)
- But European shale gas is facing some challenges :
  - ✓ Results of first exploration wells were disappointing in Poland
  - ✓ Reserves located on environmentally protected areas
  - ✓ Social unacceptability of fracking end up in political decisions to ban this technology (France, Bulgaria)
  - ✓ Gas exploration industry is less present than in the US market

## Pending questions on indigenous production:

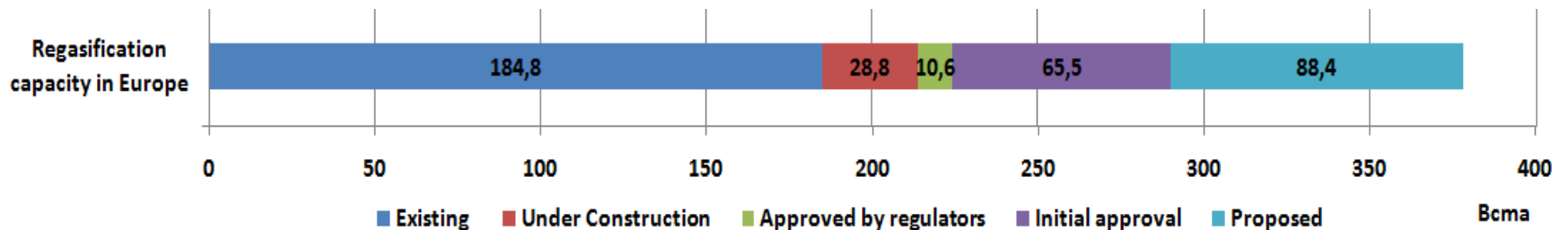
- Speed of the decline?
- Could producer be willing to sacrifice further production for present flexibility?

# ...might be compensated by growth in imports pipeline and LNG flexibility? (Uncertainty 1)

## Some growth in imports pipeline capacity

- 400 Bcm of pipe import capacity in 2010
- Around 140 Bcm of potential additional pipeline in the next 5-10 years (Nord Stream, South Stream, ITGI)

## LNG imports expected to provide the bulk of additional flexibility



- European LNG imports are expected to grow from 90 Bcm in 2011 to 130 Bcm in 2020 and 144 Bcm in 2030 (CERA)

## But uncertainty over LNG import levels due to competition with other regional markets (Asia, US)

- Fukushima accident has boosted Asian prices. But no further impact expected in 2012 even if all NPP will have been stopped by early May. (LNG imports increased by 15.2 in 2011 and might grow by 23 Bcm In 2012 the impact)
- But European prices remain much lower than Asian prices.
  - ✓ In 2011 Qatar sold most of its flexible volumes in the Atlantic basin.
  - ✓ In 2012, 45 Bcm out of 106 Bcm of Qatar's liquefaction capacity could be contracted under flexible LNG → How much will be headed to Europe?
- Which terminal in Europe will receive less LNG?
  - ✓ more diversions of cargos from Spain in 2011 (-2.6 Bcm of LNG imports compared to 2010) than from the UK (+5.4 Bcm of LNG imports compared to 2010)

## Additional LNG will bring additional flexibility if it comes



## Uncertainty 2: a future decline in pipeline import contracts flexibility?

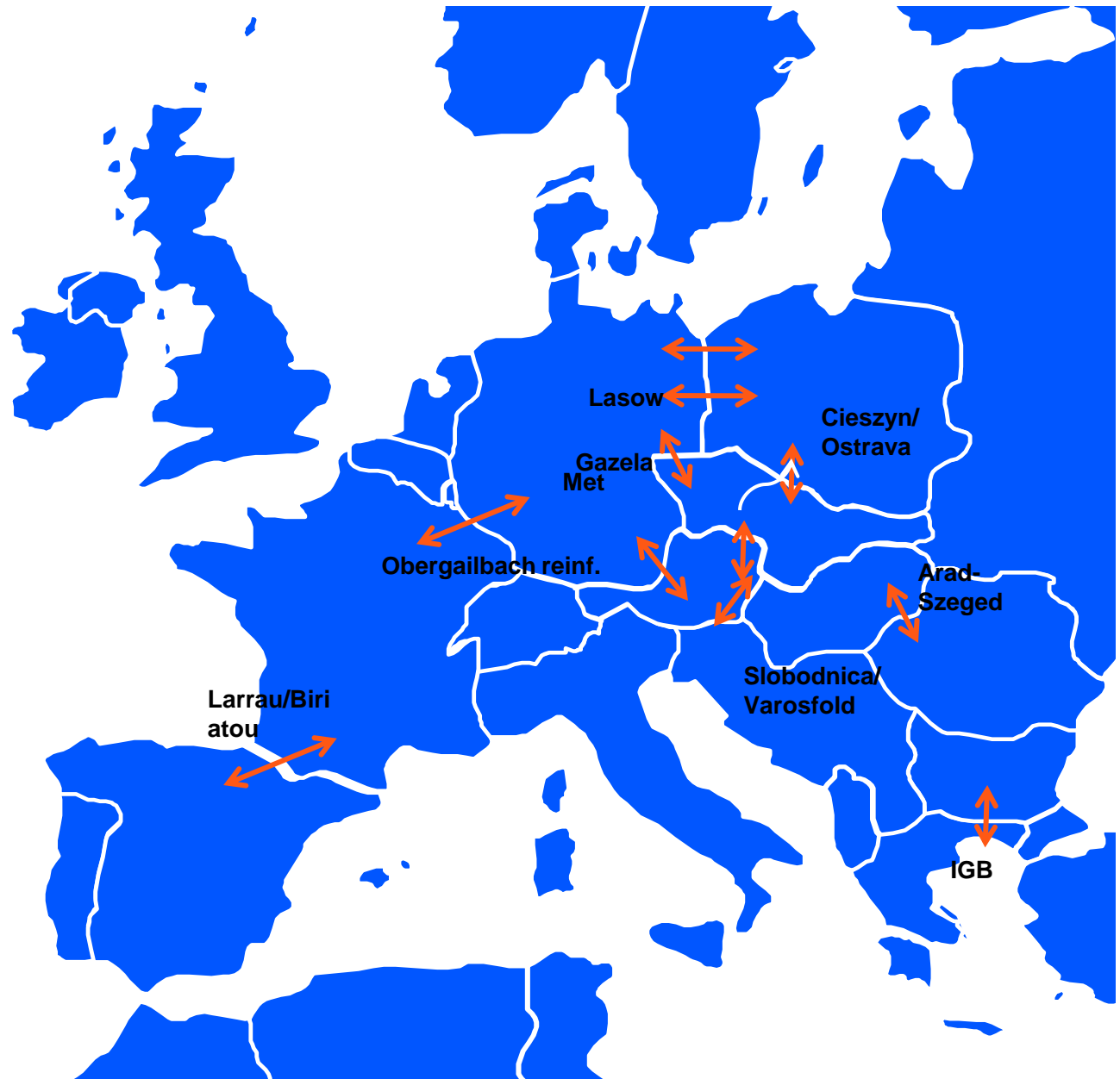
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- ▶ **Will producers be able/willing to sustain the same level of contractual flexibility with new routes for gas?**
  - Indexation of long term contract on spot reference in contradiction with supply of flexibility by producers
  - Growing distance between gas production and consumption locations
  - and change in transit routes might impact the flexibility sources available (ex: storages in Western Ukraine)
- ▶ **Contractual flexibility vs spot market liquidity? Impact of the lower share of long term contracts in supply on contractual flexibility available?**
  - Impact of the lower share of long term contracts in supply on contractual flexibility available?
  - 77 %\* : share of contracted volume by 2020 (if no renewal/new contract by then)
  - 26 %\* : share of contracted volume by 2030 (if no renewal/new contract by then)

*\* Share of LNG and pipeline import volumes contracted in 2011 over total import forecast*

## Uncertainty 3 : How deeply integrated will the European market be?

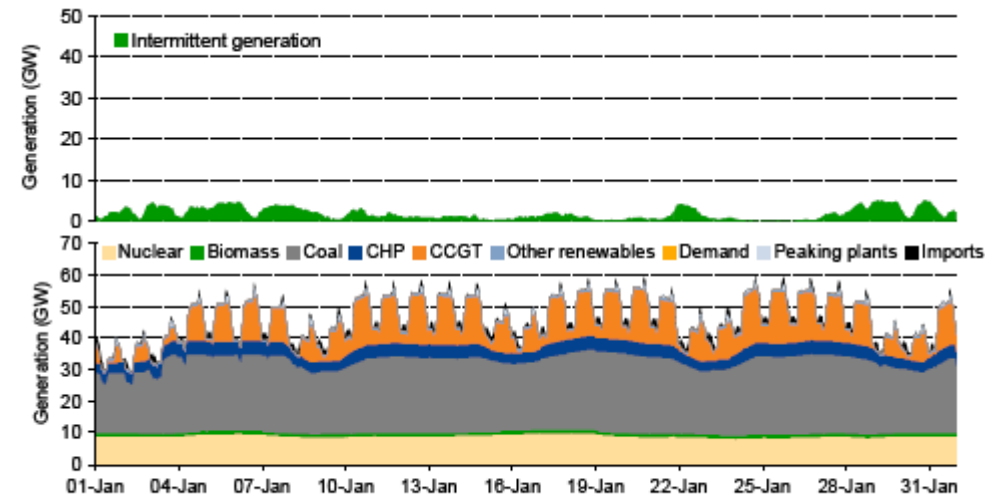
- ◆ Interconnections may ease the transport of flexibility and decrease the need for additional storage
- ◆ Around 15 new interconnections (operating or under construction) since 2009 for a total of 95 Gm3
- ◆ A lot of projects have been eligible for the European Energy Programme for Recovery
- ◆ Further connections planned:
  - Example: Greece/Bulgaria (IGB),
  - Recent announcements: to connect storage to other markets (Haidach connected to the Austrian market by 2014, Bierwang connected to the Austrian market)



# Uncertainty 4 : Impact of wind generation on gas demand

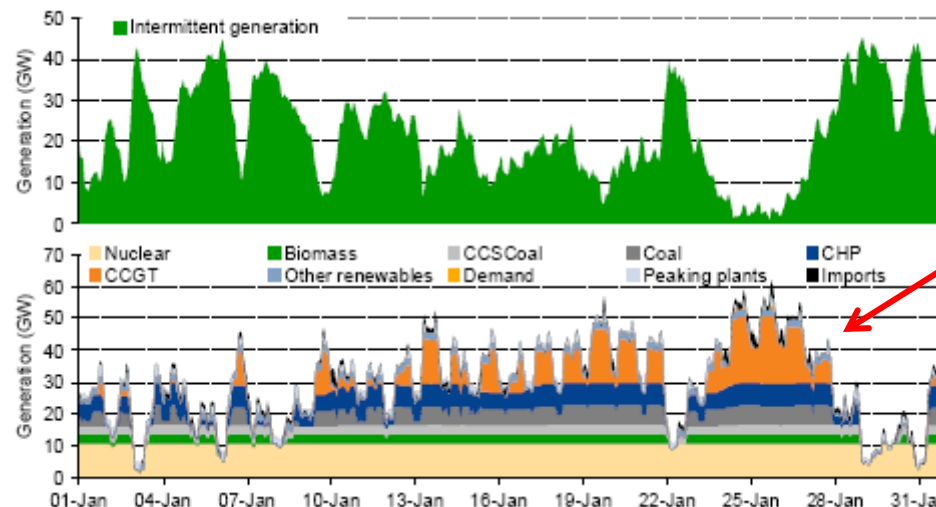
- ▶ Increasing role of intermittent wind generation: impact on CCGT generation profile (ex: UK)
- ▶ Need for more flexibility (storage capacity, multicycle storage, liquid within day/hour products on European gas spot markets)

## Electricity Generation in the UK in 2010



Hourly generation for intermittency (wind, wave and tidal) and conventional plant. Assumes weather patterns of January 2010

## Electricity Generation in the UK in 2030



More volatile power production from CCGT → additional gas storage?

Source: Poyri

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## Regulatory issues for accessing the existing capacity

- Remove contractual congestions → analysis of 48 Bcm of capacity shows massive congestion (more than 70% not accessible at all before years)

Storage operator	Country	Bookable capacity	Sign post	Capacity (Bcm)
RWE Storage Czech	Germany	No capacity		2,5
RWE Deutschland Speicher	Germany	9% up to 2015 and 56% in 2016 and all beyond		1,1
Wingas	Germany	No capacity up to 2014 and 22% from 2016 Rehden full booked up to 2022 Jemgun booked by 90% up to 2022		4,5
Storengy Deutschland	Germany	80% of the capacity booked up to 2020		2,0
E.ON Gas Storage	Germany	Capacity in some facilities		6,2
VNG	Germany	Negligible on mid term Some ? On long term		2,5
EON Foldgaz Storage	Hungary	No information		3,3
Storengy	France	For 1 year depending on storage obligations		10,1
TIGF	France	For 1 year depending on storage obligations		2,5
OMV	Austria	No free capacity before 2020		2,43
Stogit	Italy	Congested capacity - allocation for 1 year		11

- Improve the visibility on tariffs :
  - Regulated vs negotiated
  - Better aligned with market conditions?
- Require the actual implementation of the Third Package:
  - Test the competitiveness of the flexibility market
  - Which countries are in compliance with article 33 of the the Directive 2009 (definition and publication of criteria determining the access regime?)

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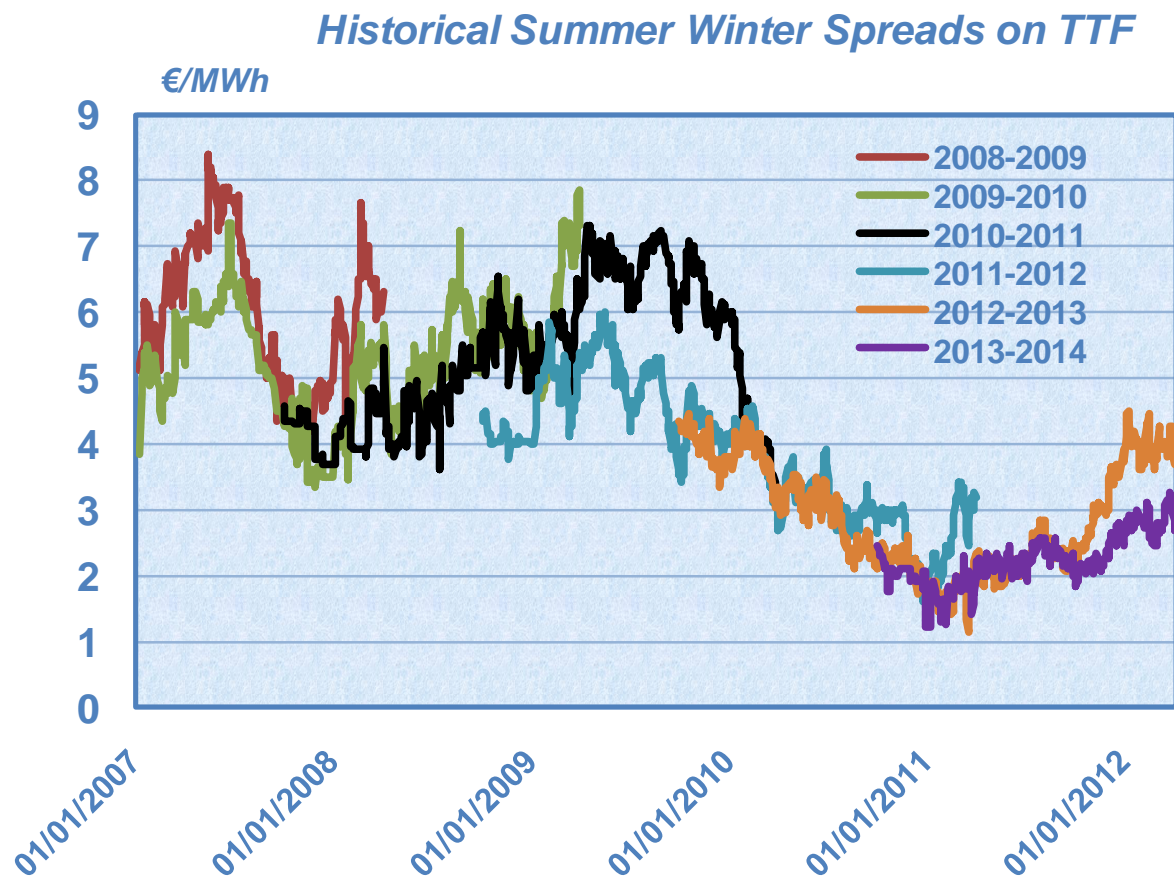
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## Seasonal storage is less attractive (extrinsic value)

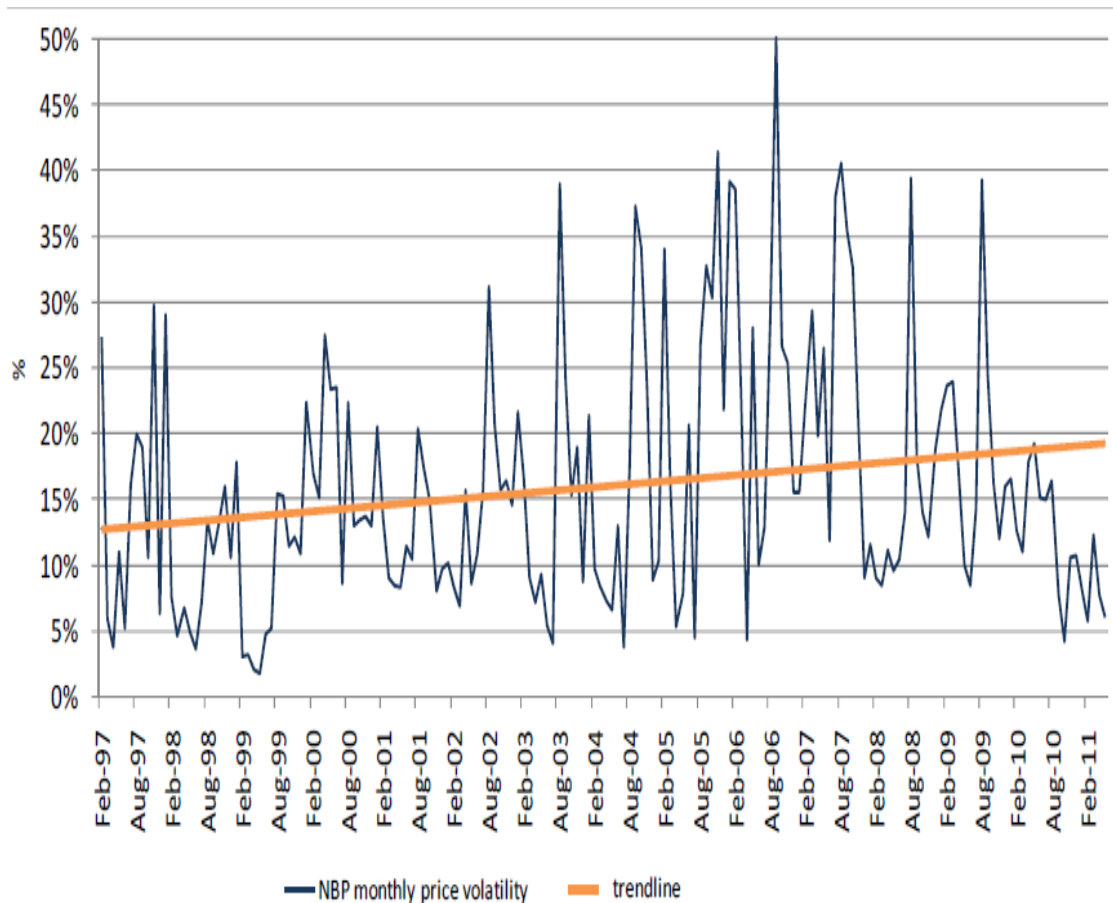
- ▶ The spread are at their lowest level comparing with 2007
- ▶ High level of gas into storage all over Europe (GIE)
- ▶ The Case of Belgium:
  - A change in the capacity allocation (abolishment of priority rights to RC) to ensure SSO revenues
- ▶ The case of France
  - Only 58% of the capacity sold for 2012/2013
  - Impact on the performance of the storage sites



- What impact on security of supply?
- What impact on investment?

# Short term storage value depends on volatility (intrinsic value)

## ► NBP price volatility



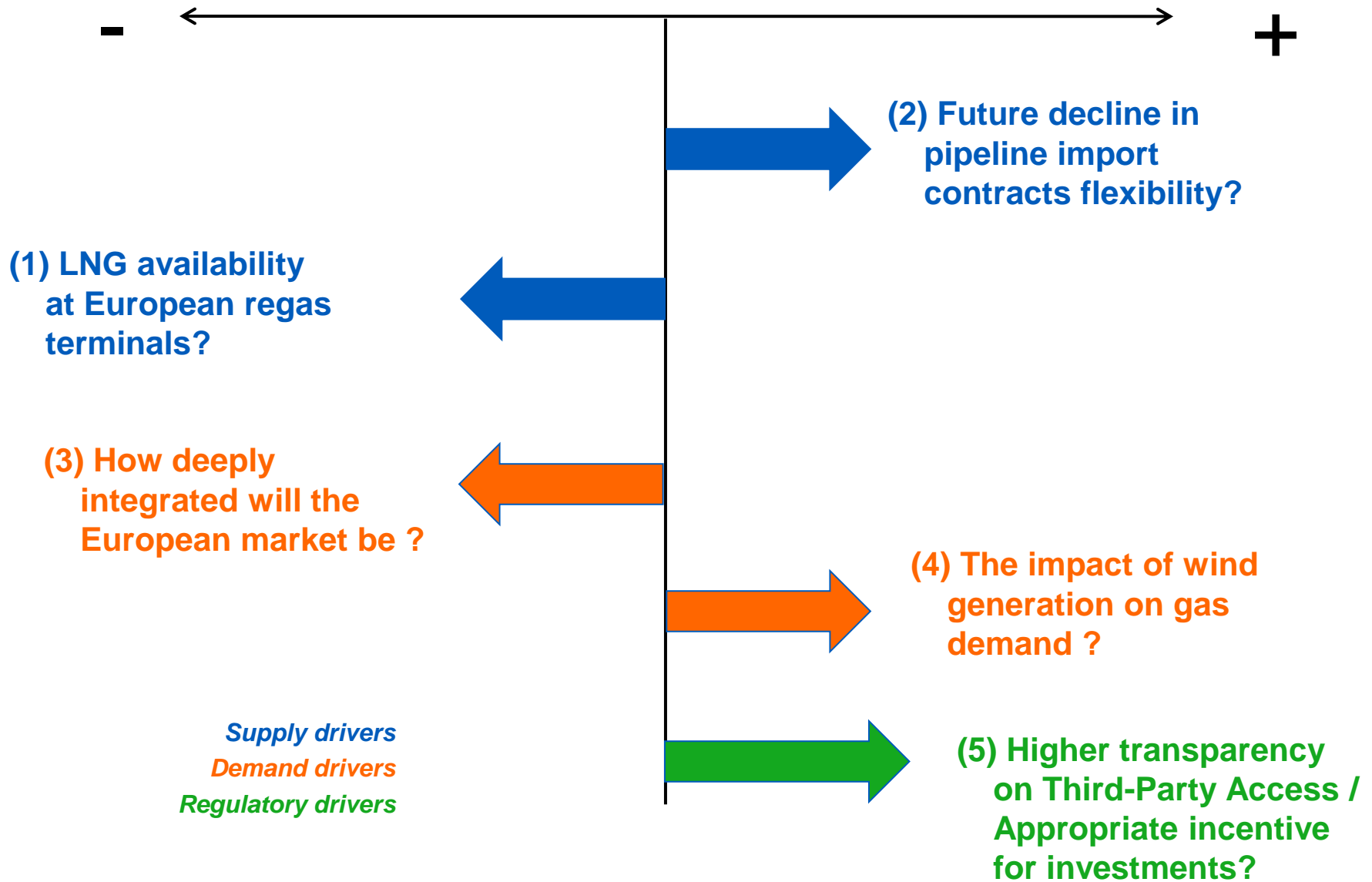
More volatile market  
due to increasing  
share of renewables ?

Well balanced markets ?

Source: OIES



# Key drivers of additional storage needs in Europe



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# Why does EDF need access to storage?

## ■ For its gas activities :

### ▶ Offering dual offers (power & gas) to our customers

- About 3.3 millions gas customers in Europe (713 000 in France end 2011)
- Consumption 2011 : 100TWh

### ▶ Diversifying and modernizing power production mix

- Replacement of certain coal / fuel-oil power plants
- Make power available to complete the intermittency of renewables
- Consumption 2011 for EDF's gas capacity: 66 TWh



Blénod

**11 GW**  
installed capacity

**3 GW**  
capacity being developed

# EDF's storage projects

**5** storages operating  
in Italy, UK, Germany

**910 Mcm**  
storage capacities  
(working volume) developed by EDF

**5** storage projects  
France, Italy, Germany, the  
Netherlands



**Hole House (UK)**



**Etzel (Germany)**



**Public debate (Salins des Landes)**

## Wrap up

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- ▶ A lot of uncertainties around the need for additional gas storage in the future:
  - On the demand side:
    - How seasonal will be the gas demand for power generation ?
    - Will there be a decline in residential consumption and how deep will it be?
    - What will be the need for back-up capacity of intermittent renewable power capacity?
  - On the supply side:
    - Will the LNG flexibility and pipeline capacity compensate the decline in indigenous production?
    - Will the contracts enclosed as much flexibility as up to now?
  - On the regulation side:
    - Lack of visibility on tariff to access storages
    - Uncertainty over the strategic obligations
- ▶ EDF's strategy to manage this uncertainty: development of storage facilities in line with our needs (portfolio and CCGTs)
- ▶ What measures would you suggest to stabilize this framework?

**Thank you for your attention**