ACER
Agency for the Cooperation of Energy Regulators

The 5th Annual Market Monitoring Report covering 2015: Gas Wholesale Markets findings

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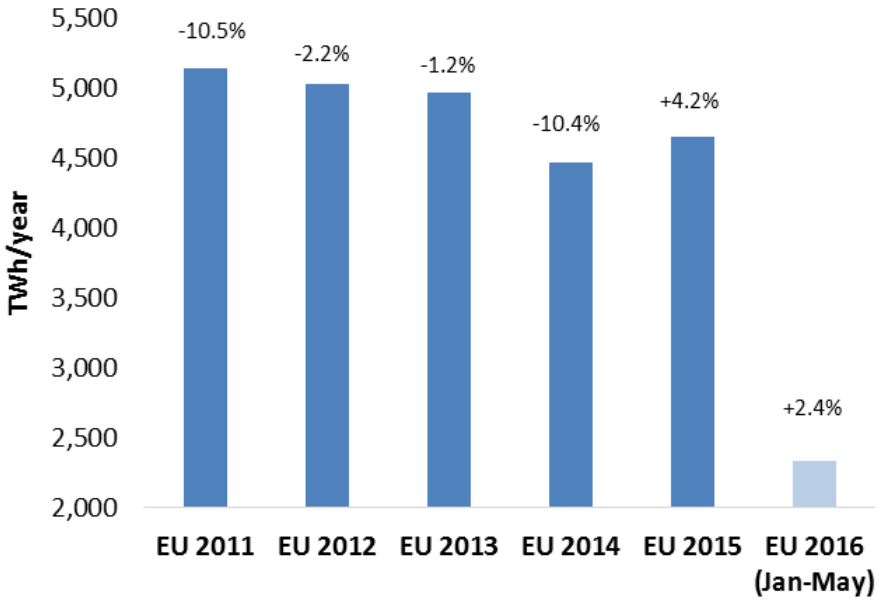
Content

- Short recap of market fundamentals
- Foundations for a functioning market
- Pivotal role of gas hubs
- Integration of markets
- Conclusions

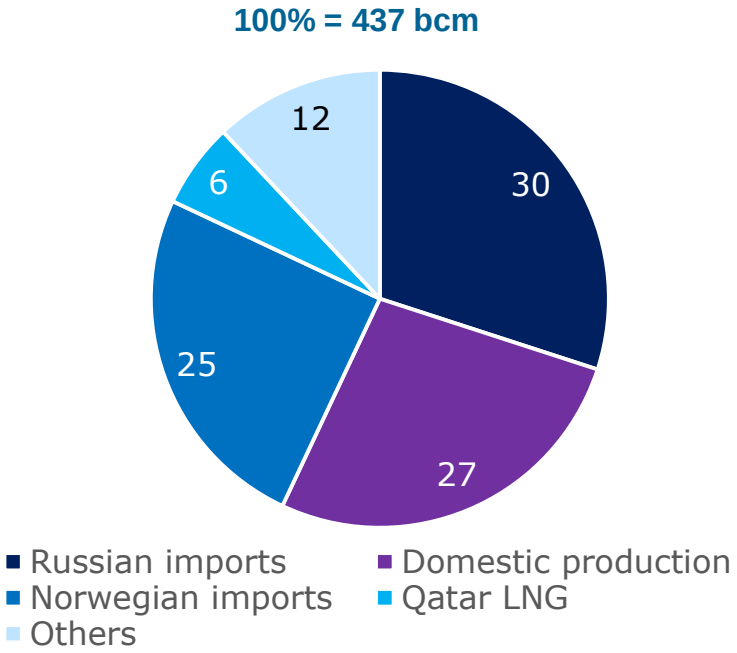
2015 saw a recovery in EU demand and growing dependency on external imports

EU gas gross inland consumption (TWh/year and YoY % variation)



Demand increased for the first time after 4 consecutive years of decline

EU 2015 gas supply by origin (%)

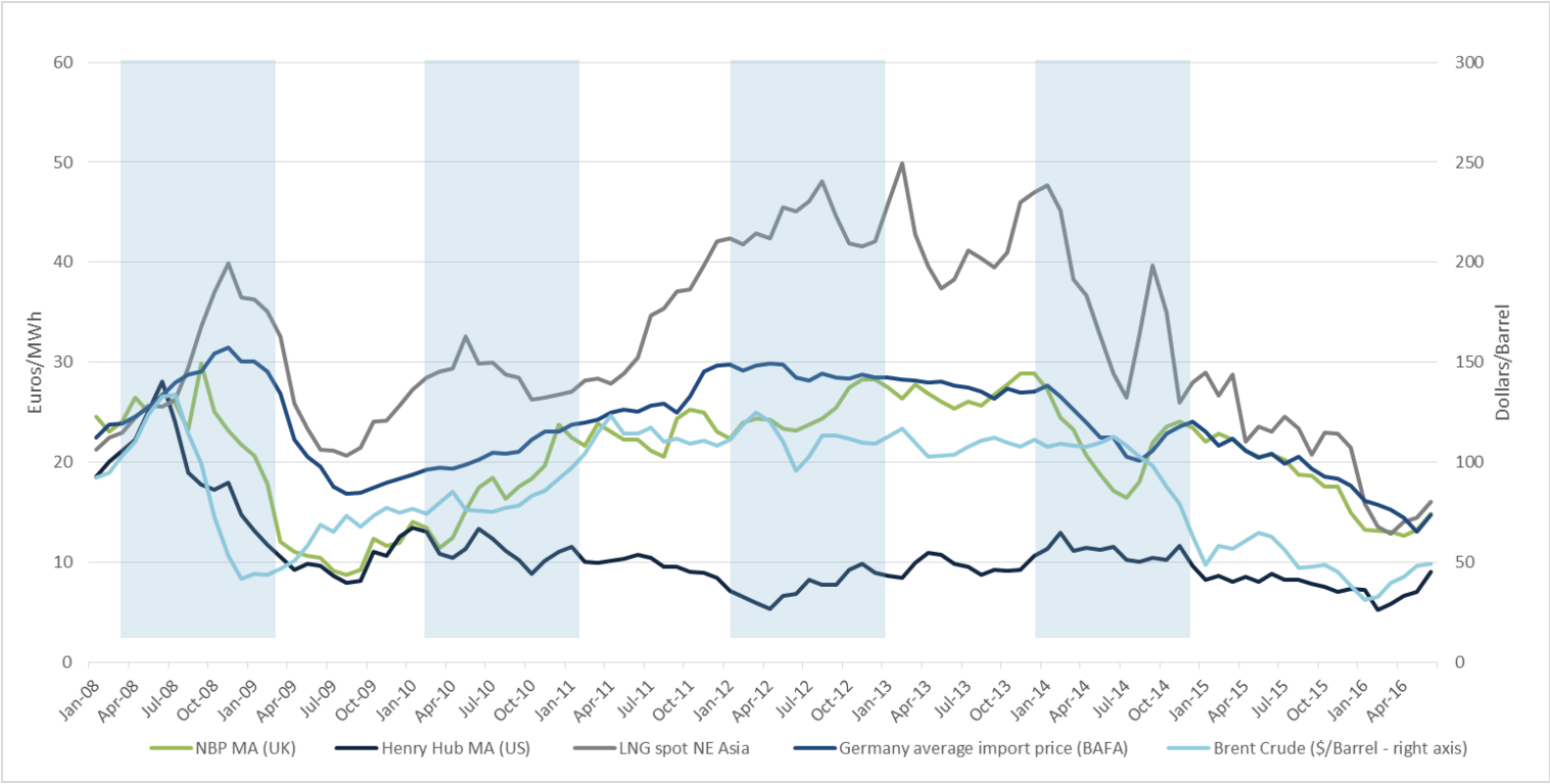


Domestic production represents less than 30% of EU gas supply in 2015

Source: Eurostat, BP statistical Review 2016

European and American gas hub prices are further aligning

Overview of international wholesale gas price evolution – 2009 – 2016
Euros/MWh and Dollars/Barrel

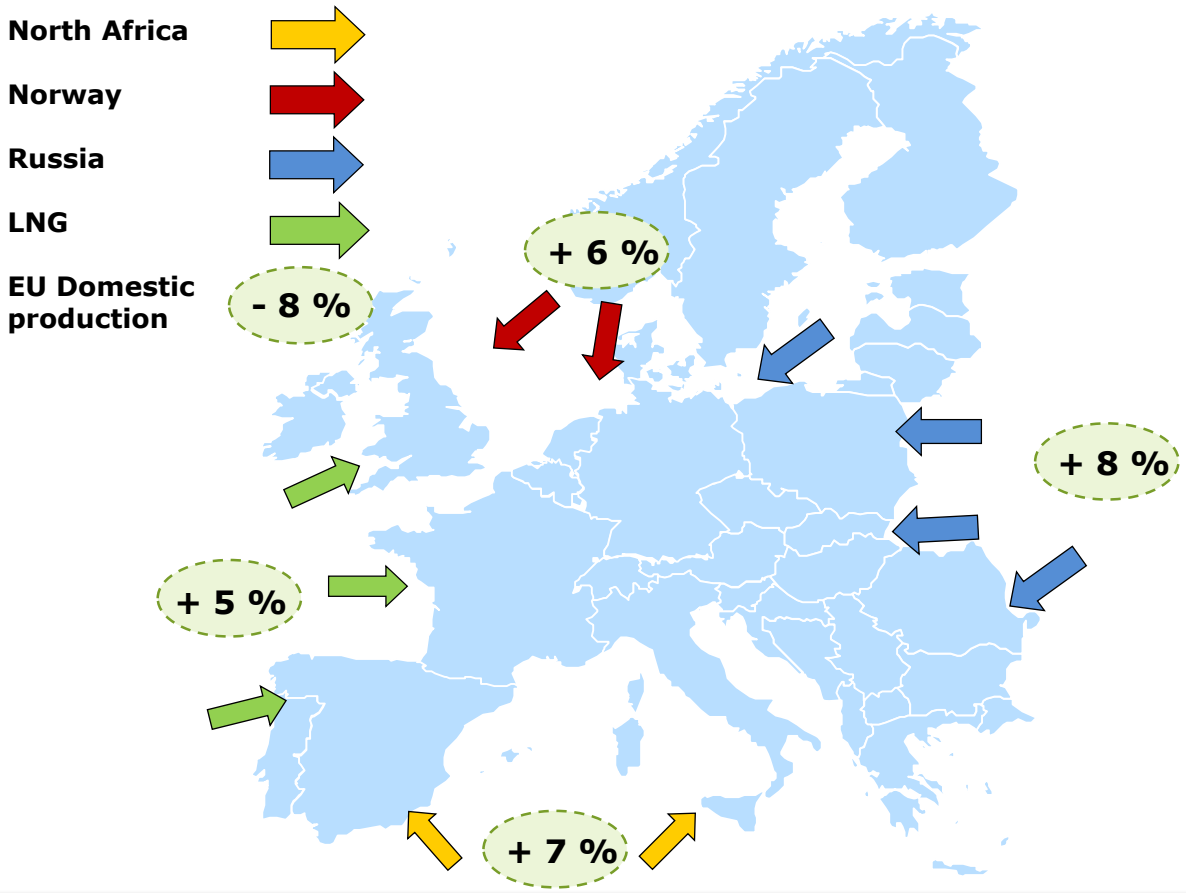


- **EU hub prices at lowest values since last 5 years**
- **Prices of long-term gas contracts decreased thanks to impact of indexation components (hub elements impact and/or falling oil prices impact)**
- **Global LNG economics contribute to alignment**

Source: Platts, Thomson Reuters and BAFA

Decreasing prices during the year 2015 impacted gas purchasing strategies

Geographical gas origin of imports in 2015 and YoY variation (%)



- Shippers price hedge supplies - as far as LT contracts ToP obligations allow:

1. Less Russian imports – which tend to be more indexed to oil – during first quarter, recover from second quarter onwards
2. More Norwegian and LNG imports
3. Storage withdrawals accelerated at the beginning of the year

- Steady flow levels through Nord Stream and recovery of transit volumes though Ukraine - Slovakia
- More reverse flows in for example CEE region

Source: IEA (2015) and ACER calculations

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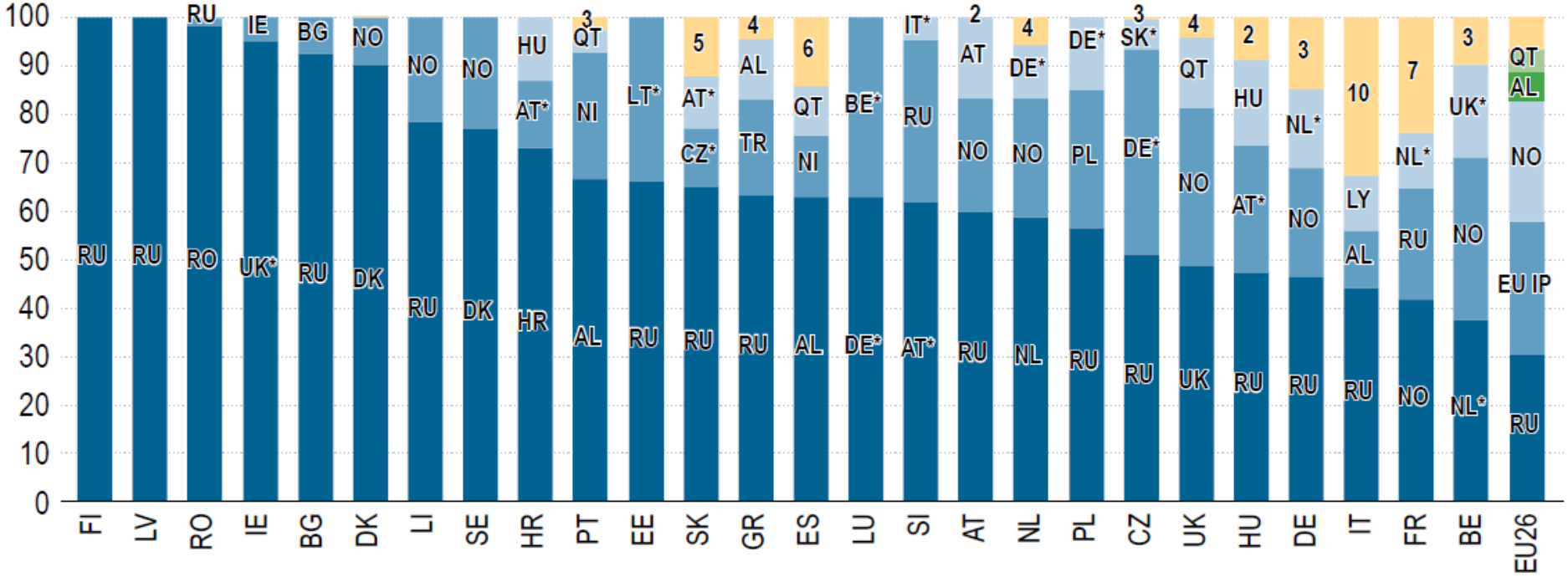
Well-functioning gas markets need good building blocks

Topics assessed in the Market Monitoring exercise

- Diversity of supply sources
- Upstream market concentration
- Capacity available and booked at interconnection Points
- Physical flows including reverse flow possibilities
- Underground storage and LNG roles
- Implementation of gas network codes

Flexibility in gas sourcing has improved in recent years but quite a few MSs are still dependent on one or two sources

Estimated diversity of origins of gas supply in EU MSs (2015)



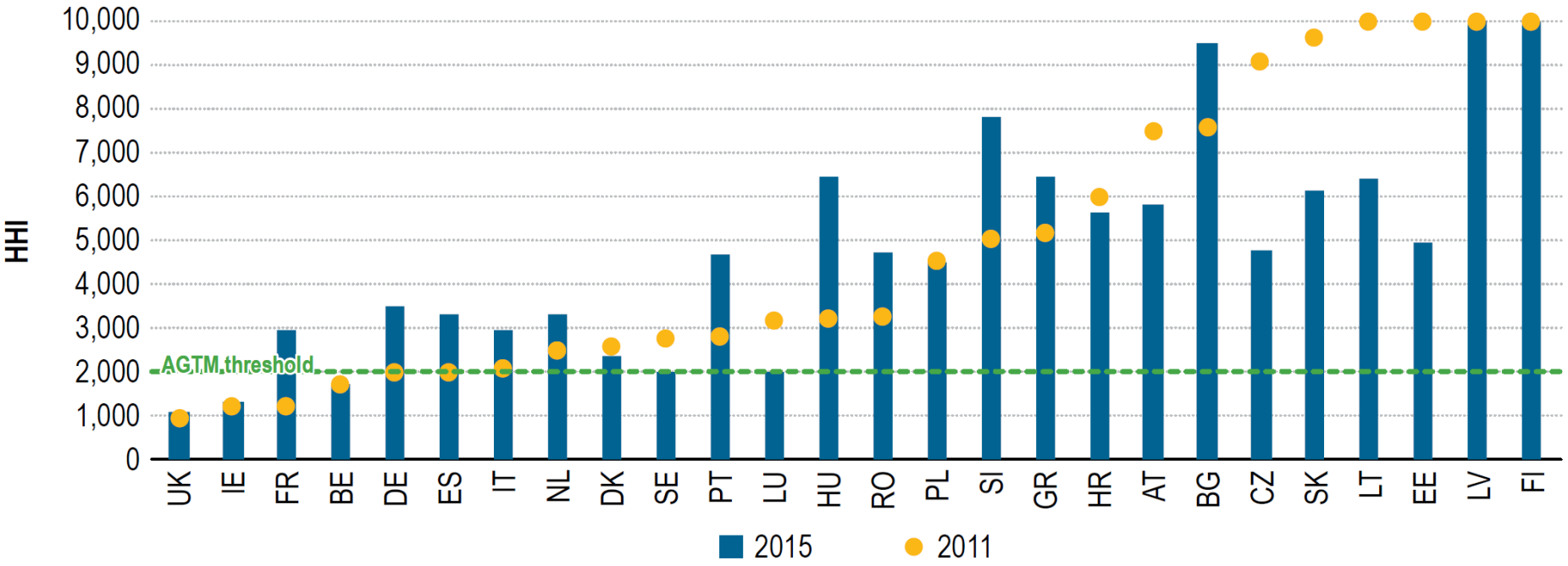
- **Decreasing domestic production is further increasing dependence on external imports**
- **MSs with higher sourcing diversification tend to have better-functioning hubs**

* refers to MSs featuring liquid organised markets from where the gas was purchased.

Source: ACER calculations based on Eurostat, Eurostat Comext and BP Statistical report (2016).

While many Member States score well on upstream market concentration, smaller gas markets tend to have weaker values

HHI index per EU MS at upstream sourcing companies' level – 2015 vs 2011

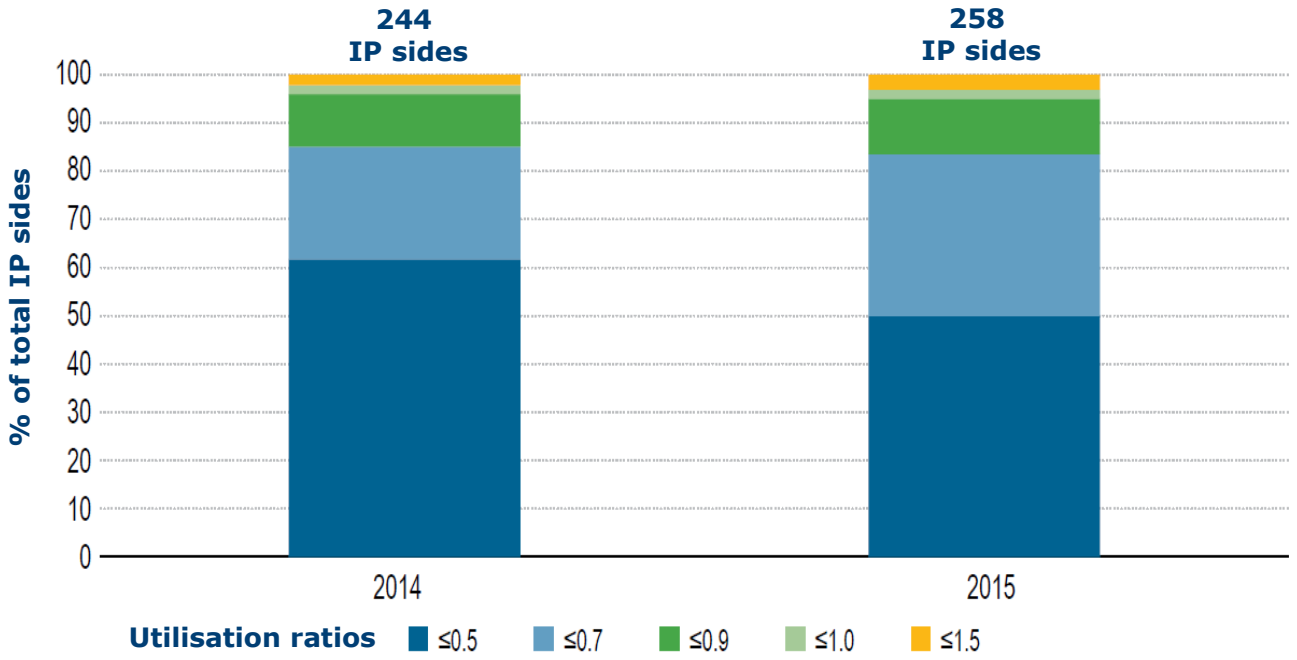


Source: ACER calculations based on Eurostat and Eurostat Comext, BP Statistical Report, Frontier Consultancy desktop research for GTM 2014 and NRAs data

Congestion Management Procedure Guidelines: some improvements in capacity utilisation but ratios are still low

Aggregated capacity utilisation of EU IPs - flows over bookings – 2014 – 2015 (%)

- CMP entered into force October 2013
- Establishes measures to prevent and reduce contractual congestions at EU IPs



- YoY increase in flows over booked capacity but average utilisation ratio still below 70%
- Reasons for low capacity utilisation:
  - Highly priced short-term capacity
  - Constraints to buy capacity closer to real-time (within-day)
  - Gas hub prices convergence and extension of swaps and flows netting mechanisms reduce arbitrage opportunities
  - Prevalence of long term contracts in some markets

Source: ACER calculations based on ENTSOG TP and PRISMA.

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ACER Gas Target Model envisages a pivotal role for gas hubs

- VTP of an entry/exit system where **title transfer of gas takes place between users via nominations**
- Hub trading is incentivised by **creation of a transparent trading venue** (i.e. exchange, broker platforms)
- **''Hub-to-hub" model** aims at constructing the internal European gas market by creating fully **functioning and integrated wholesale markets** in the MSs.

	Initial →		Advanced
Players	• Players with focus on physical and balancing		• Financial players
Centralised venues	• Bilateral trades	• Brokers	• Exchange for future products
Price reference	• Spot	• Forward products	• LT contract indexation
Transparency	• Price discovery		• Depth and frequent publication

Source: Gas Target Model

What is the observed current status? EU market is heterogeneous when it comes to hub development with NPB and TTF in the lead

A ranking of EU hubs based on 2015 monitoring results

Established hubs

Broad liquidity

Sizeable forward markets which contribute to supply hedging

Price reference for other EU hubs and for long-term contracts indexation

Advanced hubs

High liquidity

More reliant on spot products and balancing operations

Progress on supply hedging role but relatively **lower longer-term products liquidity levels** results in weaker price risk management role

Emerging hubs

Improving liquidity from a lower base taking advantage of enhanced interconnectivity

Liquidity partially driven by market obligations imposed on incumbents

Still significant reliance on long-term contracts

Illiquid hubs

Reliance chiefly on long-term contracts

Early stage organised market places or lack of a hub

Absence of an entry-exit system in some markets

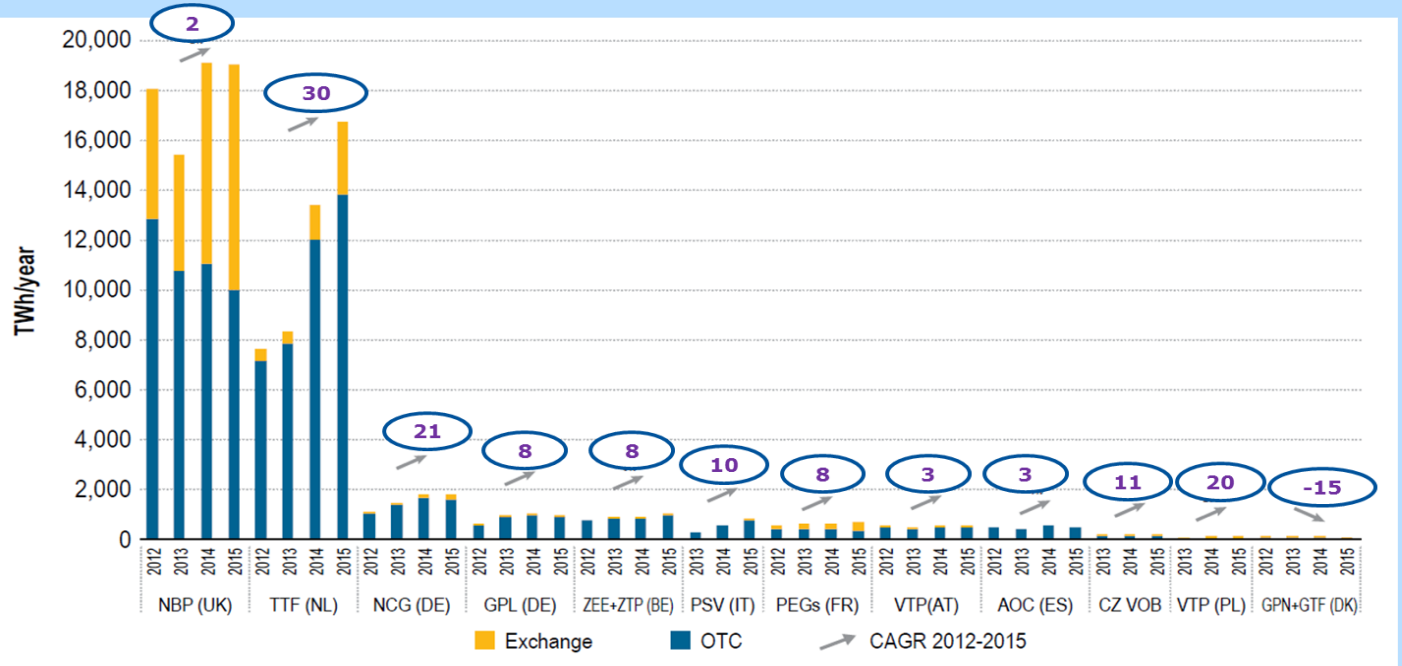
Source: ACER

Traded volumes at gas hubs continue to grow overall, underlining their increasing importance

Evidence of TTF/NBP lead

- Highest volume traded
- Larger number of trades
- Tighter bid ask spreads for forward products
- Lower trade concentration levels
- Larger order book volumes
- Longer order book horizons

Traded volumes at EU hubs and CAGR – 2012–2015 (TWh/year and %)



Liquidity growth is underpinned in most EU hubs by the intensification of suppliers' preference for short-term hub sourcing and price risk management. Rising volatility promotes also financial players trading.

Source: Trayport, hub operators, NRAs

In most hubs trading operations mostly cover spot products, only TTF and NBP show significant forward products activity

Evidence of TTF/NBP lead

- Highest volume traded
- Larger number of trades
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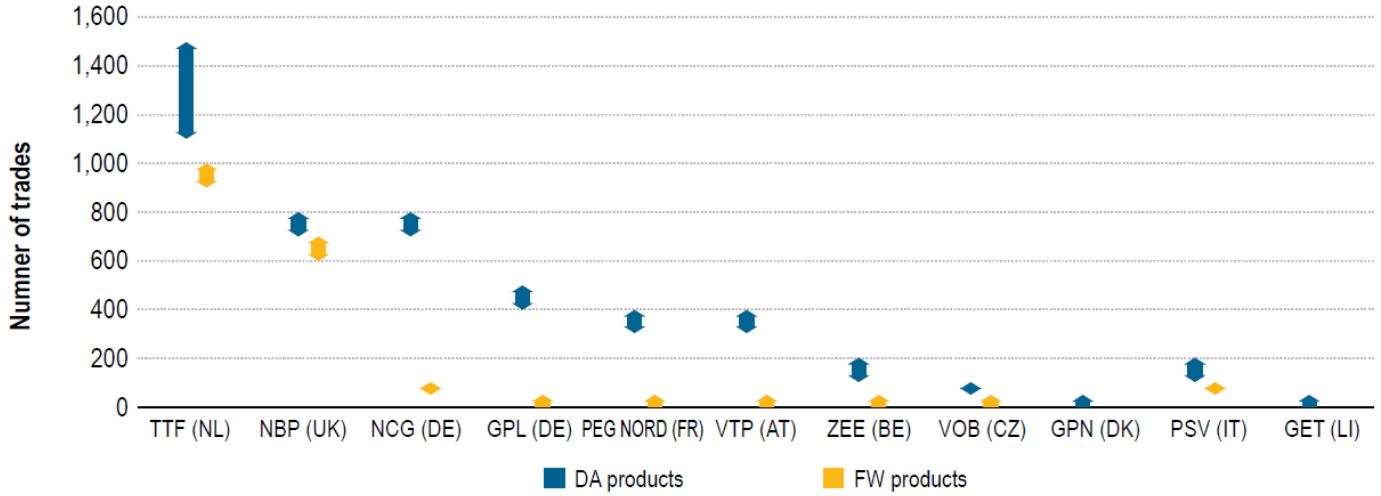
Number of executed trades (daily average) for DA and FW products in selected hubs for November 2015–April 2016



Trades for DA products are usually higher at all hubs as those operations are operationally larger

Source: ACER calculations based on sanitized REMIT data

Bid ask spreads are lower for spot than for prompt and forward products as a result of a larger availability of orders

Evidence of TTF/NBP lead

- Larger number of trades
- Highest volume traded
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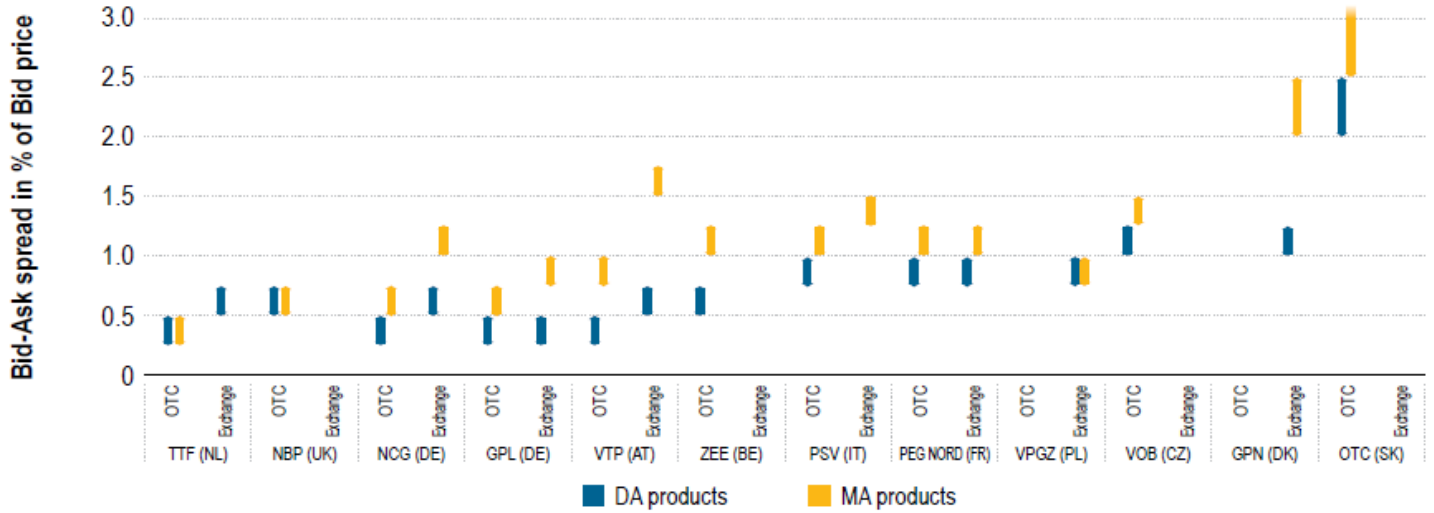
Bid ask spreads for selected hubs, by market and product category during November 2015 - April 2016 (%)



Lower bid ask spreads are found for spot products used for final portfolio optimization and balancing purposes than on the curve

Source: ACER calculations based on sanitized REMIT data

Concentration is relatively low in most hubs given the active presence of a large number of companies

Evidence of TTF/NBP lead

- Larger number of trades
- Highest volume traded
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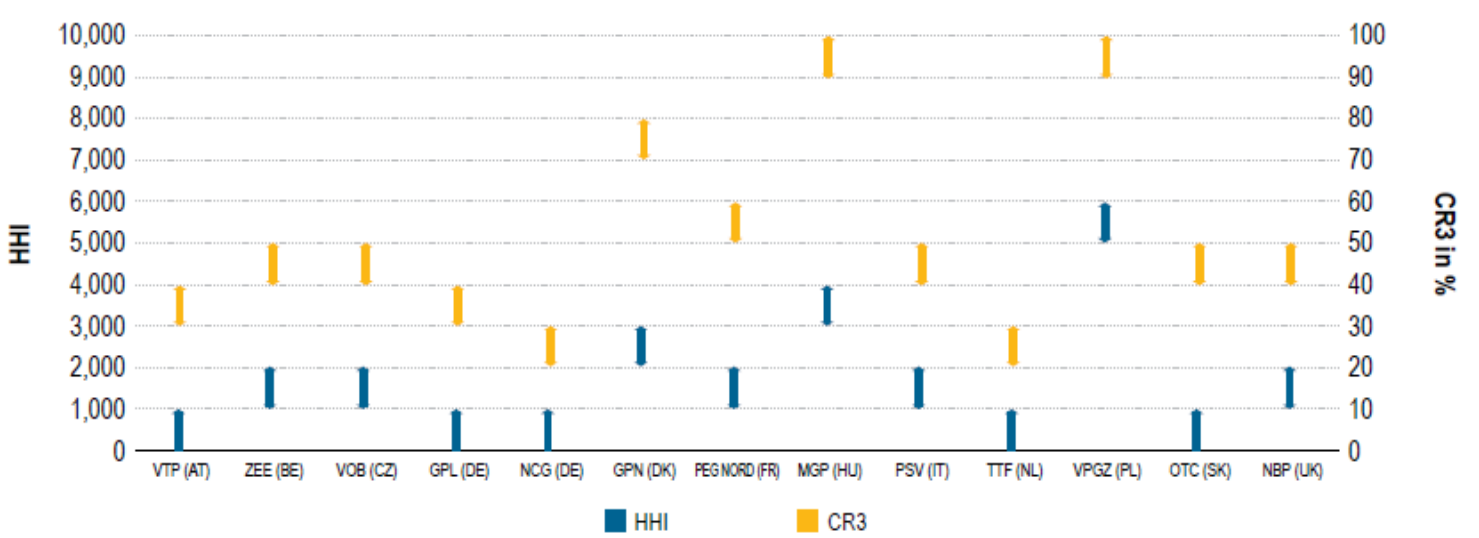
Market concentration ranges of finalised transactions of MA products for selected EU hubs for the selling side - November 2015-April 2016



However in selected markets, usually those less advanced hubs, concentration is higher

Source: ACER calculations based on sanitized REMIT data

Selected NWE hubs (e.g. Germany) show more comparable results to TTF ad NBP for spot products availability which is linked to portfolio optimisation and balancing trade, but…

Evidence of TTF/NBP lead

- Larger number of trades
- Highest volume traded
- Tighter bid ask spreads for forward products
- Lower trade concentration levels
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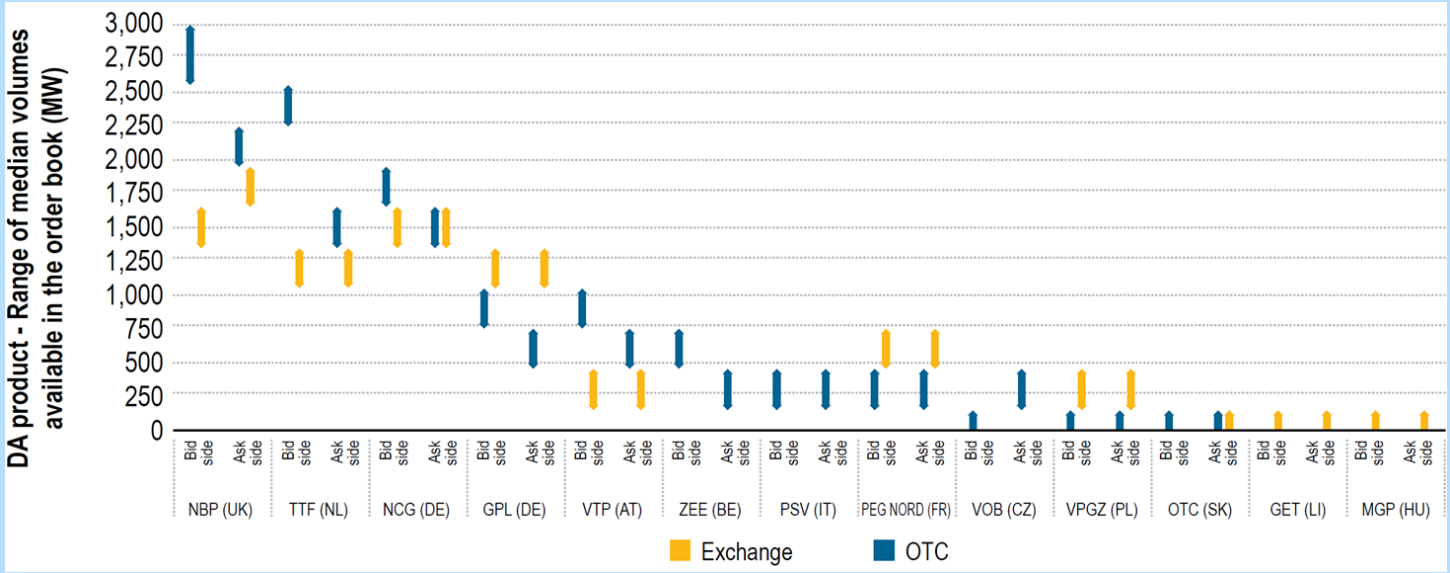
- Longer order book horizons

Available median bid and ask-side volumes in the order book during the day for DA in selected EU hubs in ranges of MW for November 2015 to April 2016



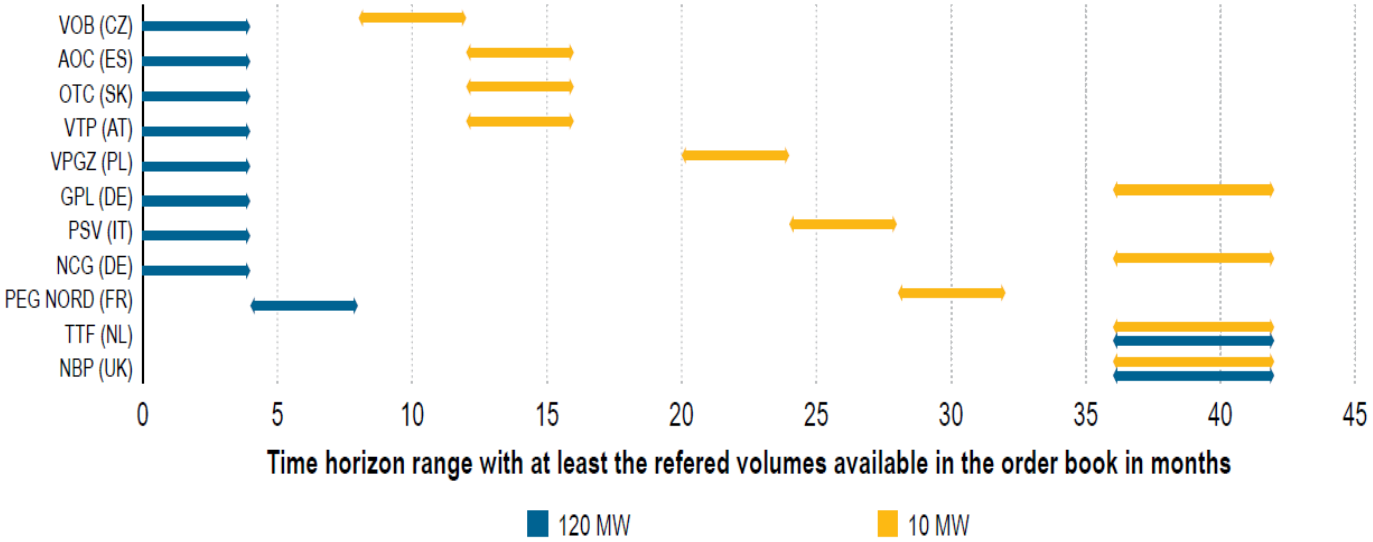
Source: ACER calculations based on sanitized REMIT data

… TTF and NBP are clearly the leading hubs in offering sizeable liquidity on the longer curve

Evidence of TTF/NBP lead

- Larger number of trades
- Highest volume traded
- Tighter bid ask spreads for forward products
- Lower trade concentration levels
- Larger order book volumes
- Longer order book horizons

Order book horizon in ranges of months for bids for forward products for different blocks of MWs – November 2015 - April 2016

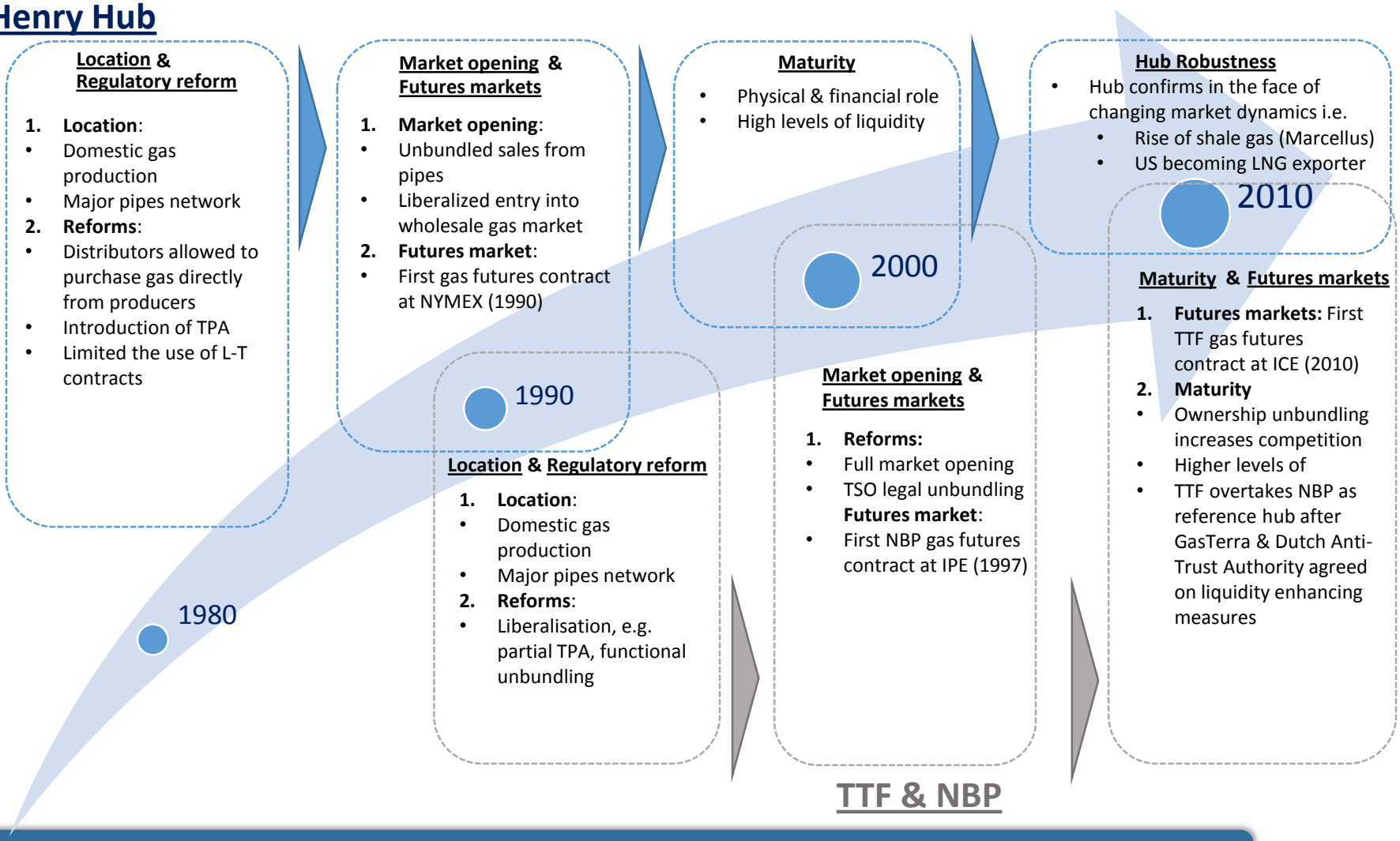


Longer liquidity on the curve enables more supply hedging and price risk management opportunities

Source: ACER calculations based on sanitized REMIT data

NBP and TTF follow similar development trajectory compared to the leading global hub, Henry Hub (US)

Henry Hub



Source: ACER, FERC

At the other end of the spectrum some Member States do not have a hub and Virtual Trading Points is weakly developed

Regional case example: Assessment of VTPs in SSE

Application of following practices	AT	CZ	HR	HU	IT	PL	RO	SI	SK
Independent VTP operator*		✓	✓	✓	✓	✓	✓	✓	✓
Transport contract not required to access VTP	✓	✓		✓	✓			✓	✓
Trading license not required to access VTP	✓				✓		✓	✓	✓
Trade notifications 30 min	No, 2hrs	No (Oct 16)	No, 2hrs	No, 2hrs	No (Oct16)	No, 2hrs	No, 2hrs	No, 2hrs	No, 2hrs
Regular shioppers' meetings	✓			✓	✓			✓	✓
Consultation on VTP changes also in English	✓				Not always	✓	Not always		
Minimum notice period for changes		1 month		1 month		14 days			

- VTP established in all MSs in SSE **except Greece and Bulgaria**
- Transport contract and trading license still needed in a few member states to access the VTP

Note: A VTP operator is considered as independent if owned by 1) a certified TSO or 2) neither the TSO nor the incumbent

Source: ACER elaboration of GRI SEE survey responses (data provided by VTPs/NRAs)

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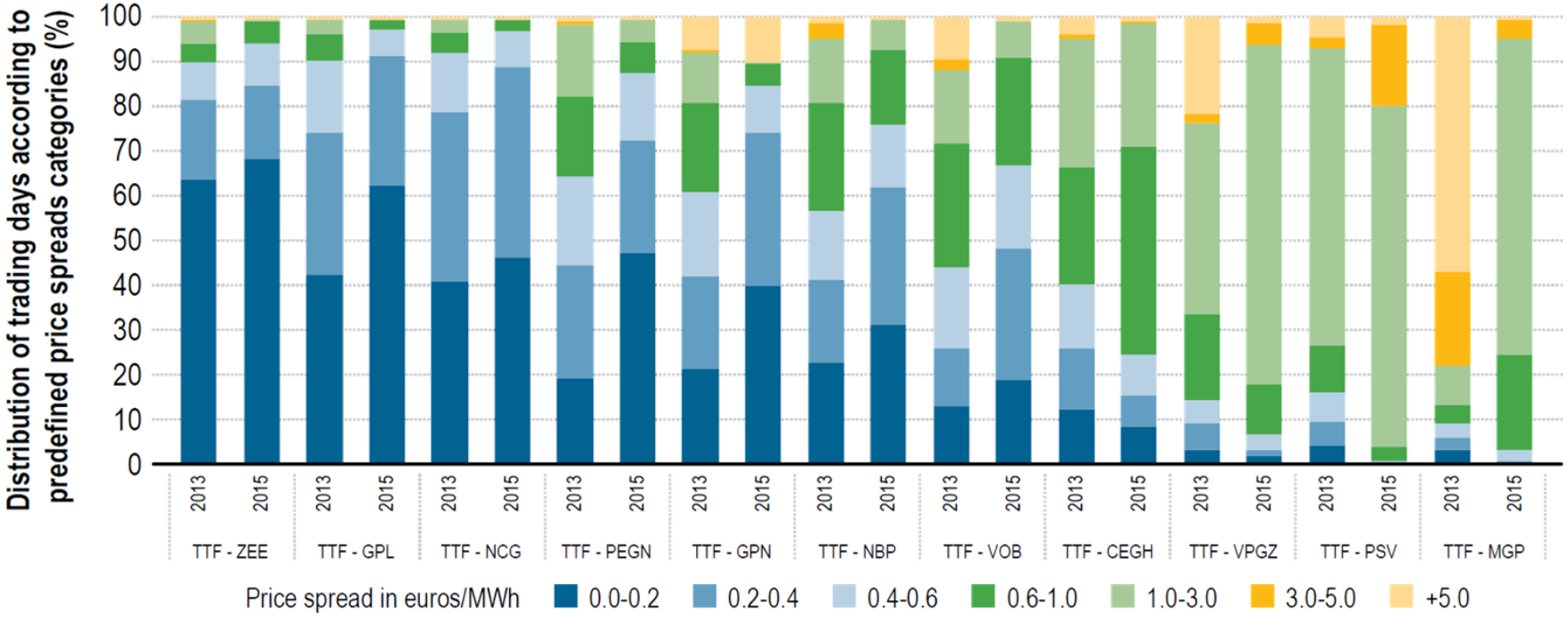
Rising price convergence is observed among hubs

Levels of DA price convergence between TTF and selected hubs year on year

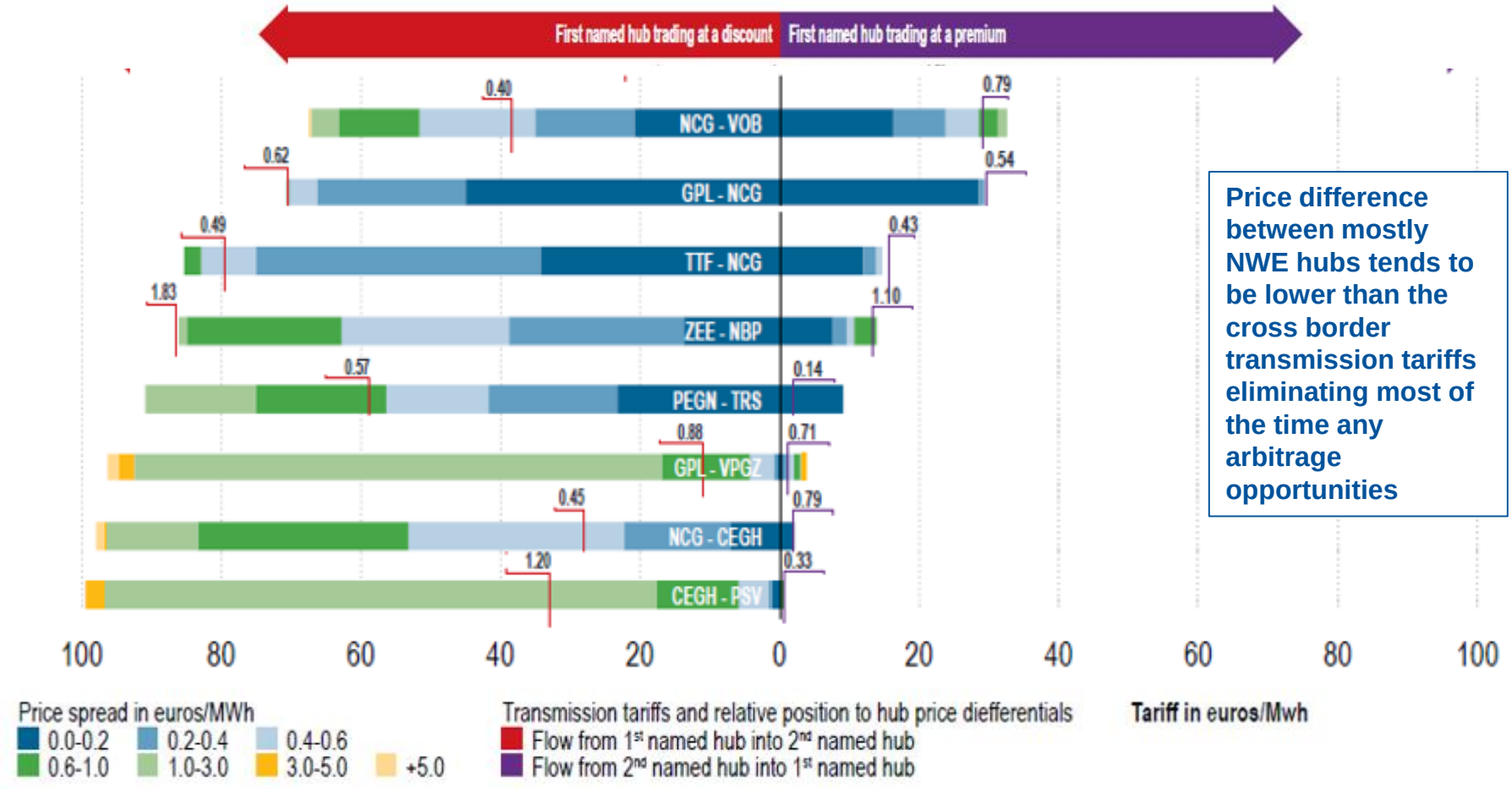


- Increased use of **hubs** for **arbitrage opportunities** in situation of **oversupplied markets**
- More **hedging possibility for traders** from comparison of liquidity and prices
- Facilitation of cross-border trade **via new infrastructure** and **harmonised regulation**
- Rising **hub price indexation** of LT contracts and use of common continental hub references

Source: ACER calculations based on Platts and hub operators data

Tariffs are becoming a less determining factor to hub trade

Day-ahead price convergence levels in EU hubs compared to transmission tariffs – 2015

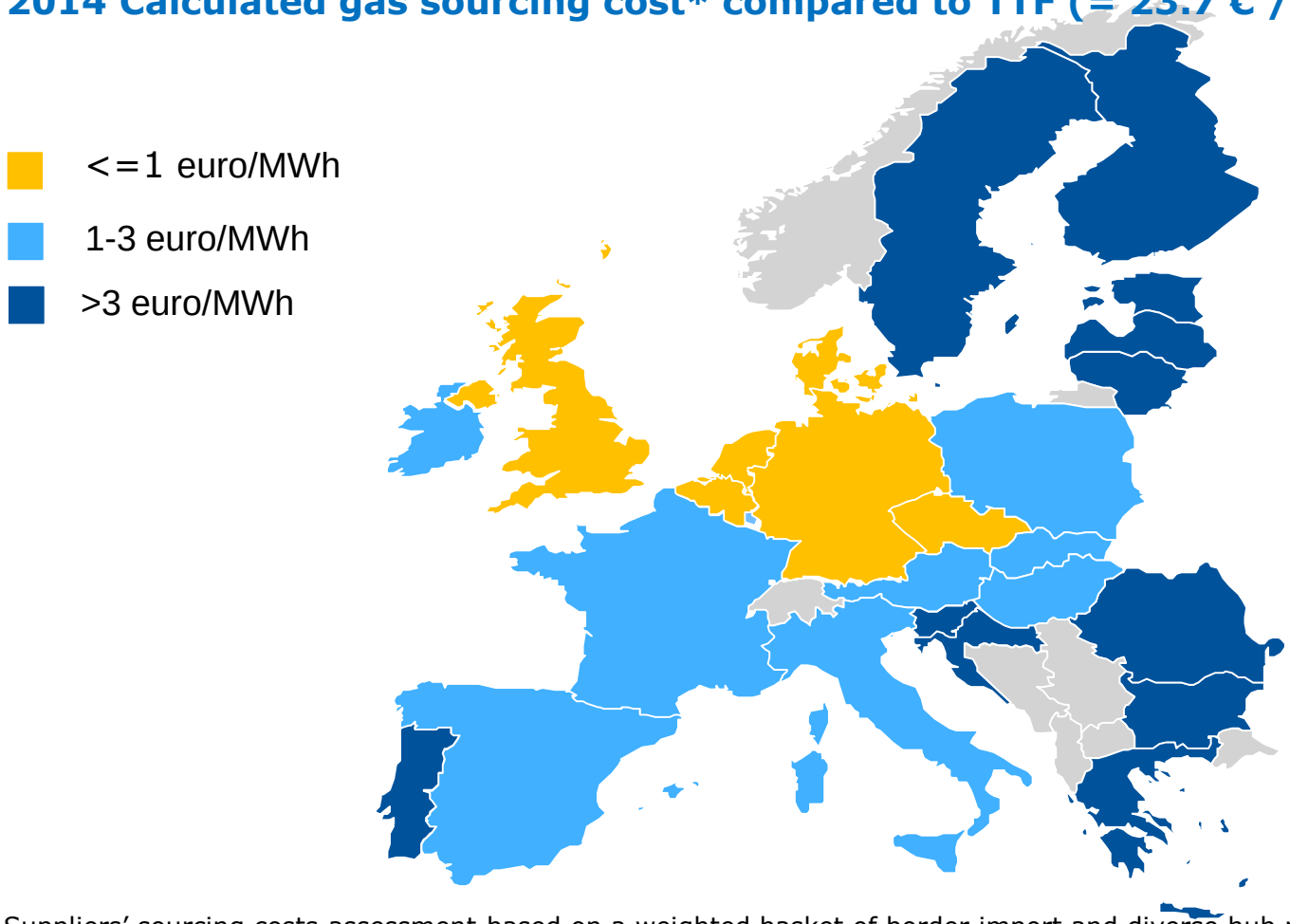


Price difference between mostly NWE hubs tends to be lower than the cross border transmission tariffs eliminating most of the time any arbitrage opportunities

Source: Prices (ACER calculations based on Platts and hub operators data for prices), Tariffs (ENTSOG).

2014 saw increasing levels of convergence in supply costs …

2014 Calculated gas sourcing cost* compared to TTF (= 23.7 € /MWh)



Price levels higher in those regions with:

- **Weaker inter-connection**
- **Less competitive market frames**
- **Less developed hubs**

* Suppliers' sourcing costs assessment based on a weighted basket of border import and diverse hub product prices. For some countries sourcing of own production occurs at lower cost than the imports (e.g. HR, RO)

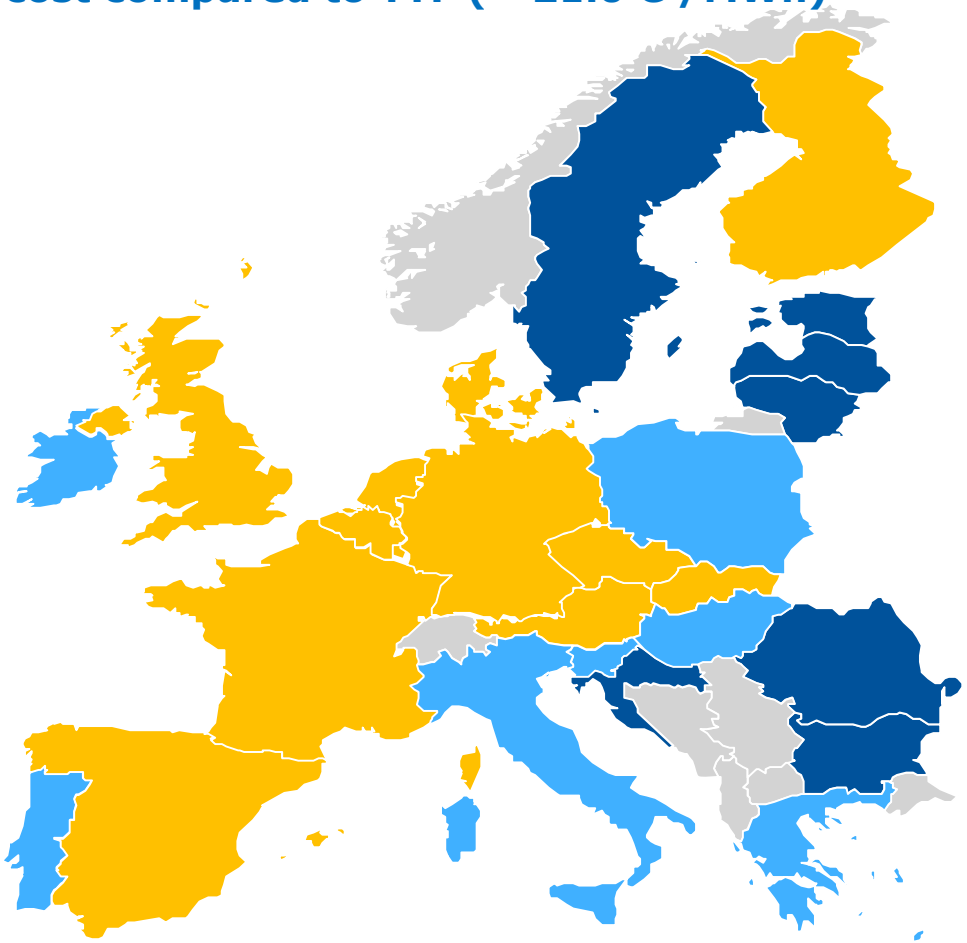
Source: ACER estimates based on NRA input, Eurostat Comext, BAFA, Platts.

… a trend which was further enhanced in 2015, indicative of further market integration

2015 Calculated gas sourcing cost compared to TTF (= 21.0 € /MWh)

- <=1 euro/MWh
- 1-3 euro/MWh
- >3 euro/MWh

- **Influence of lower oil price and gas oversupply**
- **Impact of reverse-flows**
- **Hub functioning**
- **Improved LNG competitiveness**

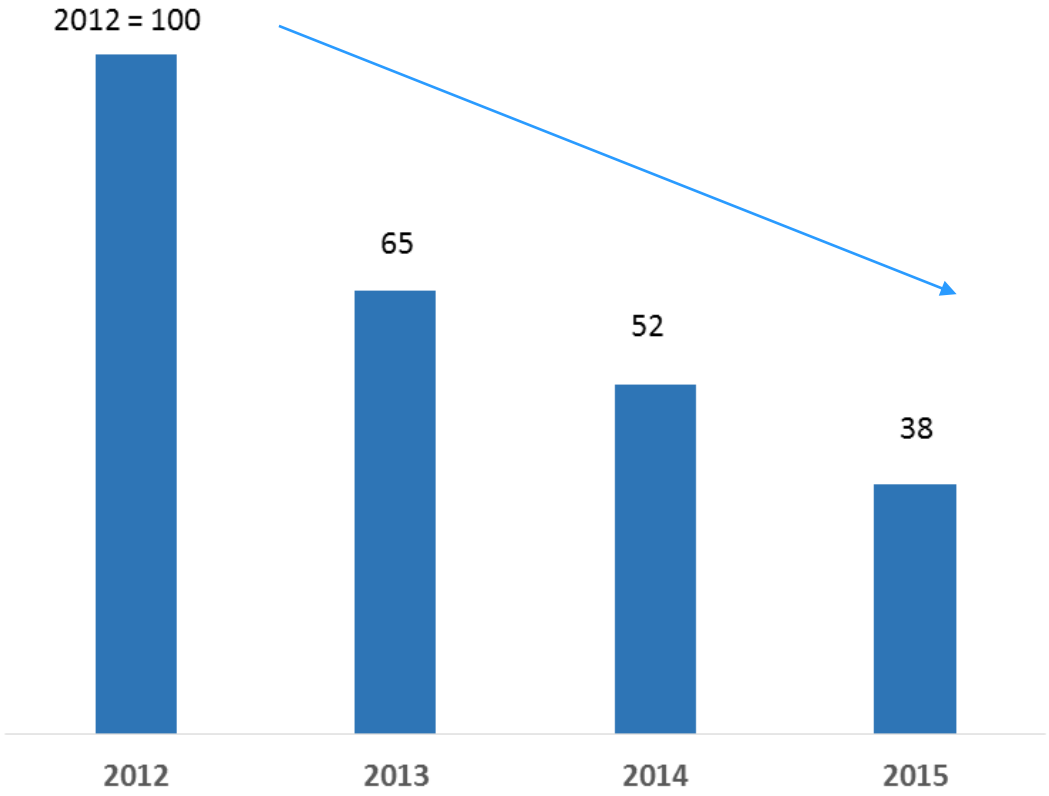


* Suppliers' sourcing costs assessment based on a weighted basket of border import and diverse hub product prices. For some countries sourcing of own production occurs at lower cost than the imports (e.g. HR, RO)

Source: ACER estimates based on NRA input, Eurostat Comext, BAFA, Platts.

Gross welfare losses continued to decrease in 2015 and have decreased substantially over the last four years

2012-2015 estimated gross welfare losses – index variation (%)



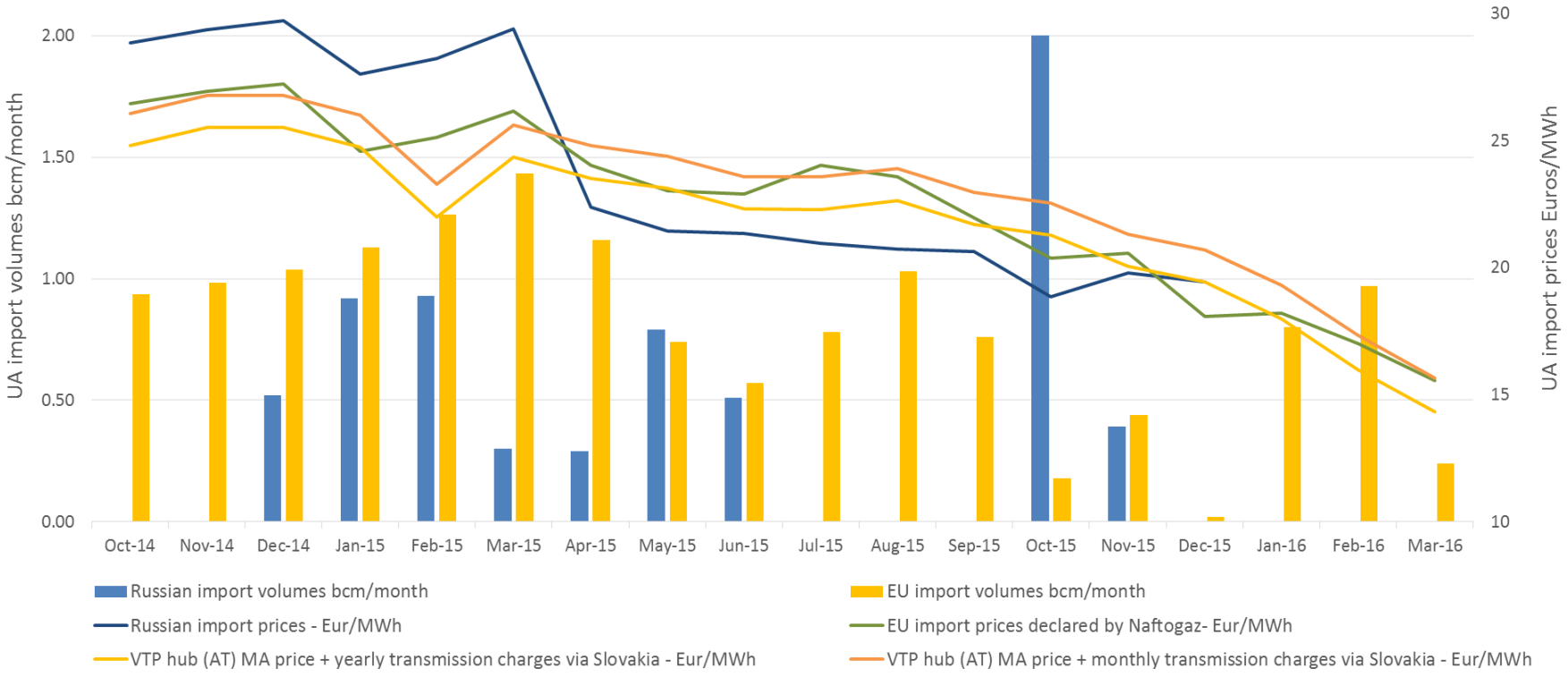
- Welfare losses of up to 75 euro per household
- Highest in those member states with weakest market dynamics
- Losses explained by:

1. Hub development & hub price convergence
2. Price indexation in long term contracts through hub instead of oil references
3. Market factors (oil price decline, demand drop)

Source: ACER estimates based on Eurostat Comext, BAFA, Platts and NRAs guidance.

European internal gas market model is also of relevance to Energy Community countries

Gas imports origin and assessed prices for Ukraine Oct 2014 – March 2016



Reverse flow capabilities on EU outer borders and hub development allows Ukraine to tap into a second, hub based gas source

Source: ACER estimates based on Platts, ENSTOG and Naftogaz.

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Conclusions (1/2)

- EU gas wholesale markets **function better and better,** but actual state of play differs by member state. The report shows that
  - The building blocks for markets' well-functionality are more and more in place
  - **Price formation** is more and more driven by **gas on gas competition** factors
  - Gas markets are becoming **more integrated**
- However, while the **group of member states with better functioning markets becomes larger**, the **gap with the remaining group –** which also saw progress – **has become wider.**

- The **market role of gas hubs are pivotal** although not all MSs feature sufficient liquid markets allowing for supply portfolio optimization and price risk management. Further facilitation of growth in trading activity in the gas hubs is needed, and some countries still lack the basic hub set up.

- TTF and NBP are the leading hubs and play a clear role as price reference hubs for the rest of Europe. They seem to cement their status and the market should further do its work.

Conclusions (2/2)

- While **diversification in the number of gas supply sources has improved**, large diversity among member states persist and **several countries do not reach the Gas Target Model target of three distinct sources**. Gas upstream market concentration is also improving but **some markets still suffer high(er) concentration levels**. These factors **hampers market development**.

- **More integration of markets** can be observed:
  - Gas sourcing costs for a typical supplier's gas portfolio get further aligned across the EU
  - There is **more price convergence** and correlation among hubs (for DA and MA). While not an absolute goal in itself there is near absolute price convergence in NWE, and dramatic improvements in other regions are further **reducing arbitrage opportunities**
  - Estimated **gross welfare losses** further **decreased** but remain highest in those Member **States with weakest market dynamics.**

- The implementation of **Network Codes seems to have a positive impact on market functioning**, however it is still too early to make a definite conclusion. Further monitoring will be required. A timely and proper implementation of network codes will push market integration and functioning