

Aurora Keynote:

Ukraine, Russia, Europe & the resurgence of geopolitics in energy markets



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A U R  R A

Spring Forum

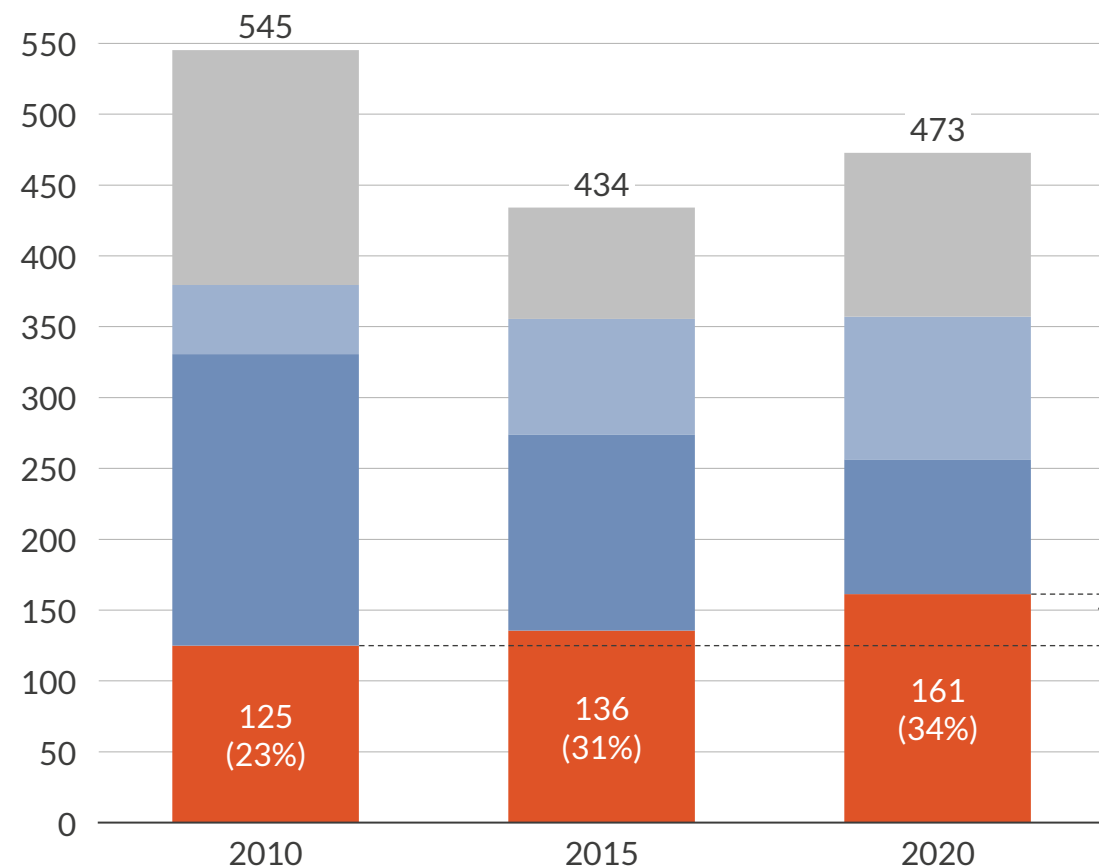
Oxford 2022

In partnership with



As indigenous gas production declined, Europe has increased its reliance on Russian gas by one third– but dependence is uneven

Share of European gas supply by source¹
bcm

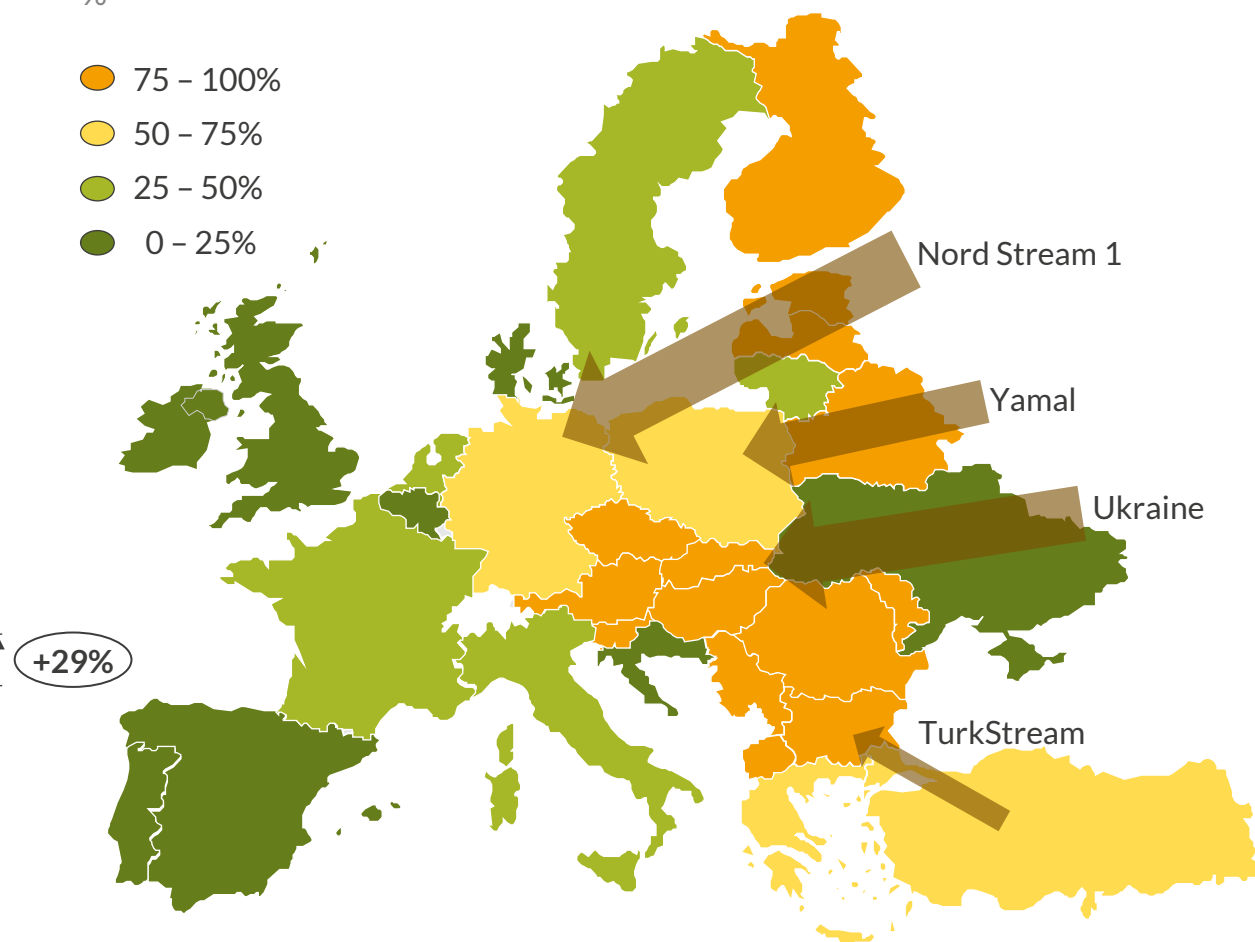


Other imports Norway Indigenous production Russia

1) Pipeline + LNG flows. Share % of trade in value. Extra-EU trade flows (no intra-EU trading)

Dependence on Russian gas (2021)
%

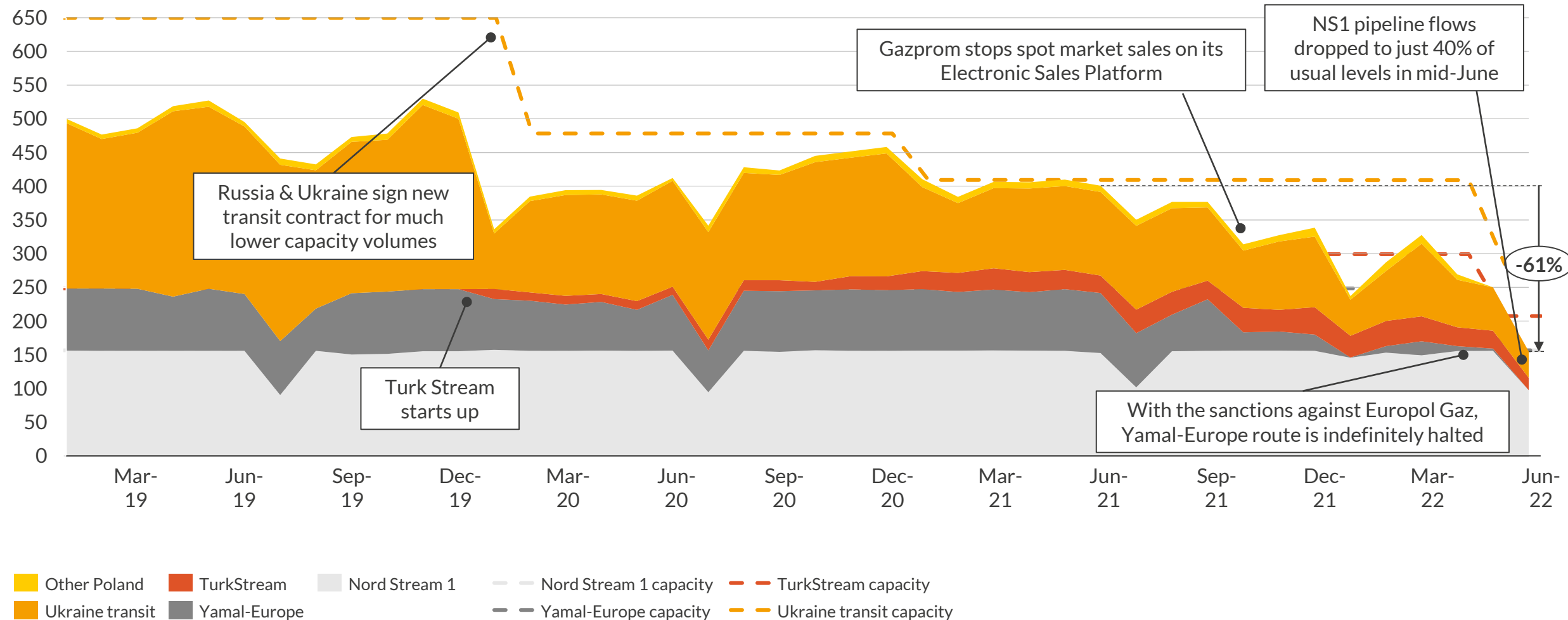
- 75 – 100%
- 50 – 75%
- 25 – 50%
- 0 – 25%



Halting transit through Poland, reducing NS1 flows to 40% as well as Ukrainian transit, Russia has reduced gas exports to Europe by 61%

Average monthly Russian gas deliveries to Europe¹ since January 2019

mcm/d

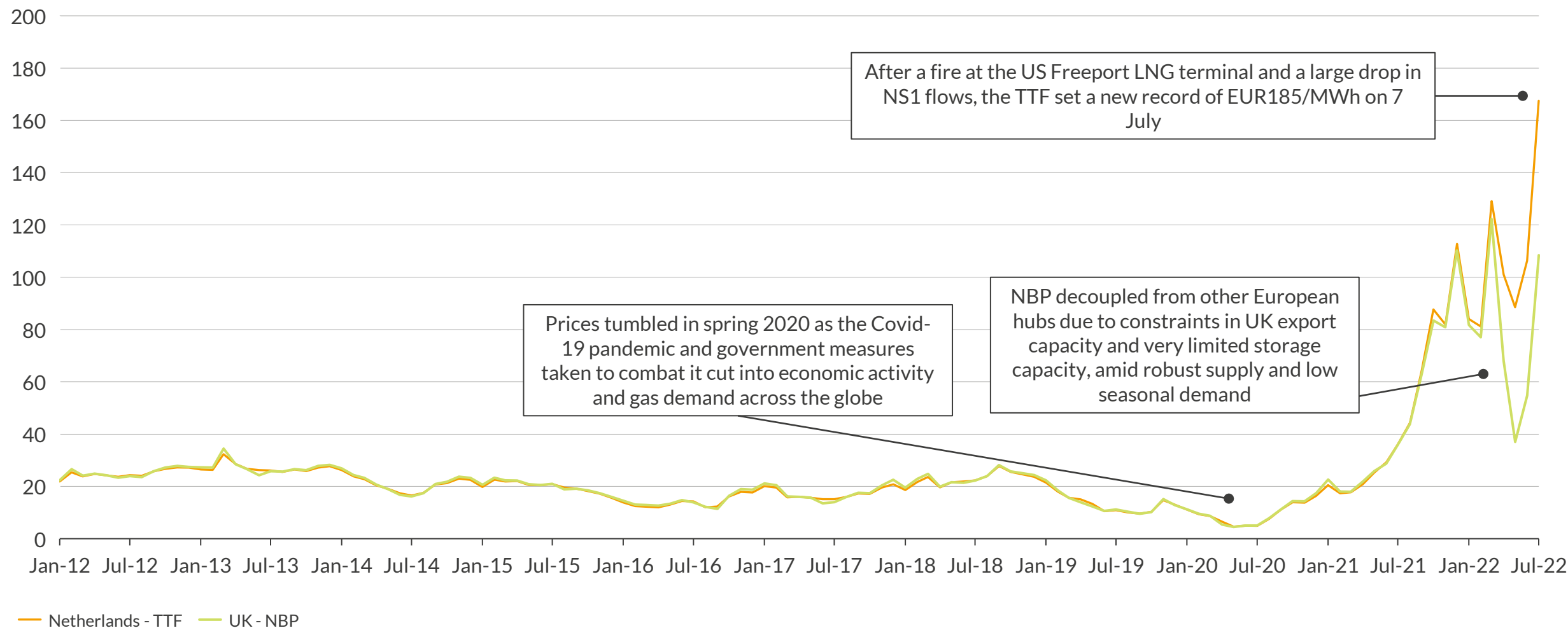


1) Shown capacities (dashed lines) are cumulative, starting from Nord Stream 1, Yamal-Europe, Turk Stream and Ukraine. Other marginal routes, including about 15.7mcm/a of additional capacity at the Belarus-Poland border, were excluded. Additionally, Turkey and the Baltics have been excluded

Lower Russian flows have led to unprecedentedly high gas prices in Europe – and a decoupling between the UK and Europe

Traded average monthly gas prices¹

EUR/MWh (nominal)



1) Monthly average of daily day-ahead prices until 08/07/2022 market close

The European Commission has responded to the Ukraine war with an updated decarbonisation strategy to reduce reliance on Russian gas

Key objectives

REPowerEU

Feasibility (Aurora assessment)

1 Electrification

- Double number of heat pumps in industry and households within 5 years



2 Renewables deployment

- Raise the 2030 target to 45%¹ of the overall energy mix, accelerating permitting to achieve 20% faster² buildout in 2020s
- Target of 10Mt of domestic green hydrogen production by 2030
- Domestic biomethane production of 35 bcm by 2030
- Mandatory rooftop solar



3 Increase energy efficiency

- Increase Energy Efficiency Directive target increase from 9% to 13%
- Behavioural and other measures to encourage energy savings



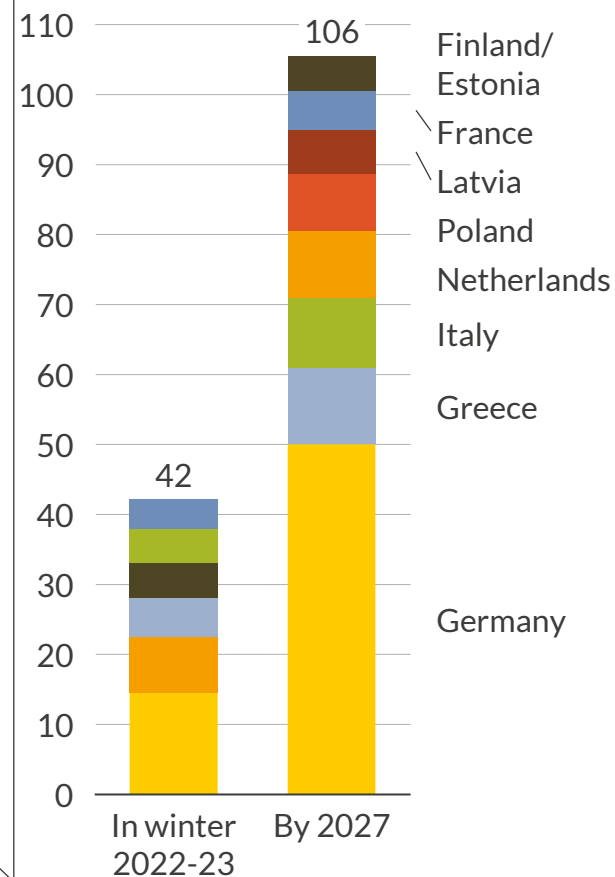
4 Ensure security of supply

- Diversify supply to reduce EU dependence on Russian gas
- Investment in LNG infrastructure (floating and fixed)



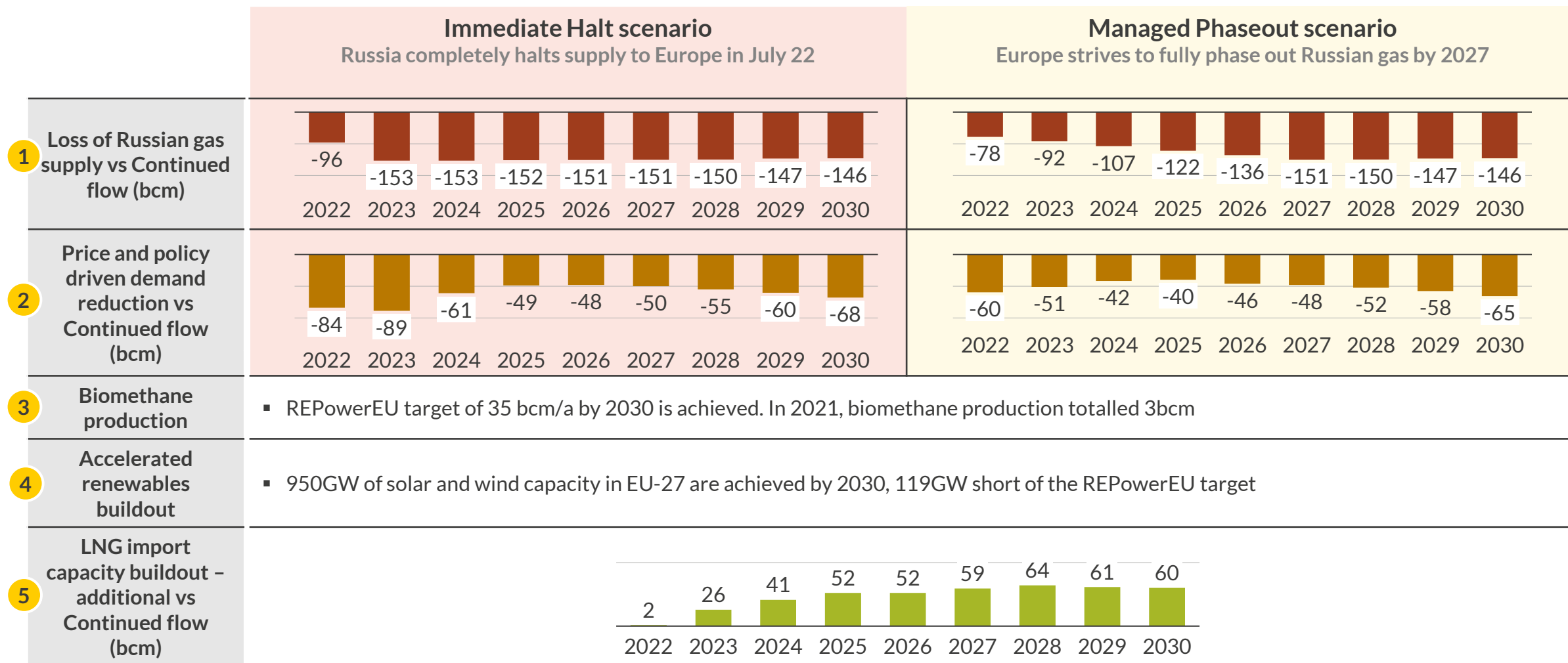
Newly committed European LNG regasification terminal capacity

bcm



1) Total wind and solar capacity would reach 1069 GW, 644GW more than in 2022. 2) Versus "Fit for 55" baseline buildout rate

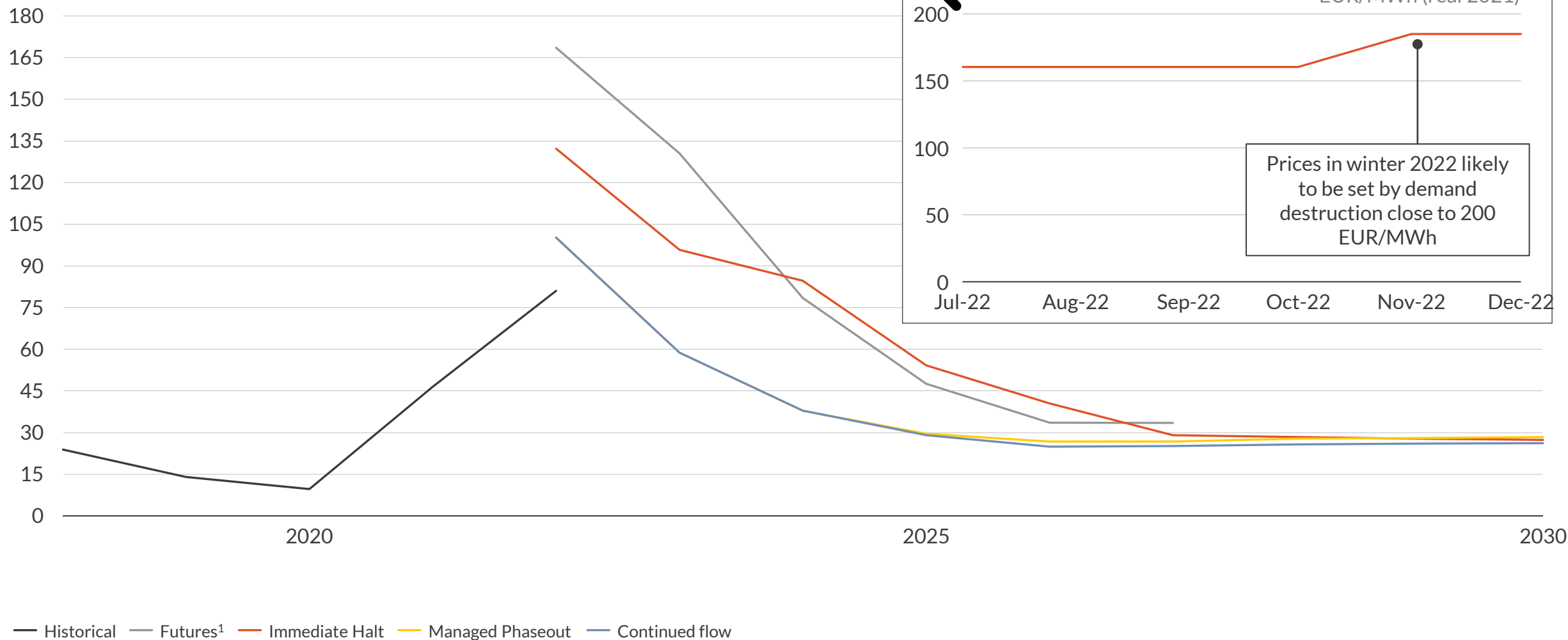
Two scenarios are considered and compared with Central: the Immediate Halt and the Managed Phaseout of Russian gas supply



The market is pricing in a stop of Russian flows in the near term; longer-term prices without Russian gas are closer to 30 EUR/MWh

Average annual TTF natural gas prices

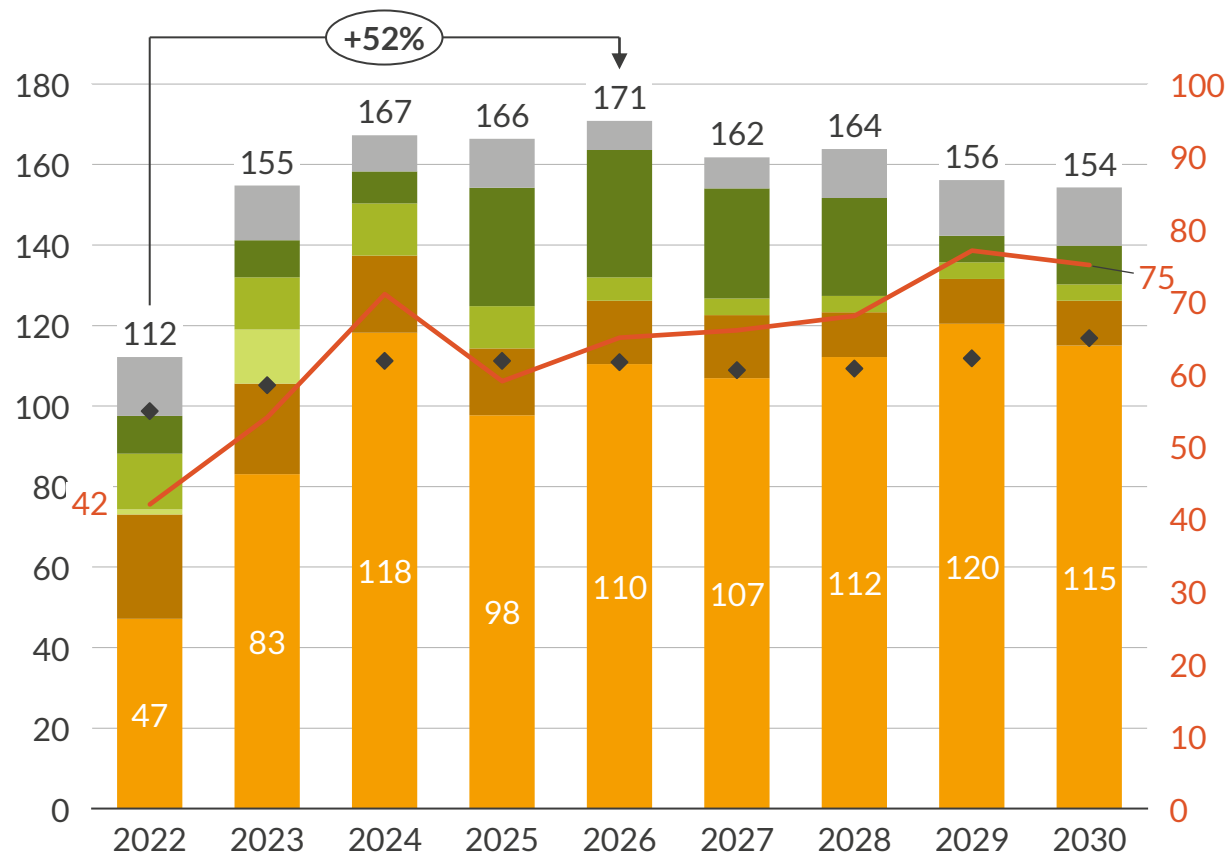
EUR/MWh (real 2021)



1) Futures as of 08/07/2022 market close

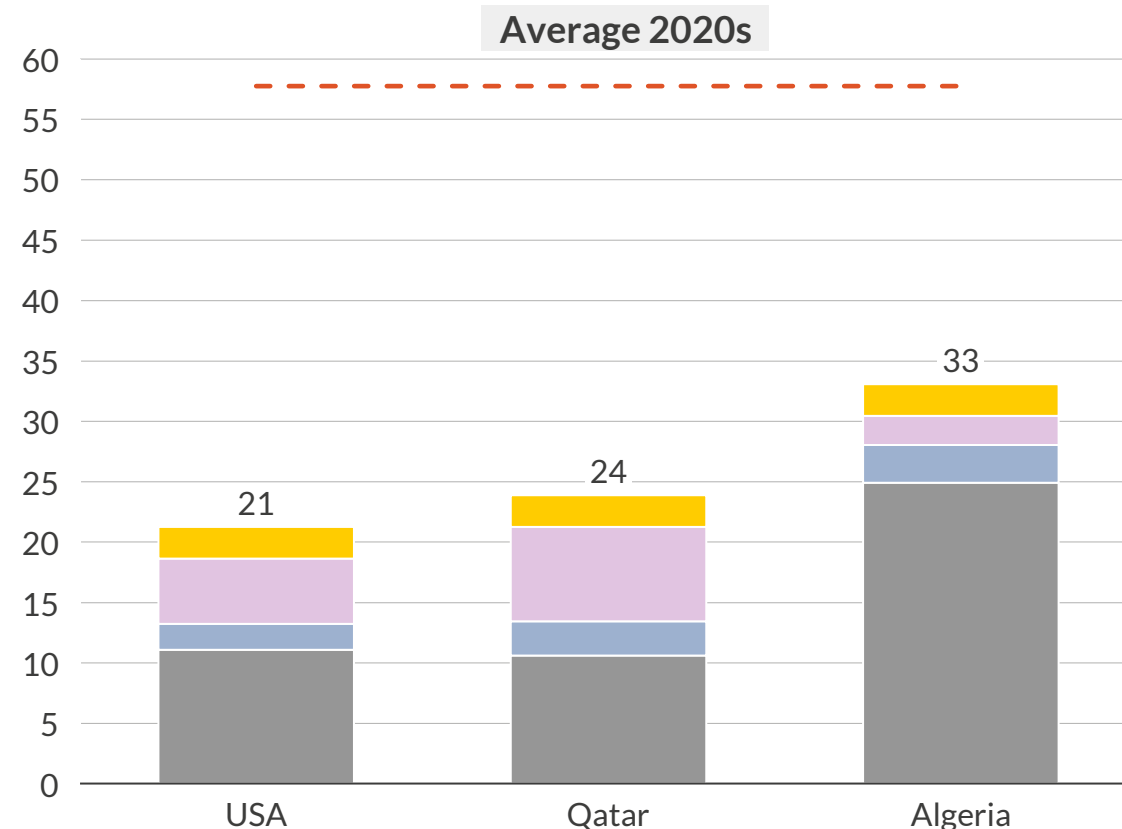
US LNG is the most economic replacement for Russian gas, leading to it taking 75% of the market

European LNG imports by source¹ – Immediate Halt
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Rest of world Egypt Qatar Central total
Rest of Africa Algeria US US share

LNG costs to TTF – Immediate Halt
EUR/MWh

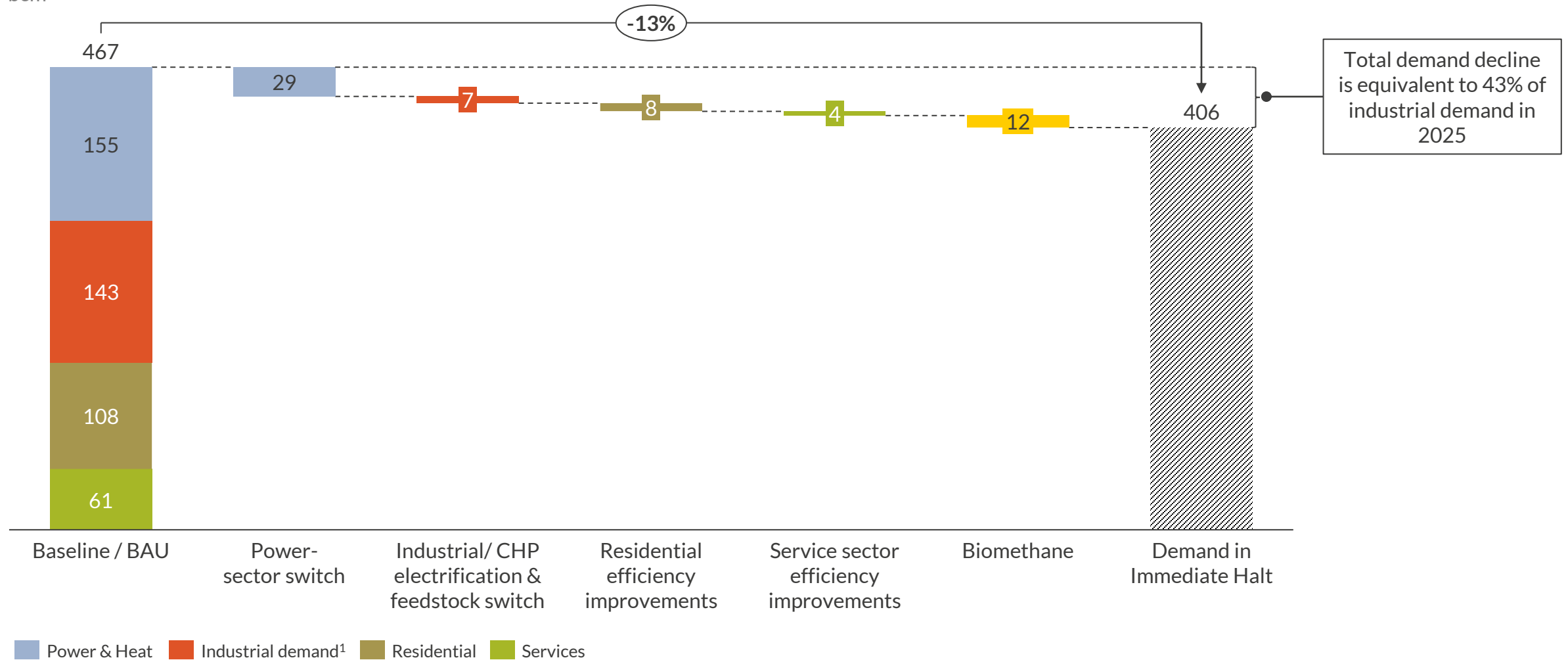


Regasification Liquefaction SRMC TTF price
Shipping Feedgas

1) Europe includes EU-27, UK, Norway and Switzerland (not the Balkans). Numbers defer from LNG numbers in EU Balance because the numbers here are gross LNG flows (before factoring in boiloff due to travel distance), while the numbers in the EU Balance are net LNG flows (after factoring in boiloff due to travel distance)

If REPowerEU measures cannot be realised, industry would have to compensate, putting at risk 43% of industrial gas demand

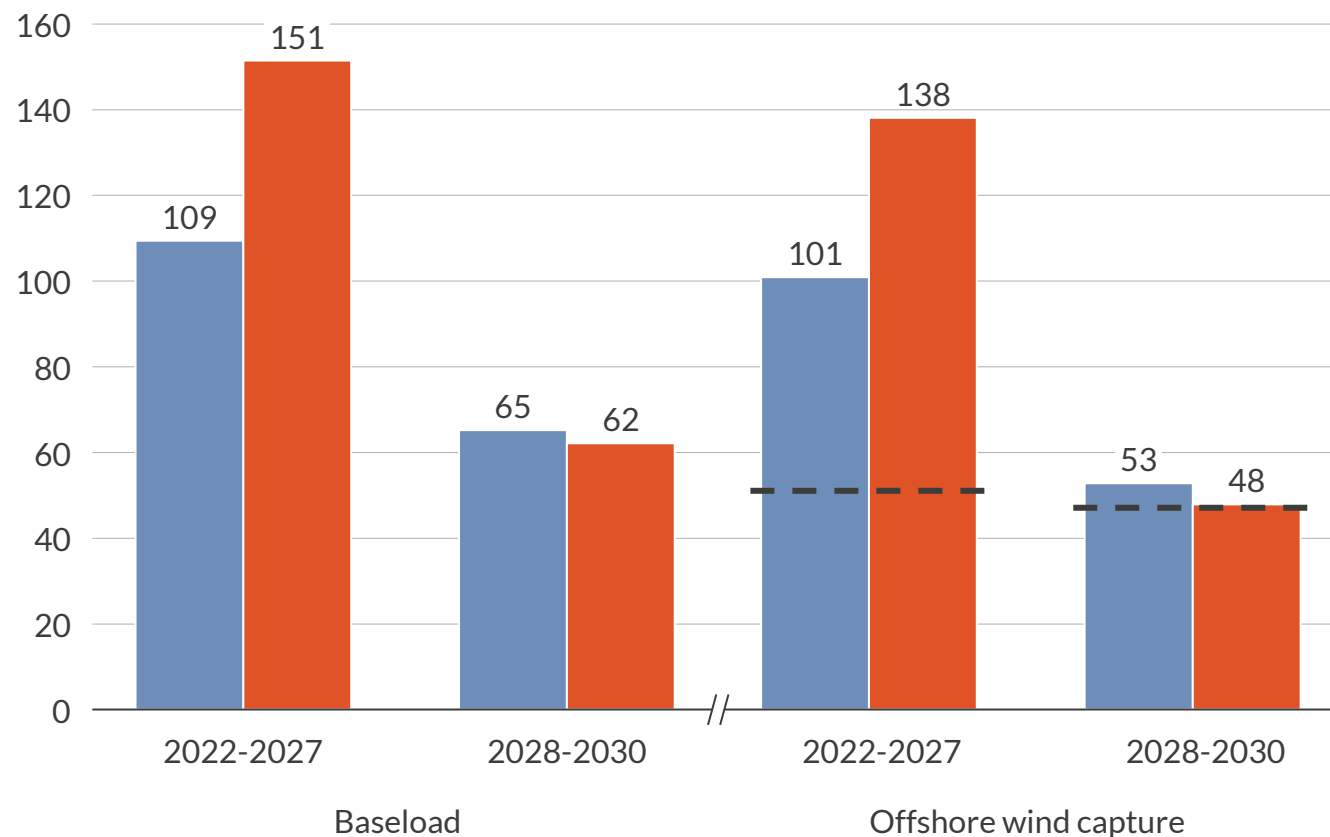
European natural gas demand decline in 2025 in Immediate Halt scenario
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1) Industry final gas consumption for energy and non-energy use

Power prices continue to be set by thermal plants, creating pressure to adapt market design – but disruptions will likely be temporary

GB electricity price (baseload and offshore wind capture)
£/MWh (real 2021)



Continued flow Immediate Halt — — — Indicative offshore wind LCOE (subsidised)



“ This market system does not work anymore. We have to reform it. We have to adapt it to the new realities of dominant renewables. ”



“ The formation of wholesale electricity prices should be decoupled from the high volatility of gas prices by having an “emergency brake” that would split the price-setting mechanisms of electricity markets. ”



“ We need to have a discussion about the market design in which the marginal power plant sets the price for everyone. This worked perfectly for the past 20 years, but suddenly it does not. This discussion is coming with force, and one must say, it does have some merit. ”

