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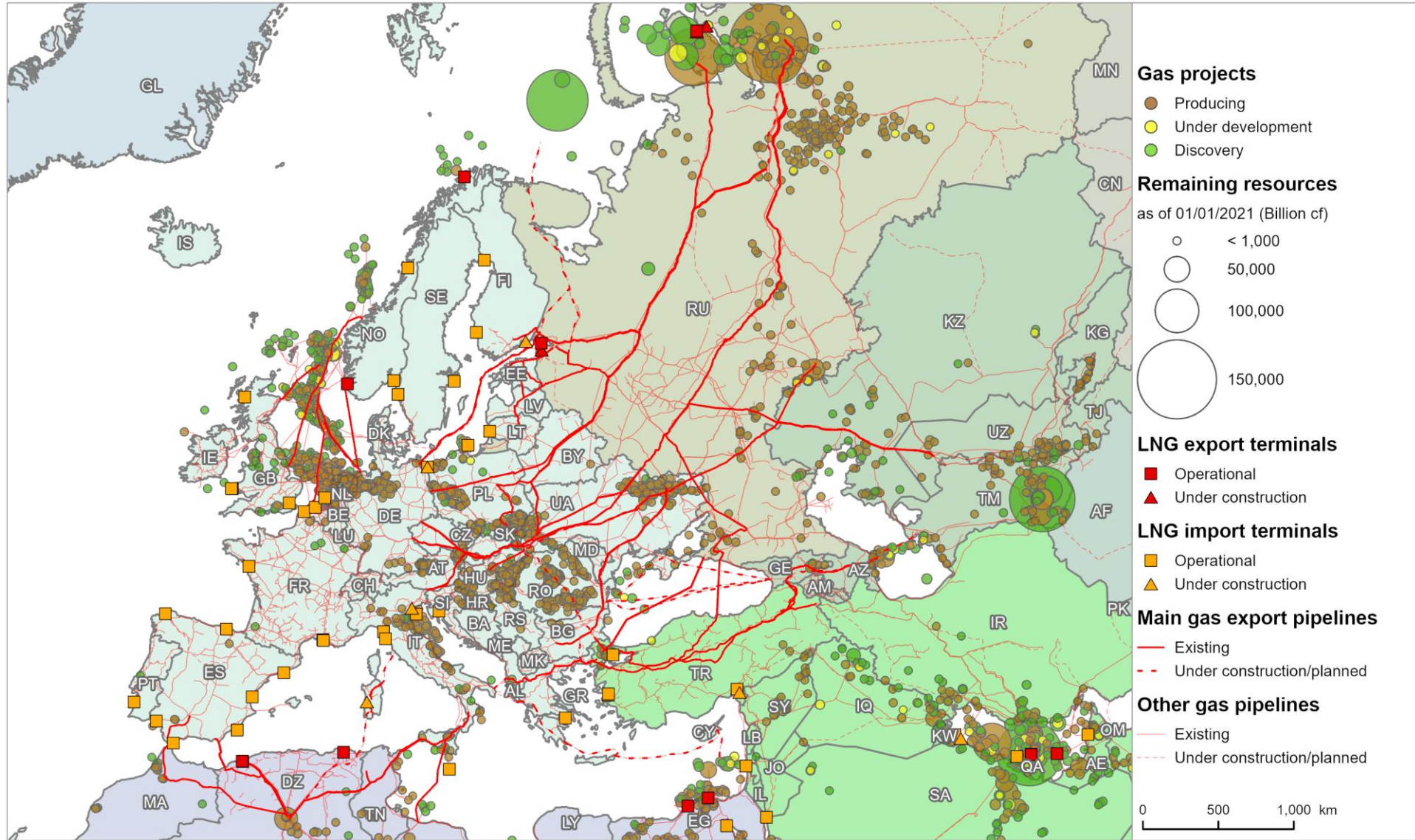
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Norwegian Gas in a Climate and European Supply Security Perspective

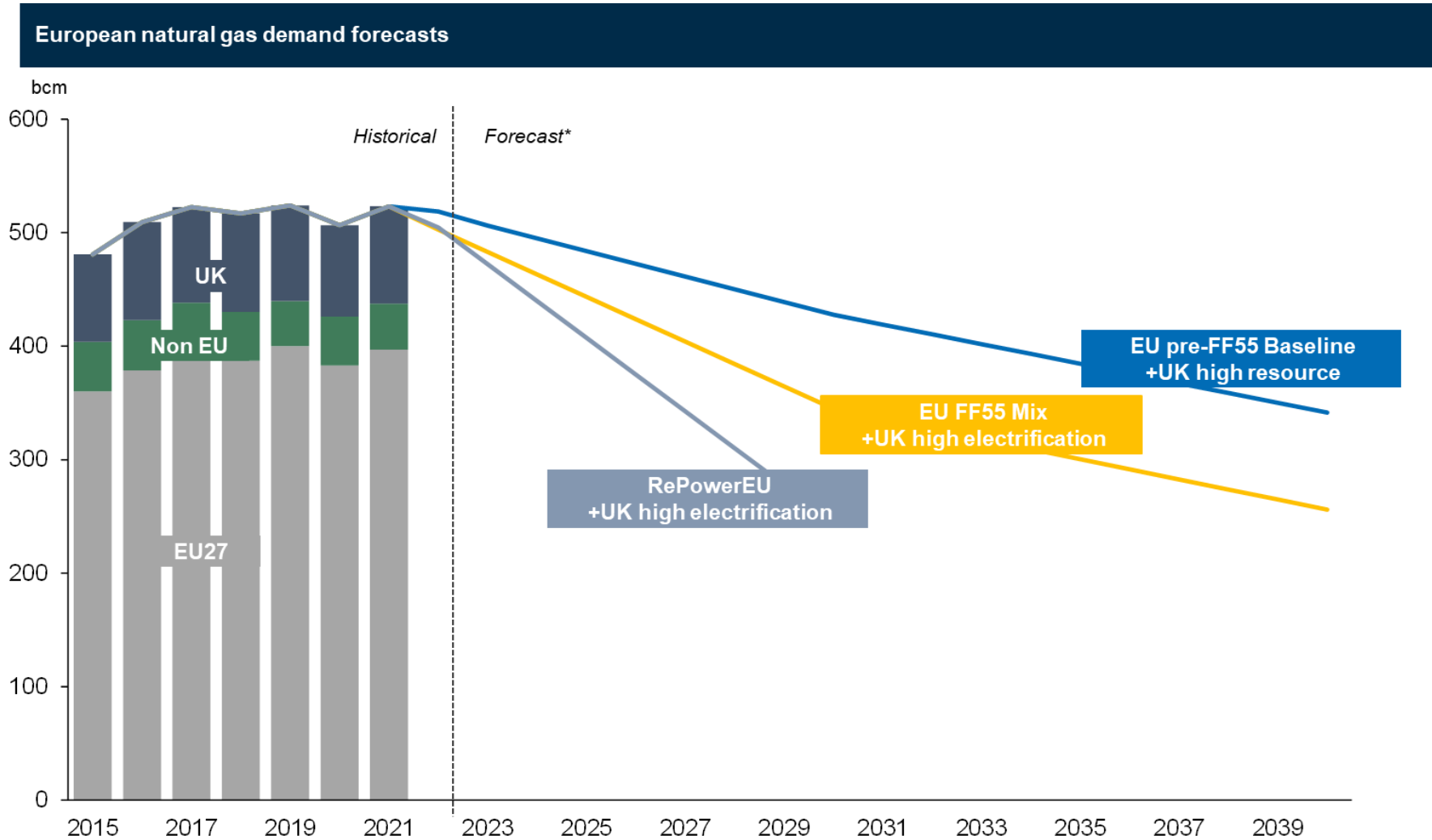
Simon Sjøthun

FORCE Seminar

Norway, Russia and LNG imports represent key sources of gas supply to Europe



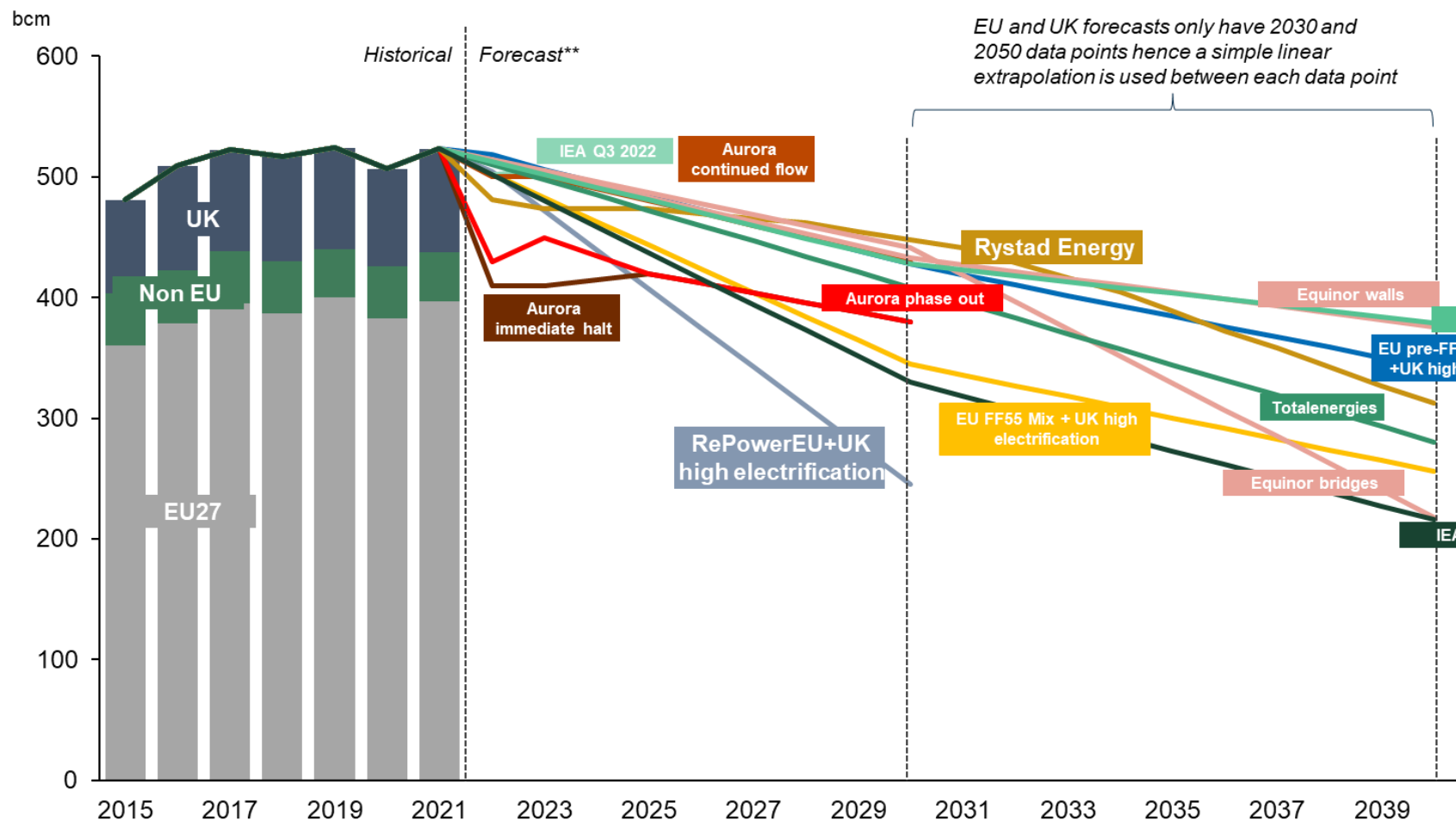
Study assumes demand reductions from 520 bcm to 260 or 340 bcm by 2040



*EU and UK forecasts have 2030 and 2050 data points only; a linear extrapolation is used between these data points
 Source: Rystad Energy research and analysis, Rystad Energy GasMarketCube, European Commission, UK Department for Business, Energy & Industrial Strategy

Post conflict consensus seems to be far above RePowerEU ambitions

European demand outlook by scenario



Countries included in the scope are: EU, UK, Norway, Albania, Moldova, Montenegro, North Macedonia, Serbia, Switzerland, Ukraine
 IEA, Equinor and Totalenergies uses relevant growth rate for outlook – geographic coverage is not exactly 1 to 1 with historical data points
 Source: Rystad Energy research and analysis, Rystad Energy GasMarketCube, European Commission, UK Department for Business, Energy & Industrial Strategy



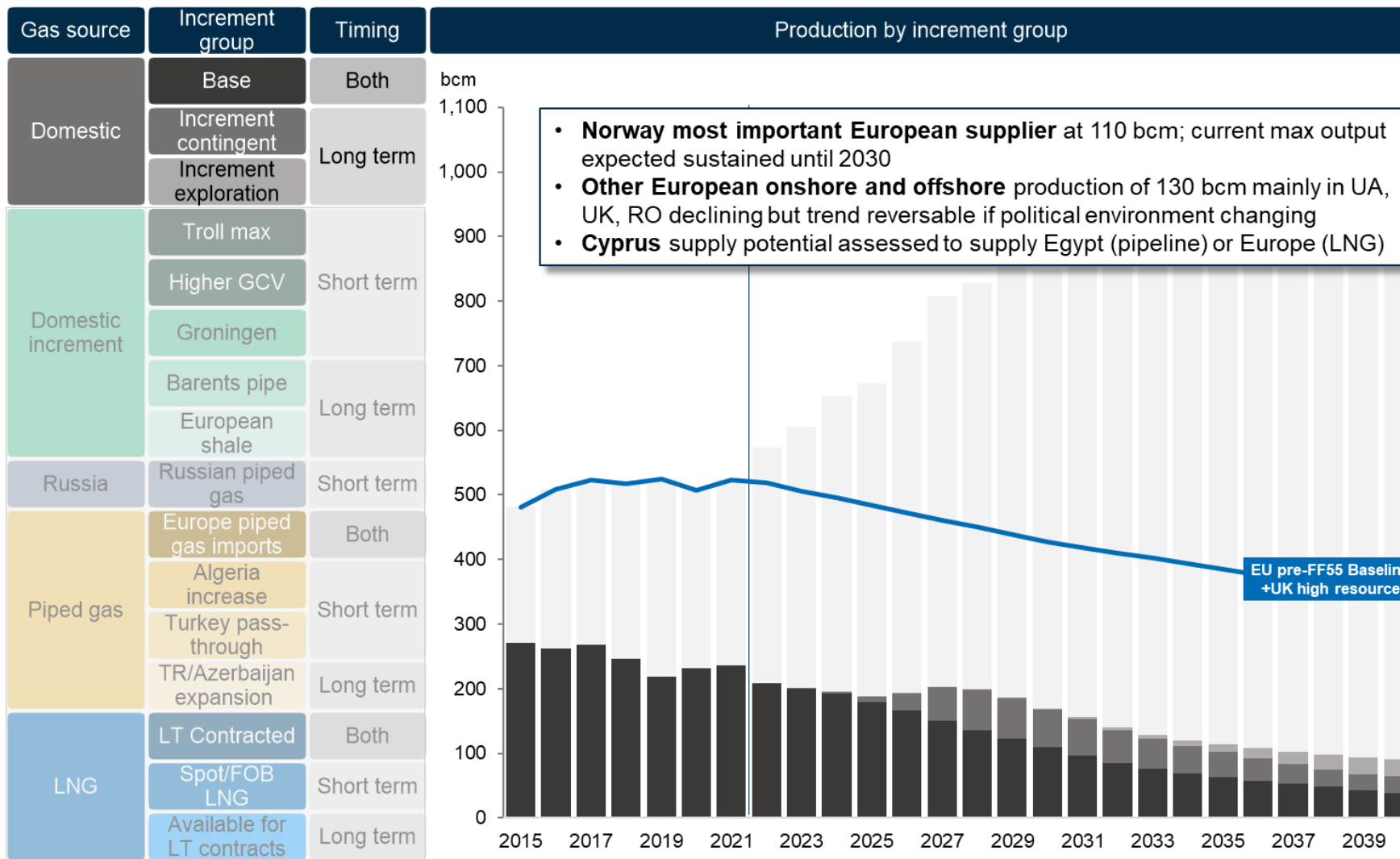
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Key Results

Domestic supplies important but challenged by resource potential, political environment

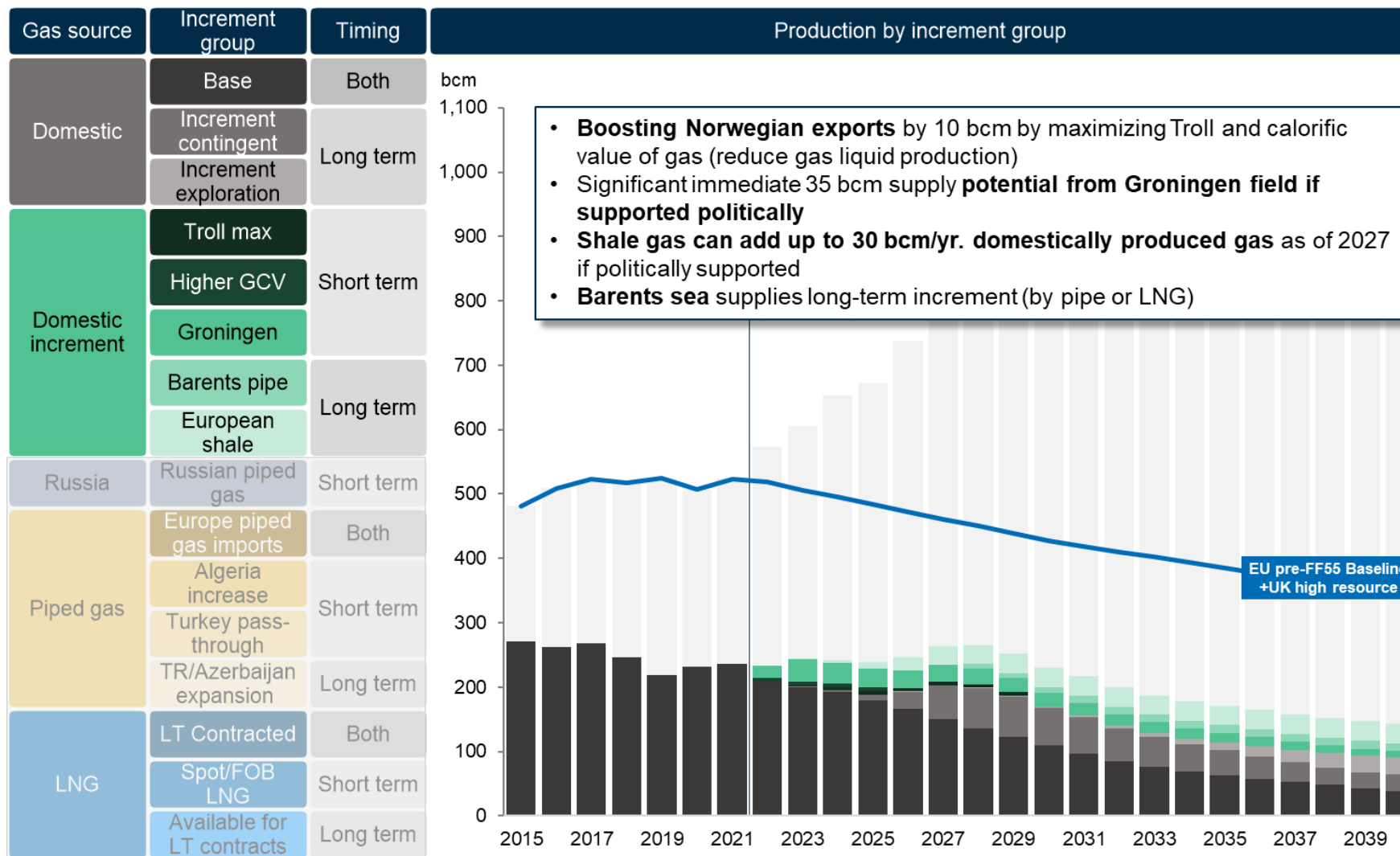


- **Norway most important European supplier** at 110 bcm; current max output expected sustained until 2030
- **Other European onshore and offshore** production of 130 bcm mainly in UA, UK, RO declining but trend reversable if political environment changing
- **Cyprus** supply potential assessed to supply Egypt (pipeline) or Europe (LNG)

EU pre-FF55 Baseline +UK high resource

Source: Rystad Energy research and analysis

Moderate maximization of domestic supplies possible

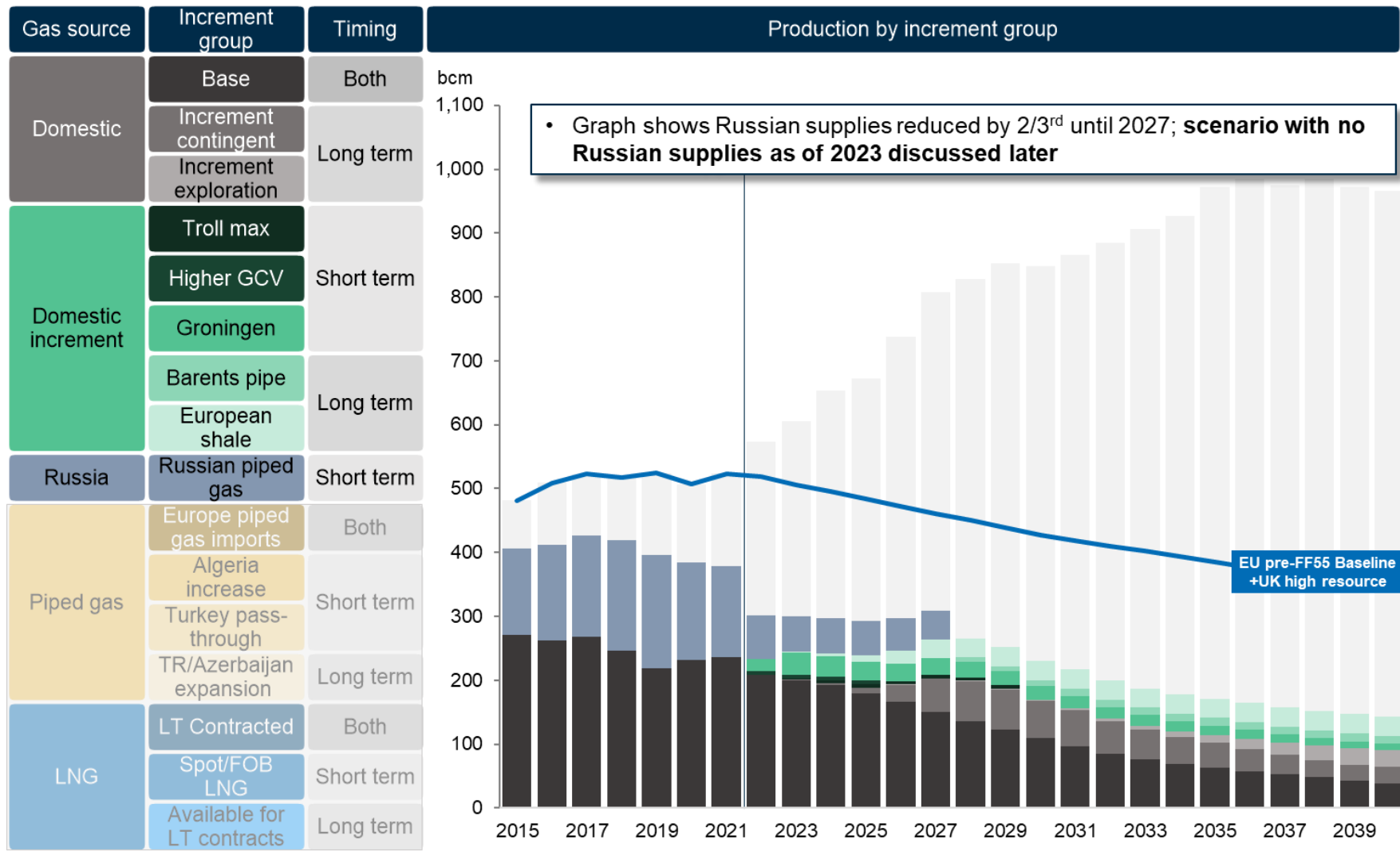


- **Boosting Norwegian exports** by 10 bcm by maximizing Troll and calorific value of gas (reduce gas liquid production)
- Significant immediate 35 bcm supply **potential from Groningen field if supported politically**
- **Shale gas can add up to 30 bcm/yr. domestically produced gas** as of 2027 if politically supported
- **Barents sea supplies long-term increment** (by pipe or LNG)

EU pre-FF55 Baseline +UK high resource

Source: Rystad Energy research and analysis

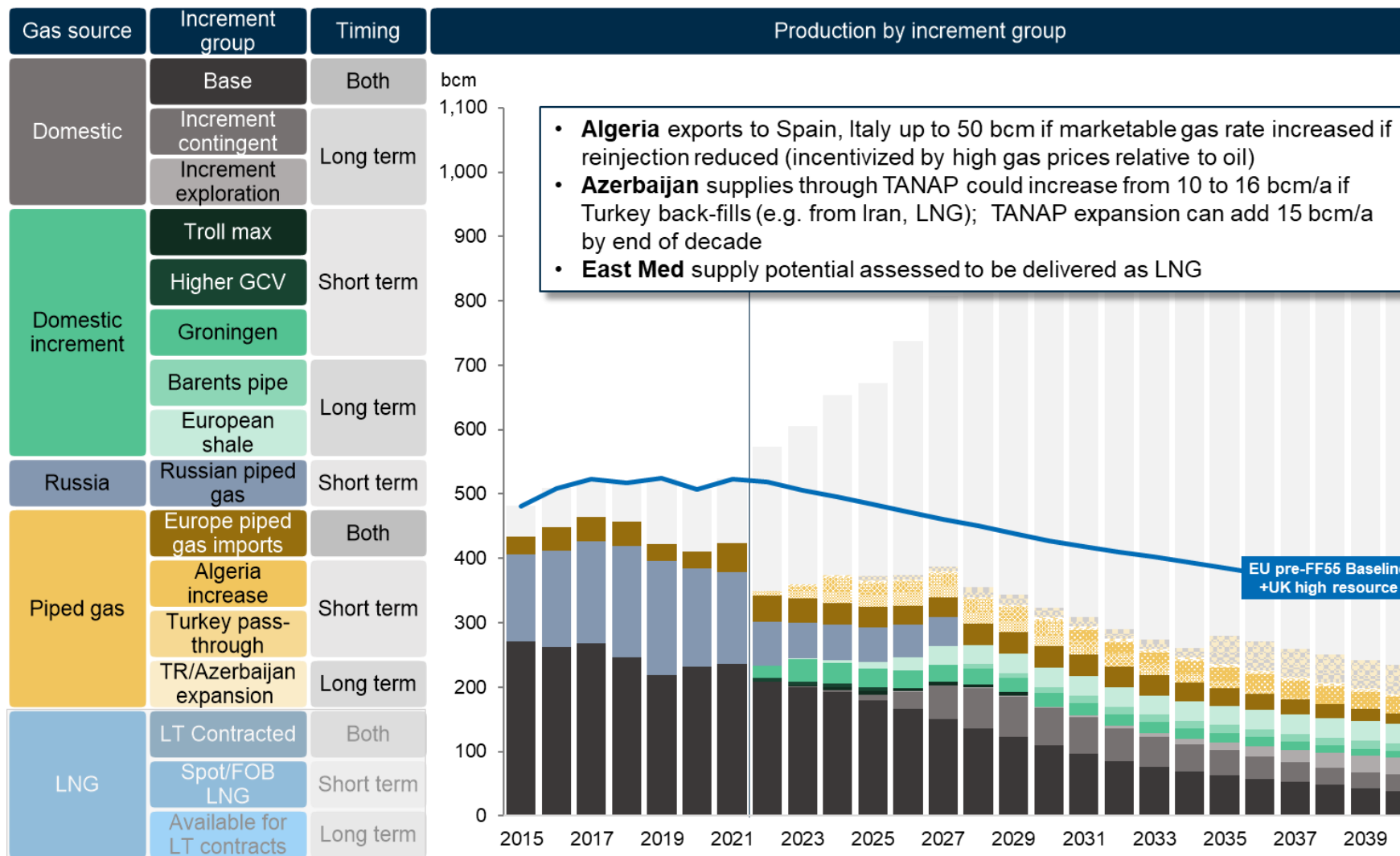
Russian piped gas supply assumed to reduce by 2/3 as of 2023 and cease in 2027



Source: Rystad Energy research and analysis



Non-Russian other pipeline imports to Europe contribute about 10% of overall supplies



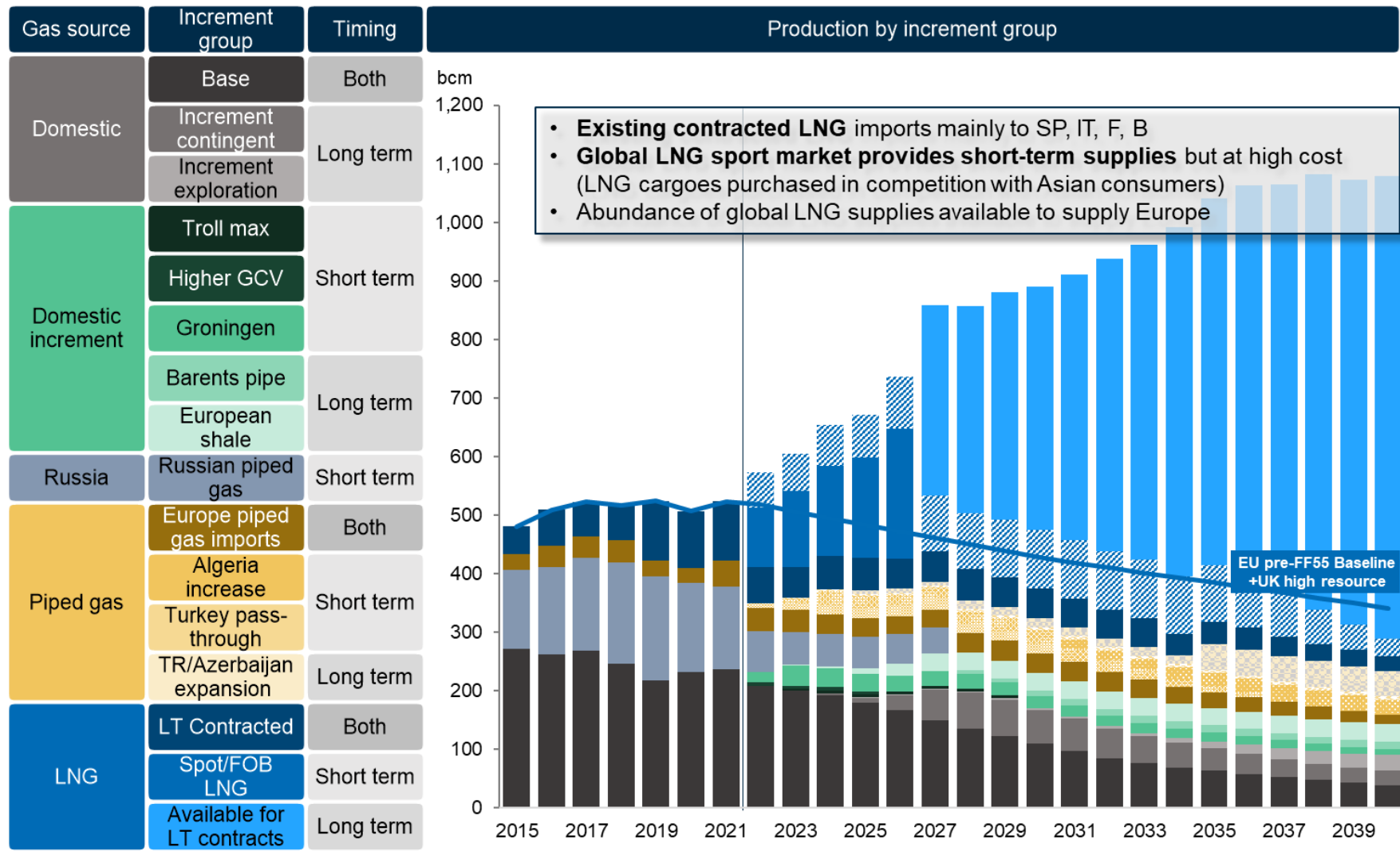
- **Algeria** exports to Spain, Italy up to 50 bcm if marketable gas rate increased if reinjection reduced (incentivized by high gas prices relative to oil)
- **Azerbaijan** supplies through TANAP could increase from 10 to 16 bcm/a if Turkey back-fills (e.g. from Iran, LNG); TANAP expansion can add 15 bcm/a by end of decade
- **East Med** supply potential assessed to be delivered as LNG

EU pre-FF55 Baseline +UK high resource

Source: Rystad Energy research and analysis



LNG is a crucial market balancing factor for Europe, both in the short and long-term



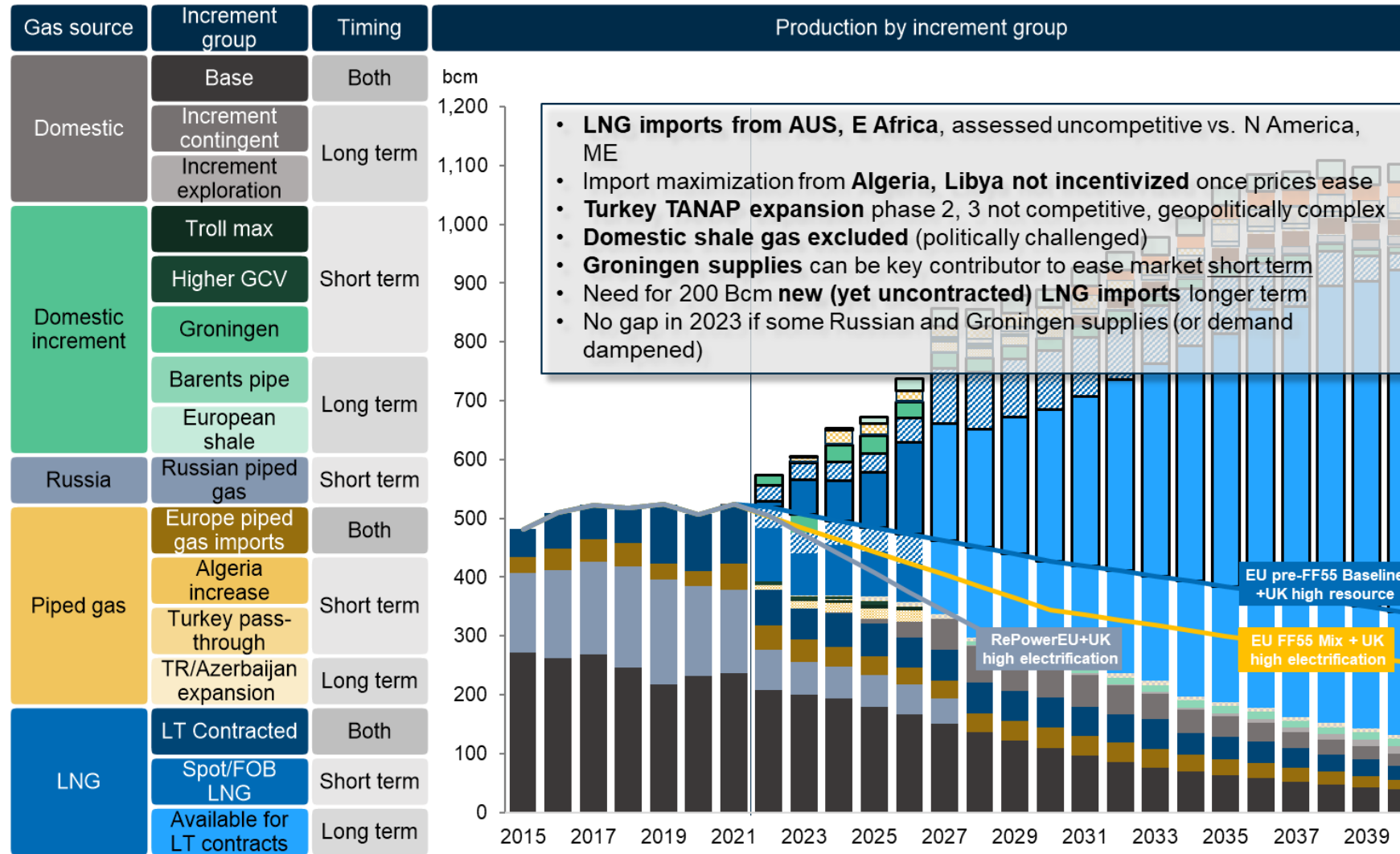
- Existing contracted LNG imports mainly to SP, IT, F, B
- Global LNG spot market provides short-term supplies but at high cost (LNG cargoes purchased in competition with Asian consumers)
- Abundance of global LNG supplies available to supply Europe

EU pre-FF55 Baseline +UK high resource

Source: Rystad Energy research and analysis



Ranking supplies by cost of supply filters out high-cost LNG, pipeline imports, politically challenged gas



Source: Rystad Energy research and analysis, Rystad Energy GasMarketCube, European Commission, UK Department for Business, Energy & Industrial Strategy





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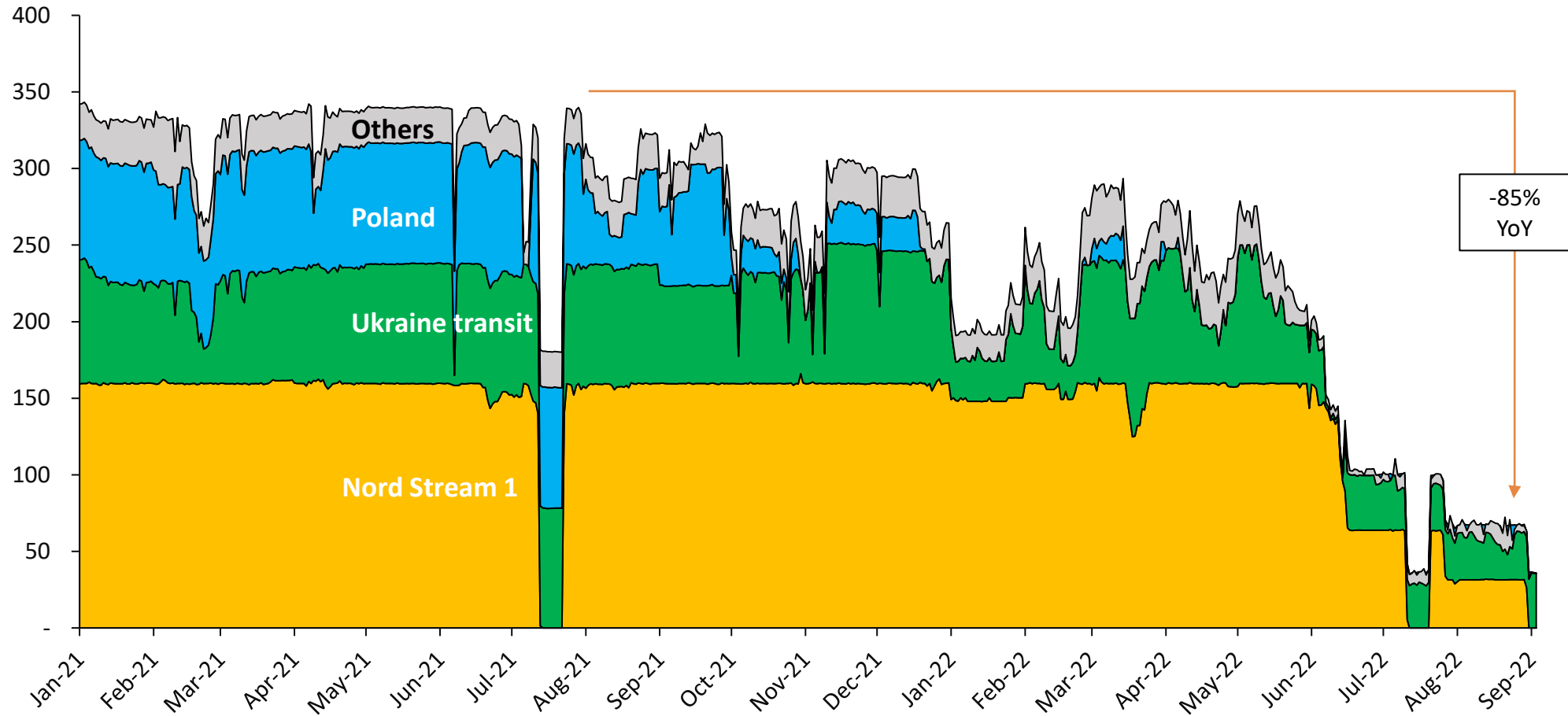
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What is the supply gap if Russia stops supplies?

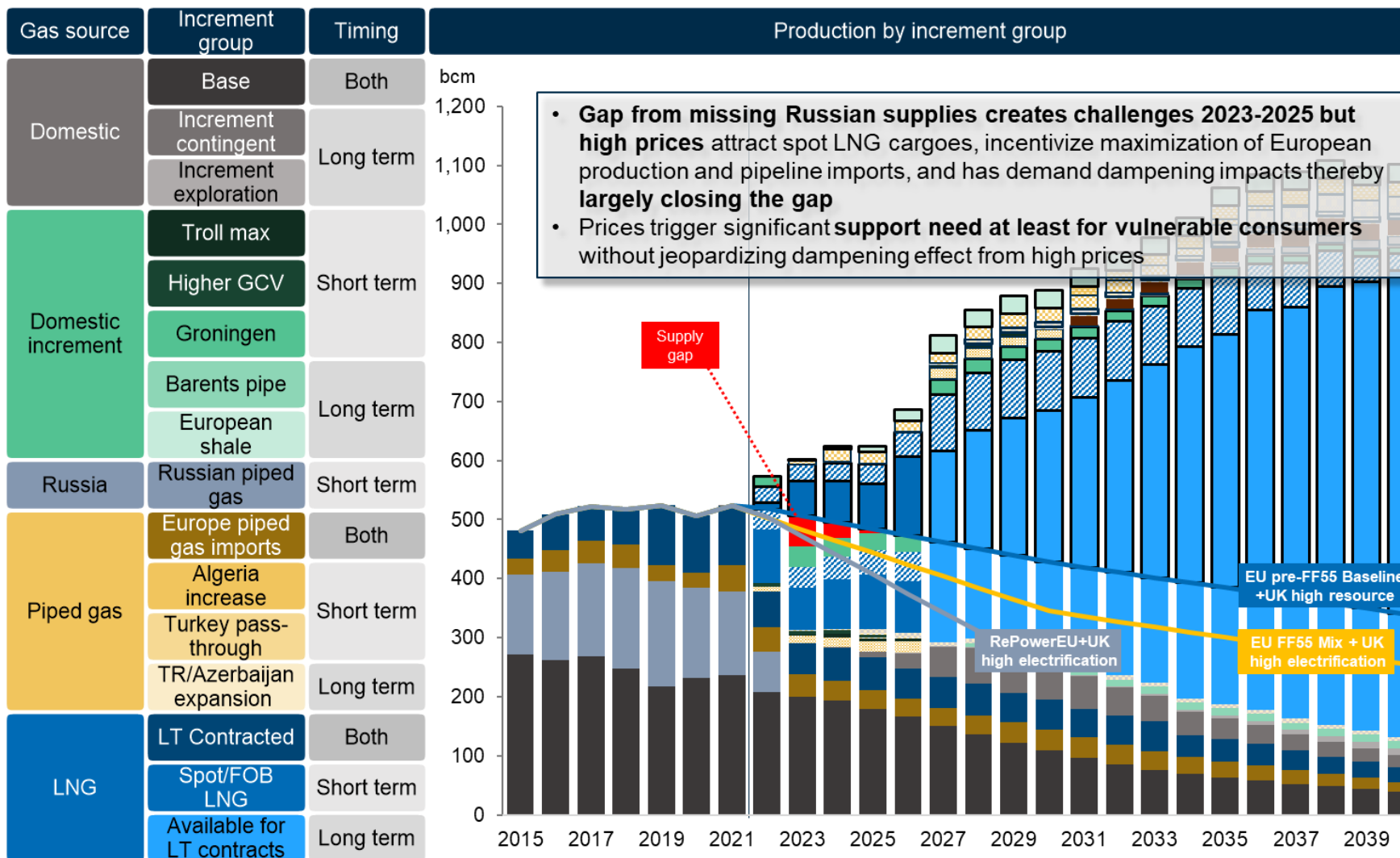
Russian gas exports has dropped 85% YoY in September 2022

Russian gas exports to Europe through main pipelines

Million cubic meters per day



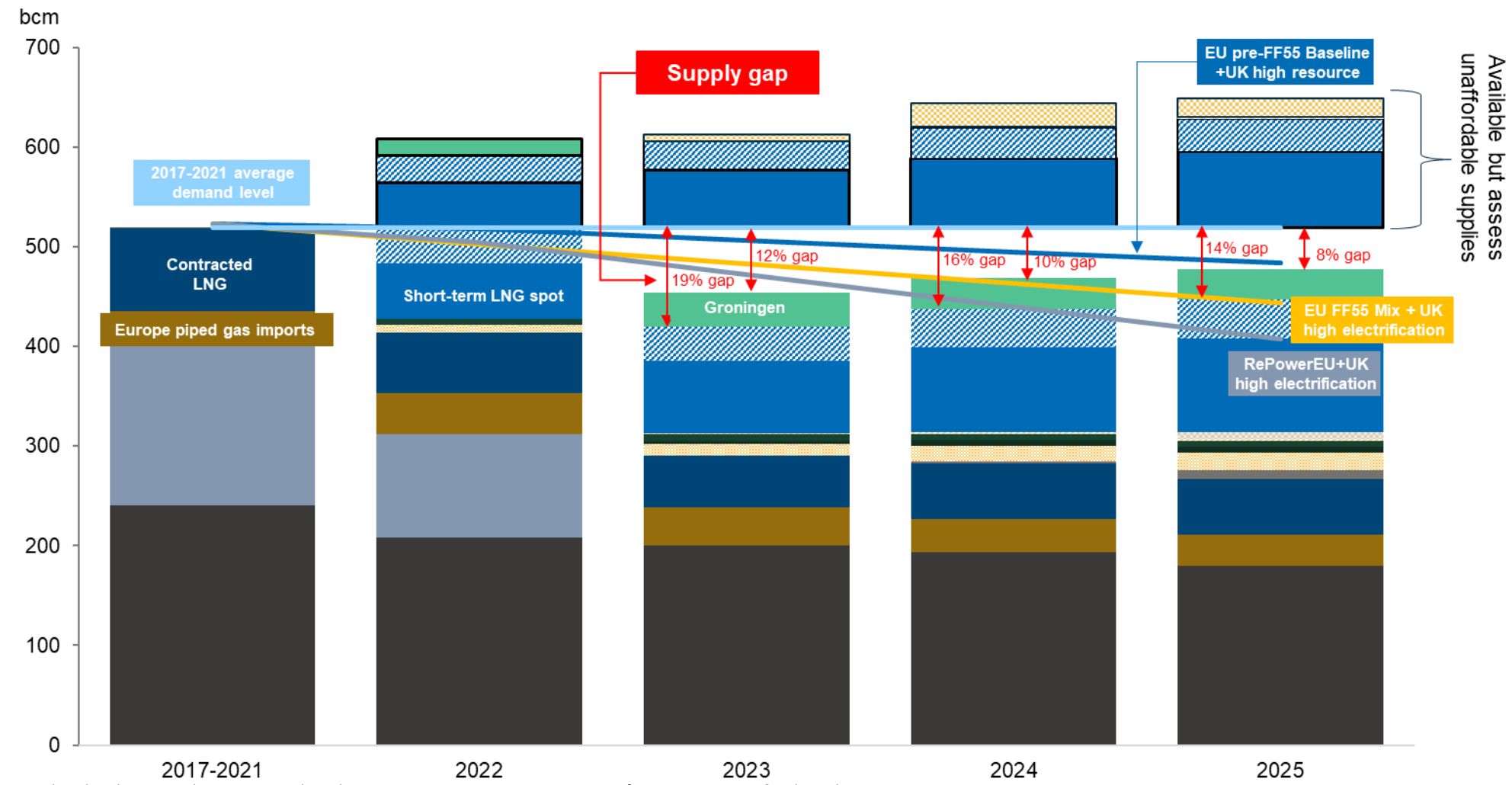
No Russian supplies as of 2023 creates supply gap in 2023 - 2025 but ...



Source: Rystad Energy research and analysis, Rystad Energy GasMarketCube, European Commission, UK Department for Business, Energy & Industrial Strategy

Possible supply gap of up to 19% in the next years unless demand is adjusted

Short-term supply with high-cost / non-affordable gas filtered out, and without Russia from 2023



Source: Rystad Energy research and analysis, Rystad Energy GasMarketCube, European Commission, UK Department for Business, Energy & Industrial Strategy





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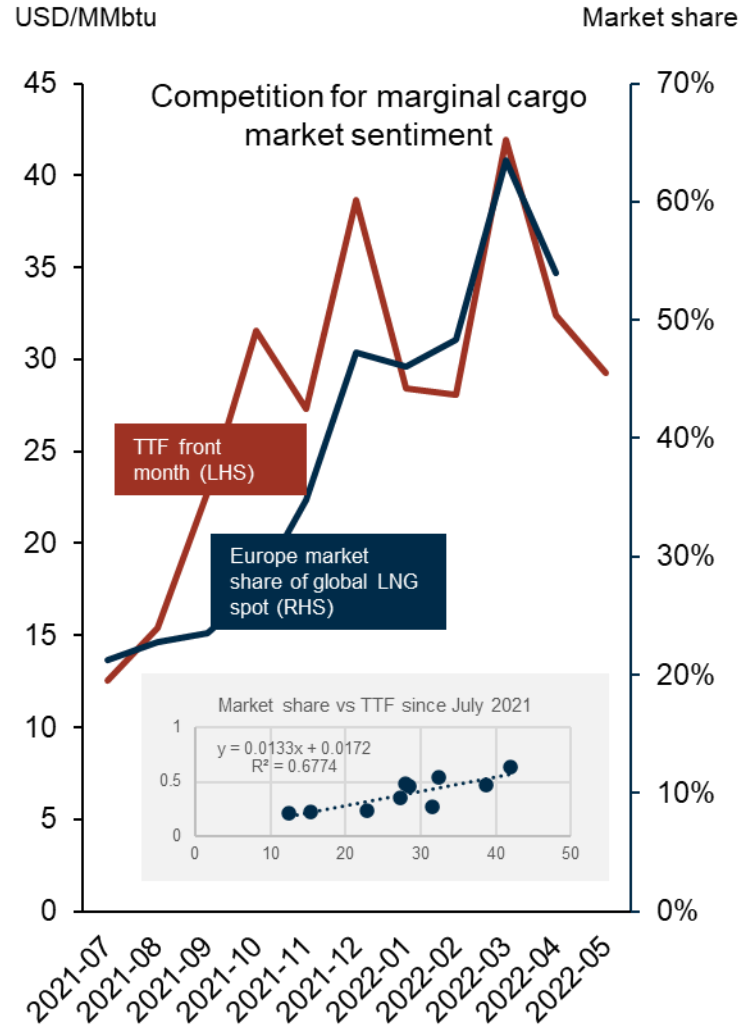


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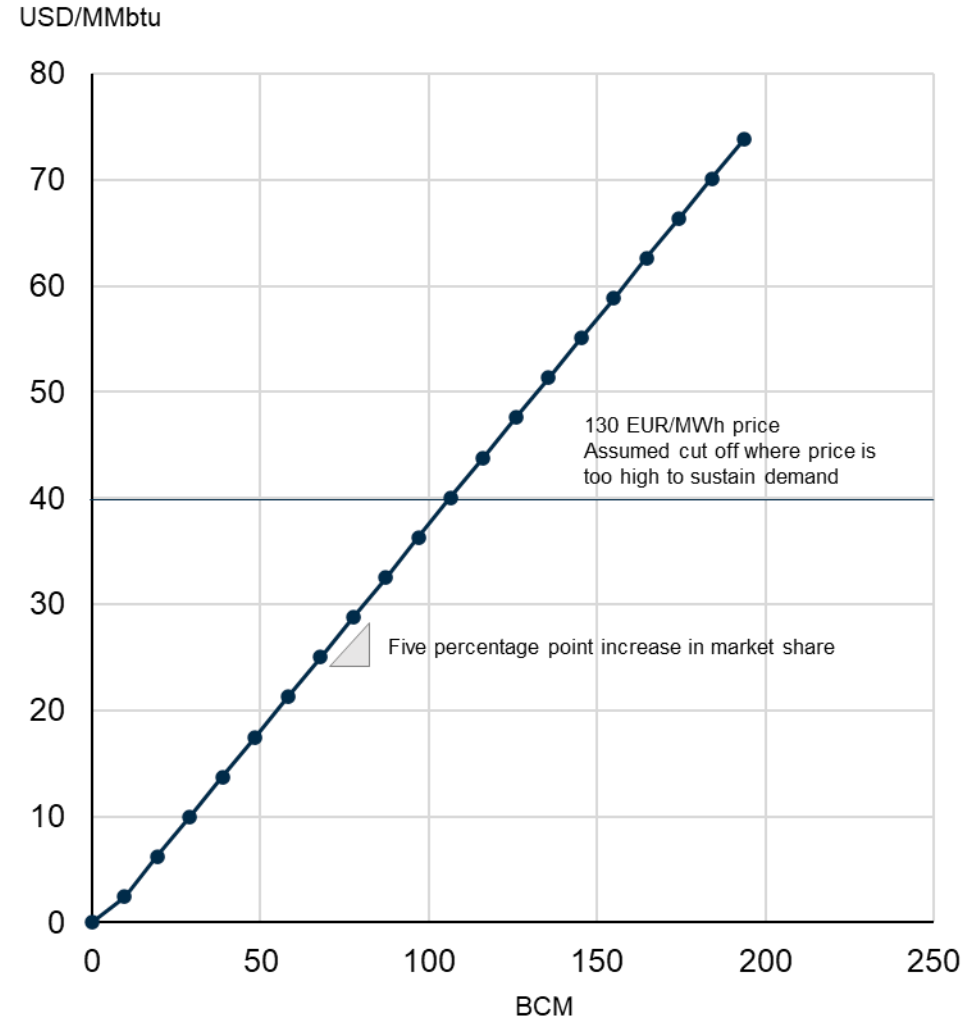
Gas price implications

Competition for LNG market share key driver for short term pricing

European LNG spot market share vs TTF



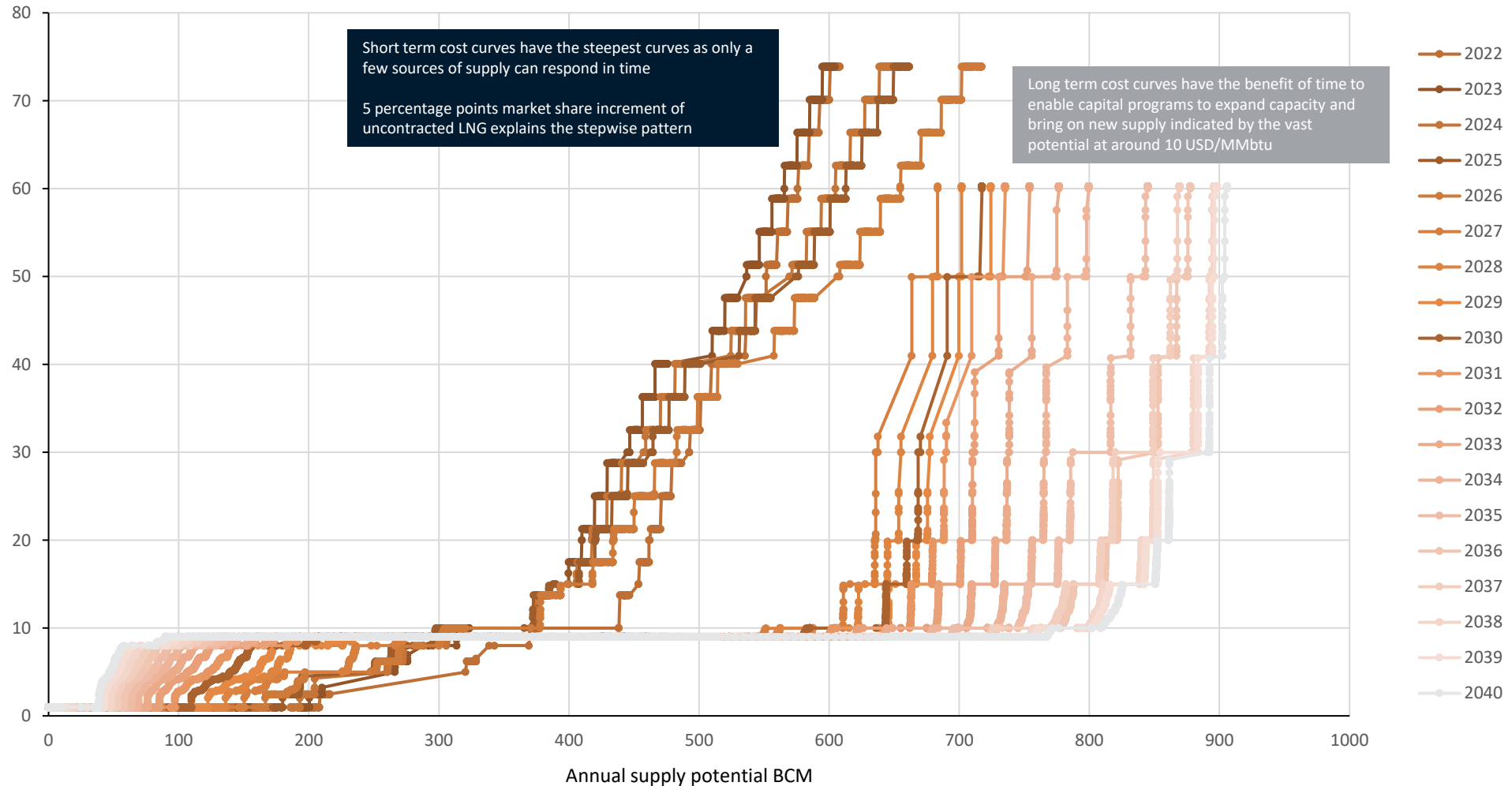
Possible cost of supply for incremental market share of spot LNG



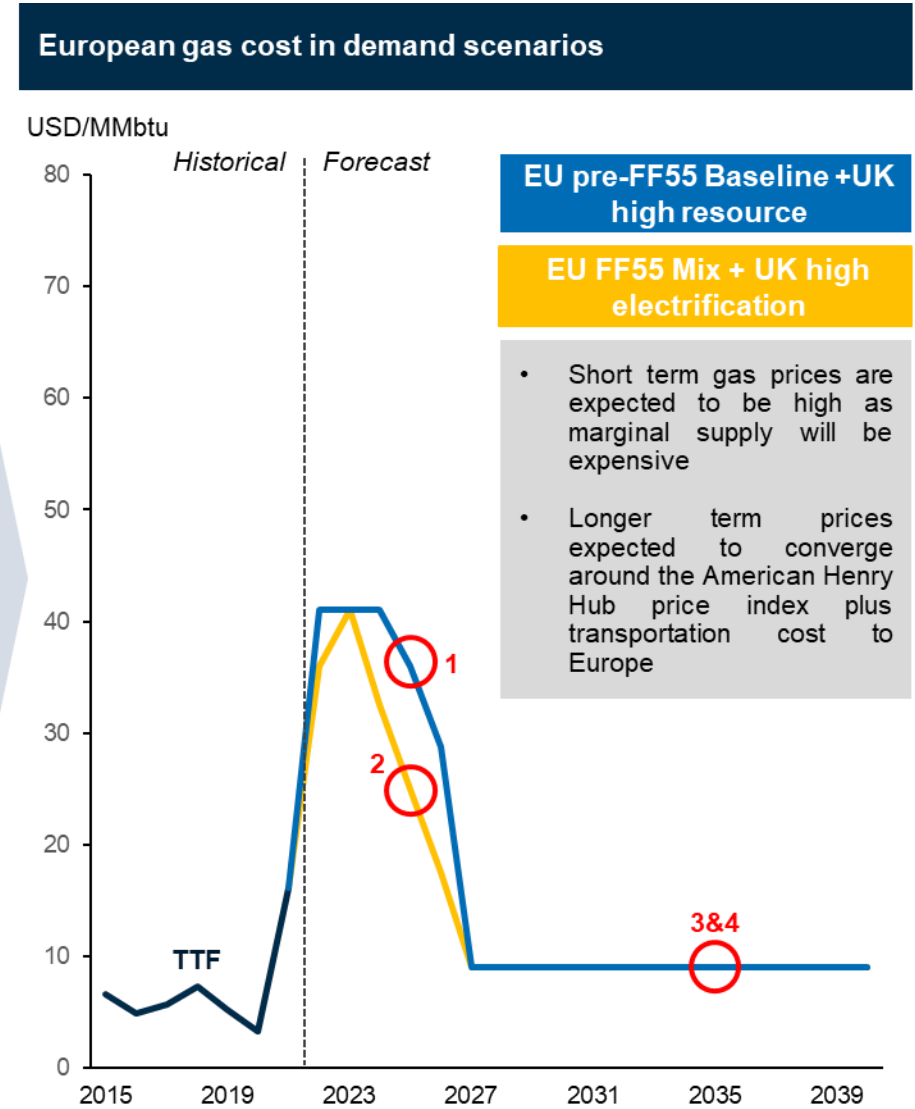
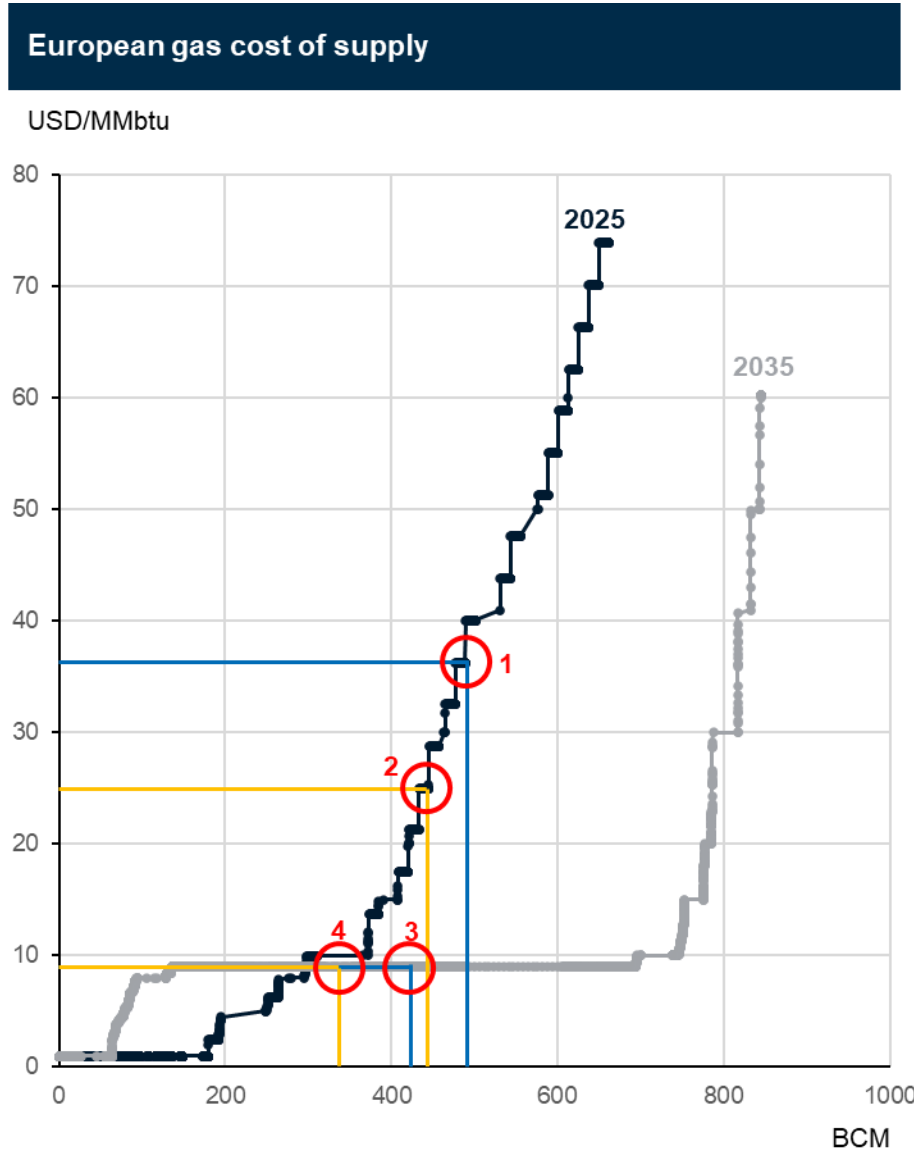
Intersecting annual cost curves with annual demand estimate informs gas price outlooks

European gas cost of supply

USD/MMbtu

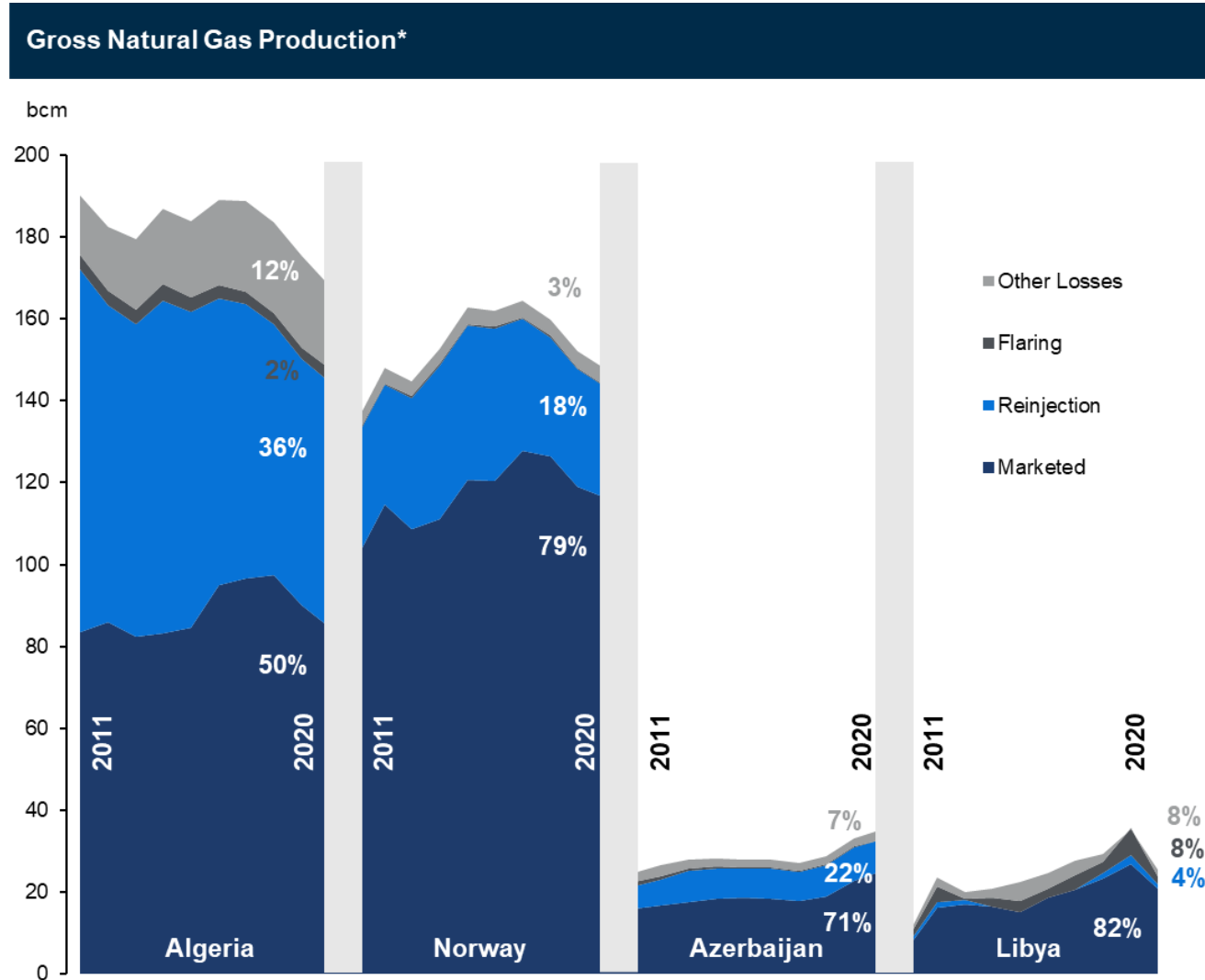


Intersecting annual cost curves with annual demand estimate informs gas price outlooks



Source: Rystad Energy UCube; Rystad Energy research and analysis

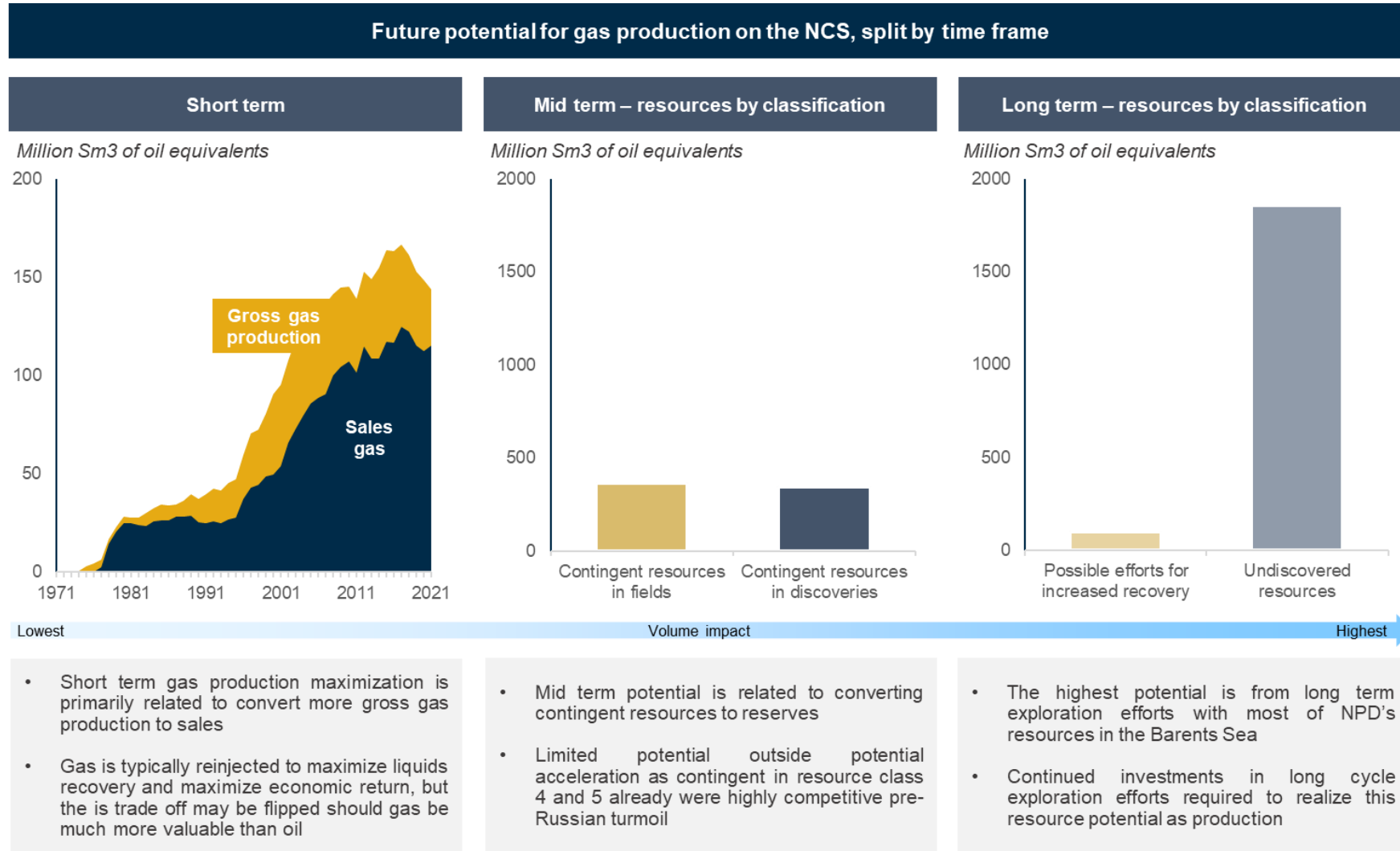
Reinjection vs market is relevant for most major exports to Europe



* Percentages shown for 2020
 Source: Rystad Energy Gas Market Cube, Rystad Energy research and analysis, GECF

Limited incremental volume impact from short and mid term resources

- More and higher risk exploration is the only way to see significant incremental reserves



Source: Rystad Energy research and analysis, Norwegian Petroleum Directorate



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