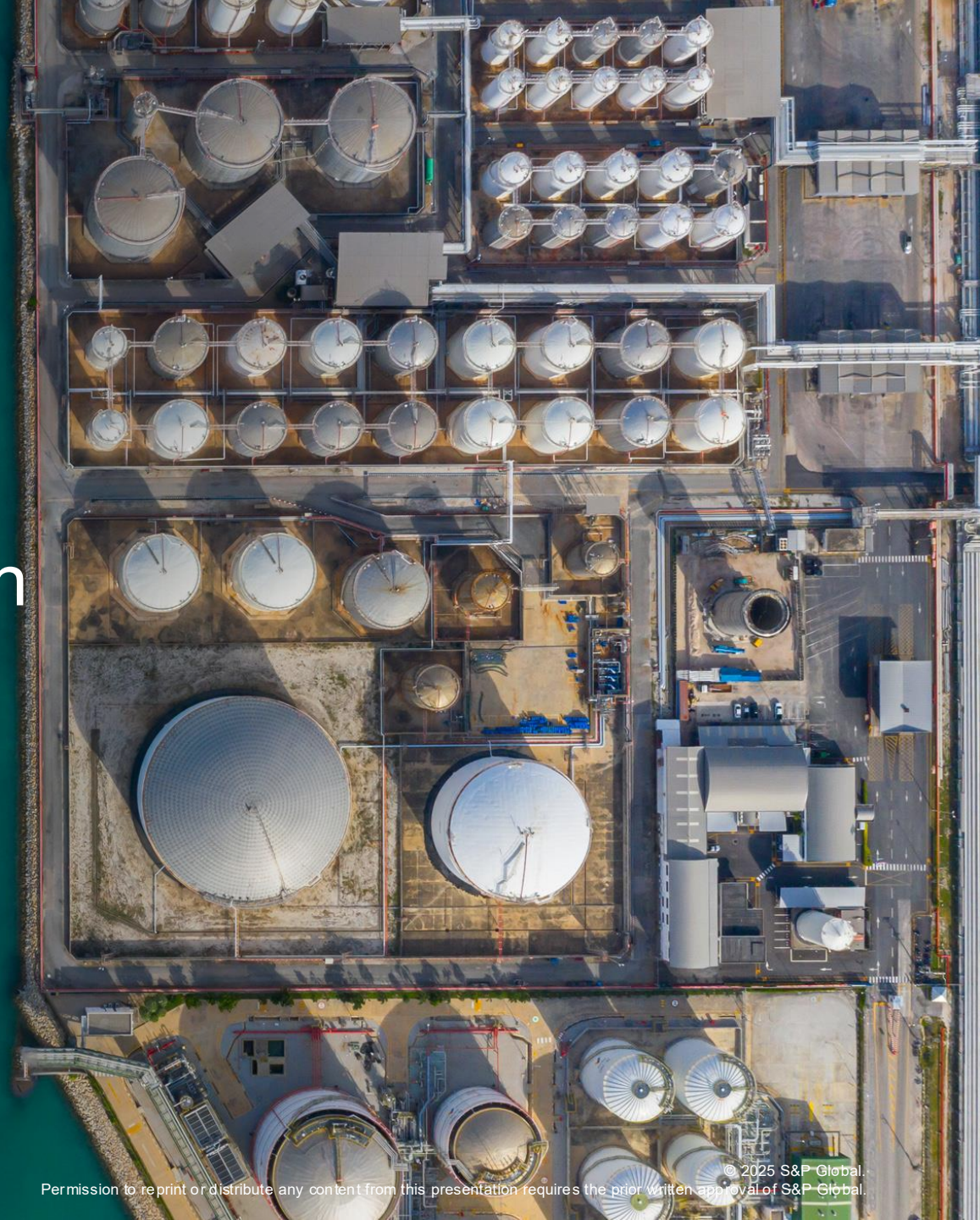
S&P Global

US LNG Exports at Risk:

Potential Unwinding of Sanctions on Russian Natural Gas

Report by Commodity Insights

May 2025



Contents

S&P Global Study Objectives and Acknowledgements

S&P Global (NYSE: SPGI) provides essential intelligence, supporting governments, businesses and individuals with the right data, expertise, and connected technology so that they can make decisions with conviction. From helping our customers assess new investments to guiding them across supply chains, we unlock new opportunities, solve challenges, and accelerate progress for the world. We are widely sought after by many of the world's leading organizations to provide credit ratings, benchmarks, analytics and workflow solutions in the global energy, capital, commodity, and automotive markets. With every one of our offerings, we help the world's leading organizations plan for tomorrow, today. For more information visit www.spglobal.com

This study offers an independent and objective assessment of the impact of alternative Russian natural gas and LNG scenarios on the global gas balance and the US LNG industry. It is built from a detailed bottom-up approach, at the asset and market level, technology by technology.

It represents the collaboration of S&P Global Commodity Insights Consulting teams and European Gas and Global LNG Research teams of energy and economic analysts continuously monitoring, modelling and evaluating markets and assets.
Explanation of the detailed study methodology is included in the Appendix. The analysis and metrics developed during the course of this research represent the independent analysis and views of S&P Global. The study assesses the market impacts of different scenarios to provide others a basis for informed policy choices.

The study was supported by the US Chamber of Commerce. S&P Global is exclusively responsible for all of the analysis, content and conclusions of the study.

S&P Global Project Leadership Team

Project Chairman, Daniel Yergin
Vice Chairman, S&P Global

Executive Project Sponsor, Carlos Pascual
Senior Vice President, Global Energy, S&P Global

Expert Advisory Committee Lead, Laurent Ruseckas, Executive Director, S&P Global Commodities Insights Research

Project Director, Eric Eyberg
Vice President, Gas & Power Commodity Insights Consulting

Project Manager, Simon Wood
Senior Director, Gas & LNG Commodity Insights Consulting

Project Team Leads, Adrian Dorsch, Associate Director, Gas & LNG Commodity Insights Consulting, Madeline Jowdy, Global Head of LNG, Commodity Insights Consulting, Aube Montero, Executive Director, Upstream, **Relationship Manager**, Linda Kinney, Head of Business Development, Commodity Insights Consulting

Communications Lead, Jeff Marn, Public Relations Executive Director, S&P Global

New US LNG investment is disproportionately impacted by Russian gas supply scenarios, with $120 billion in direct expenditures at risk in the ‘Opening the Taps’ Scenario

With the curtailment of Russian gas supply, Europe pivoted toward US LNG to help meet household and industrial demand; resumption of imports would derail significant new investment in US LNG projects critical to supporting Europe’s diversification efforts

- European pipeline imports of Russian gas expected to drop to 1.2 bcf/d this year from 13.7 bcf/d in 2021, marking a significant shift from historical norms
- To balance, European consumption fell by 9.3 bcf/d between 2021 and 2024 as robust gas prices continue to hit demand despite falling from record highs
- Europe added significant regasification capacity to effectively replace pipeline gas with LNG- with the US accounting for 50% of total LNG imports

S&P’s “Current Trend” Scenario highlights that a European industry and power-led market recovery will require significant new LNG to balance – in this study, we developed two additional scenarios for Russian gas supply to test the market response

- In the “Current Trend” Scenario, Europe’s demand for gas in the industrial and power sectors will recover to 2030, before resuming a structural decline
- Additional LNG volumes are critical to closing supply gap to 2040 from declining domestic production, piped imports and LNG contract expiry
- S&P tested the implications of two Russia supply scenarios: 1. “Opening the Taps:” Europe resumes buying Russian pipeline gas in higher volumes while LNG-related sanctions are lifted increasing Russian gas and LNG exports globally by 3.9 bcf/d by 2040 versus the ”Current Trend” Scenario, and 2. “Phasing Down:” Europe phases out Russian LNG and most piped gas, reducing Russian gas by 3.4 bcf/d by 2040 versus the “Current Trend” Scenario

US LNG is disproportionately impacted by upside and downside Russian gas supply due to its flexibility and speed to market. “Opening the Taps” puts at risk 29 million tons per year (MMtpa) of US LNG projects and $120 billion in direct expenditure

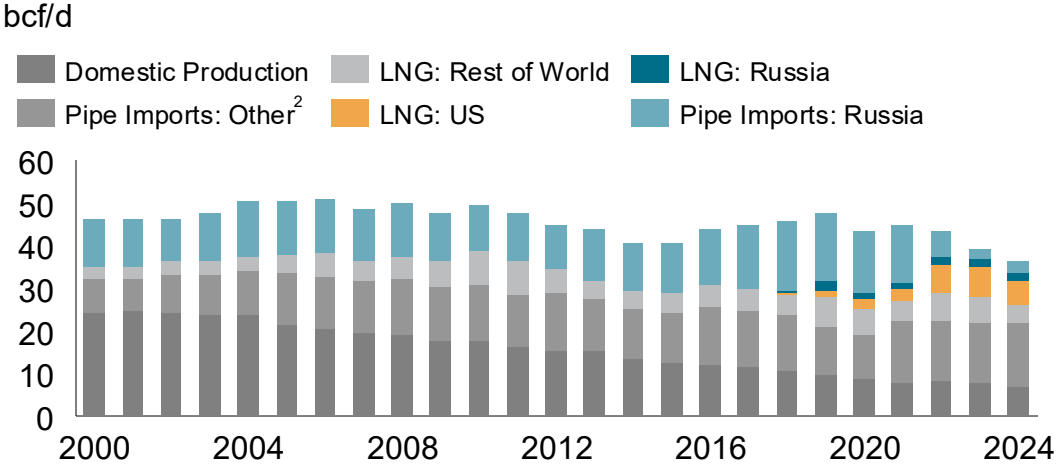
- US LNG provides the balancing supply for global LNG markets. Its contractual structures and US market liquidity allow it to react more quickly to price signals
- In “Phasing Down,” 45.5 MMtpa of US LNG capacity could take final investment decision (FID) 2025-2026 (including 16.5 MMtpa that has already taken FID) if current Russian LNG exports to Europe are eliminated, piped exports remain constrained and further export expansions are restricted
- In “Opening the Taps,” the return of modest Russian pipeline gas to Europe combined with an expansion of Arctic-2 LNG would reduce new volumes of US LNG projected to FID to 16.5 MMtpa, effectively hindering any new US LNG development and putting $120 billion in expenditures at risk, in US final investment decision projects

Source: S&P Global Commodity Insights.

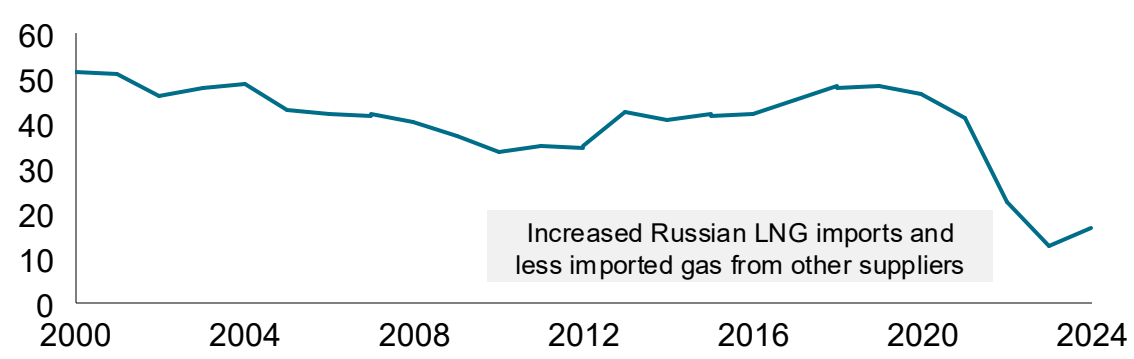
Contents

Historically, Europe relied heavily on Russian gas, supplying close to half of European gas imports pre-2022 and providing substantial annual volume flexibility

European[1] Gas Supply History



Russia Pipeline & LNG Share of Total European Gas Imports



Russia supplied around 30% total European gas supply and over 40% of imported gas. Today, it supplies less than 5% of European gas

Russia provided buyer-driven flexibility at a known price, active use of European storage, short-term sales and merchant trading

Gazprom was an integrated investor in European gas infrastructure, and a key distributor of gas with established European trading entities

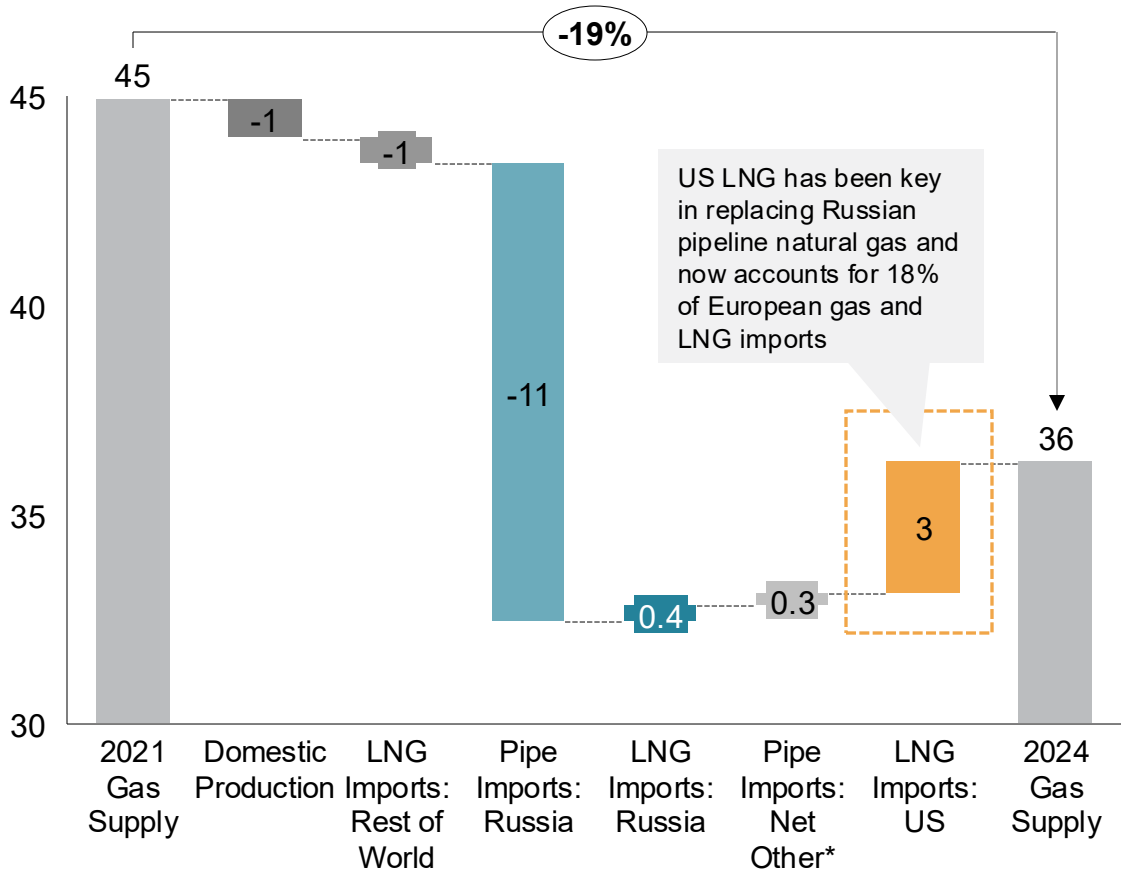
Since 2022, the EU Commission's policy objective has been to phase-out Russian fossil fuel dependence by 2030 or earlier[3]

1 Europe in this report is defined as EU27+ UK. 2 Other pipe imports include: Norway, Azerbaijan, Algeria and Libya. 3 EU Commission REPowerEU Plan May 2022
Source: S&P Global Commodity Insights

Curtailments of Russian pipeline gas eroded 25% of total European gas supply since 2022 with flexible US LNG serving as the primary supply response

European Gas Supply: Change in Supply 2021 vs. 2024

bcf/d



1 LNG supplies from Rest of World to Europe including from Qatar and Nigeria declined between 2021-24
2 Other pipeline imports include: Norway, Azerbaijan, Algeria and Libya, net of pipeline exports outside of Europe
Source: S&P Global Commodity Insights

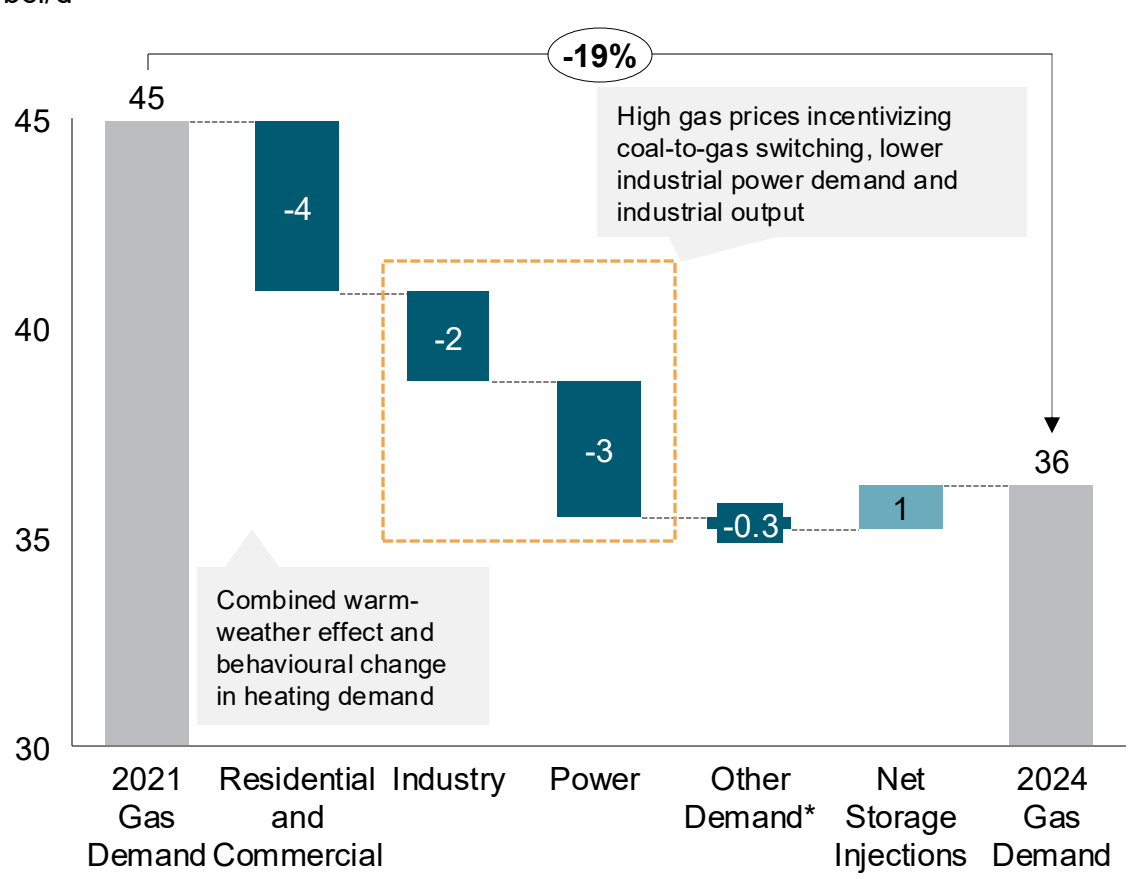
Russian pipeline supplies to Europe peaked at 16 bcf/d in 2019 via key export pipelines: Nord Stream, Yamal-Europe, Ukraine transit and deliveries to the Baltics

Russian curtailment of pipeline supply in 2022 saw a global rebalancing of gas and LNG markets, resulting in high gas and LNG prices

As a result, Europe pivoted to LNG and the US is now Europe's largest LNG provider, supplying 50% of total LNG, and circa 15% total gas supply

The inability of supply to respond further led to a rapid tightening of the European gas balance – resulting high prices have driven industry and power-led demand retrenchment

European Gas Demand: Change in Demand 2021 - 2024



Record-high gas prices in 2021-2023 strongly eroded demand across all gas-consuming sectors

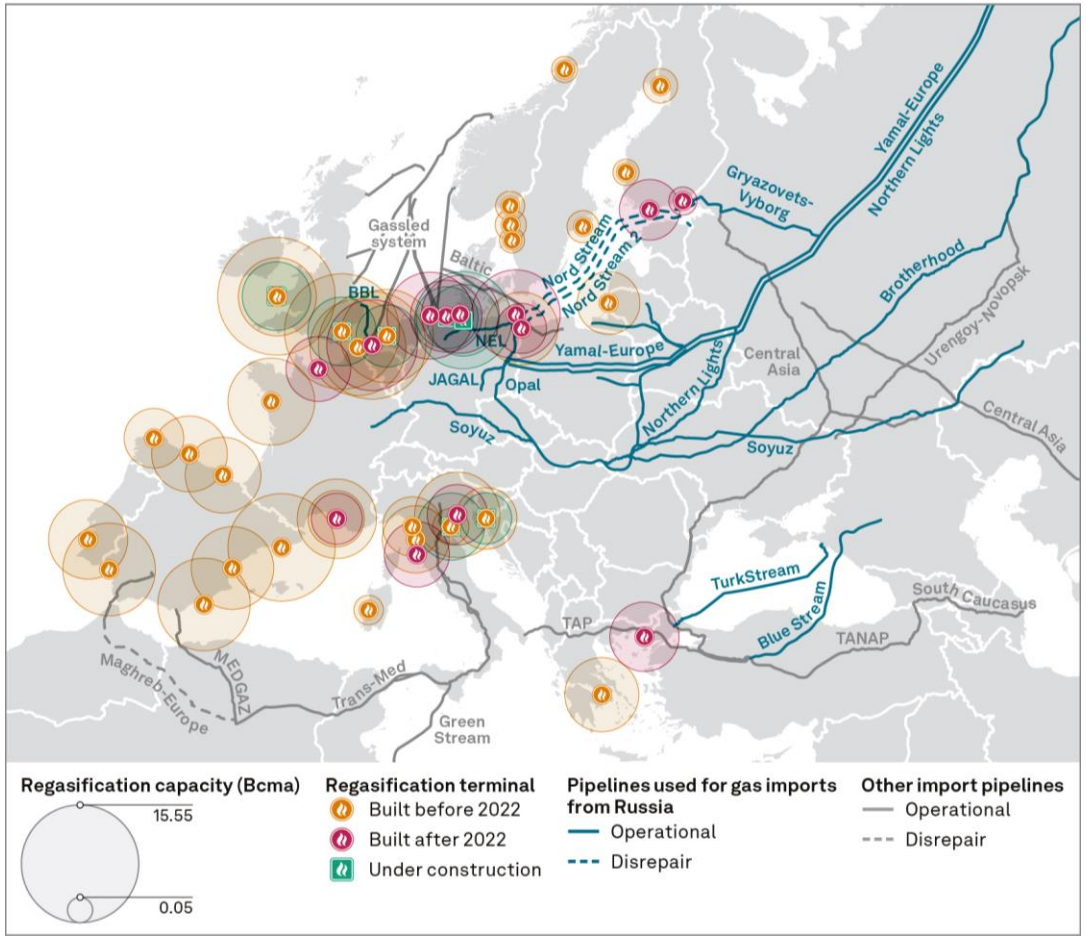
Estimated 1.5 bcf/d of demand retrenchment in industry is permanent, despite global markets rebalancing

Loss of flexible Russian supply placed greater emphasis on refilling European gas storage, which US LNG is crucial for

Note: *Other Demand refers to gas consumed in Hydrogen generation, Transportation, and Own uses/losses
Source: S&P Global Commodity Insights

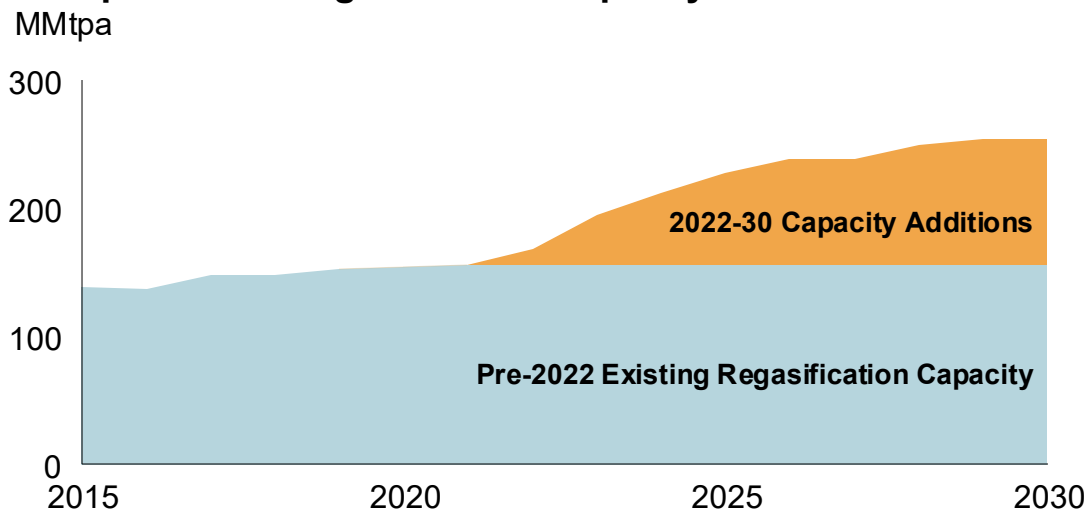
Europe has responded by significantly increasing LNG import regasification capacity with the region infrastructure-ready to import even greater levels of LNG supply

European Gas Infrastructure: LNG Terminals and Import Pipelines



Source: S&P Global Commodity Insights

European LNG Regasification Capacity



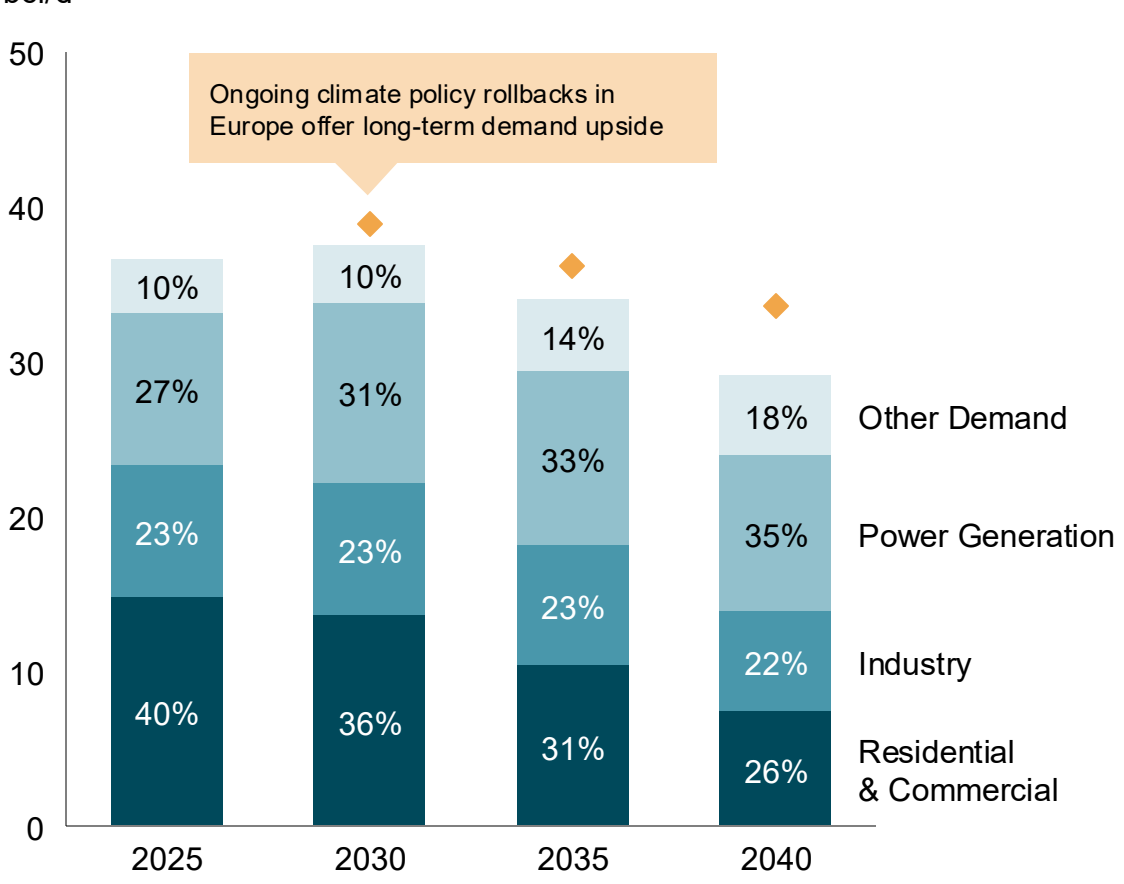
1. Europe continues to add significant LNG import regasification capacity, making it infrastructure-ready to import more LNG long-term

2. With alternative pipeline supply availability in long-term decline, Europe's supply picture becomes one of LNG vs. return of Russian gas

Contents

Europe’s demand for gas in the industrial and power sectors is expected to recover through the end of this decade; a policy rollback offers upside for gas long-term

European Gas Demand by Sector ‘Current Trend’ Scenario

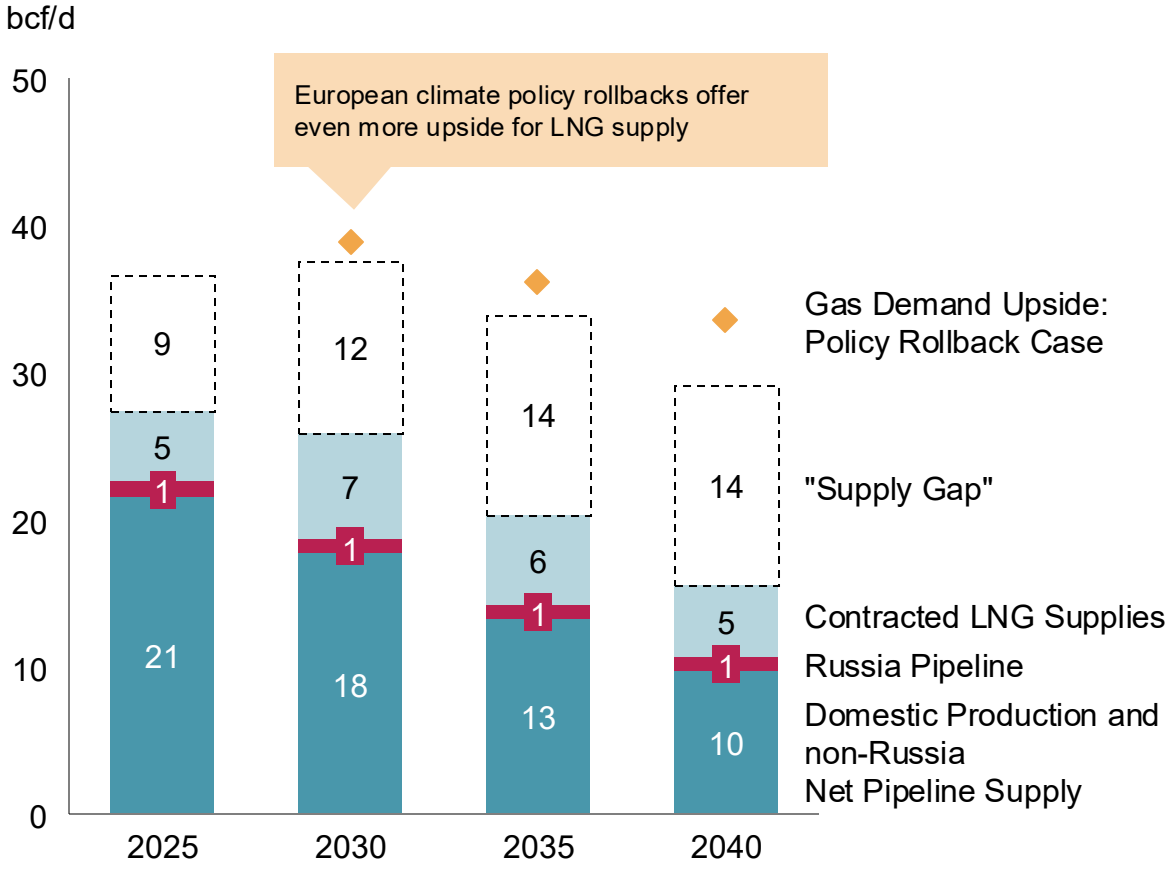


Source: S&P Global Commodity Insights

- Europe's gas demand will peak this decade and won't return to pre-invasion levels due to industrial demand loss from high prices
- Long-term demand declines as Europe aims for net-zero GHG emissions with strong policy support
- Share of electricity will rise ~30% by 2040, aiding decarbonization across sectors
- Gas-fired power generation remains vital for baseload and balancing power supply amid renewable intermittency

Europe is heavily reliant on “uncontracted” LNG volumes, these volumes are sourced disproportionately from US LNG

European Natural Gas Uncontracted Supply Gap
‘Current Trend’ Scenario

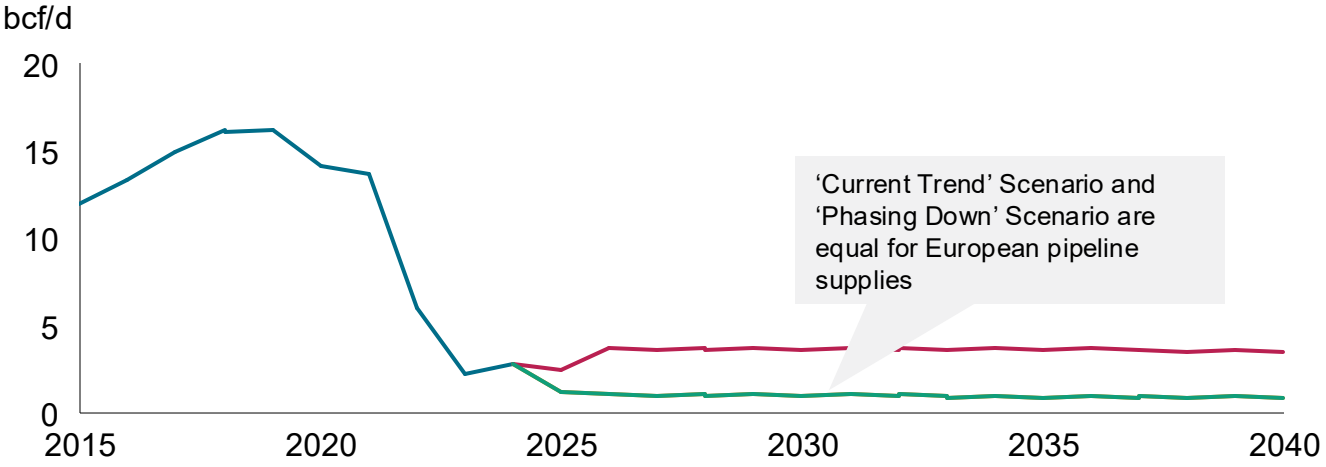


- Russian pipeline gas makes up only 3% of Europe's 2040 demand
- Declining domestic production and reserves mean Europe gas market relies on LNG to balance
- Europe’s “supply gap” begins to widen as existing contracts expire and domestic supply declines
- This "supply gap" creates a need for more LNG contracts (including US) or Russian gas supplies

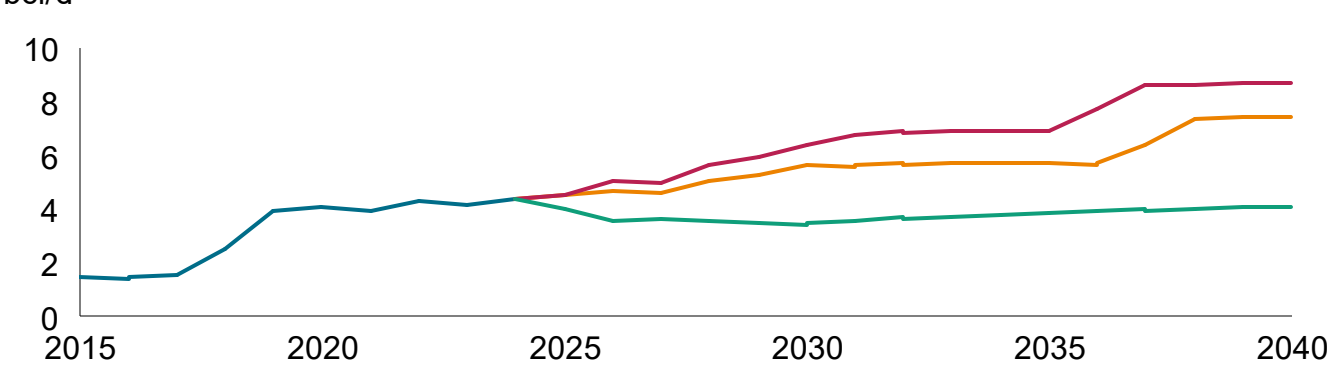
Note: Contracted LNG Supplies includes LNG contracts of European Utilities and Industrials as well as European DES contracts
Source: S&P Global Commodity Insights

Prospects of either a return of Russian gas to Europe or further constraints on Russian LNG exports creates divergent scenarios with major implications for US LNG exporters

Russian Pipeline Natural Gas Export to Europe Scenarios



Russian LNG Export Scenarios (Globally)



Current Trend Scenario

- Russian pipeline gas to Europe continues via TurkStream
- Russian LNG still purchased by some European countries
- Sanctions continue to limit new Russian LNG projects
- Power of Siberia-2 to China launches in the 2030s

Opening the Taps Scenario

- Additional 2.7 bcf/d of Russian pipeline gas to Europe[1] via the remediation of an existing pipeline route from July 2025
- Sanctions on Russian LNG are lifted, adding c. 9 Mmtpa of Russian export capacity by 2035 versus the 'Current Trend' Scenario
- Development of existing and future Russian LNG projects accelerates

Phasing Down Scenario

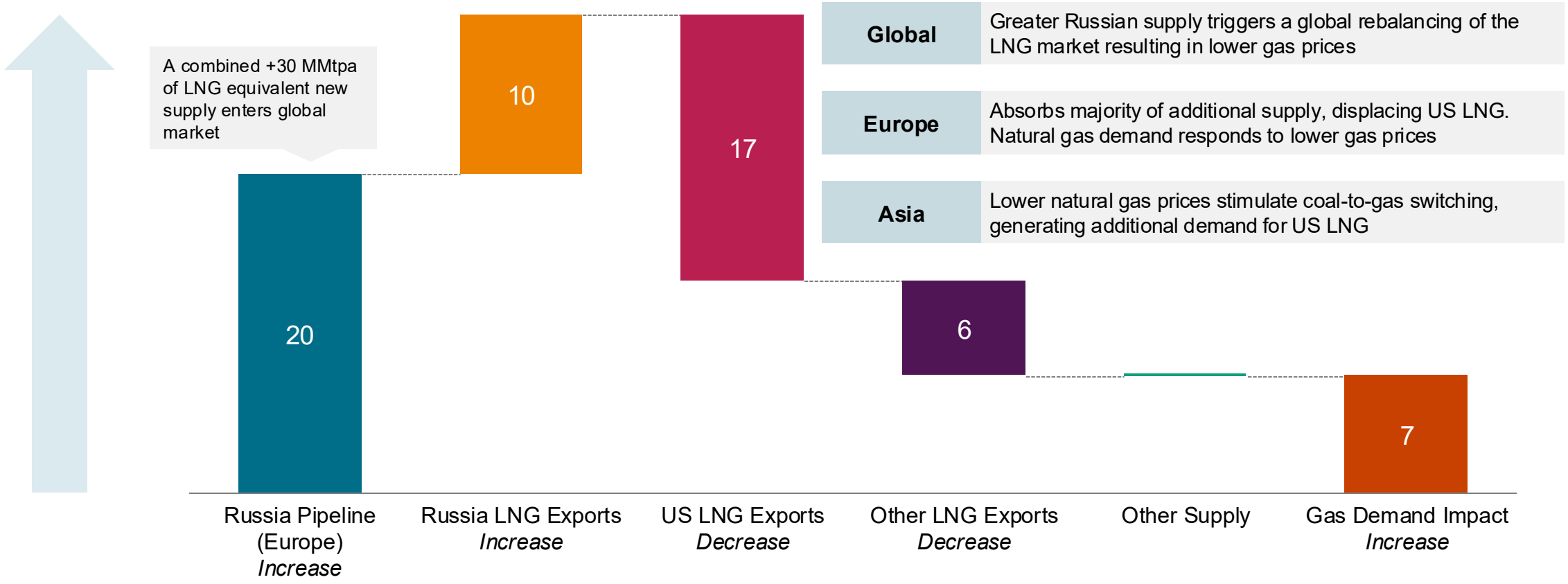
- Complete ban on Russian LNG to Europe from January 2026
- Arctic-2 LNG ramp-up delayed and Yamal LNG deliveries effected by shipping and trade-route logistical challenges
- Pipeline flows continue to Southeast Europe via TurkStream, as per the 'Current Trend' Scenario

1 The gas can likely be produced and transported at low cost given existing spare production capacity and transport infrastructure
Source: S&P Global Commodity Insights

Contents

In the ‘Opening the Taps’ Scenario with most incremental supply landing in Europe, the global response disproportionately impacts US LNG with a 17 MMtpa drop in exports

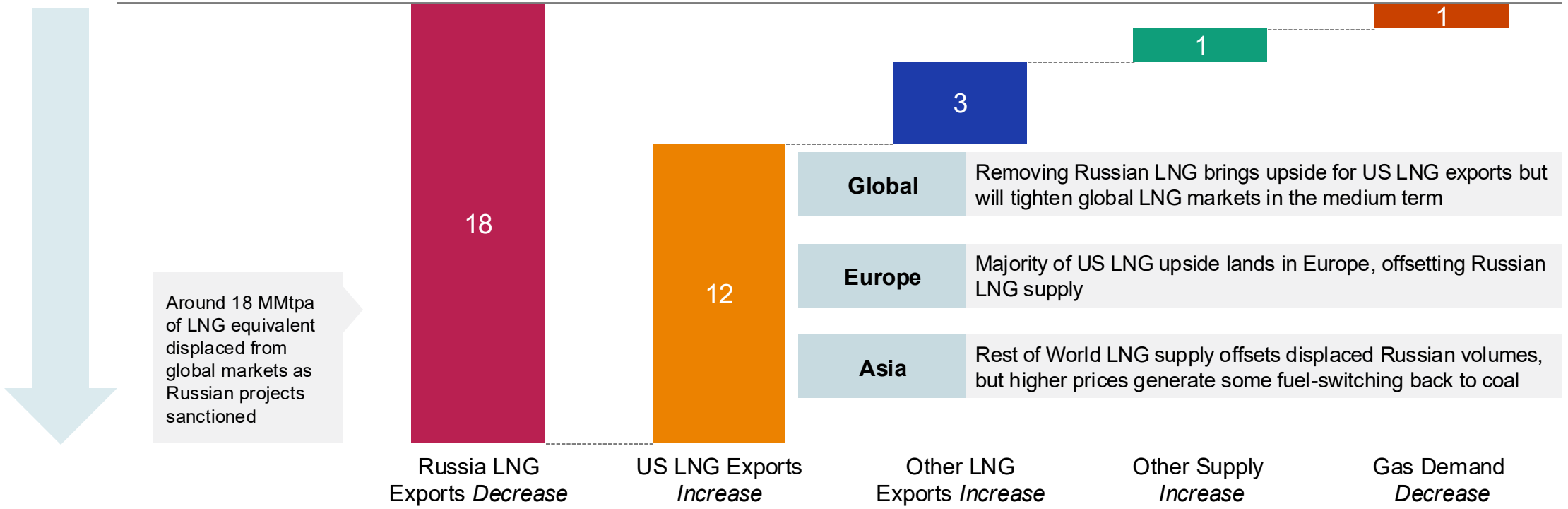
Global Response: ‘Opening the Taps’ Scenario vs. ‘Current Trend’ Scenario – Yearly Average 2030 - 2040
MMtpa of LNG equivalent



Note: Gas Demand Impact category reflects additional natural gas demand consumption and any increase in gas consumed as a result of fuel-switching from alternative fuels
Source: S&P Global Commodity Insights

In the 'Phasing Down' Scenario, further sanctions of Russian LNG facilitates 12 MMtpa of additional US LNG to bridge the supply gap in Europe

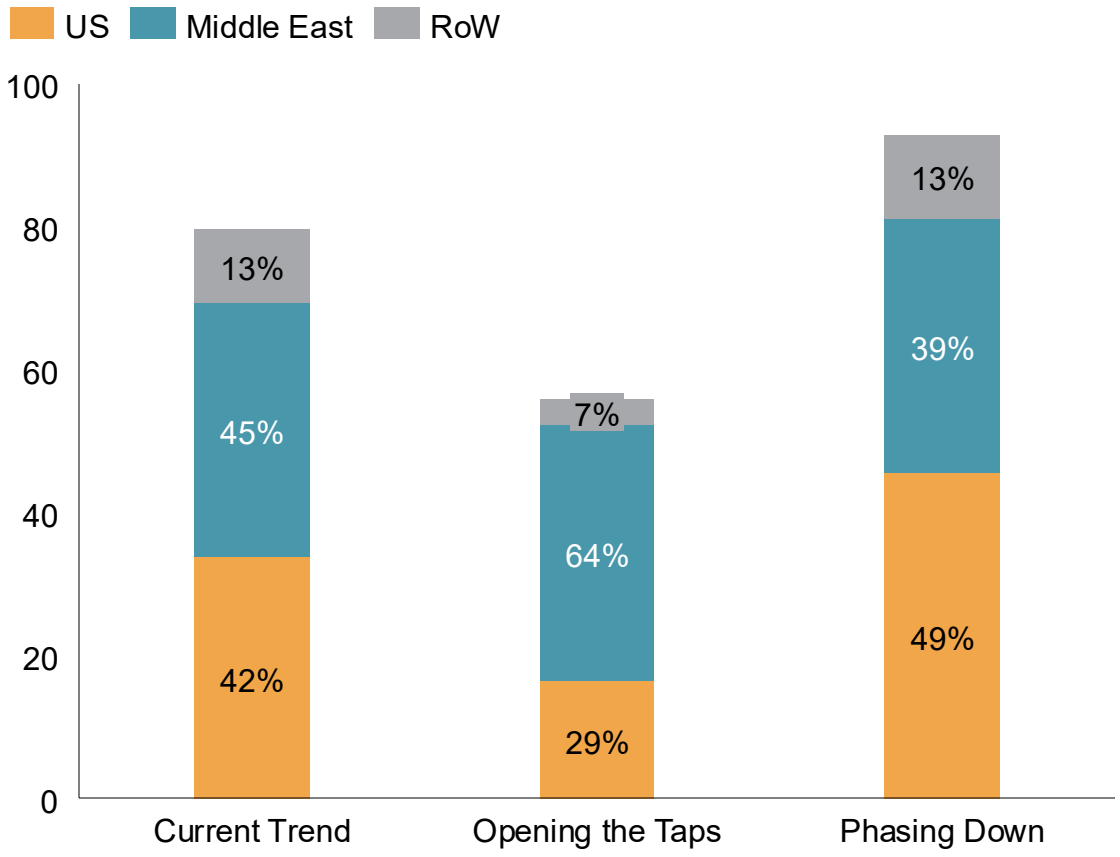
Global Response: 'Phasing Down' Scenario vs. 'Current Trend' Scenario – Yearly Average 2030 – 2040
MMtpa of LNG equivalent



Note: Gas Demand Impact category reflects natural gas demand displaced as a result of fuel-switching to alternative fuels
Source: S&P Global Commodity Insights

US LNG FIDs are greatly affected by changes in Russian exports; although US LNG can be developed quickly, it is not cost-competitive with the Middle East

Global LNG FID Outlook (2025-27) by Scenario
MMtpa of LNG



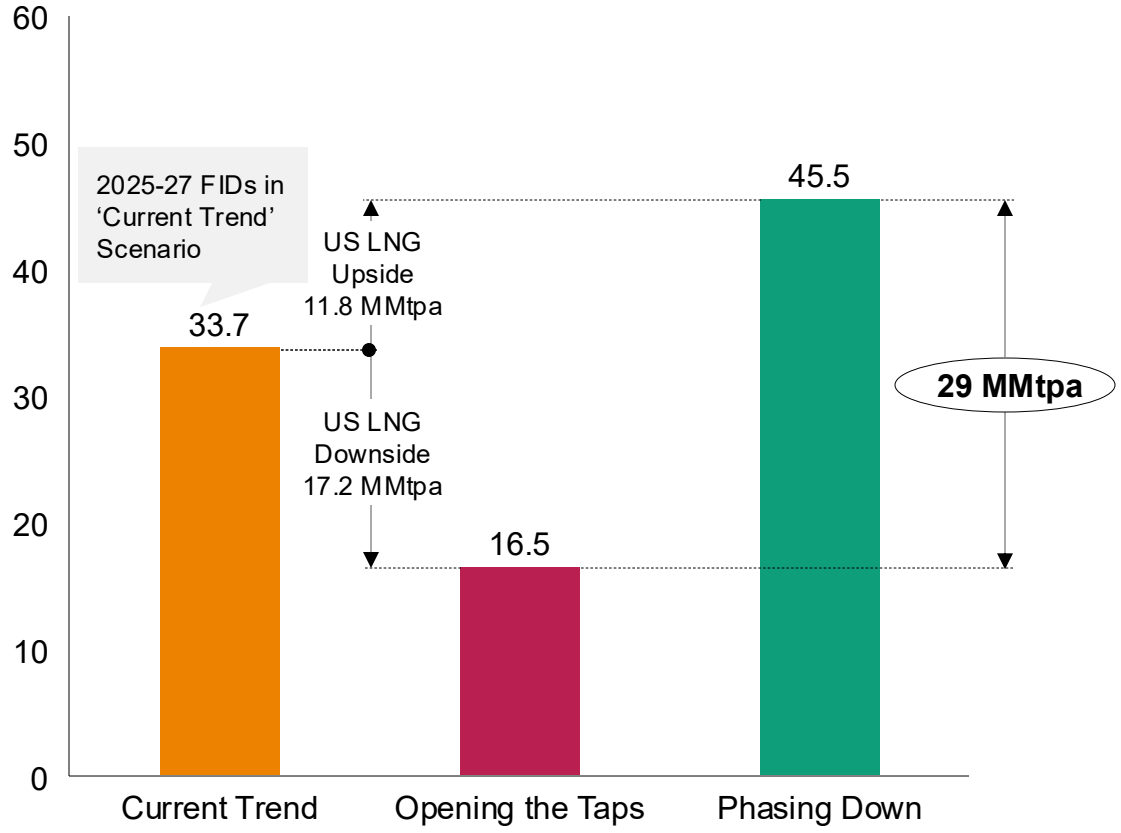
Rest of World	Limited project volumes and typically attractive shipping cost to key consumer markets (e.g., East Africa to Asia)
Middle East	Unlikely to be delayed / cancelled due to low cost of production and shipping to EU/Asia
US	Strong risk of delay / cancellation given projects typically at the margin considering delivered costs to EU/Asia

Source: S&P Global Commodity Insights

$120 billion in US LNG value chain direct expenditure is at risk in an ‘Opening the Taps’ scenario relative to the ‘Phasing Down’ Russia gas supply scenario

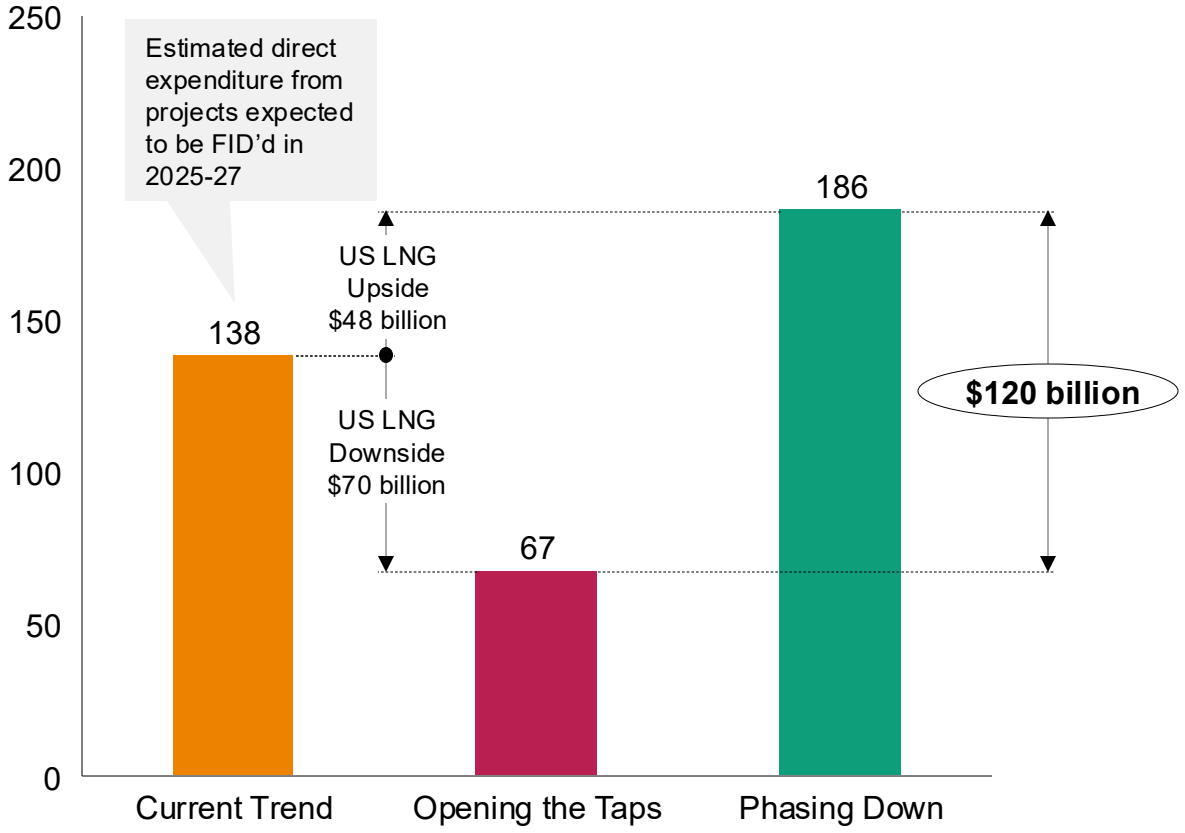
US LNG Liquefaction project FIDs by Scenario (2025-27)[1]

MMtpa of LNG



US LNG Value Chain Direct Expenditure[2] by Scenario

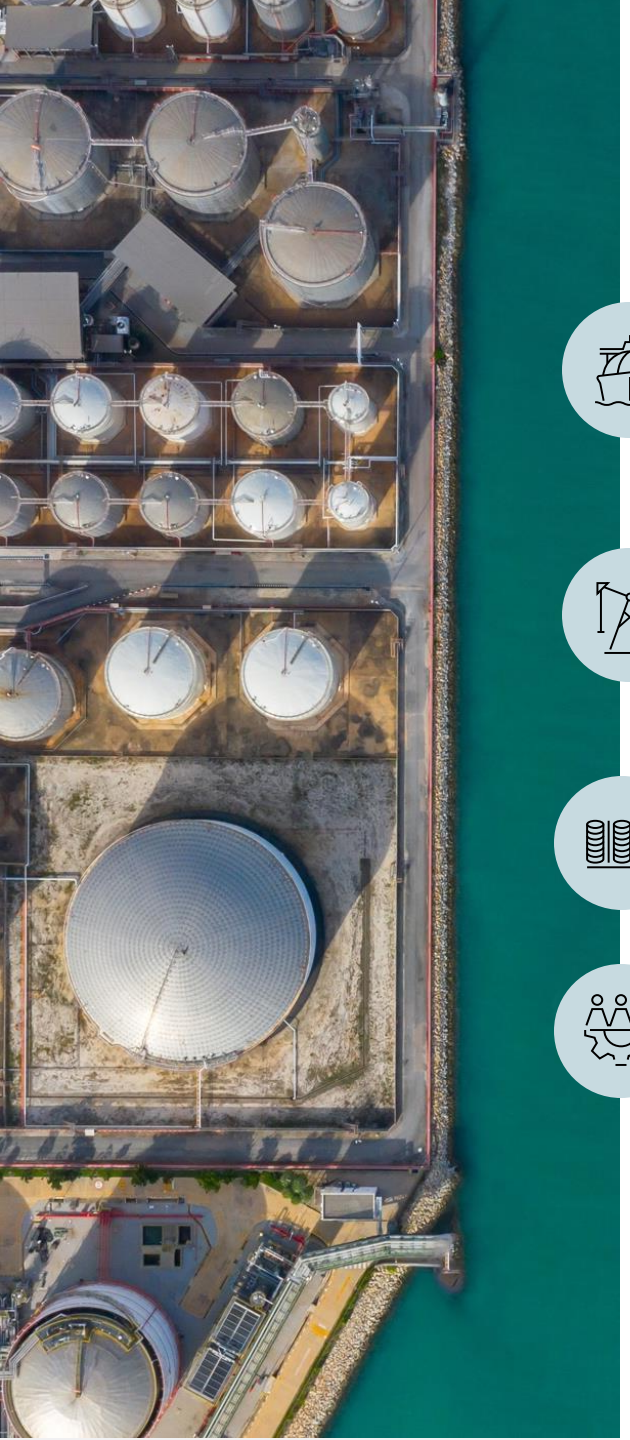
Nominal $ billion



Includes the April 2025 sanctioning of the 16.5 Mmtpa Woodside Louisiana LNG facility. 2 Incremental US LNG Value Chain Direct expenditure estimation (2025-40) based on US LNG Impact Study Phase 1 report covering direct expenditure for LNG, Pipeline &Storage and Upstream (Drilling, Completion, Facilities and Gathering & Processing costs)

Source: S&P Global Commodity Insights

Contents



Key Takeaways

Role of Russia as key supplier of gas to Europe has been upended: resolution is critical to investment decisions taken in the next two years – an estimated 29 MMtpa in US LNG FIDs and an associated nearly $120 billion in US LNG value chain direct expenditure is at risk with a return of Russian gas

In the “Opening the Taps” Scenario with most incremental supply landing in Europe, the global response disproportionately impacts US LNG with a 17 MMtpa drop in exports versus the “Current Trend” Scenario

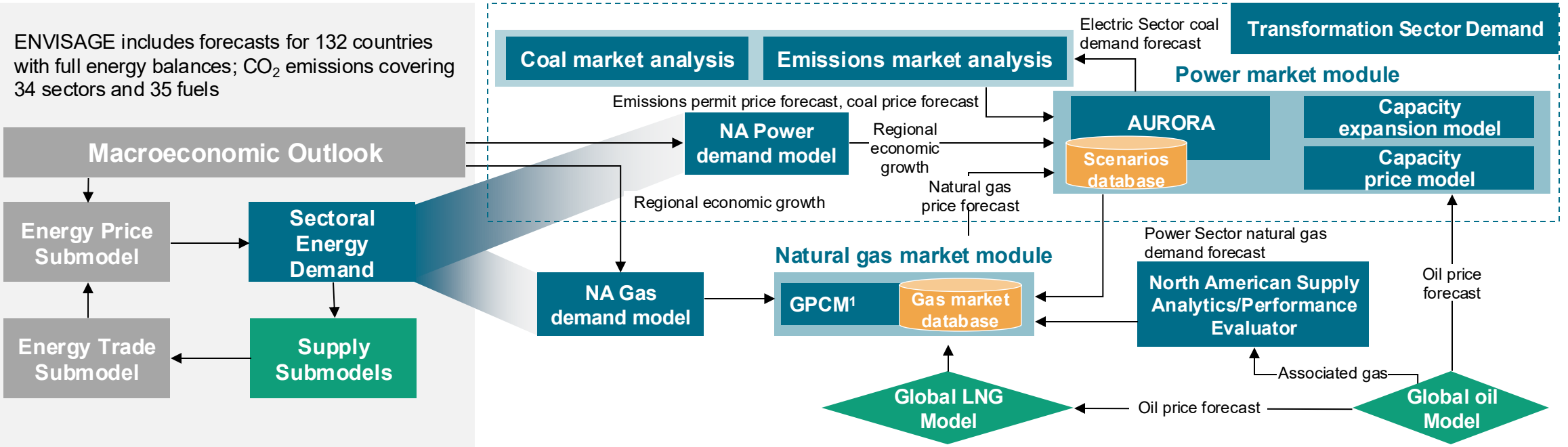
In the “Phasing Down” Scenario, further sanctions on Russian LNG facilitate 12 MMtpa of additional US LNG to bridge the global supply gap

A significant supply gap in Europe presents an opportunity for US LNG exports, despite demand reductions that raise questions about future energy needs in the power and industrial sectors. Country specific national security imperative to reduce dependence on fossil fuels complicates the energy landscape

Contents

Our best-in-industry integrated energy market modelling process is connected to granular gas and power models for credible detailed results and inputs for later Phases

ENVISAGE includes forecasts for 132 countries with full energy balances; CO_2 emissions covering 34 sectors and 35 fuels



- Macroeconomic outlook feeds global commodity prices as input to sectoral models
- Sectoral Model iterates with the Power Model to validate call on supply
- Supply & Demand are fed to Trade Model to balance which updates price and iterates

S&P Global customized GPCM database includes

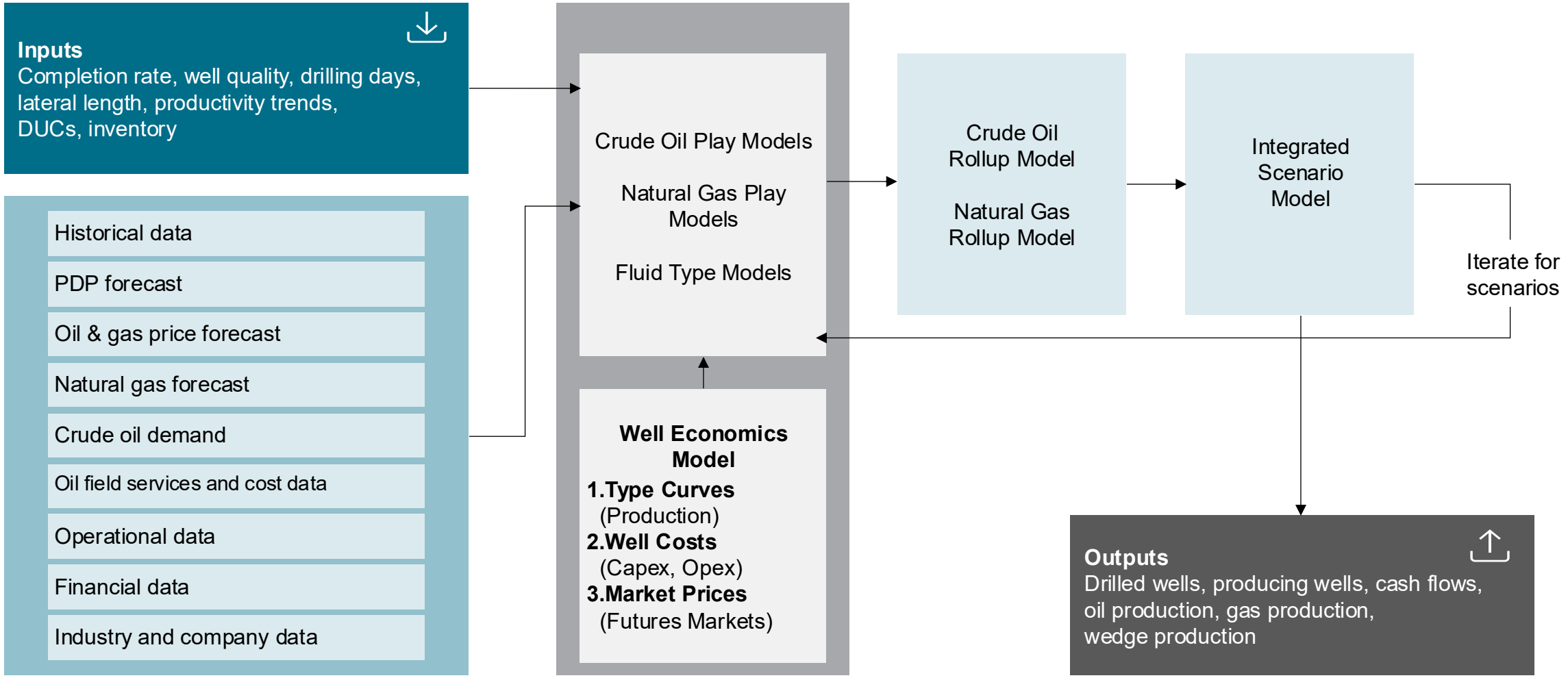
- +650 Pipelines & Storage
- +1000 Pipeline Zones
- +275 Producing plays
- +4000 Nodes

S&P Global has the world's largest team of over 1,400 energy and economic research analysts and consultants continuously modelling and analyzing markets

1. GPCM: Global Pipeline Competition Model

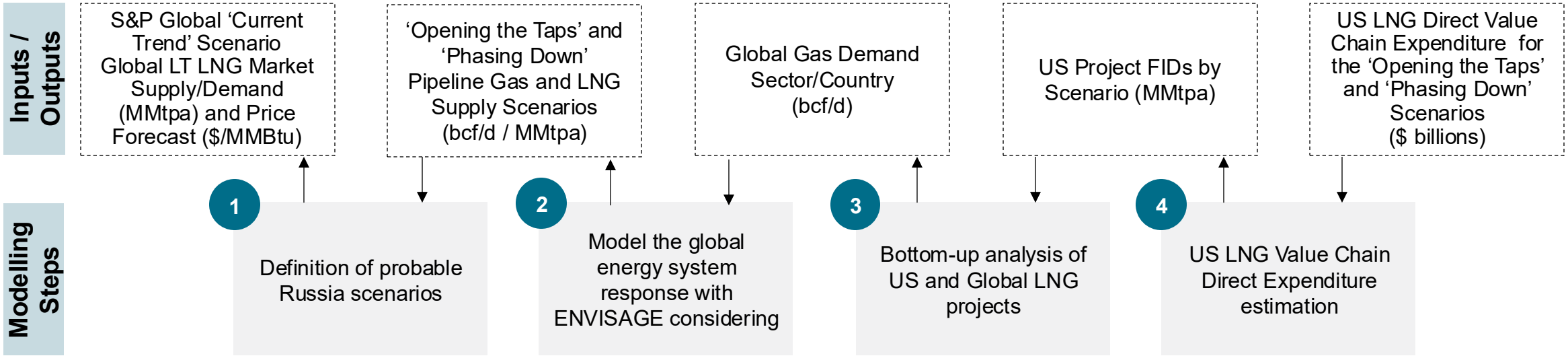
Source: S&P Global Commodity Insights

Upstream leverages inputs and bespoke models to generate US market-based forecasts including required iterations for specific scenarios



Source: S&P Global Commodity Insights

S&P Global Russia Scenarios US LNG Expenditure Impact Estimation Methodology



1. Russia Scenarios were developed based on available Russian and Russia related infrastructure, LNG project information, assumed access to LNG carriers and possible sanction or sanction lifting impacts
2. S&P Global's ENVISAGE global energy modelling provides the global energy system response to the Russia scenarios by commodity (e.g., coal, oil, renewables) country and demand sector
3. A detailed analysis of US and global LNG projects was performed considering the likelihood of taking FID in scenario specific gas price and demand environments including delivered cost of LNG, time to market, greenfield v. brownfield, contracting status and other risk considerations
4. Estimation of US LNG Direct Value Chain Expenditure based on the December 2024 detailed S&P Global economic impact analysis study[4] where 44 MMtpa of US LNG project FIDs were associated with $180 Billion of US LNG Direct Value Chain Expenditure across LNG, Pipeline & Storage and Upstream (Drilling, Completion, Facilities and Gathering & Processing costs) for the 2025-40 Period. This represents circa $4 Billion per MMtpa of LNG liquefaction capacity FID'd.

In the 'Phasing Down' Scenario, US liquefaction project FID is 29 MMtpa higher than in the 'Opening the Taps' Scenario. With US LNG Direct Value Chain Expenditure (2025-40) assumed at circa $4 billion[4] per MMtpa of liquefaction capacity FID'd, $120 billion of direct expenditure is at risk in the 'Opening the Taps' Scenario.

1 S&P Global Study: Major New US Industry at a Crossroads: A US LNG Impact Study – Phase 1, December 2024
Source: S&P Global Commodity Insights

For the context of this report, ‘Europe’ refers to the 27 European Union member states, plus the United Kingdom

Report Market Grouping	Countries
Europe	Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom
Northwest Europe (NWE)	Belgium, Denmark, France, Germany, Ireland, Luxembourg, Netherlands, United Kingdom
Baltics	Estonia, Finland, Latvia, Lithuania

NB

The following markets have not been included in the regional definition of “Europe” for the context of this analysis:-

Turkey

- Non-EU member state and therefore not subject to the same energy and environmental policies and geopolitical pressures
- Turkey remains a major offtaker of Russian pipeline gas and LNG and is not subject to the same EU member state policies that aim to reduce dependence on Russian gas

Norway

- Norway is the largest gas producer in Europe that supplies the EU27 member states + the United Kingdom
- Limited domestic gas consumption

Albania, Bosnia and Herzegovina, North Macedonia, Serbia and Switzerland

- Non-EU member states

Source: S&P Global Commodity Insights

Russia European pipeline and LNG export scenarios: US LNG projects and future export volumes are assumed to be strongly sensitive to Russian output

'Current Trend' (bcf/d)	2026	2030	2035	2040
Russian pipeline to Europe	1.0	1.0	1.0	0.9
Russian LNG Exports Globally	4.6	5.6	5.7	7.4
Other LNG Exports Globally	42.6	52.1	54.1	57.2
US LNG Exports Globally	16.2	24.6	25.8	25.8

'Opening the Taps' (bcf/d)	2026	2030	2035	2040
Russian pipeline to Europe	3.7	3.7	3.6	3.6
Russian LNG Exports Globally	5.0	6.3	6.9	8.6
Other LNG Exports Globally	42.6	51.5	53.3	56.4
US LNG Exports Globally	16.2	22.5	23.5	23.6
Russian pipeline to Europe Impact	**2.7**	**2.7**	**2.7**	**2.7**
Russian LNG Exports Globally	**0.3**	**0.7**	**1.2**	**1.2**
US LNG Exports Globally Impact	**0.0**	**-2.1**	**-2.2**	**-2.2**

'Phasing Down' (bcf/d)	2026	2030	2035	2040
Russian pipeline to Europe	1.0	1.0	1.0	0.9
Russian LNG Exports Globally	3.5	3.4	3.8	4.0
Other LNG Exports Globally	42.6	52.3	54.3	58.0
US LNG Exports Globally	16.2	26.1	27.3	27.8
Russian pipeline to Europe Impact	**0.0**	**0.0**	**0.0**	**0.0**
Russian LNG Exports Globally	**-1.1**	**-2.2**	**-1.8**	**-3.4**
US LNG Exports Globally Impact	**0.0**	**1.5**	**1.5**	**1.9**

Source: S&P Global Commodity Insights

Current Trend Scenario

- Russian pipeline gas to Europe continues via TurkStream
- Russian LNG still purchased by some European countries
- Sanctions continue to limit new Russian LNG projects
- Power of Siberia-2 to China launches in the 2030s

Opening the Taps Scenario

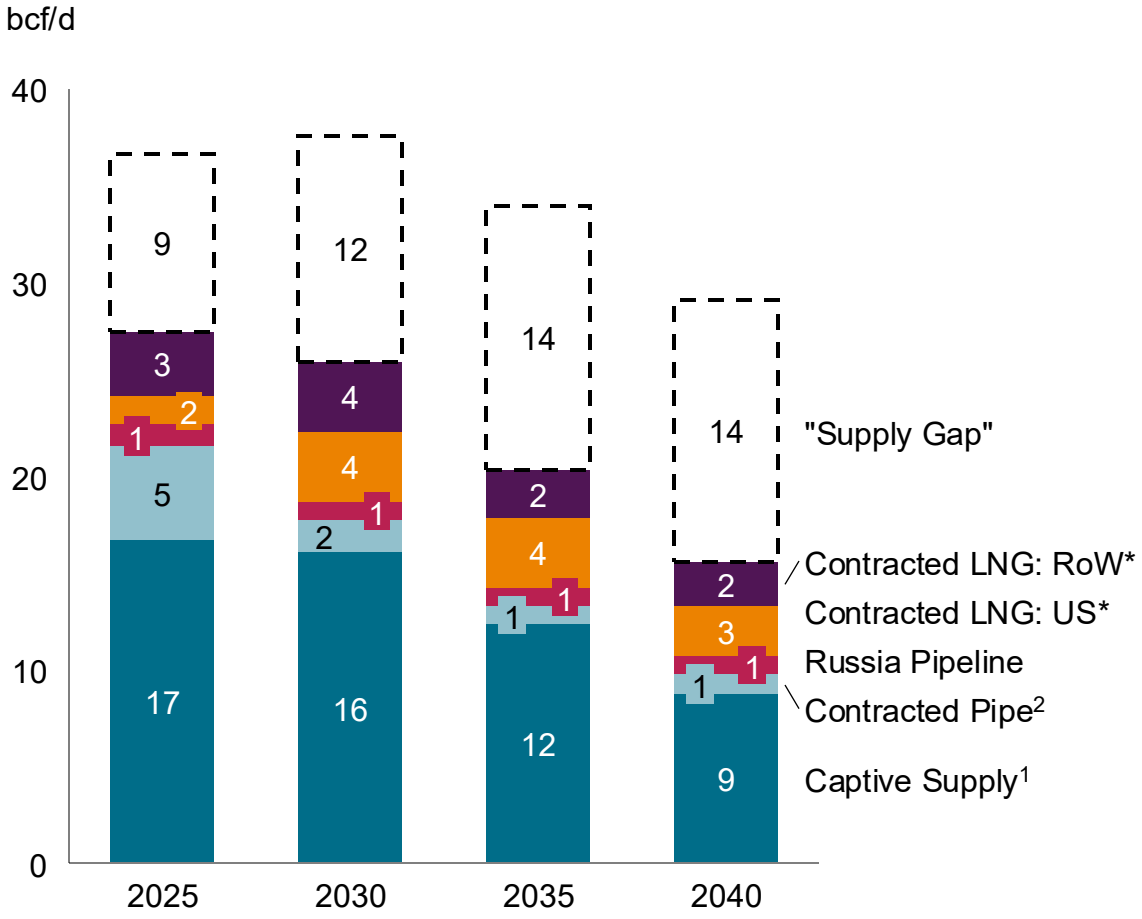
- Additional 2.7 bcf/d of Russian pipeline gas to Europe via the remediation of an existing pipeline route from July 2025
- Sanctions on Russian LNG are lifted, adding c. 9 MMtpa of Russian export capacity by 2035 versus the "Current Trend" Scenario
- Development of existing and future Russian LNG projects accelerates

Phasing Down Scenario

- Complete ban on Russian LNG to Europe from January 2026
- Arctic-2 LNG ramp-up delayed and Yamal LNG deliveries affected by shipping and trade-route logistical challenges
- Pipeline flows continue to Southeast Europe via Turkey, as per the "Current Trend" Scenario

Long-term LNG contracts, particularly US sourced gas, are potentially among European gas sources most challenged with the new EU Methane Emissions Regulation (MER)

European Natural Gas Uncontracted Supply Gap 'Current Trend' Scenario



UK and Norwegian gas systems are already monitoring methane reporting, making strides to demonstrate compliance with EU-wide regulations

No substantial new long-term pipeline contracts are expected to be signed in Europe due to declining gas supplies. Furthermore, existing contracts only have the obligation to report from 2028 onwards

New US and other LNG projects seeking long-term offtake agreements are most challenged by the roll-out of new EU methane reporting regulations

Note: *Contracted LNG volumes include LNG contracts of European Utilities and Industrials; [1]Captive Supply denotes domestic production and Norwegian supply net of pipeline exports; [2]Contracted Pipe includes: Algeria, Libya and Azerbaijan
Source: S&P Global Commodity Insights

Disclaimer

(where "Client" is the legal entity for which this Proposal was prepared and addressed)

The contents of this Proposal are private and confidential. S&P Global Commodity Insights, a division of S&P Global Inc. ("SPGCI") is the owner of the copyright of this document and its contents, including strategies, structures and processes disclosed in it. No part of this document may be published, distributed, extracted, utilised or re-utilised, or reproduced by Client in any form, except with the written approval of SPGCI.

This document is not legally binding and does not constitute an offer by SPGCI to engage or enter into a contract with Client or any other person, firm or entity or to provide any consulting services. The submission of this Proposal by SPGCI to Client does not constitute an offer capable of acceptance. No contract or other legally enforceable rights shall exist with respect to the subject of this Proposal unless and until a written consulting services agreement is executed by SPGCI and Client.

SPGCI is not agreeing to any Client legal or contractual terms, conditions, or obligations in connection with the services that are the subject of this Proposal. SPGCI expressly reserves the right not to provide the services that are the subject of this Proposal if the parties are unable to come to agreement on all relevant contractual and legal terms and conditions. It is SPGCI's policy to license its deliverables and services pursuant to SPGCI's own consulting services agreement which has been specifically designed for this purpose.

SPGCI makes no warranty, expressed or implied, as to the accuracy, completeness, or timeliness of any information in this Proposal, and shall not in any way be liable to Client for any inaccuracies or omissions. SPGCI shall have no liability whatsoever to Client, whether in contract, in tort (including negligence), under warranty, under statute or otherwise, in respect of any loss or damage suffered by Client as a result of or in connection with any information provided, or any course of action determined, by it or any third party, whether or not based on any information provided in this Proposal.

SPGCI is a business division of S&P Global Inc. ("S&P Global"). S&P Global also has the following divisions: S&P Dow Jones Indices, S&P Global Market Intelligence, S&P Global Mobility, and S&P Global Ratings, each of which provides different products and services. S&P Global keeps the activities of its business divisions separate from each other in order to preserve the independence and objectivity of their activities. Client's receipt of SPGCI reports, data and information pursuant to a consulting services agreement may also affect Client's ability to receive services and products from other S&P Global divisions in the future.

The names "S&P Global®" "S&P Global Commodity Insights" "S&P Global Platts™" and "Platts®" and the logo are trademarks of S&P Global Inc.


S&P Global