Nord Stream 2
Committed. Reliable. Safe.

Nord Stream 2

Enhancing European Energy Security

29-May-18 Paul Corcoran, Chief Financial Officer. European Gas Conference, Oslo, Norway

The Pipeline Will Run Through the Baltic Sea – Along the Proven Nord Stream Route

> With an overall length of some 1,230 km, the **Nord Stream 2 Pipeline** will connect Europe to the largest gas reserves in the world, in Russia

> Route optimised for **maximum efficiency** and **minimum impact** on the environment

> Design & implementation verified by **independent certification**

> Extensive international **consultation and permitting** process

> Construction and design will follow the **Nord Stream model**

Nord Stream 2 Is a Privately Financed Project Developer

- **EUR 8 billion CAPEX**
- **EUR 9.5 billion total expenditure** (including financing costs)
- **220 employees** from 20 nations, based in Zug, Switzerland – additional offices in St Petersburg and Moscow
- Investments in over **25 European countries**
- Contracts with over **600 supplier companies**
- Commitments to date **over EUR 5 bln**

Nord Stream 2 – a European Project

> Already, **over half of the CAPEX of EUR 8 billion invested** in European industry, involving over 670 companies from 25 countries. A selection:

Logistics

1. Port of Mukran
2. Port of HaminaKotka
3. Port of Karlshamn
4. Port of Hanko Koverhar
5. Company Headquarter in Zug

Pipes & Materials

1. EUROPIPE
2. OMK
3. Chelpipe
4. PetrolValves
5. Voestalpine
6. MMK
7. Dillinger Hütte
8. Impalloy
9. Wasco Coatings

Engineering & Surveys

1. Saipem Fano
2. Fugro Survey
3. Geo
4. Next
5. MMT
6. N-Sea

Offshore Pipelay

1. Allseas
2. Saipem
3. Boskalis / van Oo

Environmental Studies, Quality Management, Safety & inspection

1. Rambøll
2. IfaÖ
3. DNV GL
4. Svarog
5. Business Trend
6. Delta Energy Services
7. Intertek

Leading Energy Companies Are Strongly Committed to Implementing the Project

100% Shareholder

GAZPROM

provides up to 50 percent of the estimated project cost

Project Developer

Nord Stream 2

EUR 8 billion CAPEX
EUR 9.5 billion total expenditure (including financing costs)

Financial Investors

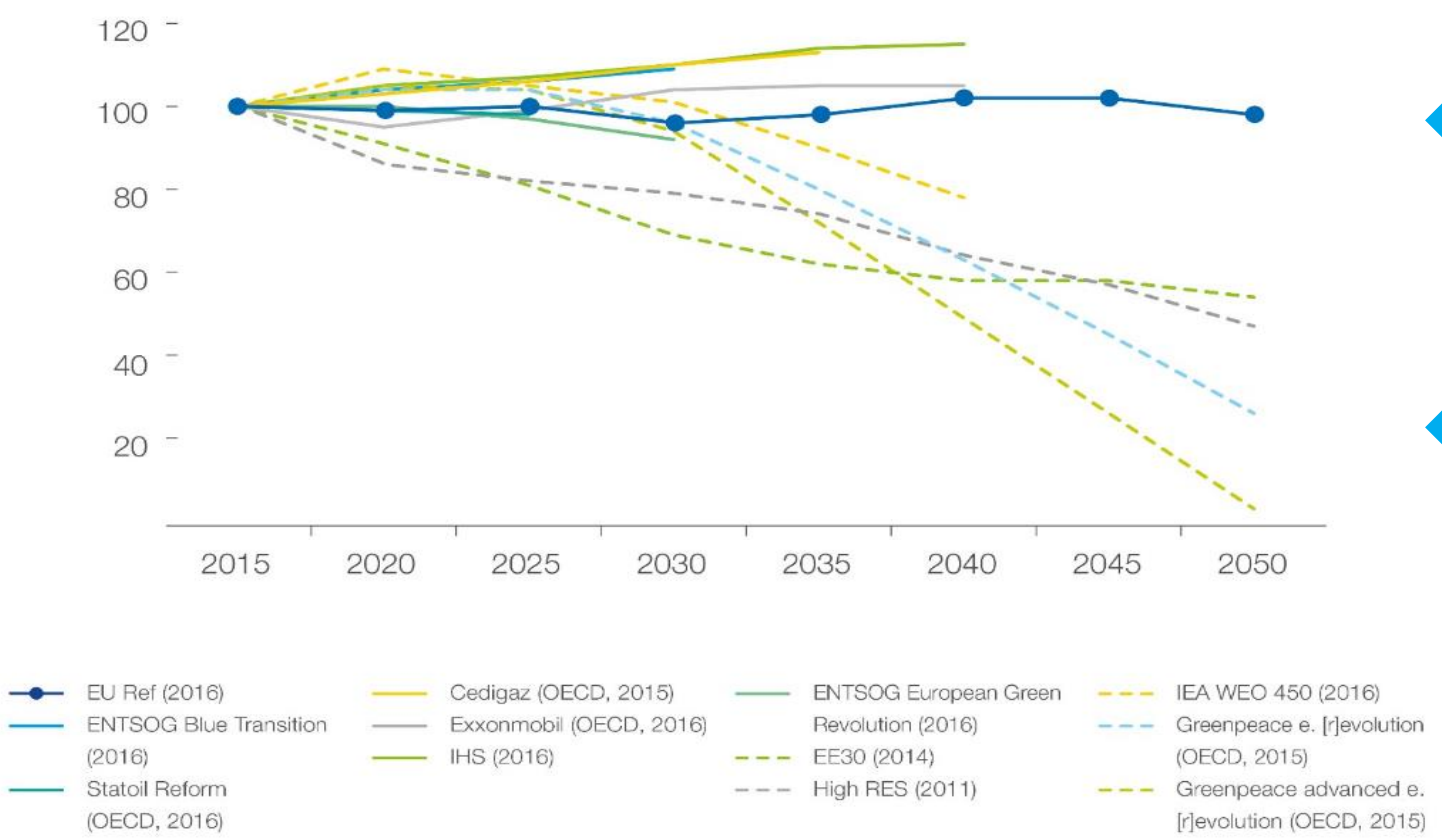
OMV · Shell · uniper · ENGIE by people for people · wintershall BASF Gruppe

support the project by providing up to 50 percent of the financing, up to 950 million euros each

Nord Stream 2: a Commercial Initiative to Reinforce the European Gas Supply

- Nord Stream 2 is a new natural gas pipeline through the Baltic Sea to connect Europe to the largest gas fields in the world, supplementing existing gas transportation with up to **55 bcm/a**
- Nord Stream 2 is a **privately funded project** to reinforce the European gas supply, **backed by major European companies**
- EU domestic gas production has fallen in recent years and is expected to fall further within the next 20 years (-50%, about 70 bcm less) while traditional suppliers from Norway (-25 bcm) and Northern Africa (-30 bcm) will not be able to supply Europe at today's level anymore
- At the same time, EU gas demand remains steady so additional gas imports and capacity are required to **meet European demand and safeguard supply security**
- Nord Stream 2 will bring considerable **benefits** by:
  - Increasing security of supply – by connecting to the world's biggest gas reserves
  - A more competitive EU gas market – by adding new capacity the market needs
  - Supporting sustainability goals – natural gas is a cost-efficient decarbonisation option

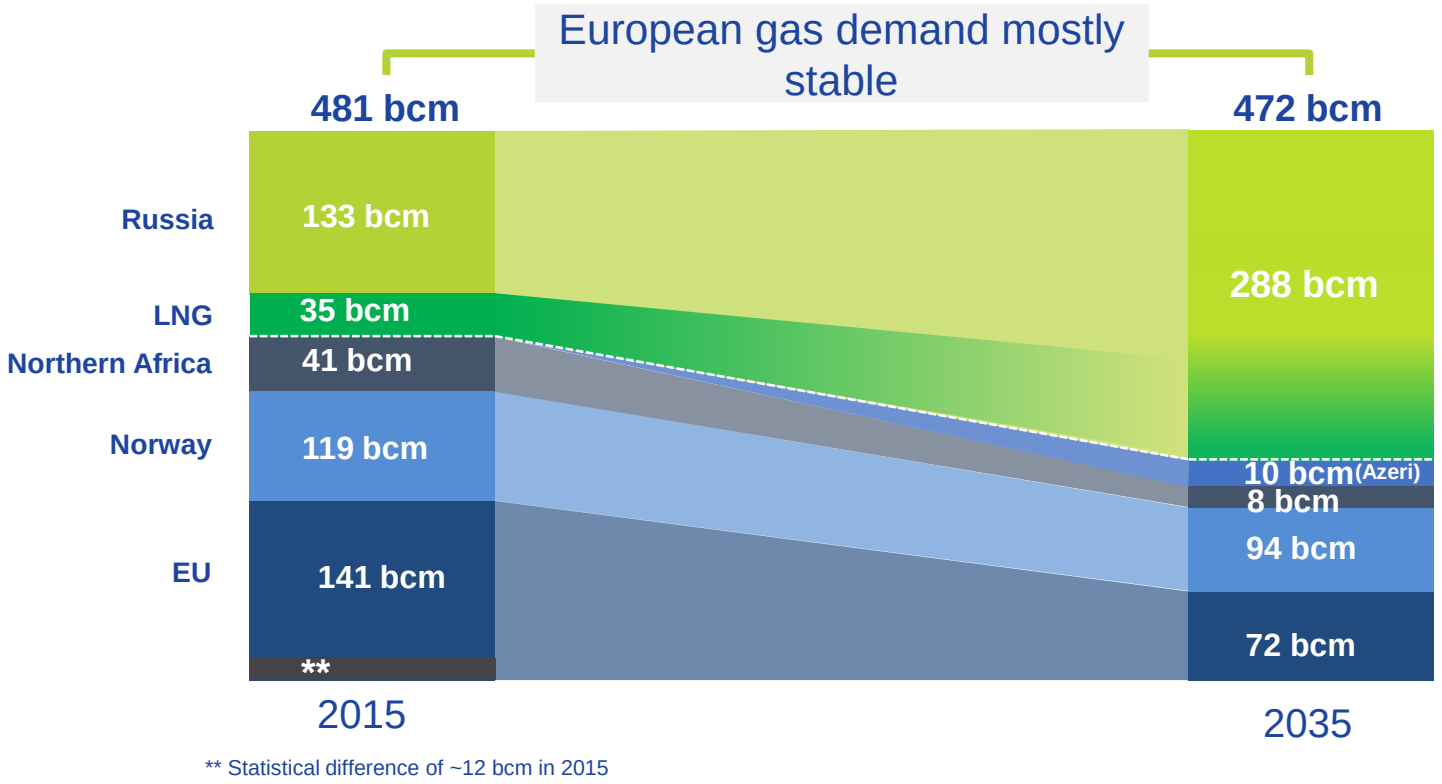
Most Projections See Stable European Gas Demand



Reference scenarios (solid lines):
Highest probability, assuming agreed political parameters and existing systems

Target scenarios (dotted lines):
Set predefined targets for emissions or energy mix, Projections assume that energy systems are restructured accordingly and targets are met

A European Natural Gas Supply Gap Is Emerging due to Decreased Production



** Statistical difference of ~12 bcm in 2015

120 bcm import gap
to be filled by Russian gas and LNG, share will be set by the market

Drop in domestic production and lower output from other supply

Sources: adapted from Prognos 2017, based on EU Reference Scenario 2016, adapted with NOP 2015, OGA (Oil and Gas Authority) production projections, February 2016, NEP Gas 2016, Norwegian Petroleum Directorate; The Oxford Institute for Energy Studies, Algerian Gas: Troubling Trends, Troubled Policies, May 2016; The Oxford Institute for Energy Studies, Azerbaijan's gas supply squeeze and the consequences for the Southern Corridor, July 2016, BP Statistical Review of World Energy, June 2016; demand includes EU-28 and Switzerland, excludes western imports to Ukraine

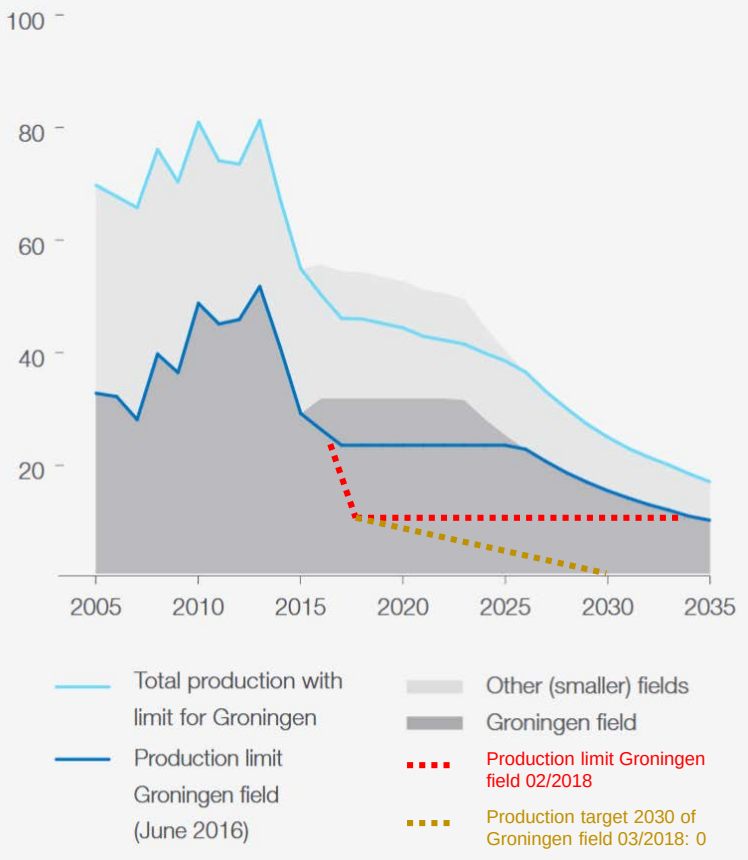
Production Limit in Europe's Biggest Gas Field in Groningen Accelerates Decline in EU Gas Production

- Europe's largest gas field, backbone of Dutch gas production, production peaked in the 1970s at 80bcm
- Increasingly stronger, repeated earthquakes in 2014-2018 lead to lower production caps:
  - Production limit for 2015: 30 bcm (down from 54 produced in 2013)
  - Production limit for 2017: 21.6 bcm
- Latest earthquake in Groningen region on January 8, 2018
- On February 1, 2018 the Dutch State Supervision of Mines advises the Minister of Economic Affairs and Climate to reduce gas production significantly for the safety of the inhabitants of Groningen:
  - **Production limit for 2018: 12 bcm (down from 21.6)**
  - *"with continued pressure drop as a result of production, seismicity will increase again raising the risk posed by earthquakes. [..] gas production will need to be reduced further in the future, **if necessary to zero**"*
- **On March 29, 2018 Economy Minister Eric Wiebes said output would be cut by two-thirds starting October 2022 and stopped altogether by 2030**

> Groningen cap would increase EU import requirement by 10 bcm per year as of 2018

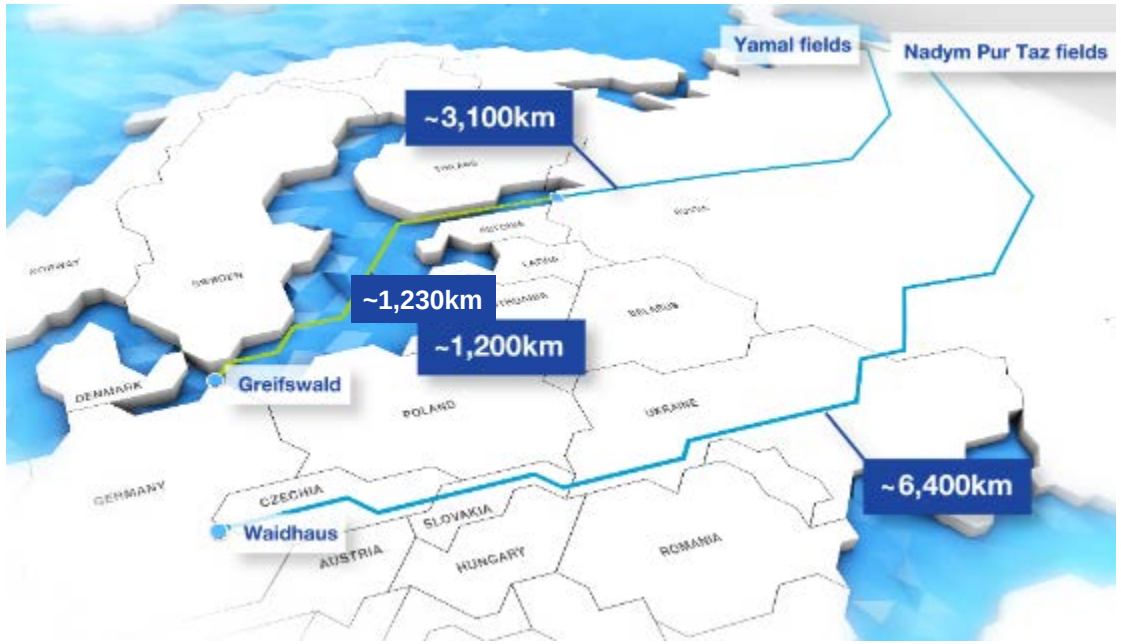
Gas production in the Netherlands [bcm]

Source: Prognos (2017), based on GTS (2015), Rijksoverheid (2016)



Nord Stream 2 Increases Security of Supply

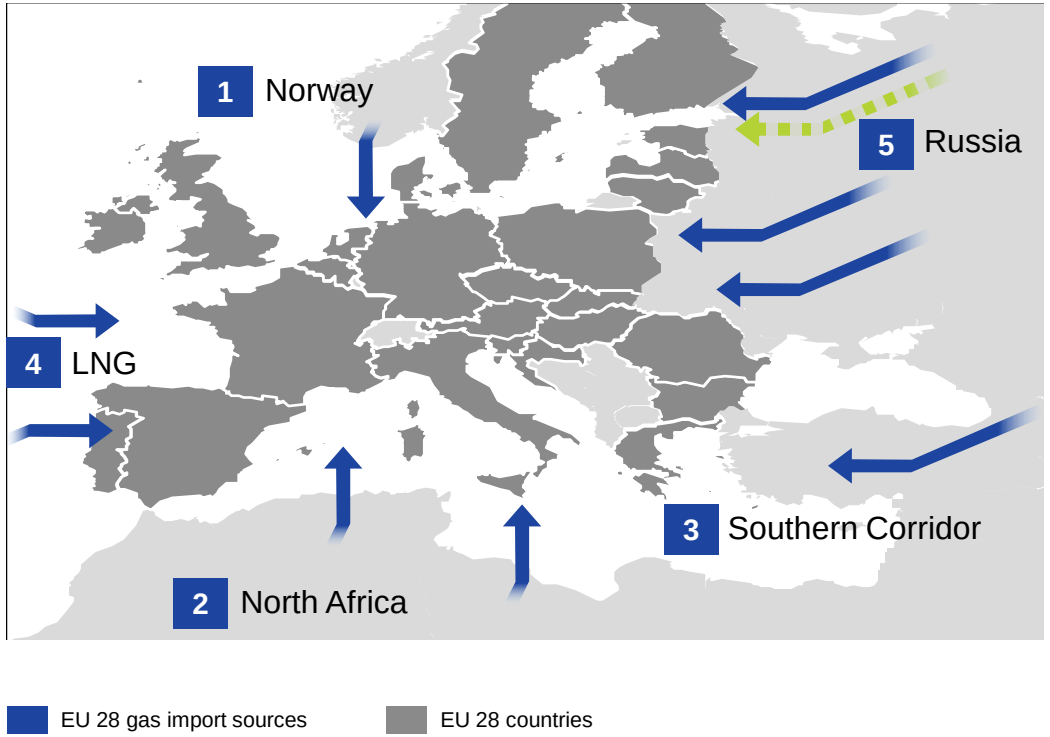
- Nord Stream 2 provides the most direct access to the **world's biggest gas reserves**
- Provides a total capacity **of 55 bcm** of gas, enough to power 26 million households
- Strategic location to supply Europe – not at risk with rising global gas competition (+45% demand by 2040)
- Offers an additional transport system to Europe, enhancing supply security



Source: BGR 2017, IEA WEO 2017

Additional Import Can Only Be Supplied by Russian Pipeline Gas and/or Global LNG

Natural gas import sources for the EU 28 market



1 Norway
> Production and thus exports from Norway to EU will decrease

2 North Africa
> Exports from North Africa limited by growing domestic demand

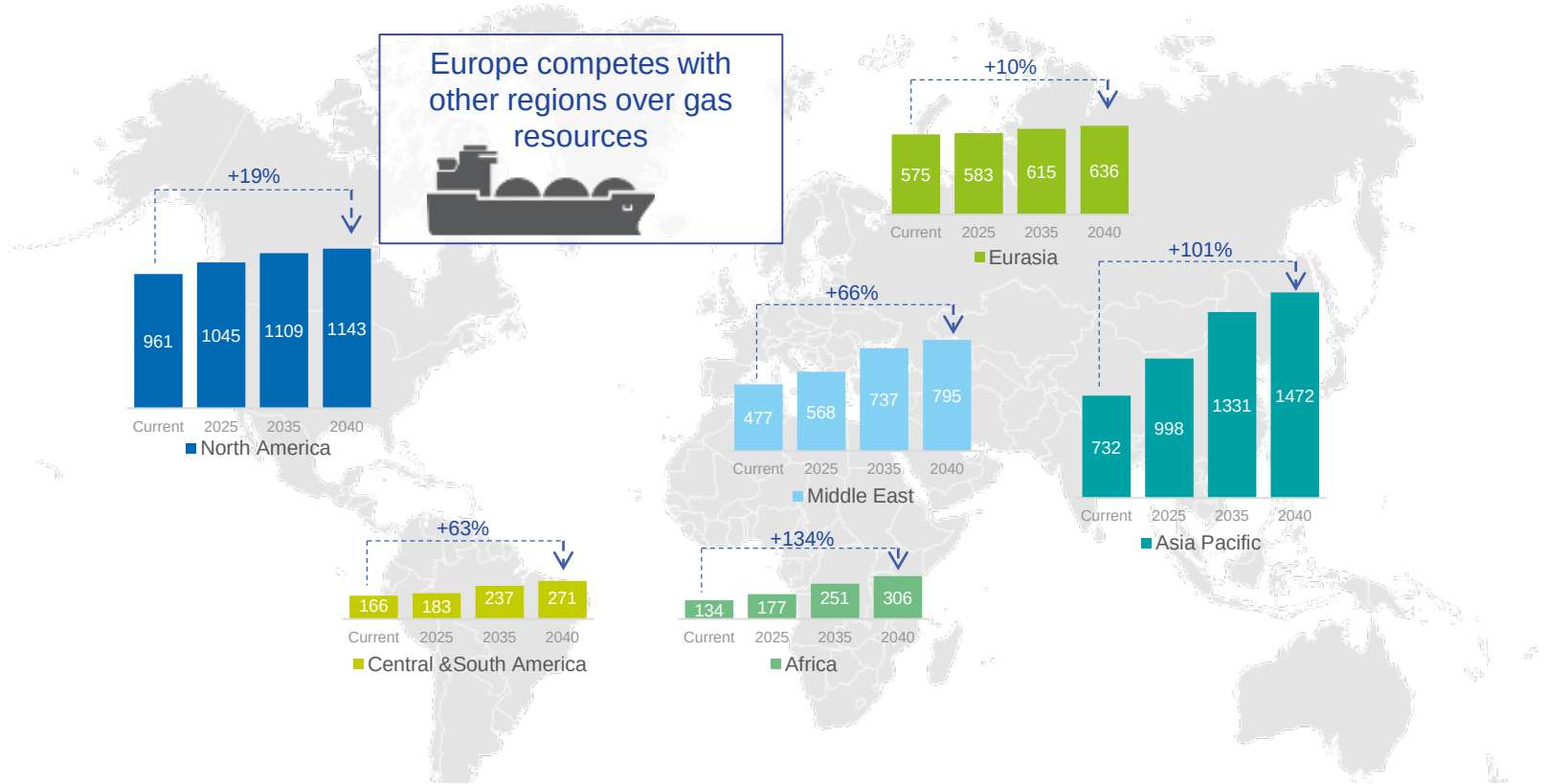
3 Southern Corridor
> No indication for substantial additional import volumes from Southern Corridor

4 Global LNG
> Significant liquefaction and regasification capacities available, volatile market

5 Russia
> The world's largest gas reserves; large volumes available for export to the EU

Global Gas Demand Is Set to Grow by About 50% by 2040, Increasing Competition Over Gas

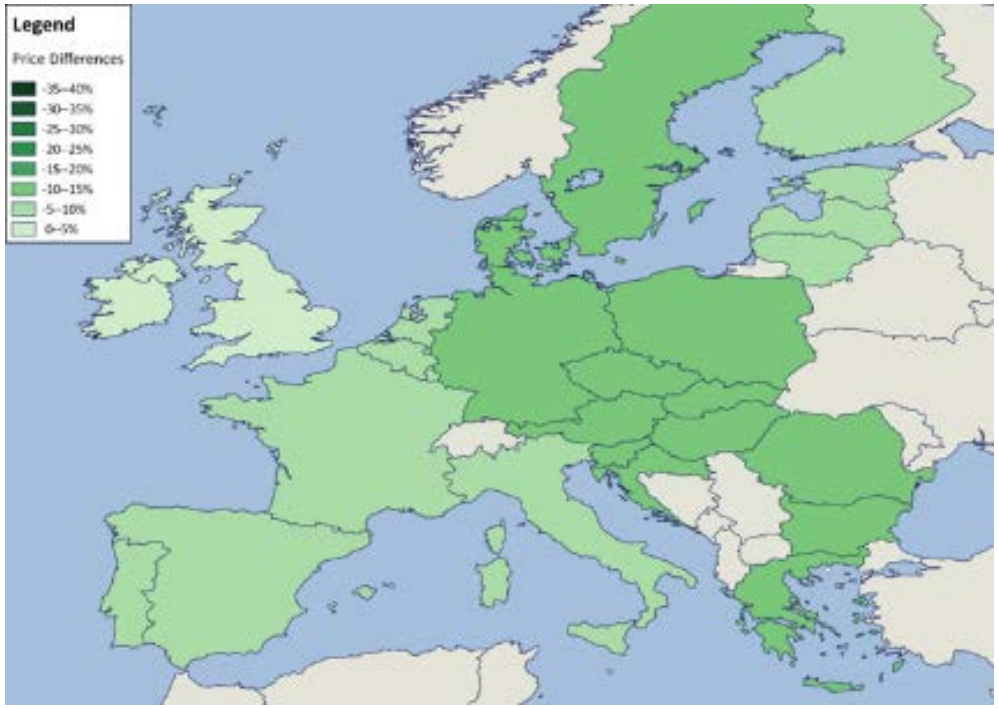
World Energy Outlook 2017: Natural gas demand in New Policies Scenario [bcm]



1) Demand growth leads to increased need for LNG because production and consumption locations further diverge from each other, i.e. Asian region is among the largest consumers globally, but has close to no natural gas resources itself or in proximity of a pipeline
2) Current = 2016
Source: IEA WEO (2017)

EWI Report Shows All of Europe Benefits from Nord Stream 2

- Nord Stream 2 helps reduce wholesale European gas prices by enabling greater choice between imports (pipeline vs. LNG)
- Europe has a price advantage from being less dependent on higher LNG prices
  - 2020: benefits for consumers between 7.9 bn and 24.4 bn EUR per year*
  - 2025: benefits for consumers between 12.9 bn and 34.8 bn EUR per year*
  - 2035: benefits for consumers between 9.7 bn and EUR 26.9 bn EUR per year*
- Every country can benefit thanks to the interconnected market

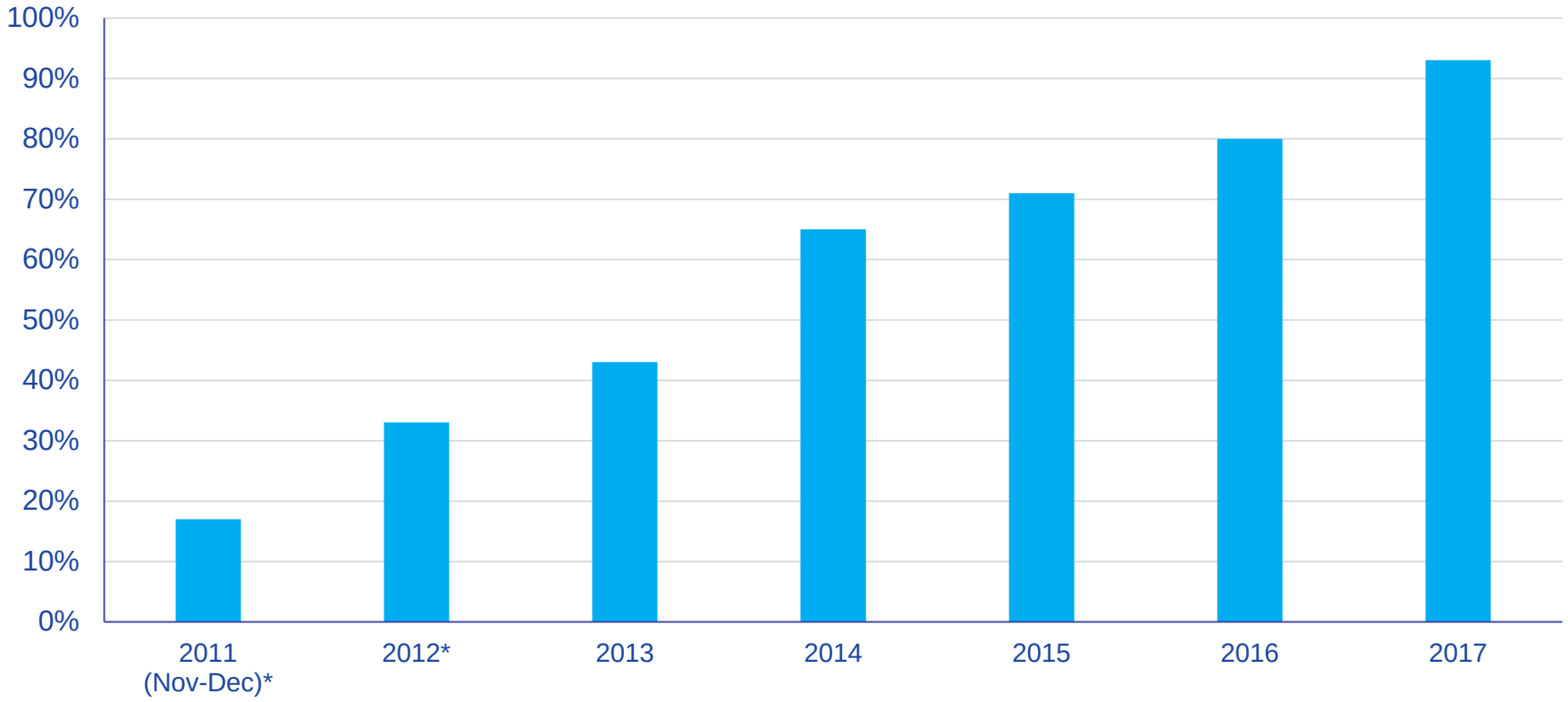


Price reductions due to Nord Stream 2 in 2020, Low Global LNG Demand.

Source: EWI ER&S: Impacts of Nord Stream 2 on the EU Natural Gas Market (2017)

* Depends on state of global LNG market as LNG is market price setter in Europe

High Capacity Utilisation of the Nord Stream Pipeline at over 90%

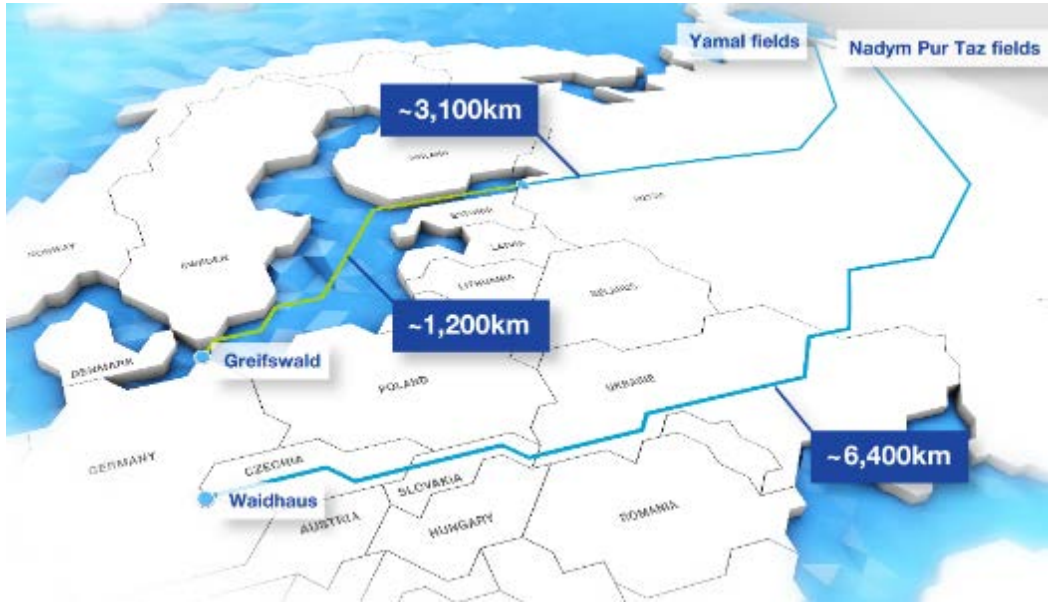


Gas transported until December 2017: 205.3 bcm

* Based on 27.5 bcm per year; all other yearly figures based on 55 bcm.

Nord Stream 2 Is a Modern Transport System with a Significantly Shorter Route

Overview on Russian gas fields and pipelines to EU gas market [schematic]



Source: Nord Stream 2, Pipeline lengths according to DBI (2016)

1 All figures rounded

- The **routing** along the **Northern corridor** through the Baltic Sea is about **one third shorter** than the Central corridor and thus an **environmentally favourable option**
- Nord Stream 2 is a **competitive option** for delivering gas to hubs in **Western Europe**
- **Attractive transportation tariff** for shipper **compared to** transit via **Ukraine**

Tariff rates for 1000 m³ on 100 km:

Nord Stream 1:	**< 2 EUR**
Nord Stream 2:	**< 2 EUR**
Ukraine current:	**~2.26 EUR[1]**
Ukraine new regime:	**~4.30 EUR**

Low-emission, High-efficiency Gas Transport

55 bcm of gas shipped via Nord Stream 2 compared to…

Central Russian corridor onshore pipeline:

Nord Stream 2 saves
8.2 million tonnes
of CO_2 per year.

This roughly equals the total annual CO_2 emissions of **Cyprus**

Source: based on Gazprom Investors Day Presentation 2017

Up to 600-700 LNG tanker loads from the global market:

Nord Stream 2 saves
17.1-44.6 million tonnes
of CO_2 eq. per year, depending on distance travelled.

This roughly equals the total annual CO_2-emissions of **Lithuania** (lower end) or **Slovakia** (higher end)

Source: based on ThinkStep GHG Intensity of Natural Gas Transport Report 2017

Coal burned in an average power plant to generate the same electricity:

Nord Stream 2 saves
~160 million tonnes
of CO_2 per year.

This roughly equals the total annual CO_2 emissions of **Sweden, Finland, Estonia and Lithuania combined**!

Source: own calculation, based on IEA 2015, 10.34 kWh/m3, 49% efficiency for gas

Country comparisons based on Eurostat, Total greenhouse gas emissions by countries (including international aviation and indirect CO2, excluding LULUCF) for 2014

The EU's Internal Energy Market Today

Diversified, integrated gas market

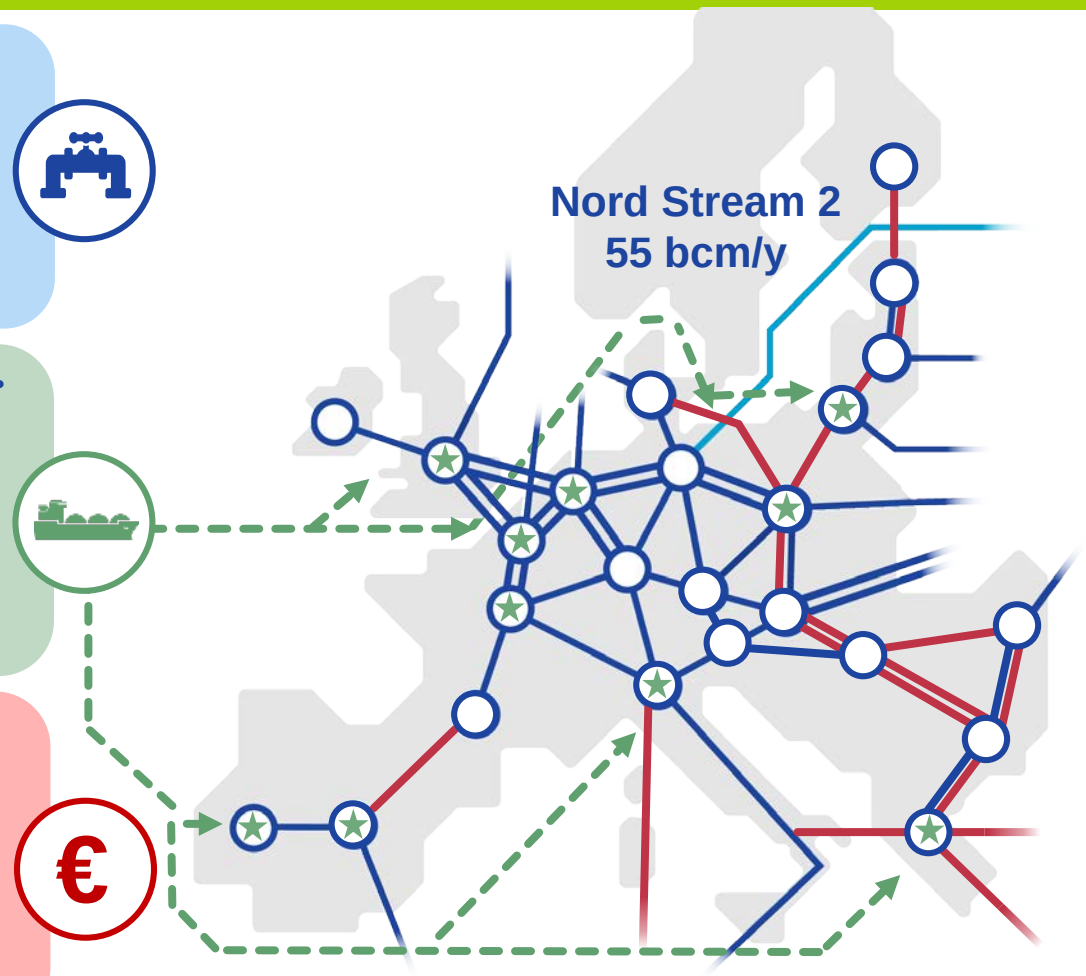
- Three main sources: Domestic, Norway & Russia. Additional sources: Northern Africa and LNG
- Once delivered to the border of the internal market, gas can flow freely in multiple directions wherever it is needed
- CEE West-East reverse flow capacity: ~147 bcm/year

LNG imports

- 23 operational LNG terminals in 10 EU states
- Capacity: 214 bcm/year (2017)
- Utilisation rate: 24% or ~52 bcm/year (2017)
- LNG terminals could already cover ~45% of EU gas demand (467 bcm demand 2017)
- Up to 69 bcm extra capacity planned by 2023

Addressing remaining gaps

- €5.35 billion EU funds available in the area of energy infrastructure between 2014-2020
- EU identified over 60 gas interconnection projects as PCIs (projects of common interest) eligible for public funding
- PCIs will remove the remaining few bottlenecks, fully unlocking the internal energy market in CEE/SEE



What the EU Says about Market Liberalisation

> **ACER Gas Market Monitoring Report, October 2017:**

"Gazprom's (and other producers') strategy – to defend market share by offering competitive prices – … boosted EU gas buyers' offtakes."

"Gazprom's actual pricing [… is an…] adaptation to the new market reality [which] is the result of enhanced upstream competition, the development of hubs, improved interconnection and legal actions."

ACER
Agency for the Cooperation of Energy Regulators

"The anticipated rise in surplus LNG flowing into Europe proved somewhat slow to materialise in 2016, due in part to robust gas flows via pipelines."

"The International Gas Union appraises that hub-price linked [purchases…] account […] for 66% of supplies across Europe."

The Legal Framework for Nord Stream 2

National level

- **National law of 5 states**
  - Germany
  - Denmark
  - Sweden
  - Finland
  - Russia
- Numerous **permitting related national provisions applicable for construction and operation**

Supra-national level

- **European Directives**
  - **Environmental legislation**, e.g. EIA Directive as implemented nationally

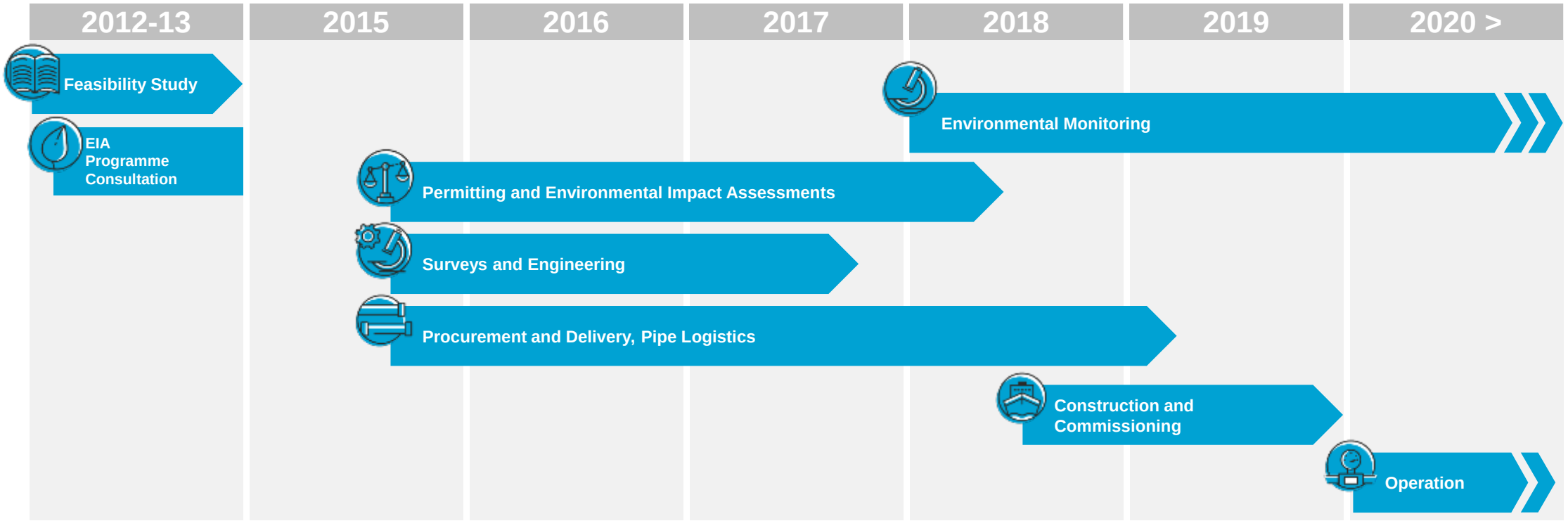
International level

- **Between states**
  - UN Convention of the Law of the Sea (UNCLOS)
  - Espoo Convention
  - Helsinki Convention
  - International Convention for the Prevention of Pollution from Ships, MARPOL
  - Further multilateral treaties and conventions

Status of Project Development

- **Material and service contracts**
  - All major contracts underway: steel, logistics, pipelay, etc
  - Pipe deliveries well on track: 2,220 km (90%) of line pipe delivered (end of April 2018)
  - Concrete weight coating ongoing at three locations, approx. 50% already coated (end of April 2018)
  - Construction vessels mobilised
- **Permits**
  - First permits received in Germany and Finland
  - Permits from Russia, Sweden and Denmark expected in the next months, in line with construction schedule

Development on Schedule



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