North West Europe Gas System Performance Report

October 2019

Executive Summary

1. **Gas prices:** Belgian prices rose by 11% month-on-month due to colder weather. GB prices also increased by 6% compared to last month as low temperatures lifted demand for heating, while indigenous production struggled to keep up with rising GB demand due to a short outage in the Forties pipeline caused by a lightning strike. **See slides 4 and 5.**
2. **Consumption:** Gas consumption in NW Europe was up 9% (a 1.8 bcm increase) compared to October last year, almost reaching the 5 year trailing maximum. Gas consumption for Germany increased by 1.8 bcm and for the Netherlands by 0.5 bcm, whilst French gas consumption decreased by 0.8 bcm. **See slides 6 and 7.**
3. **Supply:** LNG imports increased by 0.9 bcm year-on-year, accounting for 14% of total gas supply, which compensated for 2.2 bcm of lower pipeline supply from Norway and Russia. The former lost 3%-points and the latter lost 2%-points in EU market share year-on-year. **See slides 8 - 11.**

- **Indigenous production:** Dutch production decreased by 16% year-on-year due to the lower production cap at Groningen, but GB production stayed constant at 2.7 bcm over the same period. Compared to September, Dutch and GB production increased by 26% and 11% respectively to meet strong residential gas demand as winter approached.

Executive Summary

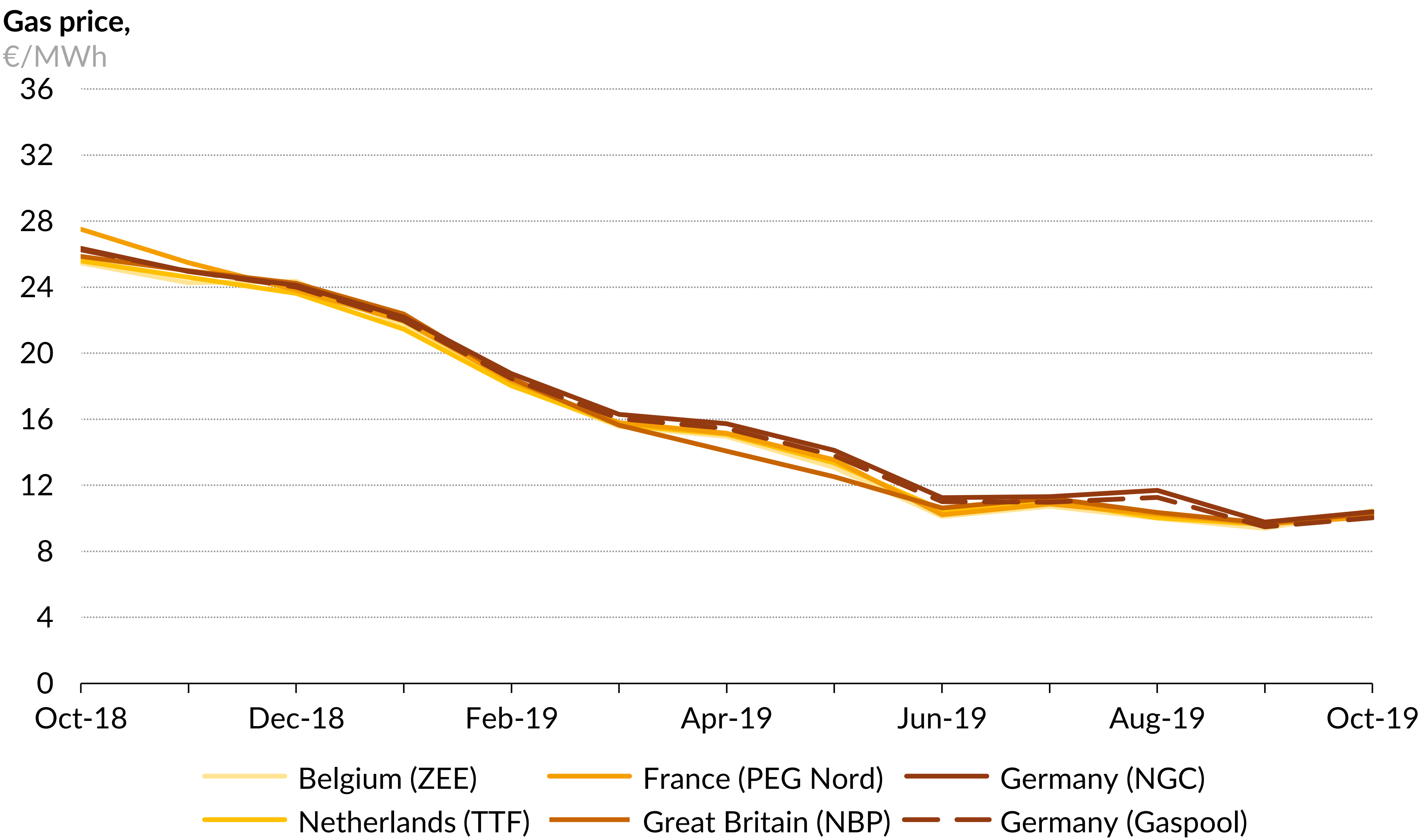
- **Pipeline imports:** NW European pipe imports were 2.2 bcm (11%) lower year-on-year. Norwegian flows saw a decrease of 1.2 bcm compared to last October, caused by more maintenance works and technical problems at offshore platforms (e.g. Troll, Kvitebjørn and Aasta Hansteen). Russian flows also were 1.1 bcm lower, with the Czech route seeing the biggest decline (0.6 bcm).

- **LNG:** NW European LNG send-outs from regasification terminals grew by 68% month-on-month to meet higher heating demand. GB saw a 48% higher utilisation rate than September, exporting 0.9 bcm more gas from South Hook and Grain into the GB network across the same time periods. Similarly, the rest of NW Europe saw higher monthly utilisation rates compared to last month.

4. **Storage:** The Netherlands saw net withdrawals of 0.2 bcm, which occurred earlier than last October, to fill the supply gap left by indigenous production. Net storage injections were down 91% year-on-year, as higher demand led to higher withdrawals than the same period last year. **See slides 12**.

Sources: Aurora Energy Research EOS, Gassco

North West European gas price development

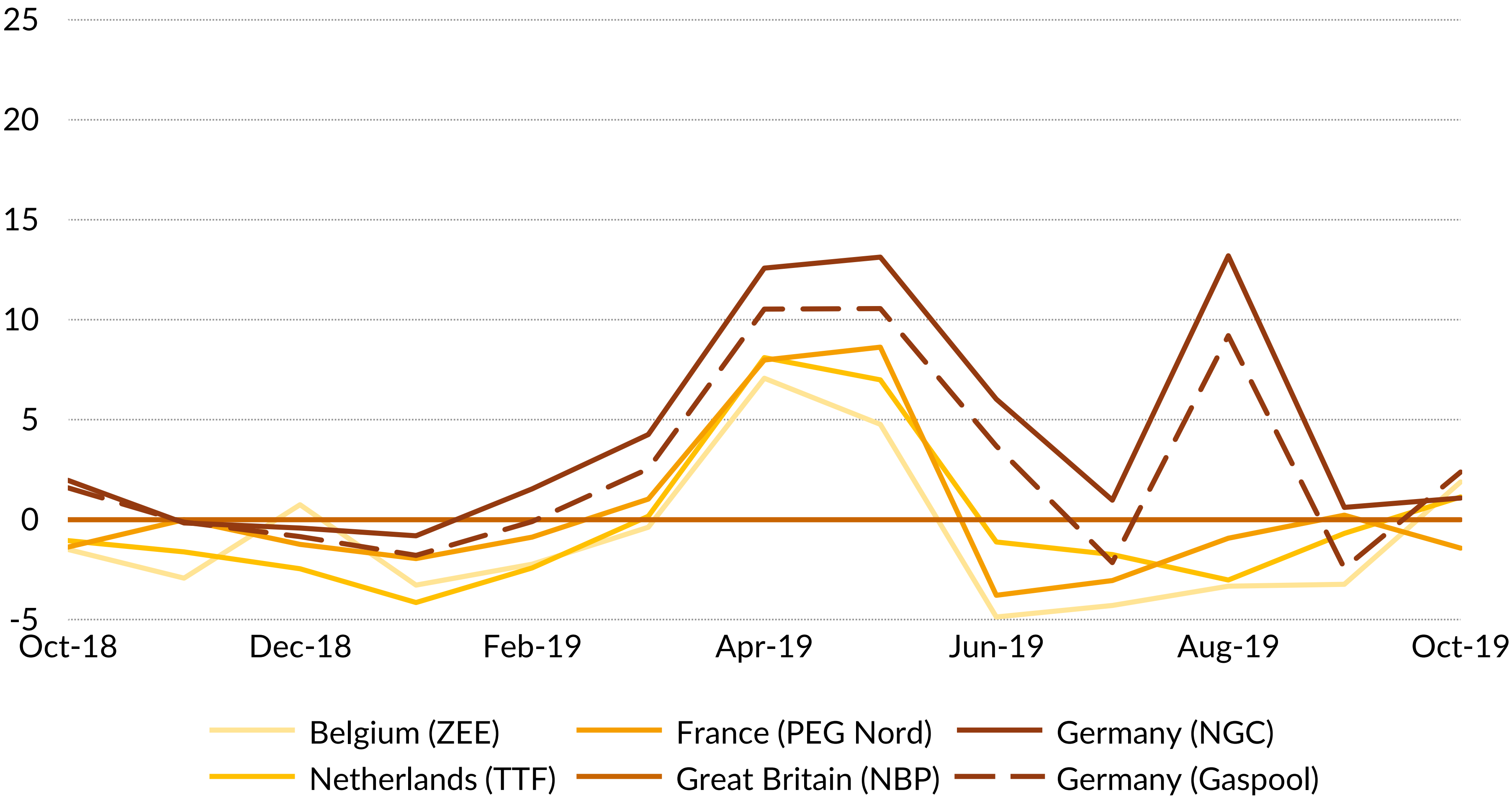


Note: Monthly prices are the averages prices of each month's daily prices. Prices are converted in € using the monthly averages of the daily exchange rates.

Sources: Thomson Reuters, Aurora Energy Research EOS

% Price spreads against NBP

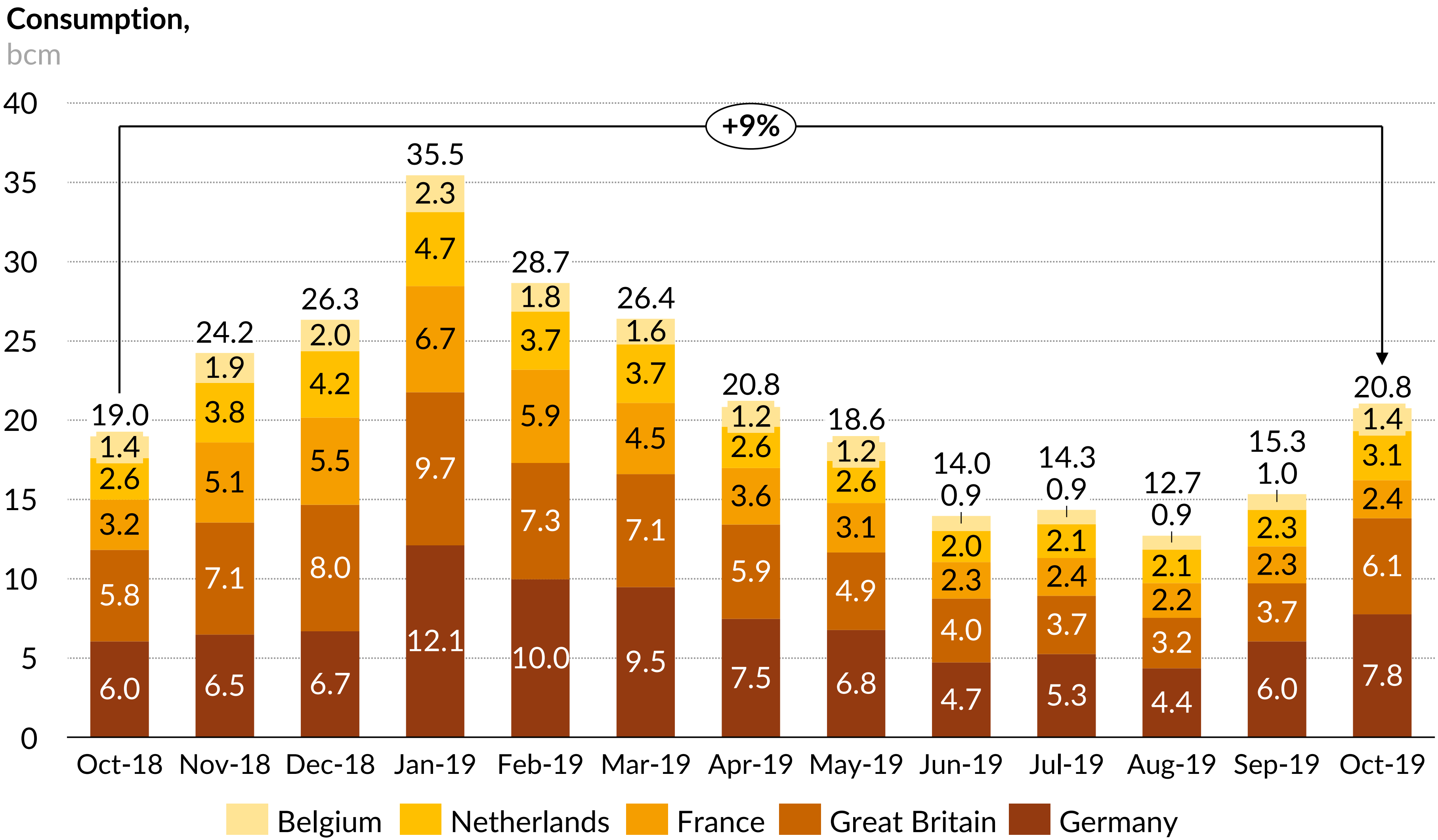
Price spread against NBP,
%



Note: Using the monthly averages prices of daily prices and the monthly averages of daily exchange rates.

Sources: Thomson Reuters, Aurora Energy Research EOS

North West Europe monthly consumption[1]

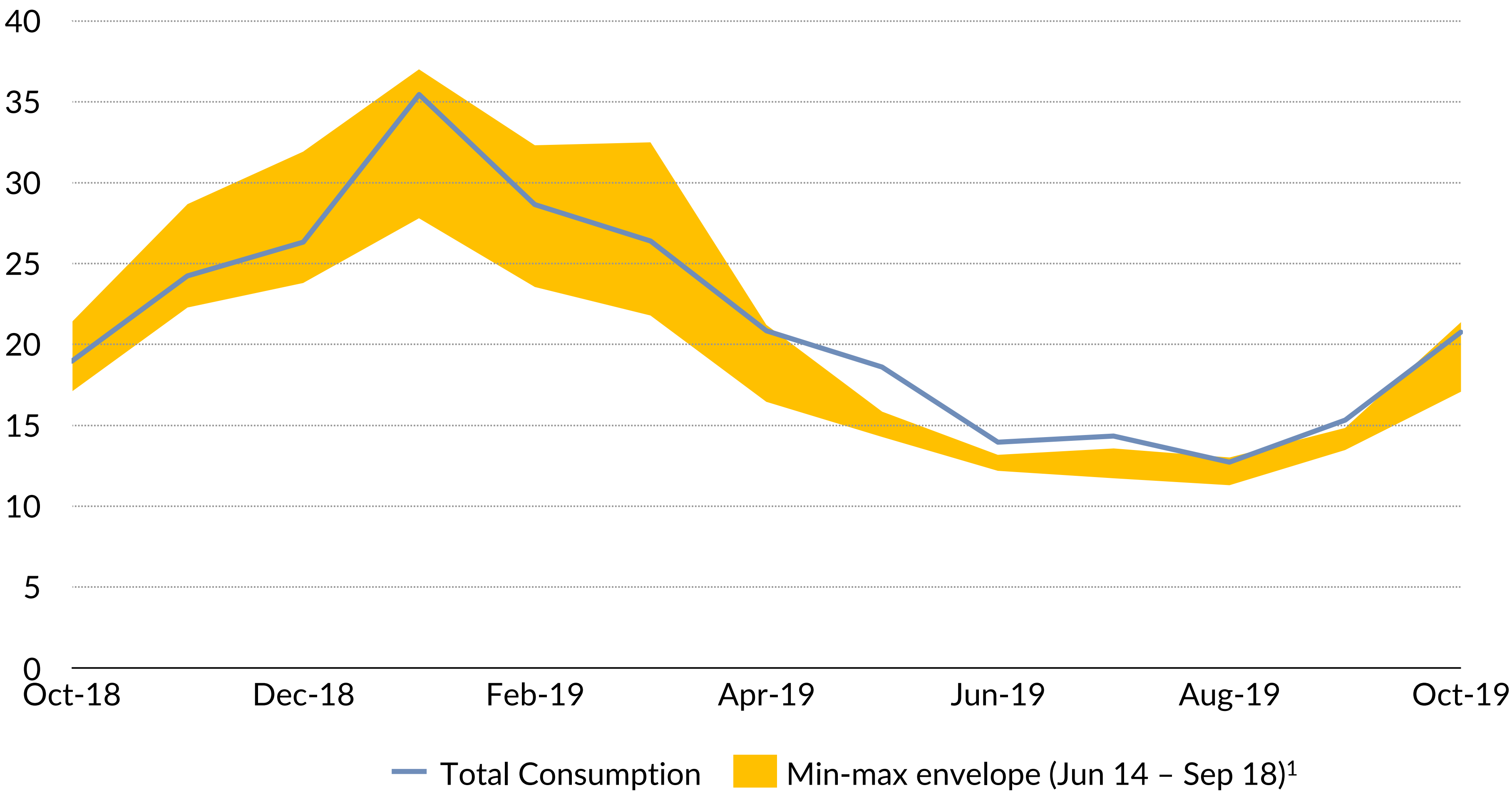


Notes 1. Consumption excludes demand from interconnectors.

Sources: Aurora Energy Research EOS

North West Europe consumption in min-max envelope

NW Europe consumption,
bcm

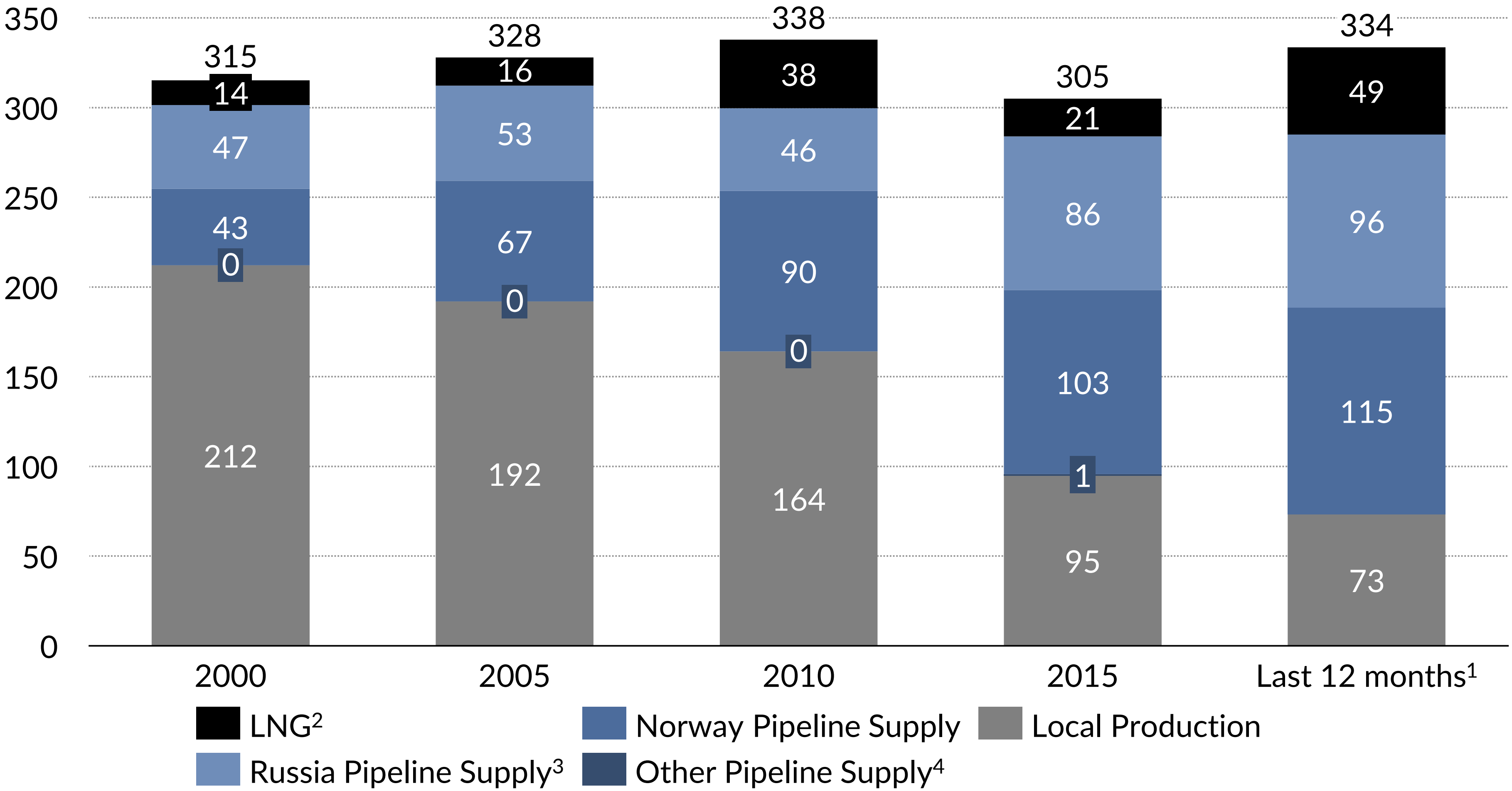


Note: 1. Envelopes are calculated by taking the maximum and minimum monthly values since June 2014.

Sources: IEA, Aurora Energy Research EOS

North West Europe annual gas supply

NW Europe supply,
bcm

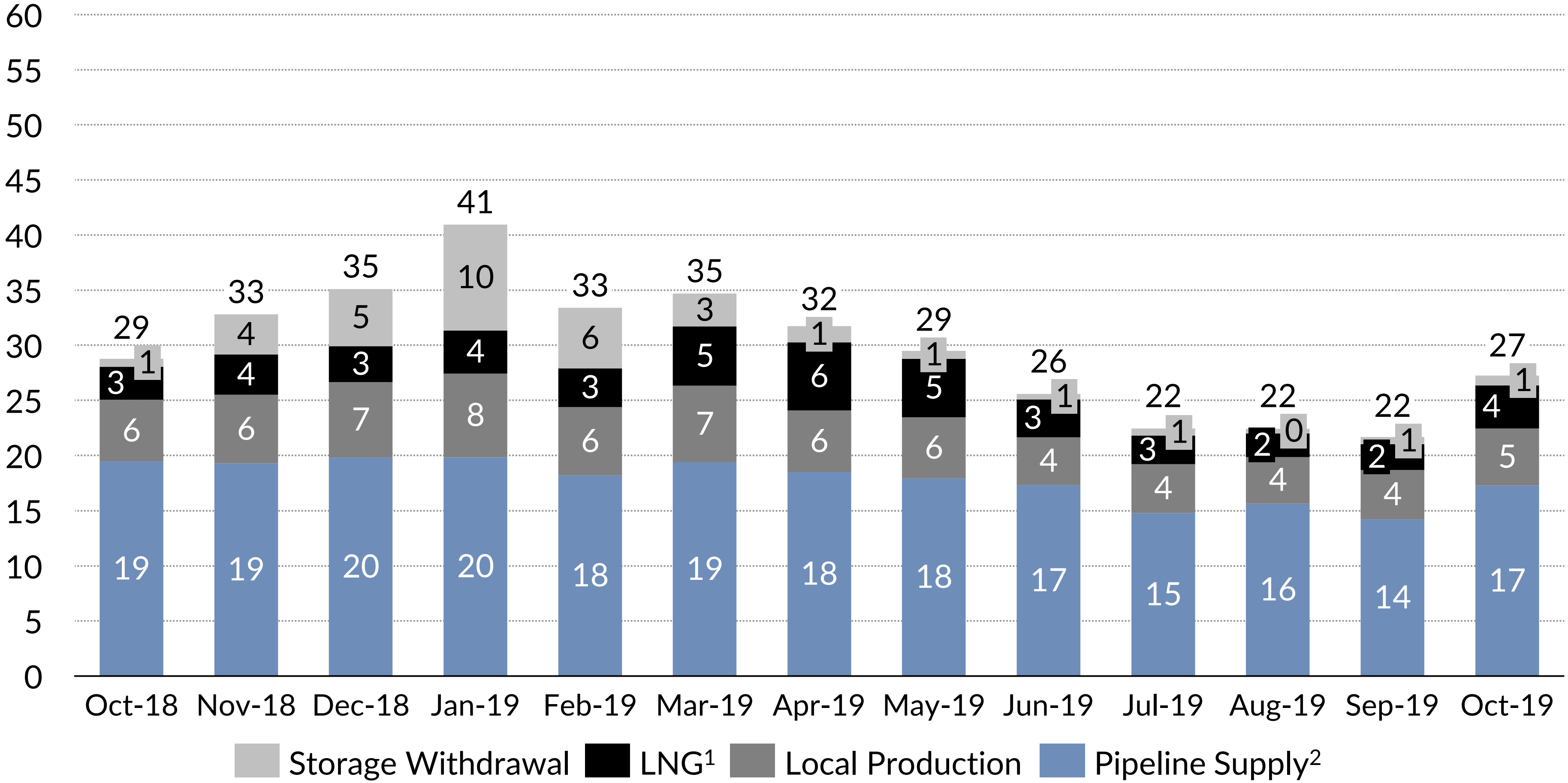


Notes: 1. Year-to-date corresponds to the last 12 months. Previous years are calendar years. 2. LNG reflects regasification send-out to the high pressure network. 3. Russia pipeline supply includes pipe imports via Poland, Czech Republic, and Austria. 4. Other pipeline supply includes Denmark, Spain and Switzerland.

Sources: Aurora Energy Research EOS, IEA

North West Europe monthly gross gas supply

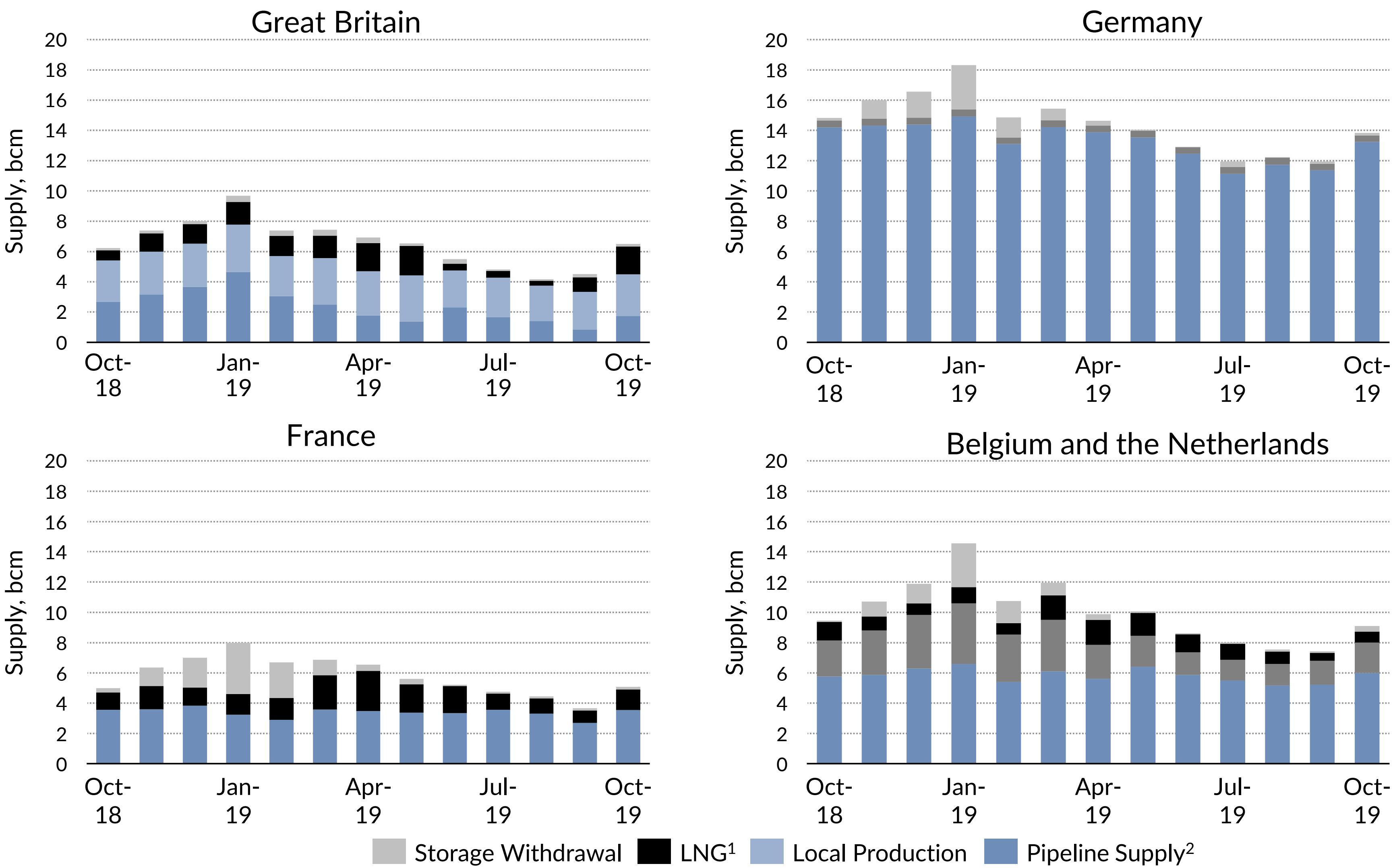
NW Europe supply,
bcm



Notes: 1. LNG reflects regasification send-out to the high-pressure network. 2. Pipeline supply is from Russia (including via Poland, Czech Republic, and Austria), Norway, Denmark, Spain and Switzerland

Sources: Aurora Energy Research EOS

Monthly gross gas supply by country

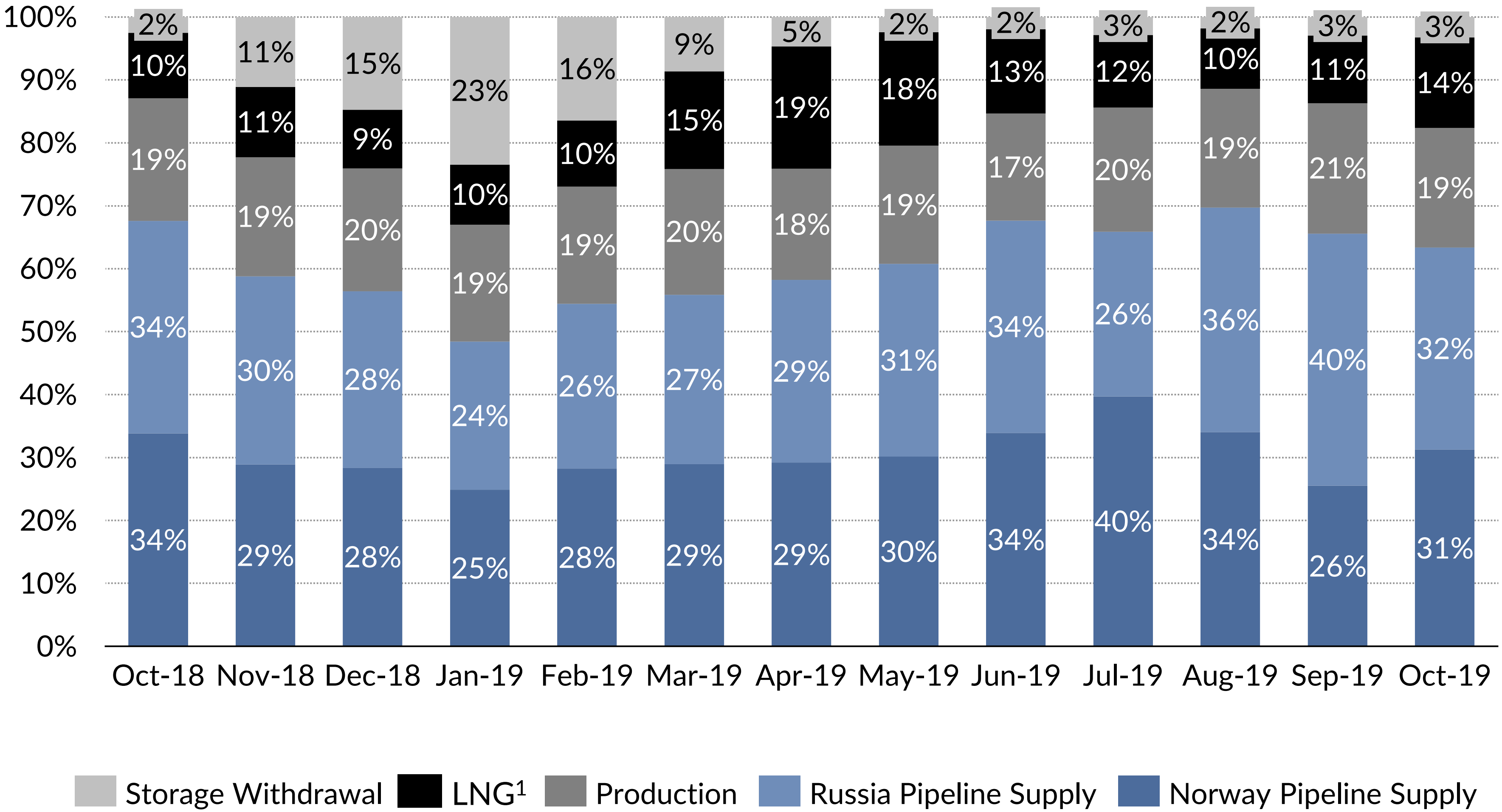


Notes: 1. LNG reflects regasification send-out to the high pressure network. 2. Pipeline supply is from Russia (including via Poland, Czech Republic, and Austria), Norway, Denmark, Spain and Switzerland

Sources: Aurora Energy Research EOS

North West Europe share of monthly gas supply

Share of gas supply,
%

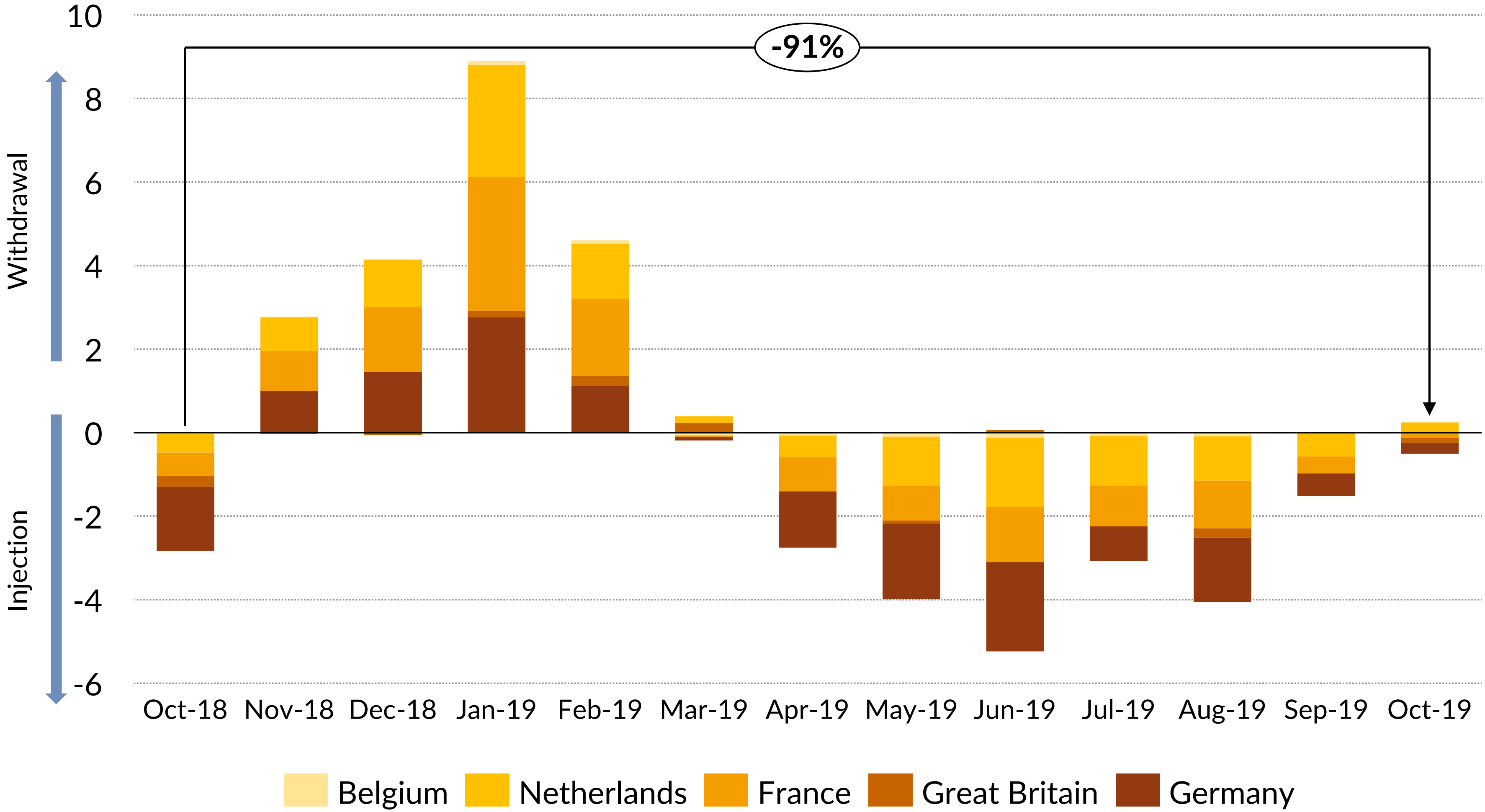


Notes: 1. LNG reflects regasification send-out to the high pressure network. 2. Russia pipeline supply includes pipe imports via Poland, Czech Republic, and Austria.

Sources: Aurora Energy Research EOS

North West Europe net gas supply from storage

Net supply from storage,
bcm



Note: Storage data is based on net daily flows.

Sources: Aurora Energy Research EOS

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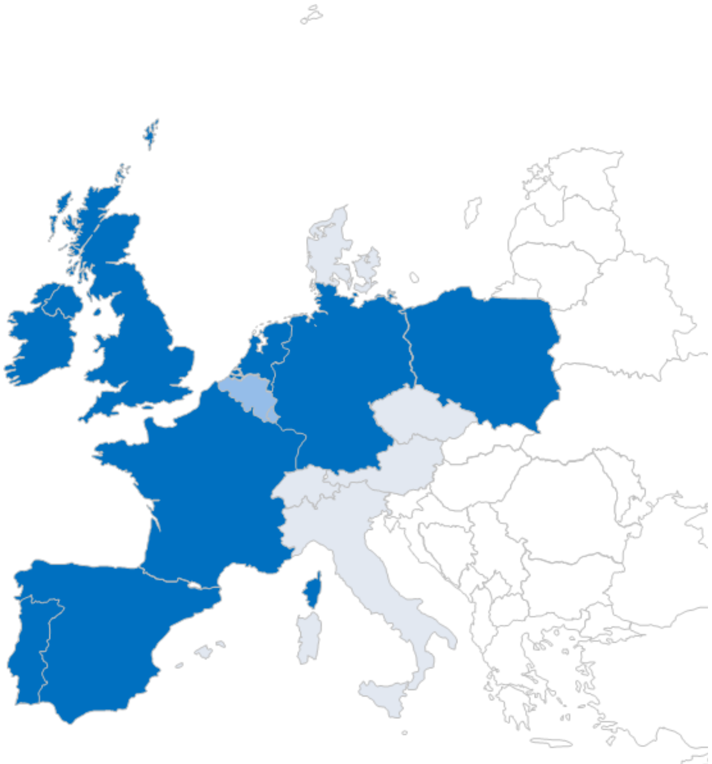

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Source: Aurora Energy Research

European Gas Market Service

Market analysis and forecasts for all participants in the European gas market

AURORA ENERGY RESEARCH

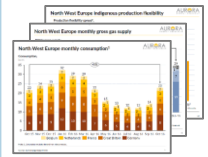
1 European Gas Market Forecasts

- European gas market development until 2040 including hub prices, seasonal and regional spreads, demand evolution, supply development within Europe and in key supplying regions, LNG and pipeline import flows
- Key modelling assumptions result from in-depth market research drawing on our unparalleled expertise across the energy, policy, environmental and financial sectors, and are further refined through a detailed consultation process across private and public sector players
- Forecasts are produced with our in-house European gas flow dispatch model that includes 430+ pipelines, all storages and LNG import facilities as well as detailed modelling of demand zones
- Comprehensive annual report (~120 pages) with full review and outlook of the market; quarterly updates (~20 pages) focusing on changes in forward prices, geopolitical and technology developments
- Additionally, a presentation with all exhibits plus underlying data in xls is provided

2 Global Energy Market Forecasts

- Aurora's long-term forecasts for oil, gas and coal markets presents a fully consistent view on fuel prices, production, and consumption by major countries and regions
- Identifies key areas of long-term uncertainty in global energy markets
- Provides central, high, low, and P10/P90 price sensitivity analyses, based on historical variation in key sources of uncertainty
- Produced with our in-house global energy market model, which provides full substitution among the commodities and regions (e.g. impact on European gas price if China's growth slumps or India builds more coal power stations)
- Our global energy market model is used to underpin BP's Energy Outlook and the scenarios they present
- The annual main report (~160 pages) provides a full outlook on the expected supply and demand balance going forward, published once a year with quarterly updates

3 Monthly market summaries



- Monthly summary on key performance parameters of the European gas market that set the market results into perspective for management to stay on top of the developments
- North West European Gas System Performance Summary: monthly snapshot of key operating characteristics of the gas market. Key statistics include hub prices, volumes, trade, suppliers market share, indigenous production flexibility and storage provision for security of supply

4 Analytics and data platform EOS

AURORA EOS

- Access to detailed historical and real-time European gas market data
- Data with daily granularity includes
  - Demand, supply and production
  - Pipeline flows and imports/exports
  - Storage utilisation and LNG sent-outs
  - Regional gas prices and commodity price data
- Data can be viewed, charted and downloaded

5 Bilateral meetings & analyst support

- Bilateral workshops with senior members and subject experts of Aurora' team to discuss Aurora's analyses and views on the market
- Short-notice support by our analysts on questions arising from our research

6 Invitation to Aurora's annual Spring Forum

- In our by-invitation-only annual Spring Forum industry leaders discuss the challenges of the energy industry of tomorrow
- Being held at distinguished venues at the University of Oxford
- Key note speakers of our 2018 Forum included Clair Perry MP (Minister State, BEIS), Magnus Hall (CEO, Vattenfall), Spencer Dale (Chief Economist, BP) and Steven Fries (Chief Economist, Shell)

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