

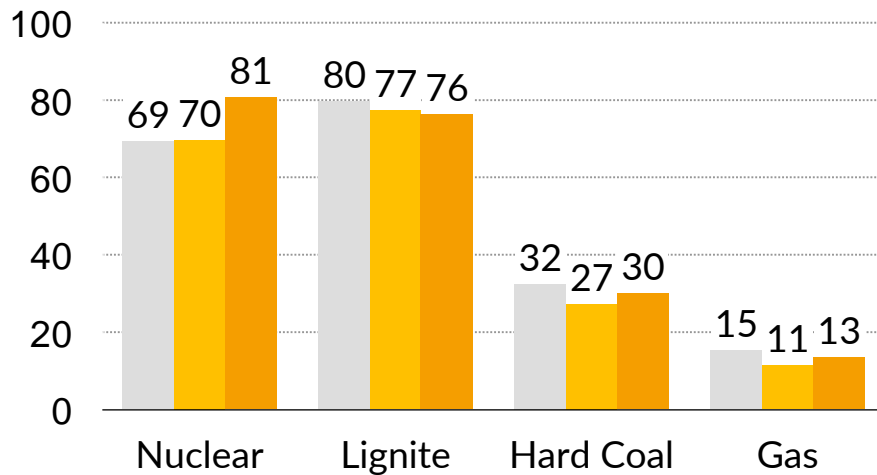


German Plant Performance Summary May 2017

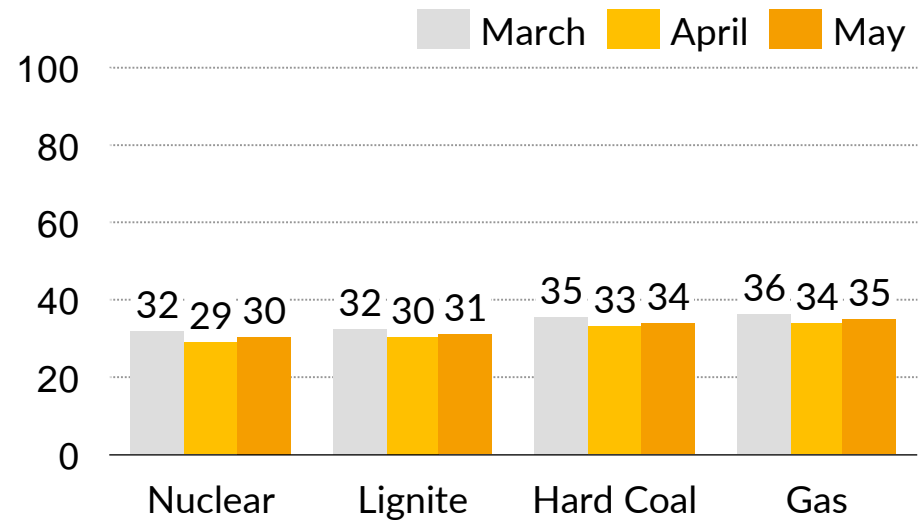
15 June 2017

Executive summary

Average load factors across technologies¹,
%, weighted by capacity



Average capture prices across technologies¹,
EUR/MWh, weighted by capacity

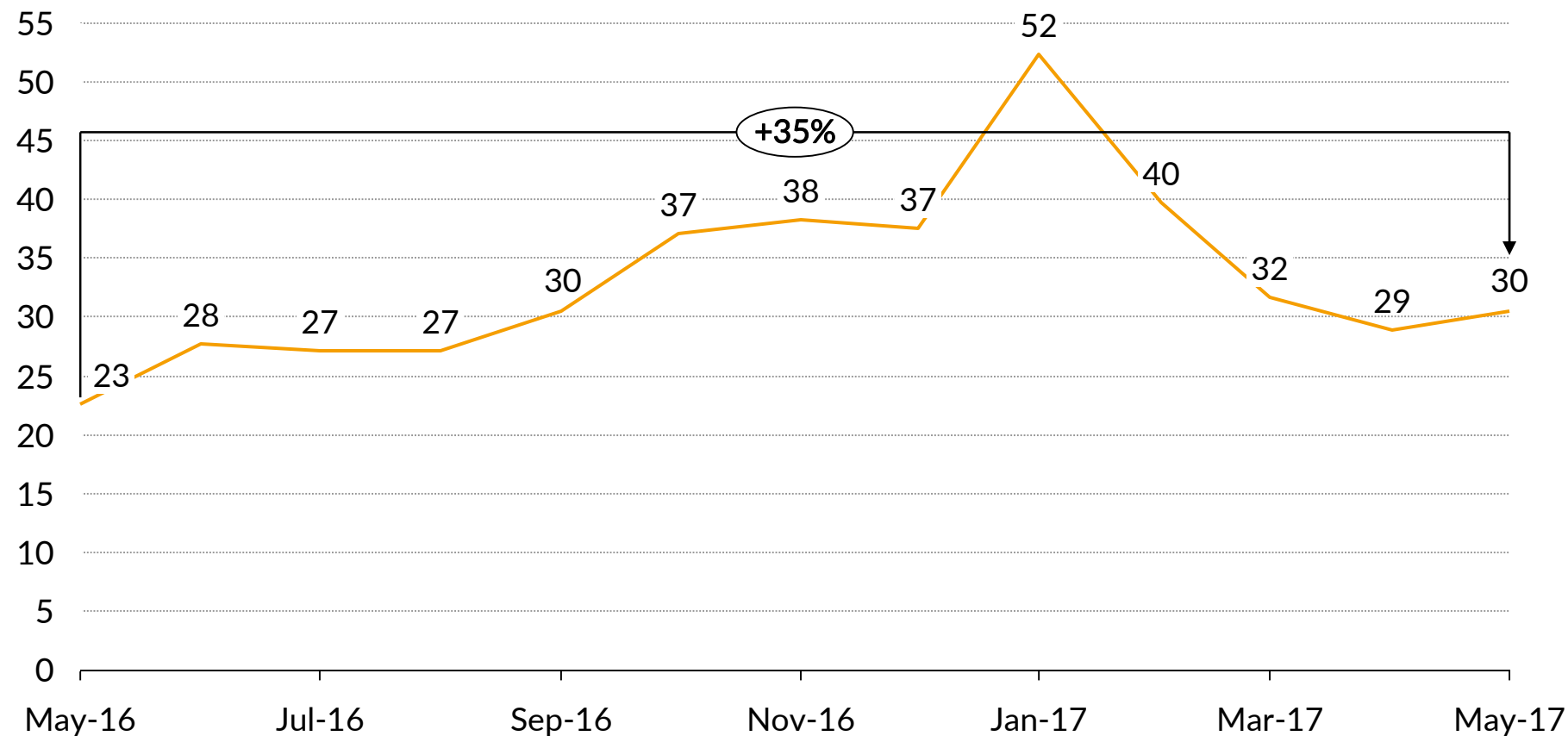


1. Compared to 04/2017, the average Phelix power price rose by 2 EUR/MWh (+6%), thereby increasing capture prices across all technologies
2. Higher prices were mainly a result of lower generation from wind and solar (-10% compared to 04/2017), which increased load factors for hard coal and gas plants, as well as additional nuclear generation stemming from Phillipsburg 2's return to the grid
3. Nuclear power plant Emsland was offline for fuel rod changes, while Phillipsburg 2 came online again in mid-May after extensive maintenance

1) Of 50 largest plants by capacity

In May 2017, power prices rose back up to 30 EUR/MWh, which represents a 35% year-on-year increase

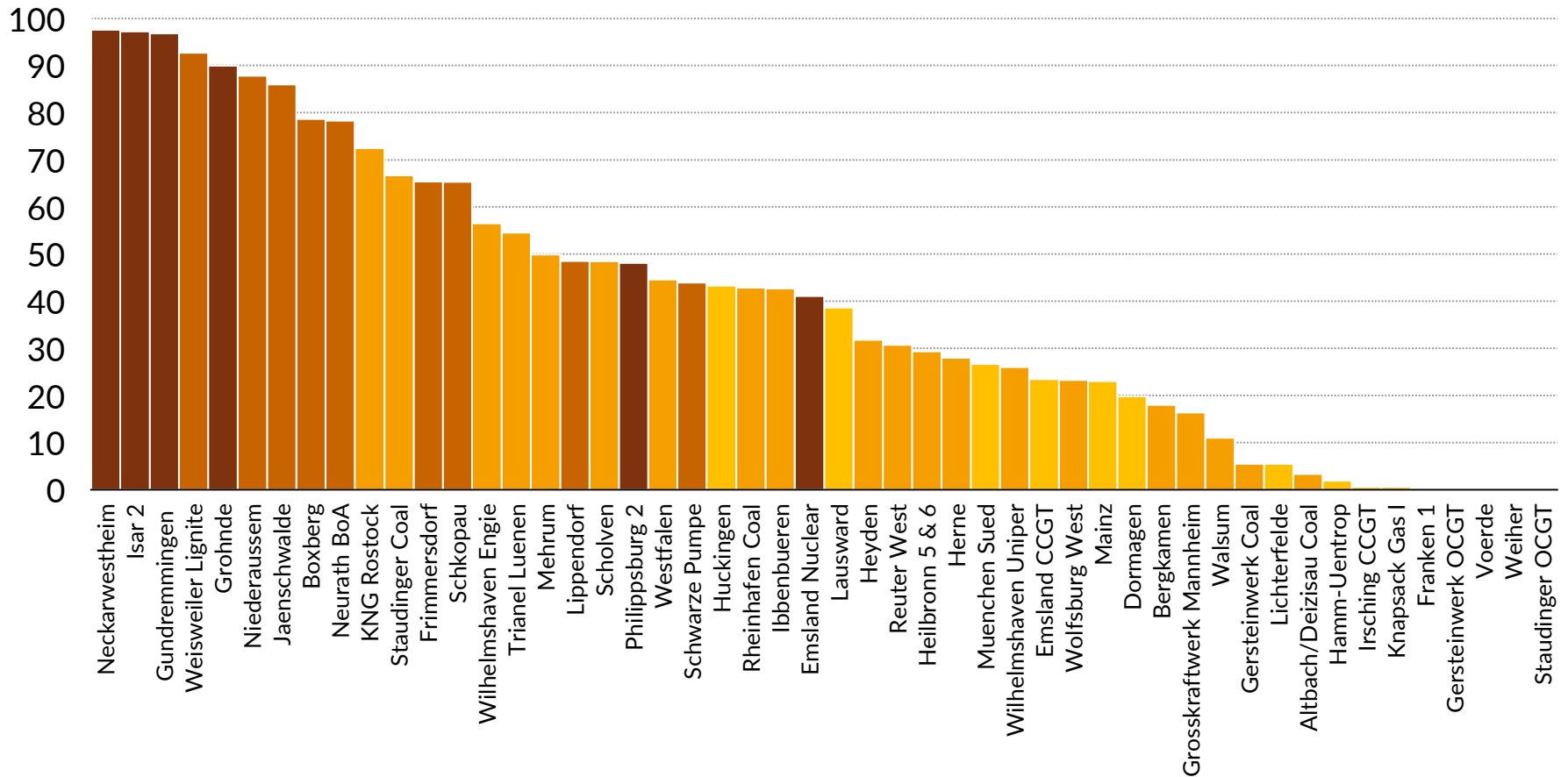
Phelix power price,
EUR/MWh



Plant utilisation – load factors by plant

Load factor,
%

■ Nuclear ■ Lignite ■ Hard Coal ■ Gas



Represents the 50 largest plants (by capacity) as reported on our EOS platform that have been active at least once in the last three months.

Please refer to the Appendix for a detailed description of the data used and categories presented.

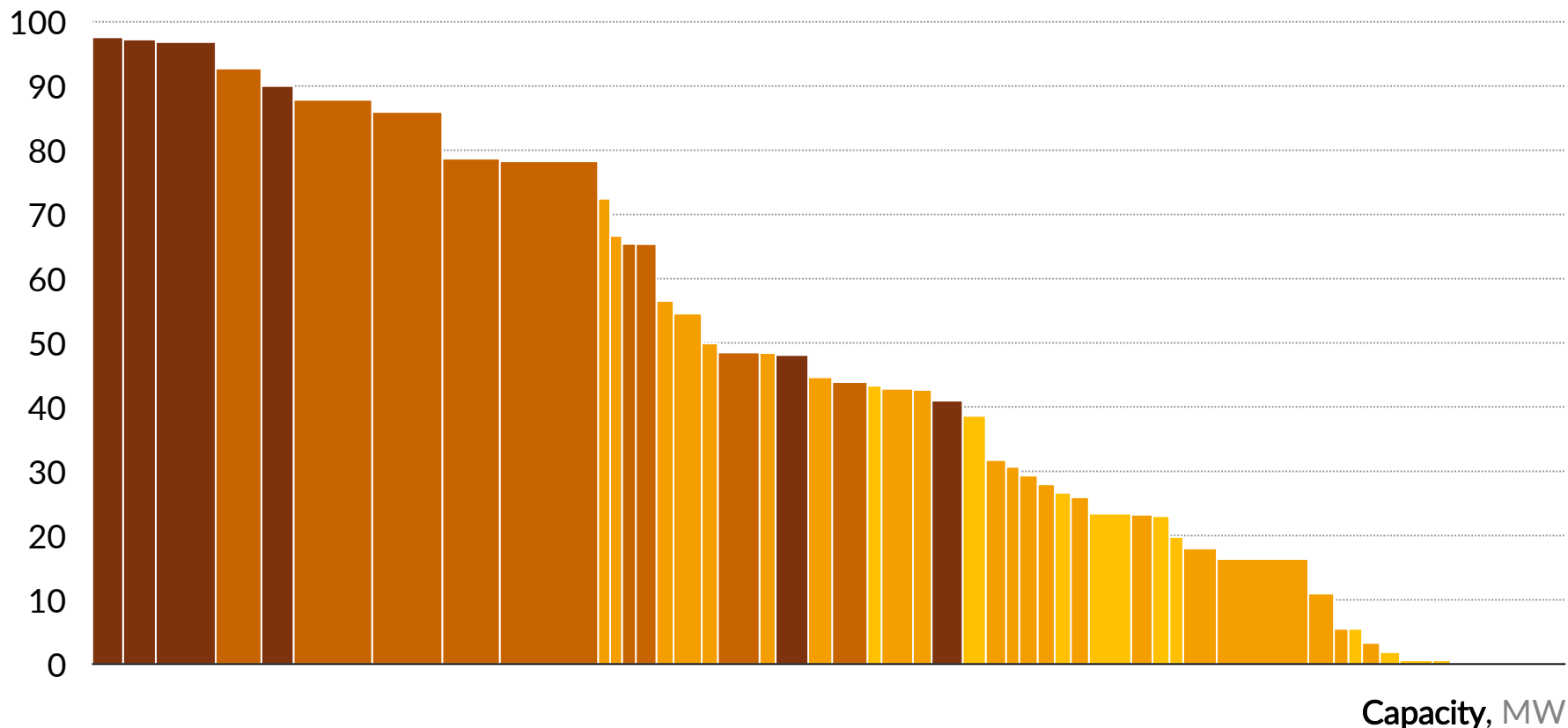
Source: Aurora Energy Research EOS as of 15/06/2017. For latest numbers, click [here](#).

Plant utilisation – load factors by plant (column width reflects capacity)

Load factor,
%

Nuclear
 Lignite
 Hard Coal
 Gas

Column width: — 2 GW – 1 GW - 500 MW



Please refer to slide 4 for plant names.

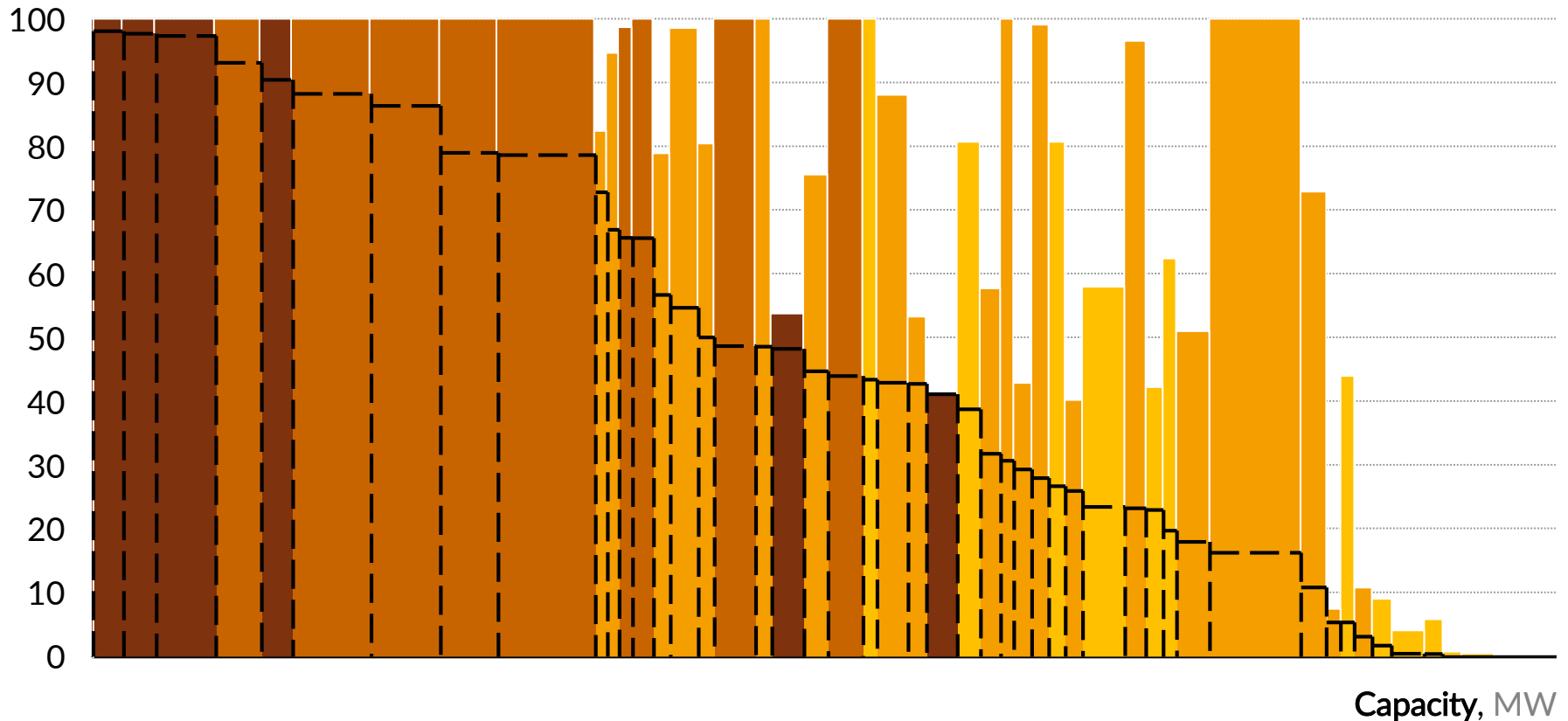
Represents the 50 largest plants (by capacity) as reported on our EOS platform that have been active at least once in the last three months

Please refer to the Appendix for a detailed description of the data used and categories presented.

Running hours versus full-load hours

Running hours,
% of total for the period

Column width: — 2 GW — 1 GW — 500 MW Full-load hours



Please refer to slide 4 for plant names.

Represents the 50 largest plants (by capacity) as reported on our EOS platform that have been active at least once in the last three months

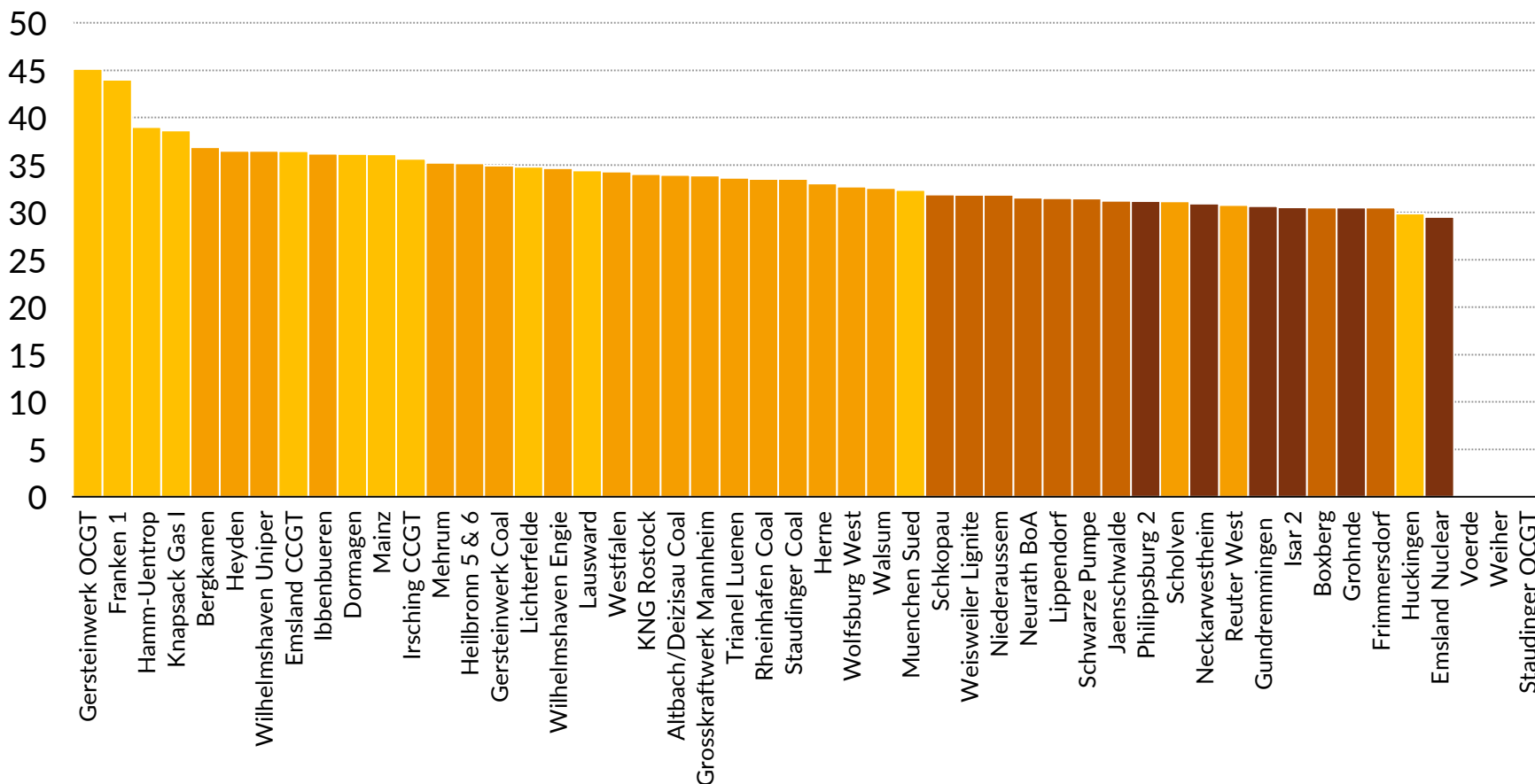
Please refer to the Appendix for a detailed description of the data used and categories presented.

Source: Aurora Energy Research EOS as of 15/06/2017. For latest numbers, click [here](#).

Capture price per MWh

Capture price,
EUR/MWh

Nuclear
 Lignite
 Hard Coal
 Gas



Uses Phelix hourly index price data.

Represents the 50 largest plants (by capacity) as reported on our EOS platform that have been active at least once in the last three months

Please refer to the Appendix for a detailed description of the data used and categories presented.

Source: Aurora Energy Research EOS as of 15/06/2017. For latest numbers, click [here](#).

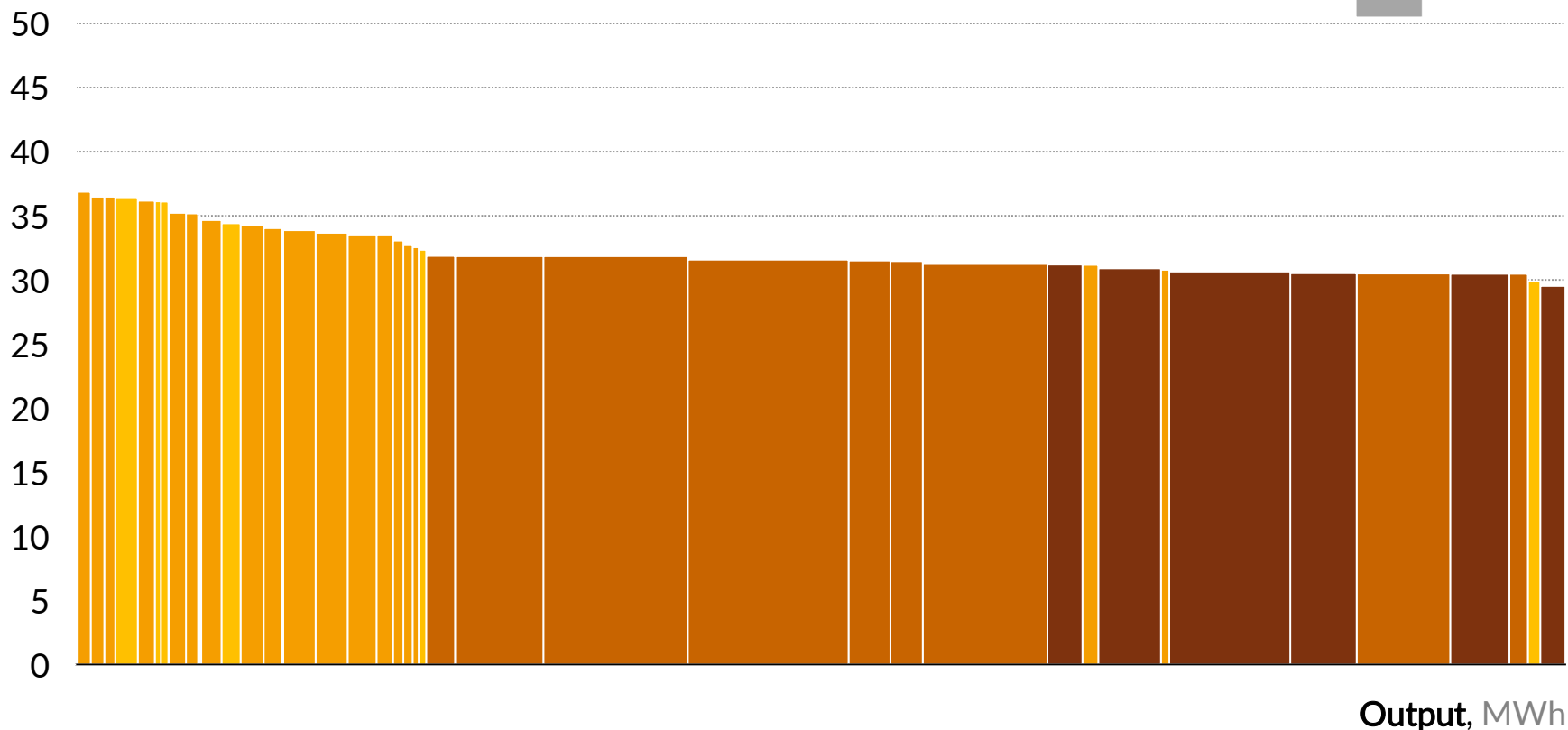
Plant-level wholesale revenues

Output × capture price per MWh

Capture price,
EUR/MWh

■ Nuclear ■ Lignite ■ Hard Coal ■ Gas

Column width: — 1 TWh — 500 GWh — 250 GWh ■ EUR 5m



Please refer to slide 7 for plant names.

Revenues calculated as the sum of products of hourly outputs multiplied by the corresponding Phelix prices. The figure does not include revenues from any other sources.

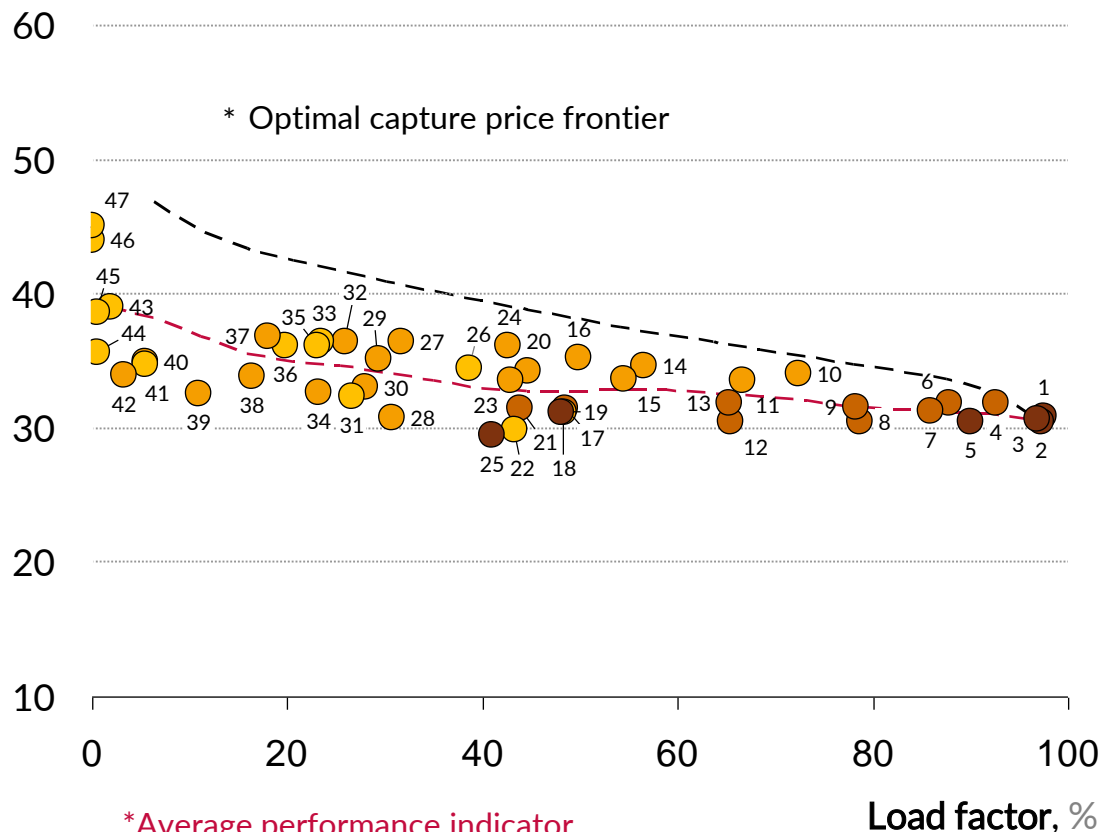
Represents the 50 largest plants (by capacity) as reported on our EOS platform that have been active at least once in the last three months

Please refer to the Appendix for a detailed description of the data used and categories presented.

Plant utilisation versus capture price – by plant

Capture price,
EUR/MWh

● Nuclear ● Lignite ● Hard Coal ● Gas



- | | |
|-------------------------------|--------------------------------|
| 1 Neckarwestheim | 25 Emsland Nuclear |
| 2 Isar 2 | 26 Lausward |
| 3 Gundremmingen | 27 Heyden |
| 4 Weisweiler Lignite | 28 Reuter West |
| 5 Grohnde | 29 Heilbronn 5 & 6 |
| 6 Niederaussem | 30 Herne |
| 7 Jaenschwalde | 31 Muenchen Sued |
| 8 Boxberg | 32 Wilhelmshaven Uniper |
| 9 Neurath BoA | 33 Emsland CCGT |
| 10 KNG Rostock | 34 Wolfsburg West |
| 11 Staudinger Coal | 35 Mainz |
| 12 Frimmersdorf | 36 Dormagen |
| 13 Schkopau | 37 Bergkamen |
| 14 Wilhelmshaven Engie | 38 Grosskraftwerk Mannheim |
| 15 Trianel Luenen | 39 Walsum |
| 16 Mehrum | 40 Gersteinwerk Coal |
| 17 Lippendorf | 41 Lichterfelde |
| 18 Scholven | 42 Altbach/Deizisau Coal |
| 19 Philippsburg 2 | 43 Hamm-Uentrop |
| 20 Westfalen | 44 Irsching CCGT |
| 21 Schwarze Pumpe | 45 Knapsack Gas I |
| 22 Huckingen | 46 Franken 1 |
| 23 Rheinhafen Coal | 47 Gersteinwerk OCGT |
| 24 Ibbenbueren | |

*Please refer to the Appendix for the definitions of optimal capture price frontier and average performance indicator.

Plants marked in bold have capture prices that lie above the average performance indicator (API).

Represents the 50 largest plants (by capacity) as reported on our EOS platform that have been active at least once in the last three months. Some of these plants were not producing this month and are therefore not shown here.

Data used:

1. Output values used in this summary reflect the sum of the actual production values of generating units of a given plant as reported on our EOS platform. These disclosures are made by market participants pursuant to Regulation (EU) No 1227/2011 on Wholesale Energy Market Integrity and Transparency.
2. Capacity values used in this summary reflect the sum of capacities of individual units, as reported on our EOS platform that have been active over the last three months. They reflect long-term capacities and exclude temporary fluctuations due e.g. to plant failures or scheduled maintenance.
3. Prices used in this summary are from the Phelix hourly index product.

Categories presented:

1. Full-load hours represent the plants' load factors, calculated as the ratio of the output produced in a given month to the maximum possible output given the plants' capacity.
2. Running hours represent the proportion of time in a given month when a plant has been active, i.e. when it produced output greater than zero.
3. Capture prices (or average output-weighted prices) are calculated as an average of Phelix hourly prices per MWh weighted by the plants' corresponding hourly outputs for all periods.
4. Optimal capture price frontier represents the set of highest possible price, in EUR/MWh, that a plant could theoretically capture at any given load factor in a given month. For example, for a load factor of 20%, the frontier indicates the highest average achievable capture price given this load factor, i.e. the average of the highest 20% of prices in a given month.
5. Average performance indicator represents the locally weighted expectation of capture price conditioning on load factor.

German Power Market Service

Market analysis and forecasts for all participants in the German power market

What's included in the subscription package?

1 Quarterly German Power Market Forecasts



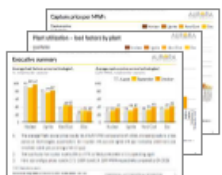
- German power market development until 2040 including prices, price shape, spreads, capacity and generation mix development, capture prices for all technologies
- Detailed review of policy and regulatory framework, including a discussion of key policy uncertainties
- Forecasts are provided under three scenarios (central, low, high) plus sensitivities of key power price drivers and selected scenarios on key policy uncertainties (e.g. coal closures and reaching the Climate Action Plan targets)
- Highly granular description of underlying assumptions and unrivalled level of transparency
- Comprehensive annual report (~150 pages) with full review and outlook of the market; quarterly updates (~50 pages) focus on changes in policies, commodity prices and technology
- Additionally, a presentation with all exhibits plus underlying data in Excel is provided

2 Quarterly Global Energy Market Forecasts



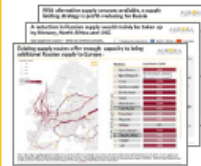
- Aurora's long-term forecasts for oil, gas and coal markets presents a fully consistent view on fuel prices, production, and consumption by major countries and regions
- Identifies key areas of long-term uncertainty in global energy market fundamentals
- Provides central, high, low, and P10/P90 price 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 decides to invest heavily in coal power stations)
- Our global energy market model is used to underpin BP's Energy Outlook and the scenarios they present.
- The 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 German power market that set the market results into perspective for management to stay on top of the developments
 - *German Power Plant Performance Summary*: monthly snapshot of financial and operating performance for individual plants on the German electricity grid, including revenues and profits, outputs, capacities, capture prices and load factors
 - Further summary reports to come throughout 2017

4 Strategic insight reports



- Regular in-depth analysis to provide unrivalled insight on critical topics for the German power industry – prepared in connection with the Group Meetings
- Recent topics covered:
 - *Closing the Emissions Gap: Germany's Climate Policy Options in the Power Sector & German balancing market (Mar 2016)*
 - *Russian gas exports to Europe & option value of plants (Jun 2016)*
 - *European market integration & Distributed and flexible capacities (Sep 2016)*
 - *Market zone splitting & Decentralised and flexible capacities (Dec 2016)*
- At least 8 such reports are published per annum

5 Group Meeting participation



- Our subscribers participate in our regular Group Meetings to discuss highly relevant topics to the industry
- In collaboration with our subscribers, we select the topics, prepare in-depth analysis, present our views & implications, and invite the participants to challenge them
- Future meetings are planned on (indicative):
 - *Continuing our research programme on "Distributed & flexible capacities"*
 - *Bidding strategies in auctions for renewables*
 - *Consumer prices & development of grid charges*
 - *LNG market & value of flexibility in an oversupplied market*
- Participants are all major German power market players (typically chief economists, heads of strategy and business development) including all major generators, oil & gas majors, Stadtwerke, investors, grid operators plus BMWi, BMUB and EU Commission
- 4 meetings are held per year in Berlin

6 Analytics and data platform EOS



- Access to detailed historical and real-time German power market data
- Data includes power station-specific output, load factors and margins/capture prices, power price and commodity price data
- Data can be viewed, charted and downloaded

7 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

8 Invitation to Aurora's annual Spring Forum



- In our by-invitation-only annual Spring Forum in Oxford industry leaders discuss the challenges of the energy industry of tomorrow
- Confirmed key note speakers include Ben van Beurden (CEO, Shell), Iain Conn (CEO, Centrica), Frank Mastiaux (CEO, EnBW) and Patrick Graichen (CEO, Agora)

For more information and pricing, contact
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