



Impact of Coronavirus on European energy markets

Weekly tracker for 20th May 2020

Update for week ending 17th May:¹

- The number of new **reported COVID-19 cases and deaths** saw a persistent decline across Europe, as lockdown restrictions were eased in many countries
- **Crude oil futures** rose further on global production cuts and signs of a recovery in fuel demand
- **NBP Gas futures** for 2020 declined further due to high storage inventories and weak demand
- **EUA Carbon prices** continue to hover below €20/tonne – around 20% below pre-COVID levels.
- **Power demand** recovered across many European countries as restrictions are further relaxed, but still remains weak relative to the same period last year.
- **Power prices** declined across much of continental Europe, remaining on average 30% - 40% lower than pre-COVID levels.
- Germany has seen record instances of **negative price hours** in 2020. This was caused by high wind in February, and the effect of COVID restrictions in reducing power demand from March onwards.

1. Comparisons to previous week unless stated otherwise

Aurora provides data-driven intelligence for the global energy transformation



3 Offices

Oxford Berlin Sydney



120+
experts



250+
subscribers



75+
transactions in 2019



COVID-19 Forecast Report

Scenario analysis for European power markets



Comprehensive scenario report and forecast dataset for



1

Recent impact of COVID-19 on European power markets

- Analysis of impacts on global economies
 - What is the impact on recent growth?
- Analysis of impacts on global financial markets
 - How are utility stocks performing?
- Analysis of impacts on power markets across Europe
 - How are power prices developing?
 - How is power demand evolving?

2

Drivers and assumptions of changes and scenario design

- Detailed description of framework and scenario design
- Economic Scenarios:
 1. Mild Global and European Recession
 2. Severe Global and European Recession
 3. Severe Global Recession and European Depression
 4. Global and European Depression
- Forecast and scenario drivers include demand, supply, commodity prices, lockdown duration, and investment/financing

3

Forecast and implications of COVID-19 impact

- COVID-19 impact on power prices, generation mix, capacity additions and retirement, asset profitability and carbon emissions
- Asset valuation impact compared to stock market declines
 - How will individual assets perform?
- Industry and technology winners and losers
- Implications for security of supply
- Risk of stranded assets
- All forecast data available in Excel

We are pleased to offer a reduced rate for Aurora subscribers

In addition, we offer bespoke services, including portfolio stress testing, transaction support and board briefings

For more information, please contact **Client Support**
To pre-order, please use the form on our web page



clientsupport@auroraer.com



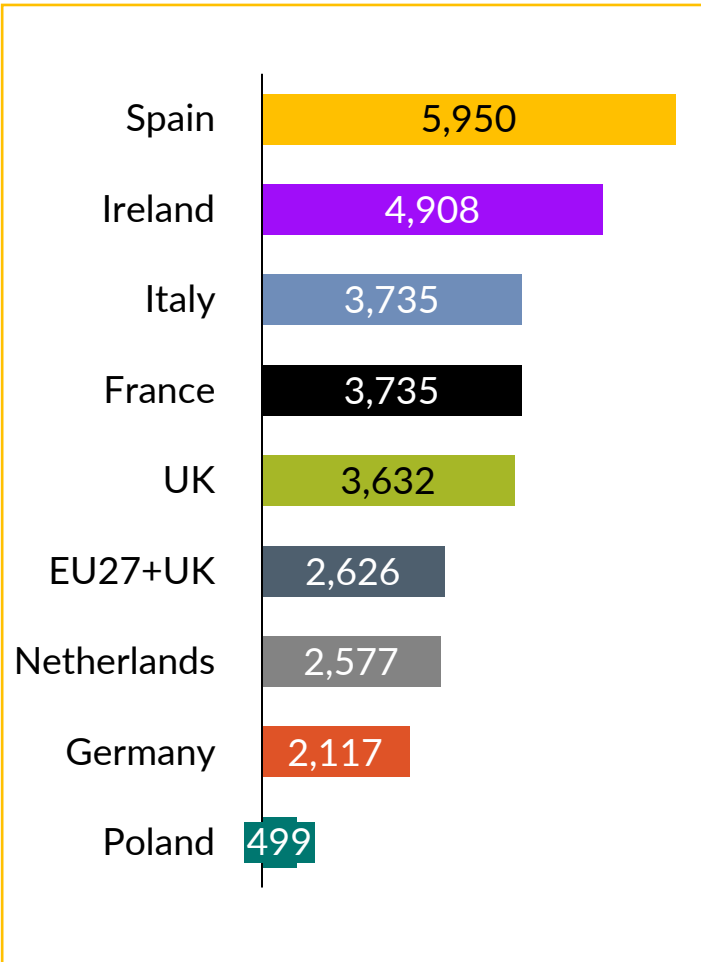
+49 (0) 30 120 84969 | +44 (0) 7741 909078

Contents

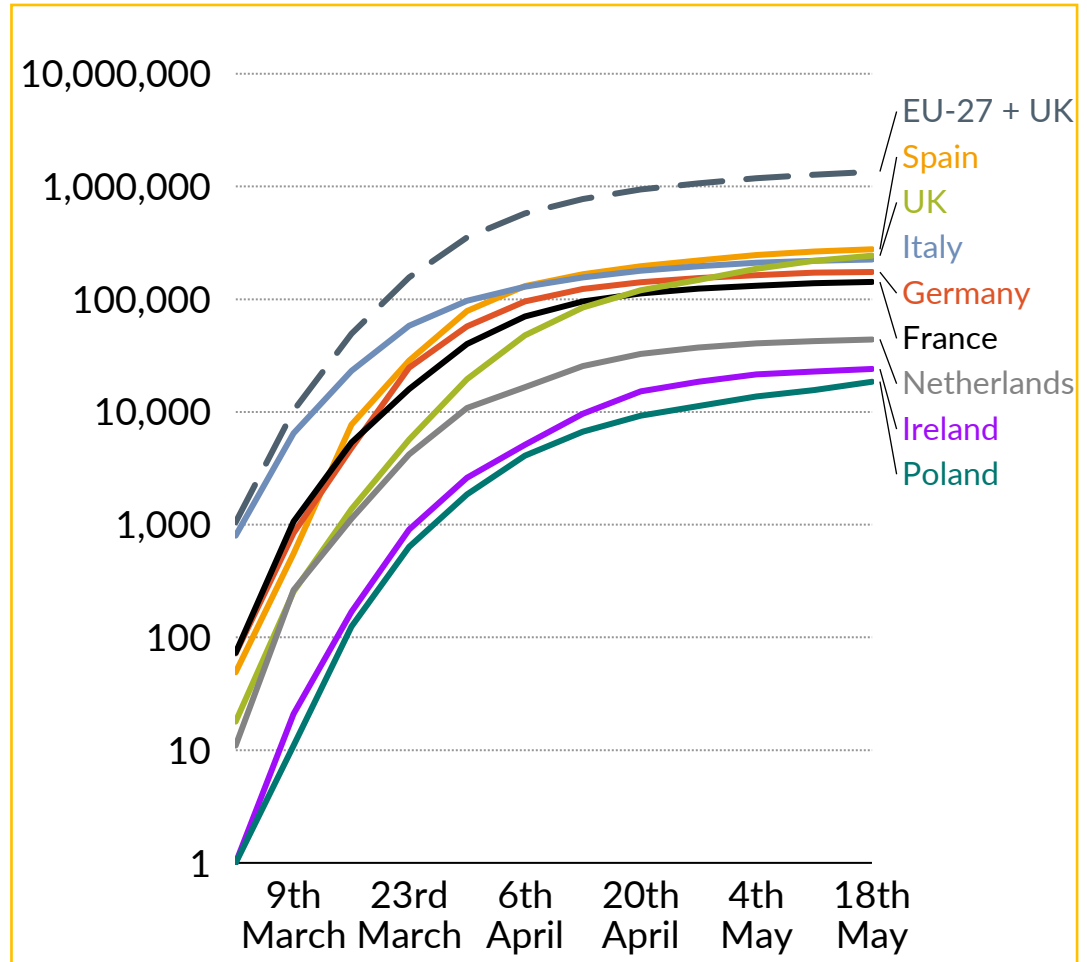
1. COVID-19 reported cases
2. COVID-19 impact on European crude oil, gas and carbon markets
3. COVID-19 impact on European power markets

Total number of COVID-19 confirmed cases exceeds 1.3 Million across Europe

Total cases per 1 million population¹²



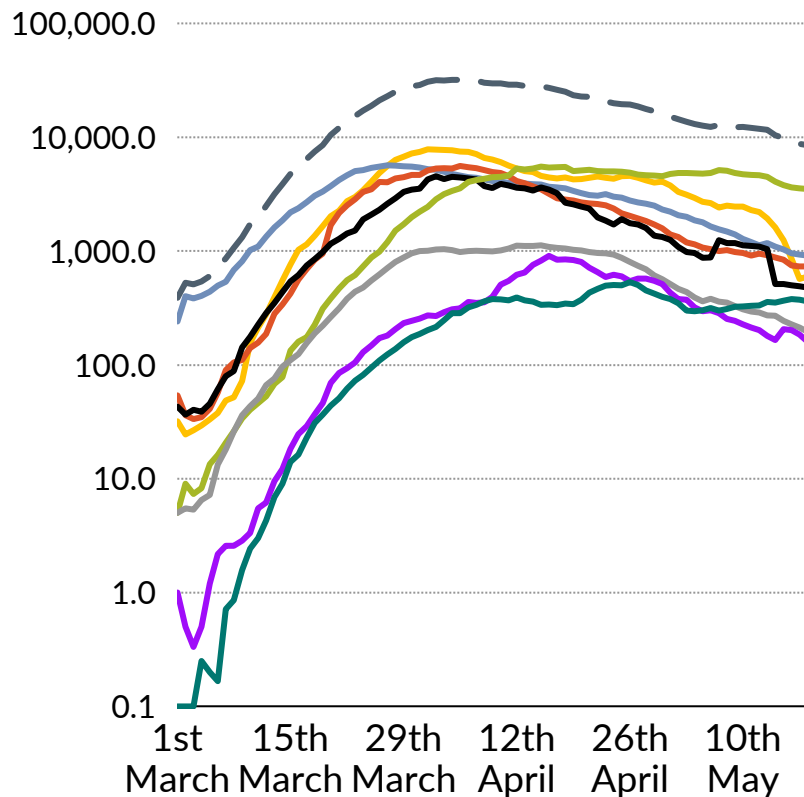
Total number of reported cases¹²



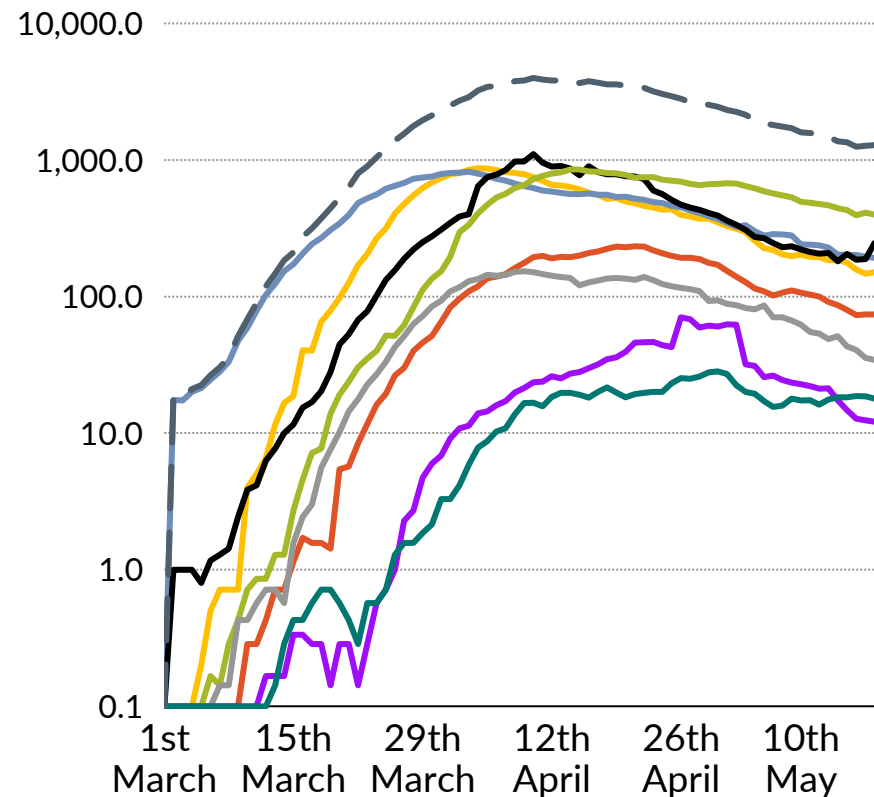
1. Chart is in log scale. 2. Data to 18^h May

Most European countries have seen a sustained decrease in number of new COVID-19 cases and deaths

Daily increase in reported cases¹



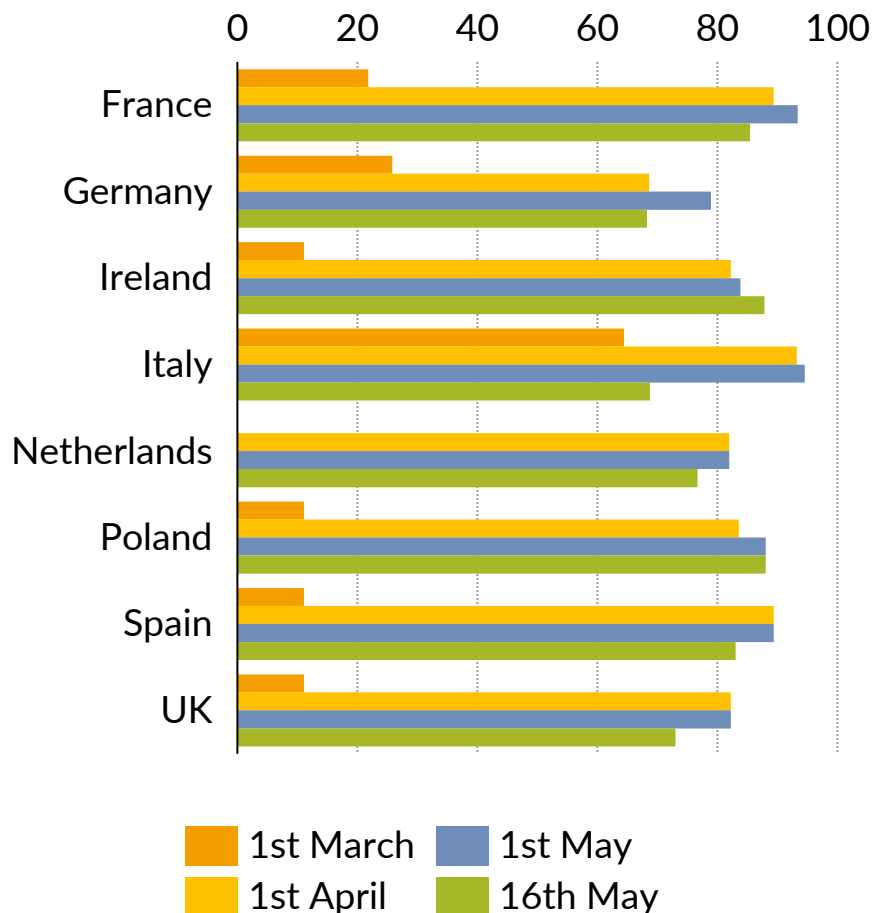
Daily increase in COVID-related deaths¹



1. Chart is in log scale. Rolling 7 day average.

COVID restrictions have been loosened in many European countries over the last fortnight

COVID stringency Index,
Index (0-100)



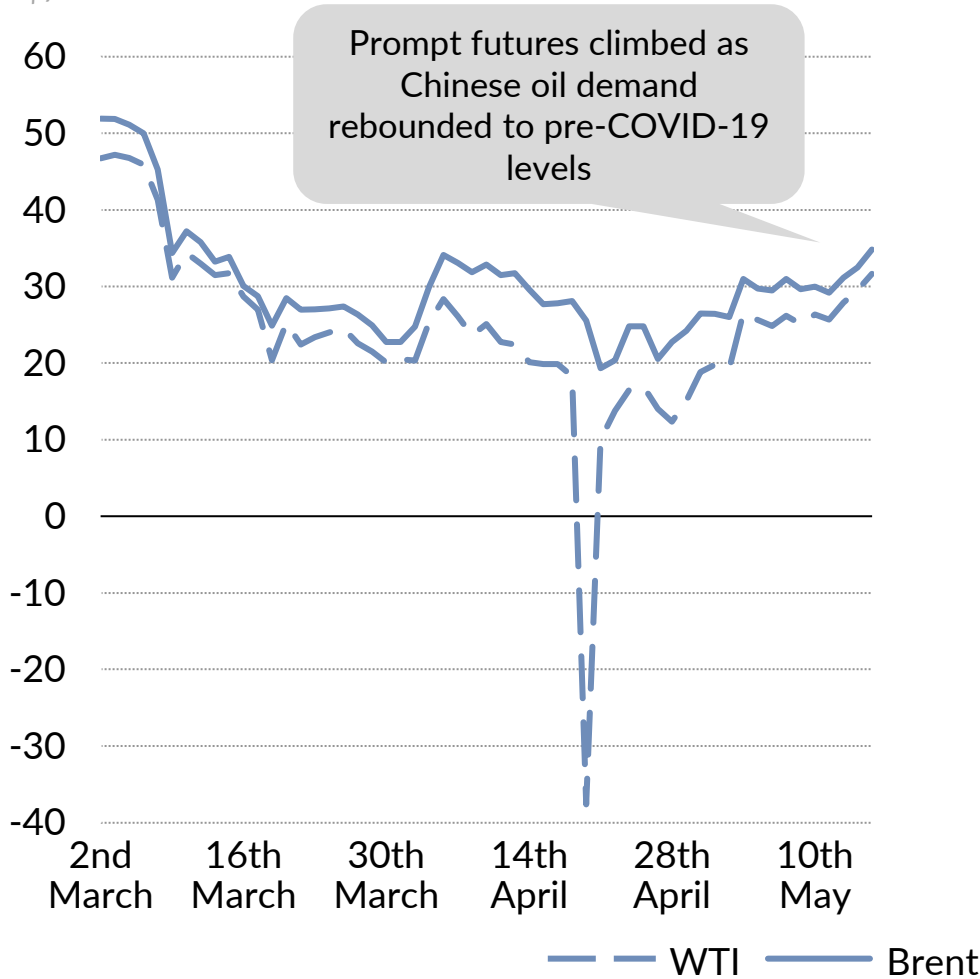
Country	Changes to restrictions
France	Some schools, shops & public amenities reopened
Germany	Shops and schools allowed to reopen already
Ireland	Some shops reopen from 18 th May
Italy	Some shops & factories reopened from 4 th May; schools closed until Sept
Netherlands	Primary schools reopened 11 th May; bars/restaurants closed until 20 th May
Poland	Retail & leisure premises reopened on 4 th May; schools reopen 24 th May
Spain	Some small businesses, bars and restaurants reopened
UK	Construction and manufacturing operations partially resumed; primary schools to open for selected years from 1 st June

Contents

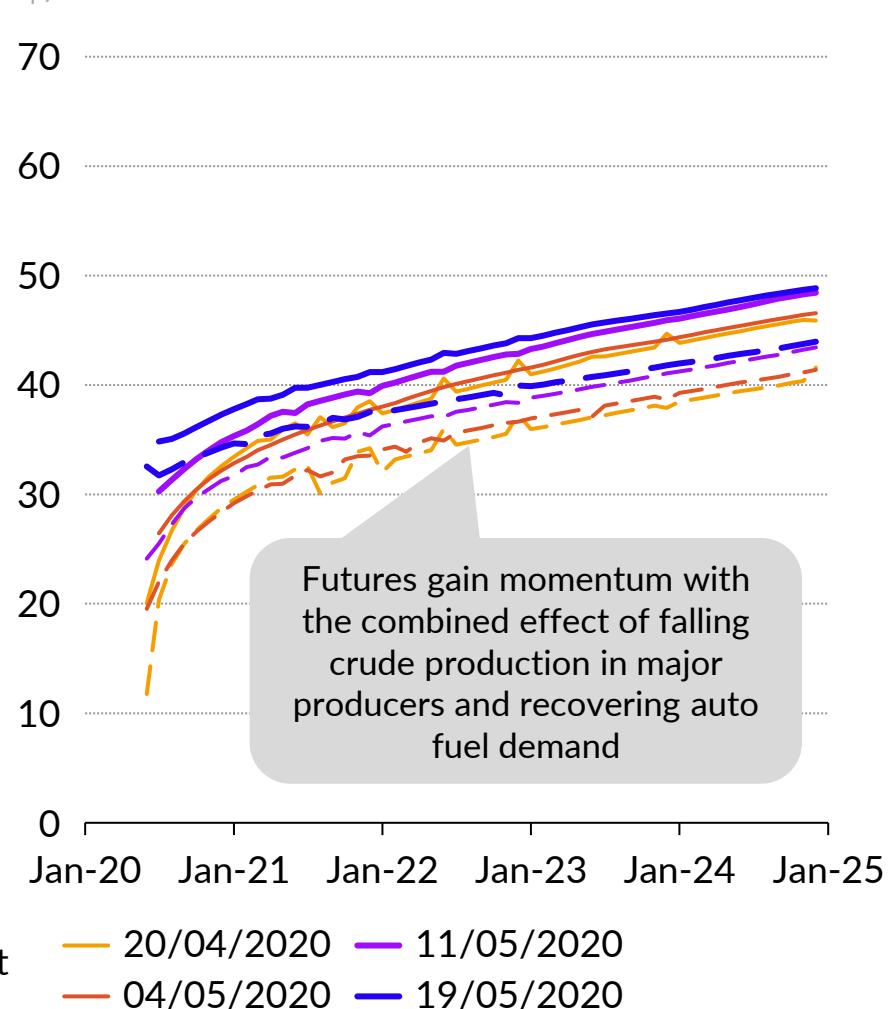
1. COVID-19 reported cases
2. COVID-19 impact on European crude oil, gas and carbon markets
3. COVID-19 impact on European power markets

Oil futures continued to recover, supported by ongoing production cuts and easing lockdown restrictions

Prompt crude oil futures¹,
\$/bbl



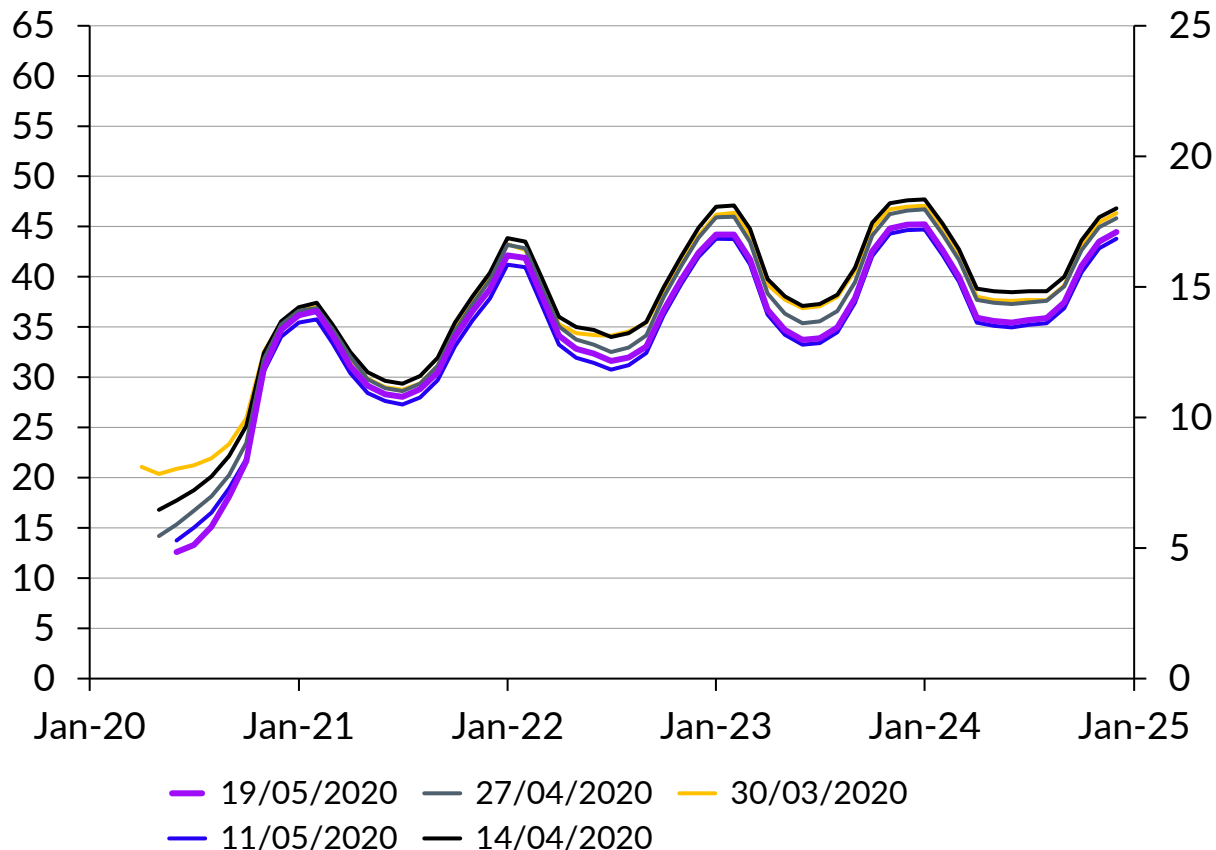
Crude oil futures,
\$/bbl



NBP gas futures remained in a bearish trend due to muted demand

Average monthly
NBP gas futures,¹
pence / therm

Average monthly
NBP gas futures,
€/MWh

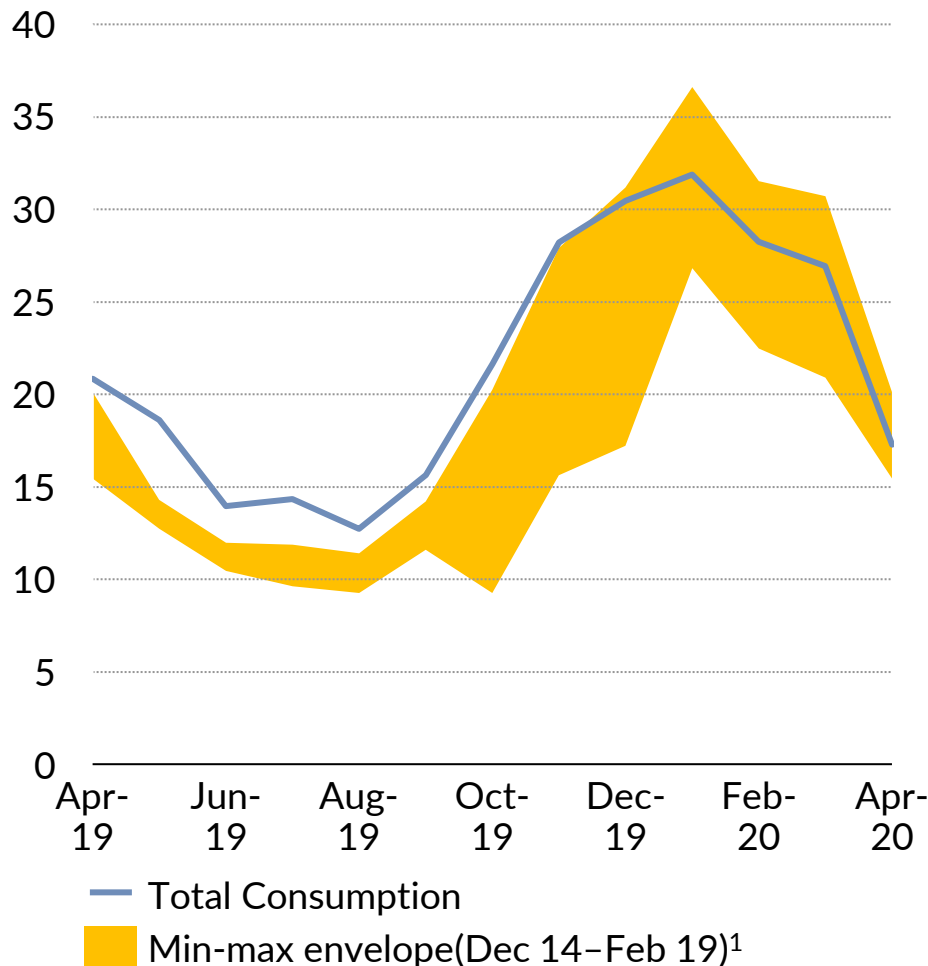


- The front part of the NBP futures curve was further hit due to limited storage injection driven by full inventories and warm weather
- But this decline is in part offset by the upside risk, caused by potential interruption on Russian gas flows via the Yamal pipeline as Poland will terminate the transit deal with Russia in May without renewal

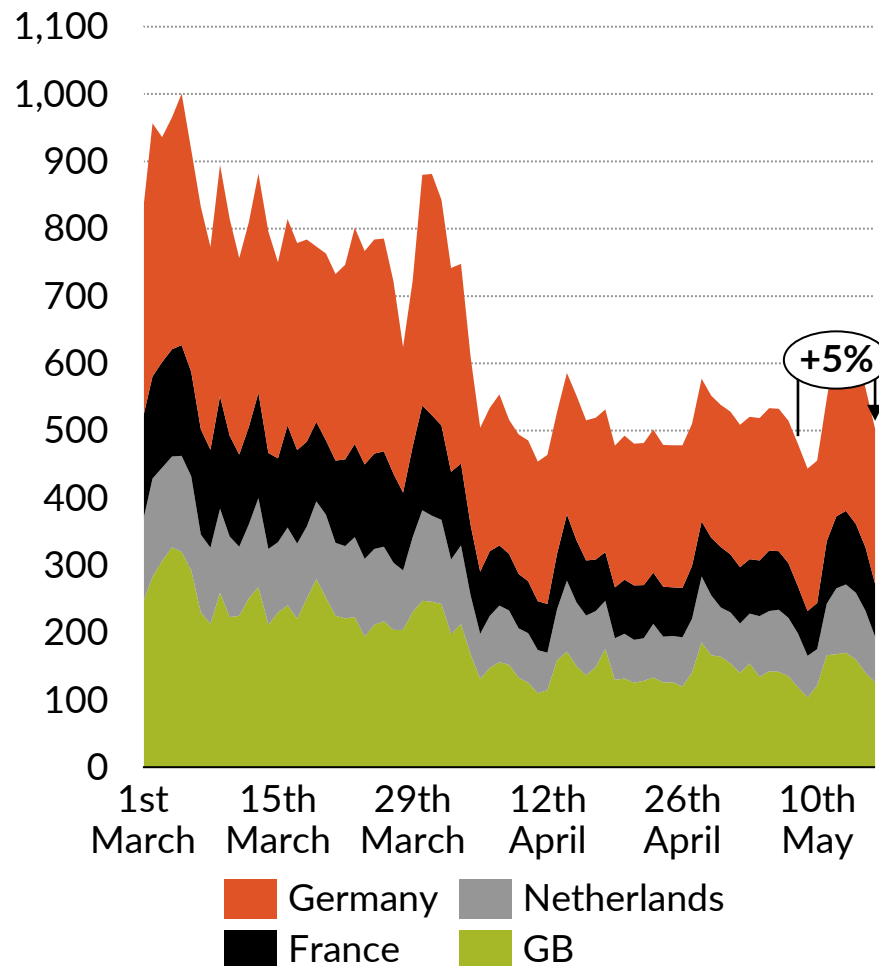
Note: 1. Futures are a rolling 7 day average.

Gas demand showed a sign of slow recovery as some COVID restrictions in Europe were lifted

Monthly NW Europe gas consumption, bcm



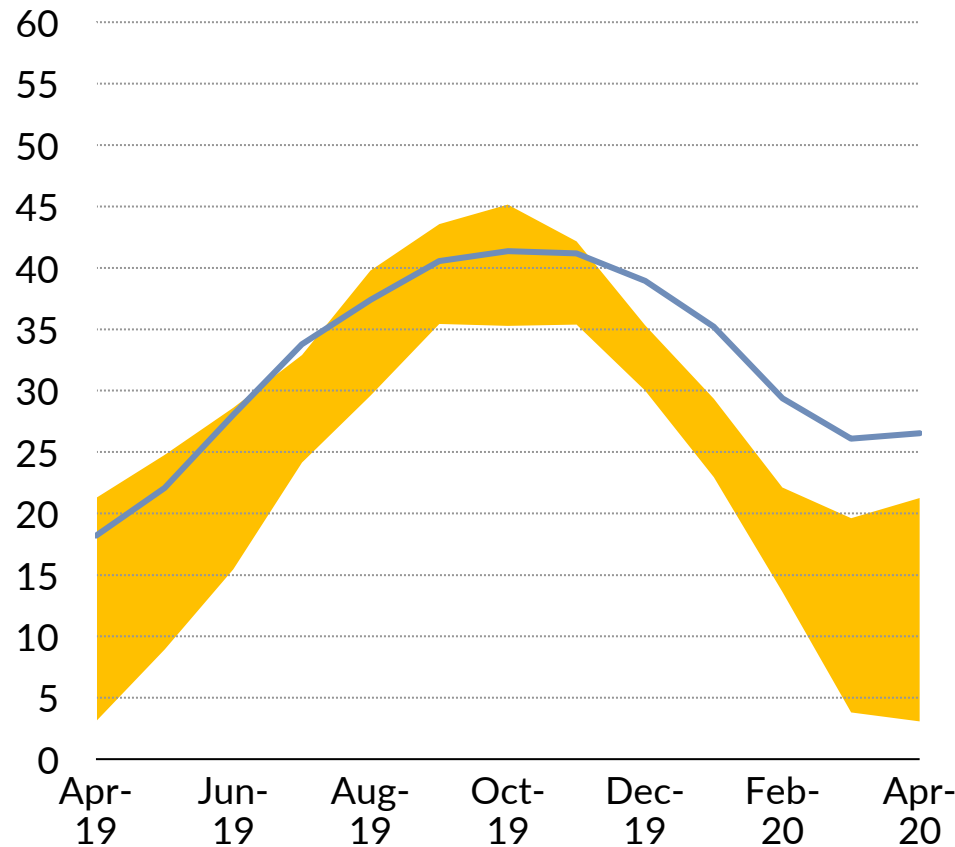
Daily NW Europe gas consumption, mcm



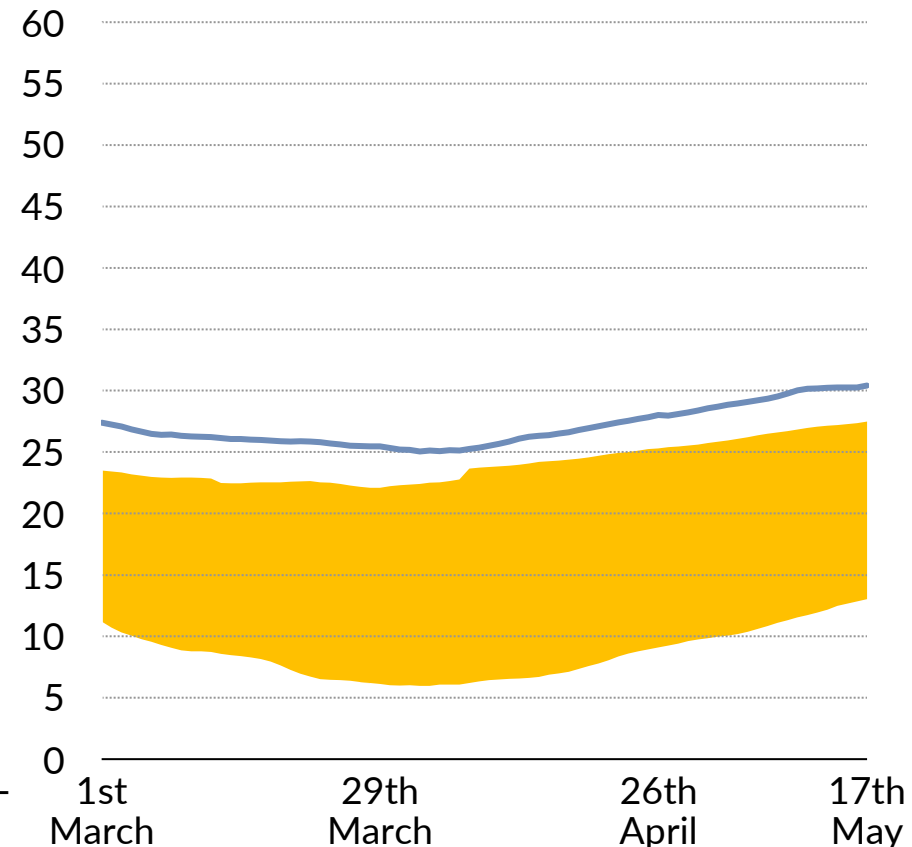
Notes: 1) Envelopes for monthly NW Europe gas storage inventory are calculated by taking the maximum and minimum monthly values from December 2014 until February 2019.

NW European gas storage inventory is 10% higher than trailing 5 year average

Monthly NW Europe gas storage inventory, bcm



Daily NW Europe gas storage inventory, bcm

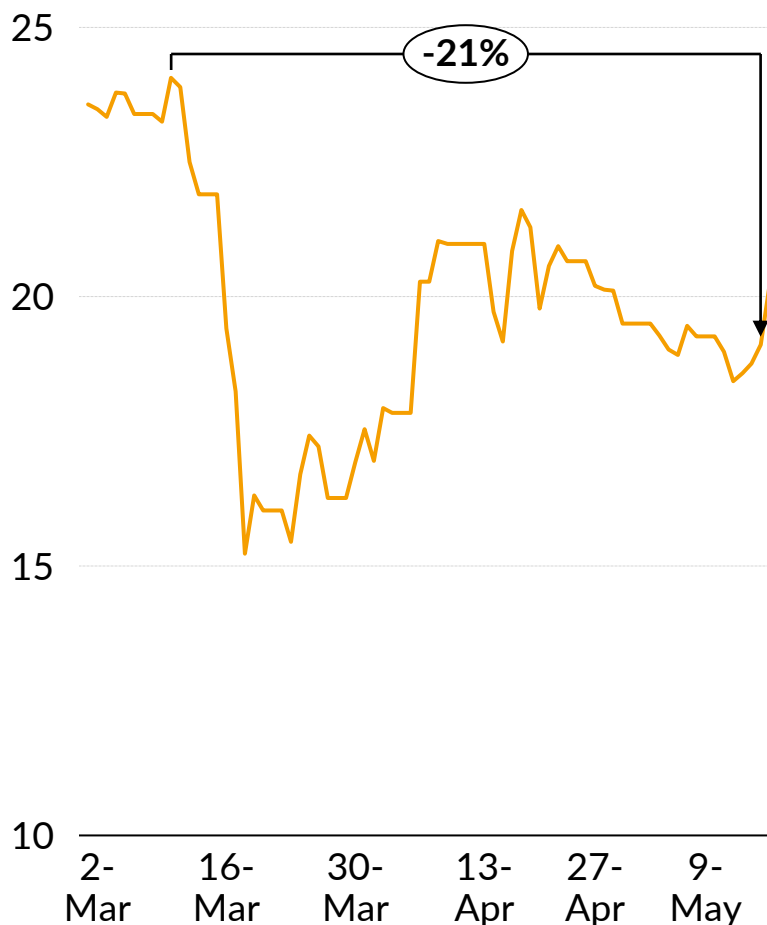


— Total inventory ■ Min-max envelope (Dec 14-Feb 19)^{2,3}

Notes: 1) Storage data is based on net daily flows. 2) Envelopes for monthly NW Europe gas storage inventory are calculated by taking the maximum and minimum monthly values from December 2014 until February 2019. 3) Envelopes for daily NW Europe gas storage inventory calculated by taking the maximum and minimum daily values from March 2015 until May 2019.

EU ETS prices continued to hover around €20/tonne – around 20% below pre-COVID levels

Spot EUA price,
€/tonne



Downward pressure on price in short term

Upward pressure on price in medium term

Lower Aviation demand: Global flight volumes fell by 2/3rds during March. Easyjet grounded its entire fleet. UK recently cancelled auction for EUA Aviation allowances

Lower Industrial demand: Factory closures due to COVID restrictions; reduced demand for metals and cement due to reduced manufacturing and construction activity

Lower Power market demand: Lower power demand (explored in next slides) reducing permit demand from coal and gas generators

ETS reforms: European Commission remains committed to tighten ETS as part of Green Deal, but looks likely to be delayed; Poland challenging logic of tightening ETS at this time

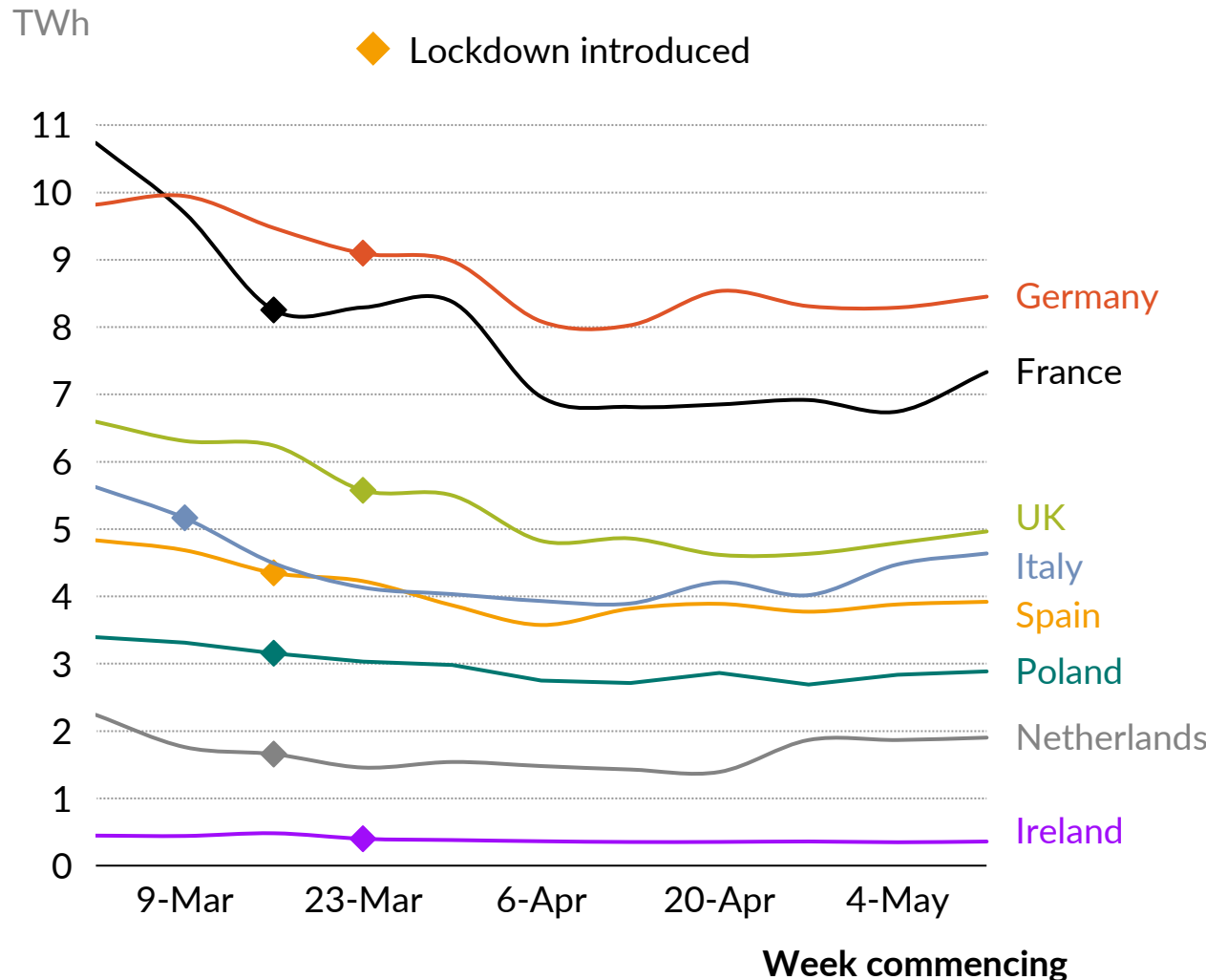
MSR Mechanism: will gradually remove excess permits from the market.

Contents

1. COVID-19 reported cases
2. COVID-19 impact on European gas and carbon markets
3. COVID-19 impact on European power markets

European power demand has seen a slight recovery as lockdown measures are eased

Weekly sum of power demand in 2020, TWh



Change in demand versus same week last year:

	w.c. 4 May	w.c. 11 May
DE:	-7%	-9%
FR:	-16%	-8%
UK:	-21%	-11%
ES:	-12%	-13%
IT:	-17%	-12%
PL:	-3%	-9%
NL:	-3%	+6%
IE:	-11%	-5%

Data excludes self-generation and embedded renewables consumption

European power demand has seen a slight recovery as lockdown measures are eased



COVID-19 cases¹
Per 1 million
population

3,735

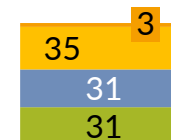
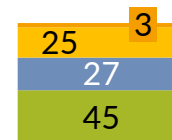
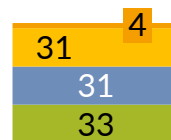
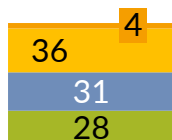
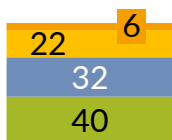
3,735

5,950

2,117

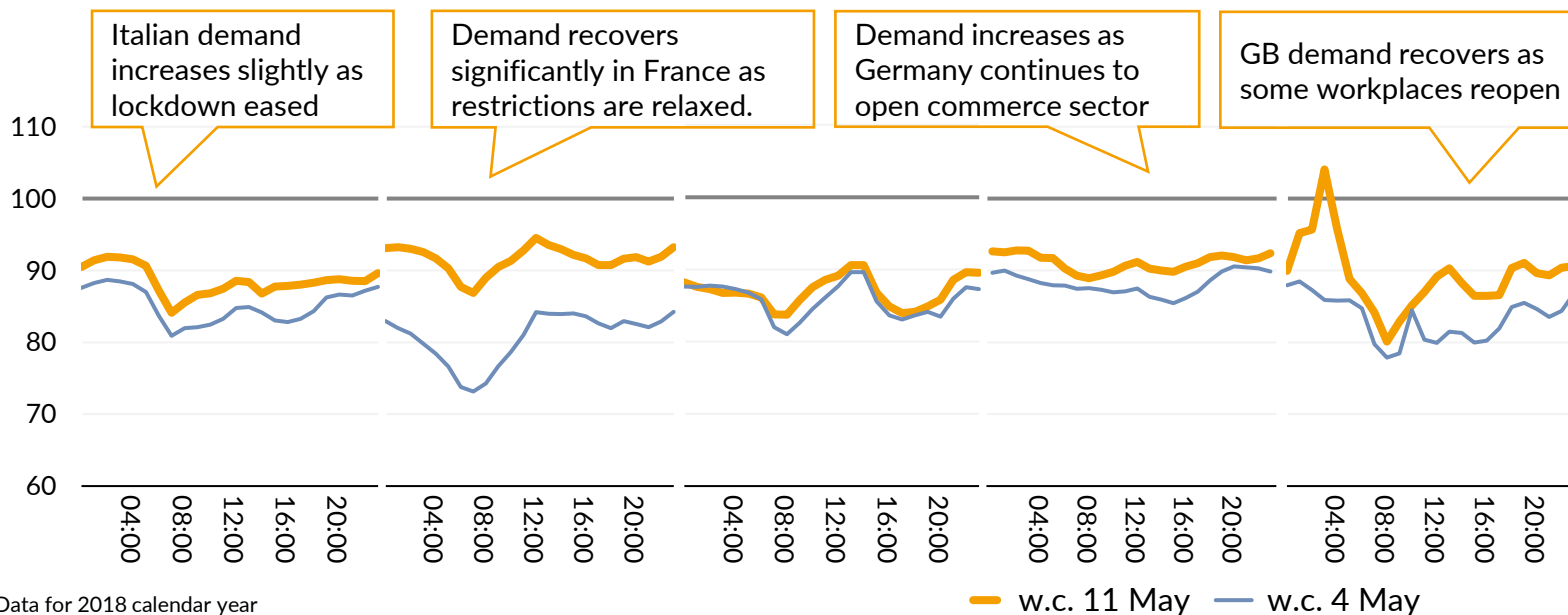
3,623

**Power demand
by end user²**



Other Household Commercial Industrial

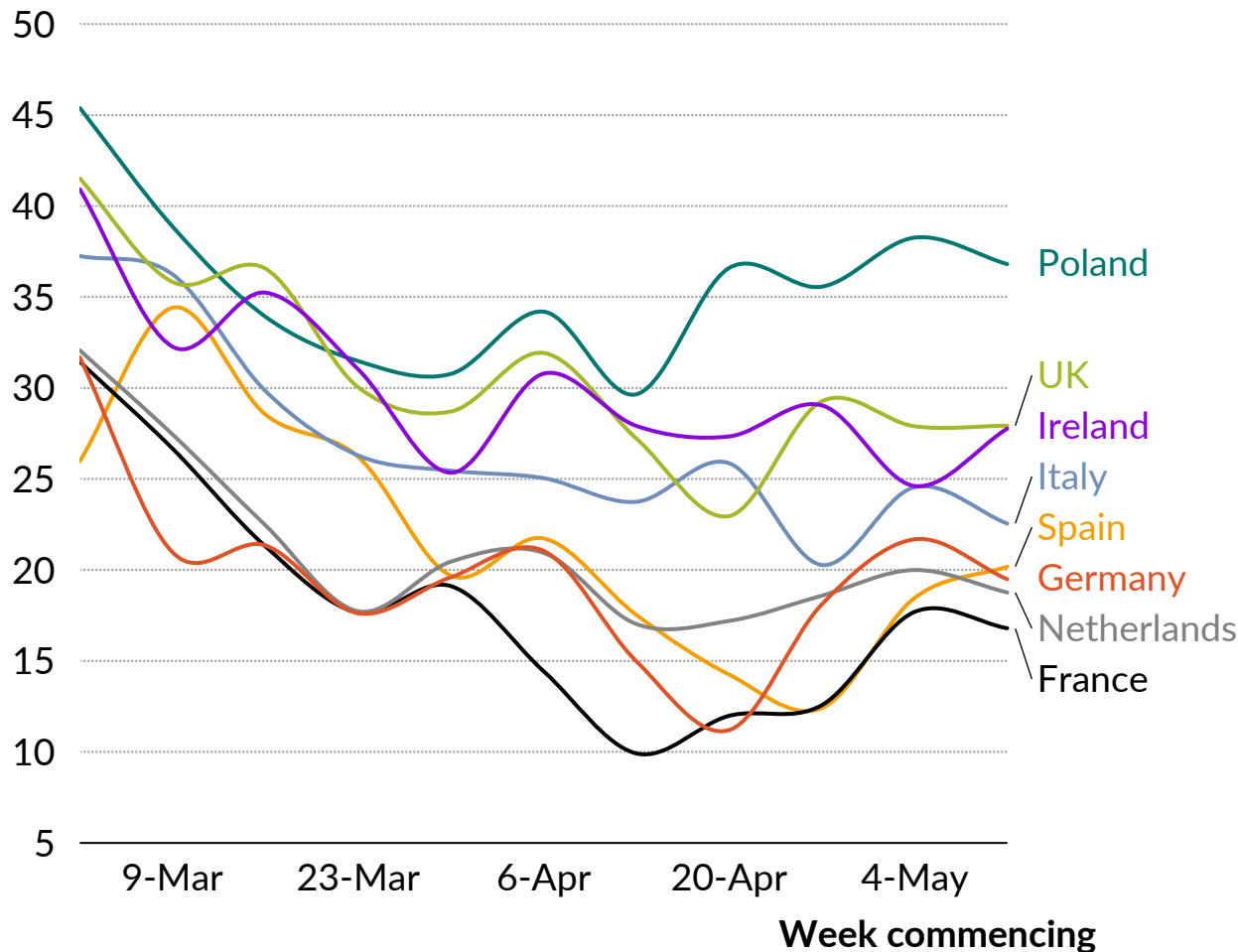
**Hourly load
during
sample
weeks
(% of same
week in
2019)**



1) Data to 18th May 2) Data for 2018 calendar year

Day-ahead prices decreased across much of continental Europe, whilst Ireland and Spain saw an increase

Weekly average day-ahead power prices in 2020,
EUR/MWh



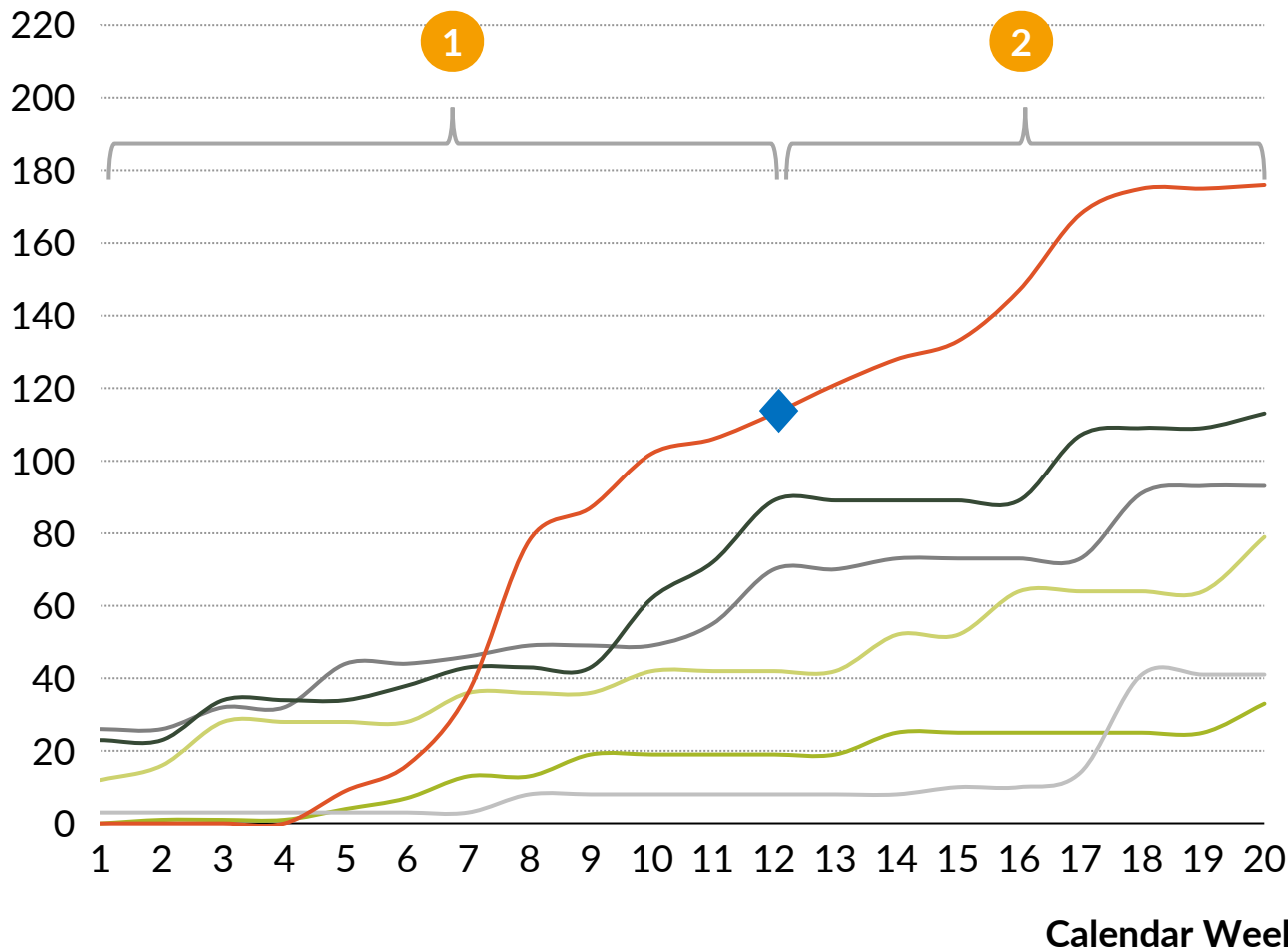
Change in prices versus
previous week:

	w.c. 4 May	w.c. 11 May
DE:	+17%	-11%
FR:	+29%	-5%
UK:	-5%	0%
ES:	+33%	+9%
IT:	+17%	-9%
PL:	+7%	-4%
NL:	+7%	-7%
IE:	-15%	+13%

Germany has seen record number of negative prices in 2020, due to high wind in February and COVID effects

Cumulative number of negative price hours, #

— 2015 — 2016 — 2017 — 2018 — 2019 — 2020 ◆ Lockdown



1
Record high wind generation in February (20 TWh) leads to high number of negative price hours early on in the year

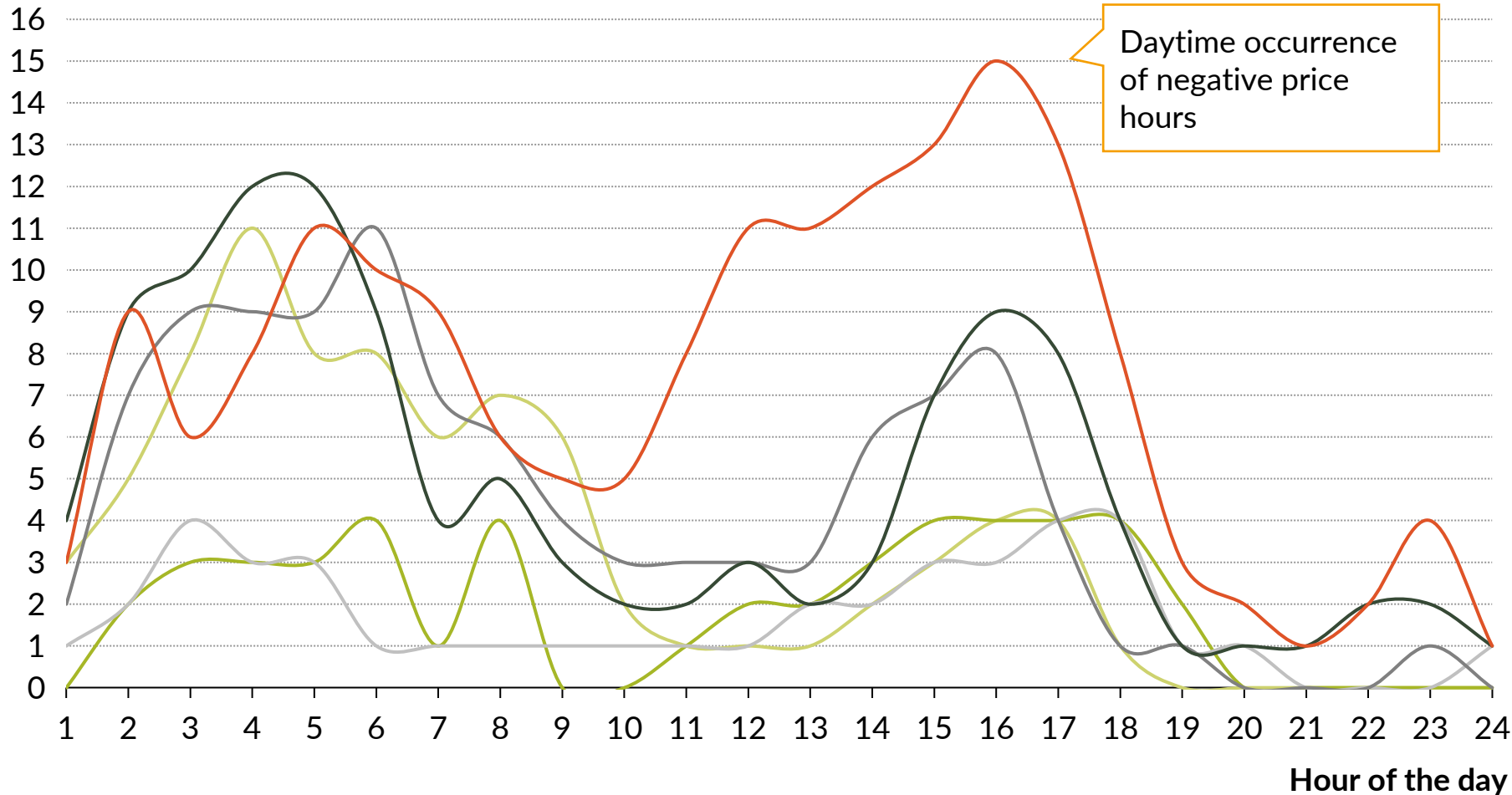
2
COVID-19 lockdown further increases negative price hours due to lower demand in sunny hours during the day

Germany: negative prices have been concentrated during daytime in 2020, driven by lower demand

Negative price hours
(Jan-May average),

— 2015 — 2016 — 2017 — 2018 — 2019 — 2020



#



Aurora continues to help you navigate the impact of COVID-19 on European energy markets

How do our market intelligence subscribers stay up-to-date on COVID-19 implications?

- **Power Market Forecast reports** incorporating COVID impacts on commodities and demand
- **Group Meetings** will explore sensitivities on the impact of COVID on European power markets and asset economics
- **Podcasts** with industry leaders
- **Coronavirus tracker** email assessing the impact on European power and commodities markets

	May	Jun	Jul
Group Meeting		◆ GB	◆ DE ◆ ◆ FR Iberia ◆ ◆ GB
Market Forecast Report			

COVID-19 Special report

- Comprehensive exploration of the range of scenarios from the fallout of COVID-19
- Impact on power prices, spreads, viability of investments, carbon emissions
- Differences in impact amongst technologies
- Implications on asset values vs stock market

Consultancy & Bespoke Analytics

- Bespoke scenarios for business planning and transaction support
- Stress testing portfolios
- Defensive/opportunistic portfolio optimisation
- Board/Management briefing

For more information contact Felix.Chow@Auroraer.com for GB, Ireland, France and Iberia and Hanns.Koenig@Auroraer.com for Germany, Poland and BeNeLux