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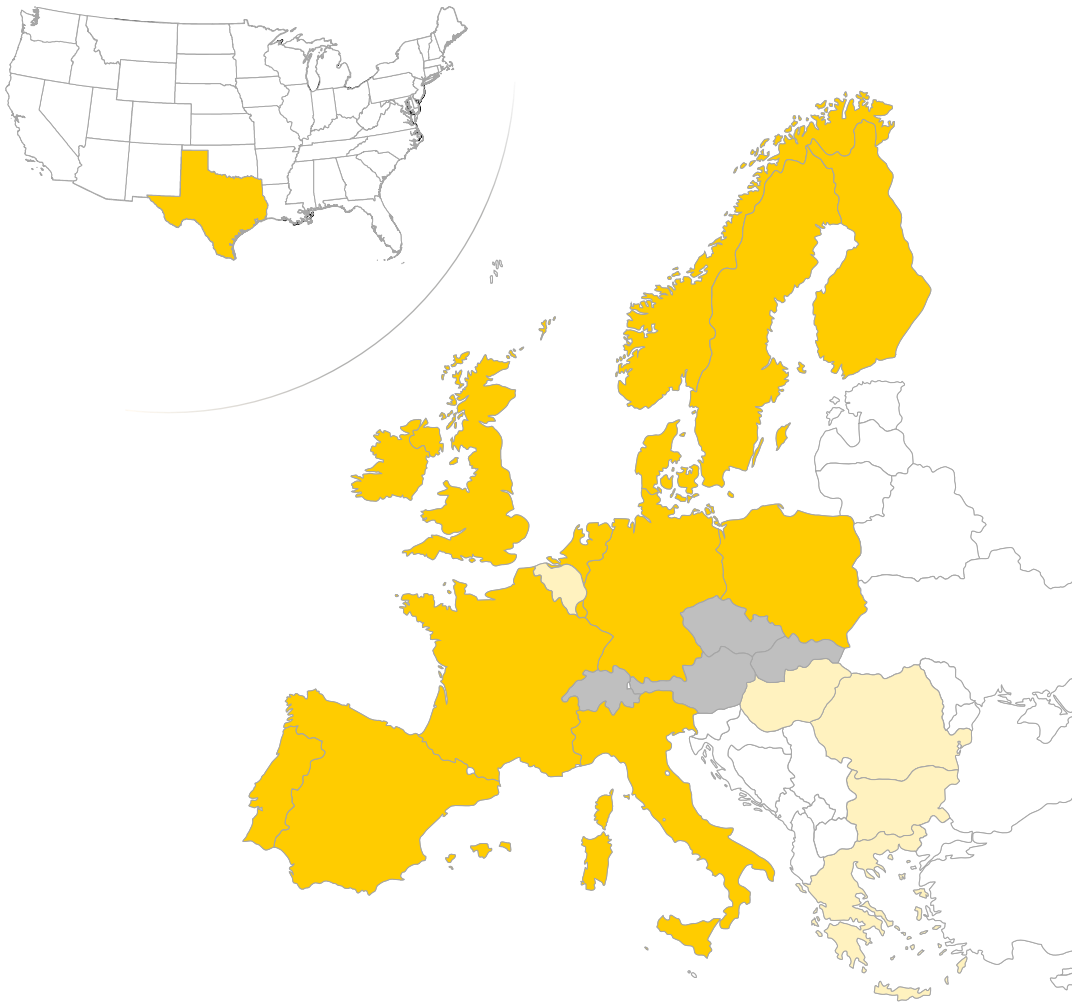
GB Wholesale Market Summary March 2021

Published April 2021

Executive Summary

1. A combination of higher carbon prices and demand caused the monthly average power price in March 2021 to rise to £54.1/MWh, a £1.2/MWh (2.3%) increase from February 2021. This represents a year-on-year increase of £25.63/MWh (89.9%) due to a subsequent economic recovery from the initial crash caused by COVID-19. See slides 5, 6, and 7.
2. Power prices in March saw high levels of volatility with several negative periods and prices exceeding £280/MWh. This was primarily driven by weather intermittency coupled with higher demand. See slides 5 and 8.
3. Driven by increased economic activity from relaxation of the national lockdown, the monthly transmission power demand in March increased by 0.8 TWh (3.6%) relative to February, while the share of low carbon generation fell by 7 p.p. to 56.2% of total generation. See slides 10 and 11.
4. Monthly thermal generation in March increased by 1.5 TWh (19.2%) relative to February as demand increased, and renewables output decreased. Consequently, carbon emissions increased by 0.5 $MtCO_2e$ (13.3%) compared to February. See slides 11 and 14.
5. The profitability of wind assets in March saw a decrease relative to February, caused by an 11 p.p. decrease in wind load factors to a monthly average of 40.5%. This was accompanied by a decrease in wind capture prices (£1.2/MWh or 2.4% relative to February). See slides 20 and 22.

Aurora offers power market forecasts and market intelligence spanning Europe's key markets, Australia and the US



Comprehensive Power Market Services	Power Market Forecast Reports	Bespoke forecasts
Market forecast reports	Power market forecast reports	Aurora can provide power market forecasts upon request
Forecast data in Excel	Forecast data in Excel	
Global energy market forecast reports	Analyst support	
Strategic insight reports		
Regular subscriber group meetings		
Policy updates		
Bilateral workshops		
Analyst support		

Source: Aurora Energy Research

Agenda

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I. System performance

II. Company performance (available to subscribers only)

III. Plant performance

Half-hourly EPEX spot price for March

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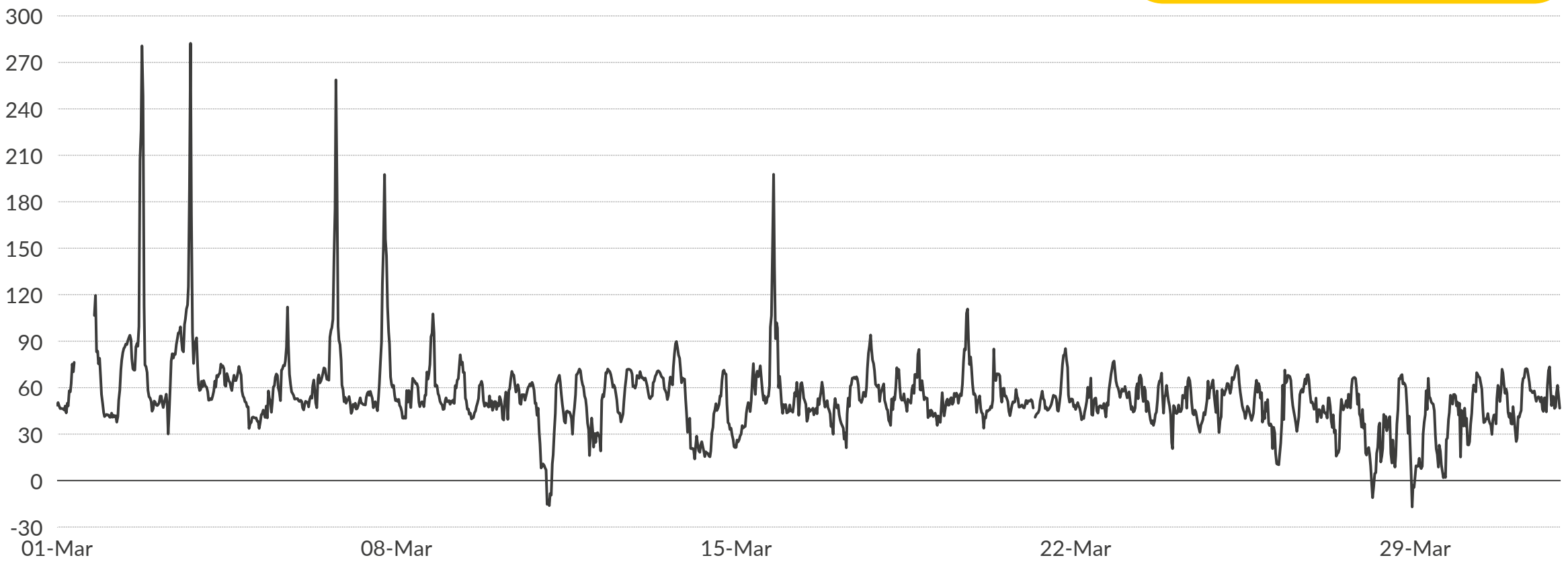
EPEX spot price[1]
£/MWh

Monthly average price in March 2021: £54.14/MWh

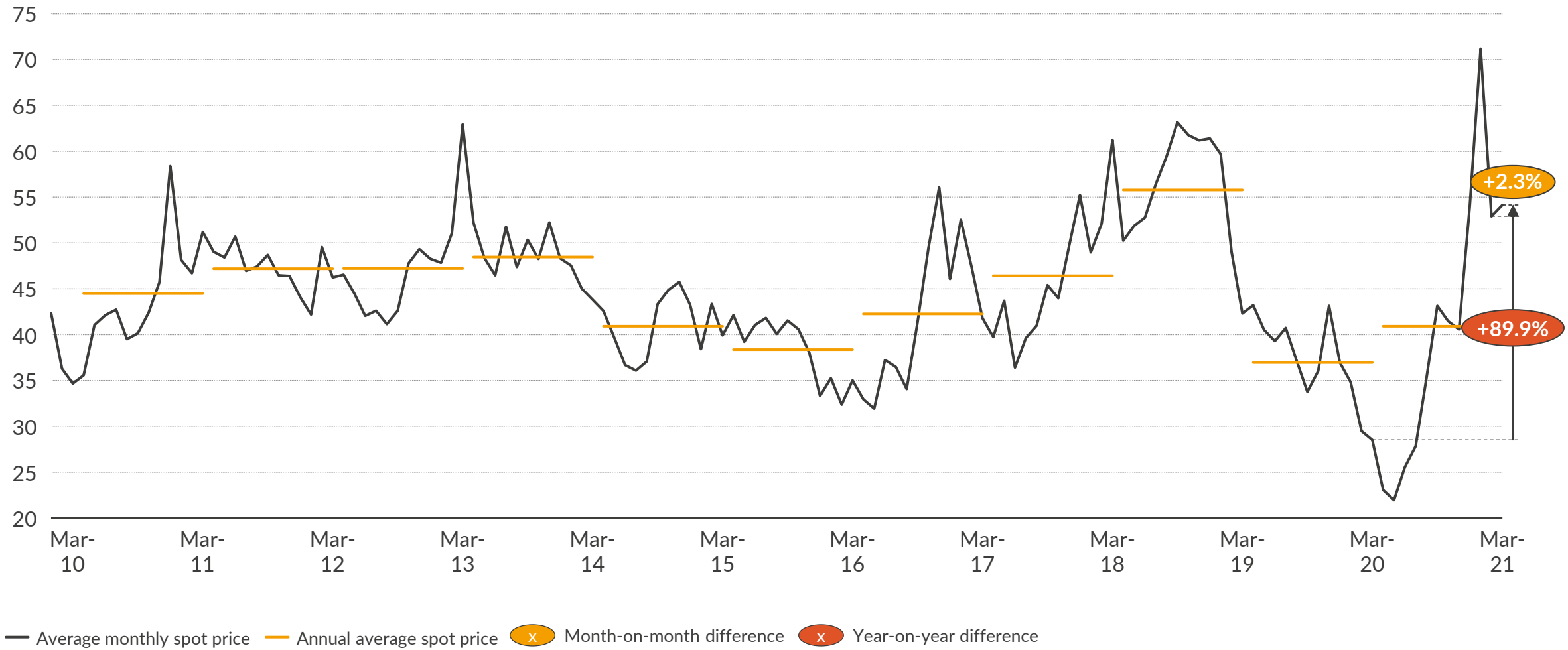


1) Half-hourly EPEX is the volume-weighted reference price over that half-hour interval, as provided by EPEX Spot

Sources: Aurora Energy Research, Thomson Reuters

Historic monthly average EPEX spot price

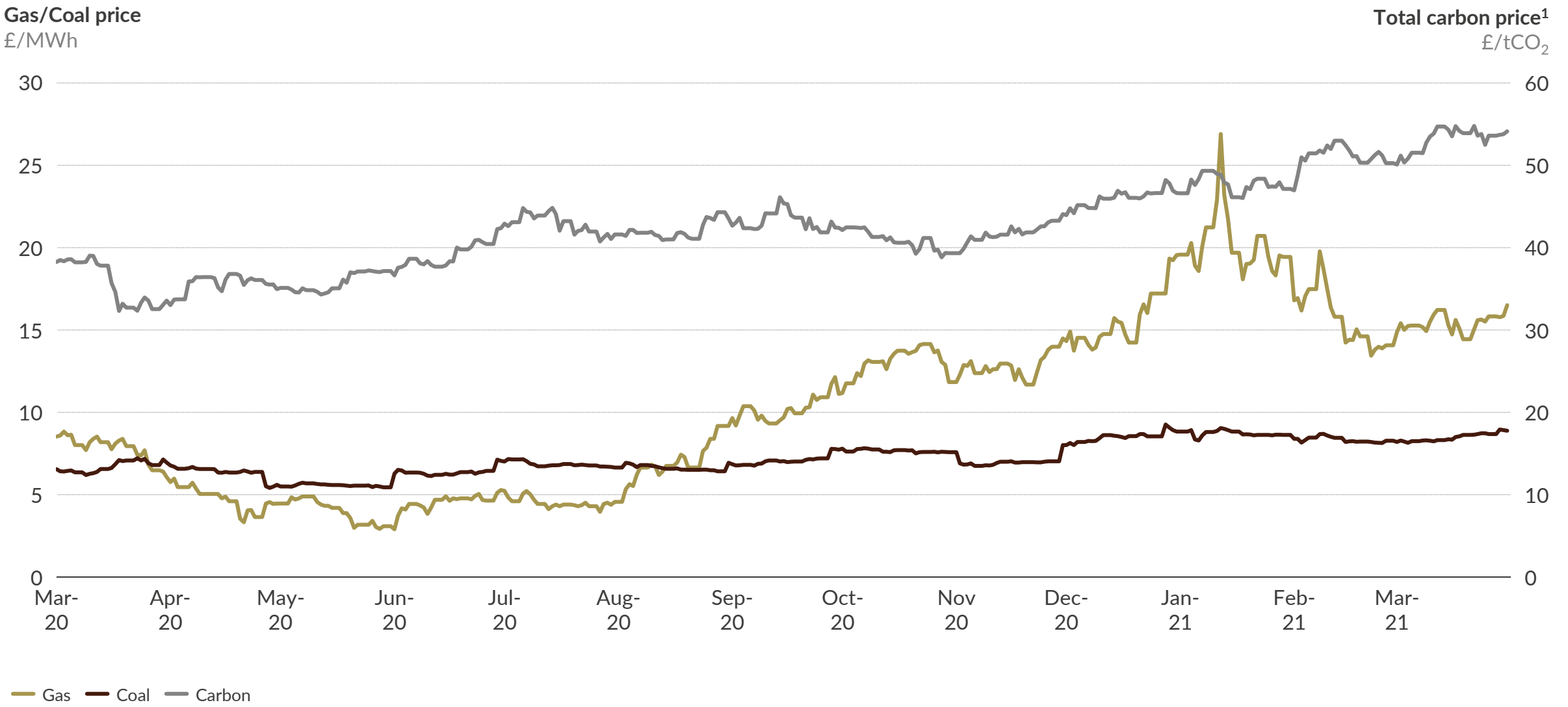
Average EPEX spot price[1],
£/MWh



1) Average monthly EPEX is the average over the month of the volume-weighted reference prices for each half-hour interval.

Sources: Aurora Energy Research, Thomson Reuters

Historic fuel prices
Gas, Coal and Carbon daily prices



1) Includes EU-ETS and CPS. The UK left the EU-ETS scheme in 2021 to a national UK-ETS scheme

Sources: Aurora Energy Research, Thomson Reuters

Half-hourly spot prices against half-hourly system margins for March

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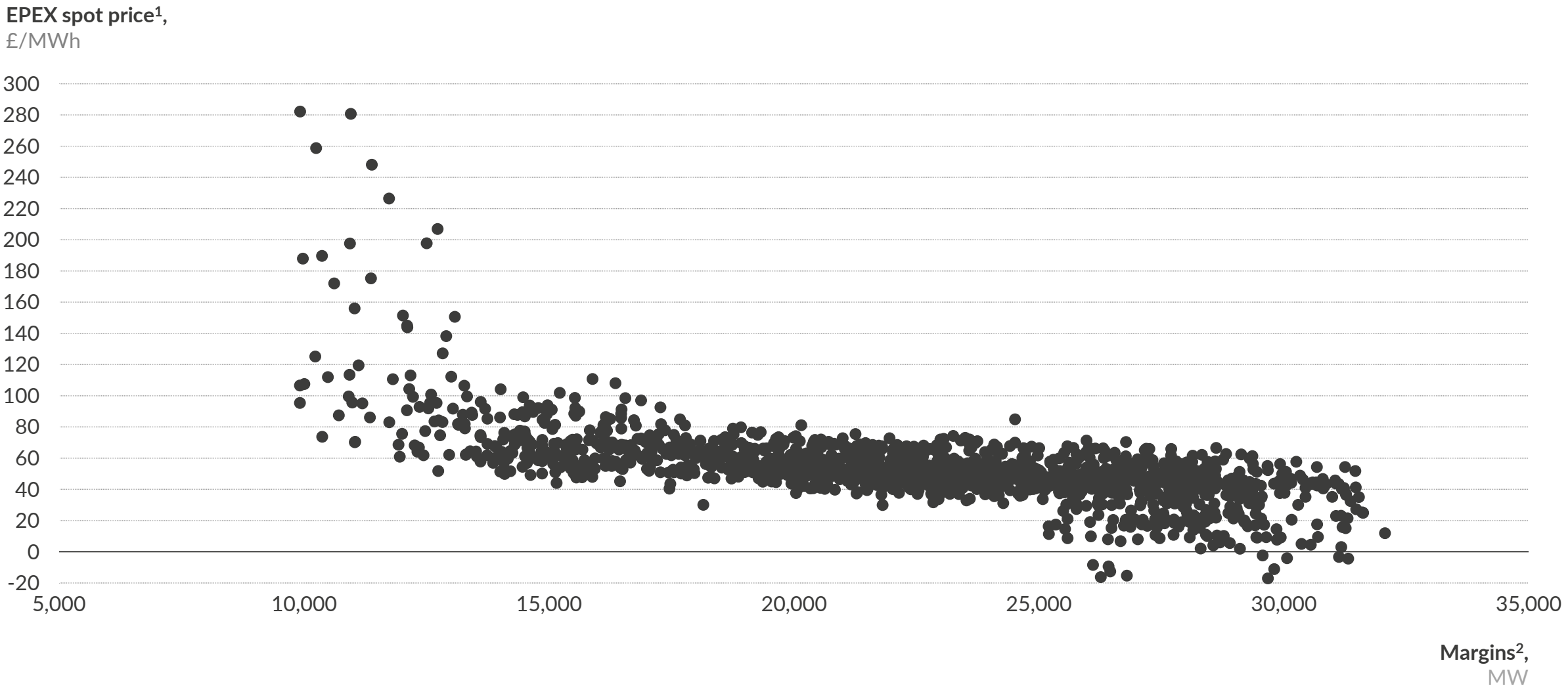
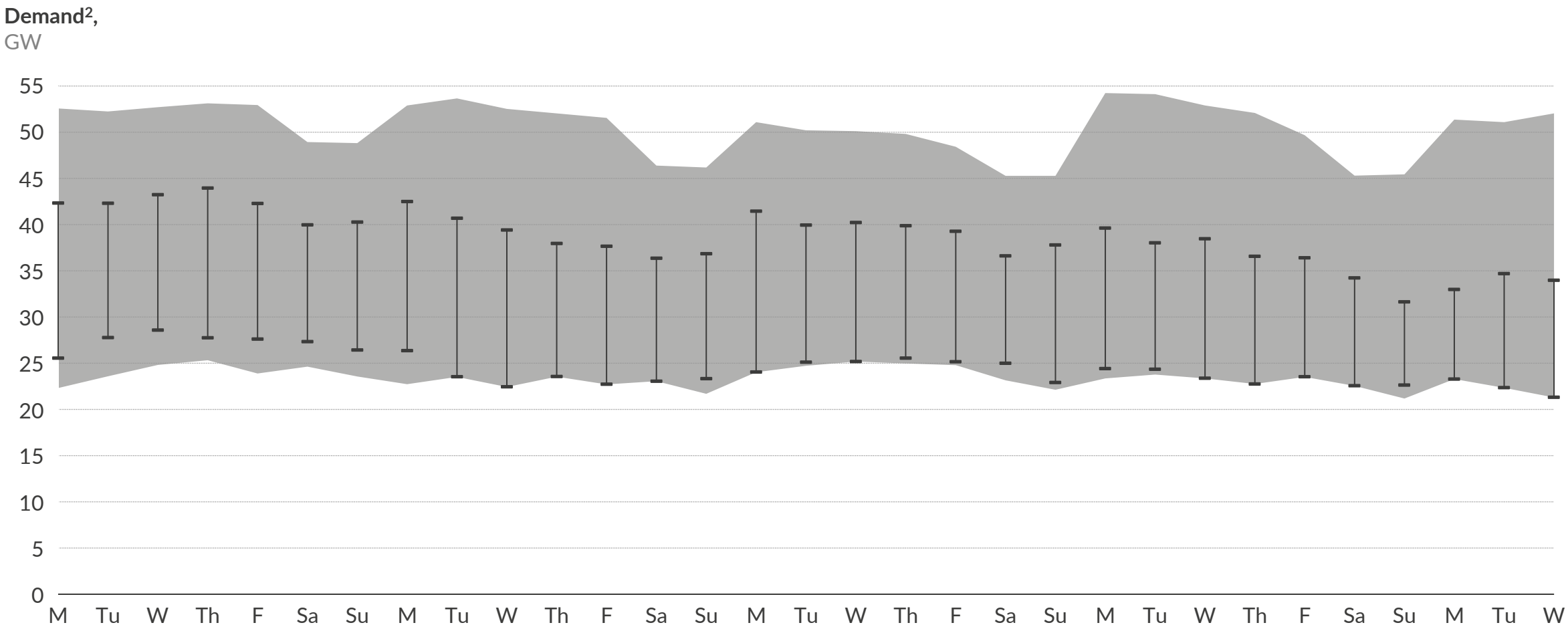


1) Half-hourly EPEX is the volume-weighted reference price over that half-hour interval, as provided by EPEX Spot. 2) Margins are calculated as the difference between MEL and Demand for each half-hour period. Demand data presented here is Initial Transmission System Demand Out-Turn, and does not include embedded demand. MEL is calculated as the sum of all transmission BM units reporting MEL values in each half-hour. Where a BMU gives multiple values in a half-hour, only the least is taken.

Sources: Elexon, National Grid, Thomson Reuters, Aurora Energy Research

Daily March max and min demand

Relative to historic March max and min demand since 2010[1]

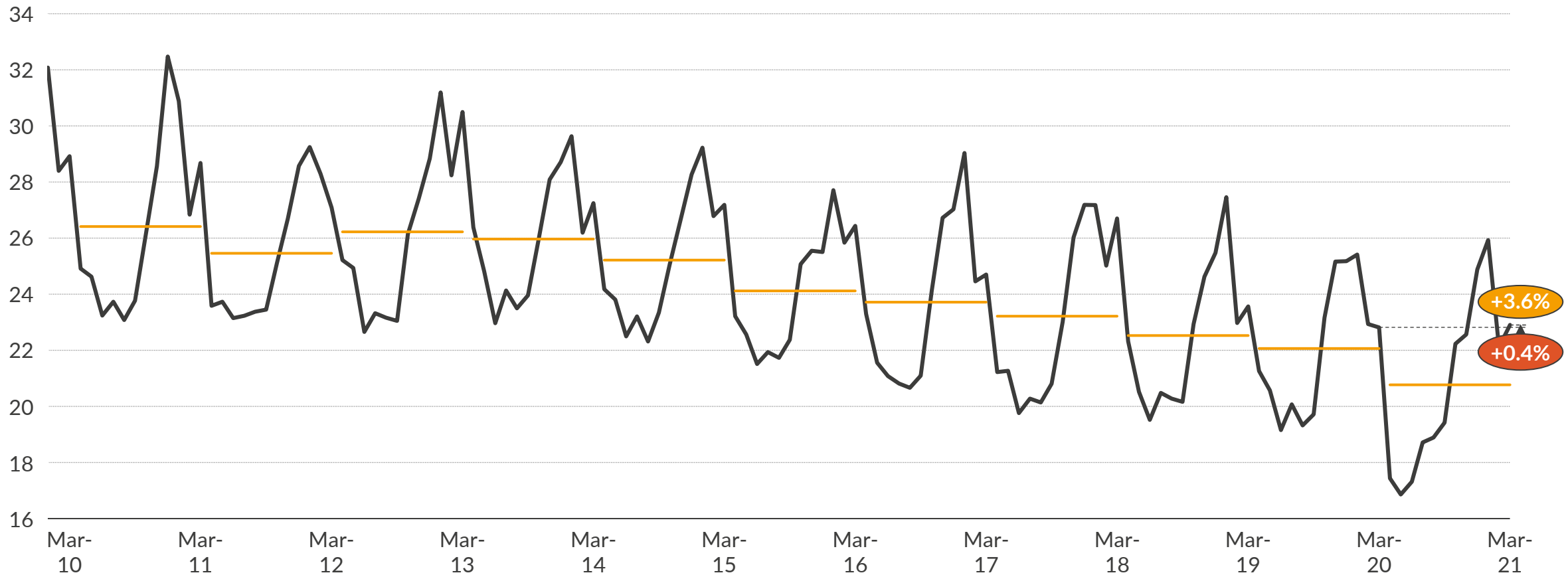


1) Data from previous years is matched to the nearest weekday within the current month, to maintain the weekly demand pattern. 2) Demand data presented here is Initial Transmission System Demand Out-Turn, and does not include embedded demand.

Sources: National Grid, Aurora Energy Research

Monthly historical demand on the transmission system

Total demand[1],
TWh



1) Demand data presented here is Initial Transmission System Demand Out-Turn, and includes station transformer load, pumped storage demand and interconnector demand, but does not include embedded demand.

Sources: National Grid, Aurora Energy Research

Monthly fuel mix breakdown

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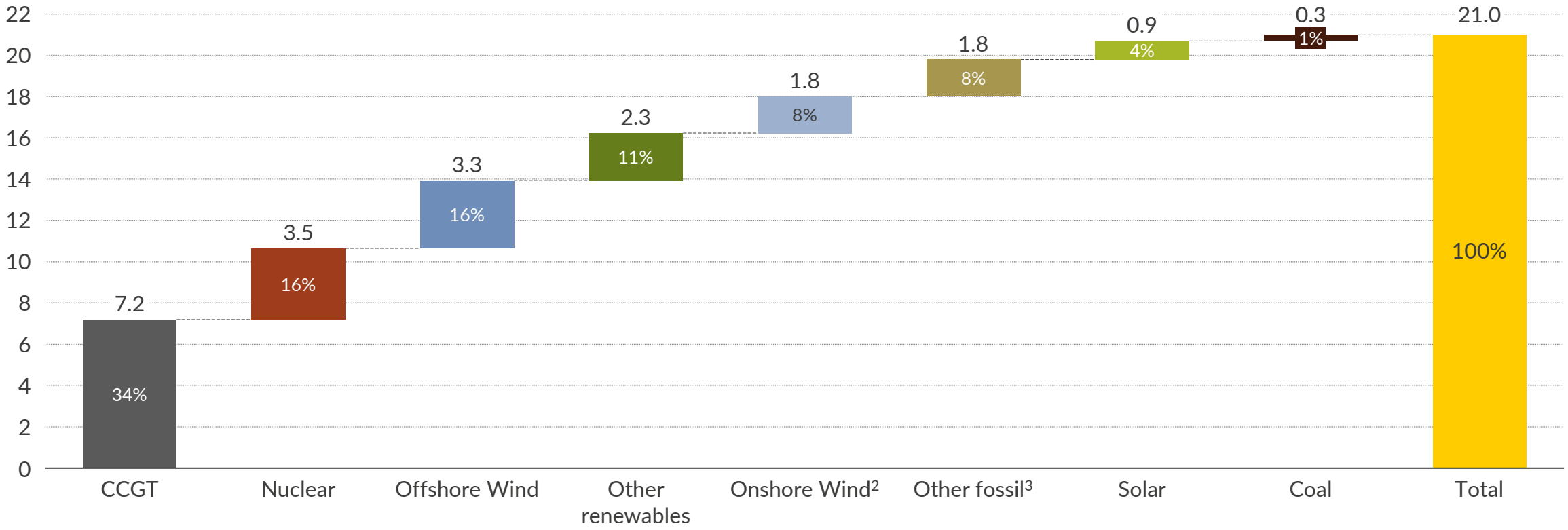
Output[1]
TWh



Load factor,
%

CCGT	Nuclear	Offshore Wind	Other renewables	Onshore Wind[2]	Other fossil[3]	Solar	Coal
36	49	45	59	36	31	9	7

1) Includes outputs from generators registered as BM Units as well as embedded wind and solar PV assets. All numbers are rounded to 0.1 TWh which means that subtotals may not sum to total value. 2) Other fossil includes oil, CHP-CCGT and OCGT. 3) Other renewables includes biomass and hydro.
Sources: Elexon, Sheffield Solar, National Grid, Aurora Energy Research

Historical fuel mix breakdown

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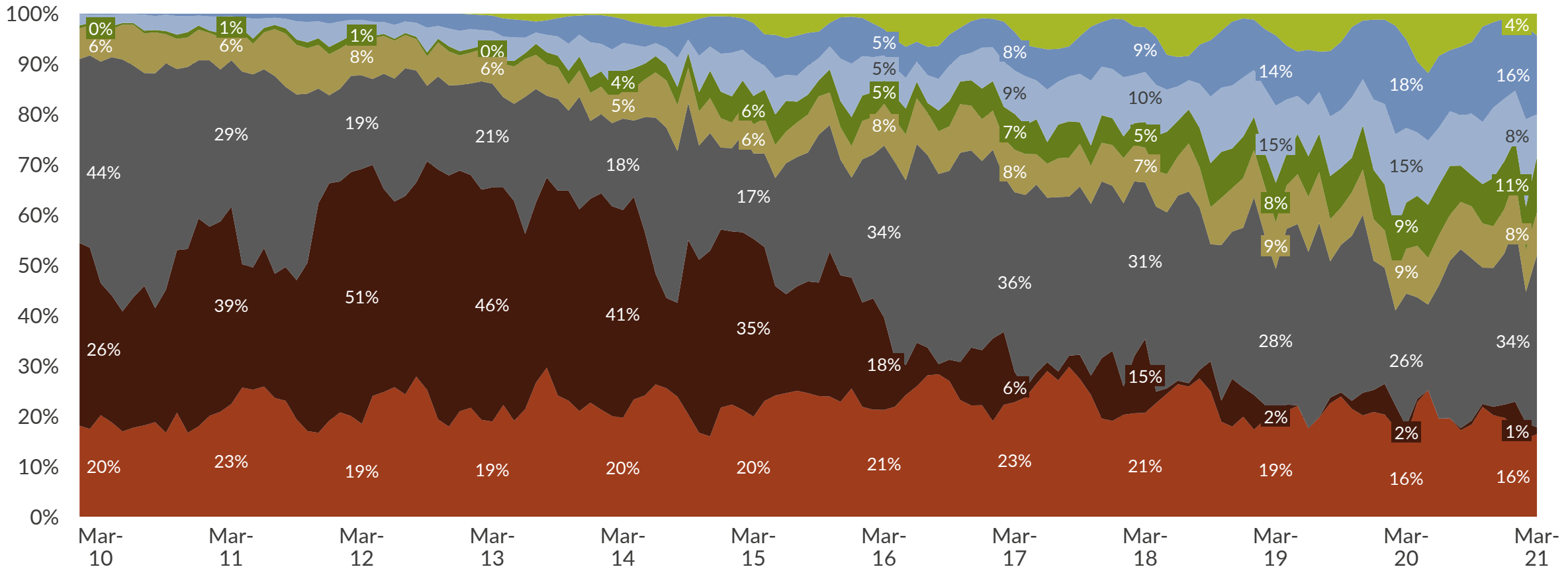
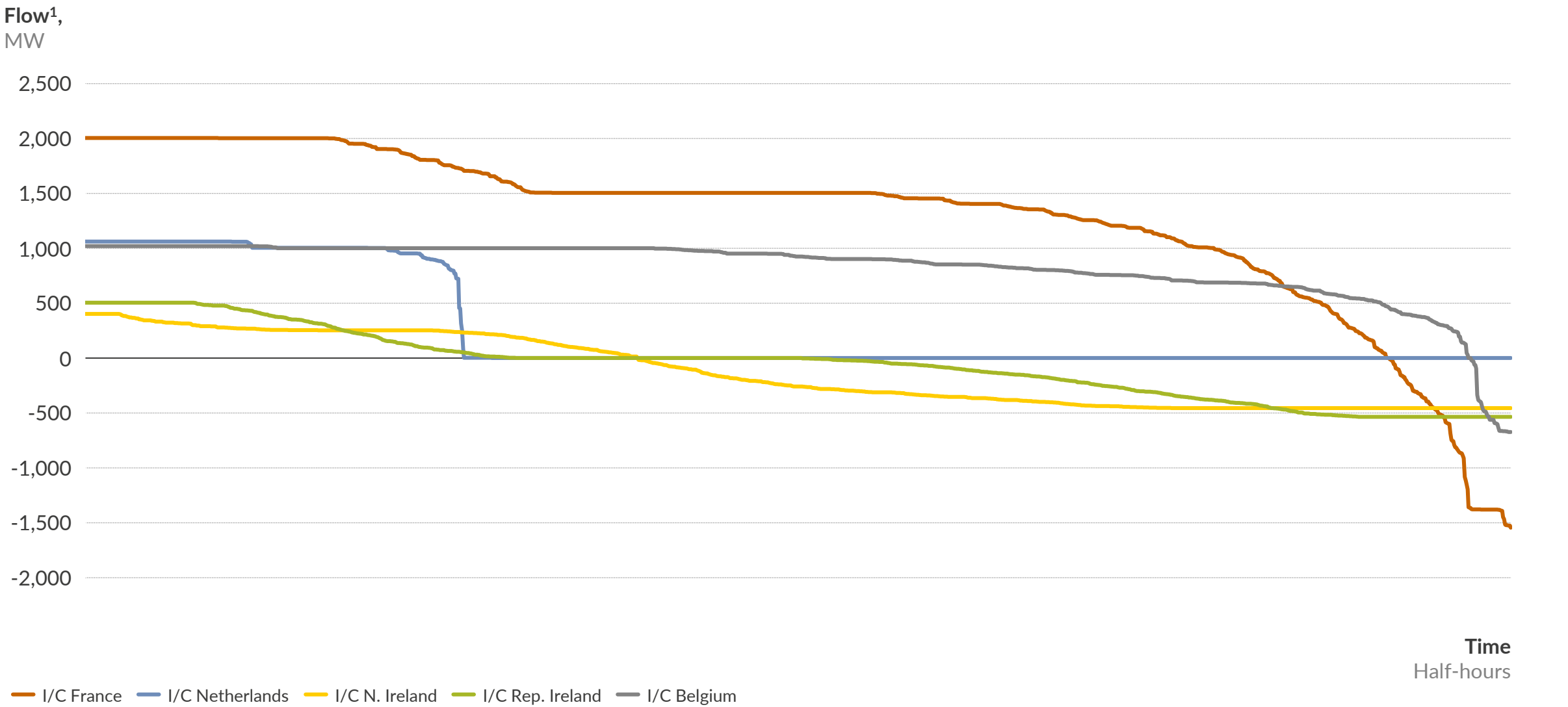
Output[1]
% of total



1) Includes outputs from generators registered as BM Units as well as embedded wind and solar PV. 2) Other fossil includes oil, CHP-CCGT and OCGT. 3) Other renewables includes biomass and hydro.

Sources: Elexon, Sheffield Solar, National Grid, Aurora Energy Research

Monthly interconnector flow duration curve
Flow in each half-hour for GB interconnectors



1) Positive flow is imports into GB, negative flow is exports.

Sources: Elexon, National Grid, Aurora Energy Research

Monthly power sector emissions by technology

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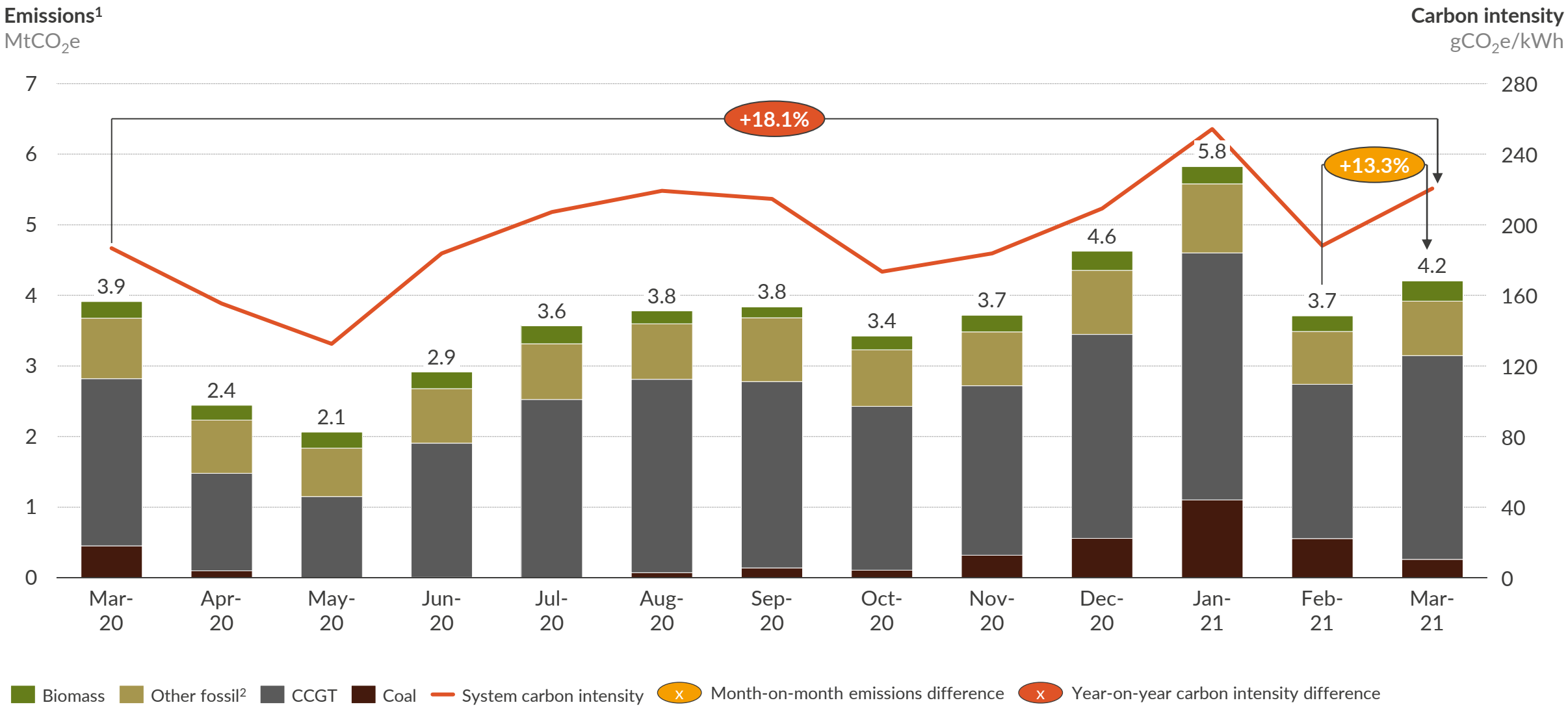

1) Please refer to Appendix for details of methodology employed to calculate emission amounts. Includes all Balancing Mechanism plants. 2) Other fossil includes oil, OCGT and gas CHP-CCGT.

Sources: Elexon, Ofgem, Aurora Energy Research

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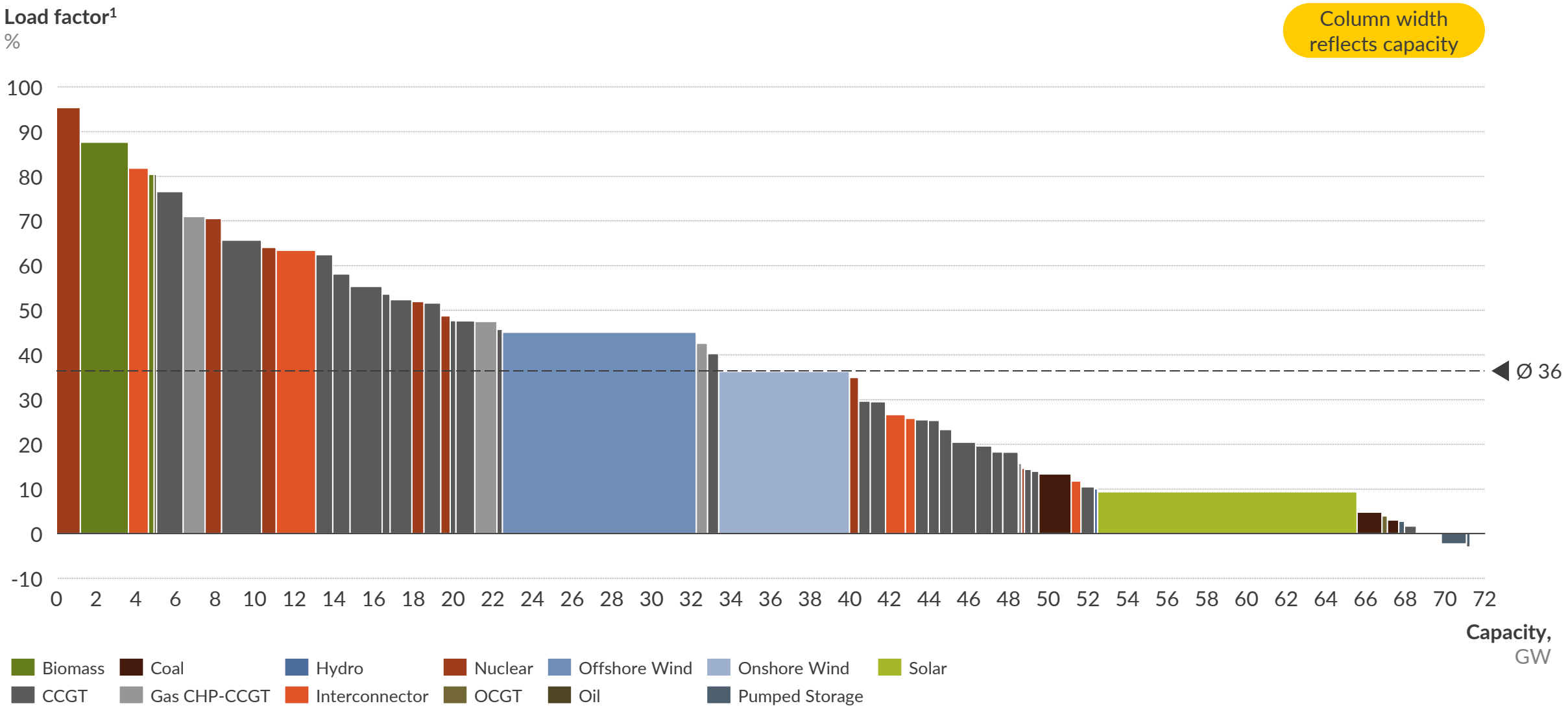
Plant utilisation – load factors by plant



1) Represents 60 plants with highest capacity according to the Balancing Mechanism (BM) database, as well as aggregated data for wind and solar. Capacity of each plant represents the sum of capacities of all its generators that have been active at least once in the last three months. Please refer to Appendix for a detailed description of the data used and categories presented

Sources: Aurora Energy Research, Elexon, BEIS

CCGT plant utilisation – by plant

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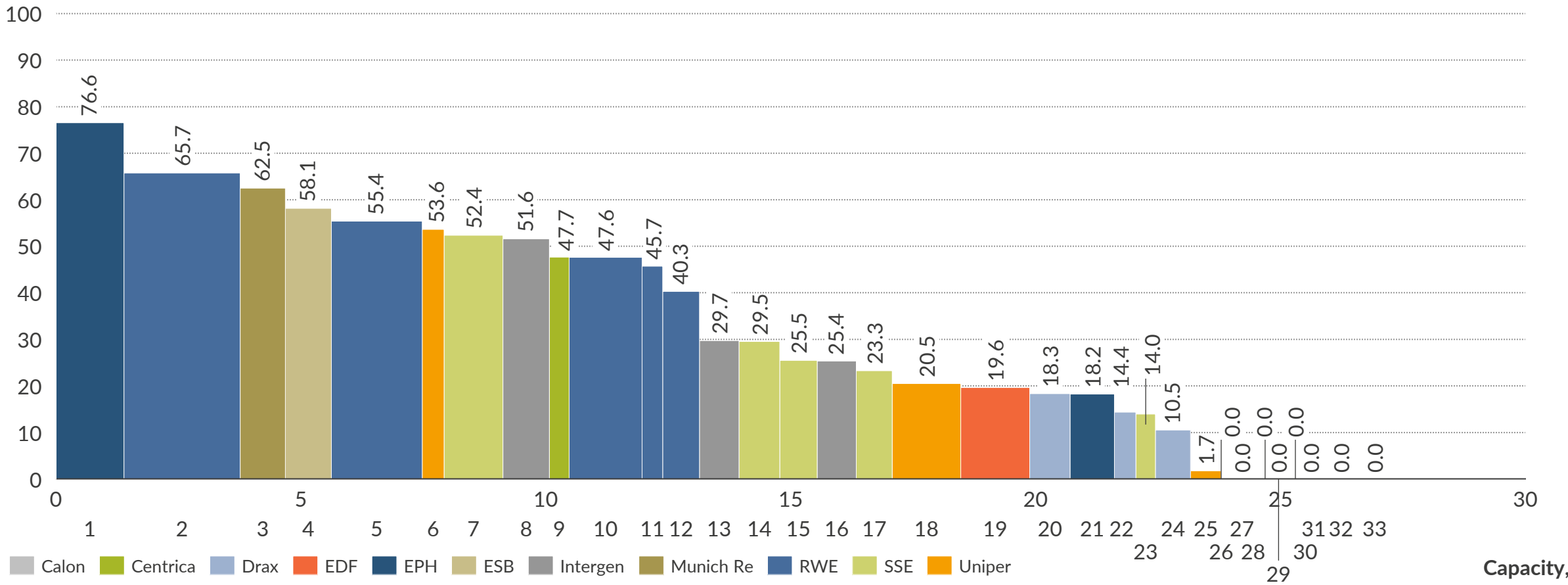
Full load hours[1]
% of total for the period

Column width reflects capacity



Plant Names: 1. South Humber Bank, 2. Pembroke, 3. Marchwood, 4. Carrington, 5. Staythorpe, 6. Cottam Dvpt Centre, 7. Peterhead, 8. Spalding, 9. Kings Lynn, 10. Didcot B, 11. Great Yarmouth, 12. Little Barford, 13. Rocksavage, 14. Seabank 1, 15. Keadby, 16. Coryton, 17. Medway, 18. Connahs Quay, 19. West Burton B, 20. Damhead Creek, 21. Langage, 22. Shoreham, 23. Seabank 2, 24. Rye House, 25. Killingholme 2, 26. Killingholme 1, 27. Sutton Bridge, 28. Glanford Brigg, 29. Enfield Energy, 30. Peterborough, 31. Corby, 32. Severn, 33. Baglan Bay.

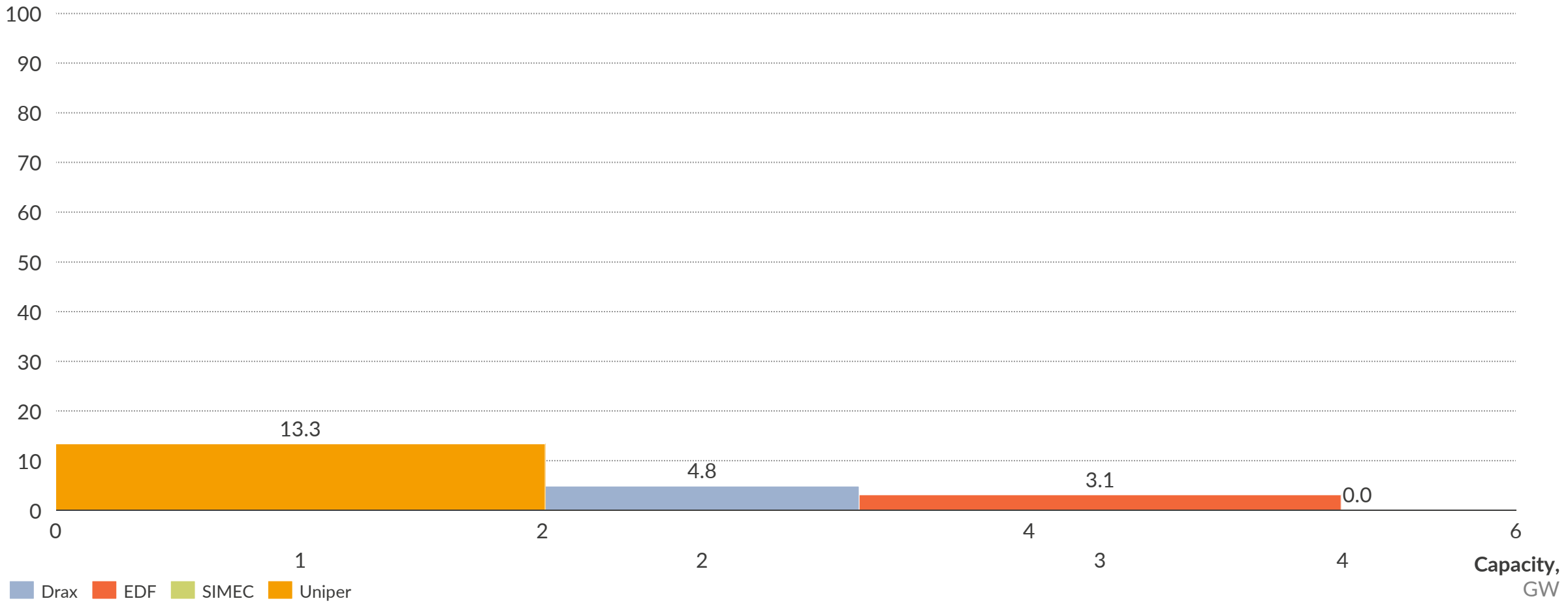
1) Includes all CCGT plants of the presented companies that report to the Balancing Mechanism

Sources: Aurora Energy Research, Elexon

Coal plant utilisation – by plant

Full load hours[1]
% of total for the period

Column width reflects capacity



Plant Names: 1. Ratcliffe, 2. Drax Coal, 3. West Burton, 4. Uskmouth

1) Includes all coal plants of the presented companies that report to the Balancing Mechanism

Sources: Aurora Energy Research, Elexon

Monthly load factors by technology

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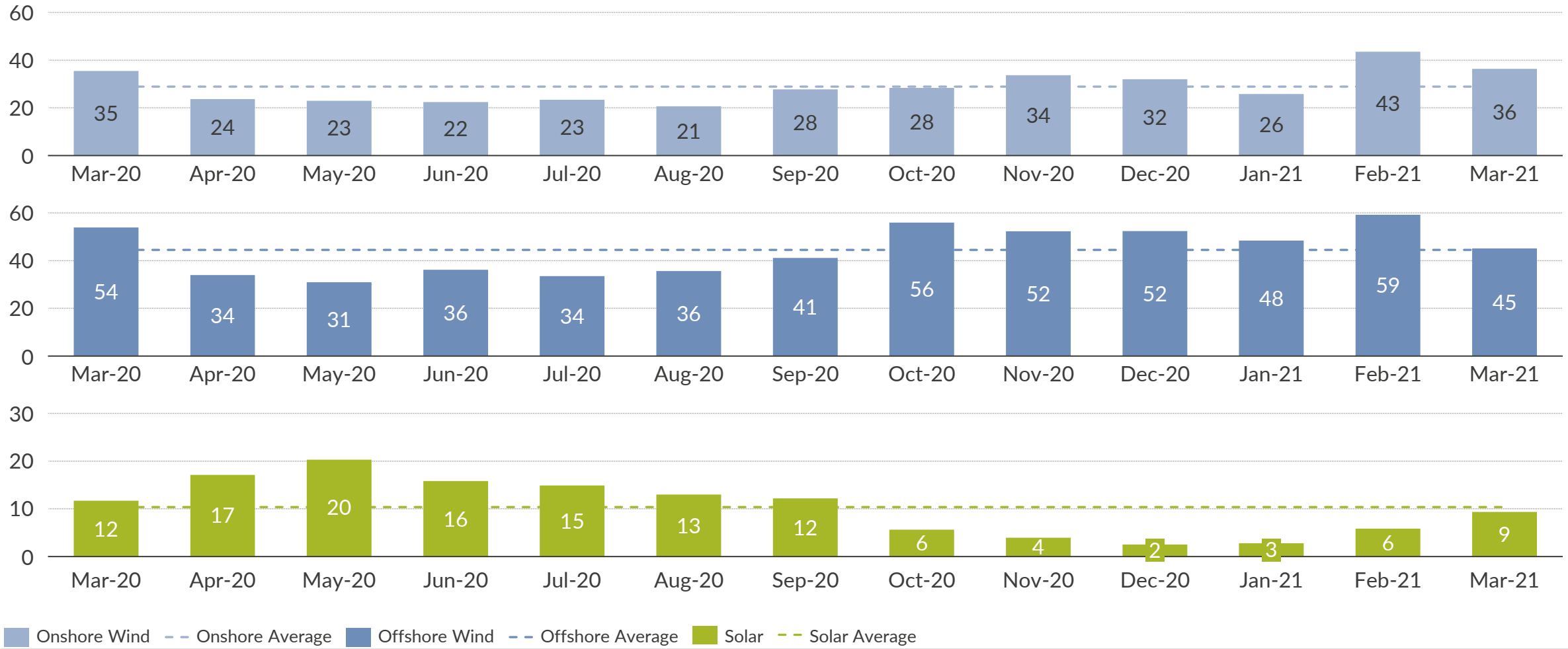
Average load factor[1]

%



1) Includes outputs from generators registered as BM Units as well as embedded wind and solar PV

Sources: Aurora Energy Research, Elexon, Crown Estate

Wind farm utilisation – load factor by wind farm

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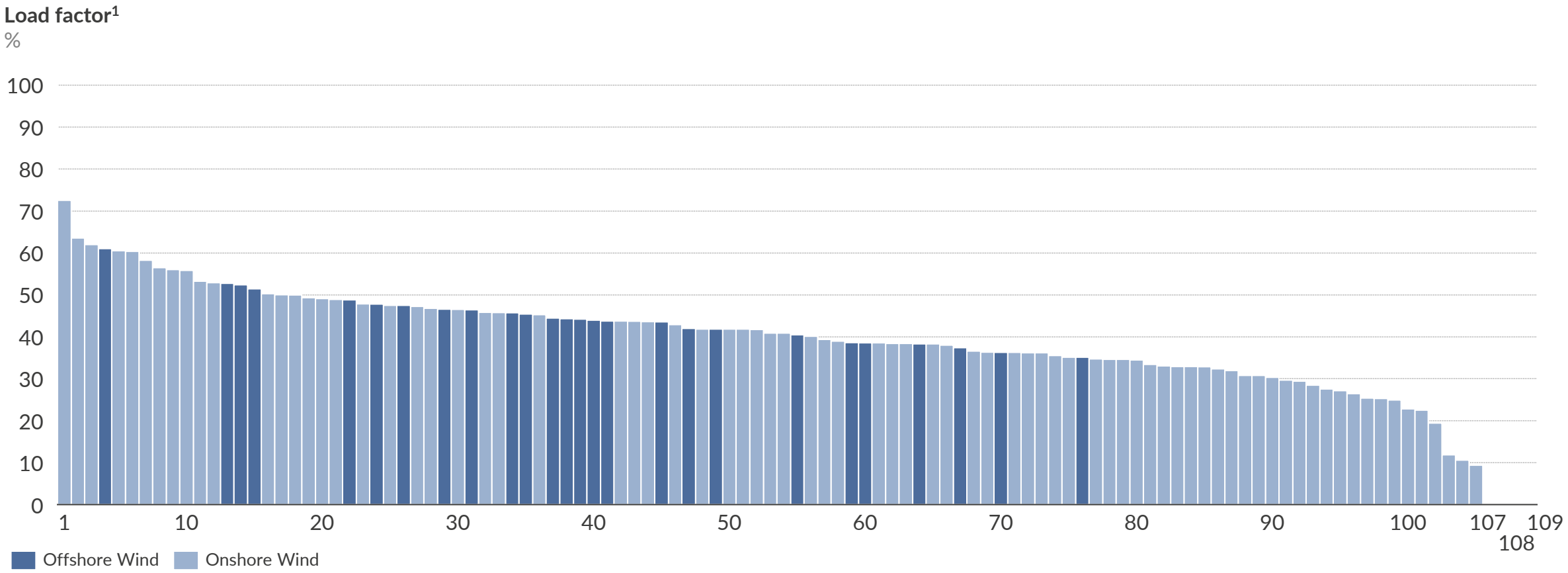

Plant Names: 1. Halsary Windfarm, 2. Whiteside Hill, 3. Gordonstown, 4. Hywind Scotland, 5. Aikengall 2, 6. Dorenell, 7. Fallago Rig, 8. Sanquhar Community, 9. Corriegarth, 10. Crystal Rig, 11. Brockloch Rig 2, 12. Coire Na Cloiche, 13. Hornsea 1 , 14. Beatrice, 15. Westermost Rough, 16. Farr, 17. Millennium, 18. Blackcraig, 19. Auchrobert, 20. Kilbraur, 21. Rothes Extension, 22. Humber, 23. Stronelairg, 24. East Anglia One, 25. Galawhistle, 26. Dudgeon, 27. Cour, 28. Hill of Glaschyle, 29. Race Bank, 30. Beinneun, 31. Walney, 32. Andershaw, 33. Kilgallioch, 34. Sheringham Shoals, 35. Galloper, 36. Carraig Gheal, 37. West of Duddon Sands, 38. Burbo Extension, 39. London Array, 40. Lincs, 41. Gwynt y Mor, 42. Dunmaglass, 43. Bad a Cheo, 44. Minsca, 45. Walney Extension, 46. Baillie, 47. Greater Gabbard, 48. Assel Valley, 49. Aberdeen, 50. Mid Hill, 51. Bhlaraidh, 52. Strathy North, 53. Beinn Tharsuinn, 54. Camster, 55. Burbo Bank, 56. Berry Burn, 57. Clyde, 58. Afton, 59. Rampion, 60. Robin Rigg, 61. Dalswinton, 62. Kype Muir, 63. Corriemoillie, 64. Barrow, 65. Harburnhead, 66. Toddleburn, 67. Ormonde, 68. Lochluichart, 69. Freasdail, 70. Gunfleet Sands, 71. Gordonbush, 72. Tullymurdoch, 73. Hare Hill Extension, 74. Ewe Hill, 75. Pen y Cymoedd, 76. Thanet, 77. Griffin, 78. Burn of Whilk, 79. Braes of Doune, 80. Glen App, 81. Minnygap, 82. Beinn An Tuirc , 83. Glens of Foudland, 84. Clashindarroch, 85. Dersalloch, 86. An Suidhe, 87. Arecleoch, 88. Whitelee, 89. Hill of Towie, 90. Edinbane, 91. Tullo, 92. Goole Fields, 93. Tullo Extension, 94. Dun Law Extension, 95. Black Law, 96. Harestanes, 97. A Chruach, 98. Moy, 99. Mark Hill, 100. Hadyard Hill, 101. Craig, 102. Glenchamber, 103. Clachan Flats, 104. Airies, 105. Embedded Wind, 106. Brownieleys, 107. Keith Hill, 108. Kincardine, 109. Middle Muir.

1) Represents UK wind farms reporting Balancing Mechanism Unit data. Figures presented reflect Final Physical Notification (FPN) expectations reported to the grid, which are not always representative of actual production

Sources: Aurora Energy Research, Elexon, Crown Estate

Wind capture price versus baseload price

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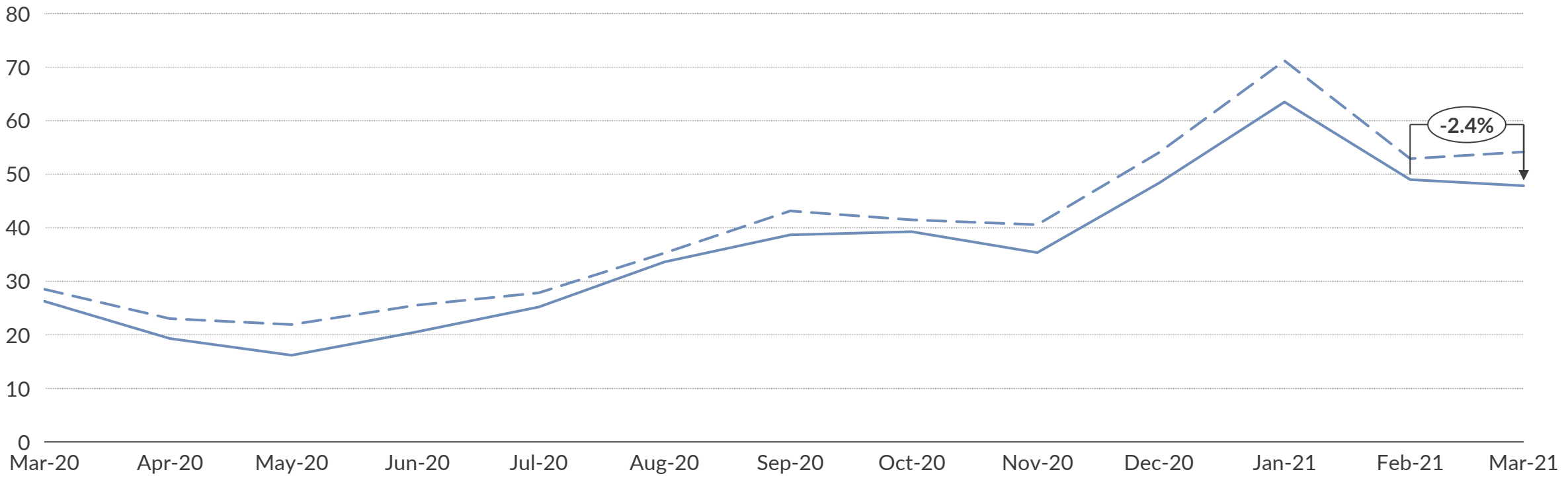
Price
£/MWh



Wind load factors
%

	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21
Baseload[1]	54	34	31	36	34	36	41	56	52	52	48	59	45
Wind Capture[2]	35	24	23	22	23	21	28	28	34	32	26	43	36

1) Baseload price is the average monthly EPEX price; 2) Wind capture price is the load-weighted monthly average EPEX price across all wind Balancing Mechanism plants for all half-hourly periods

Sources: Aurora Energy Research, Elexon, Thomson Reuters

Appendix

Data used

- Output values used in this summary reflect the sum of Final Physical Notifications (FPN) submitted by all BM Units of a given plant that have been active over the last three months.
- Capacity values used in this summary reflect the sum of capacities of individual BM Units, as reported to the Balancing Mechanism, 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.
- Prices used in this summary are the EPEX half-hourly Reference Prices for half-hourly, two-hourly and four-hourly spot products.

Categories presented

- 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.
- Running hours represent the proportion of time in a given month when a plant has been active, i.e. when at least one of its BM Units produced output greater than zero.
- Capture prices (or average output-weighted prices) are calculated as an average of EPEX half-hourly prices per MWh weighted by the plants' corresponding half-hourly outputs for all periods.
- Average gross margins are calculated as a sum of the uplift and inframarginal rent. Uplift is calculated as the difference between the EPEX price and the system marginal cost (SMC). SMC is the maximum marginal cost of all the plants with at least one generator producing above 80% of its installed capacity in a given half-hour.
- Emissions are calculated as plant output divided by electrical efficiency, multiplied by theoretical carbon content of the fuel input. The carbon content of fuel inputs is sourced from BEIS's Greenhouse gas reporting – Conversion factors 2016. System carbon intensity is calculated as the total emission divided by total electricity generated.

Source: Aurora Energy Research

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