



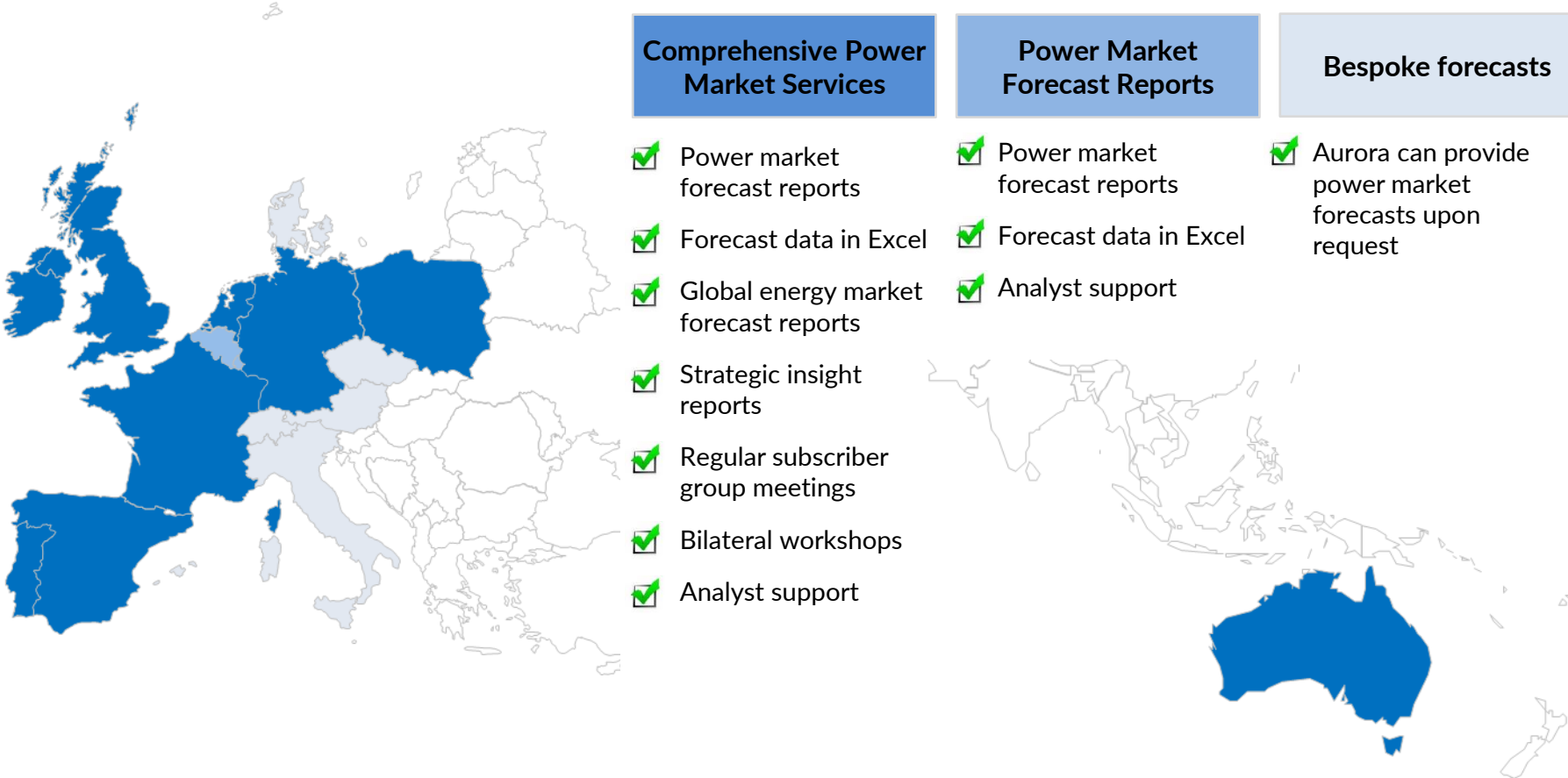
GB Wholesale Market Summary March 2020

Published April 2020

Executive summary

1. Through a combination of lower fuel prices, carbon prices and demand, COVID-19 resulted in a month-on-month decline in power prices of £1.0/MWh to £28.5/MWh in March – the lowest in a decade. See [slides 6, 7](#) and [10](#).
 2. With higher temperatures and lockdowns in place, monthly power demand fell by 10% compared to February. The dip is most notable in the last week of March, where social distancing measures resulted in demand declining by an excess of 4 GW during working hours relative to the start of March. See [slides 10](#) and [11](#).
 3. Despite the decline in demand, monthly emissions increased by 0.4 MtCO₂ (or 13%) relative to February as gas generation increased by 1.7 TWh to compensate for a dip in wind production. See [slides 10, 12](#) and [15](#).
 4. With an 8% decrease in wind capture prices and a 16 p.p. average decrease in wind load factors, wind assets saw a 10% dip in monthly gross revenues relative to February. See slides [21](#) and [23](#).
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Aurora covers key European markets & Australia



The map shows Europe and Australia. Most of Europe is highlighted in blue, including the UK, Ireland, France, Germany, Poland, Czech Republic, Slovakia, Austria, Hungary, Italy, Spain, Portugal, Greece, and Turkey. Some Eastern European countries like Russia, Ukraine, and Belarus are in light grey. Australia is also highlighted in blue. New Zealand is in light grey.

Comprehensive Power Market Services	Power Market Forecast Reports	Bespoke forecasts
<ul style="list-style-type: none">✓ Power market forecast reports✓ Forecast data in Excel✓ Global energy market forecast reports✓ Strategic insight reports✓ Regular subscriber group meetings✓ Bilateral workshops✓ Analyst support	<ul style="list-style-type: none">✓ Power market forecast reports✓ Forecast data in Excel✓ Analyst support	<ul style="list-style-type: none">✓ Aurora can provide power market forecasts upon request

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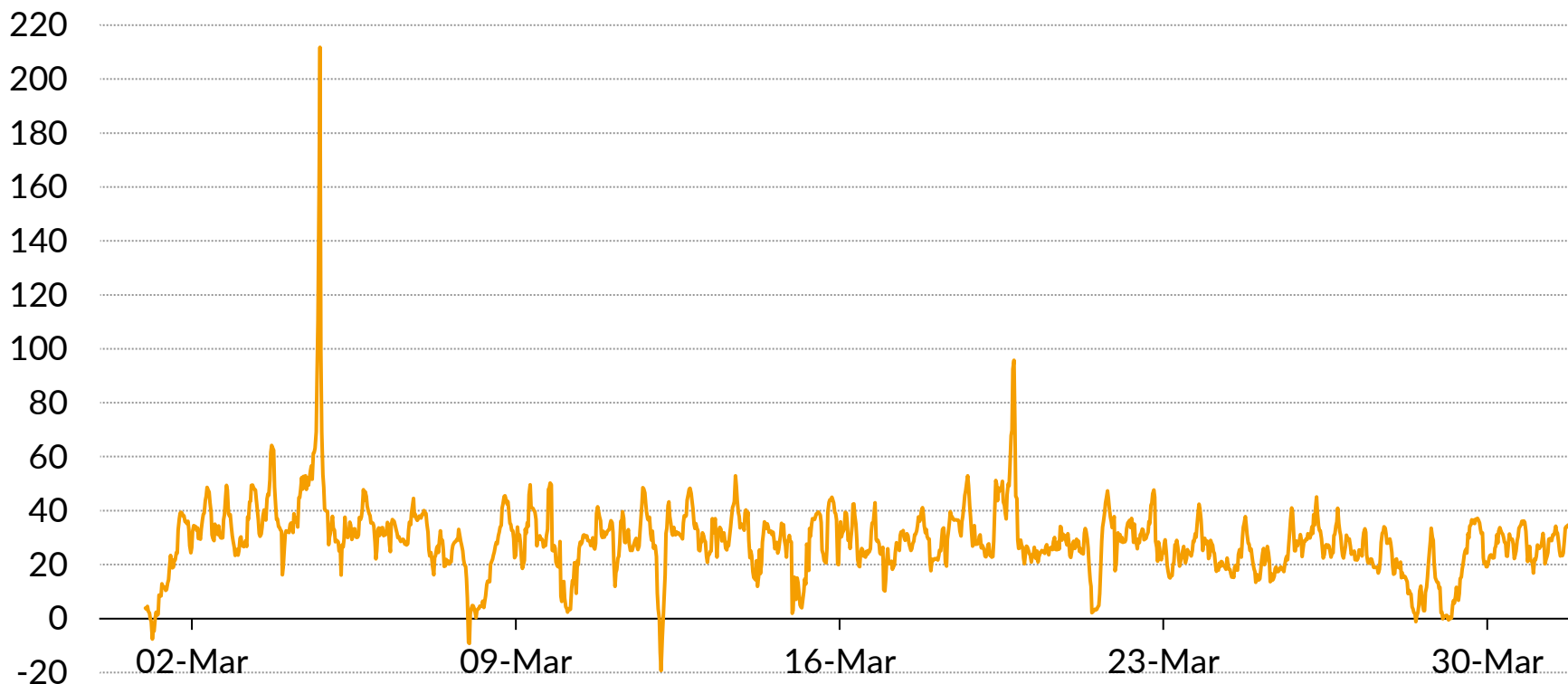
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1. System performance
2. Company performance (available to subscribers only)
3. Plant performance

Half-hourly APX spot price for March

APX spot price¹,
£/MWh

Monthly average price
in March 2020:
£28.51/MWh

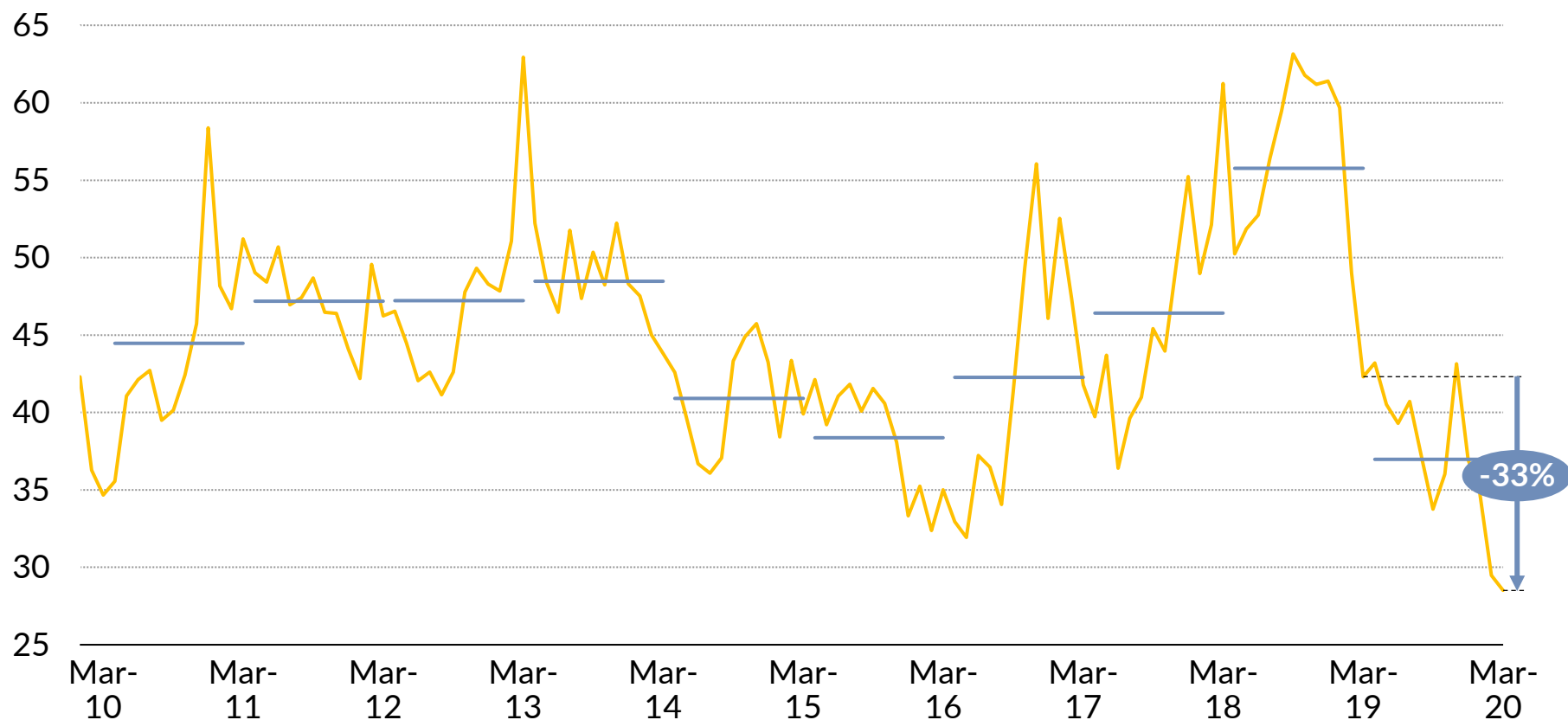


1. Half-hourly APX is the volume-weighted reference price over that half-hour interval, as provided by APX Power UK.

Historic monthly average APX spot price

Average APX spot price¹,
£/MWh

— Average monthly spot price — Annual average spot price



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

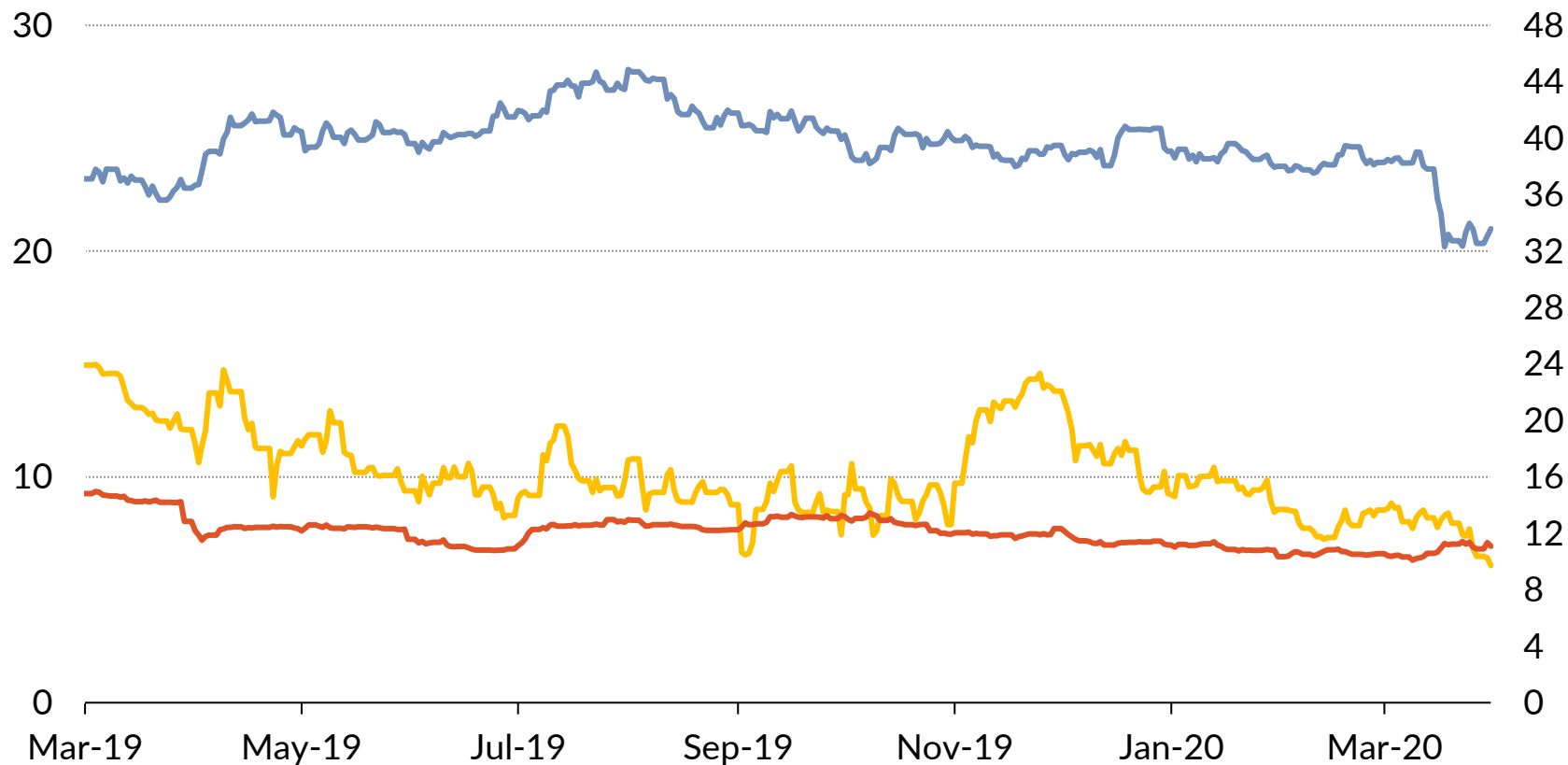
Historic fuel prices

Gas, Coal and Carbon daily prices

Gas/Coal price,
£/MWh

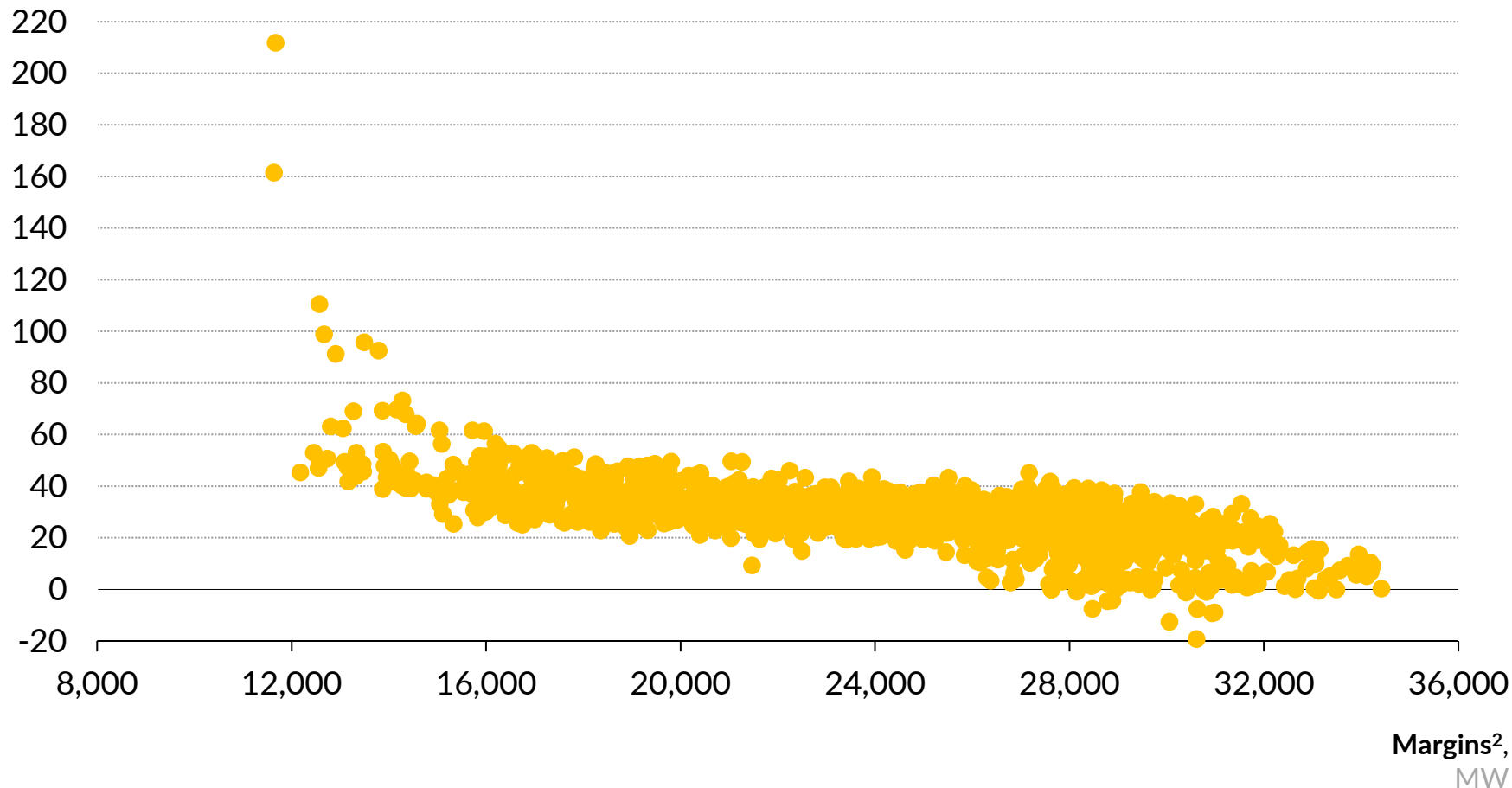
— Gas — Coal — CO2

Carbon price,
£/Tonne



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

APX spot price¹,
£/MWh

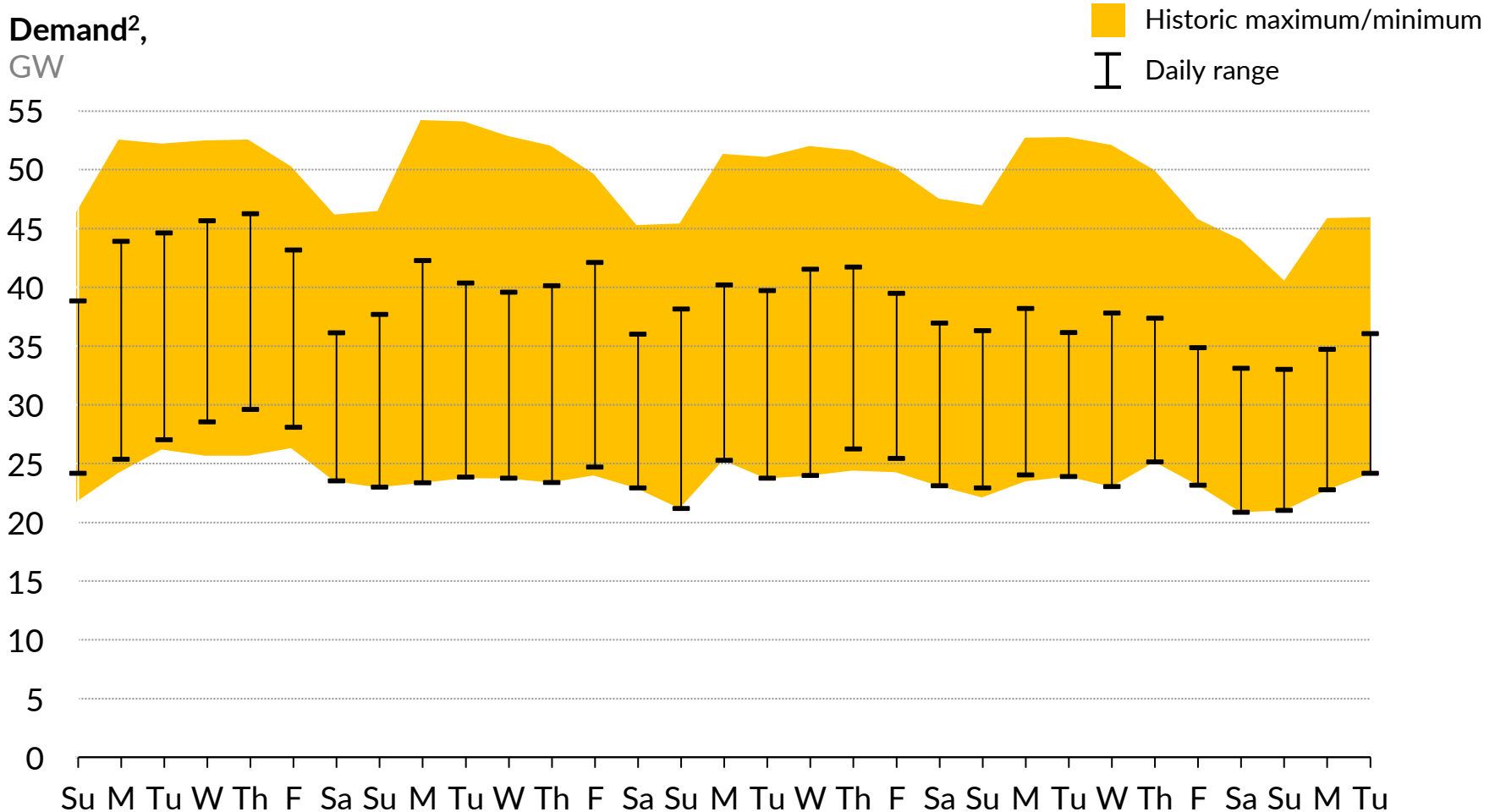


1. Half-hourly APX is the volume-weighted reference price over that half-hour interval, as provided by APX Power UK.

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.

Daily March max and min demand

Relative to historic March max and min demand since 2010¹



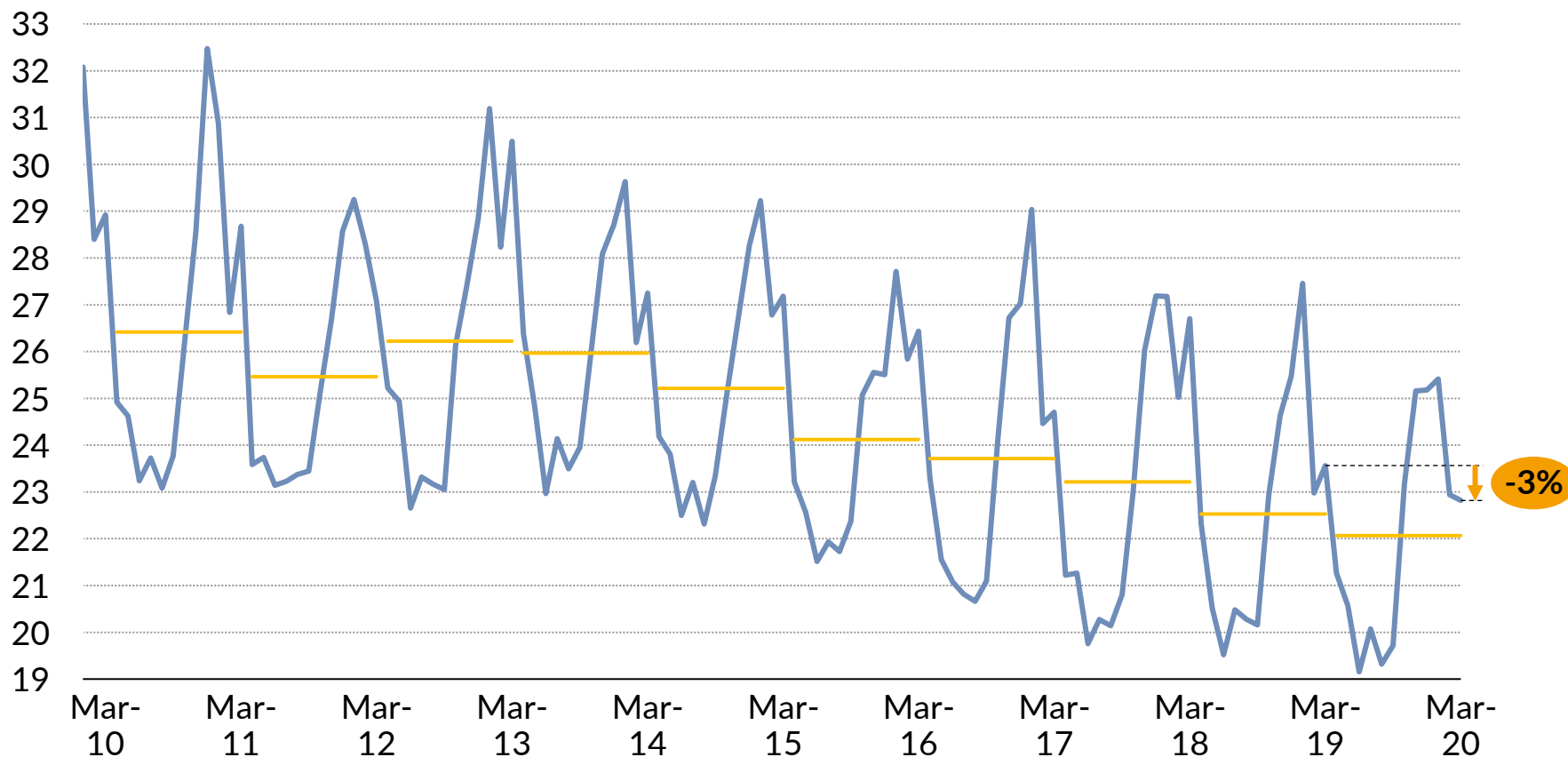
1. Data from previous years is matched to the nearest weekday within the current month, to maintain the weekly demand pattern.

2. Demand data presented here is Initial Transmission System Demand Out-Turn, and does not include embedded demand.

Monthly historical demand on the transmission system

Total demand¹,
TWh

— Total monthly demand — Annual average demand



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.

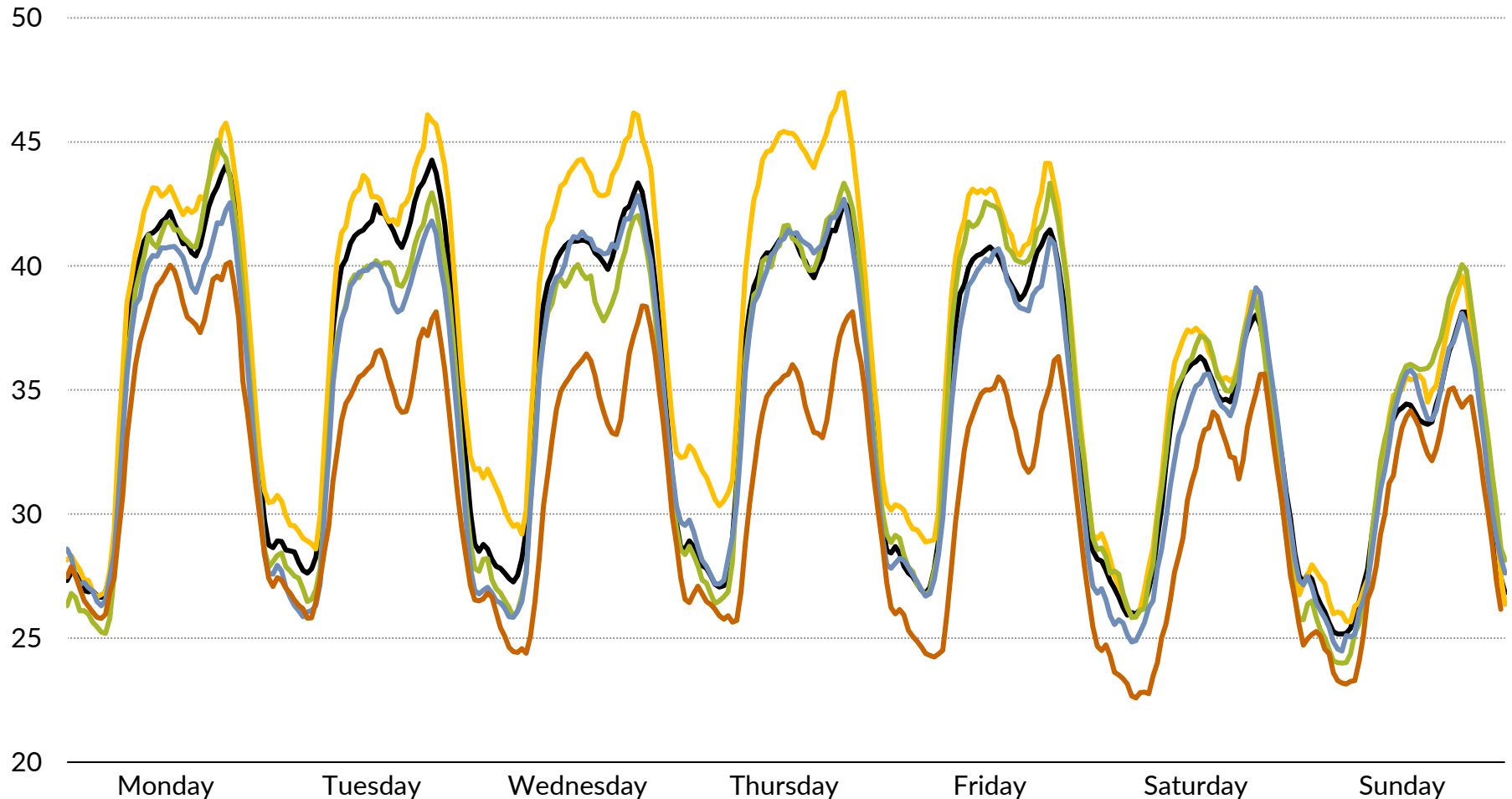
Daily March demand trends

Displayed by week and relative to March 2019

GB Daily demand¹,
GW

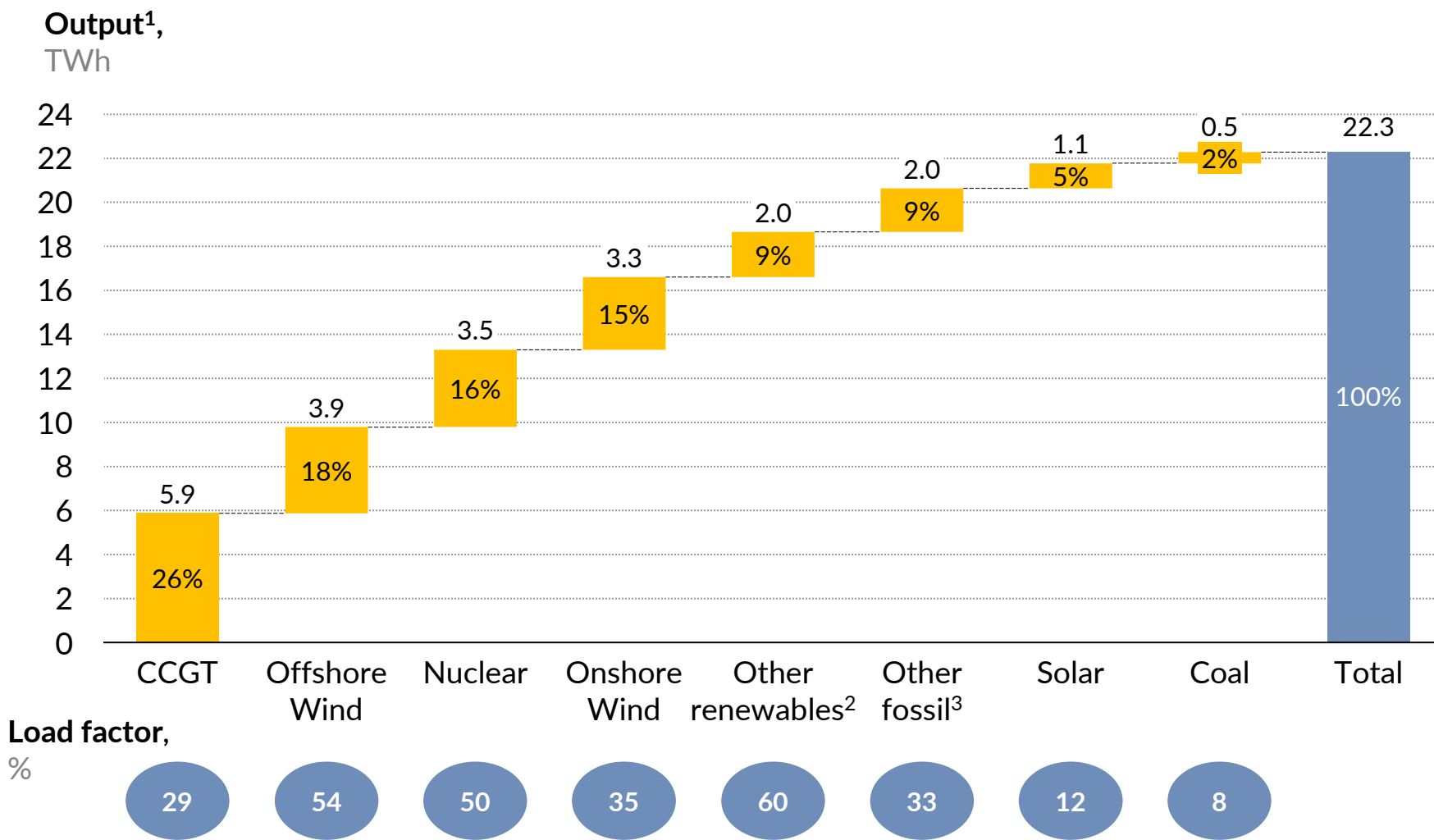
March 2020

— March 2019 avg. — W. starting 2nd — W. starting 9th — W. starting 16th — W. starting 23rd



1. Includes both transmission and embedded demand.

Monthly fuel mix breakdown

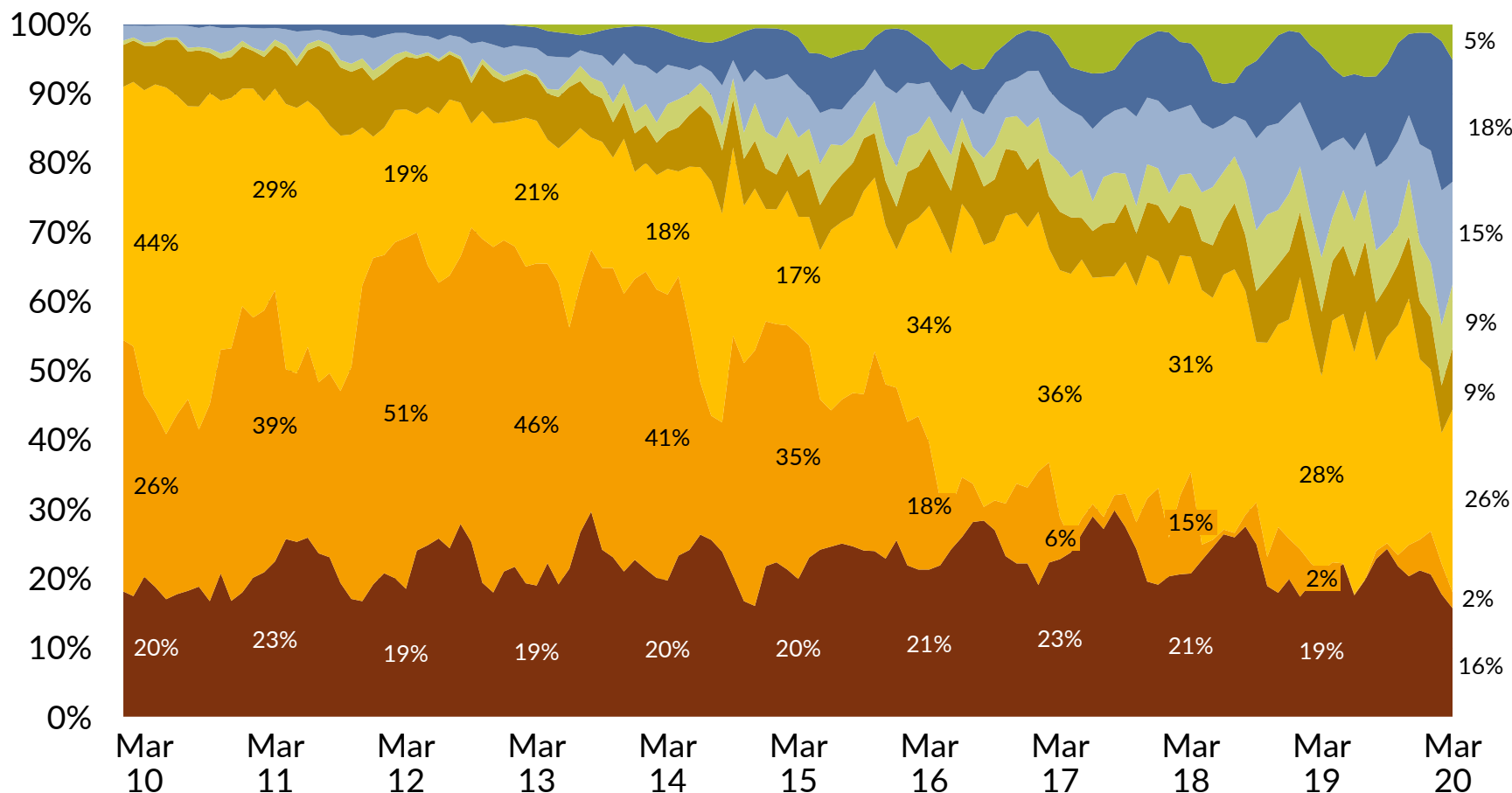


1. Includes outputs from generators registered as BM Units as well as embedded wind and solar PV assets. All numbers are rounded to 0.1 TWh which means that subtotals may not sum to total value. 2. Other fossil includes oil, CHP-CCGT and OCGT. 3) Other renewables includes biomass and hydro.

Historical fuel mix breakdown

Output¹,
% of total

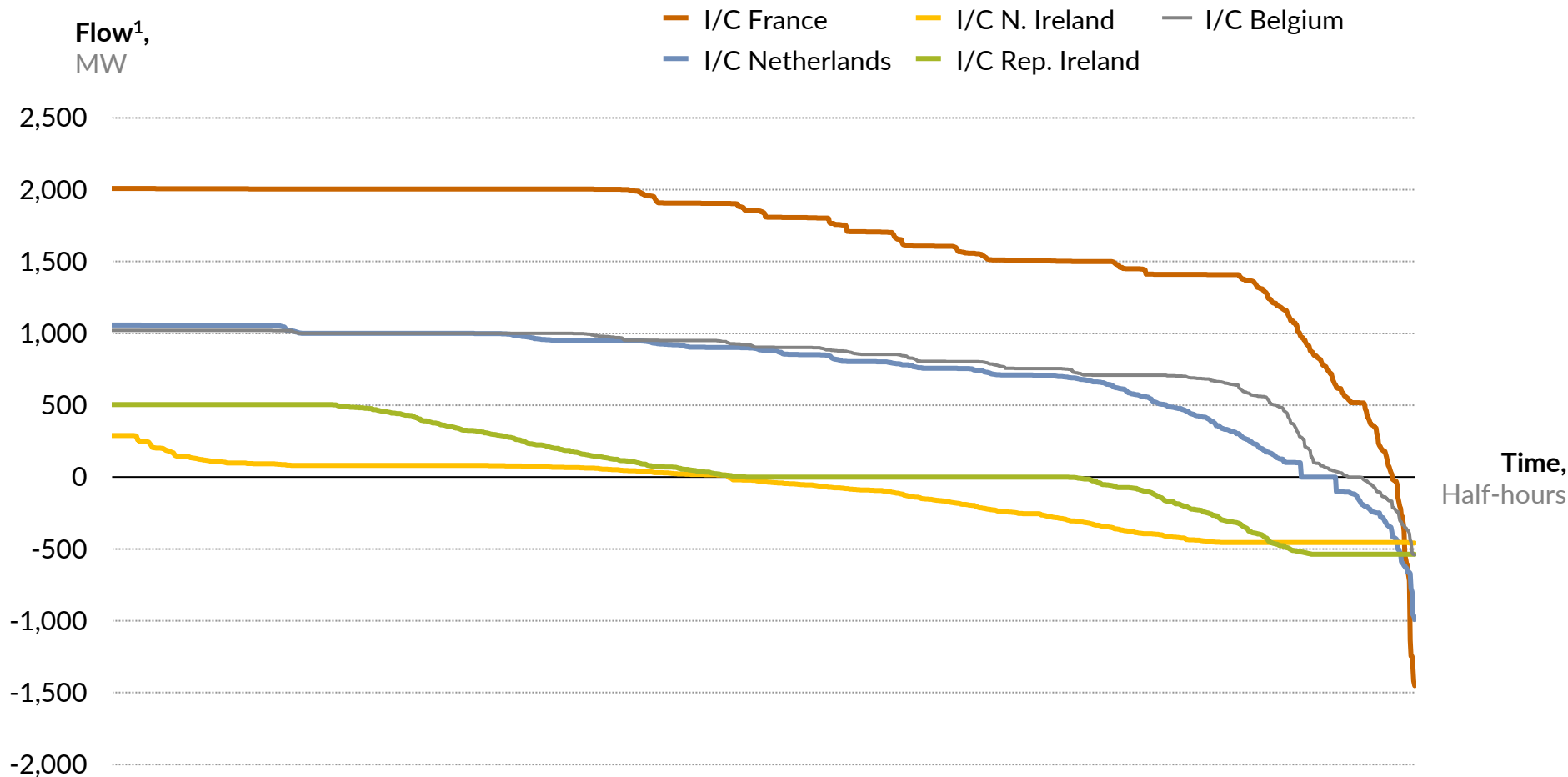
■ Nuclear ■ Coal ■ CCGT ■ Other fossil² ■ Other renewables³ ■ Offshore Wind ■ Onshore Wind ■ Solar



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.

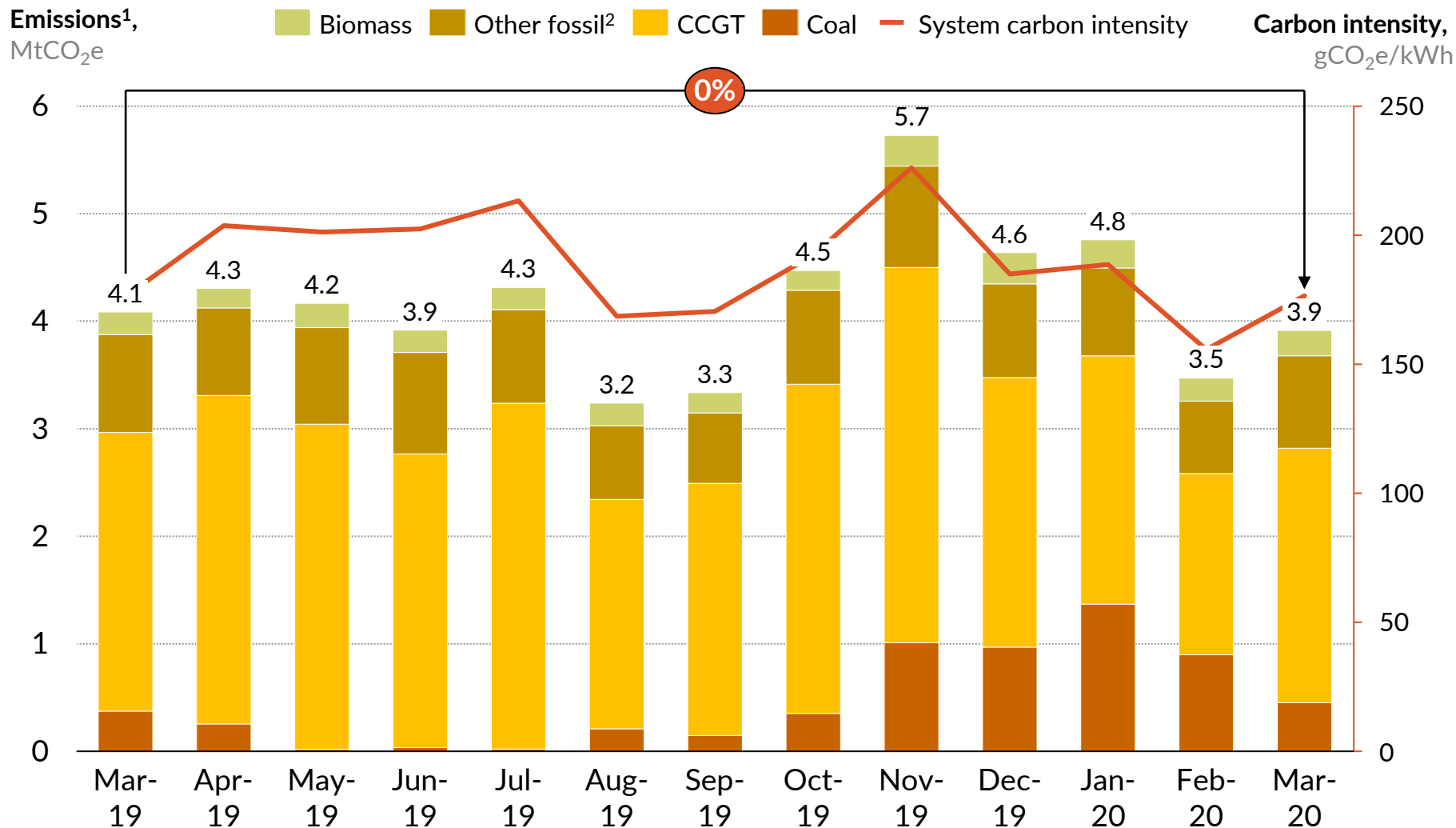
Monthly interconnector flow duration curve

Flow in each half-hour for GB interconnectors



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

Monthly emissions by technology



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

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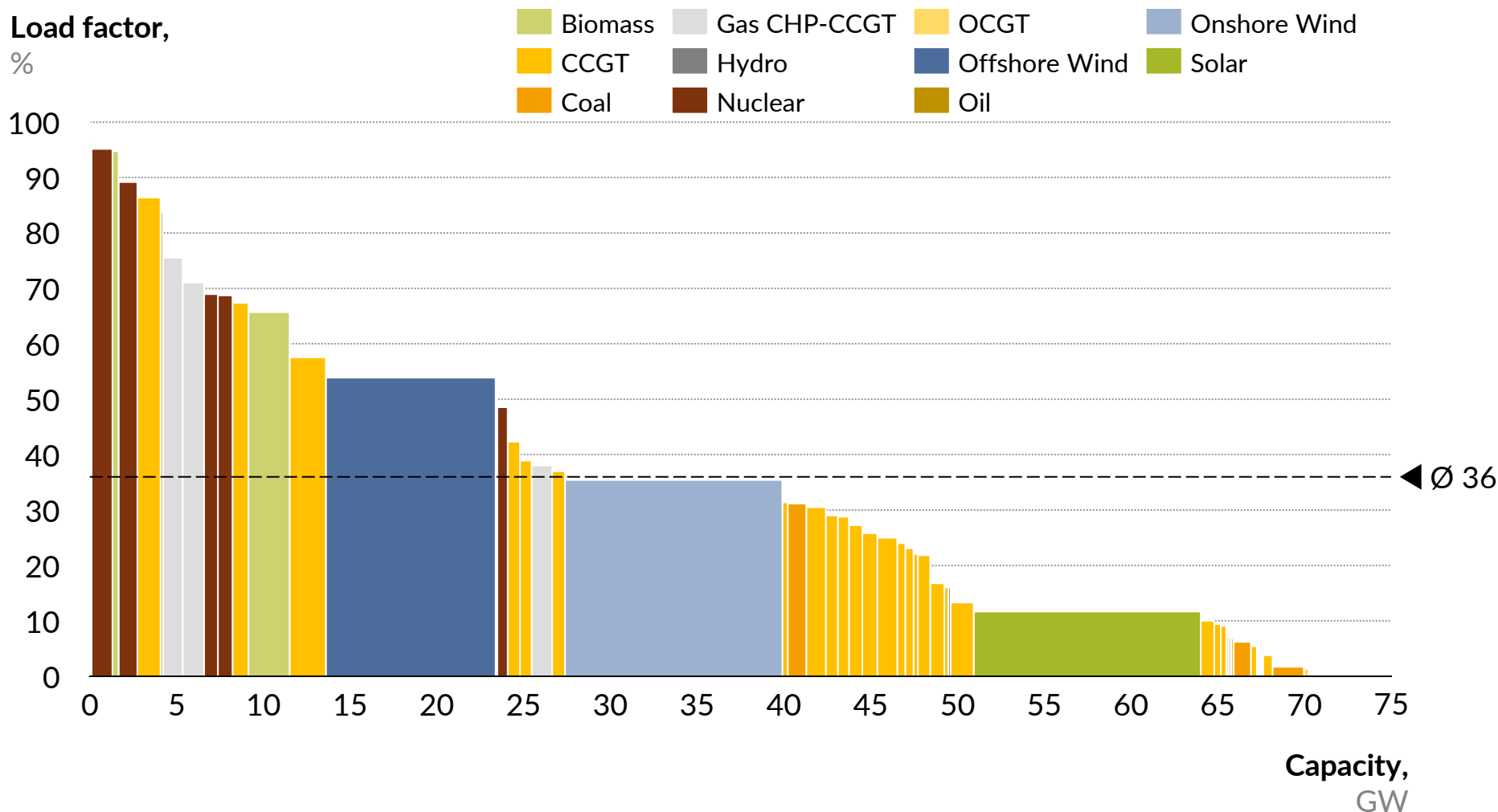
1. System performance
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Plant utilisation – load factors by plant (column width reflects capacity)

Load factor,
%



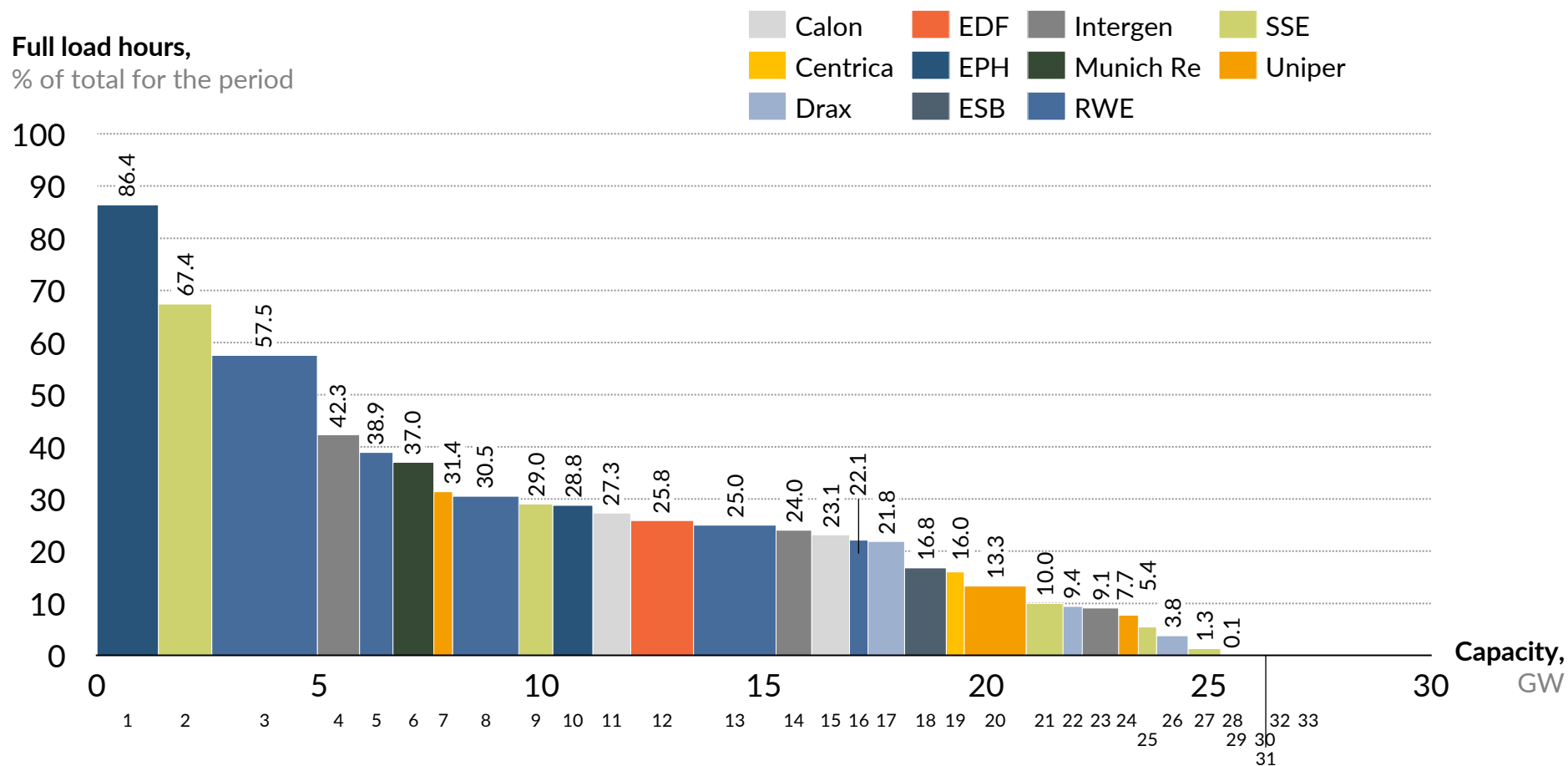
Represents 60 plants with highest capacity according to the Balancing Mechanism (BM) database, as well as aggregated data for wind and solar. Capacity of each plant represents the sum of capacities of all its generators that have been active at least once in the last three months.

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

CCGT plant utilisation – by plant, March 2020

Column width reflects capacity

Full load hours,
% of total for the period



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

Includes all CCGT plants of the presented companies that report to the Balancing Mechanism. Refer to Appendix B for ownerships in joint-ventured CCGT plants.

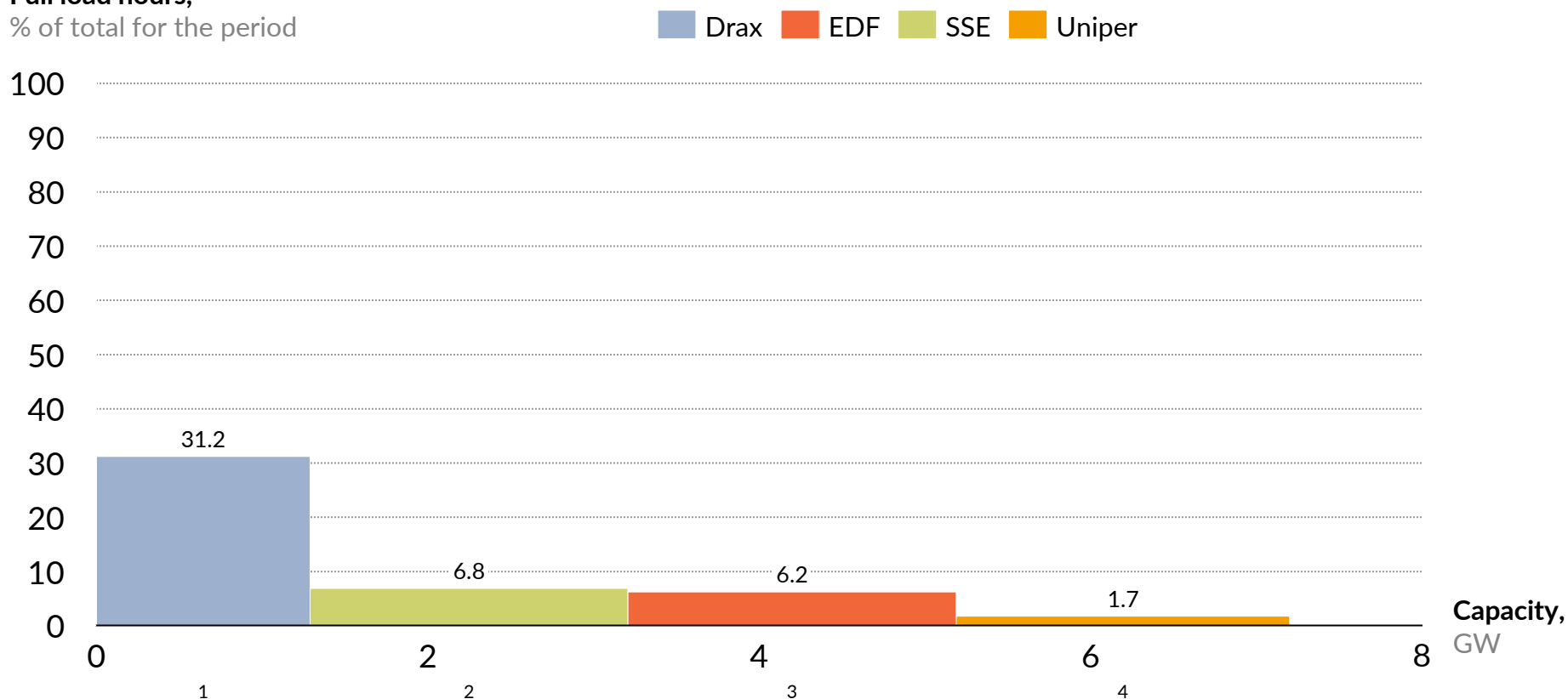
3. Plant performance

Coal plant utilisation – by plant, March 2020

Column width reflects capacity

Full load hours,

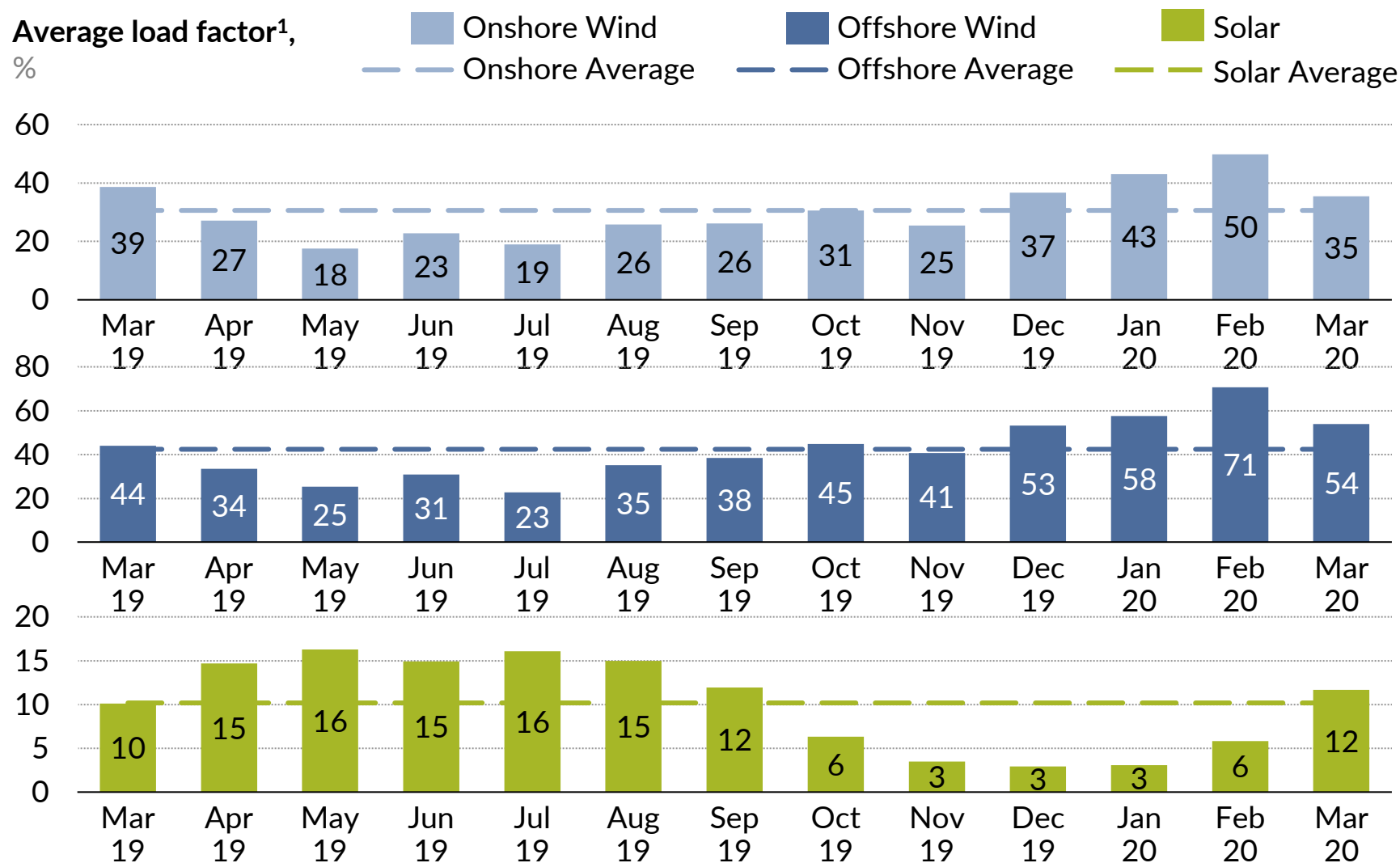
% of total for the period



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

Includes all coal plants of the presented companies that report to the Balancing Mechanism. Refer to Appendix B for ownerships in joint-ventured coal plants.

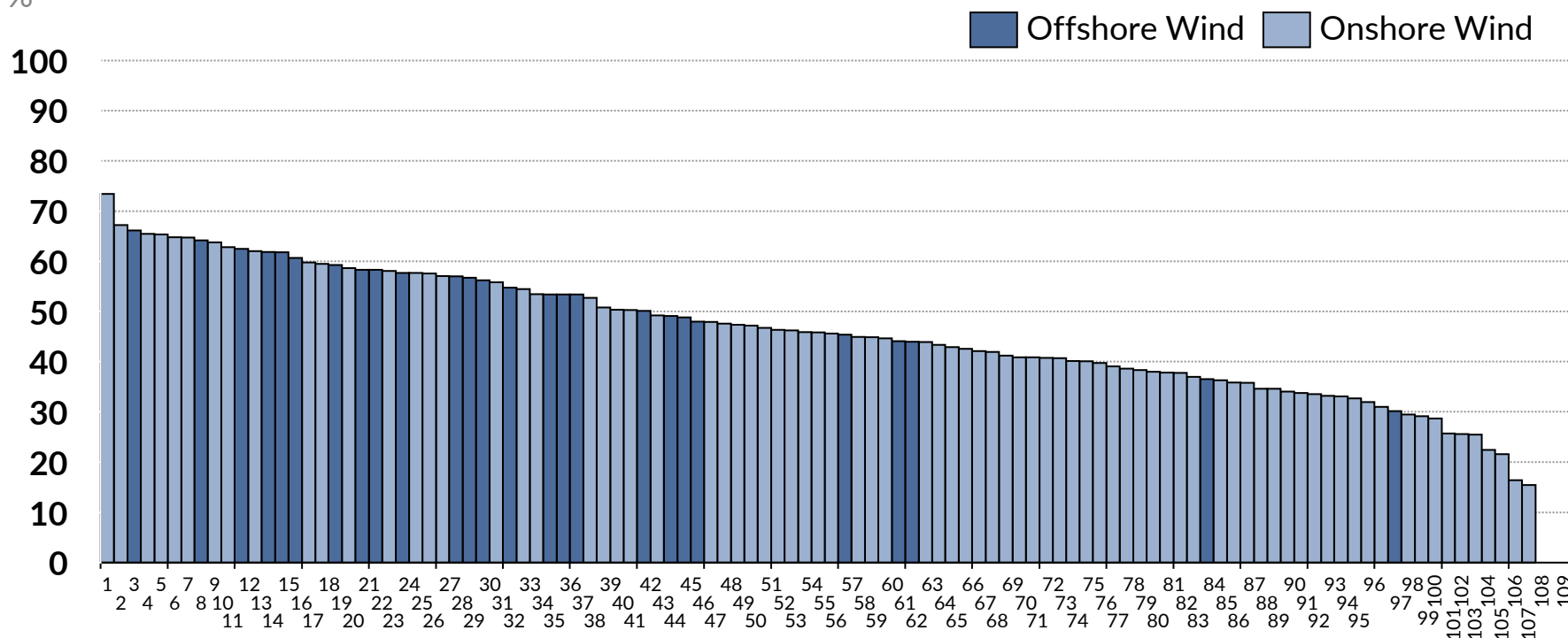
Monthly load factors by technology



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

Wind farm utilisation – load factor by wind farm

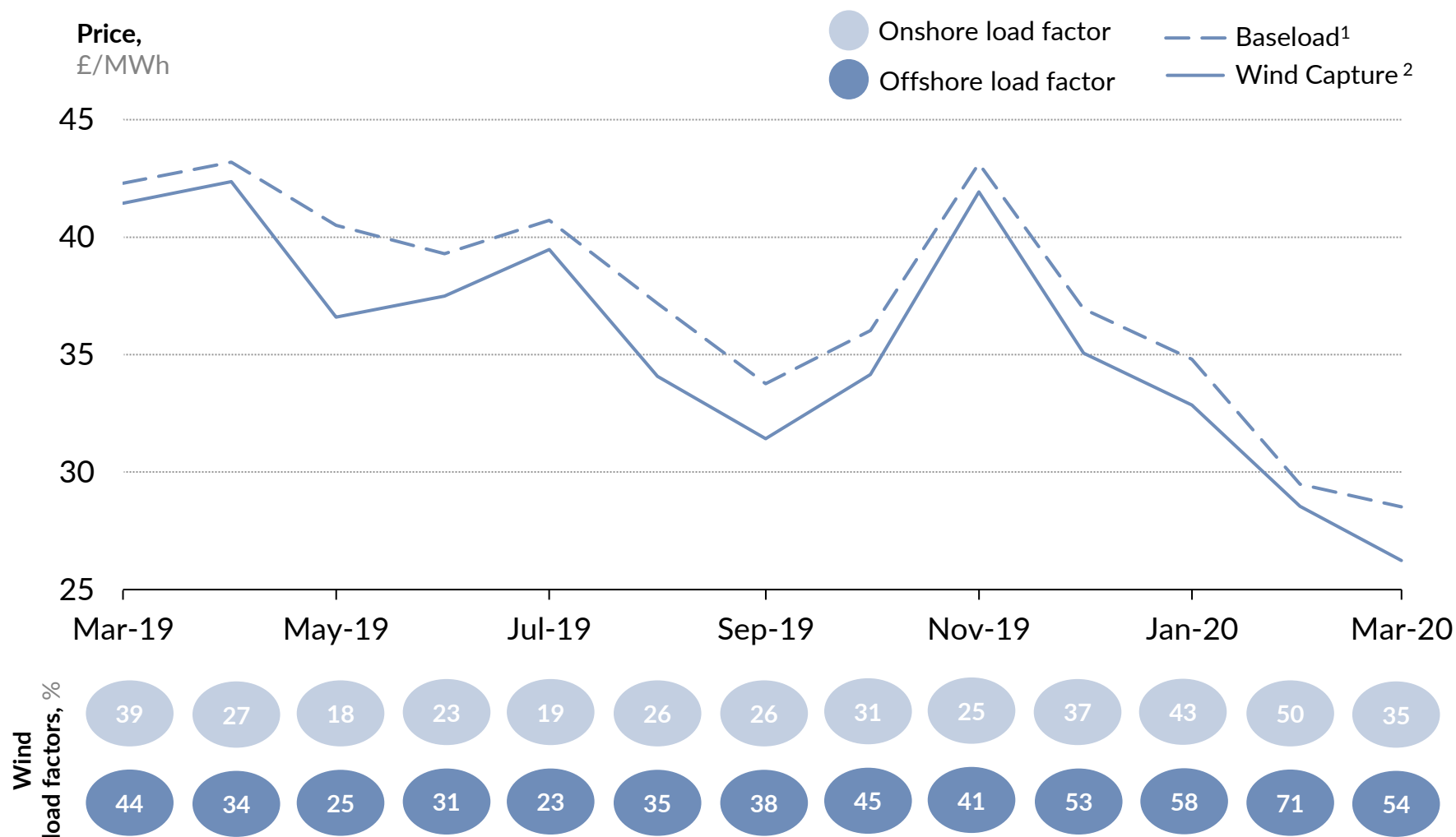
Load factor¹,
%



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

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.

Wind capture price versus baseload price



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

Appendix A

Data used:

1. 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.
2. 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.
3. Prices used in this summary are the APX half-hourly Reference Prices for half-hourly, two-hourly and four-hourly spot products.

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 at least one of its BM Units produced output greater than zero.
3. Capture prices (or average output-weighted prices) are calculated as an average of APX half-hourly prices per MWh weighted by the plants' corresponding half-hourly outputs for all periods.
4. Average gross margins are calculated as a sum of the uplift and inframarginal rent. Uplift is calculated as the difference between the APX 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.
5. 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 DECC's *Greenhouse gas reporting – Conversion factors 2016*. System carbon intensity is calculated as the total emission divided by total electricity generated.

Appendix B

List of joint ventures in CCGT, coal and offshore wind:

CCGT plants:

Marchwood is co-owned by SSE (50%) and Munich Re (50%);
Deeside is co-owned by Engie (75%) and Mitsui (25%);
Seabank 1 is co-owned by SSE (50%) and Cheung Kong Infrastructure Holdings (50%).
Seabank 2 is co-owned by SSE (50%) and Cheung Kong Infrastructure Holdings (50%).

Coal plants:

Eggborough is co-owned by EPH (90%) and Engie (10%);
Rugeley is co-owned by Engie (75%) and Mitsui (25%).

Offshore wind farms:

Gwynt y Mor is co-owned by RWE (60%), Stadtwerke Muenchen (30%) and Siemens (10%);
Greater Gabbard is co-owned by SSE (50%) and RWE (50%);
London Array is co-owned by E.ON (30%), DONG (25%), the Caisse (25%) and Masdar (20%);
Gunfleet Sands is co-owned by DONG (50.1%), Marubeni (24.95%) and Development Bank of Japan (24.95%);
Walney is co-owned by DONG (50.1%), SSE (25.1%) and PGGM & Dutch Ampere Equity Fund (24.8%);
Sheringham Shoals is co-owned by Statkraft (40%), Statoil (40%) and Green Investment Bank (20%);
Lincs is co-owned by Centrica (50%), Siemens (25%) and DONG (25%);
West of Duddon Sands is co-owned by DONG (50%) and Scottish Power (50%);
Westermest Rough is co-owned by DONG (50%), Marubeni (25%) and Green Investment Bank (25%).

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