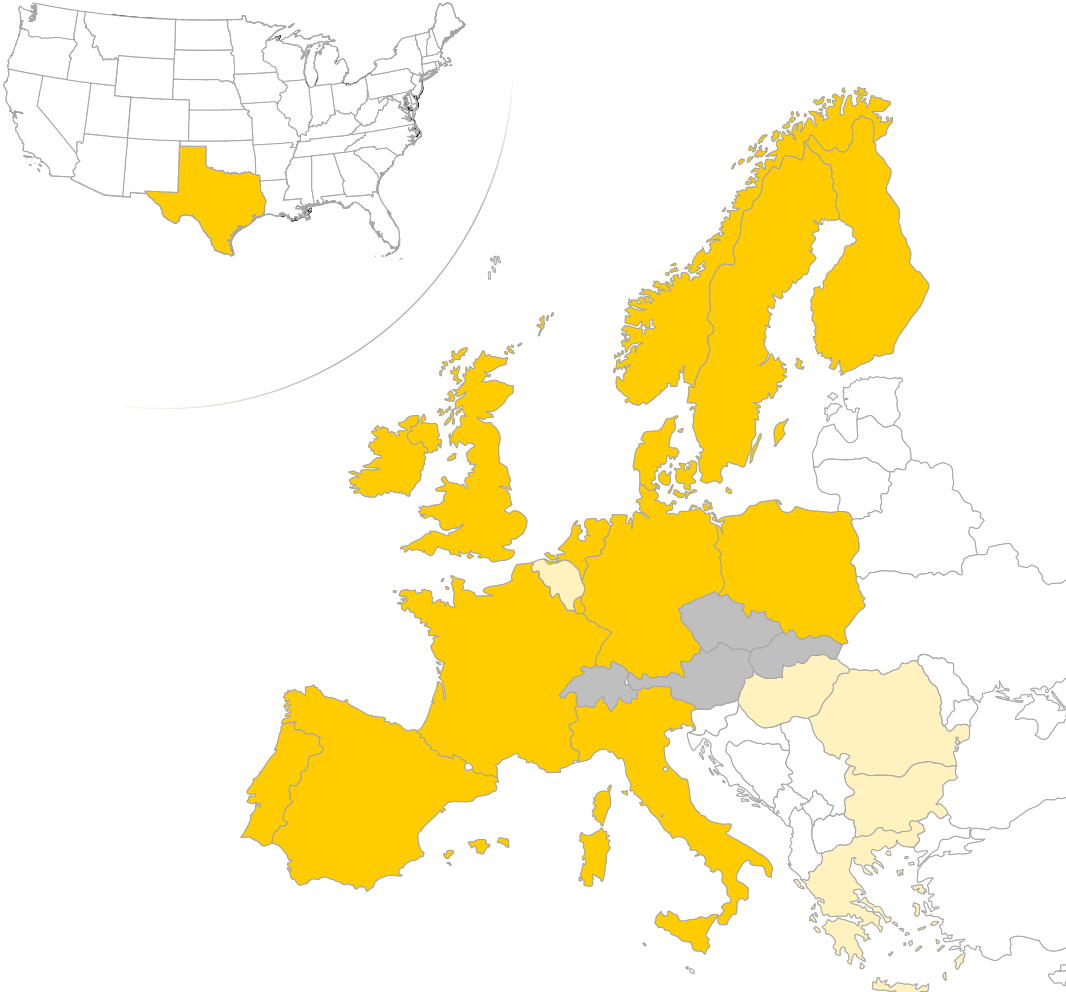


GB Wholesale Market Summary July 2021

Published August 2021



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Executive Summary

- Average power prices in July climbed to £94/MWh driven by the continued increase in gas and carbon prices, a 23% increase from May
- The UK-ETS traded at an average of £44/tCO₂ in July, a £2/tCO₂ decrease relative to June
- Driven by increased demand and lower onshore wind generation relative to June, thermal generation climbed from 53% to 57% of the fuel mix for July
- Consequently, emissions increased to 4.1 MtCO₂e, a 24% increase relative to June
- Lower wind speeds saw onshore wind load factors fall by almost half, averaging just 11% throughout July

	Monthly value ¹	Month-on-month change	Year-on-year change	Slide reference(s)
Power prices £/MWh	93.9	+17.3 (22.5%)	+66.1 (237.5%)	<u>5, 6</u>
Gas prices £/MWh	30.8	+6.2 (25.2%)	+26.3 (583.4%)	<u>7</u>
Carbon² prices £/tCO ₂	63.7	-1.8 (3%)	+19.4 (45.1%)	<u>7</u>
Transmission demand TWh	19.7	+0.9 (4.8%)	+1.0 (5.1%)	<u>10</u>
Low carbon³ generation TWh	9.3	-1.5 (13.5%)	-2.7 (22.3%)	<u>11, 12</u>
Thermal⁴ generation TWh	9.1	+1.6 (21.5%)	+1.0 (12.2%)	<u>11, 12</u>
Carbon emissions MtCO ₂ e	4.1	+0.8 (22.8%)	+0.5 (15.0%)	<u>14</u>
Grid carbon intensity gCO ₂ e/kWh	244.1	+42.3 (21.0%)	+35.6 (17.1%)	<u>14</u>
Wind load factors⁵ %	15.9	-6.1 (28.3%)	-12.4 (44.8%)	<u>25</u>
Wind capture prices⁵ £/MWh	88.7	+12.5 (16.4%)	+63.5 (251.8%)	<u>27</u>

*all data presented in this report is as collated on 5th of August 2021

1) Values averaged over the calendar month. 2) Includes CPS and EU-ETS, the UK-ETS auctions commenced in May 2021. 3) Includes renewables and nuclear generation 4) Includes CCGTs, coal and other fossil plants. 5) Average of onshore and offshore wind
Sources: Aurora Energy Research, Thomson Reuters, National Grid, Ofgem, Elexon

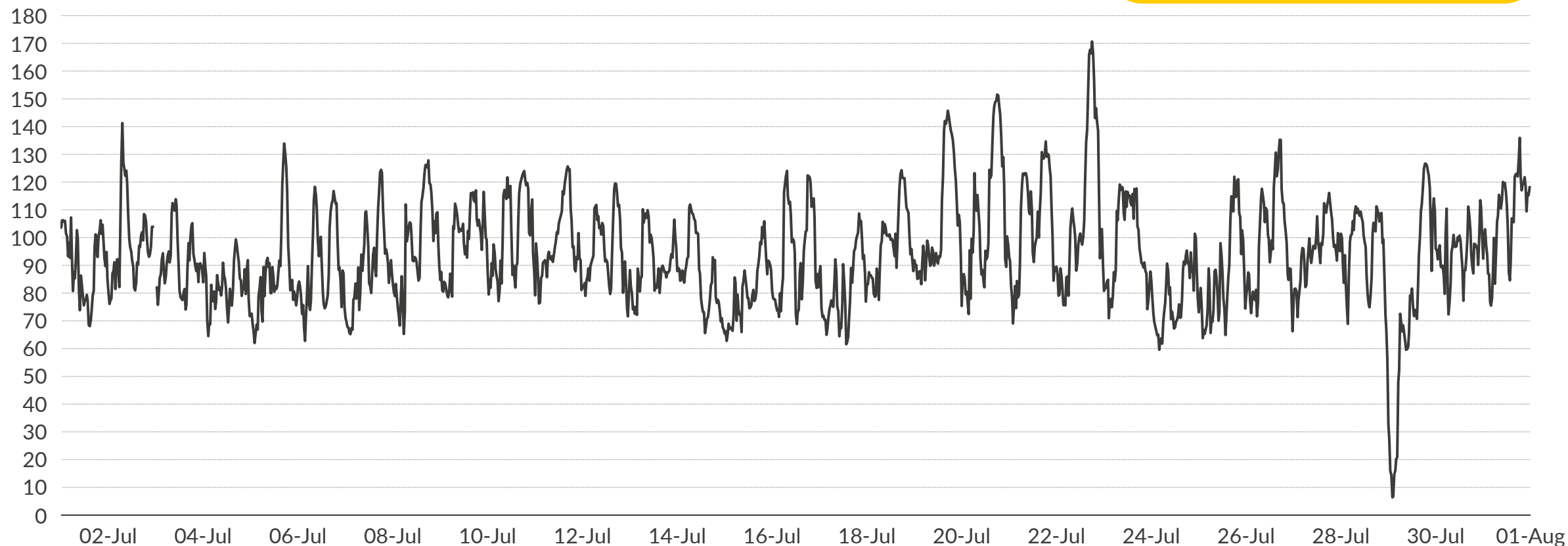
Agenda

- I. System performance
- II. Company performance (available to subscribers only)
- III. Plant performance

Half-hourly EPEX spot price for July

EPEX spot price¹
£/MWh

Monthly average price in July 2021:
£93.93/MWh



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

Historic monthly average EPEX spot price

Average EPEX spot price¹
£/MWh



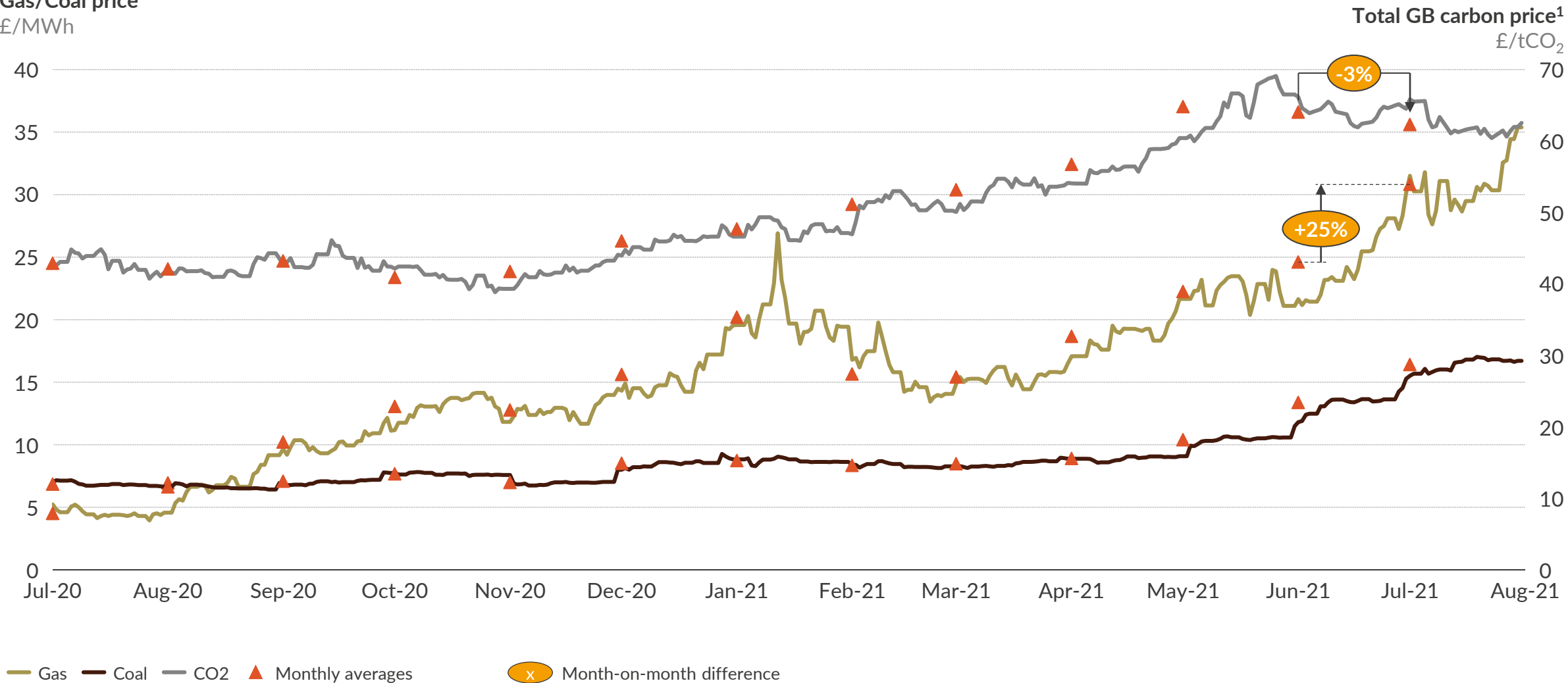
— Average monthly spot price — Annual average spot price (x) Month-on-month difference (x) Year-on-year difference

1) Average monthly EPEX 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

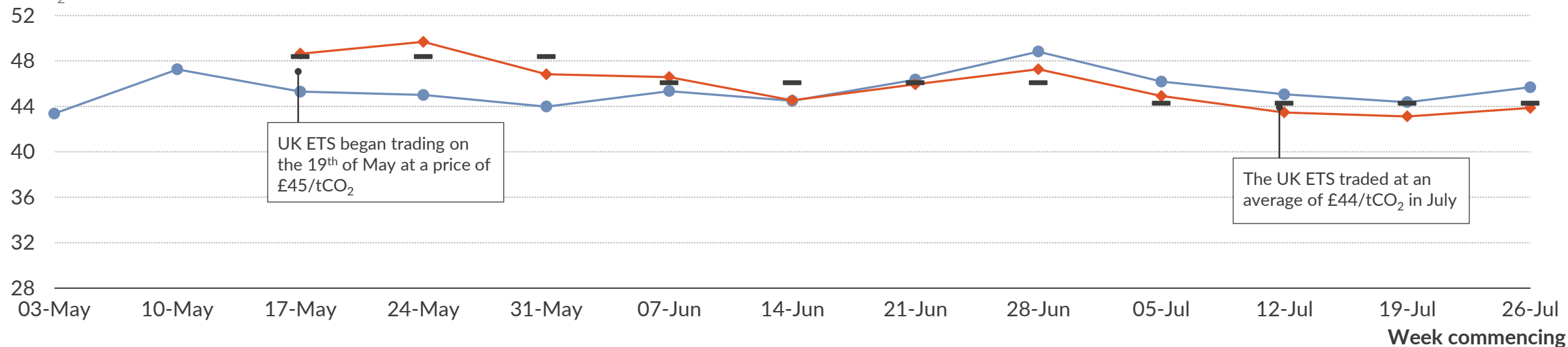
Gas/Coal price
£/MWh



1) Includes CPS and EU-ETS until 18th of May 2021, and from 19th of May onwards, includes CPS and UK ETS.

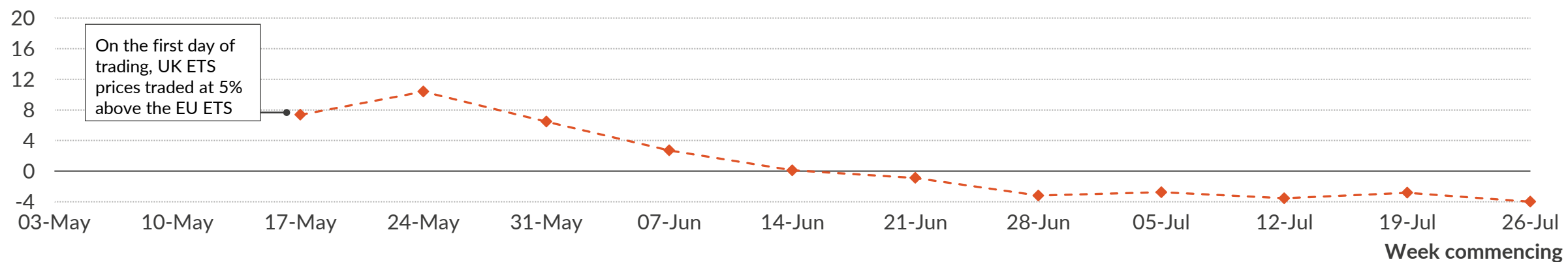
Historic UK ETS and EU ETS Prices

Weekly average EU and UK ETS prices

£/tCO₂

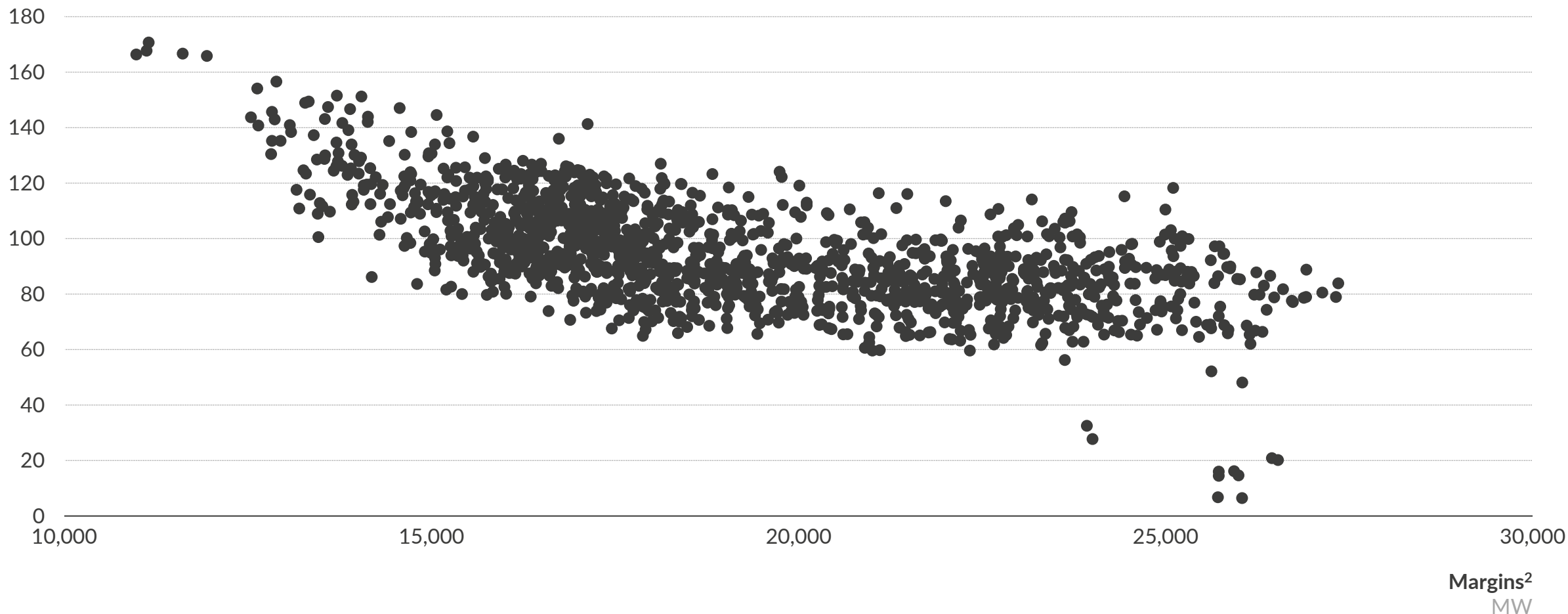
Relative difference between UK and EU ETS prices

%



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

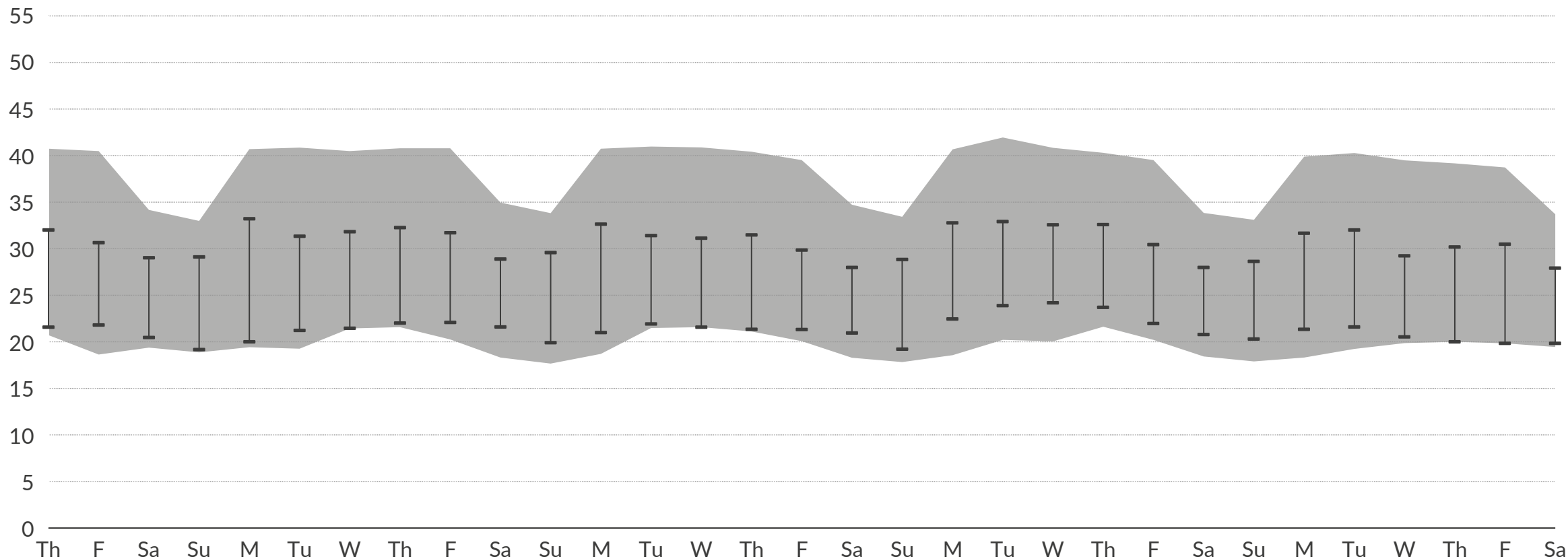
EPEX spot price¹
£/MWh



Daily July max and min demand

Relative to historic July max and min demand since 2010¹

Demand²
GW

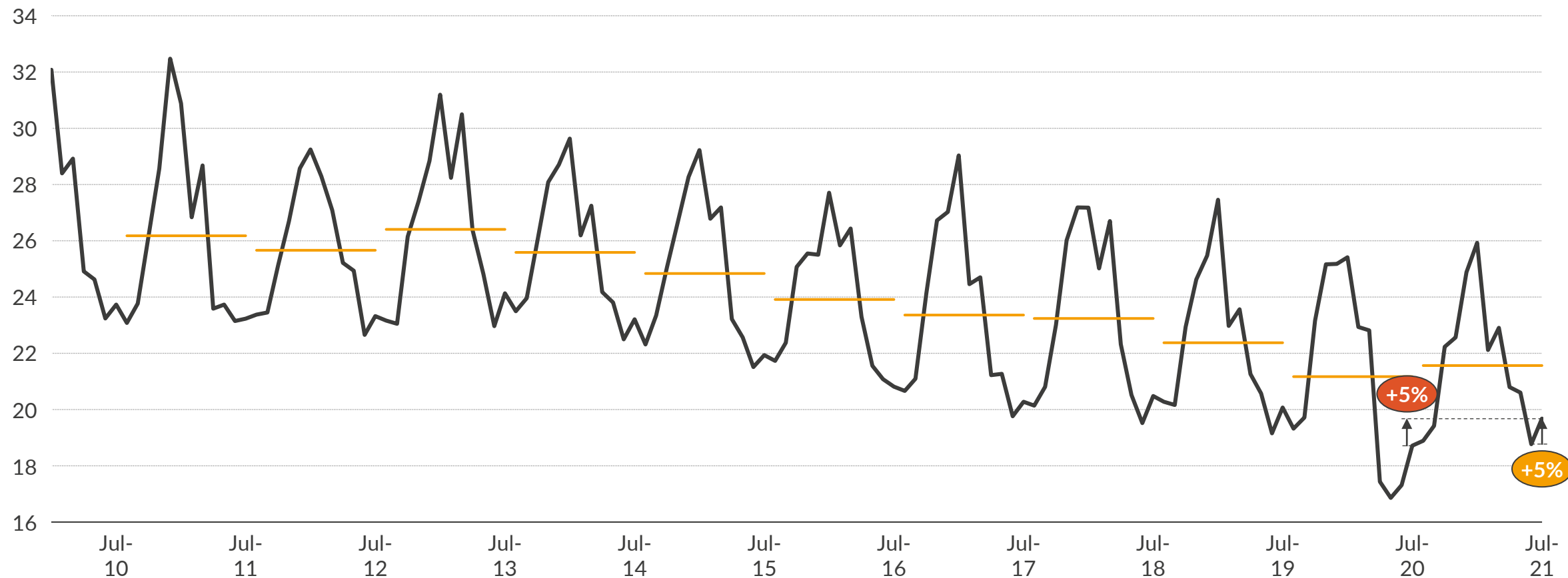


 Daily range  Historic maximum/minimum

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



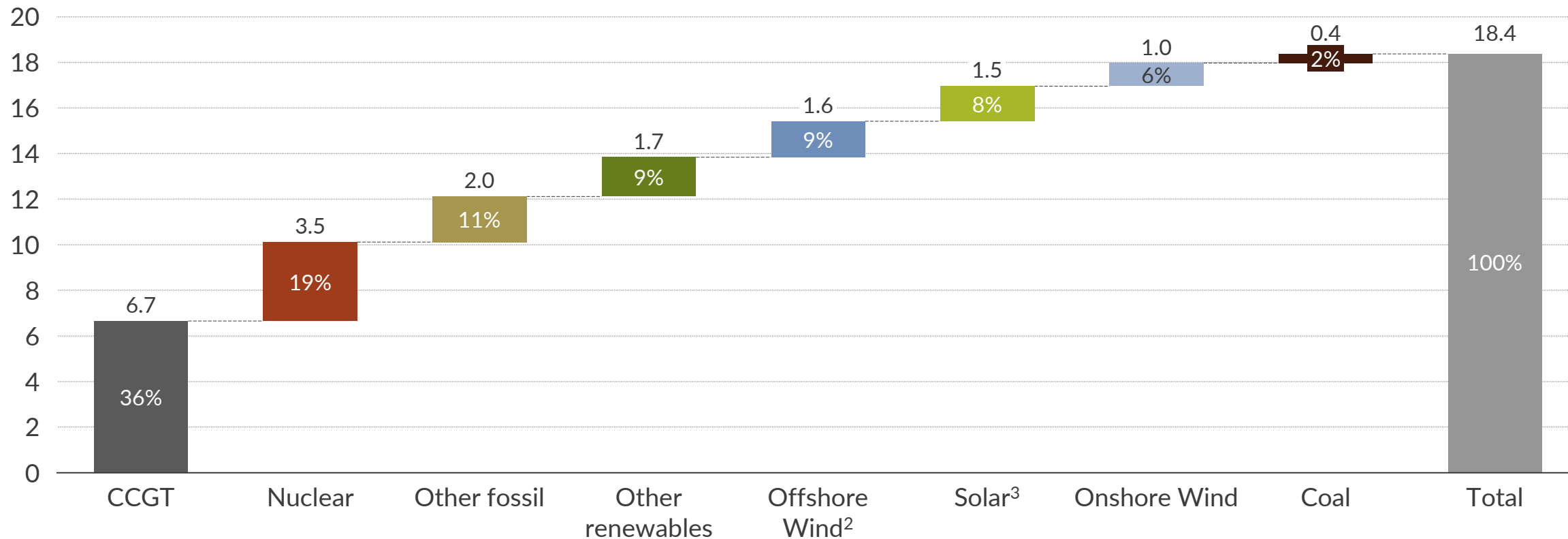
— Total monthly demand — Annual average demand (x) Month-on-month difference (x) Year-on-year difference

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.

Monthly fuel mix breakdown

Output¹

TWh



Load factor

%

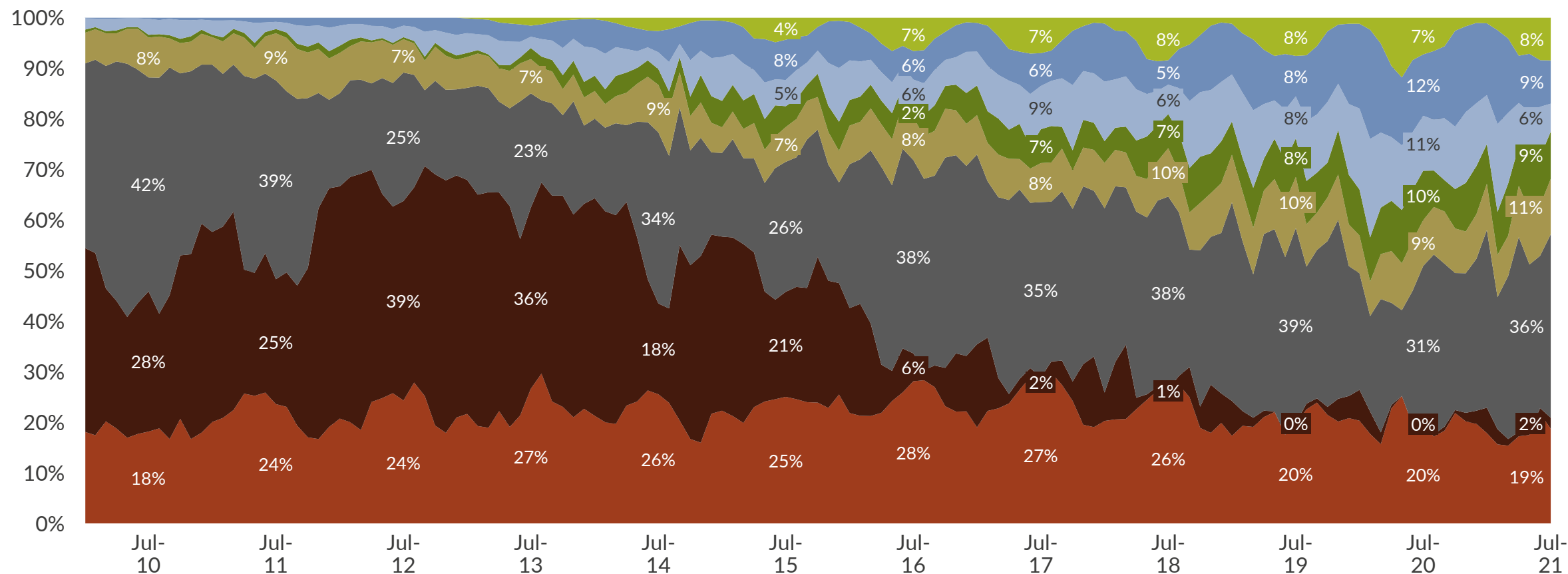


1) Includes outputs from generators registered as BM Units as well as embedded wind and solar PV assets. All numbers are rounded to 0.1 TWh which means that subtotals may not sum to total value. 2) Other fossil includes oil, CHP-CCGT and OCGT. 3) Other renewables includes biomass and hydro.

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

Historical fuel mix breakdown

Output¹
% of total



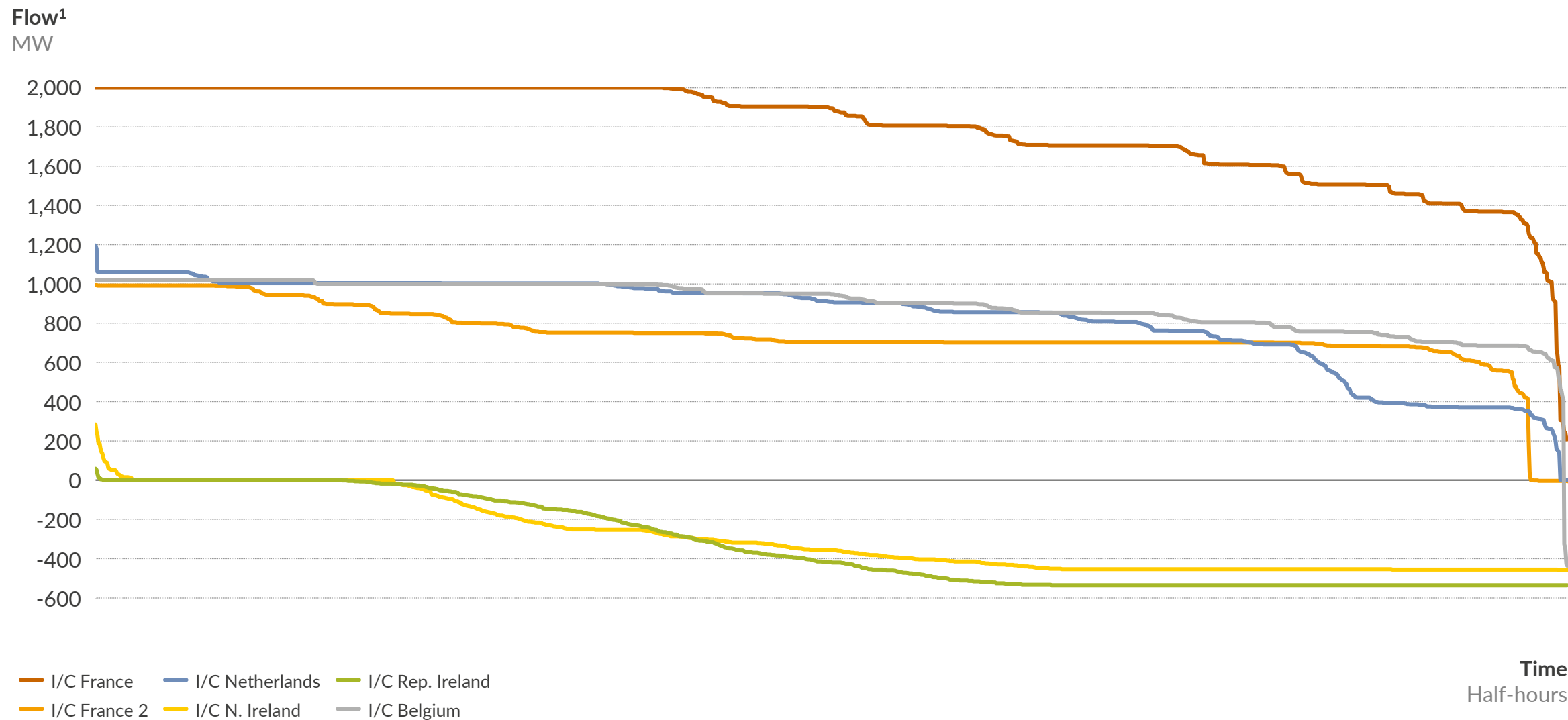
■ Nuclear
 ■ Coal
 ■ CCGT
 ■ Other fossil²
■ Other renewables³
■ Onshore Wind
 ■ Offshore Wind
 ■ Solar
 ■ Imports

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

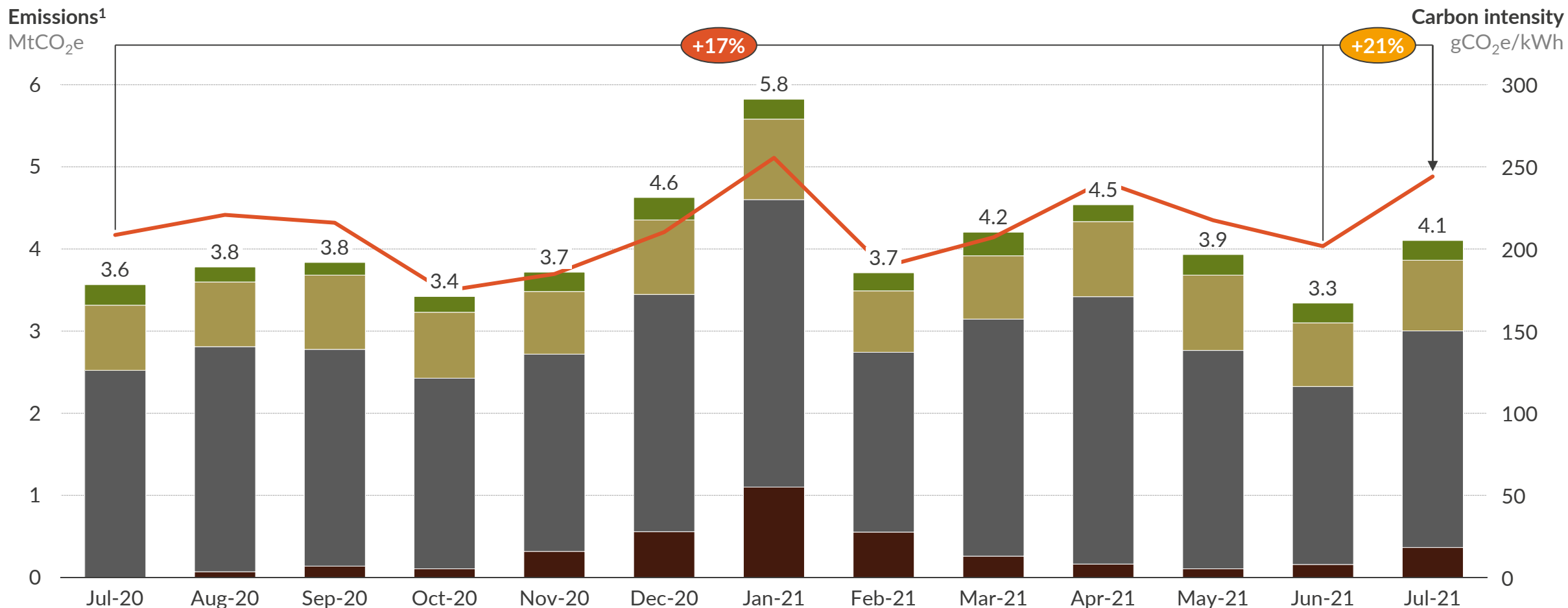
Monthly interconnector flow duration curve

Flow in each half-hour for GB interconnectors



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

Monthly emissions by technology



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.

Agenda

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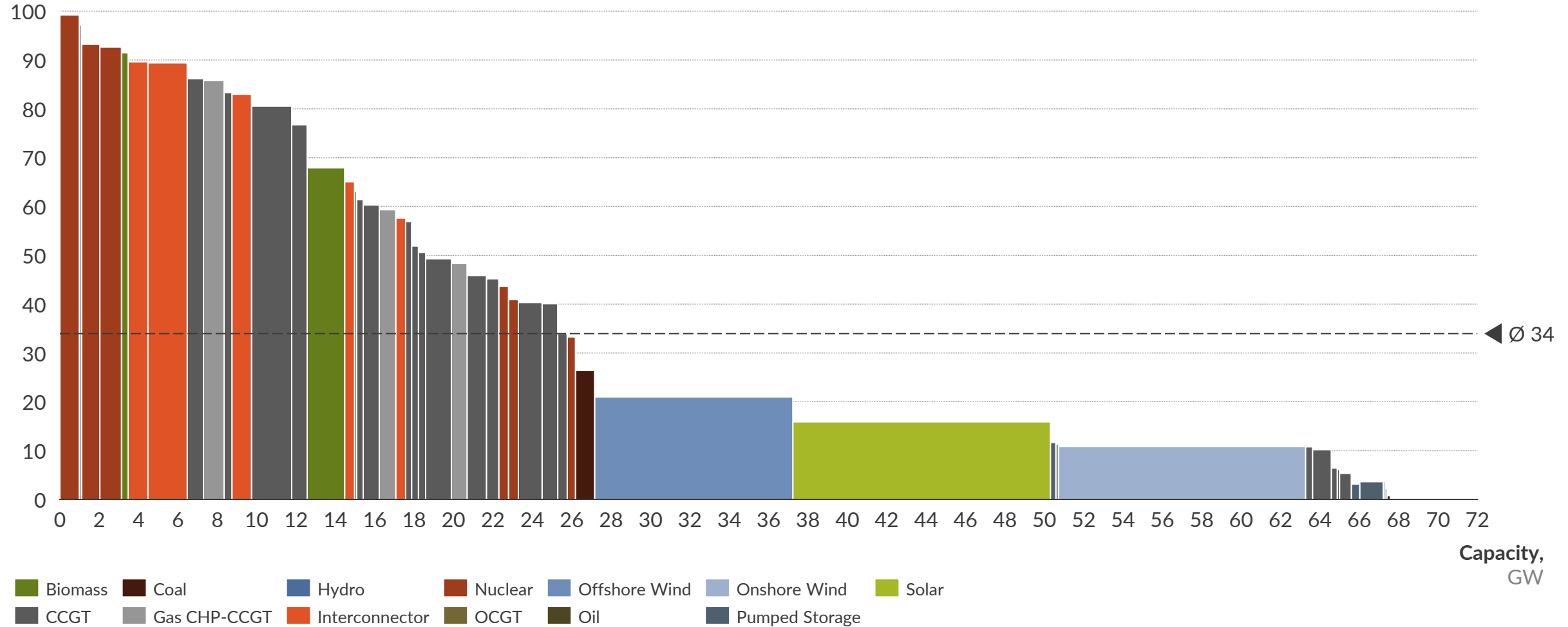
Agenda

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Plant utilisation – load factors by plant

Load factor¹
%

Column width
reflects capacity

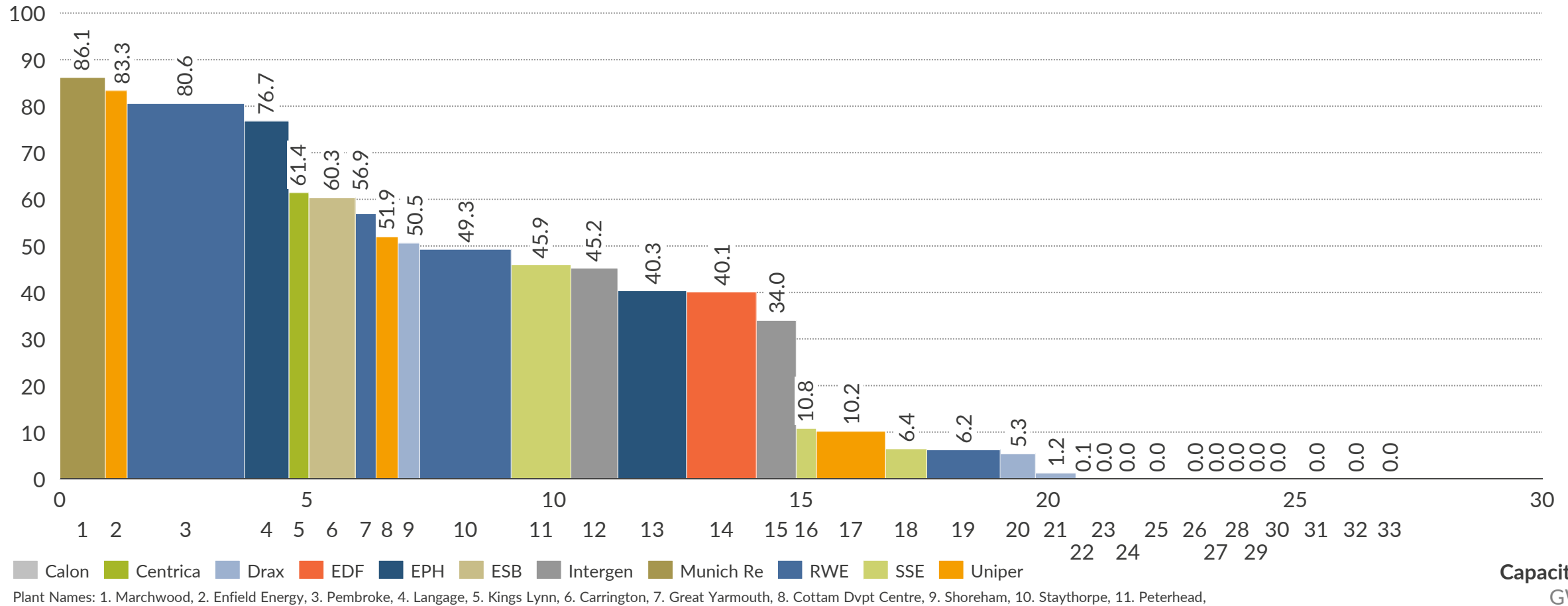


1) Represents 60 plants with highest capacity according to the Balancing Mechanism (BM) database, as well as aggregated data for wind and solar. Capacity of each plant represents the sum of capacities of all its generators that have been active at least once in the last three months. Please refer to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

CCGT plant utilisation – by plant

Full load hours¹
% of total for the period

Column width
reflects capacity



Calon Centrica Drax EDF EPH ESB Intergen Munich Re RWE SSE Uniper

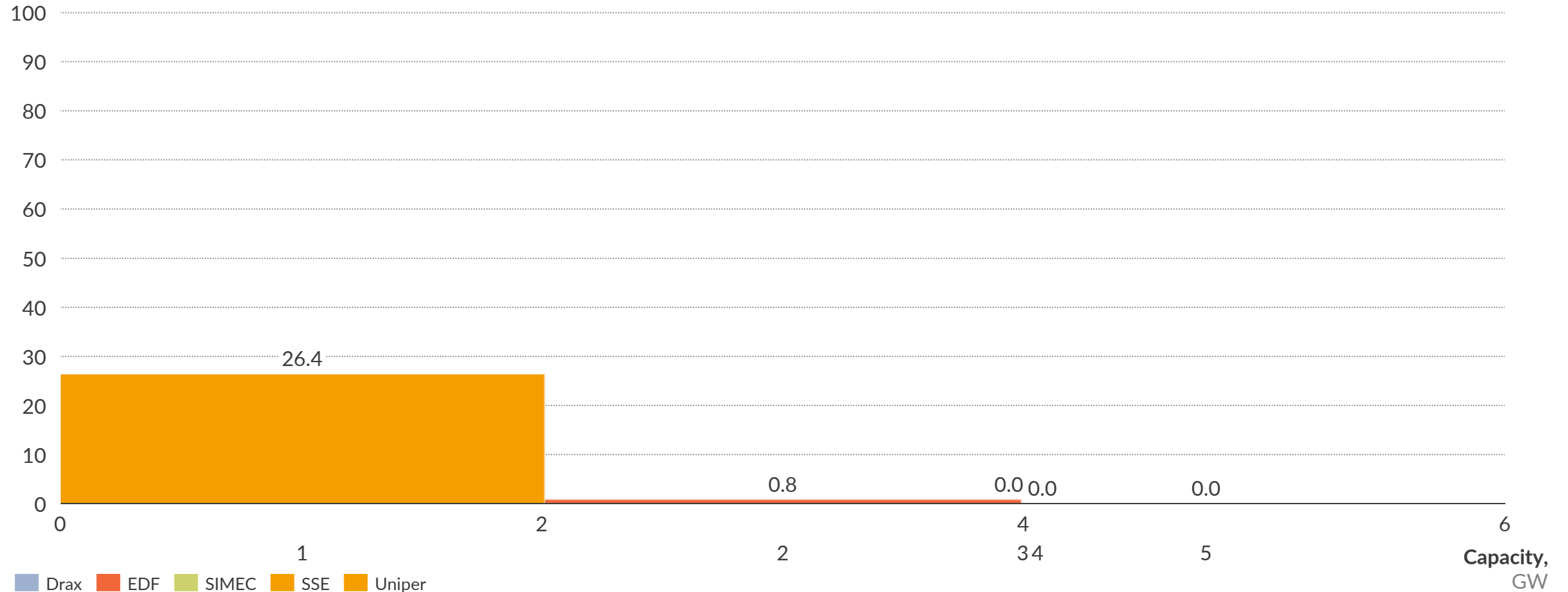
Plant Names: 1. Marchwood, 2. Enfield Energy, 3. Pembroke, 4. Langage, 5. Kings Lynn, 6. Carrington, 7. Great Yarmouth, 8. Cottam Dvpt Centre, 9. Shoreham, 10. Staythorpe, 11. Peterhead, 12. Spalding, 13. South Humber Bank, 14. West Burton B, 15. Rocksavage, 16. Seabank 2, 17. Connahs Quay, 18. Seabank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

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

Coal plant utilisation – by plant

Full load hours¹
% of total for the period

Column width
reflects capacity

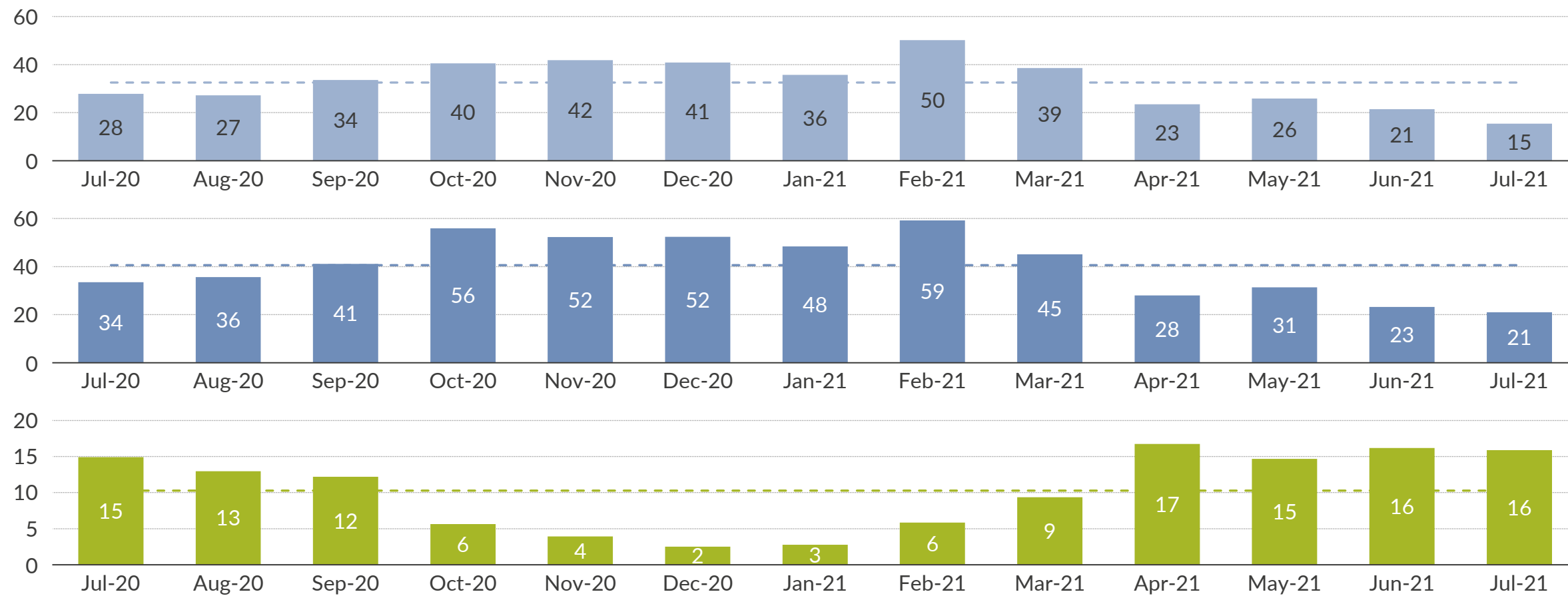


Plant Names: 1. Ratcliffe, 2. West Burton, 3. Uskmouth, 4. Fiddlers Ferry, 5. Drax Coal.

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

Monthly load factors by technology

Average load factor¹
%



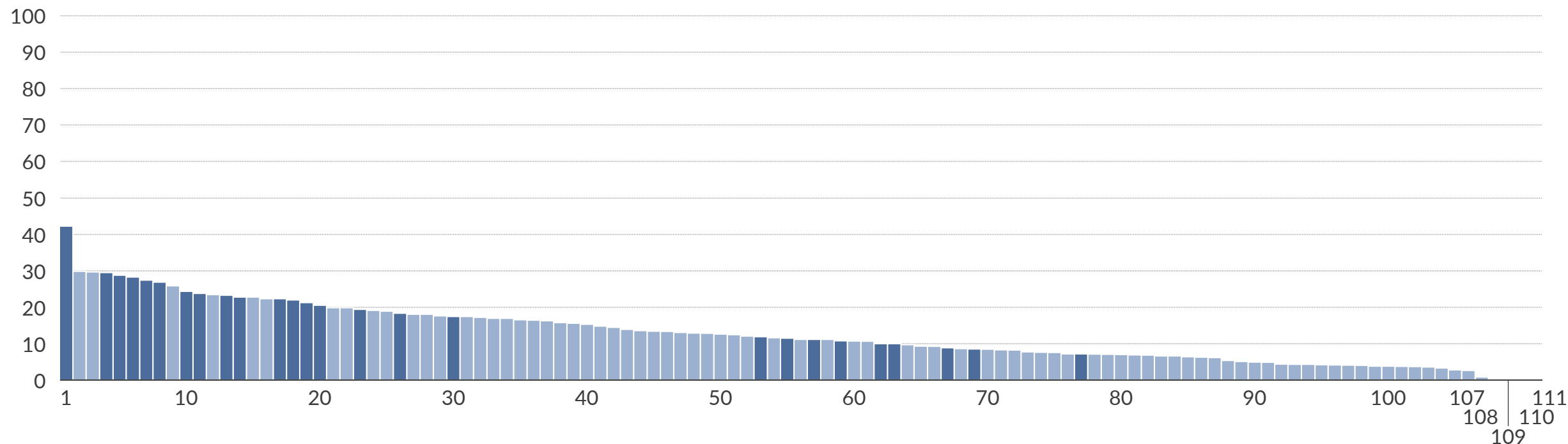
■ Onshore Wind - - Onshore Average ■ Offshore Wind - - Offshore Average ■ Solar - - Solar Average

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. Galloper, 2. Whiteside Hill, 3. Gordonstown, 4. East Anglia One, 5. Greater Gabbard, 6. Hornsea 1, 7. London Array, 8. Dudgeon, 9. An Suidhe, 10. Hywind Scotland, 11. Rampion, 12. Halsary Windfarm, 13. Thanet, 14. Sheringham Shoals, 15. Dorenell, 16. Kilbraur, 17. Westernmost Rough, 18. Race Bank, 19. Humber, 20. Lincs, 21. Sanquhar Community, 22. Aikengall 2, 23. Gunfleet Sands, 24. Beinn an Tuirc III, 25. Baillie, 26. Moray East, 27. Cour, 28. Fallago Rig, 29. Corriegarth, 30. Beatrice, 31. Brockloch Rig 2, 32. Galawhistle, 33. Hill of Glaschyle, 34. Gordonbush, 35. Bad a Cheo, 36. Crystal Rig, 37. Auchrobert, 38. Dalswinton, 39. Andershaw, 40. Coire Na Cloiche, 41. Millennium, 42. Farr, 43. Rothes Extension, 44. Minsca, 45. Mid Hill, 46. Carraig Gheal, 47. Strathy North, 48. Blackcraig, 49. Assel Valley, 50. Camster, 51. Burn of Whilk, 52. Embedded Wind, 53. Gwynt y Mor, 54. Tullymurdoch, 55. Burbo Extension, 56. Pen y Cymoedd, 57. Aberdeen, 58. Berry Burn, 59. Walney Extension, 60. Braes of Doune, 61. Corriemoillie, 62. West of Duddon Sands, 63. Walney, 64. Glens of Foudland, 65. Clashindarroch, 66. Dunmaglass, 67. Ormonde, 68. Goole Fields, 69. Robin Rigg, 70. Beinneun, 71. Beinn Tharsuinn, 72. Stronelaig, 73. Craig, 74. Afton, 75. Glenchamber, 76. Beinn An Tuirc, 77. Barrow, 78. Toddleburn, 79. Lochluichart, 80. Hill of Towie, 81. Bhlaraidh, 82. Freasdail, 83. Kype Muir, 84. Harburnhead, 85. Griffin, 86. Glen App, 87. Kilgallioch, 88. Edinbane, 89. Clyde, 90. Hare Hill Extension, 91. Moy, 92. Middle Muir, 93. Dersalloch, 94. Arecleoch, 95. Airies, 96. Hadyard Hill, 97. Tullo, 98. Ewe Hill, 99. Minnygap, 100. Tullo Extension, 101. Mark Hill, 102. Dun Law Extension, 103. Whitelee, 104. Black Law, 105. Harestanes, 106. A Chruach, 107. Clachan Flats, 108. Burbo Bank, 109. Keith Hill, 110. Brownieleys, 111. Kincardine.

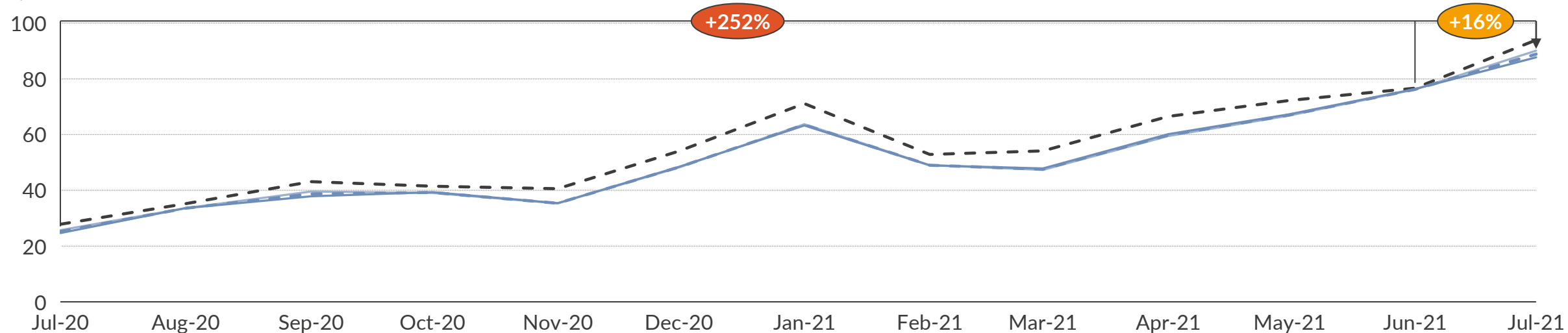
■ Offshore Wind ■ Onshore Wind

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

RES capture price versus baseload price

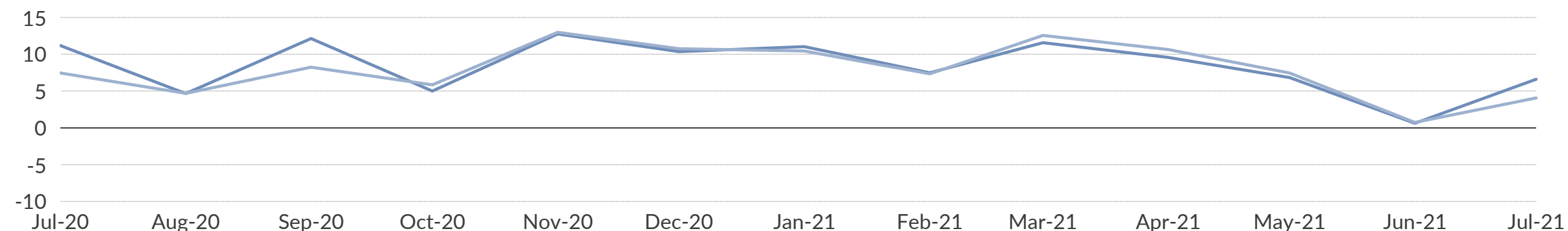
Baseload and capture price^{1,2}

£/MWh



Technology capture discount^{2,3} to baseload

%



— Baseload — Onshore Wind — Offshore Wind — Average wind x Month-on-month difference (average wind) x Year-on-year difference (average wind)

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. 3) Negative values represent capture prices above the baseload price while positive values represent capture prices below the baseload price

Sources: Aurora Energy Research, Elexon, Thomson Reuters

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.

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