



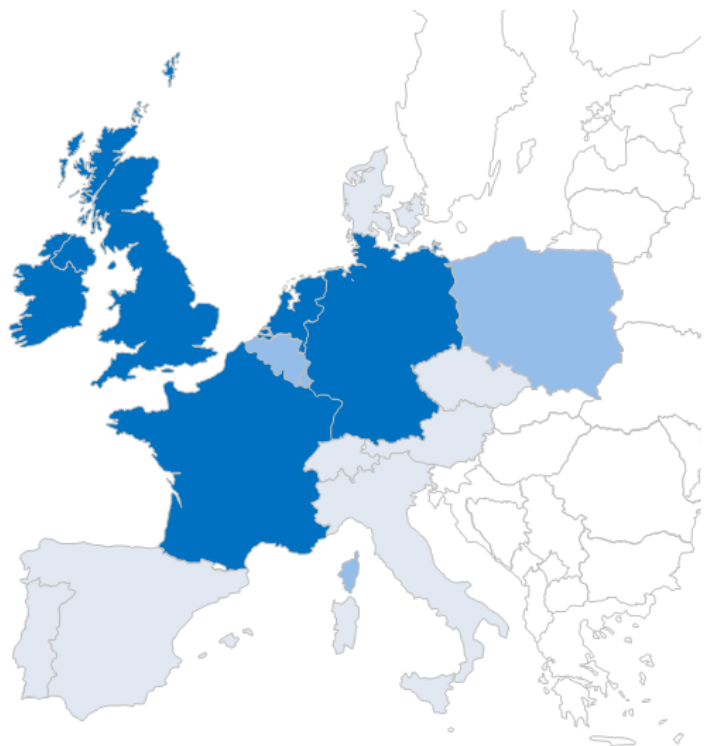
GB Wholesale Market Summary October 2018

Published November 2018

Executive summary

1. With gas and carbon prices decreasing, the average power price in October decreased to £61.8/MWh, a 2% reduction from previous month's price, however this represents a 41% increase compared to last October. See [slides 6](#) and [7](#).
2. Colder weather in October increased demand by 14% and total production increased by 2.7 TWh – 2.4 TWh of which was from CCGT, due to gas prices falling by 8% from September. See [slides 7](#), [10](#) and [11](#).
3. Total monthly gross profits rose by £44m compared to September, due to higher demand mitigating the downward pressure on prices of reduced fuel costs and increased utilisation rates of non thermal assets. See [slides 7](#), [10](#) and [21](#).
4. SSE and Scottish Power saw gross profits increase by 20% and 10%, as average wind load factors increase by 3 percentage points while the wind capture price stayed constant between months at £60.4/MWh. See [slides 22](#) and [23](#).

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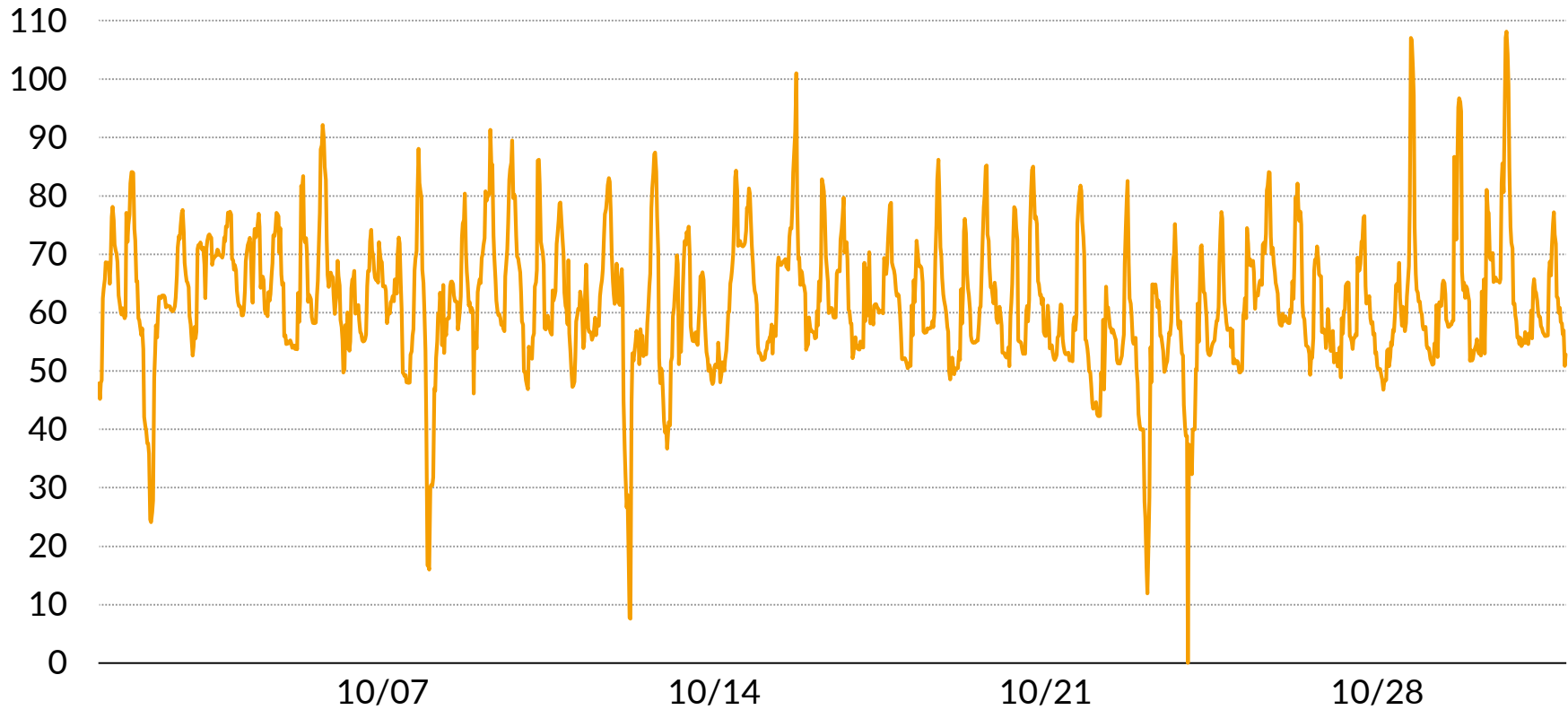
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1. System performance
2. Company performance (available to subscribers only)
3. Plant performance

Half-hourly APX spot price for October

APX spot price¹,
£/MWh

Monthly average price
in October 2018:
61.79 £/MWh

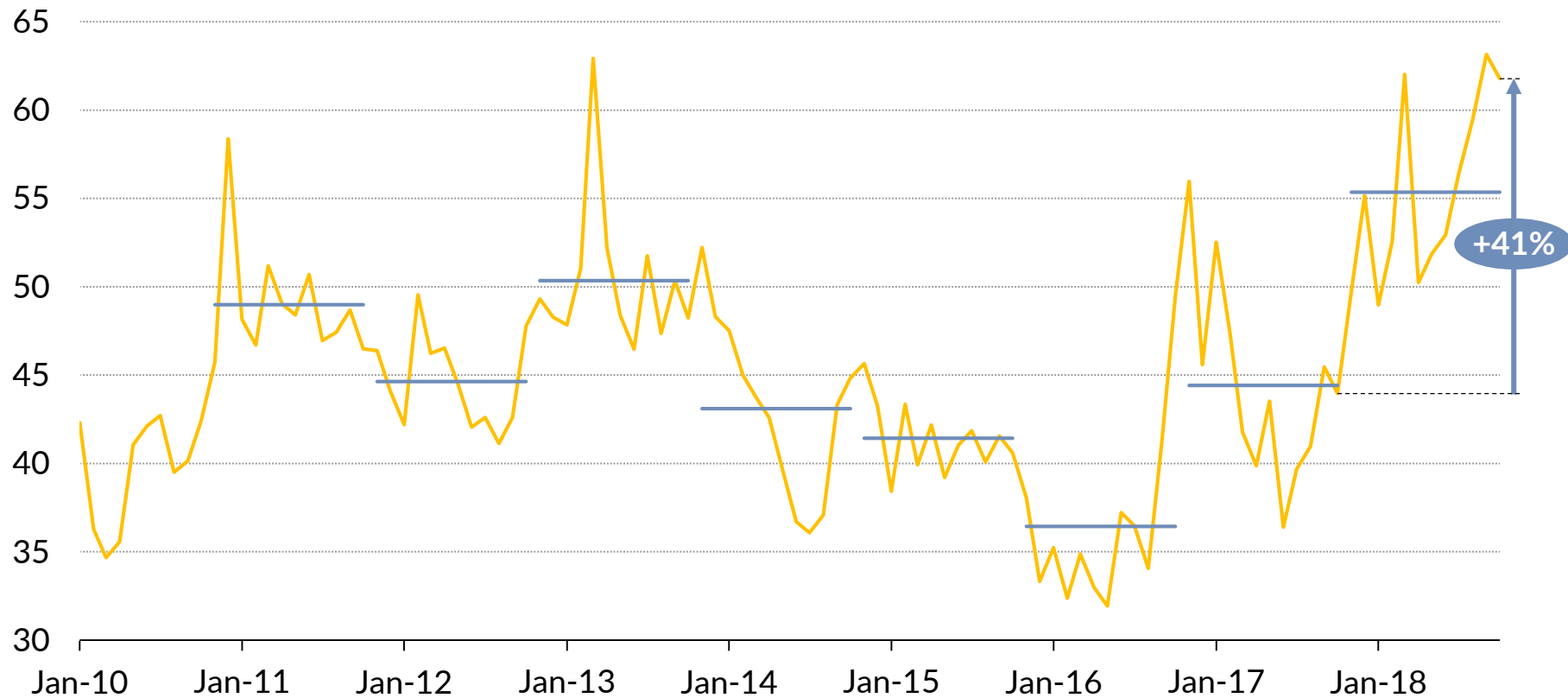


1. Half-hourly APX is the volume-weighted reference price over that half-hour interval, as provided by APX Power UK.

Historic monthly average APX spot price

Average APX spot price¹,
£/MWh

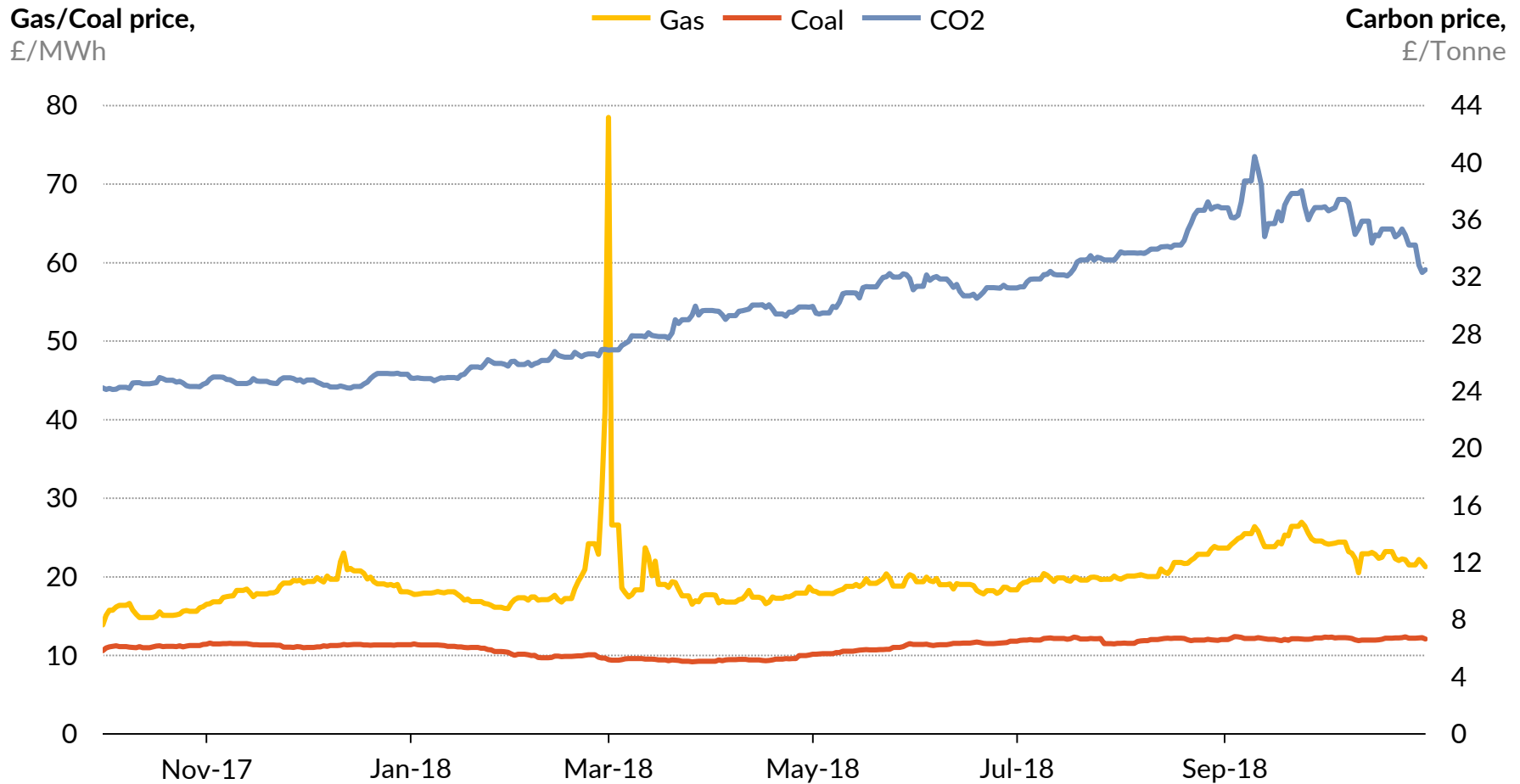
— Average monthly spot price — Annual average spot price
— Annual average spot price



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

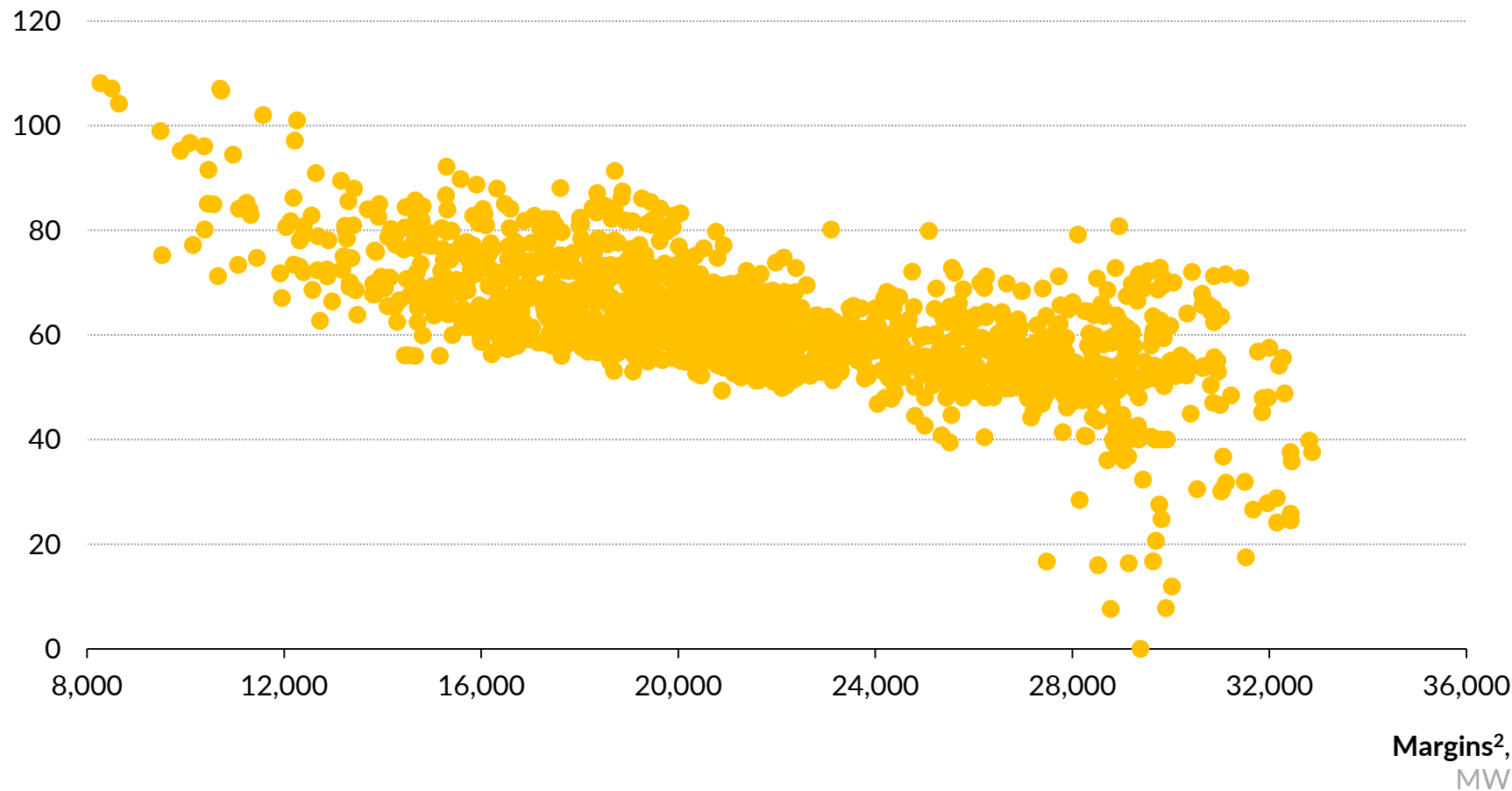
Historic fuel prices

Gas, Coal and Carbon daily prices



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

APX spot price¹,
£/MWh

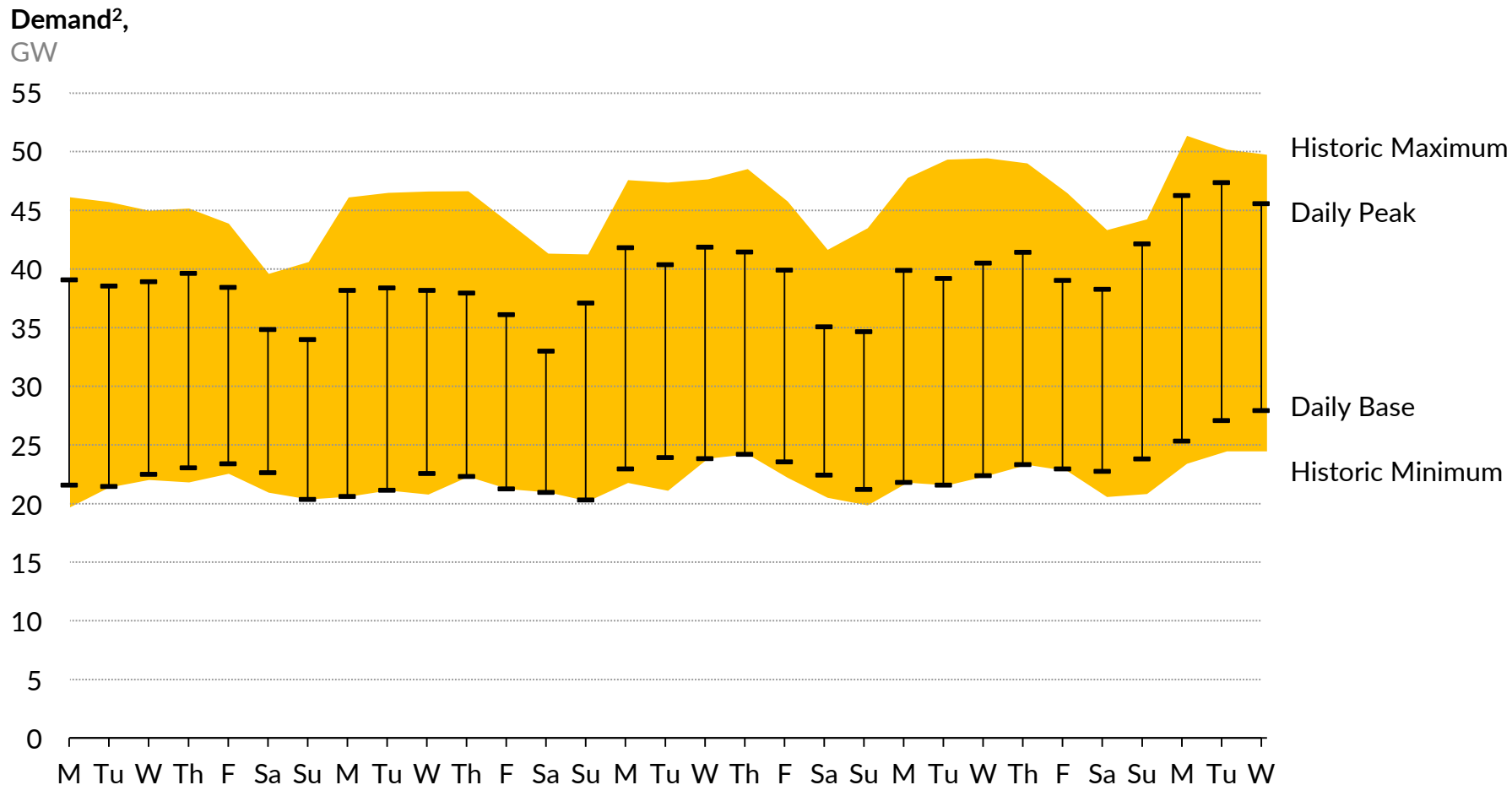


1. Half-hourly APX is the volume-weighted reference price over that half-hour interval, as provided by APX Power UK.

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 October max and min demand

Relative to historic October max and min demand since 2010¹



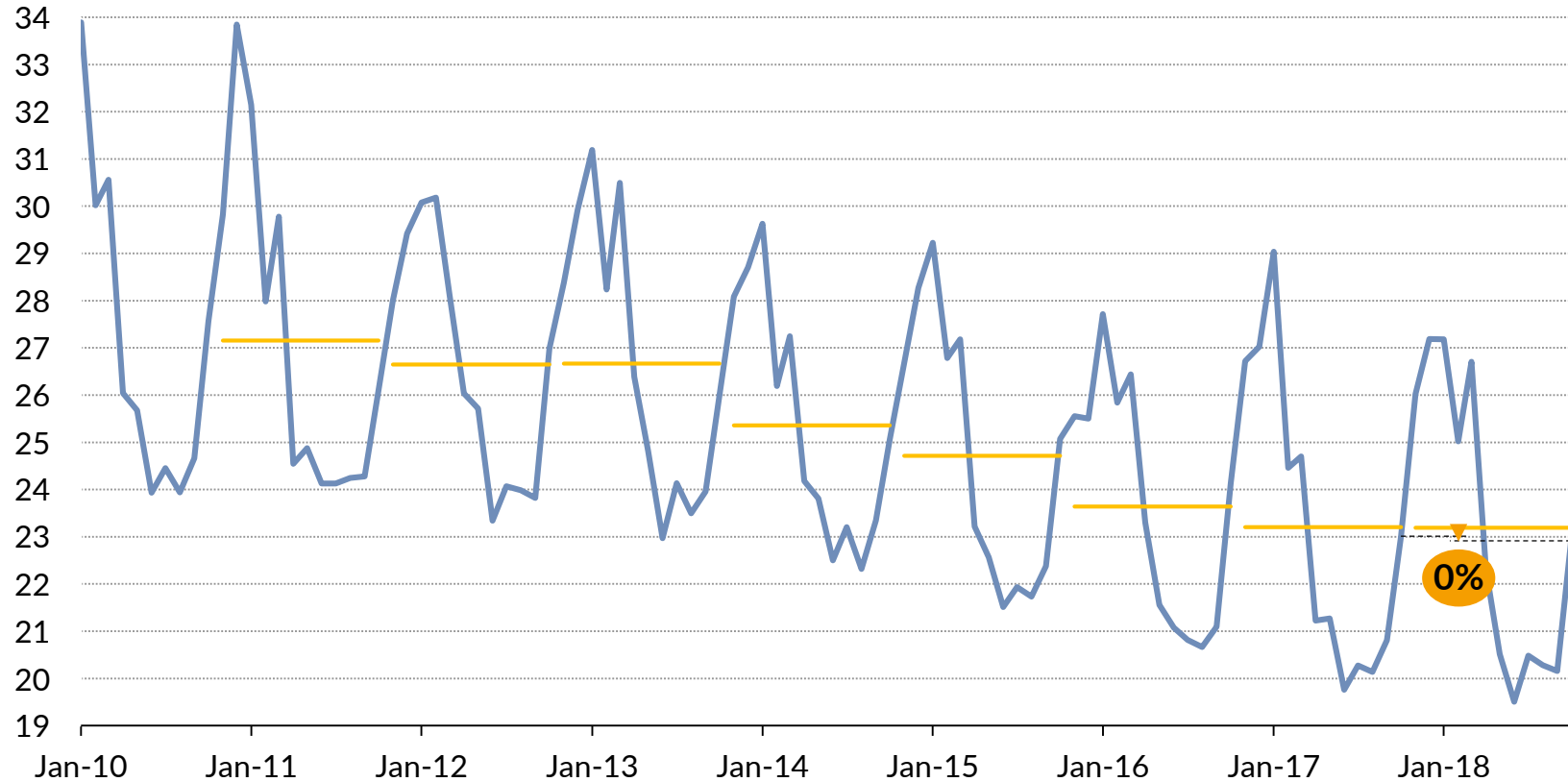
1. Data from previous years is matched to the nearest weekday within the current month, to maintain the weekly demand pattern.

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

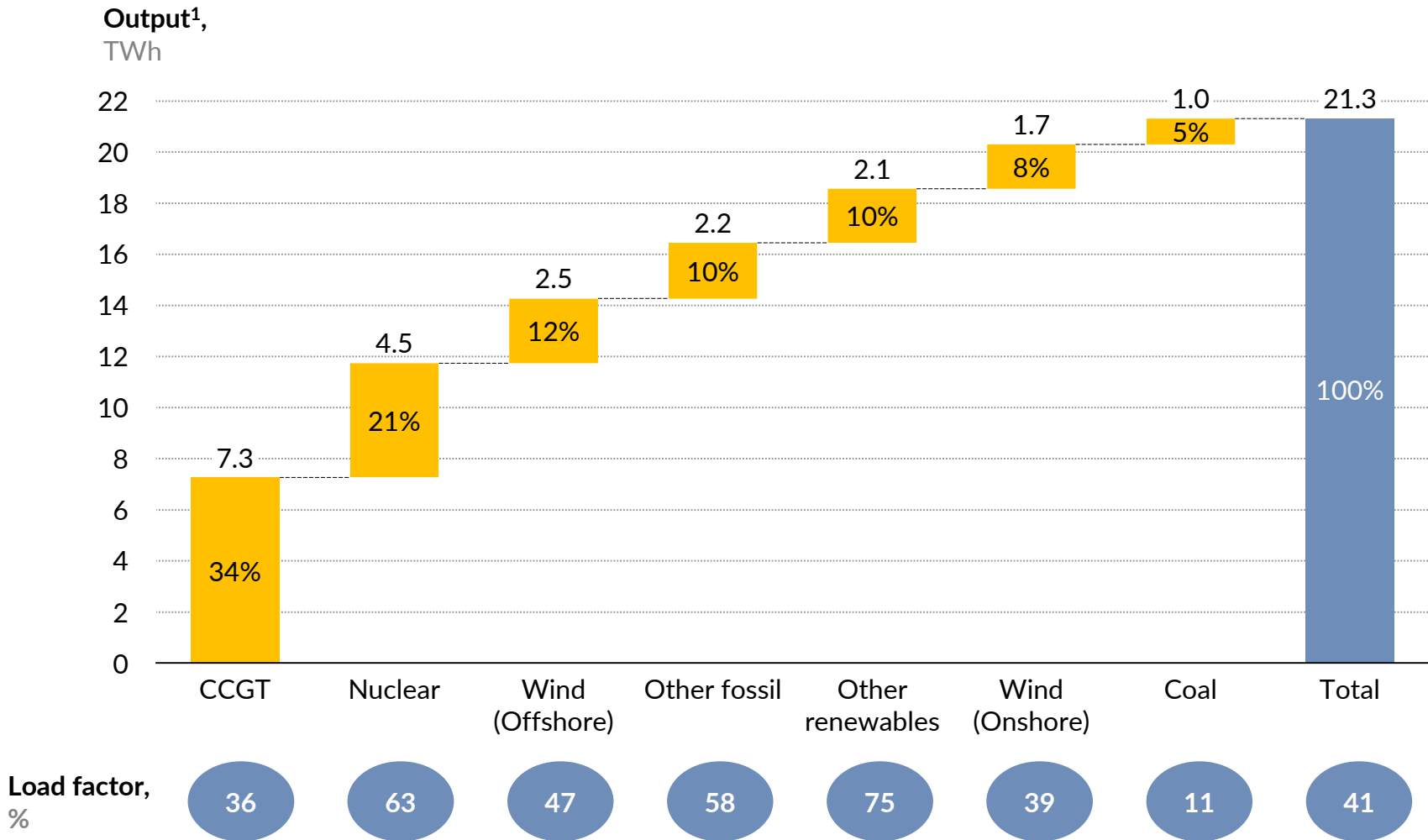
Total demand¹,
TWh

— 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.

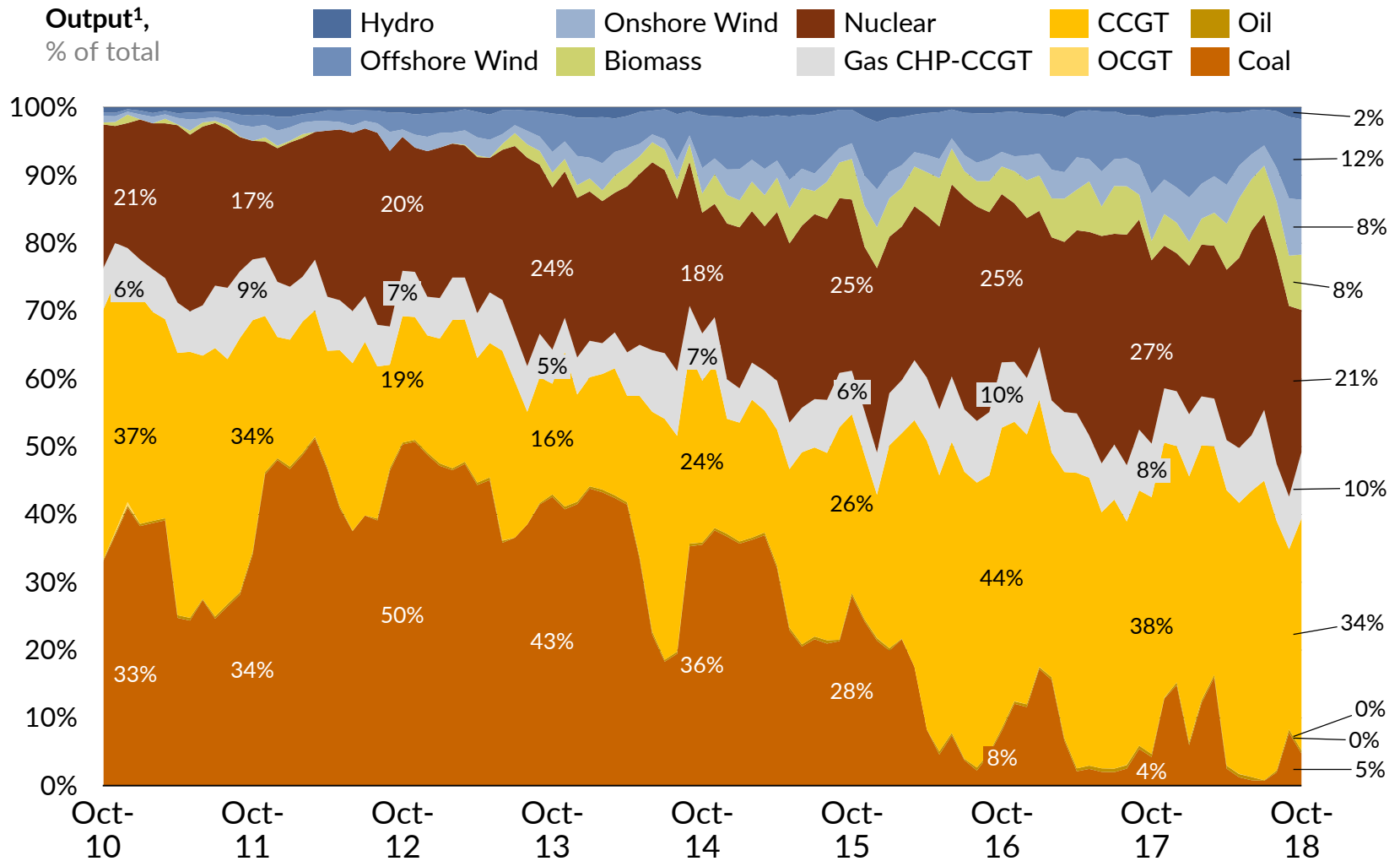
Monthly fuel mix breakdown



1. Only includes outputs from generators registered as BM Units. 2. Other fossil includes oil, OCGT and gas CHP-CCGT. 3. Other renewables includes biomass and hydro.
 4. All numbers are rounded to 0.1 TWh which means that subtotals may not sum to total value.

Historical fuel mix breakdown

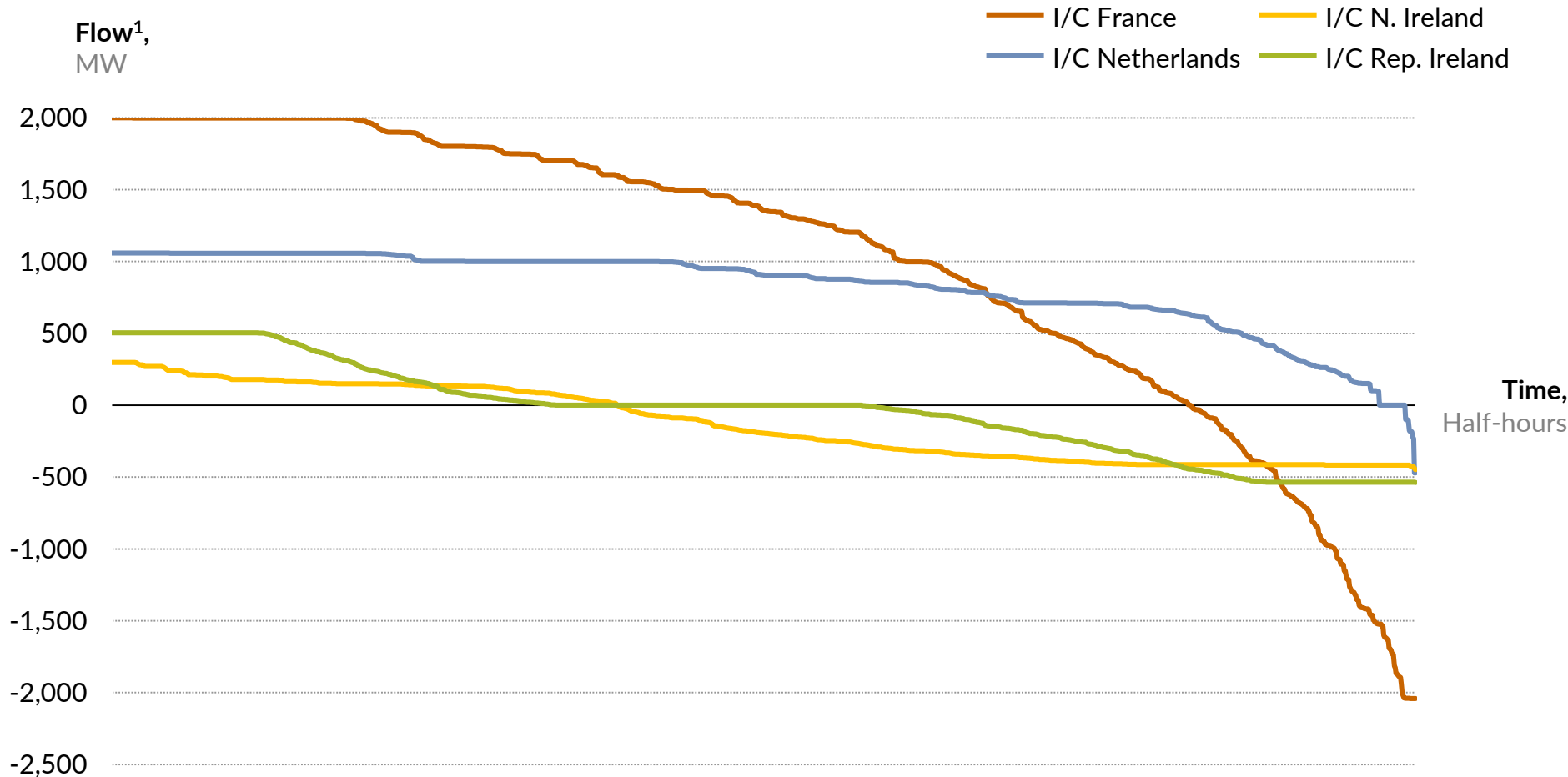
Monthly values from 2010



1. Only includes outputs from generators registered as BM Units.

Monthly interconnector flow duration curve

Flow in each half-hour for GB interconnectors

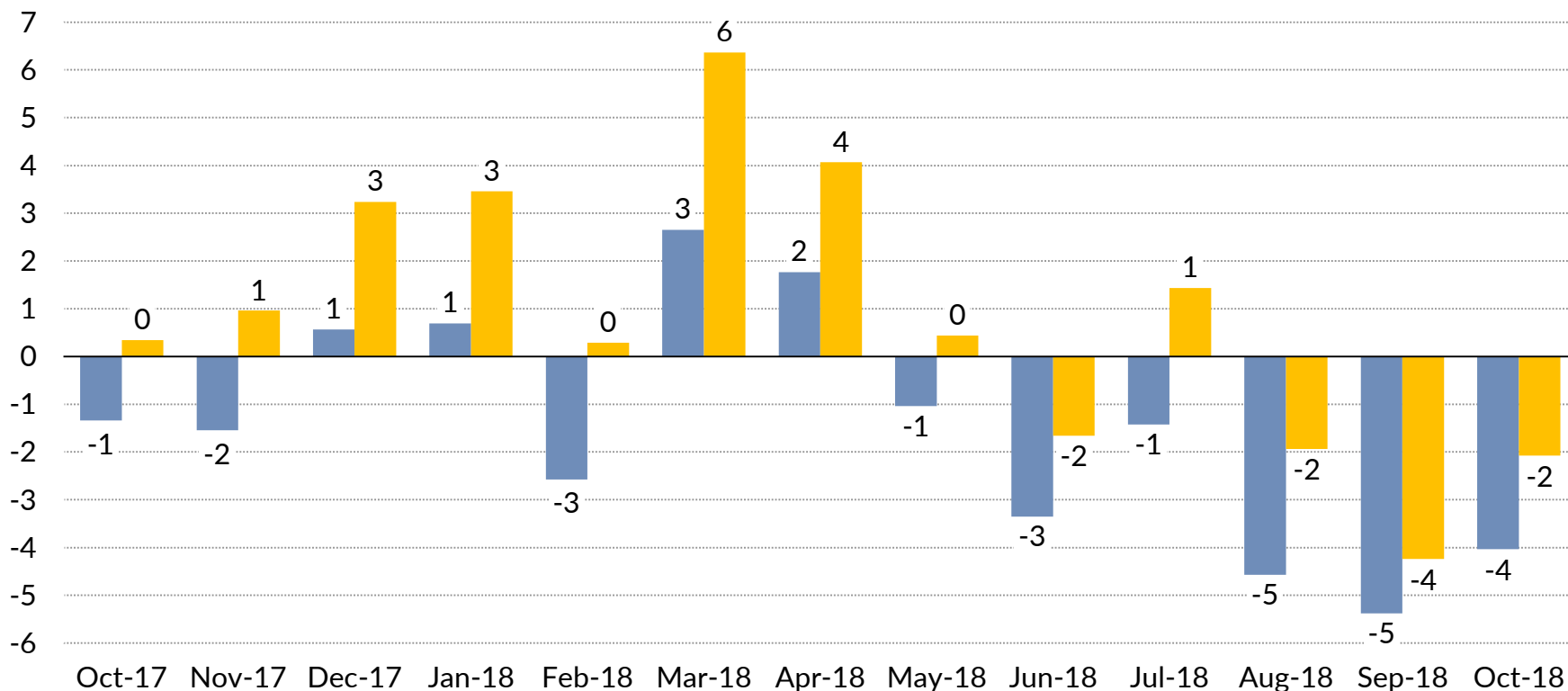


1. Positive flow is imports into GB, negative flow is exports.

Monthly historical uplift (baseload and peak)

Uplift¹,
£/MWh

Baseload²
Peak³

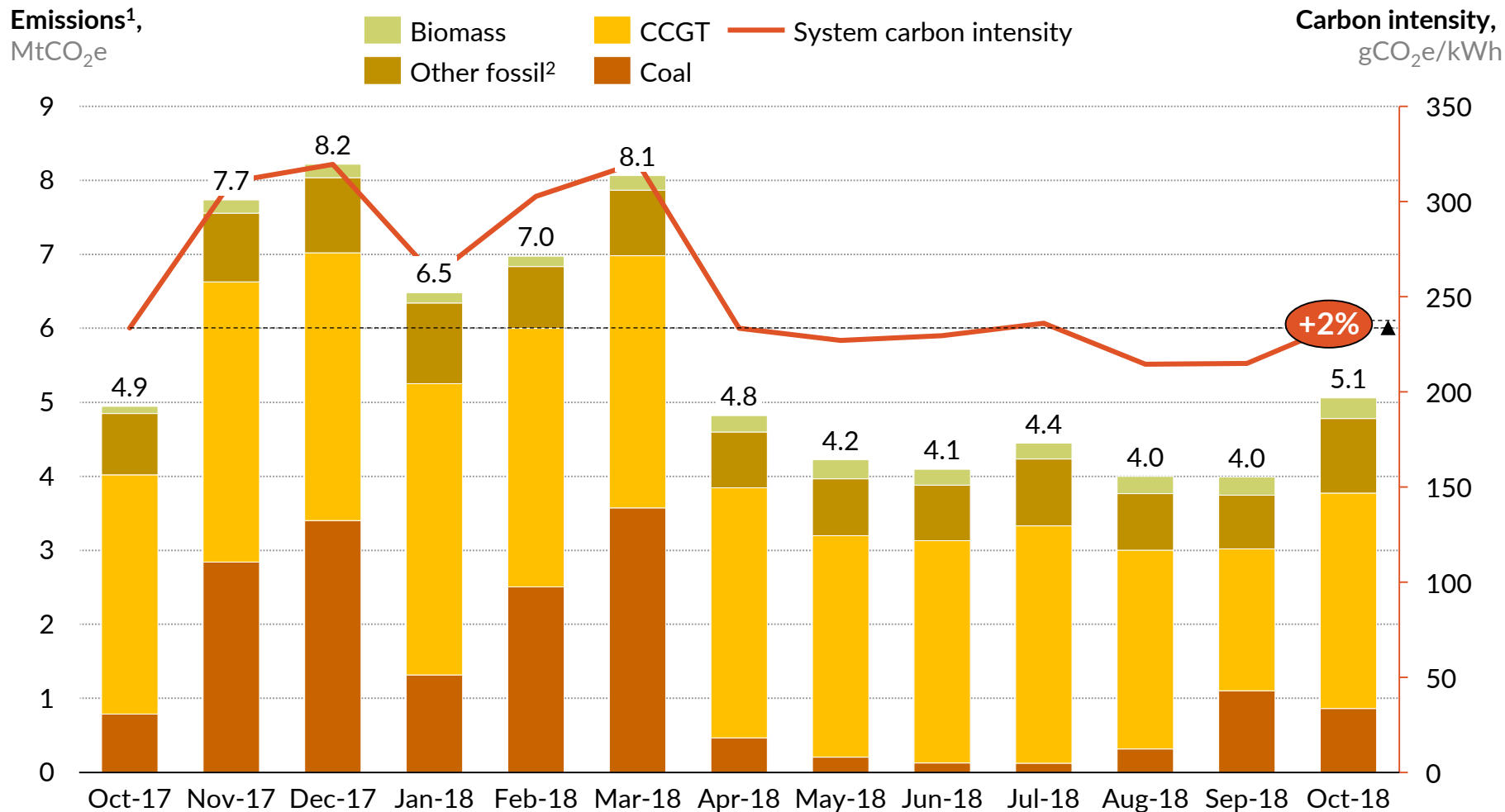


1. Uplift is calculated as the difference between the APX price and the system marginal cost (SMC). SMC is the maximum marginal cost of the plant with at least one generator producing above 80% of its installed capacity in a given half-hour. Marginal costs are calculated using Aurora's plant characteristic database. This divides costs into the following categories: fuel costs, VOM costs, transportation costs, BSUoS charges and ROC revenues for renewables. ROC revenues are treated as negative marginal cost. We use an algorithm to remove outliers that are dispatching for reasons not related to energy market profitability, for example bilateral National Grid contracts.

2. Baseload uplift is the unweighted average uplift over all hours of each day. 3. Peak uplift is the unweighted average uplift during the peak hours: 7am to 7pm

Due to coal closures we observe changes in variable costs, and have recalibrated our calculation of the variable cost of coal to reflect these changes, which impacts uplift values.

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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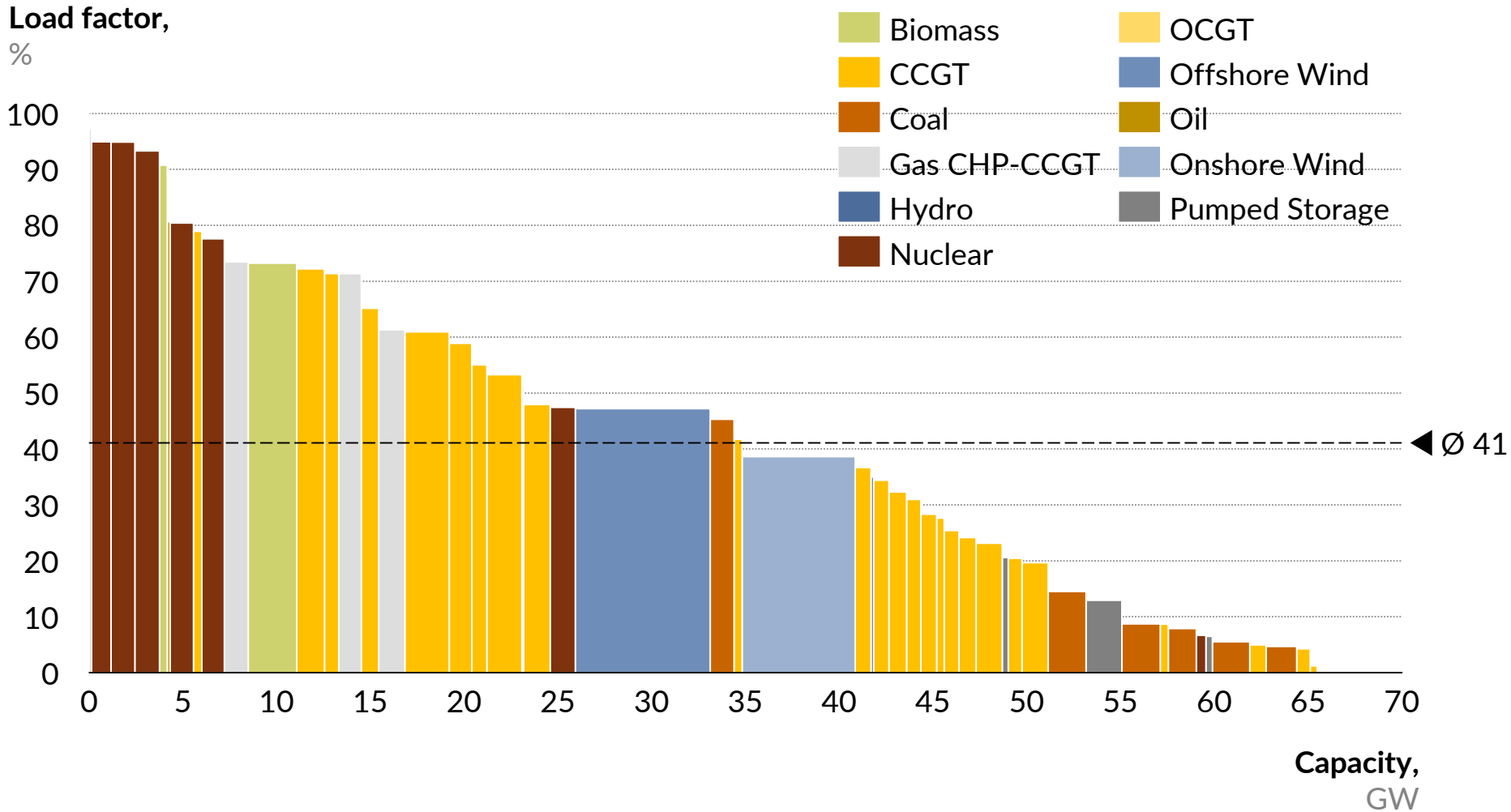
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Plant utilisation - load factors by plant

(column width reflects capacity)



Represents 60 plants with highest capacity according to the Balancing Mechanism (BM) database, as well as aggregated data for offshore and onshore wind farms reporting to the BM. 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.

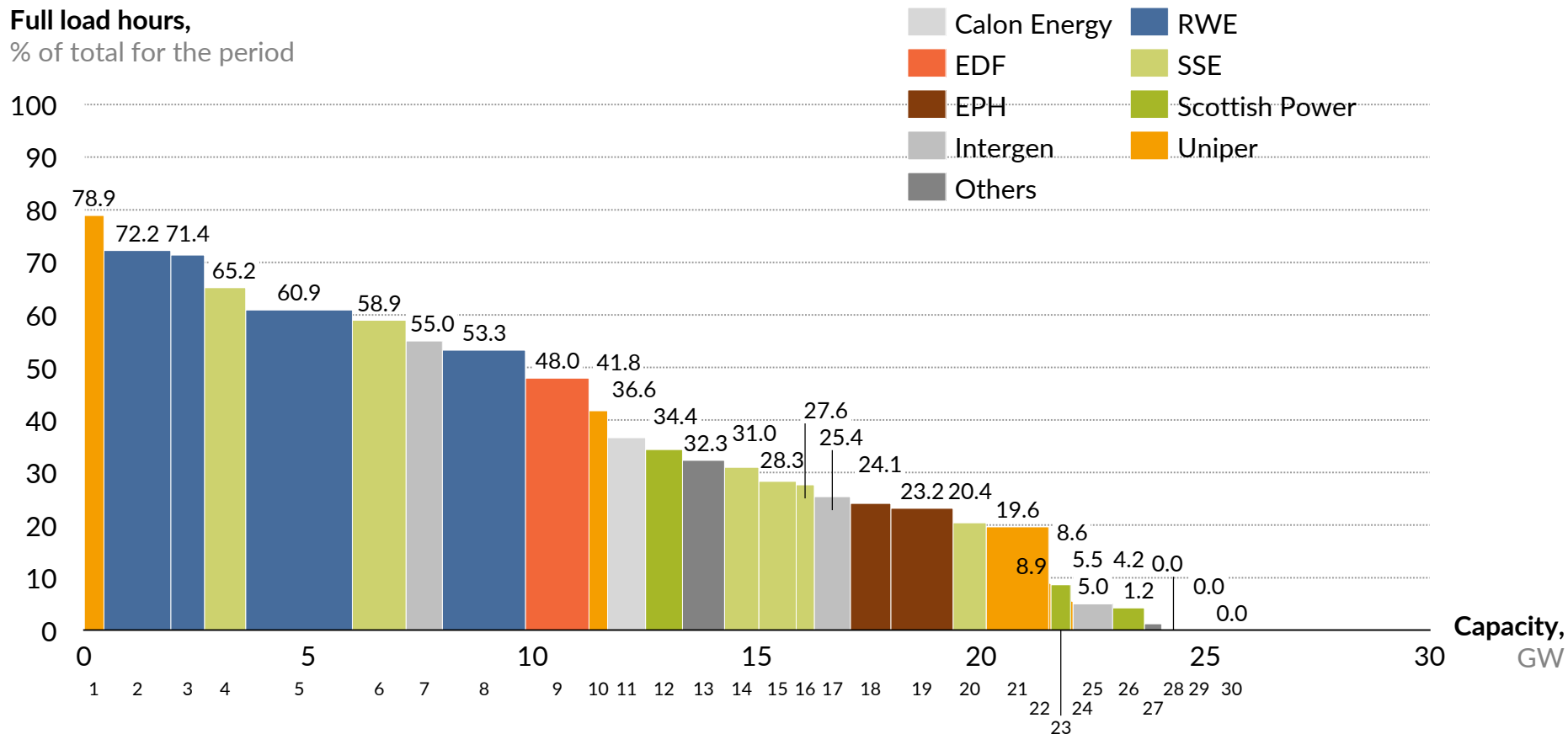
Please refer to Appendix for a detailed description of the data used and categories presented.

CCGT plant utilisation – by plant, October 2018

Column width reflects capacity

Full load hours,

% of total for the period



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

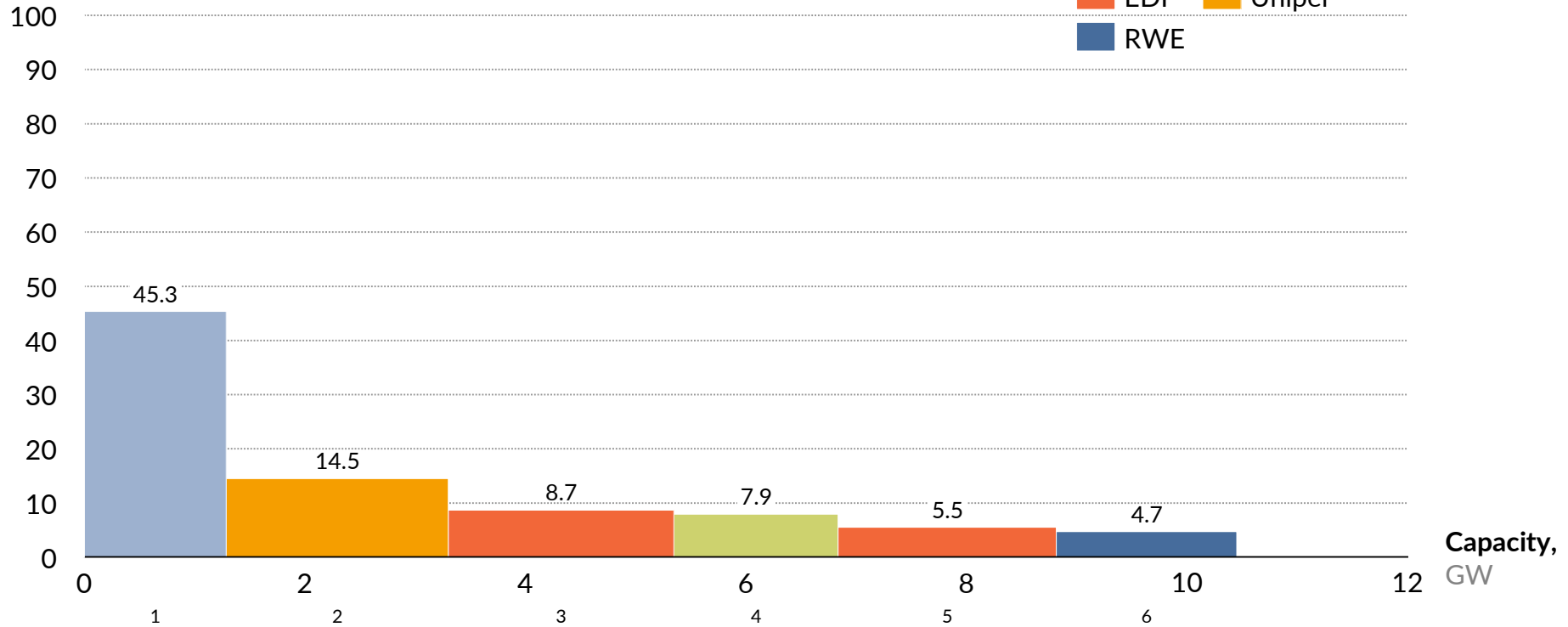
Includes all CCGT plants of the presented companies that report to the Balancing Mechanism. Refer to Appendix B for ownerships in joint-ventured CCGT plants.

Coal plant utilisation – by plant, October 2018

Column width reflects capacity

Full load hours,

% of total for the period

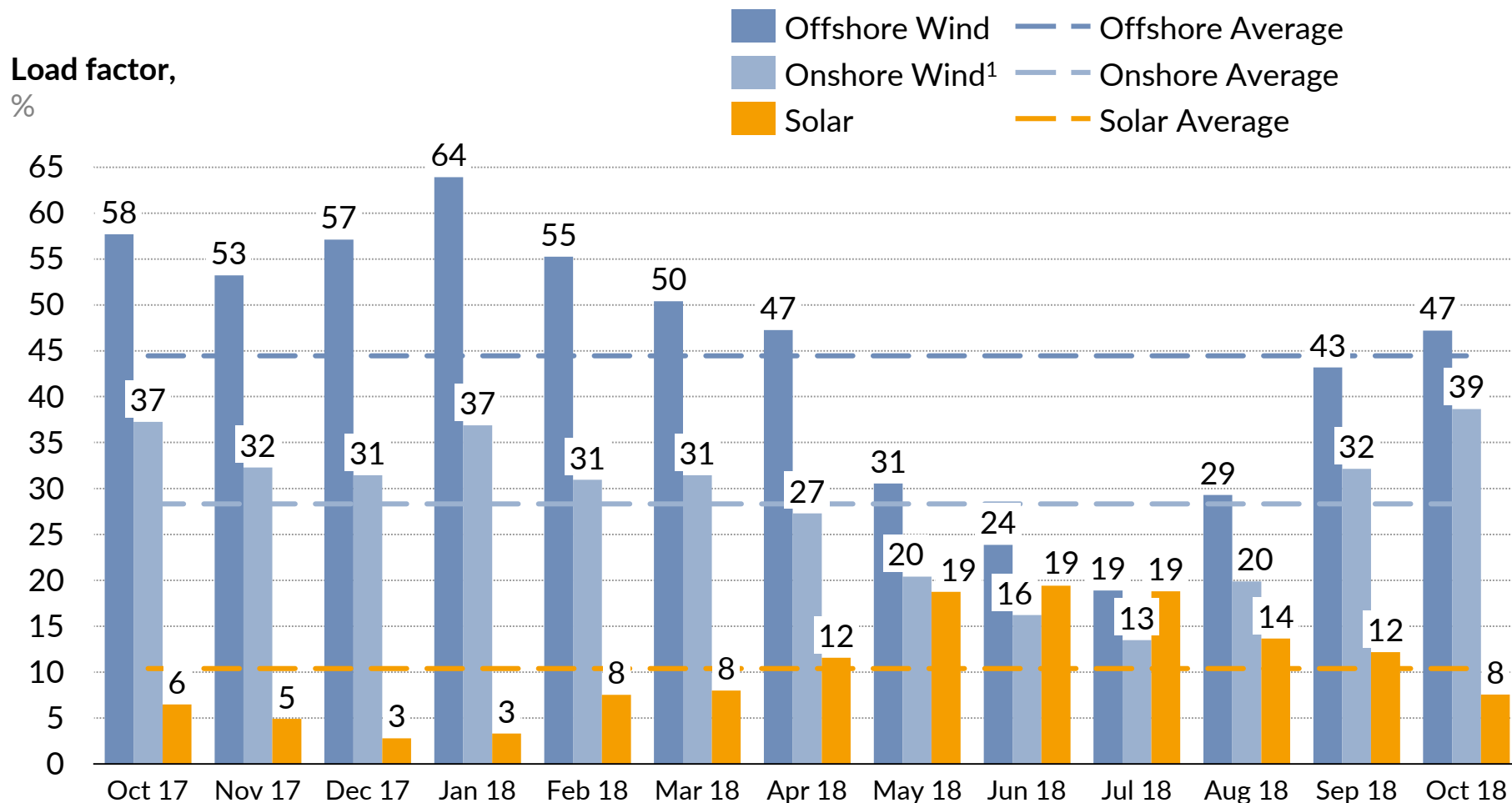


Plant Names: 1. Drax Coal, 2. Ratcliffe, 3. Cottam, 4. Fiddlers Ferry, 5. West Burton, 6. Aberthaw B.

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.

Renewables utilisation

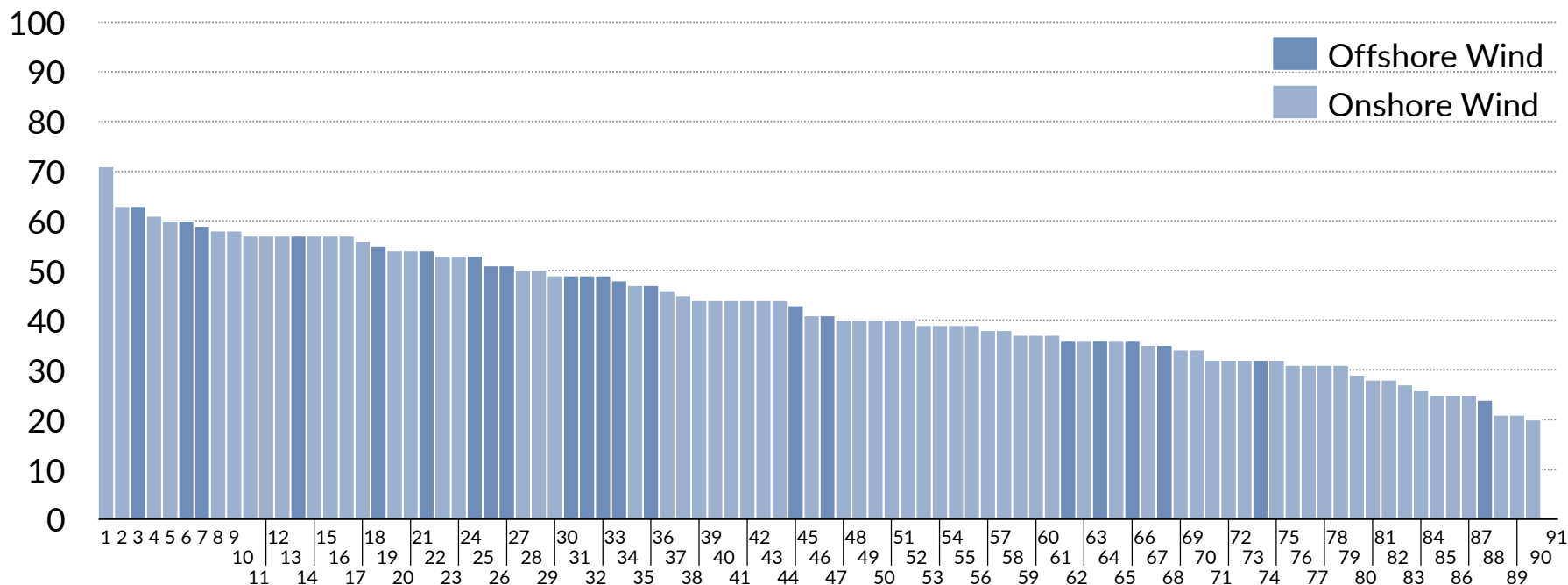
Average load factors over the last year



1. Includes embedded wind.
Represents UK wind farms reporting to Balance Mechanism Unit data. Load factors of offshore wind farms under construction might not be representative.

Wind farm utilisation – load factor by wind farm

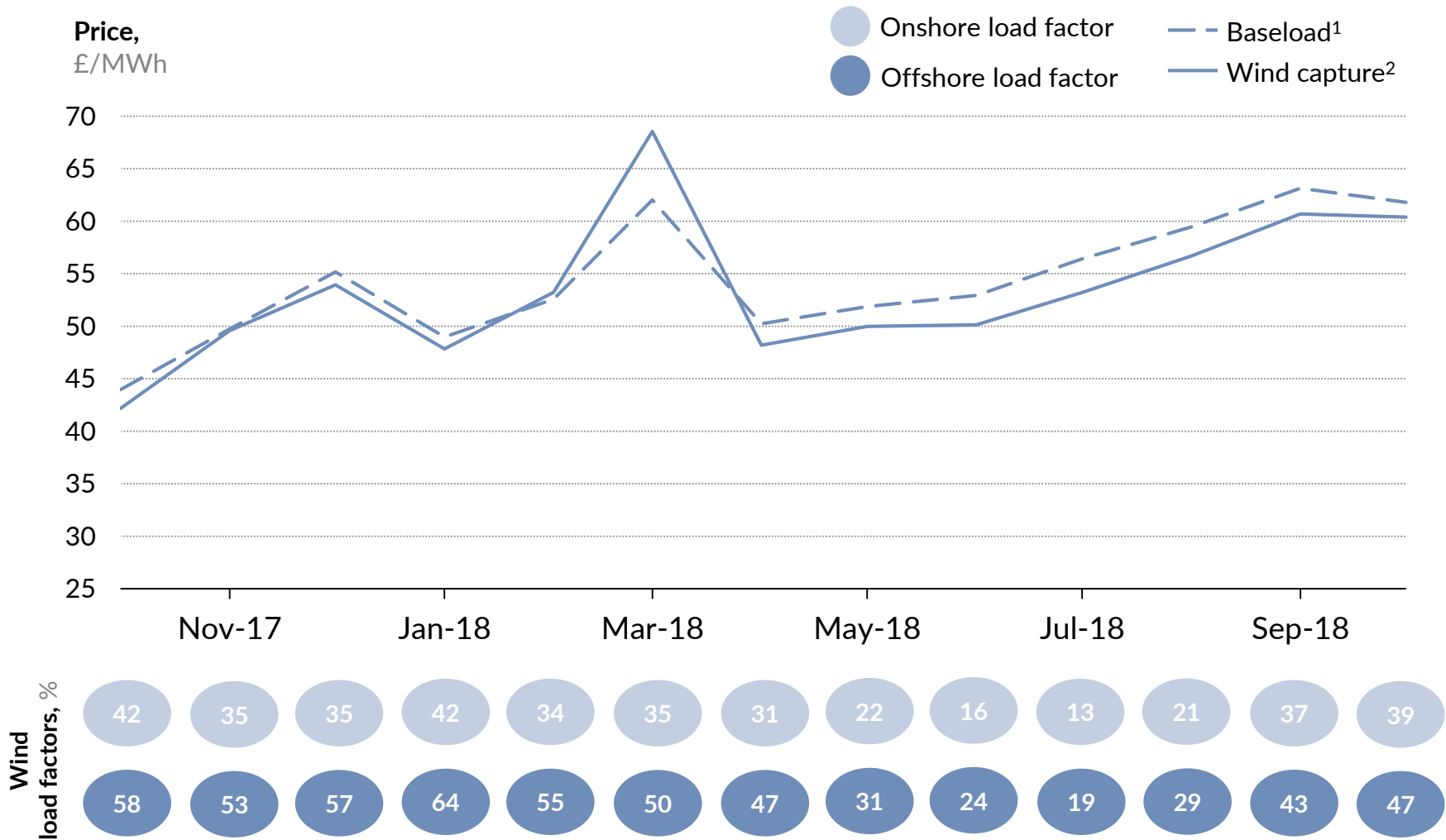
Load factor,
%



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

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%);

Westermost Rough is co-owned by DONG (50%), Marubeni (25%) and Green Investment Bank (25%).

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