

February 2022

## Introduction

### System operability, now and in the future

Decarbonisation, decentralisation and digitalisation are driving significant change across the electricity network, impacting how National Grid ESO operates the system now and into the future. Its latest annual Operability Strategy report reviews system operability across five key areas (frequency, stability, voltage, thermal and restoration) and highlights areas where services will need to be developed to achieve net zero emissions. We provide a summary.

### Renewables to support grid

A modification to the grid code means that National Grid ESO can now procure grid stability services from renewable generators, which is considered crucial to decarbonising the power system by 2035 and enabling net zero emissions. [GC0137](#) sets the specification for 'grid forming' to allow converter connected equipment to provide system stability support in a similar way to conventional generators that are directly connected to the transmission system.

### Sizewell C gets public funding

The [government](#) is to support the continued development of the 3.2GW Sizewell C new nuclear project with £100m in funding. This option fee will be invested by developer EDF to help bring the project to maturity, attract investors and advance to the next phase in negotiations. As part of the funding deal the government will take certain rights over the land of the Sizewell C site and EDF's shares in the Sizewell C company, providing opportunities to continue to develop nuclear or alternative low carbon energy infrastructure on the site should the project not ultimately be successful.

### ...As does floating offshore wind

The [government](#) is to provide £31.6m in funding to 11 floating offshore wind projects to drive forward plans to place turbines in deep-sea areas, including in areas where winds are at their strongest. This will be matched by over £30m from industry to help accelerate deployment. Research will focus on areas such as how turbines are moored to the seabed, undersea cabling and developing foundation solutions.

### French power link refused

The [government](#) has rejected the proposed Aquind 2GW interconnector between the UK and France on the basis that the developer had not considered more appropriate alternatives for the proposed route. The developer said it was disappointed by the decision and plans to appeal the ruling.

### Time-of-use tariffs reduce peak demand

Engaged domestic users could significantly reduce peak electricity demand by using time-of-use tariffs, according to a new [study](#). Customers on such tariffs significantly reduced their demand during the evening peak by 15-17% and maintained that reduction over six months. Households that owned an Electric Vehicle (EV) showed a greater ability to flex their demand, achieving reductions of up to 23%. Responses to one-off signals were similarly significant and strongly affected by EV ownership.

### REGO prices continue to climb

'Deep green' REGOs reached £7.15/MWh in e-POWER's e-REGO [auction](#) held in mid February. Fuelled prices reached £5.00/MWh. REGO prices continue to rise as a result of more domestic and business green tariff offerings and strong corporate demand for ESG reporting at a time of lower than average renewable generation.

### Buy-out set

[Ofgem](#) has issued the buy-out price and mutualisation ceilings for 2022/23 (CP21). The buy-out price has been set at £52.88/ROC, which is just £0.05/ROC higher than was estimated last month. The mutualisation ceiling for England and Wales is £318,538,886.70 and for Scotland is £31,853,888.66. These reflect an annual increase in the Retail Prices Index (RPI), which was 4.1% in 2021.

### CP18 mutualisation redistributed

[Ofgem](#) has redistributed the RO quarter 2 mutualisation payments for the 2019/20 (CP18) compliance period. This totalled £7.9m, with £7.5m in England and Wales and £0.4m in Scotland.

Louise Bell  
Thrushgill Renewable Energy

Introduction	Feature	Wholesale market	Network costs	Renewables capacity	Renewables Obligation	Contracts for difference	Capacity market/ FIT	Non-commodity costs	Comment Key dates
<a href="#">Page 1</a>	Grid operability <a href="#">Page 2</a>	<a href="#">Page 3</a>	<a href="#">Page 6</a>	<a href="#">Page 9</a>	<a href="#">Page 10</a>	<a href="#">Page 14</a>	<a href="#">Page 15</a>	<a href="#">Page 16</a>	<a href="#">Page 17</a>



## System operability strategy

National Grid ESO published its annual Operability Strategy [Report](#) for 2022 in January, which explains the challenges the system operator faces in operating a rapidly changing electricity system and describes the capabilities and system requirements required to resolve these challenges.

### Context

Significant change across the electricity system is being driven by decarbonisation, decentralisation and digitalisation, which is impacting how the system is operated now and in the future. The growth of distributed energy resources, more offshore wind and interconnection will also impact.

National Grid ESO said that by 2025 the innovative systems, products and services will be in place to ensure the transmission system can operate with only zero carbon generation. The system will continue to evolve to achieve net zero emissions, through the integration of newer technologies such as large-scale offshore wind and domestic-scale solar and more demand side participation.

### Challenges

The operability challenges are divided into the following five key sections.

#### 1. Frequency

A reduction in system inertia and more variation in supply and demand are leading to more volatile and unpredictable system frequency.

Post fault services will need to be faster to ensure frequency close to 50Hz is maintained and new reserve services will need to work seamlessly with the new response services.

#### 2. Stability

Synchronous generation has traditionally provided system stability but the increased use of solar and wind has seen these inverter-based technologies reduce stability. Synchronising CCGTs and biomass generation provides more stability but impacts economically and increases emissions. Alternative solutions will need to be found to support net zero.

#### 3. Voltage

Falling levels of reactive power demand on distribution networks and reducing power flows across the transmission network are driving an increasing need to absorb reactive power on the transmission system, thereby managing voltage. The closure of coal and gas-fired power stations is reducing the available reactive power capacity and the reduced running hours of these leads to them being synchronised to allow access to their reactive power capacity increasing balancing costs. New reactive power providers will be required.

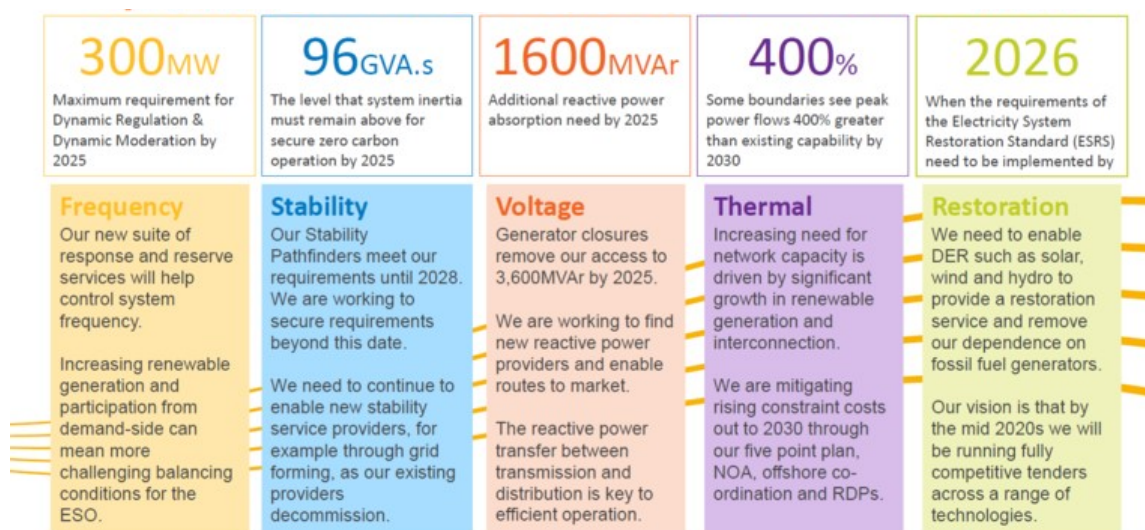
#### 4. Thermal

The physical limitations on the network of transmitting power from generation to consumer are managed through constraint actions, currently involving the redispatch of generation. National Grid ESO said it is mindful of the impact these actions have from both a carbon and cost perspective and are proactively focused on seeking innovative solutions to manage these constraints.

#### 5. Restoration

A range of users will need to provide restoration services in the future as the traditional generation shifts from large transmission connected fossil fuel to more Distributed Energy Resources (DERs).

### Operability strategy report—Need to know



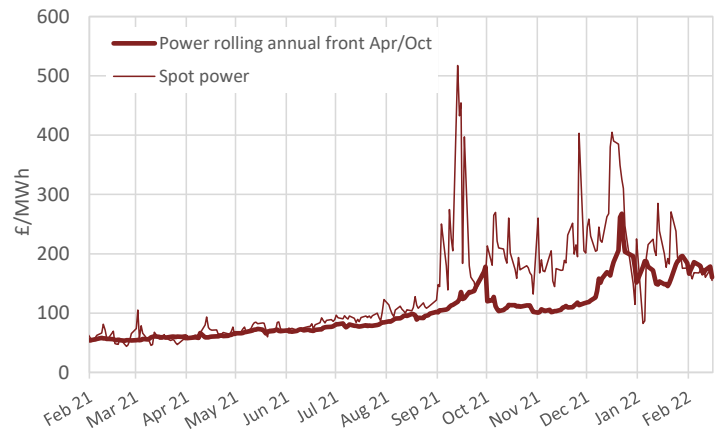
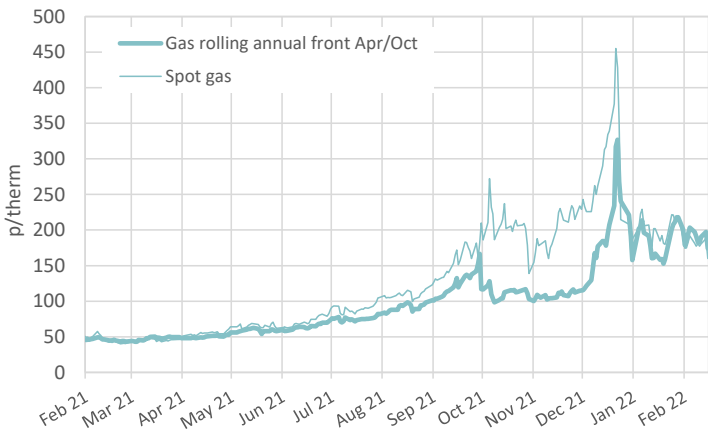
The Operability Strategy Report is published on our website here <https://www.nationalgrideso.com/research-publications/system-operability-framework.pdf>

**nationalgridESO**

Source: National Grid ESO



### Pricing



	Gas (p/therm)							Power (£/MWh)														
	End	Latest	Change on month		Change on year		Six month			End	Latest	Change on month		Change on year		Six month						
	Jan 22	Feb 22	p/th	%	p/th	%	Forecast	Low	High	Jan 22	Feb 22	£/MWh	%	£/MWh	%	Forecast	Low	High				
Day-ahead	189.05	160.15	(28.90)	(15%)	↓	119.03	289%	↑	179.00	99.50	455.05	176.02	155.00	(21.02)	(12%)	↓	89.46	137%	↑	166.34	82.71	517.52
Mar 22	200.10	170.95	(29.15)	(15%)	↓	130.25	320%	↑	170.95	178.10	224.41	193.00	161.25	(31.75)	(16%)	↓	93.85	139%	↑	161.25	161.25	214.10
Q2 2022	197.34	168.84	(28.50)	(14%)	↓	130.37	339%	↑	168.84	63.27	326.98	185.00	160.75	(24.25)	(13%)	↓	108.20	206%	↑	160.75	149.50	198.75
Summer 2022	197.00	169.01	(27.99)	(14%)	↓	130.51	339%	↑	169.01	60.50	324.57	184.00	160.25	(23.75)	(13%)	↓	113.05	240%	↑	160.25	67.50	267.50
Winter 2022	205.03	178.91	(26.12)	(13%)	↓	131.51	277%	↑	178.91	66.02	329.00	194.00	171.25	(22.75)	(12%)	↓	116.20	211%	↑	171.25	74.25	275.00
Summer 2023	113.26	114.88	1.62	1.4%	↑	77.73	209%	↑	114.88	47.22	105.96	112.50	115.25	2.75	2.4%	↑	70.35	157%	↑	115.25	52.55	120.00
Winter 2023	120.84	122.83	1.99	1.6%	↑	76.73	166%	↑	122.83	55.39	113.81	120.00	125.25	5.25	4.4%	↑	n/a	n/a		125.25	78.00	126.00
Ann Apr 22/23	201.02	173.96	(27.06)	(13%)	↓	132.34	318%	↑	173.96	63.26	326.78	189.00	165.75	(23.25)	(12%)	↓	115.88	232%	↑	165.75	70.88	271.25
Ann Oct 22/23	159.15	146.90	(12.25)	(8%)	↓	105.77	257%	↑	146.90	56.62	217.48	153.25	143.25	(10.00)	(6.5%)	↓	93.35	187%	↑	143.25	63.43	193.25

Source: Marex Spectron, Thrushgill Renewable Energy estimates

### Market update

#### Gas

Above seasonal average temperatures helped reduce heating demand in February with gas burn by generators also lower. Zeebrugge exports increased while industrial demand remained low.

Offshore supplies were again supplemented by LNG send-out but to a lesser extent and Belgian imports fell. LNG cargo arrivals have helped increase capacity back up to around 60%, higher than at the same time last year.

So far in February spot gas has averaged 179p/th, 23p/th lower than in January.

#### Power

A rise in temperatures, to above the seasonal normal, in February saw heating demand fall along with slightly reduced lighting requirements as the days lengthened.

Maintenance restricted nuclear output slightly but strong wind speeds lifted wind output to a new high, which along with higher imports reduced the call on gas-fired generation significantly to its lowest in nearly two years, although coal increased slightly.

So far in February spot power has averaged £166/MWh, £29/MWh lower than in January.

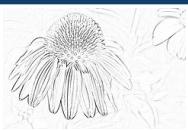
### Short-term outlook

#### Gas

LDZ heating should ease as temperatures start to rise although any cold spell is likely to be price supportive. Global LNG prices remain supported and storage stocks across Europe are depleting although LNG and storage capacity in the UK are relatively high. Prices are expected to continue to ease but only slowly.

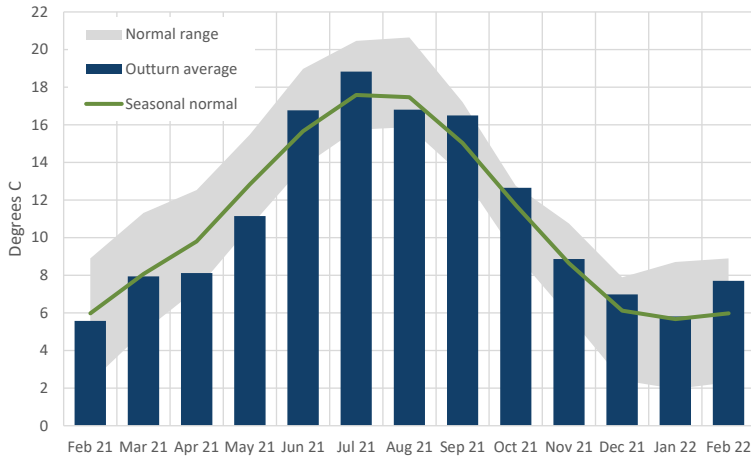
#### Power

As Spring approaches heating demand should ease although any particular cold spells with still conditions could see spot prices spike higher once again, particularly if gas prices remain high. Generally prices should trend downwards but significant reductions in the short term are unlikely.



## Demand

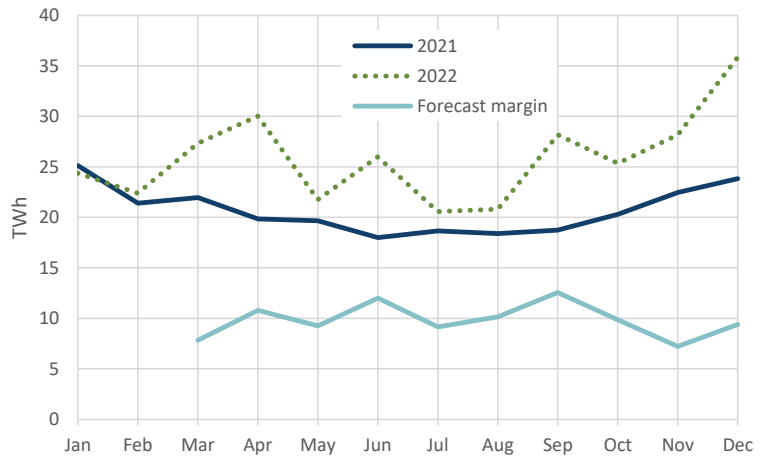
Monthly average temperatures



Source: Elexon

Price support:

Monthly demand and forecast margin

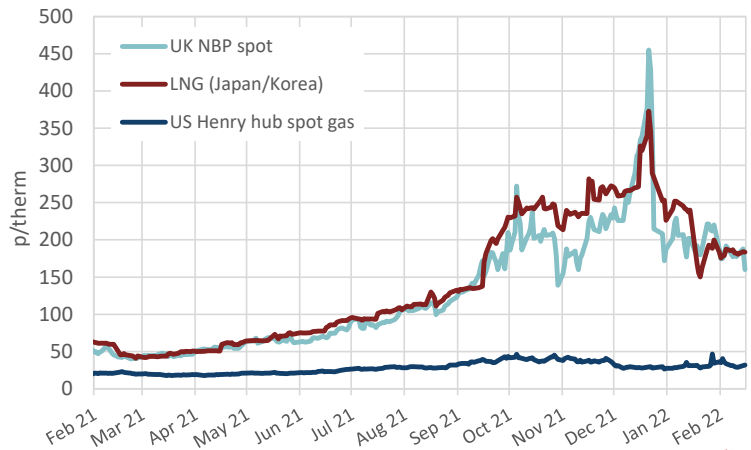


Source: Elexon

Price support:

## Gas

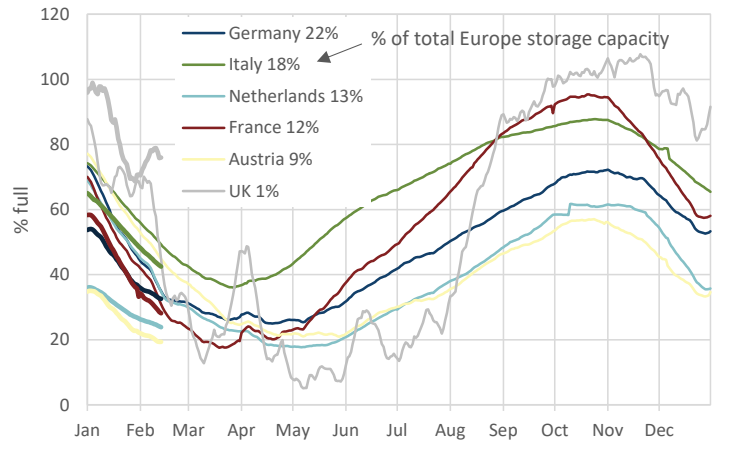
LNG, US, UK gas price comparison



Source: Marex Spectron

Price support:

European gas storage stocks, 2021 and 2022

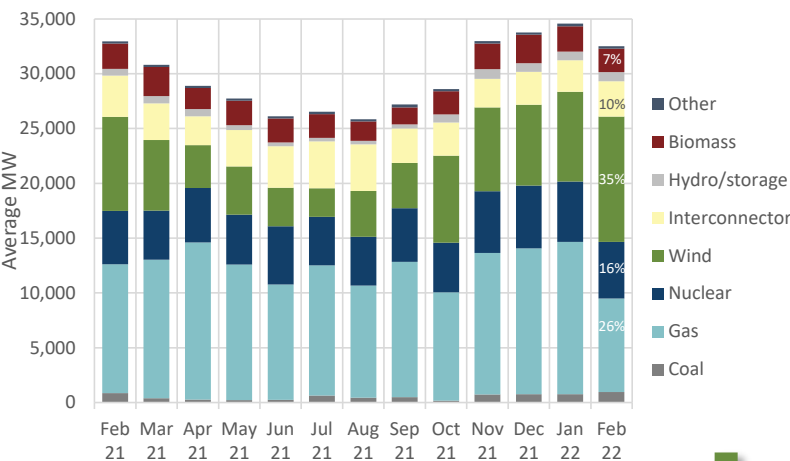


Source: AGSI

Price support:

## Power

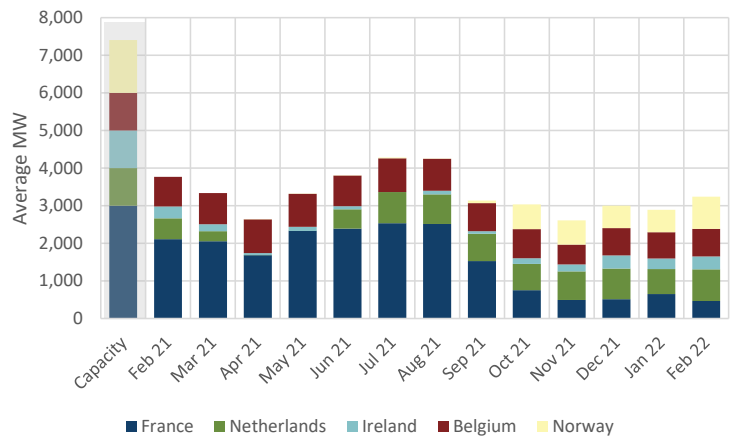
Generation mix



Source: Elexon

Price support:

Interconnector flows



Source: Elexon

Price support:

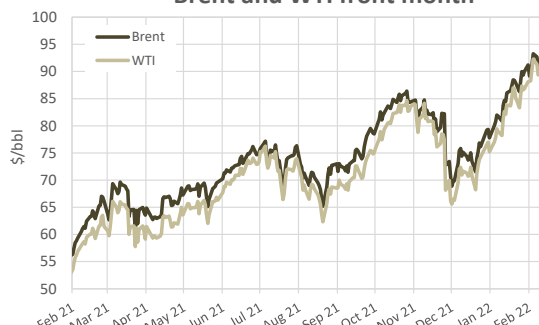


### Oil

Oil prices continued to climb in February with Brent peaking at a its highest in over seven years at over \$96/bbl. Support came from fears that Russia could invade Ukraine, with Russia one of the largest crude oil producers. Prices then eased slightly as tensions between the countries eased. Support continues though from a tight market as economies recover and demand increases following the Covid-19 pandemic.

\$/bbl	End	Latest	Change on month		Change on year		Six month	
	Jan 22	Feb 22	\$/bbl	%	\$/bbl	%	Low	High
Brent	91.21	93.28	2.07	2.3%	27.15	41.1%	65.18	96.48
WTI	88.15	92.07	3.92	4.4%	30.57	49.7%	62.32	95.46

Brent and WTI front month



Source: Marex Spectron

Price support:

### Coal

Strong coal prices this year continue supported by strong demand at a time of high gas prices. Potential conflict in Russia is also supporting given that Russia is Europe's largest supplier of thermal coal particularly to Germany.

The export ban from Indonesia has been lifted helping to ease supply pressures.

\$/tonne	End	Latest	Change on month		Change on year		Six month	
	Jan 22	Feb 22	\$/tonne	%	\$/tonne	%	Low	High
API#2 2023	115.85	113.60	(2.25)	(1.9%)	45.10	65.8%	90.00	182.00

European coal front year



Source: Marex Spectron

Price support:

### Carbon

Carbon continued to gain, supported by strong gas prices as generators switch to coal increasing emissions and demand for permits. Technical buying saw the EU ETS price rise, with analysts saying that €100/tCO<sub>2</sub> is in reach.

The UK government decided in January to still not intervene after the cost containment mechanism was triggered again.

Front year	End	Latest	Change on month		Change on year		Six month	
	Jan 22	Feb 22	/tCO <sub>2</sub>	%	/tCO <sub>2</sub>	%	Low	High
EUA €/tCO <sub>2</sub>	90.52	91.84	1.32	1.5%	54.24	144%	54.26	97.66
UKA £/tCO <sub>2</sub>	86.62	87.40	0.78	0.9%	41.15	89%	46.36	89.92
UKA €/tCO <sub>2</sub>	103.68	104.07	0.38	0.4%	50.82	95%	54.25	106.33

Carbon front year



Source: Marex Spectron

Price support:

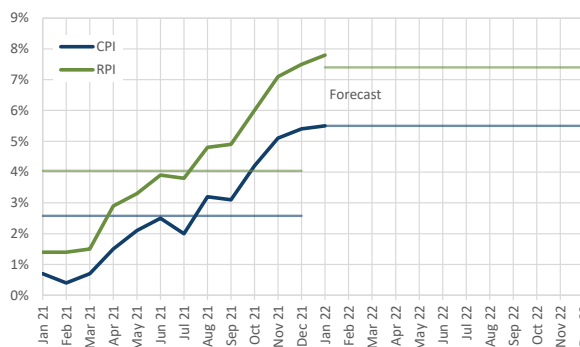
### Economy

Exchange rates



Source: Bank of England

UK inflation



Source: ONS

Year	RPI
2020	1.5%
2021	4.0%
2022	7.4%
2023	4.3%
2024	3.3%
2025	3.4%
2026+	3.3%

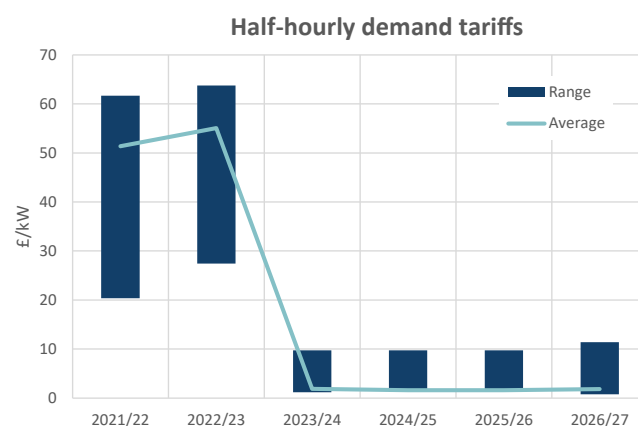




### Transmission

#### Half-hourly demand tariffs

Zone Name	£/kW Final		Yr-on-yr	National Grid forecast			
	2021/22	2022/23		2023/24	2024/25	2025/26	2026/27
1 Northern Scotland	20.38	27.45	34.7%				
2 Southern Scotland	29.30	35.47	21.0%				
3 Northern	41.44	44.68	7.8%				
4 North West	48.04	51.41	7.0%				
5 Yorkshire	48.70	51.84	6.5%				
6 N Wales & Mersey	49.45	53.41	8.0%				
7 East Midlands	52.43	55.53	5.9%				
8 Midlands	53.96	57.19	6.0%	1.18	1.54	1.31	0.76
9 Eastern	54.28	57.95	6.8%				
10 South Wales	56.24	58.46	4.0%	4.23	3.04	3.07	8.19
11 South East	56.77	60.20	6.0%	2.36	1.33	1.40	1.15
12 London	59.19	63.69	7.6%	4.71	3.58	3.69	3.57
13 Southern	58.87	62.26	5.8%	4.95	4.49	4.58	4.73
14 South Western	61.68	63.75	3.4%	9.72	9.75	9.75	11.40
<b>Average</b>	<b>51.36</b>	<b>55.06</b>	<b>7.2%</b>	<b>1.87</b>	<b>1.60</b>	<b>1.61</b>	<b>1.84</b>
Residual	53.23	56.86	6.8%				



Source: National Grid

#### Reform

Ofgem is pushing for wider flexibility across the energy system and is proposing a broader review of the existing transmission charging arrangements alongside its targeted charging review. Network charges could have a significant impact on how net zero emissions are delivered.

The existing Transmission Network Use of System (TNUoS) charging mechanism is complex and Ofgem believes reducing this complexity could improve competition. Charges are often volatile and unpredictable and can vary significantly by location.

Annual fixed charges depending on site consumption have therefore been proposed to replace the existing residual charging element. Implementation is expected from April 2023.

#### Proposed non-locational banded tariffs

Band	2023/24	2024/25	2025/26	2026/27
Domestic	£31	£31	£29	£30
LV_NoMIC_1	£15	£15	£14	£14
LV_NoMIC_2	£77	£76	£73	£73
LV_NoMIC_3	£179	£177	£171	£172
LV_NoMIC_4	£535	£529	£509	£512
LV1	£1,112	£1,100	£1,059	£1,065
LV2	£1,852	£1,832	£1,764	£1,773
LV3	£2,876	£2,845	£2,740	£2,754
LV4	£6,467	£6,396	£6,160	£6,191
HV1	£4,632	£4,581	£4,412	£4,434
HV2	£16,039	£15,862	£15,278	£15,355
HV3	£31,202	£30,859	£29,722	£29,871
HV4	£76,866	£76,020	£73,222	£73,588
EHV1	£26,987	£26,690	£25,707	£25,836
EHV2	£161,285	£159,511	£153,638	£154,407
EHV3	£343,814	£340,031	£327,513	£329,152
EHV4	£924,576	£914,403	£880,739	£885,146

#### Final 2022/23 tariffs see a slight reduction

National Grid published as required the [final](#) TNUoS tariffs for 2022/23 at the end of January, which take effect from 1 April until 31 March 2023. These tariffs reflect the current methodology including the impacts of CMP317/327 (removing generator residual), which are subject to an ongoing judicial review, and may yet be recalculated as a result. They do not include the impacts of CMP368/369 (physical asset update).

Transmission demand residual banded charges, which will see fixed charging introduced) is not expected to be introduced until 2023/24 as per Ofgem's latest minded to position on CMP343.

The revenue to be collected from demand tariffs is down by £35m compared to the previous draft tariffs published last November. This results in a reduction of £0.65/kW on average or 1.2%. Year-on-year there is a 7.2% increase in the average tariff and a 6.8% increase in the residual.

In 2022/23 National Grid ESO will recover £12.85m for the Network Innovation Competition (NIC). This includes £0.9m that was returned in unspent funds from the 2021 NIC funding.

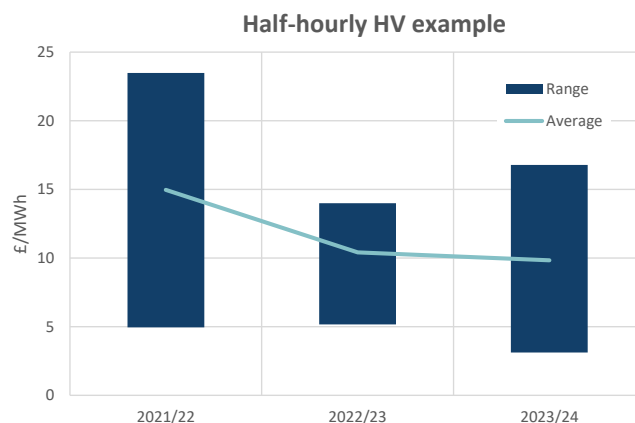
National Grid ESO is next due to publish its initial forecast of 2023/24 tariffs and five-year view in March.



### Distribution

#### HH HV site specific Band 4 (estimate by DNO)

DNO - £/MWh	2021/22	2022/23	2023/24
SEPD	10.71	9.31	7.92
SHEPD	23.31	13.10	14.47
SPD	17.67	12.01	14.47
SPManweb	23.49	14.00	16.78
Northern (Yorkshire)	14.51	9.11	8.90
Northern (Northeast)	16.88	10.50	10.56
ENWL	12.40	10.49	11.71
WPD East Mids	13.35	9.12	8.49
WPD West Mids	15.43	10.34	9.13
WPD South Wales	19.34	12.12	11.66
WPD South West	19.73	12.15	12.17
UKPN Eastern	9.22	9.01	7.92
UKPN London	4.95	5.17	3.12
UKPN South Eastern	12.64	9.28	8.35
<b>Median</b>	<b>14.97</b>	<b>10.41</b>	<b>9.84</b>



Source: DNOs

#### Reform

Through the targeted charging review and significant code review Ofgem is assessing how residual network charges should be set given that the regulator is concerned that the current framework for residual network charging could lead to inefficient use of the network.

The reviews aim for the residual charge, which covers the cost of maintaining the existing network, to be proportionate with a consumer's use of the network.

The changes will take effect for distribution charging from April 2022 when the residual will change to a fixed charge dependent on region, customer type and consumption (banding) level.

#### HH bandings by voltage

kVA	LV		HV		EHV	
	Lower (>)	Upper (<=)	Lower (>)	Upper (<=)	Lower (>)	Upper (<=)
Band 1		80		422		5,000
Band 2	80	150	422	1,000	5,000	12,000
Band 3	150	231	1,000	1,800	12,000	21,500
Band 4	231		1,800		21,500	

#### Round-up

WPD has issued a [consultation](#) on flexibility procurement. Topics covered include new flexibility products and time-scales, digitising WPD's processes, secondary trading and interactions with market platforms. The DNO is looking to develop products with longer lead times while moving closer to real-time procurement and domestic provision. Costs and requirements will be balanced to ensure their market is competitive and accessible.

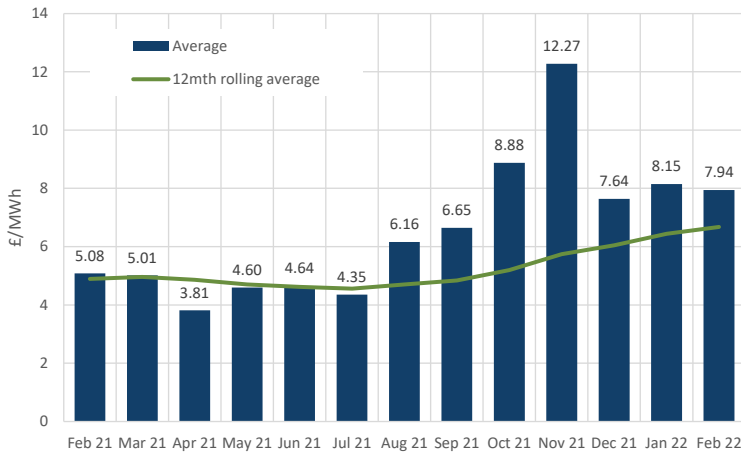
WPD has launched its first bi-annual [flexibility tender](#) to support its management of a smart and efficient network, enabling a greater volume of demand, generation and storage to be connected. Coverage is around a third of WPD's network in the Midlands, South West and South Wales.

Ofgem sought views on any aspect of DNO business plans for RII0-2, which will run from April 2023 to March 2028. Draft determinations on DNO allowances are due to be published by July for consultation. Final determinations are expected in winter 2022.



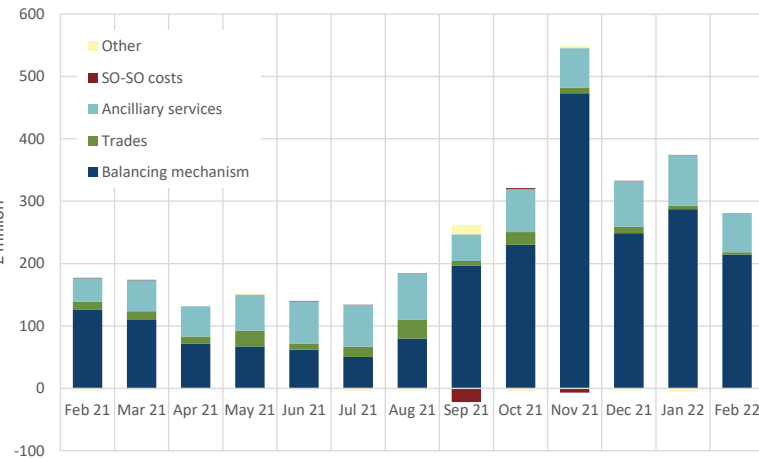
### Balancing services

Average monthly BSUoS rate

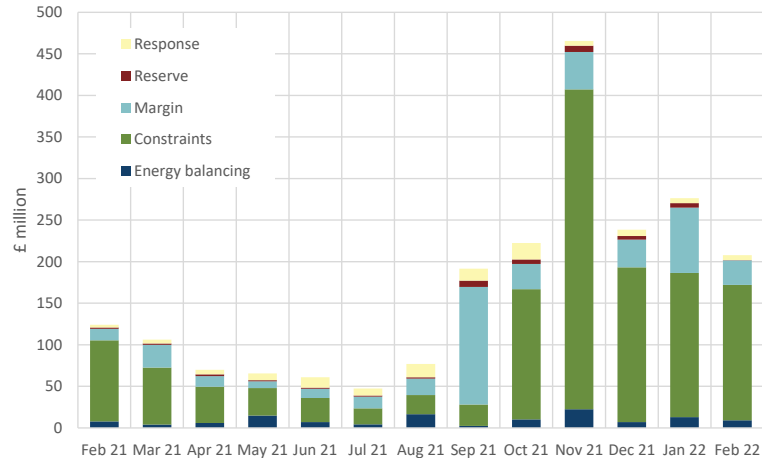


	Jan 22	Feb 22	Change on month	
			Absolute	%
BSUoS £/MWh	8.15	7.94	(0.20)	(2.5%)
Total cost £m	368.5	280.2	(88.4)	(24.0%)
Volume TWh	45.2	35.3	(10.0)	(22.0%)

Monthly total cost breakdown



Monthly balancing mechanism breakdown



Source: National Grid

Note: Latest month is month to date data

#### Latest monthly costs

The BSUoS rate for February to date is £7.94/MWh, 2.5% lower than January's actual of £8.15/MWh.

#### Regulatory change

National Grid ESO has appointed Frontier Economics to work on the balancing market review. Initial insights from the data analysis are expected by early March with the final report due to be published by early April. The review aims to fully understand the factors driving the market, particularly at a time when consumer budgets are under strain.





## In planning

### Planning Inspectorate programme of projects

MW	Pre-application	Pre-examination	Examination	Recommendation	Decision	Approved	Refused	Total max capacity	Number of schemes
Offshore wind	7,903	1,000	0	0	1,600	19,410	1,310	31,223	29
Tidal	8,400	0	0	0	0	320	0	8,720	4
Solar PV	2,113	500	0	0	150	350	0	3,113	11
EFW	291	0	0	0	0	393	140	824	11
Onshore wind	24	0	0	0	0	180	89	293	4
Biomass	150	0	0	0	0	0	0	150	1
Gasification	0	0	102	0	0	0	0	102	1
<b>Total</b>	<b>18,881</b>	<b>1,500</b>	<b>102</b>	<b>0</b>	<b>1,750</b>	<b>20,653</b>	<b>1,539</b>	<b>44,425</b>	<b>61</b>

Source: Planning Inspectorate

The government has approved the 1,800MW Norfolk Vanguard offshore wind proposal following a legal challenge. As part of the Round 4 offshore wind licensing arrangements three projects are expected to be submitted from the end of next year. These are the 1,500MW Mona, 1,500MW Morgan and 480MW Morecambe offshore wind schemes.

### Total capacity in planning

MW	E&W	Scotland	NI	Total
Battery	5,198	831	53	6,082
Onshore wind	438	4,628	184	5,250
Solar PV	4,828	78	55	4,960
Offshore wind	2,100	0	0	2,100
Pumped storage	0	1,500	0	1,500
Tidal	240	200	100	540
EFW	219	62	0	281
Biomass	0	260	0	260
Hydro	212	1	0	213
Adv conversion	28	0	0	28
Wave	7	20	0	27
Hydrogen	0	20	0	20
Landfill gas	16	0	0	16
AD	5	0	1	6
<b>Total</b>	<b>13,290</b>	<b>7,600</b>	<b>393</b>	<b>21,282</b>

Source: BEIS, data at Q4 2021

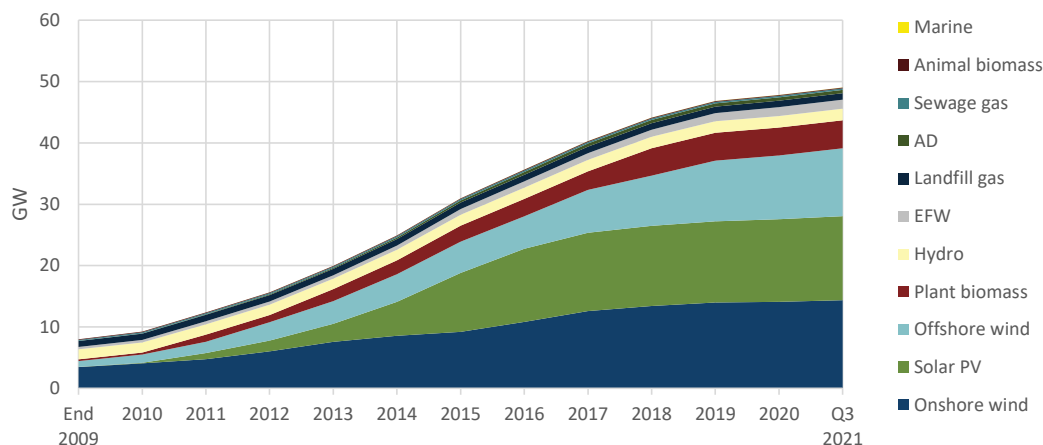
## Under construction

MW	E&W	Scotland	NI	Total
Offshore wind	5,857	1,985	0	7,842
Onshore wind	127	732	51	909
Battery	658	40	100	798
Solar PV	385	45	0	430
EFW	293	58	15	365
Biomass	357	0	0	357
Adv conv	124	25	0	149
Liquid air storage	50	0	0	50
AD	12	0	0	12
Hydro	2	7	0	9
Hot dry rocks	7	0	0	7
<b>Total</b>	<b>7,872</b>	<b>2,891</b>	<b>165</b>	<b>10,928</b>

Source: BEIS, data at Q4 2021

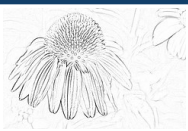
## Operational

### Operational renewables capacity



Source: BEIS, data at December 2021

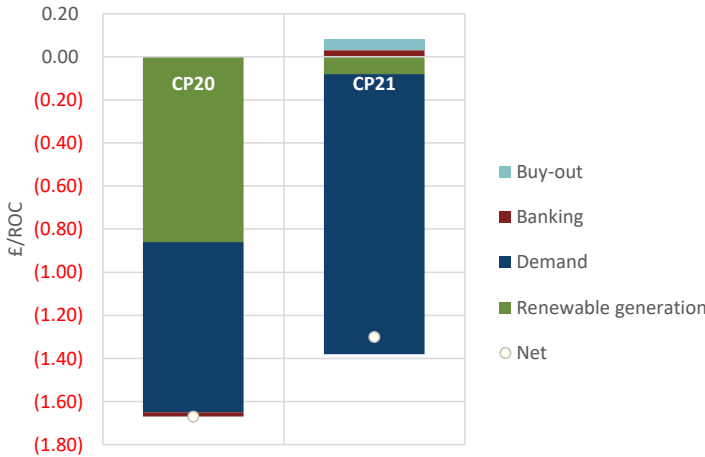
MW	End Q2 2021	Q3 2021	Change
Onshore wind	14,224	14,368	143
Solar PV	13,625	13,689	64
Offshore wind	10,666	11,066	400
Plant biomass	4,556	4,556	0
Hydro	1,893	1,894	1
EFW	1,467	1,467	0
Landfill gas	1,055	1,055	0
AD	540	541	1
Sewage gas	247	247	0
Animal biomass	129	129	0
Marine	22	22	0
<b>Total</b>	<b>48,424</b>	<b>49,033</b>	<b>609</b>



## Summary

	£/ROC	Buy-out	Recycle	Nominal	Change	
2021/22 CP20	50.80	50.80	9.79	60.59	(1.67)	↓
2022/23 CP21	52.88	52.88	7.97	60.85	(1.30)	↓

### Contribution to changes in ROC values



	2021/22 (CP20)	2022/23 (CP21)
Renewable generation (m ROCs)	1.5	0.1
Demand (TWh)	(3.4)	(5.5)
Banked brought fwd (m ROCs)	5.1	2.0
Banked carried fwd (m ROCs)	2.0	1.0

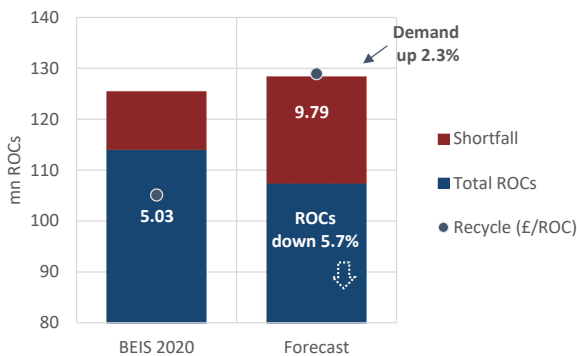
### Risks

- The extent demand is reduced as a result of the Covid-19 pandemic
- Wind speeds during the winter and the resulting output from onshore and offshore wind
- The use of banking to bring ROCs forward and to retain for following year

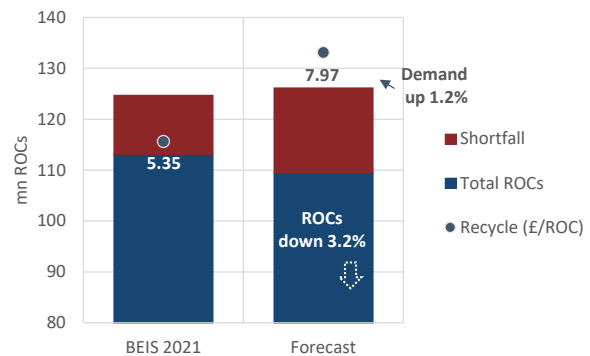
	Buy-out	Recycle	£/ROC	Total Change on mth	Total portfolio (£/MWh)	Banking (mn) Prev yr	Banked	England & Wales (RO) Ob level (%)	Shortfall (%)	RO (mn ROCs)	Scotland (ROS) Ob level (%)	Shortfall (%)	RO (mn ROCs)	Northern Ireland (NIRO) Ob level (%)	Shortfall (%)	RO (mn ROCs)	RO re-newables supply (%)
2021/22	50.80	9.79	60.59	(1.67)	24.99	5.1	2.0	49.2%	(8.9%)	115.3	49.2%	(0.2%)	11.5	19.4%	(0.1%)	1.5	27.3%
2022/23	52.88	7.97	60.85	(1.30)	25.96	2.0	1.0	49.1%	(7.2%)	113.4	49.1%	(0.2%)	11.3	19.3%	(0.1%)	1.4	28.9%

## Headroom

### 2021/22 (CP20)

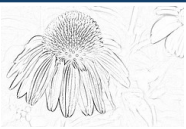


### 2022/23 (CP21)

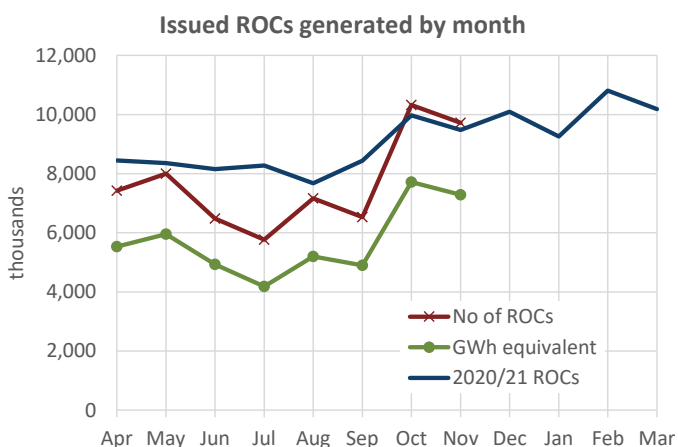


(millions)	BEIS 2020	Forecast	Change	Change on mth
<b>Total ROCs</b>	<b>114.0</b>	<b>107.5</b>	<b>(5.7%)</b>	<b>1.5%</b>
Shortfall	11.4	20.9		
Demand (TWh)	259.3	265.4	2.3%	(1.3%)
<b>Recycle (£/ROC)</b>	<b>5.03</b>	<b>9.79</b>	<b>4.76</b>	<b>(1.67)</b>
		Demand	1.29	
		ROCs	3.40	
<b>Headroom</b>	<b>10.0%</b>	<b>19.4%</b>		<b>(3.3%)</b>

(millions)	BEIS 2021	Forecast	Change	Change on mth
<b>Total ROCs</b>	<b>113.1</b>	<b>109.5</b>	<b>(3.2%)</b>	<b>0.1%</b>
Shortfall	11.6	16.7		
Demand (TWh)	258.3	261.4	1.2%	(1.3%)
<b>Recycle (£/ROC)</b>	<b>5.35</b>	<b>7.97</b>	<b>2.62</b>	<b>(1.35)</b>
		Demand	0.67	
		ROCs	1.93	
<b>Headroom</b>	<b>10.0%</b>	<b>15.2%</b>		<b>(2.6%)</b>



### 2021/22 (CP20) ROCs



In 2021/22 (CP20) to date, April to November 2021, 61.4m ROCs have been issued. For only the second month of this compliance period the number of ROCs is higher than in the same month last year.

Actual renewable generation during the year is predicted to be 4.0TWh lower year-on-year mainly as a result of less gen-

### Forecast ROCs generated by technology

ROCs '000s	2020/21 fcst	Forecast 2021/22	2021/22 to date	Change on mth	GWh yr-on-yr fcst
Offshore wind	44,083	42,479	21,776	998	(866)
Onshore wind	27,244	24,055	13,223	632	(3,150)
Fuelled	21,353	22,478	15,100	466	896
PV	9,787	9,093	7,807	(573)	(492)
Landfill gas	2,932	2,741	1,827	(5)	(189)
Hydro	2,593	2,490	1,212	0	(96)
Sewage gas	704	651	434	(3)	(64)
Microgeneration	390	355	24	0	(10)
Tidal power	49	24	16	(10)	0
Wave power	0	0	0	0	0
<b>Total</b>	<b>109,136</b>	<b>104,365</b>	<b>61,418</b>	<b>1,504</b>	<b>(3,971)</b>

eration from onshore and offshore wind, although output from the fuelled technologies is expected to be higher.

Compared with last month there are 1.5m more ROCs from wind as a result of expected higher wind speeds and biomass ROCs issued to date. This reduction is partially offset by fewer from solar PV based on ROCs issued to date.

### Electricity supplied

For April to November 2021 sales of electricity to consumers was 168.6TWh, 4.5% higher than in the same period a year earlier and 0.6 percentage points lower than the year-to-date reported last month. In the three months to November industrial usage was higher than in 2020 reflecting an increase in manufacturing activity, as the impact of the Covid-19 lockdown continued to ease. Commercial activity also increased reflecting the reopening of some offices, leisure venues and non-essential shops although warmer temperatures capped further gains. Domestic consumption fell with heating demand relatively low as temperatures were higher.

#### Forecast

For 2021/22 (CP20) we now assume a 3.1 percentage point year-on-year increase from the 2020/21 (CP19) figure. This is based on actual data to date and a two-year average for March. This 3.1% increase is 1.3 percentage points lower than last month, which gives a total of 265.4TWh.

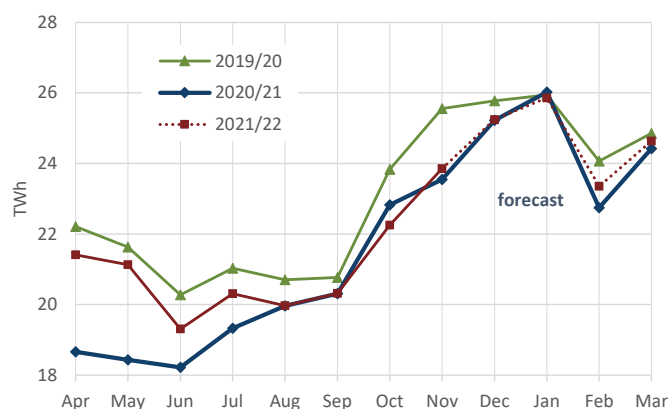
Longer term factors driving electricity demand are the decarbonisation of generation, energy efficiency, growth of electric vehicles, the economic background and the development of smart technologies

#### April to November

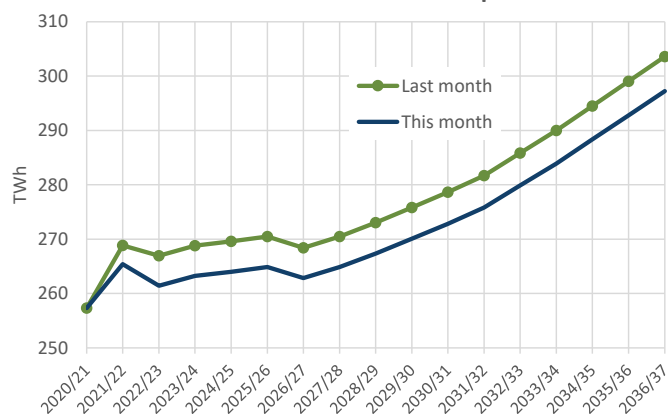
TWh	2020/21	2021/22	% change
<b>Total</b>	<b>161.3</b>	<b>168.6</b>	<b>4.5%</b>
E&W	143.9	150.4	4.5%
Scotland	13.0	13.6	4.2%
NI	4.4	4.6	4.7%

Source: BEIS

### UK electricity demand comparison



### Annual UK demand comparison



### 2021/22 (CP20) ROC value forecast

#### Central forecast

Under the central forecast the nominal ROC value is estimated at £60.59/ROC for 2021/22 (CP20), with the recycle value at £9.79/ROC. The buy-out is set at £50.80/ROC.

There is a £1.67/ROC reduction compared with last month. This is as a result of more ROCs from higher generation, a £0.86/ROC reduction, lower demand, a £0.79/ROC decrease, and a small reduction of £0.02/ROC through banking.

For banking we assume that 5.1m, or 4.2%, will be brought forward and that 2.0m, or 1.6%, will be held over until the following year, little changed from last month.

#### Headroom

The level of actual headroom based on the forecast number of ROCs is 19.4%, 3.3 percentage points higher.

#### Banking for headroom risk mitigation

Suppliers can present up to 25% of their RO in ROCs banked from the previous year. For 2021/22 (CP20) up to 32.1m ROCs could be banked for submission in 2022/23 (CP21). This could see generation increase, for example lifting the wind load factor to 52%, compared with 28% forecast.

2021/22	Recycle value (£/ROC)	ROC value (£/ROC)	Change on central (£/ROC)	ROCs as % of RO	E&W obligation shortfall
<b>Central forecast</b>	<b>9.79</b>	<b>60.59</b>		<b>84%</b>	<b>(8.9%)</b>
Less ROCs banked 0.0%	8.69	59.49	(1.10)	85%	(8.0%)
More ROCs banked 2.3%	10.34	61.14	0.55	83%	(9.3%)
Demand 2.1%	9.23	60.03	(0.56)	85%	(8.5%)
Demand 4.1%	10.41	61.21	0.62	83%	(9.3%)
2019/20	5.65	54.43		89%	(5.5%)
2020/21	4.42	54.47		88%	(6.1%)

#### Extreme banking

(millions)	2021/22 (CP20)
RO	128.3
Bankable	32.1
Max ROCs	159.9
Other techs	37.8
Wind	122.0
Wind (MW)	18,657
<b>Max wind LF</b>	<b>52%</b>
Fcst LF	28%

### Long term generation

#### Forecast RO capacity and ROCs by technology and year

MW	2022	Mthly change	2023	Mthly change	2024	Mthly change	2025	Mthly change	2030	Mthly change	2035	Mthly change	% subject to 2022	% subject to 2025
Onshore wind	12,439	(0)	12,439	(0)	12,439	(0)	12,439	(0)	8,781	(0)	5,568	(0)	45%	45%
Offshore wind	6,565	0	6,565	0	6,565	0	6,565	0	4,563	0	1,550	0	71%	95%
PV	5,842	3	5,842	3	5,842	3	5,842	3	5,842	3	5,557	3	66%	100%
Fuelled	1,693	0	1,693	0	1,693	0	1,693	0	1,233	0	770	0	100%	100%
Landfill gas	598	(0)	330	(0)	197	(0)	130	(0)	40	0	5	0	11%	49%
Hydro	719	0	719	0	719	0	719	0	0	0	0	0	1%	1%
Sewage gas	207	0	207	0	207	0	207	0	65	0	20	0	35%	35%
Microgeneration	126	(0)	126	(0)	126	(0)	126	(0)	122	(0)	22	(0)	100%	100%
Wave & tidal	17	0	17	0	17	0	17	0	16	0	11	0	32%	97%

ROCs '000s	2022	Mthly change	2023	Mthly change	2024	Mthly change	2025	Mthly change	2030	Mthly change	2035	Mthly change
Offshore wind	45,063	130	45,357	0	45,233	0	45,233	0	30,421	0	5,923	0
Onshore wind	26,435	(0)	26,507	(0)	26,435	(0)	26,435	(0)	17,744	(0)	8,734	(0)
Fuelled	21,413	0	21,443	0	21,413	0	21,413	0	7,736	0	2,924	0
PV	10,132	4	10,082	4	9,978	4	9,901	4	9,514	4	8,032	2
Landfill gas	1,918	(0)	995	(0)	530	(0)	298	(0)	22	0	0	0
Hydro	2,491	0	2,497	0	2,491	0	2,491	0	15	0	9	0
Sewage gas	656	0	658	0	656	0	656	0	113	0	39	0
Microgeneration	355	0	356	0	355	0	355	0	343	(0)	31	(0)
Wave & tidal	30	0	30	0	30	0	30	0	28	0	12	0
<b>Total</b>	<b>108,492</b>	<b>134</b>	<b>107,926</b>	<b>4</b>	<b>107,120</b>	<b>4</b>	<b>106,811</b>	<b>4</b>	<b>65,935</b>	<b>4</b>	<b>25,704</b>	<b>2</b>
GWh equivalent	75,600	83	80,276	3	79,290	3	79,290	3	46,062	3	20,419	1

Note: Fuelled excludes co-firing of biomass with fossil fuel, energy crops and large-scale conversions



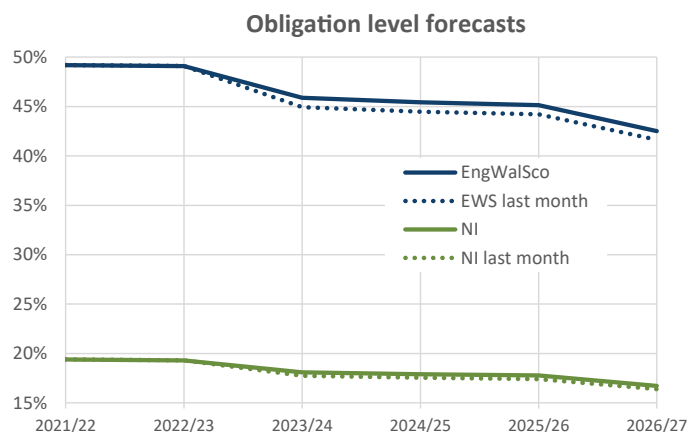
## Obligation levels

The obligation levels for 2021/22 (CP20) were set in October 2020 at 0.492 ROCs per MWh for England, Wales and Scotland and at 0.194 ROCs per MWh for Northern Ireland.

The obligation levels for 2022/23 (CP21) were set in October 2021 at 0.491 ROCs per MWh for England, Wales and Scotland and at 0.193 ROCs per MWh for Northern Ireland.

Our modelling shows that the obligation levels for 2023/24 (CP22) and beyond are set on the 10% headroom basis.

The fixed targets for 2022/23 (CP21) and later are 15.4% for England, Wales and Scotland and 6.3% for Northern Ireland.



## Long term forecast

### 2022/23 (CP21)

The nominal ROC value is estimated at £60.85/ROC in 2022/23 (CP21), which is £1.30/ROC lower than last month. The recycle value is estimated at £7.97/ROC.

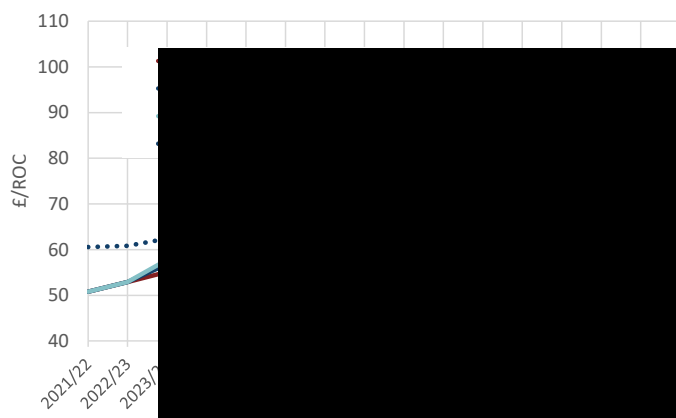
The higher number of ROCs from more generation accounts for a reduction of £0.08/ROC. The lower demand accounts for a £1.30/ROC decrease, the buy-out is £0.05/ROC higher and there is a small £0.03/ROC increase through banking.

### Longer term

From 2023 the number of ROCs is higher and demand is lower. The headroom mechanism has adjusted the obligation levels upwards.

From 2027 the ROC value will be fixed at the long-term buy-out price plus 10%, with the current annual link to inflation.

### Long-term buy-out under low, central and high scenarios



Year	Buy-out (£/ROC)		Nominal ROC value (£/ROC)	Change on month (£/ROC)	ROC value real terms (£/ROC)	Buy-out on total portfolio (£/MWh)	Ob level E&W&S (%)	E&W shortfall (%)	Ob level NI (%)	Shortfall (%)	RO (m ROCs)			RO re-newables supply (%)	Buy-out (£/ROC)	
	Low	High									E&W	Sco	NI	Low	High	
2021/22	50.80	50.80	60.59	(1.67)	59.05	24.99	49.2%	(8.9%)	19.4%	(0.1%)	113.4	11.3	1.4	27.3%	50.80	50.80
2022/23	52.88	52.88	60.85	(1.30)	58.43	25.96	49.1%	(7.2%)	19.3%	(0.1%)	106.7	10.6	1.4	28.9%	52.88	52.88
2023/24	55.10	55.10	63.30	1.33	57.55	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	55.10	57.89
2024/25	55.10	55.10	63.30	0.00	57.55	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	55.10	57.89
2025/26	55.10	55.10	63.30	0.00	57.55	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	55.10	57.89
2026/27	55.10	55.10	63.30	0.00	57.55	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	55.10	57.89
2027/28	60.61	60.61	63.30	2.69	60.61	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	60.61	63.68
2028/29	60.61	60.61	63.30	2.69	60.61	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	60.61	63.68
2029/30	60.61	60.61	63.30	2.69	60.61	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	60.61	63.68
2030/31	60.61	60.61	63.30	2.69	60.61	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	60.61	63.68
2031/32	60.61	60.61	63.30	2.69	60.61	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	60.61	63.68
2032/33	60.61	60.61	63.30	2.69	60.61	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	60.61	63.68
2033/34	60.61	60.61	63.30	2.69	60.61	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	60.61	63.68
2034/35	60.61	60.61	63.30	2.69	60.61	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	60.61	63.68
2035/36	60.61	60.61	63.30	2.69	60.61	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	60.61	63.68
2036/37	60.61	60.61	63.30	2.69	60.61	26.06	45.0%	(4.6%)	18.1%	(0.1%)	105.0	10.6	1.2	20.5%	60.61	63.68

Note: ROC values in real terms are set at 2020/21 prices. From 2027/28 (CP26) fixed ROC price at buy-out plus 10%



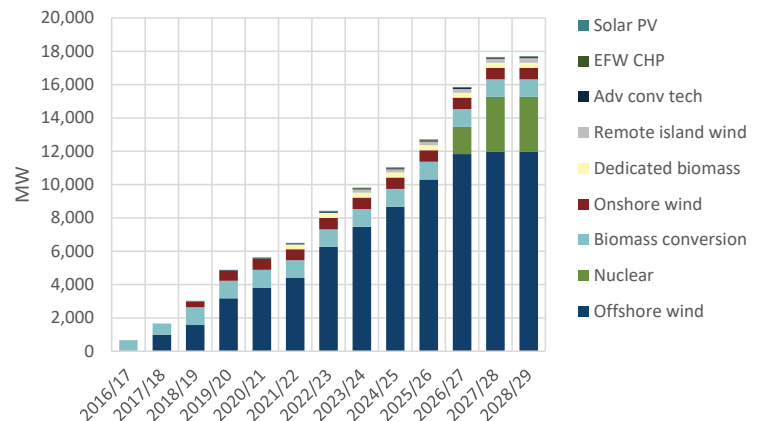


### Summary and forecast

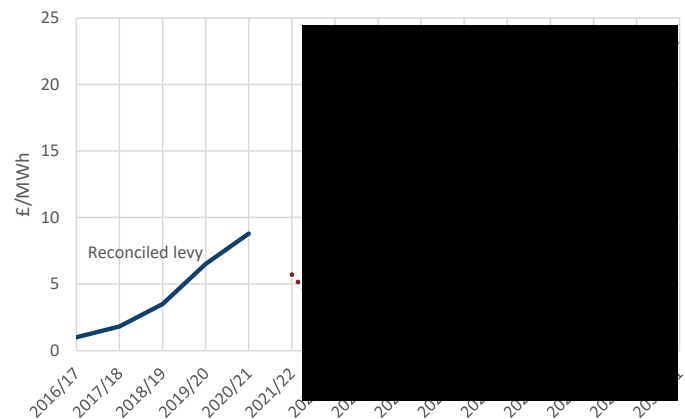
The government is [consulting](#) on proposed changes to the CFD mechanism on how to make supply chains across the low-carbon electricity generation sector more competitive, productive and efficient. The proposals include more rigorous questioning and scoring of questionnaire responses, along with introducing an interview, allowing for greater scrutiny of applications, and raising the pass mark to make qualification more robust. Under the proposals the supply chain process would also be extended to include emerging technologies such as floating offshore wind. The changes aim to ensure the fifth round delivers increased benefits when it opens next year. Alongside the consultation a call for [evidence](#) is seeking views on the potential for more significant changes, including penalties for failure of supply chain plan commitments, negotiating supply chain plans, changing the supply chain plan 300MW threshold and ways to further improve the process.

The government has published its [response](#) to last November's consultation on the operational cost budgets and levies on the Low Carbon Contracts Company for 2022/23 to 2024/25. The estimated costs, forecast demand and levy rates have been set as per the original proposals.

Operational and contracted CFD capacity by year, technology



Reconciled and forecast interim levy



### Quarterly CFD cost breakdown

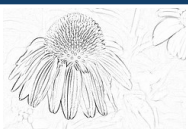
	2019/20				2020/21				2021/22				2022/23			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Reconciled levy (£/MWh)	5.171	6.262	6.733	7.904	9.622	8.834	9.232	7.457	5.963	2.849	-1.052					
Interim levy rate (£/MWh)	4.888	5.448	6.237	5.848	7.469	8.532	9.733	7.345	8.037	3.851	0.000					
Forecast interim levy (£/MWh)																
Reconciled eligible demand (TWh)	63.7	61.4	75.2	75.9	54.7	58.9	71.9	76.6	65.0	62.2	74.0					
Expected eligible supply (TWh)																
Reconciled EII demand (TWh)	2.4	2.3	2.3	2.3	2.0	2.3	2.4	2.4	2.6	2.7	2.6					
Reconciled payments to gens (£m)	329.2	384.5	506.2	599.8	526.7	520.1	663.5	571.3	387.6	177.2	-77.9					
Expected payments to gens (£m)																

### Annual CFD cost breakdown

	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Reconciled levy (£/MWh)	6.517	8.786										
Forecast interim levy (£/MWh)			5.711									
Operational costs (£/MWh)	0.059	0.061	0.076									
Reconciled eligible demand (TWh)	276.1	262.1										
Expected eligible supply (TWh)			281.9									
Reconciled EII demand (TWh)	9.2	9.2										
Reconciled payments to gens (£m)	1,819.8	2,281.6										
Expected payments to gens (£m)			1,609.7									

Note: EII is energy intensive industries

Source: Actuals from Low Carbon Contracts Company



## Capacity market

## Feed-in tariff

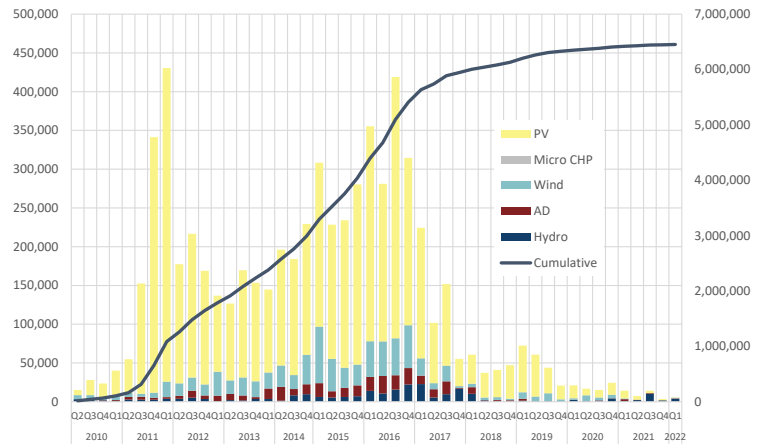
The T-1 auction for delivery in 2022/23 ended on 15 February with a clearing price of £75/kW/year with 4.996GW of capacity awarded. This was slightly below the target of 5.361GW, which was 4.7GW higher than the recommended target reflecting broader uncertainties within the power sector. We will provide a full summary in March along with the T-4 results.

The auction [parameters](#) have been confirmed for the T-4 auction, which is due to start on 22 February. For T-4 the target is set at 43.6GW, a 0.5GW reduction to account for small technical considerations, with 1.5GW of this set aside for the future T-1 auction.

National Grid ESO as delivery body is [consulting](#) on potential changes to the methodology used to calculate capacity market de-rating factors for some embedded conventional generation technologies. This concerns reciprocating engines and energy from waste. The proposed changes will not affect the February 2022 auctions.

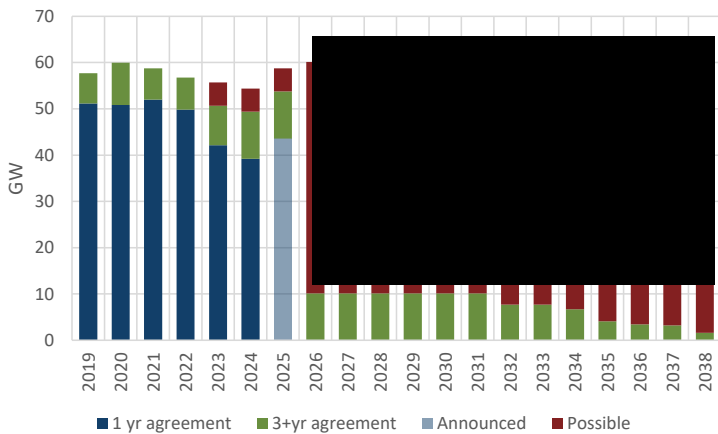
[Ofgem](#) published the tariff rates effective from 1 April 2022 in late January. The relevant tariffs have been adjusted by RPI of 7.5%.

Installed FIT capacity, by quarter and cumulative (kW)



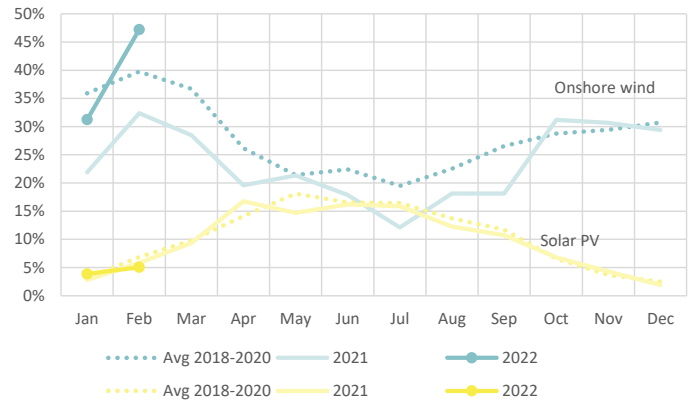
Source: Ofgem

Capacity awarded and expected



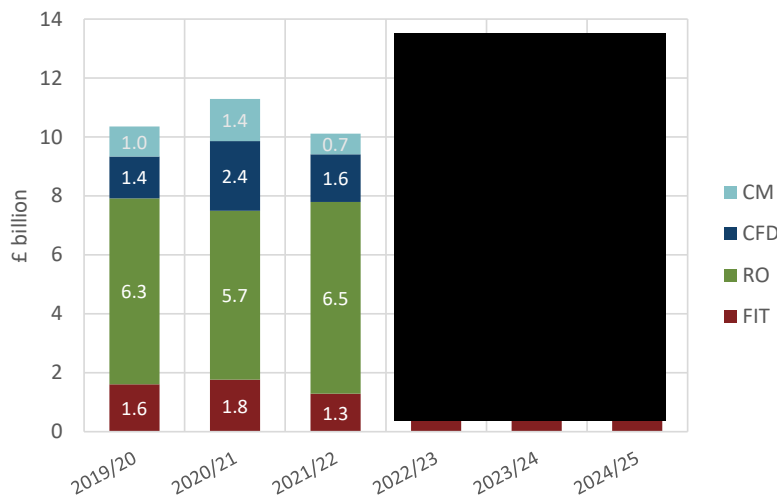
Source: Actuals from Low Carbon Contracts Company

Embedded wind and solar PV load factors by month



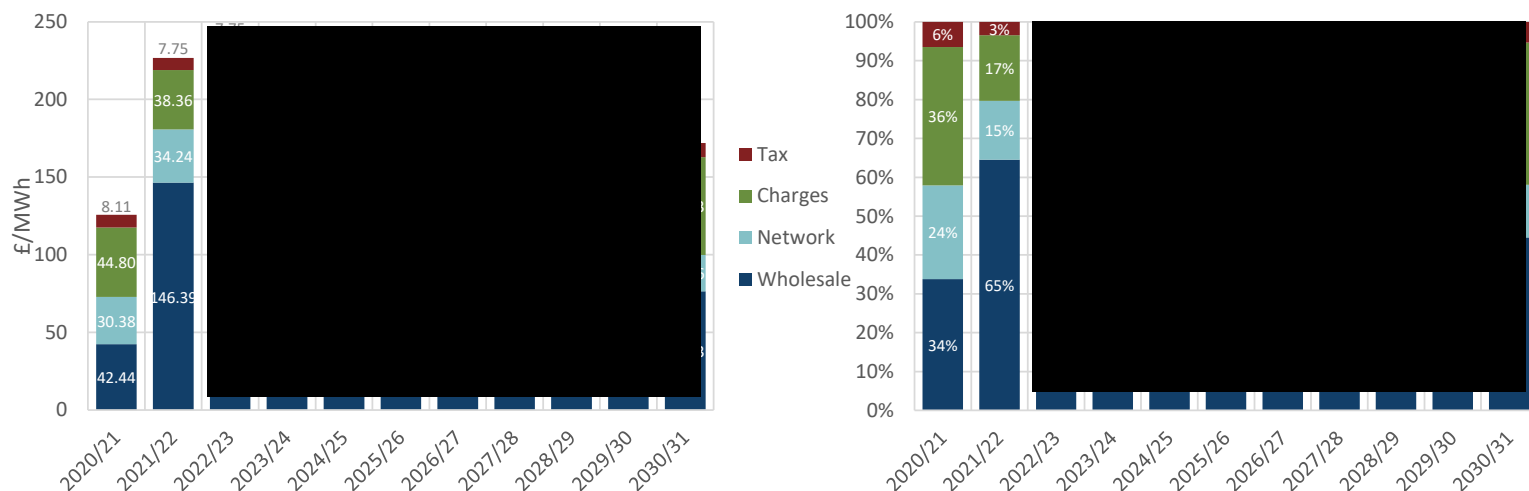
Source: National Grid

## Low-carbon cost summary



## Summary

Consumer retail power price forecast cost by category



Retail power price outlook (£/MWh)

£/MWh	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Wholesale	42.44	146.39									
Transmission	11.48	11.94									
Distribution	13.64	14.97									
BSUoS	4.96	6.92									
AAHEDC	0.30	0.40									
RO	23.57	24.99									
FIT	7.42	5.25									
CFD	8.79	5.71									
CM	5.02	2.41									
CCL	8.11	7.75									
<b>Total</b>	<b>125.73</b>	<b>226.74</b>									

Annual percentage change in price

%	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Wholesale	5.7%	244.9%									
Transmission	(0.1%)	4.0%									
Distribution	(1.2%)	9.8%									
BSUoS	33.3%	39.7%									
AAHEDC	15.9%	32.8%									
RO	(0.2%)	6.0%									
FIT	17.8%	(29.2%)									
CFD	34.8%	(35.0%)									
CM	48.5%	(52.0%)									
CCL	(4.3%)	(4.4%)									
<b>Total</b>	<b>6.8%</b>	<b>80.3%</b>									

Note: Transmission and distribution charges are representative of an HV consumer with 20GWh annual consumption. Assumes no cost category exemptions, such as climate change agreements from CCL. Minor costs, such as supplier margin, are excluded from the analysis. Forecasts are in nominal terms.

Client specific charges can be calculated and provided as a bespoke service.



## Comment

### Rebate for households

The [Treasury](#) has announced an Energy Bills Rebate that will provide all domestic electricity consumers with a £200 reduction in energy bills from October. The discount will then be automatically recovered from bills in equal £40 instalments over the next five years, starting from 2023 when wholesale gas prices are expected to fall. In addition households in England in council tax bands A-D will receive a £150 rebate to help with the cost of living as wholesale energy prices rise. Eligibility for the Warm Home Discount will also be expanded by nearly a third and the planned £10 uplift to £150 from October will go ahead.

In response many said the package of measures did not go far enough. The Association for Renewable Energy and Clean Technology (REA) said the measures would ease some up-front costs to consumers and support suppliers but the expected bill increases would not be covered. It added that unless dependency on fossil fuels is reduced, consumers will continue to suffer from volatile energy bills in the future.

### ...as default price cap increases

The price cap in place for domestic consumers is set to increase from 1 April as a result of rising global gas prices. [Ofgem](#) has published a number of documents relating to the cap to ensure that it better reflects the costs of supplying energy, as well as decisions in response to the recent wholesale market volatility and to allow the cap to respond flexibly to future exceptional or unprecedented market changes.

The cap was previously adjusted twice a year, it will now also be adjusted in April to September and October to March 2023 to account for additional costs incurred by suppliers through wholesale market price volatility. The changes include an in-period adjustment in exceptional circumstances

according to specified criteria. The green gas levy allowance will also be taken into account for the gas cap. Ofgem is also consulting on further medium-term changes.

### Levelling-up omits net zero

The government has launched its levelling-up [strategy](#) but it was criticised for failing to focus on new net zero measures. Of the list of 16 priorities ‘the green industrial revolution and transition to net zero’ came at number 15 with a pledge of £26bn in capital investment although this was unclear whether this was new funding or how it would be allocated.

The REA said it was disappointed that net zero did not play a greater role in the White Paper. It added that the need to accelerate the energy transition has never been greater amid volatile fossil fuel prices increasing the cost of living.

### CFD auctions to be held annually

The frequency of CFD auctions will increase to every year, from every two years, from March 2023 when allocation round 5 opens, the [government](#) has announced.

The decision comes following the outcome of an internal review of CFD auction frequency, which the government agreed to undertake in the Net Zero Strategy. The review found that annual allocation rounds can help accelerate the deployment of low-carbon electricity generation, increase market confidence and support investment in the sector.

More frequent CFD rounds should support the delivery of renewable technologies to help decarbonise the power sector, such as low-cost offshore wind, locally supported onshore wind, and solar PV. Annual auctions will provide a stable platform for emerging technologies, such as tidal stream and floating offshore wind, to demonstrate their scalability and cost-efficiency.

## Dates to watch out for

Organisation	Subject	Date
e-POWER	e-ROC auction	23 February, 22 March
LCCC	Capacity market auctions	February
LCCC	CFD allocation Round 4 results	Spring/summer
National Grid	Five year outlook from 2023/24 for transmission charges	March
e-POWER	e-REGO auction	10 May

### Disclaimer

Thrushgill Renewable Energy deems that the information and opinions provided in this report and all other documentation are sound, but parties must rely upon their own skill and judgement when making use of it. Thrushgill Renewable Energy will not assume any liability to anyone for any loss or damage arising out of the provision of this report however caused.

The report makes use of information collected from various sources in the public domain and from confidential research not subjected to independent verification. Thrushgill Renewable Energy does not provide representation or warranty as to the accuracy or completeness of the information contained in this report.

Thrushgill Renewable Energy makes no warranties, whether express, implied, or statutory regarding or relating to the contents of this report and specifically disclaims all implied warranties, including, but not limited to, the implied warranties of merchantable quality and fitness for a particular purpose.

