Warnings of new energy crisis amid fear climate change will make the wind drop

Rachel Millard examines whether models predicting how melting polar ice caps will affect the weather are too alarmist

A lull in wind speeds over the summer was felt in boardrooms across Europe.

As it blew at the weakest for around 60 years, major energy companies lost millions of pounds in electricity sales.

By September, households started to feel the pain. Coal and gas-fired plants were switched on to make up for loss of wind, compounding a global shortage of gas and pushing electricity prices to record levels.

"It's very serious," Mads Nipper, chief executive of Danish oil-turned-wind giant Orsted, told the *Financial Times* in August, as he warned shareholders of a hit to profits.

"It is like you're a farmer and it doesn't rain."

Countries are relying more on wind to meet their energy needs in the rush to slash carbon emissions.

The technology accounts for more than 6pc of global electricity, and is set to grow as fossil fuels are muscled out of the way by cleaner sources.

In the UK, turbines on land and dotted around the coast generate about a quarter of domestic electricity over the year. Boris Johnson wants to make wind the backbone of the energy system, with a huge increase in offshore turbines, as part of the legally binding push to net zero.

But events like the wind lull have triggered questions over whether it was a sign of things to come, and how predictable wind patterns are in the long term amid climate change.

It's an area of growing corporate and scientific research, with huge consequences for energy security and

'We need studies to understand it better, given our increased reliance on wind for energy'

business investment. But much remains unknown.

"Given what we saw in 2021, I think we will see and we need studies to understand [wind trends] better, especially given our increased reliance on wind as an energy source," says Paul Williams, professor of Atmospheric Science at the University of Reading.

Scientists have identified a pattern of declining average wind speeds globally, averaging about one mile an hour every 30 years, based on wind speeds since the 1970s. They point to climate change melting snow and ice in the Arctic, which is weakening the temperature difference between the Arctic and the Tropics, slowing down wind speeds.

The United Nations' Intergovernmental Panel on Climate Change (IPCC), which collates research from around the world, predicts with "medium confidence" that average wind speeds over land in large parts of Europe will fall by up to 10pc in the summer months by 2100, under a scenario in which the world stays within its ambitious 1.5 degree global warming target limit.

The trend could have a serious impact. The relationship between the speed and energy generation is "very sensitive," adds Williams. "A 1pc drop in wind speed can imply a 3pc drop in energy generation. So if the IPCC is correct and there's a 10pc drop in wind speed – that can imply a 30pc drop in energy generation."

The picture is complicated, however. Long-term wind modelling is uncertain and some evidence also points the other way. "There are a good handful of models that say wind speeds could increase," says Dr Hannah Bloomfield, research associate in climate risk analytics at the University of Bristol.

After falling since the 1970s, wind speeds have picked back up again since 2010, though this reversal is hard to explain, according to Adrian Chappell, professor in climate change Impacts at Cardiff University.

While he says it is very difficult to be definitive about future wind trends, he believes one influential factor that has not had enough attention is changes on land. Buildings and vegetation can act as a break on wind speed, for instance. Land use can also affect the amount of carbon dioxide and warmth absorbed, fuelling or reigning in climate change.

He believes "we can explain up to about 50pc of the variability in wind speed in Europe due to the changes in inland surface roughness".

"Broader wind models we rely on are not very well coupled to the land surface," says Chappell, arguing that more work around land could help understand wind patterns. "They essentially assume a fixed and static land surface."

As more attention is paid to the power of the energy source, stock market analysts are picking through the scientific research for clues on wind giants' earnings.

In a recent report on Orsted, Bernstein said academic research on wind speed trends was "unclear and non-conclusive".

But it added that speeds in the UK have not strayed from the long-term average, and there was some evidence wind gust intensity will increase due to global warming.

In future, "more powerful wind turbines will more than compensate for the impact of lower wind speeds of 0-10pc, should that be the case", it added. "For existing projects, investors should ignore the 'noise' on wind yield data."

Speaking in November, Orsted's Nipper stressed the company believed 2021 was "an anomaly" and cited academic research he claimed showed a slight increase in wind speeds over 40 years.

"We continue to be quite convinced that this is something that will over time fully normalise," he added. "We were also happy to see October, which is a pretty big wind month, actually being slightly above average."

As for the UK, the University of Bristol's Bloomfield stresses the North Sea is in a strong position to host more wind turbines with or without changes to wind speeds.

"Basically, we are one of the best places in the world [for wind energy]," she says. "The North Sea is so windy that if you take 10pc off it, it's not a problem."

'If the IPCC is correct, a 10pc drop in wind speed can imply a 30pc drop in energy generation'

On top of that, she adds, the IPCC's projections indicate a much lower fall in wind speeds in the North Sea by 2100, more like 2pc.

A paper in the journal *Nature* at the start of this year pointed to research indicating a 10pc increase to wind resources over the UK over the century, with a slight decline in the Mediterranean.

Building turbines in more locations around Britain also helps to make it more resilient.

The energy system needs to be set up to cope with events like the lulls in September, insists Bloomfield.

The coal-fired power plants that helped this time are set to retire next year, while the long-term viability of some gas-fired power stations is open to question.

The future of other backup measures is uncertain, with existing nuclear plants set to retire and storage such as batteries and hydrogen still being ramped up.

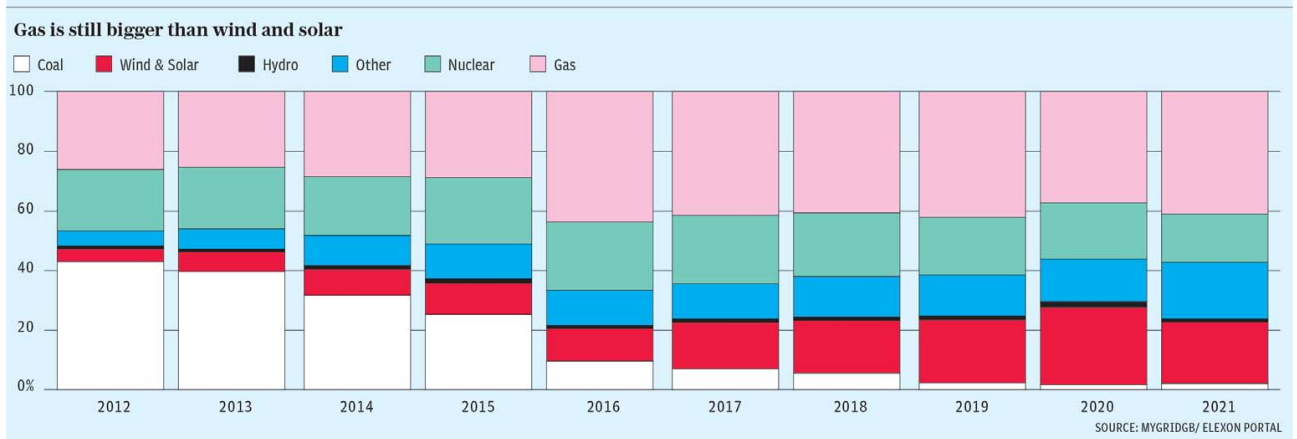
"It's something we need to be able to plan for, and people shouldn't forget that it happened. But it's not going to happen every year," she says. "It was a really extreme event, incredibly unlikely to happen this year or the year after."

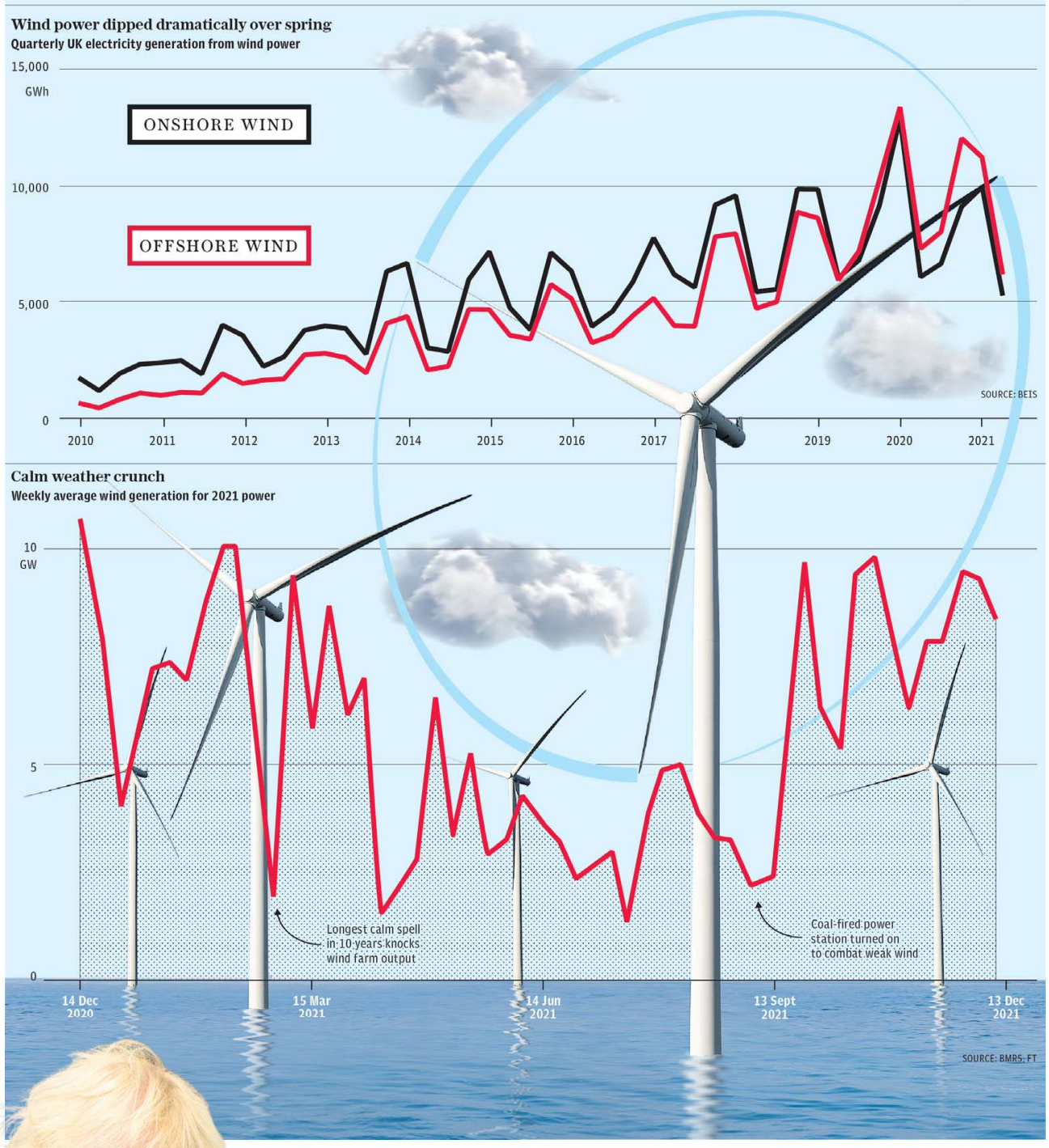
Another, more immediate problem related to wind speeds in Johnson's push to quadruple the amount of offshore wind online by 2030, is crowded seabeds which can affect the wind speeds reaching some of the turbines, warns Chappell.

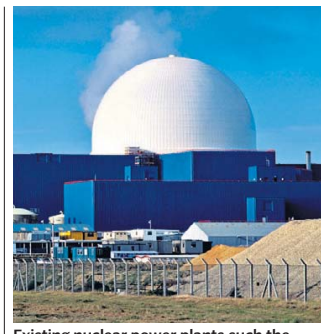
"I think people are starting to realise that maybe we need more regulation of how and where and why wind farms are being developed, not just from a nuisance perspective but more from a wind resource perspective.

"The urgency for building wind turbines and reaching net zero may be undermined by not taking a more holistic perspective."

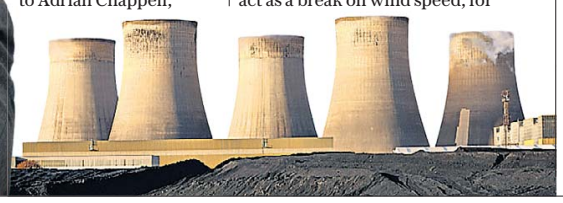
Puffed out






Existing nuclear power plants such the ones at Sizewell are due to retire


Coal-fuelled power stations are due to be decommissioned



The week ahead

Monday

Full-year results
Scottish Investment Trust
Interim results Nike
Economics
Rightmove house price index (UK), interest rate decision (China), CBI Monthly Industrial Trends Survey (UK)

Tuesday

Interim results
Cheerios, Häagen-Dazs, General Mills
Economics
Government borrowing (UK), consumer confidence (EU), HMRC house sales (UK), CBI Monthly Distributive Trades Survey (UK)


Mega-brewer Heineken owns Birra Moretti, Amstel and Tiger beer

Wednesday

Interim results
Heineken, Winnebago
Economics
GDP (UK, US), Chicago Fed National Activity Index (US), personal consumption expenditures (US), consumer confidence (US)

Thursday

Interim results Cintas
Economics Consumer confidence (UK), CBI monthly growth indicator (UK), durable goods orders (US), jobless claims (US), non-defence capital goods orders (US), personal income (US), Michigan consumer sentiment index (US), new home sales (US)

Friday

London Stock Exchange closes at 12.30pm

Top 100 shares

www.theice.com

Stock	Price	Change on week	52 week High	52 week Low	Div Yld%	MktCap £m
3i	1424	+31½	1465½	1089½	2.8	13858.5
abrdn	236½	+½	333½	226½	6.2	5166.1
Admiral	3109	+21	3706	2829	9.4	9313.2
Anglo Amer	2943	+27	3509	2321	6.0	39560.1
Antofagasta	1369½	-1½	1972	1280½	4.0	13501.3
Ashtead Group	6032	-168	6572	3246	—	26895.1
Ass Brit Fds	1952½	+8½	2528	1719	1.4	15457.4
AstraZeneca	8513	+320	9523	6736	2.4	131880.0
Auto Trader Grp	718½	-15½	751½	538	1.1	6812.6
Avast	614½	+½	618½	418	2.0	6373.5
Aveva Group	3257	-8	4242	3076	1.1	9819.8
Aviva	402½	+10½	429½	307½	5.3	15193.5
BAE Systems	532½	-17½	1957½	456½	4.5	16876.0
Barclays	180½	-1½	203½	111½	1.7	30291.9
Barratt Dev	720½	-14½	799½	606½	4.1	7367.9
Berkeley Gp Hdgs	4725	+6	5383½	4101½	0.2	5295.7
BHP Group	2179½	+51½	2505	1774½	10.0	46032.6
B&MEurValRtl	617	-23½	651	494½	7.0	6177.6
BP	333½	-8½	508½	250½	4.9	65806.5
Brit Amer Tob	2762½	+3½	2914½	2478	7.8	63390.7
British Land	519	-½	551½	424½	3.3	4810.2
BT Group	167½	-11	206½	120½	4.6	16604.9
Bunzl	2867	-89	3000	2122	1.9	9673.2
Burberry	1745	-75	2267	1673½	3.1	7056.9
Coca-Cola HBC	2520	+63	2809½	2125	2.2	9220.0

Stock	Price	Change on week	52 week High	52 week Low	Div Yld%	MktCap £m
Compass	1556½	+32	1657	1283½	0.9	27768.9
CRH	3803	+9	3936	2986	2.2	29342.7
Croda Intl	9922	-488	10505	6032	1.0	13843.0
Darktrace	420	+23	1003	315	—	2931.1
DCC	6078	+394	6684	5178	2.7	5994.2
Diageo	3977	+29	4051	2808	1.8	92606.2
Entain	1601	-32	2500	1112	—	9390.7
Evraz	600	+½	707½	449¼	11.9	8752.1
Experian	3513	-107	3674	2265	1.0	32419.8
Ferguson	12805	+400	12980	8344	1.4	28270.7
Flutter Entrtmt	11195	+195	17130	9912	—	19652.3
Fresnillo	914½	+53½	1280	742½	2.6	6741.1
GlaxoSmKline	1613¾	+1¼	1624¾	1190¾	5.0	81182.7
Glencore	368¾	+½	397¾	229	2.5	48644.0
Halma	3068	-67	3189	2214	0.6	11647.5
Hargrve Lans	1349	+32	1796	1291½	3.7	6398.6
Hikma Pharms	2220	+7	2703	2158	1.8	5138.9
HSBC	445½	+6½	462½	329½	3.7	90505.9
Imp Brands	1588	+2½	1686	1330	8.8	15029.0
Informa	502	-¼	603¾	459¼	—	7545.6
IntContl Hotels	4475	-167	5568	4384	—	8198.9
Intl Cons Air	132	-5½	222½	122	—	6550.8
IntermediateCap	2134	-39	2493	1578	2.7	6200.4
Intertek	5546	-166	6306	4724	1.9	8950.9
ITV	107¾	-3¼	134¼	98	3.1	4339.4

Stock	Price	Change on week	52 week High	52 week Low	Div Yld%	MktCap £m
JD Sports Fash	198¼	-21¼	235¼	149¼	0.1	10228.6
Johnson Matt	1962½	-82½	3363	1948	3.7	3798.1
Kingfisher	337¾	+4½	389¾	259½	2.8	7021.6
Land Secs	751½		766½	600	4.1	5570.0
Legal&Gen	287¾	-5½	299¾	237½	6.2	17152.8
Lloyds Bk Gp	46½	-¼	51¾	¾	2.7	32779.5
Lon Stock Ex	6808	+66	10010	6502	1.1	34464.6
M&G	194½	..	254½	173¾	9.4	5046.4
Meggitt	733¾	-4½	846	383¼	—	5735.2
Melrose Ind	146¼	-2¼	211	139¼	1.1	6420.9
Mondi	1816½	-14	2088	1675½	2.9	8820.1
Natl Grid	1073¾	+23	1073¾	805¼	4.6	38840.4
NatWest Group	219¾	+3¼	235¼	145¼	2.7	24758.8
Next	7772	-478	8484	6388	—	10332.8
Ocado Group	1722	+137	2886	1545¾	—	12940.6
Pearson	604	+9¾	909	571	3.3	4571.0
Persimmon	2747	-62	3272	2476	8.6	8765.7
Pershing Square	3015	-80	3125	2375	1.0	6408.6
Phoenix	641½	-10	764¼	616¼	7.5	6411.0
Polymetal Int	1301½	-26	1857	1222	7.8	6164.2
Prudential	1275	-23	1598½	1158	0.9	35016.7
Reckitt Benck	6230	+60	6844	5367	2.8	44505.0
RELX	2340	-62	2451	1682½	2.0	45272.9
Rentokil Initial	535	-88¾	662	457¼	1.4	9947.4
Rightmove	767	-4¼	782¾	551¼	1.0	6498.0

Stock	Price	Change on week	52 week High	52 week Low	Div Yld%	MktCap £m
Rio Tinto	4876	+122	6788	4354	12.8	60859.1
Rolls Royce	114¼	-8½	161¼	86¾	—	9564.2
Royal D Shell B	1595¾	-59¼	1813½	1227	4.2	57364.3
Royal Mail	496¼	+11¾	613¾	310½	4.0	4947.6
Sage Group	813¾	-11	836¼	543¼	2.2	8328.3
Sainsbury	271¼	-4	342	215½	3.9	6326.2
Schroders	3439	+14	3913	3193	3.4	7772.9
Scot Mort Inv Tst	1358½	-35½	1568½	947½	0.3	19642.5
Segro	1384½	-24½	1437	869¾	1.6	16648.0
Severn Trent	2929	+4	2976	2148	3.5	7330.8
Smith&Neph	1240	+9	1681½	1197½	2.2	10908.7
Smith (DS)	385¼	-¼	466	355¼	3.3	5300.4
Smiths Gp	1548½	+48½	1669½	1347½	2.4	6098.3
Smurfit Kappa	3973	+9	4334	3304	2.5	10291.4
Spirax-Sarco Eng	15380	-690	17225	10520	0.8	11321.6
SSE	1609	-23½	1690	1284½	5.1	17147.5
St James Place	1615	+6½	1697	1082½	3.1	8727.5
Standard Chart	431¼	+7¾	533¼	406¼	2.0	13298.7
Taylor Wimpey	167¾	-¼	193¼	145¼	4.9	6104.2
Tesco	284¼		317½	217½	3.2	21825.6
Unilever	3982	-33½	4519	3721	3.7	102189.0
Utd. Utilities	1102	-19	1138½	851½	3.9	7514.4
Vodafone	114¼	+1	142¼	106¼	6.7	31099.6
Whitbread	2769	-129	3709	2685	—	5593.3
WPP	1091	-4	1121	748½	2.4	12622.5