

POWER IN EUROPE

Issue 767 / February 12, 2018

Coal crashes out of UK's T-4 CM

- Just 2.5 GW of coal contracted
- Existing gas plant dominates
- New interconnection wins 2 GW

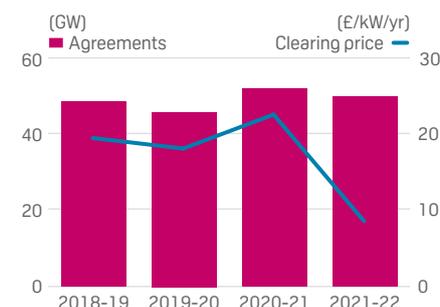
Around 7 GW of coal-fired generation capacity failed to win agreements in the UK's T-4 capacity market auction for delivery 2021/22, National Grid data showed February 9.

The failures could prove terminal for plants ahead of tougher air quality standards from 2021, and a complete coal phase-out date of 2025 set by the UK government.

The auction cleared at £8.40/kW/year, with provisional agreements for 50.41 GW of de-rated capacity.

Agreements went 86% (43.3 GW) to existing generation, 762 MW to new build generation and 2.155 GW to new build interconnection. Of the total, just over 49 GW have been awarded one-year

T-4 CLEARING PRICE DECLINE



Source: National Grid

contracts, while 600 MW of new capacity have won 15-year agreements.

Existing interconnection (2.4 GW) and demand response (1.2 GW, almost all unproven) made up the balance.

Natural gas dominated by fuel type, cornering 29.6 MW of agreements, followed by nuclear with 7.9 GW.

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Thermal output squeezed by wind

- Wind output up 10 GW on year
- Coal, gas 12 GW down on year
- Mild, wet Jan drags demand down

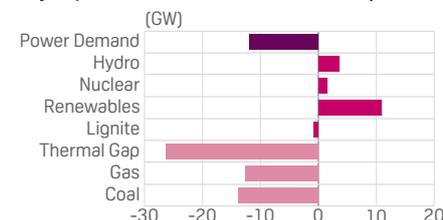
Coal- and gas-fired generation across West Europe is being forced down the merit order this winter by record wind output, with lower French power demand in January combining with a rebound in nuclear and hydro production to exacerbate the thermal squeeze.

Within a shrinking thermal gap, gas performed slightly better than coal, but with only Spanish CCGT output able to defend slight on-year gains, while coal output fell strongest in Germany.

The thermal gap is the space left to fossil plant in the merit order once must-run renewables and cheaper sources have been called.

EU4 POWER FUNDAMENTALS CHANGES Q1-18 (TO FEB 6) vs Q1-17

- Thermal gap shrinks on record wind, low demand
- Hydro, nuclear rebound adds to thermal squeeze



EU4 = Germany, France, Italy, Spain.
Source: S&P Global Platts Analytics

The size of the thermal gap is defined by variations in demand, renewables output and dispatchable plant availability.

Gas plant output so far this year is 12.5 GW lower than the Q1 average last

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ITM: hydrogen systems market ‘at tipping point’

The market for hydrogen energy systems is at a tipping point, ITM Power CEO Dr Graham Cooley told S&P Global Platts February 8.

The value of global tenders seeking hydrogen energy equipment now exceeds £200 million, reflecting consistent growth in industrial demand, Cooley said.

“These are qualified projects ready to go with finance in place – there is a bigger underlying pipeline of projects, and all are commercial sales, none are grants,” he said.

The market falls in to three categories: clean fuel; power to gas; and renewable chemistry.

The Sheffield-based manufacturer of PEM electrolysis equipment says straight sales are now displacing grant-funded projects in its order book, and it is about to move to new premises in Rotherham with capacity to build 300 MW/year of electrolyzers.

“Two things are happening: we’re being selected because we have equipment in the field and are seen as a market leader, but this is also market growth, industrial companies looking to buy power-to-gas and refuelling equipment. I’m really encouraged by it,” he said.

Responding to comments from EC officials that power-to-gas needs to prove itself at industrial scale (see below), Cooley said Shell was doing just that.

ITM is installing a 10 MW rapid response electrolyser at Shell’s Rhineland refinery in Germany.

“That is the world’s largest PEM electrolyser – it’s a modular system, a building block towards 100 MW and true industrial scale, where you can begin to see utility-to-utility scale energy storage,” he said.

At 100 MW, electrolyzers could run for 10 hours a day and provide 1,000 MWh of power-to-gas storage.

If the power is surplus renewables, the produced hydrogen is green and potentially decentralized, in contrast to the bulk of current hydrogen production, dominated by centralized reforming of natural gas.

Gas grid: huge RES store

“There is an opportunity here for owners of the gas grids to totally re-think what it is they own,” Cooley said. “They own a country’s renewable energy store. It’s a compelling way to store excess renewables in an existing asset.”

The gas grid is three times the size of the power grid and has valuable seasonal storage potential.

“You can store solar through the summer and use it as heat in the winter. You can turn electrolyzers on and leave them on all day and all year if you want. The device is never full, unlike a battery, because you’re not storing the energy in the device,” he said.

The investment community is getting more enthusiastic about power to gas storage, with decarbonizing the heat sector “by far the largest issue [compared to power and transport] and we’ve not even started on it,” Cooley said.

What about the efficiency argument, and the energy losses involved in the electrolysis process?

“I get a little bit frustrated when I see battery companies talking about €350 per kWh costs, which is a low figure. With hydrogen used in long-duration storage, say a 10 hour system, we sell electrolyzers at €1 million per MW. That is a power rating, so for 10 hours you’re talking about £80 per kWh,” Cooley said.

FCEV forecourts

With a recent £29 million fund raising round over-subscribed, ITM is working through a £42 million deal backlog, up 99% YoY, and has just opened an office in Australia.

ITM electrolyzers and hydrogen pumps are due to open this year at Shell forecourts at Beaconsfield and Gatwick, while ITM is to build, own and operate a 3 MW hydrogen refuelling station in Birmingham for fuel cell electric buses.

There is no argument, however, that plug-in electric vehicles have stolen a march on fuel cell electric vehicles because of the proliferation of battery EV charge points.

“FCEVs are waiting for government funding to kickstart forecourt refuelling,” Cooley said.

“To date FCEVs have received a fraction of the funding devoted to plug-in EV infrastructure. I’m calling for a level playing field, a technology agnostic approach from government giving the consumer a real choice,” he said.

Trains and ships

Meanwhile the hydrogen fuel cell story is focused on buses, trucks and trains – all return to a central depot to refuel and fit well with the extended range and payload power of fuel cells.

Alstom has recently taken an order for 14 hydrogen fuel cell trains from LNVG in Lower Saxony. Siemens is also

developing a fuel cell train, and the two companies are to merge their train operations, Cooley said.

“The proposition is that hydrogen is a replacement for diesel trains, removing the need to electrify the track. It is becoming a serious air quality issue for large city stations, where the diesels drive in under a canopy,” he said.

The same applies to ships docking in cities where air quality rules are starting to ban use of diesel, Cooley concluded. “Look at the legislation – how will ships dock in the French ports or Rotterdam if you can’t use diesel? The potential markets for hydrogen are diverse, global and huge.”

Gas ‘not just transitional’

Moving to a fully electrified economy using only renewable electricity and no natural gas would be “profoundly wrong,” according to the European Commission’s top internal energy market official, Klaus-Dieter Borchardt.

“If you go to other [European] conferences, you will hear that the future is the electrification of all sectors and electricity to be all renewable,” Borchardt told the European Gas Conference in Vienna January 30.

“This is, in my view, profoundly wrong [and] a mistake,” he said.

Borchardt said that relying on a fully digital power-only system would leave the EU vulnerable to cyber-attacks.

It would also be a mistake to leave the EU’s gas infrastructure, which has been built up over decades and is still being invested in today, empty, he said.

Borchardt agreed with Russian company Gazprom’s deputy CEO Alexander Medvedev, who was also speaking

at the conference, that “gas cannot and should not be a bridge fuel for renewables... Gas should have its own role to play.”

Russia is the EU’s biggest single supplier of gas. It sold a record 194 billion cubic meters to Europe and Turkey in 2017, and Medvedev told the conference he expected these sales to remain around 190 Bcm/year in future.

Borchardt’s comments are likely to comfort the European gas industry, which has been pressing the EC in recent years to clarify the policy approach to gas as the EU seeks to cut emissions and move away from fossil fuels.

Green gas drive

Borchardt said the EC would be working this year on proposals for EU gas market regulation, and wanted to explore in particular the possibilities for synergies between the gas and power grids, and for developing renewable gases.

“We can use the gas grid as [one of the storage options] that we are still lacking in the power system,” for example by transforming excess wind into methane or hydrogen, he said.

This power-to-gas technology is still at a very early stage. “If we really believe in this technology, we have to show it can be rolled out at an industrial level,” he said.

The EC is planning a study on sector coupling synergies between power and gas, and Borchardt also wants one on renewable gases, he said.

The EC plans to present the formal EU gas market legislative proposals in 2020.

Fortum lifted by rising hydro

A recovery in Nordic spot prices last year, pulled higher by increased exports to the continent, is not reflected in Fortum’s forward hedge.

Higher hydro volumes, power prices and Russian capacity payments combined to lift Fortum’s fourth-quarter profits, the Finnish energy utility said February 2.

Fourth quarter generation of 11.3 TWh was up 5.6%, while full-year 2017 generation of 44.2 TWh was down 2.4%.

Nordic sales volumes of 13.3 TWh (Q4) and 51.8 TWh (FY17) were basically flat, while Fortum’s FY17 Nordic power sales

price edged up 2.5% to €31.8/MWh. A 1.5 TWh increase in Q4 hydro volumes was partly offset by lower nuclear volumes resulting from closure of Oskarshamn 1 in Sweden and lower nuclear availability, Fortum said.

While Nordic power prices recovered in 2017, futures remain at a low level, Fortum said. As at end-2017, Fortum’s generation segment had hedged 70% of its estimated Nordic power sales volume at €28/MWh for