



New nuclear in Europe needs different financing models; Moody's

Moody's Ratings sees a renaissance of nuclear power in Europe, though private sector finance poses significant risk due to high capital costs, long lead times and volatile energy prices. "Different revenue models can mitigate at least some of that risk," analysts find, but government support – in some form – is still vital for new projects to come to fruition.

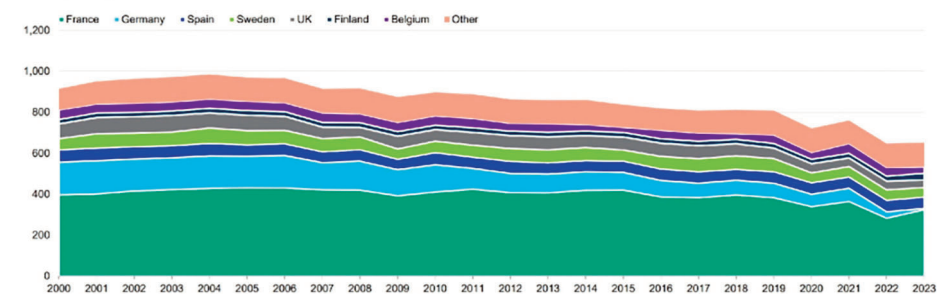
Several EU member states, notably France, Finland) and the Czech Republic are strong advocates for nuclear energy, while others oppose it and/or have already stopped generating electricity from nuclear power.

Stable baseload capacity is hence increasingly in short supply. In fact, maintaining the same production capacity as today by replacing closed units with new reactors, will require between €350 billion and €450 billion of investment, the European Commission estimates.

Utilities in Europe, rated by Moody's, that own nuclear generation capacity generated funds from operations of €71 billion and had adjusted debt totalling more than €275 billion in 2023. But only a few utilities are actively looking at new nuclear projects:



Five countries account for more than 75% of the region's nuclear power generation
Nuclear power generation, TWh



Data for the EU, the UK and Switzerland.
Sources: World Nuclear Association, IAEA PRIS and Moody's Ratings

Upfront CAPEX required in new nuclear is "substantial compared to the total investments of the 20 largest European unregulated utilities that we rate," commented Moody's senior VP Joanna Fic. "We estimate the aggregate capital expenditure at over €360 billion over 2024-26," she specified.

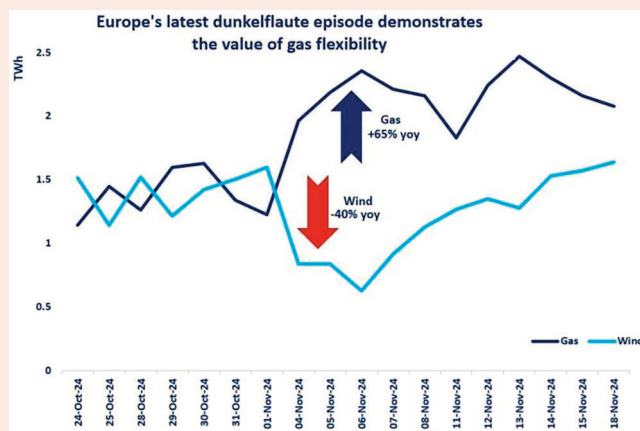
Considering European utilities already plan sizeable investments in energy networks and renewables, many of them do not have the balance sheet strength to shoulder the cost of delivering a

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Europe's latest 'Dunkelflaute' shows importance of gas power

Europe's latest episode of dark and almost wind-still weather – dubbed as Dunkelflaute – has, once again, highlighted the importance of flexible gas generation. Low wind speeds since early November reduced wind power output by 40% yoy, down nearly 15 TWh compared to November 2024, according to IEA figures, and that shortfall was largely offset by flexible gas power plants ramping up output by 65% yoy, or 13 TWh.

"Gas and wind is like a perfect modern day romance, full of volatility, unpredictability and ups and downs. and the value of gas supply flexibility should not be forgotten... it always makes up for its capricious partner to keep up the lights



even on a dark, still Dunkelflaute day," Greg Molnár, gas analyst at the International Energy Agency (IEA) said.

Renaissance of coal and nuclear

Apart from natural gas, both nuclear and coal-fired generation have been gaining tracking –

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new nuclear project without support. Moreover, long construction periods and the risk of cost increases and delays make financial investors unwilling to invest in the same way they did in offshore wind projects, for example.

"We therefore believe that governments have a key role to play in supporting the financeability of new nuclear development in line with their respective countries' energy policies," Ms Fic said, pointing at long-term Power Purchase Agreements (PPAs) or Contracts for Difference (CfDs) as a way to smoothen and stabilise the revenue

stream for investors.

"Funding cap" may help investors come forward

Moody's is using the Regulated Asset Base (RAB) model as a way to calculate investor return during the construction phase of a nuclear power plant. A new nuclear power plant can recover "reasonable" costs, including depreciation on the investment, operating costs and decommissioning costs and generate a reasonable return on the regulated asset base that accumulates during the construction phase, analysts found.

"The RAB model should, ideally, be complemented by the government support, such as a guarantee or a "funding cap", where the government bears costs above a certain level," Fic and her team write in their latest sector analysis.

The RAB-based model is proposed for Sizewell C in the UK, which will be the first power plant to be regulated under a RAB-based model introduced by the government's Nuclear Energy (Financing) Act 2022, designed to help speed up development and construction of much-needed stable power generation capacity in Britain. ■

German cartel office criticises RWE's market dominant position

Power plants dispatched by RWE have been found "indispensable for meeting Germany's demand," putting the Essen-based utility in a "dominant position" with "structural market power" next to LEAG and EnBW – the next largest suppliers. Andreas Mundt, President of the Federal Cartel Offices criticised at certain periods "it would possible for RWE to systematically increase prices."

Over the past year the German electricity market experienced a sharp fall in electricity demand due to lower economic activity. At the same time, electricity imports increased markedly once the nuclear phase-out was completed. Several mothballed coal-fired power plants had to be reactivated to keep soaring electricity prices in check, especially during the 'gas crisis' in the wake of the Kremlin's invasion of Ukraine.

"The rise in electricity imports shows that surplus foreign power plant capacities have become even more important for restricting the market power of domestic electricity producers," Mundt commented.

Regulator keen to reign in power of 'dominant utilities'

He fears the market power of dominant utilities

could rise further as most so-called emergency power plants that had been reactivated are now closed again. In addition, the gradual exit of coal-fired power generation poses further strain on the already tight electricity supply/demand balance.

If the German economy reverses soon, as some analysts anticipate, electricity demand is set to be on the rise again – while the capability of TSO to import electricity remains limited and hinges on whether foreign plants have spare capacity to generate electricity for export.

It currently does not look like the market power situation will continue to ease. In fact, the opposite is the case," Mundt warned. "We expect that since May 2024 RWE's power plants have become increasingly indispensable again and that this trend is likely to continue. Due to the market developments we are observing, the power plants of the next largest power generating companies LEAG and EnBW are also likely to become increasingly indispensable again."

The cartel office is hence closely monitoring the market share of individual utilities, and to what extent and length of time they could become the 'indispensable supply' which allows them to set wholesale electricity prices.

Predicting the 'moment of indispensability' can move prices

For RWE and the likes to be able to drive up prices when their plants are indispensable for their market power, they need to be able to predict these periods. Analysis by the Bundeskartellamt shown that RWE is "able to systematically predict when its own power plants will be indispensable for meeting demand."

"Ultimately, such a finding will require a specific decision in an individual case. But the extent of RWE's indispensability and the fact that it can be systematically predicted," in Mundt's view, "suggest that RWE has to observe the prohibition of abusive practices under competition law." ■

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the former as small-scale nuclear reactors, the latter as flexible, abated coal peaking plants.

The reason for both is to meet the world's rising energy demand as electrification of transport, industry and heating progresses. The second, and equally important reason for the renaissance of fossil fuels sources is the need to balance intermittent wind and solar power supply given that energy storage installations are

still comparatively expensive and cannot technically provide electricity for more than four to eight hours on average.

Europe's, and particularly Germany's rising gas demand over the winter period, has so far largely met strong storage draws, with more than 4 bcm withdrawn since the start of November, higher piped gas deliveries from Norway and we also see LNG inflows speeding up, data from the regulator BNetzA shows. ■

New levy to fund Germany's H2-ready power plants on hold?

Overshadowed by pre-election quarrels, the remainder of the German coalition government has many pressing issues which may put plans for a new levy to fund hydrogen ready power plants on hold. Energy offtakers were meant to pay a tax on their bills to support an initial ten plants with 5 GW capacity combined.

This initial H2-ready gas power gen capacity will then be gradually expanded to 12.5 GW – still short of the 21 GW flexible capacity the regulator BNetzA deems necessary.

Industry has cried out against the planned new levy, though market observers noted the additional cost would be “minimal” and get added to an existing charge for combined heat and power. Taxes, levies and surcharges currently make up 27 percent of household electricity costs, while the energy-intensive industry is often exempt or allowed to pay less.

Tenders for H2-ready plants envisaged in Q1-2025

Tenders for the first round of H2-ready gas power plants are meant to be held early next year, ideally in the first quarter once the general election has been held and a new government is instated. Over 20 GW of additional dispatchable capacity are needed, the regulator BNetzA calculated, calling for urgent action to balance growing volumes of intermittent electricity supply from wind and solar energy sources.

The outgoing economy minister Robert Habeck conceded, speaking in Parliament, that not all of this electricity can come from gas or hydrogen, hence coal-fired power plants will likely be on stand-by until after 2030.

Race against time to get projected plants into operation

The first H2-ready gas power plants are scheduled to be built, commissioned and start full commercial operations by the end of 2024 – but time is running out to get these plants built on time.



Render of RWE's H2-ready power plant in Werne

The new levy is hence intended to make investors forthcoming. It is actually viewed by the government as a “bridge towards capacity markets,” which the coalition government wants to get in place by 2028.

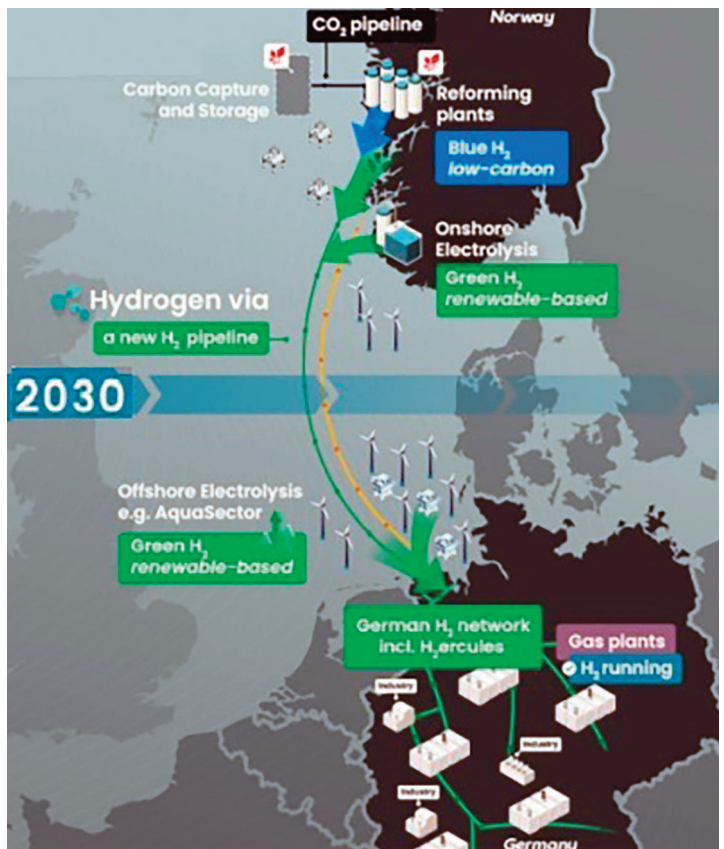
Capacity payments remunerate power plant operators for standing ready to dispatch their plants at short notice, rather than for the actual electricity they produce. “As we need the new capacity quickly, it must be ensured that it is actually built,” RWE CEO Markus Krebber stressed, disclosing the Essen-based utility wants to realise H2-ready plants “mainly” at the sites of its existing coal-fired power plants.

“We are working on developments at sites not only in North Rhine-Westphalia, but also outside,” he specified, noting RWE wants to build at least 3 GW by the end of 2030.

Lack of funding for balancing power

The Institute of Energy Economics (EWI) found Germany lacks €60 billion in secured funding to build much-needed 25 GW backup power generation capacity by 2030. This shortfall cannot be covered by earnings on the electricity market and needs “resolute state support,” researchers reckon.

Peaking power



Map of H2-ready power plants in Germany

stations, mostly running on natural gas and potentially hydrogen to some degree, are hard to finance. This is because they are running only for a very limited amount of time each year – earning a tiny rate of return.

High capital costs contrast with limited dispatch, meaning the plants will not be able to recover their investment costs – especially if they are made to run on costly green hydrogen. “These are politically desired investments that cannot be carried out based on market mechanisms at the moment,” commented EWI researcher Philipp Kienscherf.

Calls for a capacity market grow louder by the minute. Owners of power gen capacity – like RWE, Uniper, EnBW and the several hundred German municipal utilities – hope they can earn some money by making electricity available at short notice, if and when needed. Through the capacity auction, the government and ultimately the taxpayer would support both utilities’ investment in new H2-ready power gas power stations and their subsequent operation.





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Tapping Finland's cheap energy to produce synfuels at Oulu

Verso Energy has reserved a site for a new plant to produce hydrogen and biogenic synthetic fuels at the Port of Oulu, in northern Finland. The company has similar production sites in various parts of France, and its synfuels production process combines green H₂ with carbon dioxide (CO₂) recovered from nearby paper and pulp mills.

Electricity in Finland is among the cheapest in Europe: In the first half of 2024, the price of electricity for non-household customers in Finland was the lowest in the EU at just 0.0939 Euro per kilowatt-hours (€/kWh).

Cheap electricity, large talent pool

Asked why Verso chose Oulu as a location for its latest hydrogen plant, CEO Antoine Huard said the region around the Finish port town is "attractive because it provides an abundance of affordable renewable energy

and biogenic carbon dioxide."

Hydrogen researchers at Oulu University alongside the large R&D investments in the area, ensure a "sufficient talent pool" which offer the French company potential customers and subcontractors, Huard said. And last but not least, the Port of Oulu, with its rail and road links, provides good connections to the rest of the world.

H₂-derivative projects already set up

In the greater Oulu region, other hydrogen production and H₂ derivative projects have already been initiated: Gasgrid Finland is planning to establish a hydrogen transport infrastructure to connect Oulu's hydrogen production with the rest of Finland and other countries in northern Europe.

Verso stressed the latest "land reservation is only a preliminary decision," final investment decision (FID) will be taken at a later stage. ■



Site of Verso Energy's projected synfuels plant at Oulu Port

GE helps power SSAB's fossil-free steel production in Sweden

Sweden's SMS Group has ordered a converter-based direct feed system from GE Vernova to power a 280 MVA electric arc furnace at SSAB's steel plant in Oxelösund. Built by SMS Group, the electric arc furnace will enable fossil-free steel production at SSAB's steel plant in Oxelösund, as the company aims for fossil-free steelmaking by 2030.

blast furnaces, which rely on iron ore and coke as raw materials, emit about 2.32 metric tons of CO₂ per metric ton of steel produced.

In contrast, the electric arc furnace (EAF)

can almost fully run on scrap steel as raw material which lowers emissions to 0.67 metric tons of CO₂ per metric ton of steel. But EAFs require a high amount of electrical energy and can hence disrupt the power grid. To remedy this, GE Vernova's feed system uses advanced injection-enhanced gate transistor technology to ensure that the new electric furnace can operate without disrupting the grid.

Delivery and installation of the equipment are scheduled for the first half of 2026, with the EAF first heat due operational in the fourth quarter (Q4-2026). ■



Early illustration of the EAF building in Oxelösund, Sweden

NEWS NUDGES

Burckhardt wins order for Brunsbüttel LNG

Swiss company Burckhardt Compression has won an order to supply critical boil-off gas and pipeline injection compressors for a new LNG regasification terminal in the northern German town of Brunsbüttel, Germany, expected to start operations in 2027. The Swiss manufacturer expects traded LNG volumes to increase by more than 50% by 2040.

Woodwards sells gas turbine combustion parts business to GE

GE Vernova has acquired the Greenville-based heavy-duty gas turbines combustion parts business from Woodward, an American aerospace and industrial energy control solutions provider. In a statement, GE Vernova said it will buy assets related to the business that are dedicated to supplying part and services to its own business in Greenville. The transaction is expected to close in early 2025.

Ansaldo and CFFT secure order for first electrolyser

CFFT, part of the Belgian logistics group Noord Natie, has bought the first electrolyser produced by Ansaldo Green Tech, installed at CFFT's inland port in Civitavecchia, near Rome, the 1 MW solution will produce green hydrogen for use at a H₂-vehicle refuelling station. Delivery of the plant due by the end of 2025.

H₂-powered Jenbacher CHP supplies clean energy to RAG Austria

RAG Austria's site in Gampern has become the first industrial plant in Europe to run on electricity and heat from a hydrogen-fuelled Jenbacher combined heat and power (CHP) unit. The project, based on INNIO-made engines, can utilise the stored hydrogen – made from summer surplus power production of 1,000 PV panels – and convert it back into electricity. ■

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