Europe’s rivers run dry as scientists warn drought could be worst in 500 years

Crops, power plants, barge traffic, industry and fish populations devastated by parched waterways

Drone footage reveals impact of climate crisis on Europe's rivers – video

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In places, the Loire can now be crossed on foot; France’s longest river has never flowed so slowly. The Rhine is fast becoming impassable to barge traffic. In Italy, the Po is 2 metres lower than normal, crippling crops. Serbia is dredging the Danube.

Across Europe, drought is reducing once-mighty rivers to trickles, with potentially dramatic consequences for industry, freight, energy and food production – just as supply shortages and price rises due to Russia’s invasion of Ukraine bite.

Driven by climate breakdown, an unusually dry winter and spring followed by record-breaking summer temperatures and repeated heatwaves have left Europe's essential waterways under-replenished and, increasingly, overheated.

With no significant rainfall recorded for almost two months across western, central and southern Europe and none forecast in the near future, meteorologists say the drought could become the continent's worst in more than 500 years.

"We haven't analysed fully this year's event because it is still ongoing," said Andrea Toreti of the European Commission's Joint Research Centre. "There were no other events in the past 500 [years] similar to the drought of 2018. But this year, I think, is worse."

He said there was "a very high risk of dry conditions" continuing over the next three months, adding that without effective mitigation drought intensity and frequency would "increase dramatically over Europe, both in the north and in the south".

Germany's Federal Institute of Hydrology (BfG) said the level of the Rhine, whose waters are used for freight transport, irrigation, manufacturing, power generation and drinking, will continue dropping until at least the beginning of next week.

On Friday the water at the critical Kaub marker 50km downstream from Mainz – which measures navigability, rather than the water depth – fell below 40cm, the level at which many shipping firms consider it is no longer economical for barges to operate. It could fall to nearer 30cm over the next few days, the BfG has said.

Many barges, which carry coal for power plants and vital raw materials for industrial giants such as steelmaker Thyssen and chemical giant BASF, are already operating at about 25% capacity to reduce their draft, raising shipping costs up to fivefold.

A vital part of northwest Europe's economy for centuries, the 760 miles (1,233km) of the Rhine flow from Switzerland through Germany's industrial heartland before reaching the North Sea at the megaport of Rotterdam.

A total halt in Rhine barge traffic would hit Germany's – and Europe's – economy hard: experts have calculated that a six-month suspension in 2018 cost around €5bn (£4.2bn), with low water levels forecast to cost Germany 0.2 points of economic growth this year.

While the EU has said boosting waterborne freight by 25% is one of the bloc's green transition priorities, Germany is now working to divert it to rail and road – although between 40 and 100 trucks are needed to replace a standard barge load.

France's rivers might not be such key freight arteries, but they do serve to cool the nuclear plants that produce 70% of the country's electricity. As prices hit all-time highs, power giant EDF has been forced to reduce output because of the drought.

Strict rules regulate how far nuclear plants can raise river temperatures when they discharge cooling water – and if record low water levels and high air temperatures mean the river is already overheated, they have no option but to cut output. With Europe's looming energy crisis mounting and the Garonne, Rhône and Loire rivers already too warm to allow cooling water to be discharged, the French nuclear regulator last week allowed five plants to temporarily break the rules.

Quiet flows the Po: the life and slow death of Italy's longest river

In Italy, the flow of the parched Po, Italy's longest river, has fallen to one-tenth of its usual rate, and water levels are 2 metres below normal. With no sustained rainfall in the region since November, corn and risotto rice production have been hard hit.

The Po valley accounts for between 30% and 40% of Italy's agricultural production, but rice growers in particular have warned that up to 60% of their crop may be lost as paddy fields dry out and are spoiled by seawater sucked in by the low river level.

In the protected wetlands of the river's delta, near Venice, its high temperature and sluggish flow have reduced the water's oxygen content to the extent that an estimated 30% of clams growing in the lagoon have already been killed off.

Low river levels and high water temperatures can prove fatal to many species. In Bavaria, the Danube reached 25C last week and could hit 26.5C by mid-month, meaning its oxygen content would fall below six parts per million – fatal for trout.

Freight on the 2,850km of the Danube has also been heavily disrupted, prompting authorities in Serbia, Romania and Bulgaria to start dredging deeper channels while barges carrying mainly fuel for the power generators wait to advance.

Even Norway, which relies on hydropower for about 90% of its electricity generation, has said the unusually low levels of its reservoirs may ultimately oblige it to limit power exports.

Climate change: Drought highlights dangers for electricity supplies

By Matt McGrath
Environment correspondent
• Published
5 hours ago

Drought in Spain is exposing villages that were submerged by the building of dams and reservoirs

The ongoing drought in the UK and Europe is putting electricity generation under pressure, say experts.

Electricity from hydropower - which uses water to generate power - has dropped by 20% overall.

And nuclear facilities, which are cooled using river water, have been restricted.

There are fears that the shortfalls are a taste of what will happen in the coming winter.

In the UK, high temperatures are hitting energy output from fossil, nuclear and solar sources.

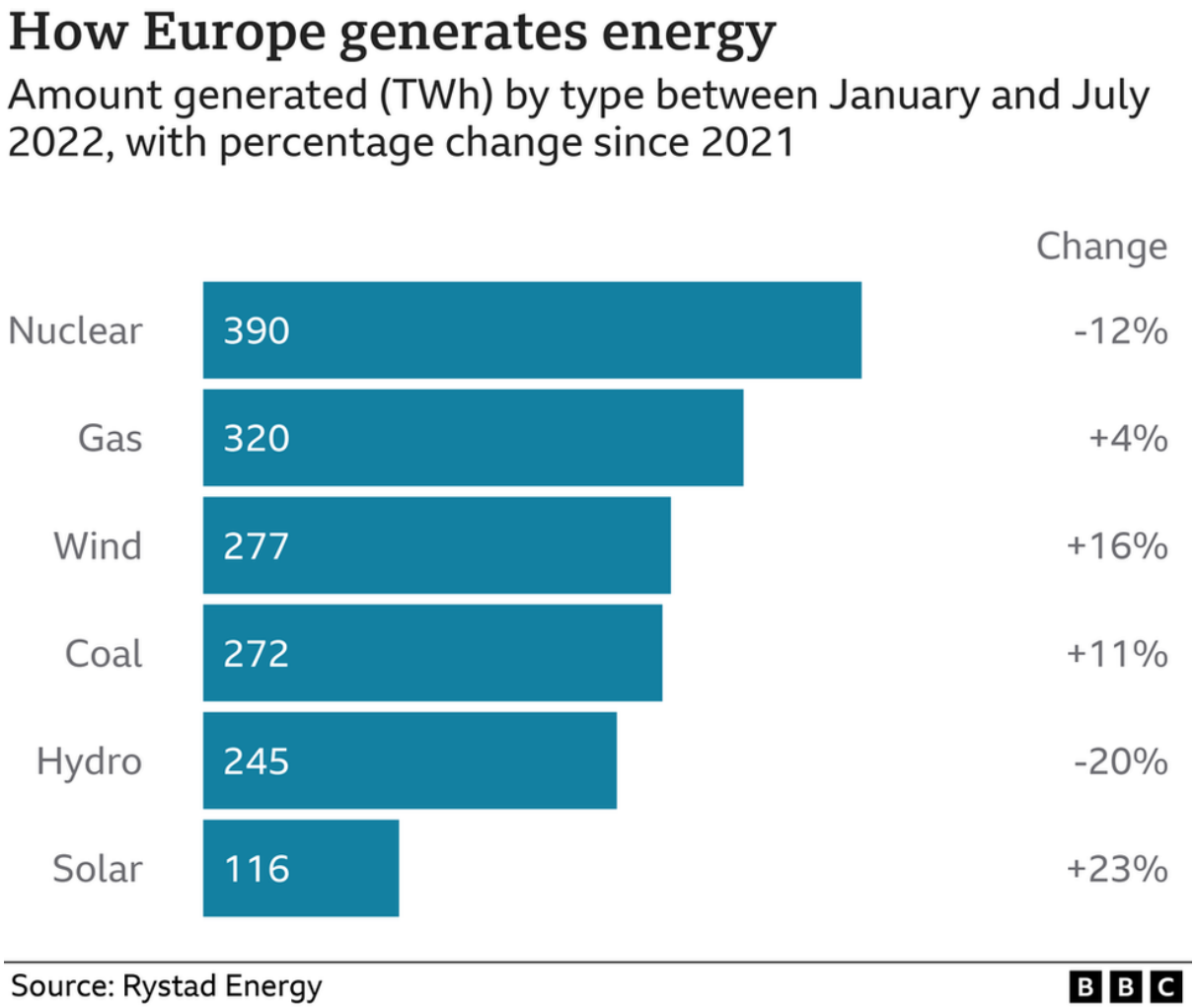
That is because the technology in power plants and solar panels work much less well in high temperatures.

The prolonged dry spell is putting further pressure on energy supplies as Europe scrambles for alternative sources after the Russian invasion of Ukraine.

- **Millions hit by hosepipe bans as drought declared**
- **US Senate passes sweeping $700bn economic package**
- **Causes of deadly dry-lightning wildfires revealed**

Hydropower is an important source of energy for Europe, but the lack of water in rivers and reservoirs is now significantly reducing the ability of facilities to produce electricity.
Italy gets around 1/5 of its power from hydro, but that's fallen by around 40% in the past 12 months.

It's a similar story in Spain, where the amount of electricity generated is down 44%, according to data from energy researchers **Rystad Energy**.



"Hydropower can be quite volatile, but 40% is absolutely extreme," says Fabian Rønningen, a power analyst with Rystad.

The figures are not just down in one part of Europe, he explains, but all the big hydropower-producing countries are making less now.

"It's really a big impact,," he adds.

taly has been hit hard by drought limiting energy from hydroelectricity by 40%

Norway is also experiencing challenges with hydro-electricity. It warned that it may not be able to continue to export energy to countries like the UK unless its reservoirs were refilled.

Some in the hydro industry say that lack of investment in modernisation and in transmission lines are also causing problems.

"We are going to face a problem this winter. And that should be a wake-up call to have more investment in the infrastructure for the next few years," says Eddie Rich from the International Hydropower Association.

The exceptionally hot weather is also hitting nuclear power production, especially in France. Around half of the 56 reactors in the fleet are offline, with several affected by a systemic issue with corrosion.

Those reactors that are working are often cooled with water from rivers that are now running low, while temperatures are running high.

"Once the water in the rivers is very low and very hot, basically you have to stop cooling down nuclear power plants. That's because the water that's released is dangerous for fish and other species in the rivers," said Prof Sonia Seneviratne, from ETH Zurich.

The French government is now allowing some facilities to release very warm water back into the rivers, as a temporary measure.

It underlines the stresses the heat is putting on energy production. France is now making up the shortfall in electricity by importing from the UK among others.

Analysts say this is putting additional pressure on the UK system - at a time when the very warm weather is hitting production from gas and nuclear facilities.

It's more difficult to cool the plants in the warmer weather, explains Kathryn Porter, an energy consultant with **Watt-Logic**.

"Solar panels also experience quite a significant drop off above 25C. Everything just works less well when it's hot," she adds.

IMAGE SOURCE, GETTY IMAGES

Image caption,
Power output from solar farms in the UK will be hit at temperatures soar

The stresses in the UK system were evident this week when the National Grid triggered a capacity market notice, a technical step indicating that the safe margins for operating the grid were reduced.

Countries, including the UK and France, rely on each other's electricity markets.

"If both French and UK systems are in stress at the same time, then nobody really knows what will happen," Ms Porter says.

She said it is a foretaste of what may happen in winter and warns that there may well be restrictions on energy use for large consumers.