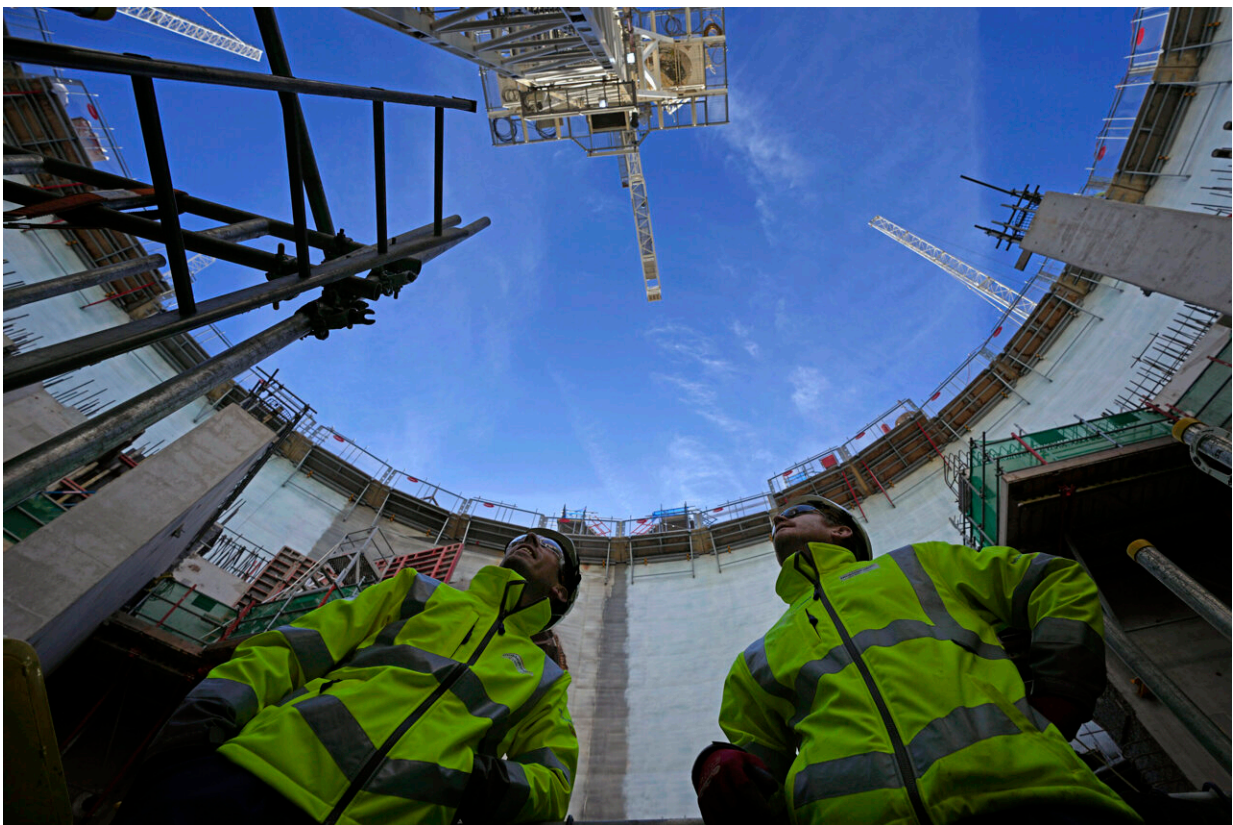


# Hopes and costs are high for UK's nuclear energy future

November 15 2022, by DANA BELTAJI and MARY KATHERINE WILDEMAN

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Employees look up at the construction site of Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. Sites like Hinkley have become integral to the U.K. government's "net zero" by 2050 strategy. Credit: AP Photo/Kin Cheung

Wedged between the southwestern town of Bridgwater and the Severn estuary is a 430-acre site where some of the U.K.'s future electricity hopes are pinned.

Now reaching over 100 feet (32 meters) high, construction on the first of two nuclear reactors at the Hinkley Point C generating station is well underway, after years of planning.

Hinkley Point C is set to be one of the the biggest power stations in Britain and will generate 7% of the country's electricity. Around 8,000 workers, many of them currently living on-site, are shuttled between work and home at any hour of the day, seven days a week, on the site's bustling bus network.

"Here at Hinkley, everything's on a grand scale," said project delivery director Nigel Cann as he gestured toward the giant site. "We have the third biggest bus service in the world. We serve more eggs and sausages and bacon than anywhere else in the U.K., I imagine."

Sites like Hinkley have become integral to the U.K. government's ["net zero" by 2050 strategy](#). Some experts say [nuclear energy](#) will be needed to help nations wean off [fossil fuels](#), but there are concerns about the substantial cost and timescale of building large nuclear reactors as well as worries over safety and nuclear waste. Other [clean energy](#), such as [wind farms](#), can be built and come online much faster.



Employees work at the construction site of Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. Nuclear power is generated through fission, the process of splitting uranium atoms. The energy released by fission turns water into steam to spin a turbine that generates electricity, a process which doesn't emit planet-warming gases into the atmosphere. Credit: AP Photo/Kin Cheung

Whether Hinkley is a success, [energy](#) analysts say, could help determine whether more large nuclear reactors like it are built in Britain and other countries in future.

Nuclear power is generated through fission, the process of splitting uranium atoms. The energy released by fission turns water into steam to spin a turbine that generates electricity, a process which doesn't emit



planet-warming gases into the atmosphere. Scientists say that for the world to limit warming to 1.5 degrees Celsius (2.7 Fahrenheit), fossil fuel emissions need to be cut dramatically, with the remainder being canceled out.

"Everyone wants nuclear," said Neil Hirst, a senior policy fellow for energy at Imperial College London. "They want it because nuclear provides security at a time when gas supplies are at risk. And also because a lot of countries have got a net zero by 2050 commitment, which may be quite difficult or even impossible to reach without substantial nuclear."



A worker walks at the construction site of a nuclear reactor at Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. Nuclear power is generated through fission, the process of splitting uranium atoms. The

energy released by fission turns water into steam to spin a turbine that generates electricity, a process which doesn't emit planet-warming gases into the atmosphere. Credit: AP Photo/Kin Cheung

But not everyone wants the costs and time commitments that come with it.

The Hinkley Point C project is estimated to cost up to 26 billion pounds (\$30 billion) and is set to be completed in 2027. It's already around 7 billion pounds (\$8 billion) over budget and has suffered delays which owners EDF—the French state-owned energy company—say are largely down to the COVID-19 pandemic causing supply chain issues and labor shortages.

The United States, which still has the most capacity to generate nuclear power of any country, has seen just one new nuclear reactor connect to the grid since 2000—a Tennessee-based project that took decades to complete. Meanwhile, plans for at least 21 new nuclear reactors have been cancelled since 2007, according to the International Atomic Energy Agency. One American project is under construction in Georgia, though the budget has more than doubled, per Associated Press calculations.



Nigel Cann, project delivery director of Hinkley Point C, poses in front of the construction site of a nuclear reactor at Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. “We understand our responsibility to get this plant generating as quickly as possible,” said Cann. “We feel that pressure, we feel the responsibility, but we will never compromise safety or quality.” Credit: AP Photo/Kin Cheung

France's Flamanville 3, still under construction and the same type of reactor as Hinkley Point C, is several times over its original budget, now expected to cost 12.7 billion euros (dollars) and has experienced multiple setbacks. Olkiluoto-3 in Finland, which began generating electricity a decade behind schedule, saw its costs nearly quadruple to around \$11 billion.



These massive overruns have "certainly given people a cause to be hesitant," said Jennifer Gordon, director of the Nuclear Energy Policy Initiative at the Atlantic Council. "But that said, in the last year the geopolitical calculus has changed so dramatically" as climate and energy security concerns mount.

But Paul Dorfman, from Sussex University's Science Policy Research Unit, said that "nuclear would be far too late to help us with our energy dilemma and unfortunately, really far too late to help us with our climate dilemma." He added that the huge uptick in renewables shows they can meet growing electricity demands.



Workers practice at the control center training area at Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. Hinkley Point C is set to be one of the the biggest power stations in Britain and will generate 7% of

the country's electricity. Credit: AP Photo/Kin Cheung

Nuclear projects need billions of dollars upfront before they start generating any electricity and also have the ongoing cost of buying fuel, something not true of wind or solar energy. They also don't see a return for several years, so they rely on government backing in most instances, and to that end, [public support](#).

This is more feasible in Europe where governments are willing to dig into the public purse, Hirst said. In the U.S., it's more difficult to get these big costs approved, [even with recent incentives for nuclear power](#), meaning the country is likely to skip ahead to a [newer advanced technology](#), called [small modular reactors](#), that have less daunting upfront costs and shorter construction timescales. This makes them an attractive prospect for many nations, Gordon said.

She added that large reactors could instead act "as a bridge to the next generation of nuclear and also as a bridge to renewables and breakthroughs in storage" technology.





A worker works at a construction site of Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. The Hinkley Point C project is estimated to cost up to 26 billion pounds (\$30 billion) and is set to be completed in 2027. Credit: AP Photo/Kin Cheung

Renewable energy sources, such as solar, wind or hydropower, doubled in capacity between 2000 and 2021 worldwide, [according to an analysis of data from a global energy think tank](#). Nuclear power, meanwhile, grew by just 13% during that time, with more than half of that growth concentrated in China. Renewables are far cheaper per megawatt of electricity generated to build.

Their power is more variable but a lot of solar and wind farms now use batteries to get closer to a 24-hour supply of electricity. Some experts

believe nuclear can provide back-up for other low-carbon energy sources in a future with no or very few fossil fuels, but there are concerns over whether it really has the modern flexibility needed to pair with sun and wind.

"It doesn't provide what's known as load flow to account for variability. It's much too inflexible to ramp up and down with the swings of demand," Dorfman said.



An employee walks at the Hinkley Point C nuclear power station construction site in Somerset, England, Tuesday, Oct. 11, 2022. The Hinkley Point C project is estimated to cost up to 26 billion pounds (\$30 billion) and is set to be completed in 2027. Credit: AP Photo/Kin Cheung

Concerns over safety and [nuclear waste](#) also persist as a result of high-profile disasters like Chernobyl and Fukushima.

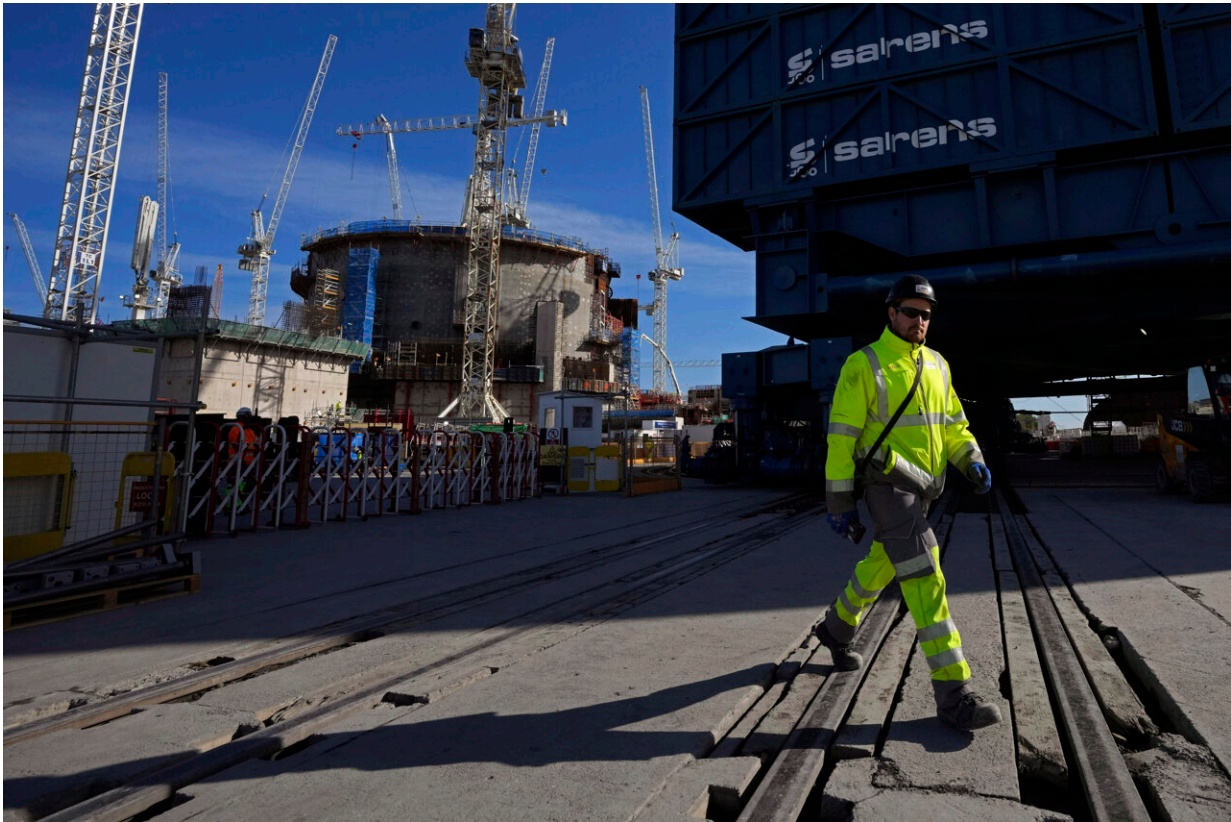
"The public perspective regarding the nuclear energy industry is one of our main challenges," said nuclear risk analyst Jenifer Avellaneda. "We have had errors. But we do better and we must do better."

Avellaneda added that the industry's many [regulatory bodies](#) and strict procedures makes it a safer bet than many other energy sources, especially high-polluting ones.

The share of nuclear energy for electricity generation worldwide has dropped to 9.8%—the first time it fell below 10%, the lowest value in four decades, and 40% below the peak in 1996, according to a recent report on the state of the industry.

Britain alone has decommissioned three nuclear sites in recent years when they came to the end of their lifespans.





A worker walks past the construction of a nuclear reactor at Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. Hinkley Point C is set to be one of the the biggest power stations in Britain and will generate 7% of the country's electricity. Credit: AP Photo/Kin Cheung



Employees work at the construction site of a nuclear reactor at Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. Hinkley Point C is set to be one of the the biggest power stations in Britain and will generate 7% of the country's electricity. Credit: AP Photo/Kin Cheung





Workers walk at the construction site of Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. Some experts believe the future of large nuclear plants, particularly in Europe, will hinge in part on the success of Hinkley. Credit: AP Photo/Kin Cheung





Workers have lunch at the canteen of the construction site of Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. Around 8,000 workers, many of them currently living on-site, work a 24-hour shift pattern seven days a week. Credit: AP Photo/Kin Cheung



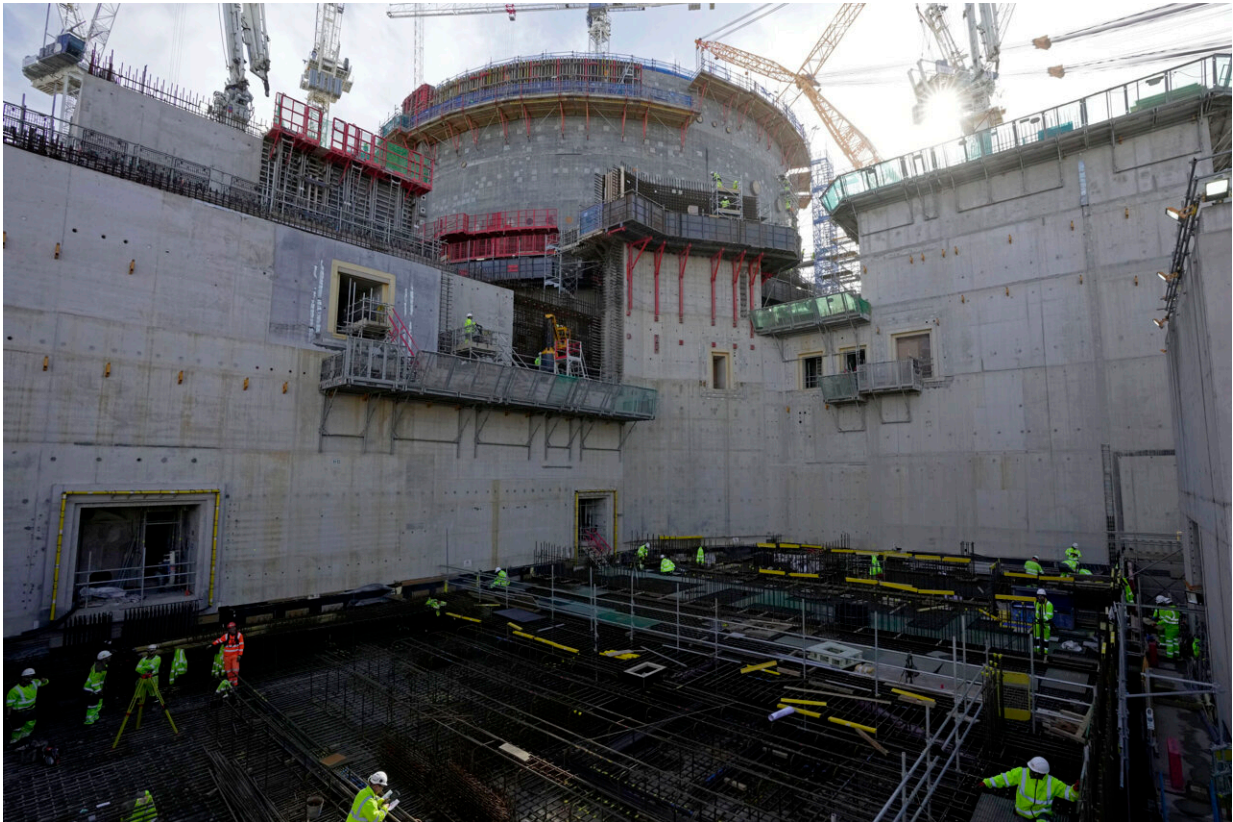
Workers work at the construction site of a turbine at Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. Some experts believe the future of large nuclear plants, particularly in Europe, will hinge in part on the success of Hinkley. Credit: AP Photo/Kin Cheung





An employee works at the site of a nuclear reactor at Hinkley Point C nuclear power station in Somerset, England, Tuesday, Oct. 11, 2022. Sites like the Hinkley Point C nuclear power plant have become integral to the U.K. government's "net zero" by 2050 strategy. Credit: AP Photo/Kin Cheung





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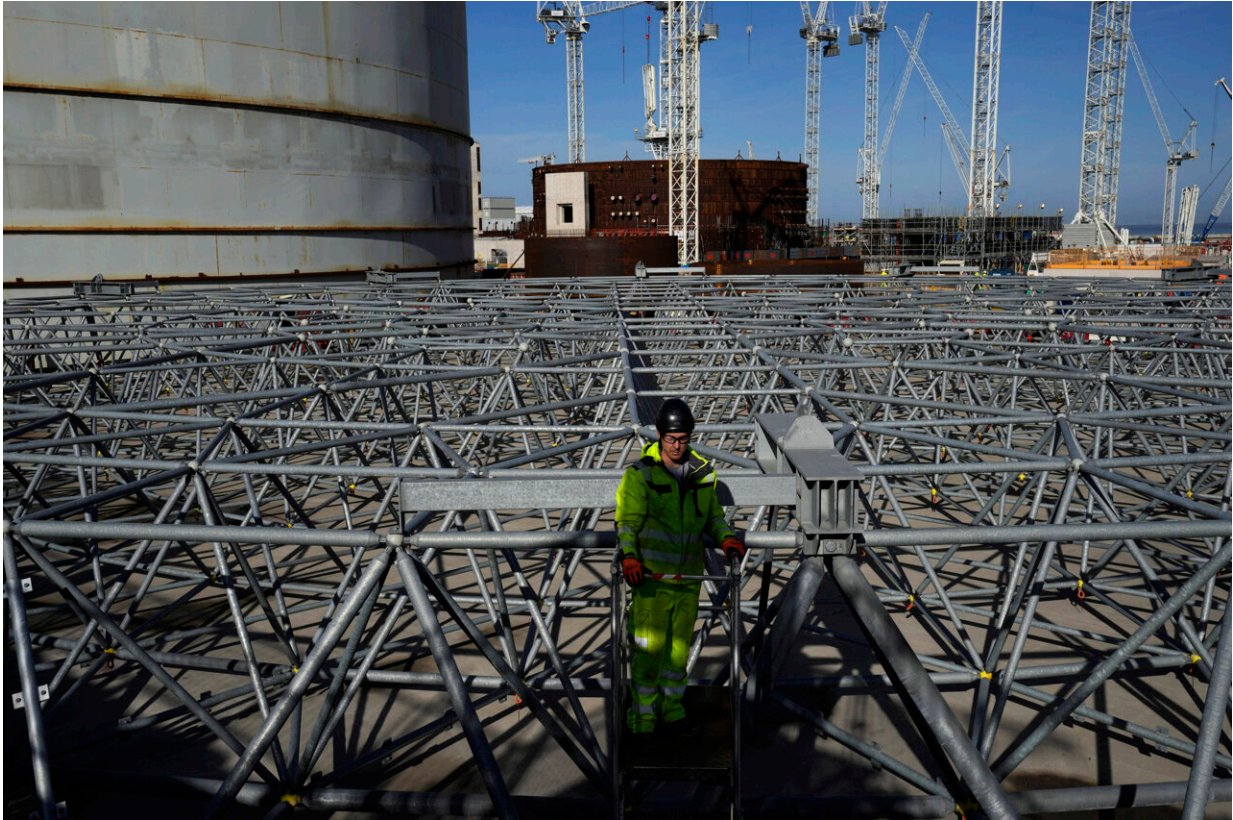
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Hirst believes the future of large nuclear reactors, particularly in Europe, will hinge in part on the success of Hinkley Point C.

"They've already had some cost overruns, but not on the scale of development," said Hirst, adding that if the site remains on its updated schedule and is "reasonably in touch with original costs, then I think we will see more orders."

The team in Bridgwater understand what's at stake.

"We understand our responsibility to get this plant generating as quickly as possible," said Cann. "We feel that pressure, we feel the responsibility, but we will never compromise safety or quality."

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