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Will France be caught with its plants down?

- Homepage - News - External sources -

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If another heat wave hits Europe this summer,
many say country's beloved nuclear-power system won't be able to cope.

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The French have long been proud of the fact that nearly 80 per cent of their electricity comes from a sophisticated network of nuclear power plants. The plants don't emit greenhouse gases, and the country doesn't depend on an increasingly precarious supply of fossil fuels.

But as Europe prepares for a predicted heat wave this summer, the French electrical utility is also preparing for the possibility that its beloved nuclear power system may not be able to cope. And environmentalists warn that's a sign that nuclear power may not be, as many now argue, a solution to global warming.

"People say that nuclear power is going to solve global warming, but I think we're going to have to solve global warming if we're going to have a future for nuclear power," said David Lochbaum, director for nuclear safety at the U.S.-based Union of Concerned Scientists.
Nuclear power plants rely on large amounts of cool water to operate at a safe temperature. That water is then pumped out at a higher temperature, warming the body of water from which it came. That doesn't usually cause any problems if the plant is located next to an ocean or sea. But if, the same as three-quarters of French nuclear generators and many others around the world, the plant is next to a lake or river, the supply of cool water can dry up during a hot spell and the operator faces some hard choices. It can reduce output or shut down the plant, or it can pump extra hot water into an already warm lake or river, and risk raising the water temperature so much that it causes massive environmental damage.

French reliance on nuclear power makes it a particularly acute problem here, where power plants were pushed to their limit during the heat wave that swept across Europe in 2003. Environmental rules ban Electricité de France from discharging water above a certain temperature, so the utility either reduced output or shut down 17 of its 58 reactors. The

state-owned EDF, which normally exports power, was forced to buy energy on the open market at prices as high as 10 times the average summer price.

Although it has started to rely more heavily on its seaside plants, the utility was forced to reduce output again during a hot spell last summer.

Nuclear power facilities in other countries, including Germany, Spain, the United States and even Sweden, which uses seawater for cooling, have experienced similar problems. And while the interruptions have so far been short-lived, some environmentalists say they're concerned nuclear power plants will become unreliable if, as predicted, heat waves become more frequent and intense and last longer.

"In 2003 and 2006, it was difficult but it still worked," said Stéphane Lhomme, a spokesman for the French lobby group Sortir du Nucléaire (Get Out of Nuclear). "Maybe in 2010 or 2012, we will have to shut down 30 reactors. And one day it will all shut down."

Industry representatives say lobbyists such as Mr. Lhomme are exaggerating the risk. Surmet Kuran, engineering manager for advanced technology options at Atomic Energy of Canada Ltd., said existing reactors in Canada are immune from problems caused by heat because all of them are on large bodies of water - either the Great Lakes or the Atlantic Ocean.

He said plants that do have trouble operating in hot weather can solve the problem by building a cooling tower, or by changing the reactor design so that it operates more efficiently and discharges less hot water.

But Mr. Lochbaum said that cooling towers are only a partial solution, because they still need to start with cool water, and that plants equipped with them may still need to shut down. One such facility is the Browns Ferry Nuclear Plant in Alabama, where operators predict they will have to reduce power or shut down for at least 10 days a year because temperatures are already far higher than predicted when the plant was built in 1977.

Magnus Mori, a project manager with the World Nuclear Association in London, said the industry is just beginning to think about other solutions,

and that new technology to significantly improve a reactor's ability to cope with heat is still 15 years away. With current technology, the most viable solution may be to limit new reactors to the seashore. But even that may be impractical, because shipping the electricity inland is inefficient and expensive and most people would not tolerate electricity pylons cutting through the countryside.

In France, EDF says it hopes to have fewer interruptions this summer. It hopes to cut back on demand by negotiating contracts to give some companies better rates if they are willing to shut down during a heat wave. It is also storing extra water for cooling, will rely more on its seaside plants, and has received permission to raise the water temperature in lakes and rivers by as much as three degrees C above the normal limit.

It is also investing in wind power and upgrading fossil fuel plants because they are better at coping with periodic peak demand.

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Nuclear top 10

Percentage of electricity supply from nuclear sources in Europe's top nuclear-power users:

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1. France: 78

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2. Lithuania: 72

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3. Sweden: 52

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4. Ukraine: 51

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5. Bulgaria: 42

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6. Germany: 32

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7. Czech Republic: 31

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8. Finland: 27

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9. Spain: 23

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10. Britain: 20

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Source: BBC, 2006