Quake-prone Japan looks at geothermal energy

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Kazuhiro Takase shows AFP around Japan's first geothermal plant at Hachimantai city in Iwate prefecture. The forces that make Japan one of the world's most quake-prone and volcanic countries, and sparked a nuclear disaster, could become part of its long-term energy solution, experts say.

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Steam and hot water billow and gush from deep below the ground at Japan's tens of thousands of famed hot springs and could be harnessed to drive turbines that generate electricity in a clean, safe and stable way, they say.

Although Japanese high-tech companies are leaders in geothermal technology and export it, its use is miniscule in the island nation, which has for decades relied heavily on imported fossil fuels and atomic power.

Japan's parliament passed a law Friday to promote renewable energy such as wind, solar and geothermal by forcing power utilities to buy it at fixed prices and letting them pass extra costs onto consumers.

"Japan should no doubt make use of its volcano, magma and other geothermal energy," said Yoshiyasu Takefuji, professor of Tokyo's Keio University and a prominent researcher of thermal-electric power generation.

"The March 11 disaster caused a lot of sadness, but it has also changed people's thinking about energy."

Japan is located on the "Pacific Ring of Fire" at the juncture of four tectonic plates that slowly grind along, driven by the flow of super-hot magma below, creating stresses that are released in earthquakes.

The most powerful of these in Japan's recorded history, a magnitude-9.0 seabed quake, struck on March 11, triggering the huge tsunami that killed more than 20,00 people and set off the Fukushima nuclear disaster .

The crisis has sparked a backlash against atomic power, which

previously made up 30 percent of Japan's energy needs, and increased interest in alternative energies, which account for only eight percent, most of it hydro.

Artist Yoko Ono, John Lennon's widow, has called on her home country to tap its natural energy, following the example of Iceland which uses steam and hydroelectric power for over 80 percent of its energy needs.

In northern Japan, 60 kilometres (37 miles) from the tsunami-ravaged coast, lies Japan's first geothermal power plant, built in 1966 at the hot spring resort of Matsukawa in Hachimantai.

The 23,500-kilowatt plant, set amid mountains where the smell of sulphur hangs thick in the air, never stopped running after the quake, while in contrast, two-thirds of Japan's reactors remain offline for safety checks.

The head of the plant, Kazuhiro Takasu, said Japan must accept that switching to renewables will carry initial extra costs, but that a new 10-billion-yen ($130 million) geothermal plant would break even in "a few decades".

The Matsukawa plant in Hachimantai city, built in 1966, is Japan's first geothermal plant. The forces that make Japan one of the world's most quake-prone and volcanic countries, and sparked a nuclear disaster, could become part of its long-term energy solution, experts say.

"People are now talking about renewable energy, but such excitement can easily ebb off after a while," Takasu warned.

For now, geothermal makes up less than one percent of the energy mix in Japan, a resource-poor economic powerhouse that imports its oil, coal and gas and has invested heavily in nuclear energy since the 1970s oil crisis.

The biggest hurdle to geothermal, most experts agree, is the high initial cost of the exploration and drilling of deep earth layers that contain hot water, and of then constructing the plants.

Another problem is that Japan's potentially best sites are already being tapped for tourism with popular "onsen" hot spring resorts or are located within national parks where construction is prohibited.

"We can't even dig 10 centimetres (four inches) inside national parks," said Shigeto Yamada, of Fuji Electric's geothermal team, adding that rules protecting nature sanctuaries would need to be relaxed for geothermal to grow.

Hideaki Matsui, senior researcher at the Japan Research Institute, said "geothermal energy is a decades-long project. We also have to think about what to do for now as energy supplies will decline in the short term".

Nonetheless, argue its proponents, geothermal energy has vast potential.

Japan is estimated to have some of the world's largest reserves of usable underground heat -- behind the United States, the Philippines and Indonesia -- but is ranked only sixth in terms of geothermal generation capacity.

Washington-based environmental think-tank the Earth Policy Institute in April estimated that Japan could produce 80,000 megawatts and meet more than half its electricity needs with conventional geothermal technology.

Ironically, Japanese giants such as Toshiba and Mitsubishi are already global leaders in geothermal technology, with a 70 percent market share. Last year Fuji Electric built the world's largest geothermal plant in New

Zealand.

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