

Estonia sees rock as future of global energy

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Estonia's shale hub is Narva, in the northeast near the Russian border. Two underground mines and two open-cast pits in the area feed a duo of power stations -- the world's biggest oil shale-fired electricity plants.

A huge excavator bites into the earth of an open-cast mine, as the operator skillfully mans the controls in a cabin four storeys from ground level.

For the small Baltic state of Estonia, rock is the future of energy.

The European Union nation of 1.3 million generates 97 percent of its electricity thanks to oil shale -- [sediment](#) formed 400-450 million years ago, containing hydrocarbons. Its industry forecasts that shale's use can only expand.

"Estonia has 1.1 percent of global oil shale reserves, but what makes us

unique is that we have used it and developed the technology for a hundred years," Sandor Liive, chief executive of state-run power firm Enefit, told AFP.

Enefit is betting on shale beyond the nation's borders, from the Middle East to the United States.

After already having signed a development deal with Jordan, this month Enefit announced the acquisition of a 100 percent stake in the US-based Oil Shale Exploration Company for an undisclosed sum.

Enefit said the firm had the largest tracts of privately-owned oil shale reserves in the United States, with over 3.1 billion tonnes of oil shale containing almost 2.1 billion barrels of oil.

The United States is home to 72 percent of global oil shale reserves. Besides Jordan, it is also found in Australia, Brazil, China and Morocco.

Asked why Enefit thinks shale makes economic sense, Liive said it hinges on the high prices for conventional oil.

"If you believe that oil will be more than \$60 a barrel, then the answer's yes. Yes, it's profitable to produce oil from oil shale," he said.

Estonia has long used shale without actually extracting oil, however.

The Estonian word for it is "polevkivi" -- "burning rock". It is mined and then burned in the country's power stations.

Shale is the main mineral resource in the former Soviet-ruled republic, which won independence from Moscow in 1991 after five decades of communist rule and joined the EU in 2004.

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Ninety-seven percent of the electricity produced in Estonia comes from oil shale, Estonia's own national mineral resource. Each year about 15 million tonnes of oil shale are used to produce energy.

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"To get one tonne of oil shale we first need to extract 10,000 cubic metres of water," production manager Pavel Onuchak told AFP at an open-cast pit.

After blasting the surface rock, the miners dig down to the shale, which lies 20-30 metres below ground.

"We replant 90 percent of the land. That's why you see so many young trees around here," Onuchak added.

Out of Enefit's 7,400 employees, 3,000 work at the mines.

In recent years, Enefit has mined an annual 15 million tonnes of shale. It

uses some 90 percent to fire the power plants.

"From one tonne of oil shale we produce 850 kWh of electricity," the power plants' risk manager Andres Kurling told AFP. The process generates 870 kilos of CO₂, however.

Alternatively, the same quantity of oil shale can produce 125 kilos of oil for 180 kilos of CO₂ -- similar to emission levels from regular oil-refining or the chemicals sector, says Enefit.

"We're currently working on technology to enable the use in cars of fuel made from oil shale," Igor Kond, head of Enefit's oil operations, told AFP. "It is going to be a very big step for the whole world."

By 2016, Enefit aims to produce high-quality liquid fuels in Estonia, with a production target of 20,000 barrels per day.

"Global shale reserves are at least 400 billion tonnes. The amount of oil in the world's shale deposits is considered to be three to nine times greater than proven conventional oil reserves," Liive said.

"There's been a boom in oil sands and shale gas, and we believe the oil shale boom is coming next," he added.

Not everyone in Estonia is onside, however.

"Mining and using oil shale is not environmentally friendly," Green lawmaker Toomas Trapido told AFP. "It causes high CO₂ emission, pollutes water and creates a lot of ash. We should work more on better solutions like solar energy."

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