

# Israel Presses for Oil From Shale

**With the help of homegrown technology, an Israeli company's proposed energy plant could help the country vastly reduce oil imports**

With oil prices hovering around \$70 a barrel, Israel is looking for ways to reduce its near-total dependence on energy imports. It's pondering the use of the nation's huge reserves of oil shale—a dark, crumbly rock loaded with hydrocarbons—located in the central and southern parts of the country. Thanks to a technical breakthrough, it should be possible to extract fuel oil from the shale for less than \$20 a barrel. That could allow Israel eventually to cut its crude imports by up to one-third.

Shale is already used as a fuel for power plants in Israel and Estonia, where the rock is burned like coal to drive steam turbines. Israel's small shale-fired power plant was built nearly 20 years ago. But past attempts to extract liquid oil from shale weren't economically feasible: The process cost upwards of \$50 per barrel at a time when oil was selling for less than half that.

Now, the tables have turned. A Russian-born Israeli immigrant named Moshe Gvirtz developed a technique in the 1990s to squeeze oil from shale by mixing the rock with a residue from conventional oil refining and putting it through a catalytic process. The dramatically improved results, coupled with soaring crude prices, have inverted the economics of oil shale. That could help not just Israel but dozens of other countries, including the U.S., that are rich in shale reserves.

**SOME CHALLENGES.** A Haifa-based engineering firm called A.F.S.K. Hom Tov, which owns the patented process, is now gearing up to exploit the opportunity. "The technology could reduce dependence on imports and substantially reduce Israel's overall energy bill," says Israel Feldman, the company's co-founder and managing director. A.F.S.K. Hom Tov has proposed building a plant that could produce up to 3 million tons of oil annually, or roughly 30% of Israel's current oil imports.

How does it work? Older technologies squeezed oil out of shale by putting the crushed rock under enormous pressure at high temperatures. But the process developed by Gvirtz costs far less. The shale is mixed and coated with bitumen, a remnant of normal oil refining, then put through a catalytic converter under relatively low pressure. The output is synthetic oil that can be refined into gasoline and other products.

The only problem for Israel is that its shale is relatively low quality, with a "caloric value" of only around 15%, compared with values of 20% or higher in other

**countries. That means A.F.S.K. Hom Tov has to use more shale for a given output of oil.**

**DREAM REVIVED.** But in an interesting wrinkle, the company also has developed a way to burn the leftover shale—which still contains residual fuel—that could someday be used to drive a 100-megawatt power plant in southern Israel.

The dream of exploiting shale's potential is far from new. Ten years ago, a study conducted for the Israeli Energy Ministry by a panel consisting of some of the country's leading technical experts found that a 3-million-ton-per-year shale plant could turn an annual profit of \$20 million to \$59 million if oil were priced at \$18 a barrel. On that basis, the experts strongly backed shale-oil technology and recommended the Israeli government finance a pilot plant.

But "falling energy prices and Israel's decision to switch to natural gas led the Israeli government to put the homegrown technology on the back burner," says Moshe Shahal, a former energy minister and now a leading Tel Aviv corporate lawyer who represents A.F.S.K. Hom Tov (Hebrew for "good heat"). Only when oil prices began skyrocketing again last fall did Shahal and the company resume serious efforts to market the process locally as well as abroad.

**DESERT PLANT.** Not surprisingly, an updated feasibility study by local energy consulting firm Eco-Energy found that the shale plant would be even more profitable today. "The cost of producing a barrel of oil using the process would be around \$17 a barrel," estimates Amit Mor, managing director of Eco-Energy. At that price, the proposed plant would be a veritable gold mine, with annual profits between \$188 million to \$317 million. Mor notes that the projections are based on the U.S. Energy Dept.'s forecasts of an average oil price of \$45 to \$50 a barrel in the coming 25 years.

So far, A.F.S.K.'s process has only been tested on a laboratory scale. The company is planning an industrial-scale plant to be built at Mishor Rotem in the Negev Desert. "We hope to be in full-scale production in 2010 or 2011 at the very latest," says Feldman.

That will entail construction of a pipeline from the Ashdod refinery located 80 kilometers (48 miles) to the north that would be used for transferring the necessary bitumen needed for the production process. A parallel pipeline would transport the synthetic oil back to Ashdod for refining.

**INTERNATIONAL APPEAL.** A.F.S.K. has already made a formal request to Israel's National Infrastructure Ministry for mining rights at Mishor Rotem. It has also asked the Industry, Trade, and Labor Ministry for government backing for the ambitious project. "The technology is extremely interesting and, with oil prices at these levels, there is a lot of interest on our part to develop shale," says Yaakov Mimran, Petroleum Commissioner at Israel's National Infrastructure Ministry.

**The two ministries are expected to give the green light in the next few weeks for a pilot plant to test the process. The company hopes to have the necessary licenses and government financial support in hand by the end of this year.**

**The technology has a huge potential abroad. Some 25 countries, including the U.S. and Jordan, have substantial shale reserves. Israeli energy industry sources involved in the project say that energy giant Royal Dutch Shell has reportedly expressed interest in the technology. Shell is already active in shale in Colorado. In addition, several major investors from Israel and abroad have reportedly expressed interest.**

**FULFILLING THE PROMISE? Shahal has discussed cooperation with neighboring Jordan, which has even larger and higher-quality shale reserves than Israel. Earlier this year, he held talks with Jordan's Energy Minister Azmi Khreisat on building a similar-size plant in the kingdom.**

**In the past the Israeli government has not taken exploiting the country's oil-shale reserves very seriously. But the spike in oil prices has changed all that. If the new technology proves to be as worthwhile as it is cracked up to be, Israel and many other countries could be on the road to greater energy independence within a matter of years.**

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