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March 25, 08

## New Reactor Converts Nuclear Waste into Inert Usable Products

Russian scientists and the Israeli firm Environmental Energy Resources (EER), have created a reactor that converts radioactive, hazardous and municipal waste into inert byproducts such as glass and clean energy.

"In the beginning, nobody believed that we could do it," says Itschak Shrem, chairman of investment company Shrem, Fudim and Keiner representing EER at a recent in Tel Aviv press briefing announcing the innovation. Shrem, himself an invoker of small miracles through the founding of one of Israel's most lucrative venture capital funds - Polaris (now Pitango) - pointed to a chunk of black, lava-like rock sitting on the table in front of everyone's coffee cups. The journalists cautiously eyed Shrem as he assured them that the shiny dark material, emitted from EER's pilot waste treatment reactor near Karmiel in the north, was safe to touch.

Using a system called plasma gasification melting technology (PGM) developed by scientists from Russia's Kurchatov Institute research center, the Radon Institute in Russia, and Israel's Technion Institute - EER combines high temperatures and low-radioactive energy to transform waste. "We go up to 7,000 degrees centigrade and end at 1,400 centigrade," says Moshe Stern, founder and president of the Ramat Gan-based company. Shrem has said that EER can take low-radioactive, medical and municipal solid waste and produce from it clean energy that "can be used for just about anything including building and paving roads.

Shrem added that EER's waste disposal reactor does not harm the environment and leaves no surface water, groundwater, or soil pollution in its wake. The EER reactor combines three processes into one solution: it uses plasma torches to break down the waste; carbon leftovers are then gasified and finally inorganic components are converted to solid waste. The remaining vitrified material is inert and can be cast into molds to produce tiles, blocks or plates for the construction industry.

EER's Karmiel facility (and its other installation in the Ukraine) has a capacity to convert 500 to 1,000 kilograms of waste per hour. Other industry solutions, the company claims, can only treat as much as 50 kilograms per hour and are much more costly.

According to the journal Research Studies, 'The production of nuclear weapons/power in the US has left a 50-year legacy of unprecedented volumes of radioactive waste and contaminated subsurface media and structures... Nuclear waste generators include the national laboratories, industrial research facilities, educational and medical institutions, electrical power utilities, medical diagnostics facilities, and various manufacturing processes.'



In the US alone, Research Studies predicts, this year's market for radioactive waste-management technologies in America will cap \$5.5 billion.

EER was founded in 2000 and has maintained a low profile until revealing its reactor last week. "We spent our time on R&D and building up the site in Israel which we started constructing in 2003," said Shrem. "We realized that nobody was going to believe us unless we started doing the process physically. They always said it sounded too good to be true, so we had to prove it to them."

Back in 2004, the Ukrainian government put out a tender searching for a solution that would provide safer hazardous waste disposal methods. At that time, the country was looking for a way to treat its low-radioactive waste zones resulting from the Chernobyl explosion. EER sent in their proposal, and their technology won the bid.

"The European community is afraid of what is happening there," notes Stern, warning that it is time for the clean up to begin, even if it means making only a small dent in the massive pile. "The low-radioactive waste is slowly contaminating the water and will continue to do so over the 300 years it takes to break down."

With a strict eye over its operations by Israel's Ministry of Environmental Protection, EER revealed its proof-of-concept to Israeli and foreign dignitaries in Aeblin, near Karmiel last week, showing how it can take mountains of municipal waste and reduce it to a pile of black rubble.

"We are not burning. This is the key word," Shrem said. "When you burn you produce dioxin. Instead, we vacuum out the oxygen to prevent combustion."

EER then purifies the gas and with it operates turbines to generate electricity. EER produces energy - 70% of which goes back to power the reactor with a 30% excess which can be sold.

"In effect, we are combining two of the most exciting markets in the US - the environment and clean energy," says Stern, "We also reduce the carbon footprint."

The cost for treating and burying low-radioactive nuclear waste currently stands at about \$30,000 per ton. The EER process will cost \$3,000 per ton and produce only a 1% per volume solid byproduct.

In the US, EER is working to treat low-radioactive liquid waste and recently contracted with Energy Solutions, the largest American company in the field with 75% of the US market.

Based on the financial forecasts, EER is certainly giving a fresh meaning to the expression - one man's garbage is another man's treasure. But in EER's case, ones man's hazardous waste may very well be EER's goldmine.



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