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Russian Scientist Drives Brazilian Biofuel Bonanza

By Giovanni Lorenzon

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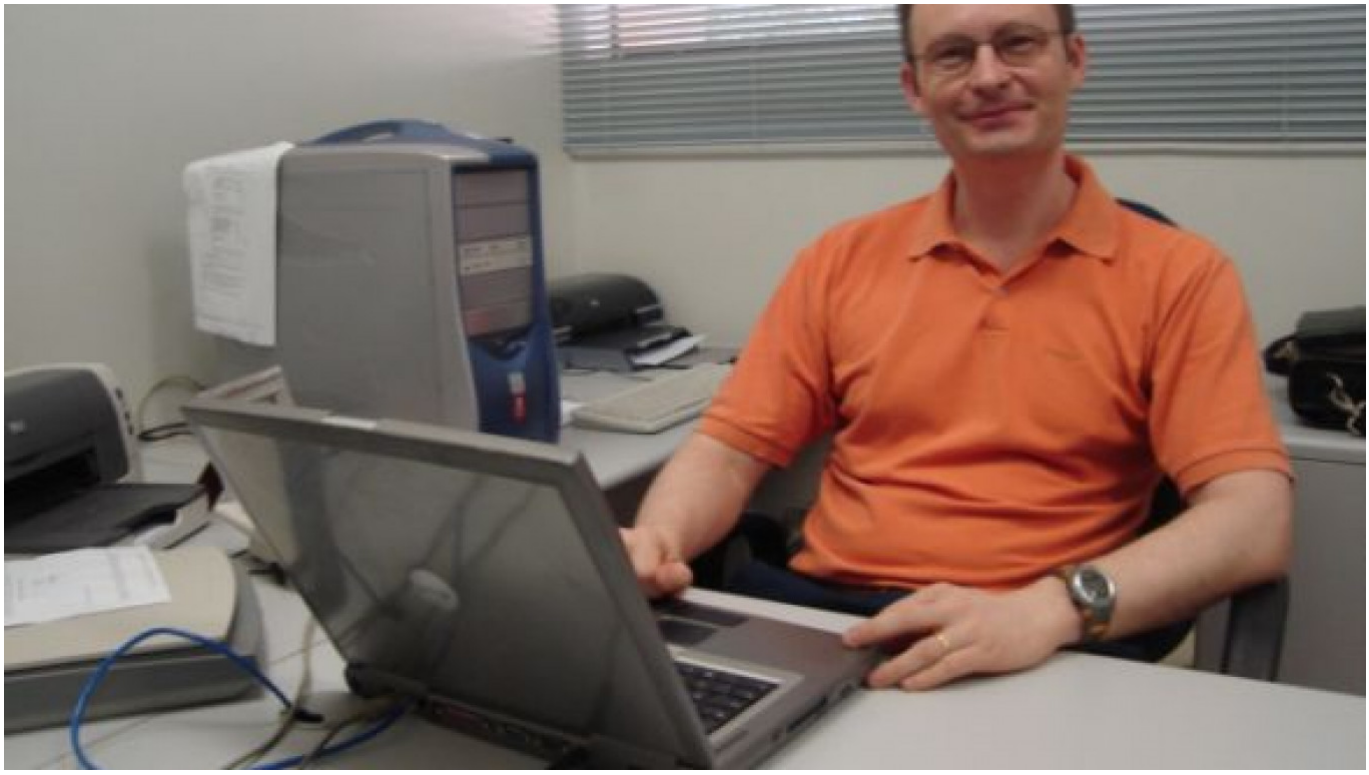

Igor Polikarpov

SAO PAULO, Brazil — Forget oil. The path toward better energy might lie in the humble potato.

Igor Polikarpov, a Russian physicist who has spent nearly 20 years helping build Brazil into a world industry leader in biofuel, says Russia could do with discarded potato peels what Brazil is doing with sugarcane stalks — creating an environmentally friendly alternative to fossil fuel.

Polikarpov knows what he is talking about. A native of the Volga river city of Ulyanovsk, Polikarpov is at the forefront of Brazil's pioneering drive to use so-called second-generation biofuels that convert waste and other nonedible material into fuel.

The bespectacled scientist, who moved to Brazil during the brain drain of the 1990s, is

currently pursuing research to reduce the cost of turning sugarcane stalks into fuel, making the final product cheaper than gasoline.

"My research is not just for Brazil but for the world because the challenges are the same in all countries that already produce cellulosic ethanol, among them the U.S.," Polikarpov said from behind his desk at the Institute of Physics at the University of Sao Paulo, where he has worked as a full professor since 1995.

"Biofuel will become cheaper for the consumer and, therefore, more competitive compared with fossil fuels and even with first-generation biofuel," he said, speaking in fluent Portuguese.

Polikarpov said his main challenge is seeking out a cheaper method of "breaking" the cellulose of the sugarcane stalk.

He hopes one day to see his work embraced by Russia, which he said could have been a world leader in new technologies if it had pursued biofuel research from the World War II era instead of drilling for easy oil riches.

The Soviet Union produced second-generation biofuel on a significant scale during the war, primarily to meet the demands of its military fleet. But the technology, acid hydrolysis, produced relatively little biofuel and was not environmentally friendly.

"Those plants must have been deactivated in the 1950s," said Polikarpov, who is a member of the editorial board of the industry magazines Biotechnology Letters and Enzyme Engineering.

Today, renewable fuel represents only 1.2 percent of the overall matrix of Russian energy and is confined to the chemical and heating sectors, according to a U.S. Agriculture Department report published in May 2013. The report noted several initiatives in Russian regions, including Kaluga and Belgorod, but pointed out that the work focused on biogas.

The Russian government has set a target of 40 percent renewable energy efficiency by 2020. But Polikarpov expressed doubt that Russia would prioritize the use of biofuel in cars, which are highly polluting.

In Brazil, which is also a major oil producer with the discovery of offshore fields in the Pre-Salt, 35 percent of all cars run on ethanol. The figure reached 50 percent in 2009 but then dropped because of a shortage of sugarcane that raised prices.

The most advanced clean fuel in Brazil is extracted from sugarcane bagasse, the fibrous material that is left over after sugarcane is crushed to extract its sticky juice. The current method is relatively expensive but more environmentally friendly than first-generation biofuel, which uses the sugar.

Brazil is expected to produce 27.1 billion liters of biofuel during the sugarcane crop cycle of 2013-14, with second-generation cellulosic biofuel accounting for a fraction of the total. National production of cellulosic biofuel should reach 100 million liters a year by 2015, Brazil's Agriculture Ministry said.

But demand is high as other countries look for alternatives to fossil fuels. The U.S. and the European Union are requiring a growing use of cellulosic ethanol, and the U.S. Environmental Protection Agency has called for delivery of a massive 79 billion liters of the biofuel by 2022.

But the U.S., which uses corn in domestic production of first- and second-generation biofuel, faces a lack of refineries and imports supplies from Brazil.

Besides helping to reduce pollution, ethanol produced from agricultural waste can boost the amount of food available to eat and help prevent deforestation.

Polikarpov said Russia also should invest in sustainable energy production, even though it lacks Brazil's rich and abundant biodiversity.

"The knowledge acquired by its research centers would supply technology that uses biomasses more common in Russia: fodder, grain, wood and even potatoes," he said.

Russian companies that face a lack of demand at home could export to the Europeans, who have ambitious targets and supply shortages, he said.

"And maybe one day Brazil will export fuel to the Russian market," Polikarpov said with a smile.

In the meantime, it seems that countries like Brazil will continue to take advantage of the academic research of Russians.

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