

# Nanotech Enthusiasm Peaks

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In nanotechnology, size matters. But federal funding for the high-tech field has tapered off in Russia, flattening out at \$1.88 billion per year through 2015 and losing ground in the race against the United States and Germany.

Since 2008, the Russian government has sought to lock in a commanding position in the industry by spending 533.5 billion rubles (\$17.64 billion) through its venture-capital conduit Rusnano.

This top-down approach, however, has yet to come to fruition in the form of patents, investments and corporate spending, according to Lux Research, a U.S.-based research and advisory firm focused on emerging technologies.

Nanotechnology uses microscopes designed to measure and move objects the size of a DNA strand. With these tools, engineers manipulate materials at their atomic level. The process enhances the physical properties of products so they are stronger, lighter and more durable.

Research has expanded rapidly in the past 10 years, with governments and corporations projected to spend a quarter of a trillion dollars on research and development by 2015, said Tim Harper, founder and chief executive of Cientifica, a London-based research and consulting firm.

Rusnano, which was restructured in March yet remains 100 percent owned by the government, invests state funds in projects that can introduce the latest forms of technology into the country, increase exports and improve domestic social conditions.

At the fourth Nanotechnology International Forum, which it organized, Rusnano showcased the strides it has made in co-financing projects and developing nanotechnology infrastructure.

The Store of the Future showed how nanotechnology could make waits in the checkout line a thing of the past. Customers place groceries in a console where, within 20 seconds, tiny radio transmitting chips implanted in product packages are automatically scanned and rung up.

The chips, manufactured by Sitronics in Zelenograd, utilize a microprocessor to transmit and store expiration and production dates. This information is also visible on the consumer's phone or at different consoles throughout the store.

Alexander Puzanov, general manager of the Urban Economics Institute, said his company hopes to implement the technology in all retail products, and added that it provides a benefit in preventing theft as well. If the product is removed from the store without being purchased, alarms are set off and the time is recorded.

Yevgeny Galen, commercial director of the family business Galen, also hosted an exhibit on another potential benefit from nanotechnology. The company manufactures rebar, reinforced metal bars for construction, which it infuses with 2 percent black carbon, eliminating static electricity — a major safety concern in mines. The supplement also improves rebar strength by 20 percent and increases heat resistance by 100 to 150 degrees Celsius compared with average rebar, Galen said.

Galen expects to expand 50 times in the next five years due to demand from the government. Rusnano had facilitated conversations with the government to use its Rockbar product in railroad and highway construction throughout Russia, a market that could produce \$50 million worth of sales, he said.

There were also major advances in batteries on display. Thunder Sky Group, a Chinese corporation producing lithium-ferrophosphate batteries in Novosibirsk, showed the capacity of their product in electric cars outfitted by Russian companies Mobil and SRICI.

By rearranging atoms, Thunder Sky can create batteries that will power a Volkswagen Caddy to reach speeds of 130 kilometers per hour and drive a distance of 350 kilometers on one charge, a Mobil spokesman told The Moscow Times. According to Thunder Sky's web site, the batteries can even recharge 70 percent of capacity in 10 minutes.

Rusnano has been the major catalyst driving investment in the nano industry in Russia. However, Lux noted a lack of private investment and patents. Research director Mike Holman

said Russia had only registered eight patents with the U.S. Patent Office by the end of 2009.

In 2009, Lux reported that while 8.1 percent of government R&D funds went to nanotechnology, versus the global average of 2.5 percent, Russian corporations only devoted \$8 million compared with U.S. private spending estimated at \$3.2 billion.

In 2011, the government is estimated to spend \$1.87 billion, retaining its third-place position behind the United States and Germany, according to a report by Cientifica. These figures place the government's share in R&D expenditure at 71 percent, Rusnano chief executive Anatoly Chubais said during the nanotechnology forum Wednesday.

Chubais called for a radical change in the next three to five years to the way businesses are financed. "State financing for research is important, but we need to increase financing for research from the business side. Business provides a different quality of financing — it imposes different requirements for research results," Chubais said, Interfax reported.

The Russian nano industry also faces work force difficulties. According to information released by Rusnano at the forum, the country needs more than 100,000 highly qualified specialists. Yet by May 2011, only 1,300 people had attended Rusnano training sessions.

To fill this gap, Skolkovo Foundation president Viktor Vekselberg and Massachusetts Institute for Technology president Susan Hockfield signed an agreement for a three-year collaboration to develop the Skolkovo Institute of Science and Technology. The school will bring together Russian, U.S. and global research and technology, and will be led by Edward Crawley, MIT's Ford professor of engineering. The inaugural class is expected to enroll 1,200 masters and doctoral students as well as 300 postdoctoral scholars in 2014.

When asked whether these steps were sufficient to sustain the nanotechnology initiative, Holman was unable to answer. But he told The Moscow Times over the phone that "to be successful, Rusnano will have to cultivate a successful private industry, one based more on private investment than money from the government."

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