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**THE ENTREPRENEURS' LAB: RUSNANO: NANOINDUSTRY PLANTS – 13+  
IN 2011  
Building Russia's Creative Capital**

**JUNE 18, 2011 — 12:00–13:00, Pavilion 8, Conference Hall 8.2 Innovation  
Hall**

**St. Petersburg, Russia**

**2011**

**Panelist:**

**Anatoly Chubais**, Chief Executive Officer, Chairman of the Executive Board,  
RUSNANO

**A. Trapeznikov:**

Good afternoon, my name is Andrey Trapeznikov. I work at RUSNANO, and I will be helping to conduct today's session. I suppose the purpose of this is to address questions that we have been asked for the past three years: "Show us this 'nano'. Where is it? On what are you spending public money?" We can already report to you this year about some interim results concerning the commissioning of factories that work in this area. I invite to the microphone the Chairman of RUSNANO, Anatoly Chubais. Please.

**A. Chubais:**

Hello. Thanks to all who have gathered here today in this hall and those who are watching and listening today via the Internet. We really wanted to answer the question that is often asked of us, "Where are the results? Show us something you have done." We often explain that everything doesn't work out immediately, that first you need to structure the project, then you have to sign legally binding documents, then invest the money, then start building, then a factory appears and so on.

And right now we want to try to answer the question about what has been done.

Yes, indeed, we have government support on a unique scale. I remind you that we had an amount equivalent to USD 10 billion. In this case, we are faced with a sufficiently large-scale strategic goal—to create a nanotechnology industry for our country by 2015 that will be able to make USD 30 billion of products annually. Today, we are at the initial stage, in that we are accomplishing some basic things.

We would like to remind you today of what RUSNANO is, especially since there are different points of view on this issue. There are those who believe that we are actually an investment fund, and they are partly right. Although I will say first that an investment fund of this kind not only does not exist in our country, but

arguably does not exist in the world. In this sense, the term 'investment fund' does not come near to describing the essence and specific nature of our work.

There are those who do not quite agree with this, and who believe that we are really not an investment fund at all, but that we represent a big scam and a reckless undertaking. And there are also quite a lot of these people, and you can often find proponents of this view, especially on the Internet on the websites of the Communist Party and other reputable sites. But life will show who was right.

There are those who consider us the 'ministry' of innovation, and I would just say that we do not see ourselves as public officials or civil servants. We are not any of these, neither legally nor in fact. At the same time, those who say this are partly correct in the sense that we are actively engaged not only in specific projects, but also in what is called the innovation ecosystem. We have developed dozens of regulations, including some major ones. The law signed by the President abolishing the tax on capital gains was a result of our work, and just recently, a few days ago, the Government introduced two bills in the State Duma. One relates to the new legal structure for venture capital funds; the existing structure is not suitable due to mutual funds, and we are certain of this. The other involves a new legal structure for startups. We have prepared a number of other regulatory documents. In this sense, if you want to call us a 'ministry', we agree. Although technically we're not a ministry, we like to actively cooperate with ministries and the Parliament for the development of major regulations, including the laws that I mentioned.

One could imagine this to be like tending a garden, though this may be too soft and sweet. I do not know to what degree this comparison is applicable to us, but it certainly is when it comes to startups. They are like seedlings that we are trying to plant through a joint effort, to nurse and nourish them, and to care for them to a lesser or greater degree of success so that these seedlings bear real fruit after some time.

The fruit for us is, of course, business. In general, after all that I have said, the key word, the key function, the key mission is to create businesses. This is the purpose for which we were created. The endeavour that goes by the name of 'RUB 900 billion' cannot be accomplished without prioritizing the business side of everything we do.

We were only recently established. In 2007 we were transformed into a publicly owned company, and if I understand correctly, we were the first among our esteemed state corporations to do so. This is the amount of financial resources backing us, both in the contribution of state property and in state guarantees. Incidentally, we have released the first of these government guarantee bonds, and we plan to do this more in the future.

These basic parameters are supported by the principles upon which we work. We work with projects in the early stages of commercialization or in the expansion stage. We have always had less than a 50% stake in the businesses we create. It is not just a technical matter. Rather, it is a question of philosophy. We understand that our task is not to replace private strategists in innovative businesses, but to support private strategists in innovative businesses. That's why we leave them the space for monitoring their own work, especially since we are not going to be involved in our projects forever—we plan to withdraw from participating in them. Our 'exits' are part of our strategy, they will give us revenues that we will reinvest in new investment projects.

The basic condition, an absolute condition, a priority condition is that production is located in Russia. Yes, we are ready to compromise, and yes, we are ready to adopt some one-off solutions related to deployment in other regions, but still this requirement is the most important one for us. And in our work, and generally in the on-going global debate on the re-industrialization of developed countries, our position is that the total outsourcing of production abroad is a mistake. We do not want to repeat this, not only because it is formally recorded in our requirements, but also because we really believe in this position.

What is the nature of our work? What we are really creating? There are three things noted here. The first and most important is directly creating new projects, new businesses as we call them, of our project companies, which will conduct business related to nanotechnology. This is the principal area in our work. In addition, we participate in investment funds (venture capital funds or private equity funds). We do not want to duplicate the work that is being conducted very correctly and intelligently by Russian Venture Company. Therefore we would like in the near future to somehow smartly combine what RVC does and what we do, in the area of nanotechnology, of course. And in this sense, investment funds are not the first, but the second, form of activity in which we engage.

But both of these areas are business. And we also have non-business activity. Like I said, we are a public company: OAO RUSNANO. But precisely because we engage in non-business activities, we decided to make the situation as transparent as possible and separate everything that is not a business activity off into a non-business form. That is why we have a subsidiary, the Fund for Infrastructure and Educational Programs, which is engaged in educational projects, foresight, standardization, certification, and dozens of other issues that are essential to create an industry. The project can be accomplished: it is not possible to build a RUB 900-billion industry without this component. Let me repeat: we fundamentally separated the business functions of the public company, with the entire set of necessary business procedures and controls, from the non-business functions that are in the Fund that we control.

This structure provides an opportunity to interact not only with applicants from Russia, but also from around the world. Incidentally, we believe that Russia's innovation strategy in general, and in nanotechnology in particular, correctly maintains a balance between new projects based on Russian designs (there are some, and I am very certain that there will be more), and technology transfer—that is, attracting the most modern, most interesting, and the most promising developments from abroad.

You can see on this slide a list of countries that have applied to us for funding. We have a fairly rigorous selection process, and it is universal and uniform for both foreign and Russian applicants. That is why today we are actually carrying out projects with 10 countries. These are countries that are already recognized as innovators, and in the future we intend to intensify cooperation with these countries and to expand the list of our foreign partners. Incidentally, in all these cases, the projects—or at least a large part of the business projects—are still located and being conducted in Russia.

The Russian regions. We are well aware that Russia is not Moscow or, at least, not only Moscow. That is why the list of regions with which we work is very broad—here it is on the slide. There are thirty. There is a large number of regions, and we are going to cooperate with this full list and expand this number further. Although I will say now that we do not believe that Russia's innovation economy will be in every region from Chukotka to Chechnya within five to ten years. This is impossible. In the United States, 50% of high technology is produced in only two states: Massachusetts and California. Period. This is no accident. Now, apparently a competition is unfolding between regions, and we cooperate especially closely with the leaders of regions that firmly grasp this issue and promote work to support innovative business. We see these regions and we are happy to cooperate with them. Not with every region. It is not realistic. This will not happen.

How does the selection process work? We believe that the examination and selection process is the basis for innovative business. Unfortunately, in our country, this has not always worked out so well. That is why we have paid a great deal of attention to our selection process, evaluating both the scientific-technical side and the business side. Moreover, we have 1,967 applications for funding, after the initial evaluation there will be 1,360, and in the next stage, the scientific-technical examination, only 509 of them will remain. Finally, after all that, we have approved 113 projects so far. That proportion—2,000 to 100—we think is

correct, and I do not think it will change radically in the future. As it turns out, that is one project out of twenty. This is a normal proportion. We are not going to relax our requirements and we say it right out: yes, we are interested in financing our applicants, but it is not easy to win financing from us. Often (certainly I am not going to name the places) people just say to us, “We would like to work with you, but why do we need to go through this whole procedure? It would be better if we received Federal Targeted Programme funds quickly or some other funds, why should we cooperate with you? It takes a long time to go through you.”

It is true that it is difficult to go through us. Partly, perhaps, in some ways we over-bureaucratize. This is a problem we have. But on the other hand, we are convinced that the result is qualitatively different, because we do not just provide money. We provide the entire spectrum, ranging from training (in almost any project, training personnel to work in the business is a mandatory element) to the creation of a market for manufactured products. Supporting the establishment of a market is fundamentally important in Russia, as well as supporting technical regulations, including the abolition of state standards or the introduction of new regulations that permit the creation and sale of our nanotechnology products.

In this sense, ours is a total backing of all the components to build these businesses. We are responsible for ensuring that our partners enjoy the most supportive environment from all angles, including the complete elimination of any possible raids—from security officials to gangsters. Our goal is to eliminate such risks, as well as the risks of corruption, which also comes under our responsibility. So, we can see for ourselves a situation where we arrange cooperation with those who went through the long and arduous selection process and ended up amongst the 113 successful projects.

Here are the designated areas in which we work: nano-materials, energy-efficient technology, and medicine and pharmaceuticals. We have already accomplished some things, and we are going to significantly expand our efforts. One extremely promising area is nano-coating. We see here a range from the hardening of

cutting tools to food packaging. Optics and electronics—some of these are well-known, some we will now describe. In short, we are talking about the full spectrum that is traditionally called 'energy efficiency' and 'clean technology'. That is practically all of the nanotechnology in the modern world.

Like I said, we already have financial projects connected not with the building of companies, but with the creation of funds, and they are listed here. These are our venture capital funds or private equity funds.

And there is another type of project, which I will describe in just two words: nanotechnology centres. It is an essential element in the future infrastructure of the nanotechnology industry and business incubators. In our nano-centres, new businesses will be created and supported across the entire spectrum, ranging from business support to the equipment with which our centres are equipped. Here on this slide, four winners are named, but as of today we can add three more winners, and the next competition amongst regions is currently in progress. The competition is tough, the competition amongst regions is tough, but, nevertheless, we believe that at least 10 and possibly 15 nano-centres in the country will form a network from which small and mid-sized businesses can arise, which can grow in the next stage, and we plan to continue supporting them.

The list in its entirety gives us 113 approved projects with a total budget of RUB 381 billion, in which, I note, the share of our co-investors is greater than ours, which is RUB 173 billion. Like I said, we have a minority stake. The flip side of this logic is that without co-investors, we do not engage in a project. We understand that we manage not our money, but others' money—the government's money. In this sense, a co-investor who goes into the project with their own money is for us an additional confirmation that the project is selected wisely and it can really work.

Our companies, as was said, are located throughout the country. Today I will tell you about our major projects: those that have already been commissioned, and those which we want to start up before the end of the year. Some of them we will

try to introduce to you almost in person, by directly contacting our colleagues who are now online in the regions of Russia.

This slide shows a project called 'ECM', which is an electro-chemical processing unit. It is a very interesting technology that has been developed by a strong research school in Ufa which is at least 25–30 years old. It is headed by Professor Zaitsev, and the result is that in Ufa there is now a very active business that allows you to conduct mechanical processing of complex surfaces in 3D silently and without waste products, which simply cannot be processed another way. We believe this area has a promising future, as the factory has started operating, it is developing, and we will support it further, especially as it is competitive not only in Russia but also by world standards.

New Instrumental Solutions, or NIR. I briefly mentioned coating tools, and this is the NIR factory that we are speaking about. Rybinsk. In this factory, ion-plasma spraying enables the coating of cutting tools, drills and power tools, which greatly strengthens the tools, lengthens intervals between re-sharpening, and significantly increases the speed of rotation of the spindle, which, as experts know, is a strategic direction in the development of machine tools. We believe that this project also has a promising future, and we intend to continue to support the already-operating factory in the city of Rybinsk.

The Optogan factory in St. Petersburg is one of our flagship projects, manufacturing LEDs. As you may have heard, they started up last year. We intend to aggressively develop business at Optogan together with our partner, Mikhail Prokhorov. We believe that we are heading in a direction that will open a market measured in billions of US dollars, just in Russia alone. You see here a figure of RUB 14.5 billion. That is the planned revenue for 2015. We believe that this is a minimum figure and we believe that we are able to reach it.

These were commissions in 2010. Now it is 2011, what has been commissioned or will be commissioned soon.

Izhevsk. This is nanotechnology production at the stage of casting and the manufacture of material that provides some very interesting parameters for springs with extensive use for a range of products. At this point, I should stop and give the floor to Vladimir Kutergin, General Director of Pruzhina, which is located in Izhevsk. Please, the floor is yours, tell us about your project.

**V. Kutergin:**

Hello. I represent the management and employees of the Pruzhina scientific-production centre, which was developed by ROSNANO, Uralsib Bank, and the Izhevsk Machine-Building Plant. The Pruzhina scientific-technical centre is a project being implemented to create high-tensile springs used in railroads, automobiles, agricultural machinery, elevators, and so on. Our springs have the unique characteristics of durability, geometric accuracy and high relaxation resistance. The uniqueness of the product lies in the fact that its properties are improved not by 30–50%, but dozens of times, depending on the type of spring. Thus, a railroad spring, even when overloaded by more than 40%, can withstand more than 10 million load cycles without failure. For comparison, springs made based on classical technology can withstand 150,000–200,000 cycles. Another indicator, the relaxation resistance, is improved more than fivefold.

This creates the conditions now to implement requirements that are presented in the concept for railway development: namely, that the service life cycle of the springs must be equal to the entire life cycle of the railcar. For reference, the life cycle of a railcar is 28–30 years. Use of our railroad springs will significantly reduce operating costs and improve traffic safety. The economic effect of their use would be approximately RUB 10 billion in savings per year.

A few words about how to implement our plans. In December, we launched trial production, and in literally just a few days we will launch mass production. Both the production efforts, taken together, will enable the production of around 200,000 springs in a year. By September, we will strive to double the productivity

of these plants, and then another four times. This will allow us to produce springs for around 750,000 automobiles, or 32,000 railcars. Negotiations with Russian Railways and with automobile manufacturers are currently active, and active work is being conducted in the markets. Options for increasing production efficiency are being examined, as well as the introduction of products on European and other markets, and the export of technology. Thank you very much.

**A. Chubais:**

Thank you, Mr Kutergin.

For me, it is important what our General Director just said, almost exactly in the same words as our principal customer, Russian Railways. I spoke with Mr Gapanovich, our partner and Chief Engineer at Russian Railways, and here at the Forum. They are very interested in this product, and we understand that the potential of this product lies not just in the railroads. We envision a potential breadth of use of the springs ranging from automobile springs to small-arms weapons, and we intend to develop this project as widely as possible. By the way, expect a visit. I will be sure to visit you, and we will begin production together. Thanks again.

**V. Kutergin:**

Welcome.

**A. Chubais:**

Thank you. And we move forward. From Izhevsk we will then move on to the Novosibirsk factory, Liotech. I give the floor to General Director Alexander Erokhin. Please.

**A. Erokhin:**

Hello. Can you hear me?

**A. Chubais:**

Yes, we hear you well. You have the floor.

**A. Erokhin:**

Liotech produces high-current lithium-ion batteries. The beginning of production will take place in the third quarter of 2011. Liotech is a joint venture between RUSNANO and the Chinese company Thunder Sky. Our plant will produce lithium-ion batteries with a capacity of 200, 300 and 700 ampere-hours. The main field of application of our products is the rapidly growing market for electric transportation and energy. In the market of electric transportation, we focus primarily on passenger transport, electric buses.

Many cities have now announced the introduction of environmentally friendly electric transportation, and our batteries will help to implement such programmes. By the way, in Russia there are successful case studies of electric transportation using analogues of our batteries. The introduction of electric transportation will significantly improve the environment in our cities, and besides, this is an excellent example of an energy-efficient solution. Operating costs of electric buses are about 5–7 times less than the cost of operating the same bus with an internal combustion engine.

In the power industry, lithium-ion batteries are used to create energy storage, which will significantly improve energy security and the operating efficiency of power-generating facilities and power grids.

There are six main advantages of our lithium-ion batteries. They have no memory effect after many charge–discharge cycles. In electric transportation, they run for 350 kilometres on a single charge for electric buses. They have an operating life of over 600,000 kilometres. Within 20 minutes, our batteries can be recharged to 70% of their capacity. Their cost is several times lower than the cost

of the nearest analogues. The batteries can be used in a wide temperature range: -45 to +85 degrees Celsius. Their reliability is confirmed by practical use and international certifications.

By 2015, our production will be 1,200 megawatt-hours, which will equip more than 5,000 electric buses per year. It is planned that by 2015 the revenues of our project will be RUB 13.1 billion. The volume of investment in our project is more than RUB 13.5 billion. The stake of RUSNANO is RUB 7.59 billion, and the rest of the investment comes from the Chinese company Thunder Sky and loans from Sberbank of Russia.

The Liotech project is a perfect example of technology transfer, particularly with China. A whole cluster of high-tech industries will be created around our production. A technology centre will be created, which will develop and test new materials and new types of rechargeable batteries, where projects of Russian scientists will be developed for commercial purposes. Liotech is a finely-tuned team of professionals that will accomplish the goals set before it. Thank you for your attention.

**A. Chubais:**

Thank you, Alexander. I only want to repeat what has been said. Charging the bus battery in 20 minutes, the number of charge cycles and a complete lack of memory effect—this is a set of parameters that has not been even remotely duplicated to date, at least for bus batteries. This is a unique product, although we believe that its potential market is wider than just buses, which is also significant to us.

Alexander spoke about the cluster. We intend to develop this project in the near future and hope to start building a new factory that will produce material for lithium-ion batteries. The future is very promising. Alexander, how are we doing on deadlines? Are we still okay to start operation in December? Or will we end up starting in the first quarter?

**A. Erokhin:**

We plan to begin manufacturing in December. Little by little, but we will start.

**A. Chubais:**

Let's count on it. If all goes well, I will come visit you. Get ready to begin operation.

**A. Erokhin:**

Absolutely. We will expect you.

**A. Chubais:**

Thank you. That was Novosibirsk. Let's move on. From another region, I give the floor to Alexander Ukhin, from the company Connector Optics, which is located not far from us in St. Petersburg.

**A. Ukhin:**

Good day, ladies and gentlemen. In the autumn of this year, our company Connector Optics will start production in St. Petersburg of vertically-emitting lasers, which are used for ultra-fast data transfer via optical cables. Such lasers are used in supercomputers and data centres, and will be used in devices using next-generation USB standards. Production is located in an area of more than 1,000 square meters, of which about 300 square meters is a clean room.

The main competitive advantage of our lasers is the speed of data transmission. Our innovative laser technology enables data transfer rates of up to 40 gigabytes per second, which is about 2.5 times the speed of lasers that are on the world market today.

The total investment in our project amounts to RUB 1.1 billion, including RUSNANO's stake, which is RUB 770 million. The expected output of our company in 2015 is RUB 2.4 billion, which will allow us to take a global market

share of about 5%. Deliveries are planned both in the Russian market and to foreign companies. To date, we will be the first and only Russian manufacturer of vertically-emitting lasers.

Our company is continuously conducting research and development activities aimed at improving and supporting our products. The goal of such work is to have the capacity that would allow us to advance 3–5 years ahead of the market. To date, Internet use and other means of data transmission have shown a sharp increase in the exchange of information. As was stated at today's Forum, video transmission will be very important. As a result, this will require a continuous growth of data transmission rates, and the market of components based on vertically-emitting lasers is one of the fastest-growing in the world—its growth rate is about 35% per year. This fact and the high performance of our products give our company a chance to occupy a strong position in the market of optical elements based on vertically-emitting lasers. Hopefully, they will enable a new Russian brand to emerge in the market as one of the world's leading manufacturers of high-speed optical components. Thank you very much.

**A. Chubais:**

Thank you, Mr Ukhin. I would like to address what you said. You said that the company is actively engaged in funding research and development, and this is almost a prerequisite for any of our businesses, which I think is of great strategic importance. I keep pushing the fact that we are creating businesses, but at the same time, we understand that our businesses are beginning their own R&D funding.

We calculated that for those companies that are already working here, the actual proportion of the cost of financing research and development is between 5 and 10% of their sales volumes. Experts are well aware that the total amount of R&D spending in our country, including the Academy of Sciences and university research, is quite substantial. The basic problem is that 90% of this funding is

from the treasury. The proportion of 90 to 10 or, according to some figures, 70 to 30, is categorically wrong. Science cannot truly develop unless it receives support from the business community. In this sense, as Mr Ukhin said, by funding research and development, private business is very well aware of what it needs and what it does not need. It understands very well what you need to get as a result of research and development. Business will certainly not under any circumstances order work that will simply sit on the shelf as a thick report. It is very important, and if we imagine that the base figure in 2015 is RUB 900 billion, with the proportions I mentioned, this means RUB 50 or 70 billion. From RUB 50 to 70 billion a year—this is a potential source of funding for research and development in the country as a result of operating those businesses about which we are speaking today.

Thanks again, Mr Ukhin, for your information. We will now move on. From St. Petersburg, we move to Kazan in Tatarstan, which we regard as one of the leaders in innovative industries. In Tatarstan, we have a few projects, like the one you see in the video on the screen. Here is the Director, Viktor Molokin. Please tell us, what is Danaflex?

**V. Molokin:**

Good afternoon to all viewers and listeners. Our project involves the production of flexible packaging by using nanotechnology. As part of this project we started building a new factory in 2009, and in mid-autumn of this year we will run and put into operation the first unit of equipment that will allow us to obtain film with the use of nanotechnology. At this point, the use of such film is very developed in Japan, but they are not manufactured in Russia. At the same time, Russia spends RUB 2 billion annually purchasing film material of this kind. The film which we will manufacture will serve for food packaging, cosmetics, household detergents, and much more.

Thanks to nanotechnology, we can enjoy a number of benefits from using this material. The very first benefit is that it is a barrier, which means that it reduces penetration of oxygen, water and air into the container by a factor of hundreds. And that, as a consequence, allows the product to be stored longer, and it also makes it possible to reduce the use of preservatives in the product. Another benefit is the cost savings of such film in comparison with conventional barrier films that are used today. The savings are about 20–25%. And one more advantage that I must mention is, of course, eco-friendliness. The film we produce can be recycled. Today's traditional film, which includes aluminium foil, unfortunately, cannot be recycled.

The budget of this project is RUB 2.45 billion. In terms of funding, 51% of the budget comes from Danaflex and 49% from RUSNANO. This year, we plan to earn revenue of about RUB 1.5 billion, and according to the plan, our revenue will be RUB 6 billion by 2015, and we will cover about 5% of the Russian market for flexible packaging. Thank you.

**A. Chubais:**

Thank you, Viktor. I would like to draw attention to the fact that, as the General Director said, there is a very significant potential for supplanting imports. At the same time, it is not limited only to the Russian market. Viktor, correct me if I am wrong, but if I remember correctly, you are already supplying packaging for such major brands in the food industry as Mars and Snickers. That is correct, or am I mistaken?

**V. Molokin:**

No, you are not mistaken, this is absolutely accurate. We are working with multinational companies through the Danaflex factory. And with Danaflex-Nano, which you see behind me, we will also work with them as soon as we undergo

the necessary audit. This is scheduled for this year and will be held in the near future.

**A. Chubais:**

As you can imagine, a business that already works with such brands is, without exaggeration, a world-class company. In our project, we intend to move another step forward and add this nano-barrier layer that will significantly increase the technical quality of the product and, of course, open up new markets. Thank you, Viktor.

And we move on. From Kazan, we move to Zelenograd, near Moscow. This is also one of our flagship projects, the industry that is being discussed most actively, electronic components, titled 'Microelectronics'. One of the principal experts in this field in this country, Academician Gennady Krasnikov, will describe one of our key projects. Please, Mr Krasnikov. You have the floor. If, of course, you can hear us. It seems that Mr Krasnikov hears us, but we do not hear him. A minor nano-technological glitch. We know who will be at fault. We will try to fix this until we are able to hear. Now we can hear him.

**G. Krasnikov:**

Production of microchips with 90-nanometre technology is a major project of RUSNANO in the nano- and microelectronics field. To implement this project, we have built new production facilities, increasing the area of clean rooms to 3,500 square meters. To date we have completed 90% of the installation of new equipment, and 150 people have been trained abroad in the most cutting-edge factories worldwide.

In December 2010, we received a test microchip with topology rules of 90 nanometres. The technology's compliance has been confirmed by international expert organizations. We are now at the stage of setting up equipment before

launching mass production, which is scheduled to start in the fourth quarter of this year.

Since the beginning of mass production of microchips on 90-nanometre technology, our production capacity for 200-mm integrated circuits and plates will double. On the demand side, the market outlook for nano-electronics is very positive. Microchips with layout rules of 180 and 90 nanometres are used in telecommunications, smart cards, consumer electronics, and industrial car and aviation electronics.

Today, only nine countries in the world besides Russia are capable of producing at 90 nanometres. In 2010, 17% of all microchips in the world were produced with layout rules of 180 and 90 nanometres, with a sales volume of more than USD 50 billion. We also plan that nearly a quarter of sales from this project will be exports. In the Russian market, we will supply microchips for electronic documents, instrumentation (including smart meters for electricity, water and gas), frequency modification techniques to fight counterfeiting, and microchips for space equipment and for telecommunications, including for GLONASS.

However, today the domestic market for microchips is only 1% of the world market, and for project development in the domestic and global markets, it is very important to have private and public partnership to build demand for microelectronics. Our production also creates a technological ecosystem in Zelenograd. More than 50 companies from 12 countries are involved in our project, and some Western companies have already localized production here in Zelenograd. New design centres have been formed.

In conclusion, I would say that having our own microelectronics technology production ensures the technological security of the state, and establishes its status among the world's leading powers. And thanks to projects such as ours, Russia has a real chance of integration into the global market as a global player in micro- and nano-electronics. Thank you.

## **A. Chubais:**

Thank you. In this project, together with our partners at Sistema, Mr Krasnikov was criticized for the fact that 90 nanometres is not cutting-edge. As is well known by experts, global microelectronics has already reached dimensions of 65, 45, 32 and even 22 nanometres. Nevertheless, one must understand that this country had no such production at all, as no one worked with 90 nanometres in the USSR or in Russia. They worked with 350, and in the best cases with 180. Also, right now at the stage when the project is about to launch mass production, and this will happen later this year, we see new, extremely high-volume markets for the 90-nanometre range.

Yesterday, we signed an agreement with our partners from Sistema and the Perekrestok chain of stores to build a 'store of the future'. Together, we want to break in a new technology based on replacing the traditional bar code with RFID tags. If the technology is good enough, if it will work, if the 'store of the future' and the so-called 'store without a cashier' proves itself, then according to simple calculations, we see a potential volume of demand in Russia amounting to billions of microchips per year. That's just for this kind of technological solution. That's just for retail sales. This is a huge market that does not require 64 or 45 nanometres.

In this sense, I want to support you, Mr Krasnikov. We just need to work together—along with product development, technology, manufacturing—to develop the market. It is almost always the case in innovative businesses that the market is created at the same time as the product itself. Once again, thank you very much, Mr Krasnikov.

As we move forward, we have several more projects. Already without regard to the regions, so as not to overwhelm you, I would like to just list them.

Novosibirsk Region, the San project, many have heard about it. Unique 3D printing on almost all types of material. Printing on glass, printing on wood, printing on marble, printing on stone, printing on plastic—it is a very interesting

product. You can look at samples of this work at our booth. This is a business created by our Novosibirsk colleagues, and we believe it is very serious and promising not only in terms of the Russian potential, but also in terms of exports. By the way, at RUSNANO we have installed glass on much of the premises with San printing. It looks great, in my opinion. The next step is printed electronics, which will enable printing on ready-made electronic circuits. This is also a direction in which we want to move forward. Pay attention to the number RUB 5.9 billion. Two hundred million in future sales in 2015, this is quite an impressive number.

Uralplastic-N is a company that is very close to Danaflex. The factory has been commissioned and is operating in the Sverdlovsk Region. It is also engaged in production of packaging, differing somewhat from the product packaging line from Danaflex, but at the same time partially in competition with it. And this is part of our policy. We are, in some cases, going to support two or maybe even three projects in the same area, because we believe the development of competition is the way to go, rather than an artificial strangulation of one in favour of others. In this sense, we wish good luck to both Uralplastic-N and Danaflex. We will continue to support both of these businesses in the future.

Another example is the company RMT, which recently started up in Moscow. This is what is called electric heat. This is the unique process of direct conversion of electricity into heat and heat into electricity. Experts know that the problem of cooling in modern microelectronics is very complex and very challenging. The developers of the RMT project managed to work out a solution in the microchip itself, enabling heat transfer at the micro level with a temperature difference of 70–80 degrees Celsius between the two plates. It is a very promising technology, again, with an impressive export volume that is not restricted to just the Russian market.

Novomoskovsk – this is 'Germanium and applications'. We believe germanium is a very promising material. This is the basis for optics, including night-vision

optics, and the scope of applications is fairly clear. Unfortunately, the demand in Russia today is low, and 80% of it is exported. But we are certain that we can convince our Russian colleagues to work in this area. We have much to offer, especially now that the product is in demand around the world.

A large proportion of the sales goes to the United States, against which we have claims for discriminatory decisions in relation to Russia's innovative products. These claims were expressed directly to the Vice-President of the United States, and I want to again publicly declare them. They have not been withdrawn. We consider that the decisions operating in the United States against imports of Russian dual-use goods are discriminatory, and insist that decisions are adopted to ensure equal access of Russian goods together with other goods of the same class.

Another example is IRE-Polus. This is an opposite case, also unique. IPJ Photonics is well known to experts, as it is a world leader in laser construction. The company was founded by a Russian scientist, Professor Gapontsev, and over the past year and a half it has experienced fantastic growth in capitalization, and I think is now somewhere around USD 3 million. This is our partner, with whom we will return the technology to Russia, returning it to Fryazino, where, incidentally, the laser was invented. I recall when the Soviet Academicians Prokhorov and Basov received the Nobel Prize for their discovery. Now we are returning this business to Russia. Recently, I had a serious discussion with Professor Gapontsev about business strategy. We will build new capacity in Fryazino, and we are convinced that it is no coincidence that this product is returning to Russia, as it was invented here. Here we have the usual story: we invented it and it was built in the West. In this case, we want to finally reverse this trend. And to ensure that we produce and capitalize on the ideas that were born in this country. RUB 9 billion for IRE-Polus in 2015—this is quite serious and very real.

Galileo Nanotech is another project in the area that I have already mentioned: RFID tags, radio frequency identification. I said that it would work in the retail trade, but not only there. In radio frequency identification, we see dozens of applications: ranging from mail and parcels, to access systems for closed sites and highway toll stations, as well as dozens of other industries.

We will approach the subject of RFID from different sides, the subject of radio frequency identification. We are developing the Galileo project in conjunction with the Italians in Khotkovo, and we are confident in its promising strategic outlook in our country and abroad.

Bryansk Region, Karachev, Metaclay. It seems to not be the most innovative area today, but colleagues, be prepared for changes. We know that many regions of Russia are now perceived with some scepticism: "What can they do, it's not Moscow, not St. Petersburg." No, dear Muscovites and Petersburgers, my countrymen, these are very 'dangerous' people. We are deeply convinced of this now and see how the redistribution between the regions is beginning. And those who yesterday were considered obviously rich, promising, and strategic may suddenly discover after 5 to 10 years that they have been already left in the dust. We consider the project being developed by Metaclay in the Bryansk Region very promising: nano-silicates, nano-clay, master batches. Russia needs to work, work and work some more in this area. This step is likely the first in this direction. We are happy to support it.

Another St. Petersburg project is dedicated to radio frequency identification. As already said, we believe that this area has very wide range of applications, and we are now beginning to approach the first industry proposals. Optosense makes flammable-gas detectors. These are unique sensors that allow detection of gas, including explosive gas, in ultra-low concentrations. Moreover, the technology was born here in St. Petersburg, and the scope of its potential is not only for professionals, but also around the house. Incidentally, we have actual products here at the booth. Come and look, I think you'll like it.

Virial produces wear-resistant products made of metal ceramics. Metal ceramics is another area with very good prospects for metal-cutting equipment. This is common knowledge, but for a long time, making a functioning business out of it has not worked out. In this case we are talking about a business already working here in St. Petersburg that will have sales of USD 100 million in 2015. We are confident of this.

Another example is the Advanced Technologies Center. This refers to a measurement technique, an ultra-high resolution microscope for metrology in nanotechnology. This industry attracts some of our attention, and we have an entire Metrology Centre that has a very promising outlook. Prepreg-SKM. I could probably talk about this project for a very long time, or even make a separate presentation. I'll try to speak briefly, and describe the most important elements. We are convinced that today, in some cases, nanotechnology is breaking into the most traditional and seemingly completely inviolable areas, beginning to replace base materials.

Two figures from the field of aviation manufacturing: the percentage of nanocomposite materials in the Boeing 777 is 12%, and the percentage in the most recent Boeing 787 Dreamliner is 52%. We are absolutely convinced that the substitution of aluminium, and possibly titanium, in the aircraft industry has already occurred. This means that we face a simple and harsh dilemma in Russia. Either we will soon create a nanomaterial industry for the country's aviation manufacturing, or we will lose aviation manufacturing. In 10 years, an aircraft made of aluminium and titanium will be uncompetitive. That is obvious. That is why, along with Prepreg, we are actively cooperating with UAC, and believe that what Mr Pogosyan is doing is very promising. Congratulations again on the fact that a Forum delegation arrived here on a Sukhoi Superjet. We intend to provide material corresponding to all modern requirements for the Sukhoi Superjet and Russian combat aircraft.

Prepreg is not just involved in aviation, and not just in a wide scope of 'high' applications, but also in such a possibly unexpected industry as construction and repair of engineering structures. Today, Prepreg has proved that it is not necessary to use traditional technology—involving complete dismantling of a bridge and rebuilding from scratch—to repair most ordinary Russian village bridges, with a length of 10–20–30 meters that extend over small streams (of which there are hundreds of thousands in Russia, and most of which, unfortunately, are in poor or critical condition). Instead, good technology using nano-composite materials is sufficient, where a layer of tissue is simply applied by three workers on the corresponding surface of the bridge. This restores sufficient load capacity that the bridge can operate for another ten years.

We are confident that nano-composite materials will be used in aviation, maintenance of engineering structures, and construction—ranging from high-rise housing to road construction, shipbuilding, and automotive manufacturing. A few days ago, BMW announced an ambitious programme to transition to nano-composite materials in their products. It is absolutely clear that nano-composite materials are replacing basic construction materials. And we believe what Prepreg is doing today is promising, and we will actively support this work further, especially since the volumes are substantial—RUB 20 billion in 2015.

We have listed the projects that have already been developed into active companies, or that will be in the coming months. This means that products are and will be on the market. This means that it is possible, so to speak, to touch, despite their small size, nano-metric base components. Here are the most relevant results the company has had to date, which we call the '13+'. This means that we have created more than 13 new companies. This can all be measured in monetary terms with the following figures.

Last year, the production of nano-products in Russia was but RUB 1 billion. From this one billion, we will have to grow to 900 in 2015. And this year, it will be 25, that is, we will have grown by a factor of 25. Next, we will have to move, maybe

not as fast; the pace cannot be measured in percentages but in times or dozens of times in order to achieve the objective with which I started, and with which I will conclude. This objective is called 'Russian nano-industry: RUB 900 billion in 2015.' Thank you very much.

**A. Trapeznikov:**

I think we still have just a few minutes to answer questions. There are questions, yes? Please.

**A. Chubais:**

Take the microphone, or they will not hear us on the Internet.

**From the audience:**

Hello. You raised a very important issue of business innovation—evaluation. Will a market for patents be established in Russia, and will a patent become an element of a bank security in Russia?

**A. Chubais:**

This is a very serious topic. I have to say I totally disagree with the nascent concept that the patent protection of intellectual property is outdated and that it is necessary to abandon it. I think this is wrong. On the contrary, I believe that the development of intellectual property protection is progressing correctly, including, incidentally, Part IV of the Civil Code, and patent agents, and the law that we just recently discussed. We want to develop this area.

Answering your question directly, yes, I believe that a patent may and should be used as a security. Well-protected intellectual property is as much an asset as an intangible asset, and we need to get used to the fact that it may be used as a security. And we, by the way, are already structuring some of our business plans like this already. We are attempting to begin to do this even with all of the

difficulties and shortcomings of the Russian system of intellectual property protection.

**From the audience:**

It is a gigantic task that RUSNANO has taken and all that we've seen is genuinely very impressive. My question is about your exit options. Since you were behaving as a private equity partner in most of these projects how would you really manage an exit? Because the whole industry is new, investors are few. Strategic buyout will be difficult. IPOs?.. I don't know whether the Russian funds market is really prepared to invest in highly technically complicated projects, most of which you have demonstrated. So, how would you find an exit at all for your investments?

**A. Chubais:**

Thanks, I understand. I would like to introduce my colleague, the asker of the question, who is one of the most respected experts in aviation manufacturing in India, a man with unique authority and unique potential behind him. He asks a question, knowing full well what he is asking about. I remember when I was at your company, and what I saw there made a very strong impression on me. The question is absolutely relevant, and to be honest, we are now at the stage when we ask this exact question of ourselves. We currently do not have any exits yet. I told you just about the factories commissioned, and it is clear that to enter the market before commission is senseless. It is necessary to increase capacity at least to an acceptable level, and we are counting on multiple returns.

However, in principle, what is our strategy, what are we focusing on? There are several.

Strategy number one. We see a situation where our partners or management companies, together with partners in the company, are ready to initiate a management buyout, and we would support such an arrangement. I already

noted that our partners keep control, we have a minority share, and if our partners are ready to buy us out, then it is completely acceptable logic.

Second: You talked about the difficulties of IPOs for innovative companies, and you're right. But, nevertheless, in a joint effort, we recently created a special platform for the IPOs of innovative companies in Russia. It is called the RII MICEX. We proudly call it the 'Russian NASDAQ'. Of course, it still has not reached that level, but, nevertheless, strategically this is exactly what is intended. Together with our partners, we created an innovative platform on the MICEX with greatly simplified procedures. To date, around 15 first IPOs have been conducted using that platform. This includes very interesting IPOs by the Human Stem Cell Institute and some other companies that have very good prospects. This platform will be developed, which means for us that a potential IPO is also an exit strategy. This is the second method of solving the problem.

A third way to solve the problem includes the Indian strategy. We are ready to discuss such options, of course, for those businesses that are interesting to you. We are completely open. Once again, we will be sure to exit from our projects, and that is why the topic for us is very interesting. We are ready to discuss it both as a matter of approaches in principle, and in an absolutely practical applied way.

**From the audience:**

One more thing that I wanted to ask. You have converted your enterprise, which was a government enterprise, into a limited company. Should that be taken as a sign of RUSNANO, being a holding corporation of a number of very different companies, thinking of really going out into either NASDAQ or any of the US or Hong Kong stock markets or even Bangladesh or Bombay? Because these markets are also coming up with a lot of funding development.

**A. Chubais:**

As I understand it, the subject of the question is a potential IPO of RUSNANO itself. Not an exit of RUSNANO from our project companies, but what will happen to RUSNANO itself. You are absolutely right, we have reorganized into a public company and, of course, we did this not by chance. First, every partner worldwide understands what a public company is. What is a state corporation, I personally do not really understand and I unfortunately cannot explain what it is, as I just do not have enough knowledge about it. This is only the first step. Of course, strategically, we think about this option. The question can be posed either about the issuing of a small amount of additional shares of RUSNANO on public trading platforms or about the sale of state ownership in RUSNANO. I say this hypothetically. There is no such solution yet, but in principle, we believe it possible. Another thing is that it is sensible to do this when we already have track records with the exit strategies of our projects, we have demonstrated proceeds from the exits, and when we have shown our ability to earn money. In this sense, what do we sell? We will sell our skills to create innovative businesses. That is the essence of what we offer our partners in this case. We are considering this option for ourselves.

**A. Trapeznikov:**

Thank you, colleagues. The organizers are telling me that the next session is already waiting outside the door, unfortunately. So, thank you for your attention.

**A. Chubais:**

Thank you.