Sverkhnovaya Realnost' [July-09]

Readers of this article should get a June-2008 copy of "Sverkhnovaya Realnost" magazine to get a full understanding of a major opportunity for Russia in the area of nanotechnology and creating high tech jobs. The magazine is available to order from "Sverkhnovaya Realnost" headquarters or readers can get a copy of the article in English or Russian at: http://www.rense.com/general82/karl.htm

C.K: Hello Mr. Schwarz, as the Sverkhnovaya Realnost article [June 2008 issue] is just now available to readers, and there have been developments since that article was completed, the following questions are a follow up to that story. As I have developed this article with you it is apparent to me that nanotechnology has the promise of changing many things in this world for the better. Do you think that is a fair assessment to draw?
K.S: Yes, and for many reasons there are changes coming that literally are not possible with current technology. This is an exciting new field but the biggest excitement to me is the absolute need to ponder the future, assess and find a way to get from "today" Point A to that "future" Point B. Everything is a process but nanotechnology is a process unlike any other.

C.K: In the June article in Sverkhnovaya Realnost, you said that this science could fundamentally change the *status quo* on this planet as we know it today. Is that accurate?
K.S: Yes, very accurate. One of my favorite cartoons in America is called "Shoe" and is about a sharp-eyed hawk and a wise owl running a newspaper publication from a tree and a desk sitting on a limb of the tree. My favorite one was about *Status Quo*. The journalist hawk was looking that phrase up, "*status quo, Latin for the mess we are in*." I think most rational minds know this planet is in a very big mess right now.
It is not that our Earth cannot sustain say 6, 10 or 15 billion people. What is clear is our species cannot sustain itself doing things as they are being done now. What we are doing now and how we are doing it is failing in major ways. Our *current status quo* is failing.

C.K: When the June article for Sverkhnovaya Realnost had been completed and was in final edit for publication, you made the comment that only the scientists of Novosibirsk had responded to your offer to collaborate with Russia. Has there been any change in that status?
K.S: Yes, we have been in contact with Rosnanotech and they expressed their desire to work with our company on this matter for Russia and what we are doing in Austria and Slovakia. Austria and Russia have also commenced discussions about high tech collaboration and we are involved in that from the Austria side. We are also meeting soon with the governments and scientists of Ukraine, Malaysia and Indonesia about long-term collaboration. Many countries intend to work with us, especially in view of the global financial recession.

C.K: That seems to be a very positive step forward.
K.S: I believe it is. I had suspected that being a new entity Rosnanotech was dealing with some internal organizational matters so they could get it operational and moving forward. That seems to be the case and we look forward to meeting soon with Rosnanotech and representatives of the Russian Academy of Sciences, as well as with others. We are past all R & D phases, and upon elaboration of all details with EIB, we'll need a mass personnel hiring. Our project may be interesting to those countries which aim at creation of more jobs, not mere development of science. What is clear is that Russia is now putting a major emphasis on nanotechnology and that logically must lead to more new jobs.

Many nations are talking a lot about nanotechnology but fundamentally not doing anything worthwhile in turning their talk into actions. I think Russia is very close to putting the words into some significant actions.

C.K: Will this 6 months delay in Russia affect whether the projects are located here?
K.S: Only in the fact that we have to roll out the spin offs as we increase production as the two are directly tied to each other. It might cause our board to move Russia to third slot rather than second in our overall plans. That is being evaluated right now as we go through the Rosnanotech process. We are not a R&D project, these projects are ready to go now and the output capacity and merging that into the finished products has to stay on schedule.

C.K: What affect will lack of World Trade Organization status have on your business plans for Russia?
K.S. Actually, it will have no effect whatsoever. I am quite aware of how WTO and their Western masters use the WTO status as a carrot and stick approach to get their way.
There are many ways for a multinational high technology company to go around such bureaucratic obstacles. Our operations in Austria and Slovakia collaborating directly with Russia and its many scientists are one such way.

C.K: What would the plants in Russia produce in the way of finished products, if located in Russia?
K.S: For example, in Kirov we plan to have a nanofilter plant that would be making a wide range of highly specialized filters for home, industry, medical, and environmental.

C.K: We heard recently that your company is now involved in a major environmental project in the EU. Is that accurate?
K.S: Yes, we were approached by a group that has secured a major funding commitment from the EU to address pollution, environmental and other problems in an entire river drainage basin. That is the Tisza River and involves parts of Slovakia, Hungary, Serbia, Romania and Ukraine. There is a much larger project in the works for the entire Danube River basin and would involve the same principals and nanotechnology applications.

C.K: What type of technologies would your company be providing for that project?
K.S: Environmental mitigation, nanofilters for air, water and industrial, geothermal heat sinks, alternative energy systems, and even extending into new types of self-sustaining housing, new types of cellular applications and wi-fi to make up for areas that have serious infrastructure deficiencies or total lack of say clean water, energy and good housing.
Also we aim at creation of new, super strong materials, very lightweight, very strong, with properties unlike what is used today for housing.

C.K: Could some of these applications be made in Russia?
K.S.: Yes, the environmental filters are part of what would be made in Kirov. The type of carbon composites could be made at one of several locations and then converted into new types of very strong, very easy to ship housing. There is a huge need in many parts of the world for the types of activities that the river basin environmental project will be addressing.

C.K: What other types of plants and finished products for Russia ?
K.S: In Kazan it would be possible to put an aerospace operation that is focused on helicopters and provide advanced components for next generation helicopters. In Moscow we see two possibilities that would include aerospace to further next generation commercial airliners and the R&D and

machining needed for these next generation machines. Since Russia is now involved with Airbus, there are multiple possibilities to put special component plants around Russia in areas that can produce the finished products needed for jet airplanes, and automobile industry too.

C.K: What type of operations do you foresee for Sankt-Peterburg?
K.S: It could be one of several. The recent initiatives put forth by then President Putin have many automakers looking at that area and there are many ways to apply this science to the cars of the future from power plants to automobile bodies, paints, and new types of polymers.

C.K: What type of site is needed for a primary Carbon Nanostructure plant?
K.S: Ocean ports are the first logical choice due to the tonnages involved in ethylene and other required materials. We think Black Sea and Pacific Ocean ports are the best places to look for these larger plants. We could consider inland locations if ethylene is readily available in those areas and can meet the specifications we need on what is our primary feed stock to make the carbon nanotubes and carbon nanofibers.
We were recently advised by a LUKOIL subsidiary that they plan a new gas-concentrate ethylene cracker in Russia and if it can meet our specifications much of that ethylene would be headed to our nanotechnology facilities.

C.K: You have hinted at the difference in current technology and nanotechnology. Could you elaborate on that for our readers?
K.S: Yes, that is easy to state. The Industrial Revolution started off with high employment, pretty much what I call “dumb technology” compared to today. Over time automation and global competition has changed the nature of the employment that such industries can sustain. Those industry sectors are producing more output with fewer employees and they are now heavily impacted by global competition.
The IT revolution started off as high employment levels but has also been affected by automation and even moving jobs from high wage areas to low wage areas to produce cheaper. That is part of what is creating such economic dislocations in the United States and Canada right now where high paying jobs are being lost and exported to low paying areas.
Nanotechnology is such that automation is extremely difficult to impossible to do with what is available now. Also, the skills needed are not low wage skills so what is happening is high skill, higher paying jobs are being created and the demand for such skills will increase to huge proportions in the coming years.
This sector requires very high skill levels and due to lack of automation abilities, now or maybe forever, nanotechnology is going to create tens of millions of desperately needed high paying jobs. Where other industries are waning and producing less in terms of GDP or gross domestic product, nanotechnology is going to fill that slot in the coming years.

C.K: That must be the underlying reason why so many nations are maneuvering for domination in certain sectors of nanotechnology.
K.S: That is exactly what some are trying to do, most noticeably the US and UK. They are trying to devise all sorts of new policies to assure they can dominate nanotechnology, blocking certain technologies for other countries, not allowing the rest be competitive.

C.K: In our previous discussions you have indicated that your company will be putting the carbon nanostructures plant in Slovakia, the R&D Center and your headquarters and nanomachine group in Austria. Do you envision that an R&D Center in Moscow might be in the future?

K.S: If Rosnanotech and the Russian Academy of Sciences wish to collaborate with us across the board that would certainly be a possibility. We have more directed R&D projects right now than scientists to fill the slots.

C.K: Is it accurate to say that you see a need for the many scientific and mathematical minds Russia has?
K.S: Yes, we realized years ago what the sheer demands are for brains and talent in nanotechnology. For example, Slovakia has about 300 scientists who specialize in nanotechnology. Our first CNS plant will have 4,330 employees so we will have to find and recruit talent from elsewhere to staff that plant. Same applies to Austria. We cannot brain drain every high tech company and educational center they have and not harm other areas of their economy. As part of our agreements with those two nations, we will be bringing in many foreigners, training them just to operate this first CNS plant and they will have to fund specific training programs to increase the skills within their own nations in this science.

C.K: Is it accurate to say that you see the talent needed in Russia, Ukraine and other nations?
K.S: Yes, but as I said in the June 2008 SNR article, not as a means to brain drain Russia of its talent. One of the least known features of our first main plant is we will be rotating at least 200 scientists per year out of production and into our R&D Center. Once they learn how to make this science at the building block level, we want them to then apply that knowledge and their training at the R&D level to create more opportunities.
Therefore, if we had say 600 key scientists and technicians from Russia as part of the Slovakia production operations, all of them would be rotated out of production and into R&D within several years. Those people could then be reassigned to the Austria R&D Center and a Russia based R&D Center.

C.K: Boeing recently announced that they are using carbon nanotechnology on their new 787 Dream Liner, can you elaborate on that for our readers?
K.S: Certainly, they are using carbon nanofibers in certain components of the wings to make them both stronger and lighter. I think if the matter was looked at closely they are actually using carbon fibers like are used in automobile tires, not carbon nanofibers literally. China wanted our technology due to the new Airbus A320 FAL that is being built in Tianjin China right now. Since Russia has signed a major agreement with Airbus the same reasons China wanted our technology could now apply to Airbus manufacturing in Russia. While our approach to that same application is not the same as Boeing.

C.K: In the last article we discussed new types of carbon composites that would be much stronger than most metals. Are uses for airplanes and automobiles considered as some of their applications?
K.S: Yes, we have been in discussions with many potential co-producers on such new types of composites. We are also pushing into some areas of R&D that potentially would change how airplanes and automobile bodies would be made. Those same new materials can be used in many ways, cell phones for example and extremely strong, lightweight housing for the third world, etc.

C.K: Getting back to Kirov as an example. Would the actual filter material be made in Kirov or just the filters in final form for the global markets?
K.S: Initially the fabric base of those nanofilters would be made with a production partner in the Czech Republic. The nanotech application part of it would be done by our scientists working with that company. That is a step in the process where we take the high purity CNT and modify them to

be applied to that fabric. The finished bolts of fabric would then be shipped to Kirov to be cut and assembled into the final form of the filters.
If we build a major CNT production plant at say Novorossikyi, the CNT modification and application to the fabric could then be moved to Russia and produce even more jobs.
There is no need to replicate the plant and machine that makes the fabric. It is what we do to that fabric that makes it unique. Those machines cost about €47,000,000 each not including the price for land, building, feed stock for the plant and the staff to run it 24 hours a day.

C.K: So you are already pulling together teams that are needed to produce these new types of products enhanced by nanotechnology.
K.S: Yes, we cannot take on building every component of the value chain. That is what excited the European Investment Bank about our technology. It will reach many levels into the EU economy to produce many opportunities that only exist due to this new science. We are like a major anchor tenant in a shopping mall. Once the major tenant is there and generates traffic (nanotechnology opportunities) then the smaller operations are much needed for the general development of finished products. We cannot take on the entire value chain ourselves and remain competitive and meet our expansion targets.

C.K: Referring to these proposed operations in Russia, would you use existing buildings by renovating them or build new facilities from the ground up?
K.S: That would depend much on what is available. If there are existing facilities that are suitable for renovation and do not have some dangerous environmental legacy that is harmful to the employees, renovation of existing buildings is a possibility. In some instances the nature of the processes are such that the only way to efficiently do it is to design and build a new facility.

C.K: Do you foresee that Russian partners might be involved with your company in this effort?
K.S: That is a definite possibly in three possible areas. If there are existing facilities that are suitable we may well be working with that owner or possibly a bank or investment fund that owns a defaulted or non-performing asset. The second way would be to meet with various Russian producers and work out the same types of co-production arrangements we have on the nanofilter fabric and other types of applications. The third possibility might be to engage with certain Russian investors. I have little desire to take on debt, and our plans provide strict discharging of debts.

C.K: Could some of these technology spin-offs wind up being traded on the Russian stock exchange?
K.S: That is a possibility and if not there, it will be in Germany or Switzerland. It will be a long time before Wall Street gets any of my business. I think as the Russian economy continues to grow in this and other sectors, listing some of these spin offs in Russia might be a good way to address the growth needs for those spin offs.

C.K: It is going to be interesting to watch all of this play out. Seems your background in architecture /engineering, Wall Street, telecoms and now nanotechnology have been helping you to acquire the skills necessary to be effective at what you do now.
K.S: I think that is accurate, and yes, it will be interesting to watch all of this play out. The real battle for mankind’s future is just beginning. The mission is going to be whether mankind wants more of the same we have seen over the past hundred years or does mankind want to move up the ladder to a higher level. Neither you nor I can control that but we will put the options and solutions on the table and let the people of Earth decide which way they want to go.

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The following are translations of Russian text that were inserted in the Russian magazine version.

Insert 1 - Fractals, Top of Page 44 and 45
of the Russian version PDF available on Rense.com.

“One of the laws of nanoworld's formation is fractality- similarity of separate parts to the whole object, fractal. So named this phenomenon American mathematician B. Mandelbrot born in France. In 1982 he wrote the book "Fractal geometry of nature" where he systematized all available info on fractals. Fractals are used in information theory for graphical data compression. Adding into fractals formulae occasional perturbances, they get stochastic fractals used in 3D factures. In radio-electronics they create antennae having a fractal form giving better reception with lesser surface. Fractals are also used for description of curvatures of currency rates fluctuations. On the illustration you may see the fractal showing Mandelbrot's multitude/universe (1- initial stage, 2- developed), its variety consists of infinite quantity of recurring figures. The most impressive pattern in the center is a cardioide. By enlarging this figure, more and more small details will appear with a tinier cardeoids- until infinity...”

Insert 2, bottom of Pages 44, 45, 46 and 47.
General commentary on nanotechnology by Gleb Sorokin named:

Perspectives of nanotechnologies in Russia

“In the middle of the twentieth century physics was popular and fashionable science. The nuclear shields of two opposing powers were forged by scientists, the physics departments of universities in the entire world noted an increase of students many times. With the disintegration of the Soviet Union domestic science here postponed her race, and competitors went in the development of technologies further.

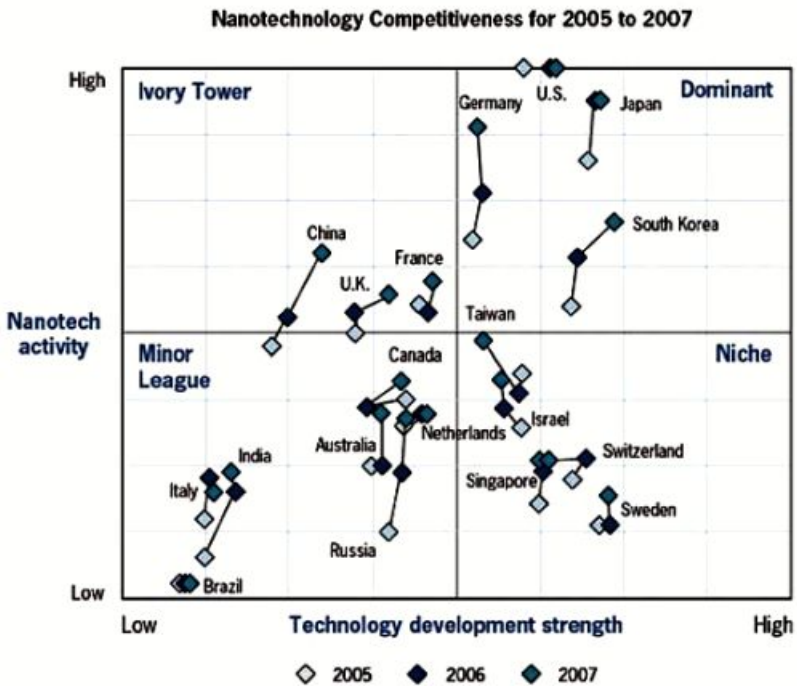
Stormy economic growth in the nineties, caused by computerization and development of high technologies, forms the new standards of quality of life. Valuable and safe existence now is connected with the developed ecology, medicine and public health, also counting Internet, mobile communication, economical automobiles and the like. Aiming at “science for the man”, humanity reaches new development stage of science and technologies, named nano-technology era.

“Nano” concept claimed to appear about 10 years ago. Then in 2000 the USA declared National nano-technological initiative, special committee coordinating works on nano-technologies in 12 largest branches of industry and armed forces, was created by the President. The interest attracted to the nano-technologies is clear: the materials, whose basis compose structures and elements of nanometer scale, possess unique properties and colossal prospects for practical applications. Almost immediately with a similar initiative came out Japan, China and countries of Europe. Everywhere a study in the nano branches obtained state priority and generous financing.

And the forms of the organization of scientific community for these purposes is identical worldwide. In Japan- on the base of the ministries of education, culture, sport, science and technology nano-technological research network was created. In China - Chinese nano-technological center, which unites all universities and laboratories occupied by nano R&D. In Europe nano-tech research and development is conducted in over 50 labs, financed both by the national, and international programs.

As it happens in Russia, all new comes to us with a certain delay. As our answer to the West, the state corporation Rosnanotekh was founded by the federal law on July 19, 2007, and it became one of several strategic state corporations in Russia, after Gazprom, Rosneft, banks VTB and VEB, Olimpstroy etc. In the near future we expect creation of national nano-technological network. Experts argue about the effectiveness of the state corporations and express doubts about their legislatively fixed non-controllability to the government. Indeed under the actual Russian flowering corruption, any good idea may go astray to nothing. Naturally arise big doubts about expediency of creation of that large monster Rosnanotekh. Indeed in the hands of the managing board colossal financial resources are concentrated, and only then they are meant to be converted into technologies. We know anecdotes which illustrate the agonizing birth of nano-industry in our country: Nano-technology is supposed to be the technology of the cutting of Federal Budget, the means are allocated subject to mutual illegal share of the funds by involved parties. With such an approach, nano-technology risks to be defamed, without even being implemented too far. Nevertheless, the very word “nano” promoted at the state level, already brings commercial income based on fanthom: so called “nanocosmetic”, nanomedicine etc. How real in fact are nano-technologies in Russia? Are there any prospects for symbiosis of science and bureaucracy, represented by Rosnanotekh? First, some numbers on the investments volumes into nano-technology.

In 2004 the world economy invested in them $8,6 billion, in 2006 - $12 billion. In average, 3-4 consumer goods based on nano tech appear each week. The sales of goods produced with the application of nano-technologies, in 2006 comprised $50 billion. As LUX research org (USA) claims, Russia plays on the Nano world market for “young leagues”, next to Brazil and India.



In order to enter the dominating zone of the USA, Japan, Germany and South Korea, Russia must keep the highest pace and rate. Whether we near the leaders, depends not only and even not so much on the capacities of money investments into RNT, as on the skills to effectively arrange these money.

The criteria of proper selection and financing of developments which will bring profit in future, remains on agenda. How will officials and high managers of the corporation do that ? Are they financially honest ?. Besides the generous financing for the technological progress, proper scientific base is needed. But science still suffers here from the continuing brain drain, which damages it for many years…

In spite of all difficulties, prospects for nano-technologies in Russia undoubtedly exist. The large number of labs and whole scientific institutes conduct nano-tech research and developments for decades through, such as the laboratory of the perspective carbon materials of Moscow University, doing studies of different carbon materials, Taganrog Uni et al. We have strong material base in the area of the atomic-forced microscopy, near to other countries. Some technologies are implemented into production, slowly but surely. We have only to hope that our state nano undertakings will not end with creation of the RNT and allocation and realization of budget funds. Our science badly needs a push for development. Let us see."

Author: Gleb Sorokin

Insert 3, bottom of Page 47:

Excerpt from Russian newspaper "Knowledge=Power" Nr. 21 dd May 2009, regarding Rosnanotech, the Russian Corporation of Nanotechnologies, and its current director Anatoly Chubais.

First "successes" of the state corporation "Rosnanotech". Chubais invented the New Nano...

Yuri A. Lisovsky

"In his interview at the nano-technological forum in Houston Chubais appointed in 2007 the head of the state corporation "Rosnanotech", further claimed: "The logic of our business is such: we do not present projects, but, on the contrary, we inquire and look for projects, we ask them to come to us with the enquiries to implement the available projects. This is a special feature of our business. Our main task is not so much to tell what we are doing, as to as obtain new projects".
In other words, what Chubais does, is not the development of innovation process, but general search for foreign orders by a subcontractor who works in the country with the cheap and unprotected working force - in Russia. It is obvious that in the case of a successful completion of work, the owner of results will be the precisely foreign customer who realizes them in his own country.
No discussions about any complex organization of high-tech production in Russia, with such a specific attitude, at the best, the issue is about primary processing of raw materials or creation of ecologically dirty production...

The aggravated lack on professional cadres in the country, caused by the non-stop mass emigration of specialists, prevents the conversion of the economy to the innovative way of development. Even Chubais admits: only in the Silicon Valley (USA) more than 40 thousand Russian-speaking scientists live and work. Yet his comments on the matter seem strange: “these are colossal resource and colossal value for the country”. The natural question arises in this connection: for what country, Mr. Chubais?...”