ST. PETERSBURG INTERNATIONAL ECONOMIC FORUM

JUNE 21–23, 2012

Securing the Future
INTERNATIONAL GLOBAL ENERGY AWARD

JUNE 21, 2012 — 10:00–10:45, Pavilion 7, Hall 7.1

St. Petersburg, Russia

2012

E. Goloshov:

Good afternoon, dear friends! We are indeed the champions. That is to say, Maria Khromova...

M. Khromova:

...and Egor Goloshov, the winners of the nationwide Energy of Adventure project, which was established and made a reality by the non-profit Global Energy partnership.

E. Goloshov:

The idea behind this new project from Global Energy is for young researchers to familiarize themselves with energy-saving and energy-efficient solutions in other countries, and to share this valuable experience with the general public.

M. Khromova:

From the start of our round-the-world trip here in St. Petersburg, we will upload the most interesting daily highlights from the next two months to our video blog and social network accounts.

E. Goloshov:

So it was no accident that Queen's wonderful song *We Are The Champions* was chosen to open the award ceremony for the international Global Energy Prize.

M. Khromova:

It was certainly no coincidence, Egor. What else could we call the winners of the Global Energy Prize in an Olympic year? They are the victors in an extremely tough competition. Over 1,600 scientists from 49 countries took part. The International Award Committee reviewed about a hundred applications and selected the winners by secret ballot.

E. Goloshov:

Maria, we are talking a great deal about how things are not coincidental. And it was no coincidence that it was this year that saw Global Energy commence a new project, Energy of Adventure. This is the tenth year that the Global Energy Prize is being awarded.

M. Khromova:

That is right. Almost ten years ago, in 2003, Russian President Vladimir Putin awarded the first-ever Global Energy Prize in the Constantine Palace.

E. Goloshov:

Today, Global Energy is rightly proud of its 27 winners, hailing from nine countries. Maria, can you remember who our first laureates were?

M. Khromova:

Of course. That is already part of our history. Dr. Ian Douglas Smith from the USA and Academician Gennady Mesyats from Russia received the prize for research and development in the field of powerful pulse energy. Dr. Nick Holonyak, also from the USA, received the prize for his invention of the first light-emitting diodes.

E. Goloshov:

Light-emitting diodes are now used everywhere: from cars and traffic lights to medicine, billboards, and telecommunications. This path from invention to everyday use is a familiar one for many of the accomplishments recognized by the Global Energy Prize. Is ten years a long time or not? Let us see. Have a look at the screen.

<video clip>

T. Sigfusson:

The Global Energy Concept means that our world is interwoven with energy; and knowledge of energy is able to move mountains.

B. Spalding:

Global energy is a large continent.

O. Favorsky:

Global energy is what enables us to live in this day and age.

C. Riedle:

Energy is today a question which cannot be solved by any country on a national level.

A. Kontorovich:

It is the key area of the economy.

Z. Alferov:

This is an area in which Russia, in many respects, is the leader. This prize is intended to recognize achievements in a field in which the Nobel Prize is not awarded.

E. Volkov:

No wonder this award was initially referred to as the 'Russian Nobel Prize'.

J. Hewitt:

This is a unique prize. There is no equivalent award.

A. Leontiev:

The award marks breakthrough developments in any field of energy.

D. Smith:

It’s a great joy to go and visit somebody in a far off land and a different culture, trying to do the same thing, and exchange information.

B. Spalding:
It promoted ambition among scientists and I think that it is a very good concept.

N. Laverov:
It proved very important to turn scientific achievements into products.

Z. Alferov:
The award's status is a function of its winners.

G. Mesyats:
I was the first Russian to win; the other two were American.

D. Smith:
My friend and colleague Gennady Mesyats in Russia, and I, won for what The Global Energy Prize calls ‘Powerful Impulse Energy’.

L. J. Koch:
Only four Americans have received that prize. I think my greatest accomplishment is the opportunity I had to participate in the very early development of real nuclear power.

F. Mitenkov:
My award was for the development of sodium-cooled fast reactors.

E. Volkov:
We developed a technology for producing synthetic oil and high-BTU gas from oil shale.

C. Bowman:

Through this prize and the support that is given, the group I am with, the Canadian Academy of Engineering, has developed nine big projects for Canada to carry over this half century.

V. Nakoryakov:

I have done quite a lot of work on creating the flow theory of mixed liquids, gas, and steam in steam generators.

T. Sigfusson:

It awarded to me for introducing real societal examples that create a world movement to introduce hydrogen into the energy economy.

A. Leontiev:

For research on the intensification of heat transfer in power plants.

Z. Alferov:

For work on developing heterostructure-based energy devices.

A. Kontorovich:

Among the winners, besides me, there is just one representative from the raw materials side of the energy sector – Academician Nikolai Laverov.

N. Laverov:

I discovered and scientifically proved a fundamentally new type of uranium deposit.

J. Hewitt:

My achievements have been focused really on multiphase flow and heat transfer.

P. Rutberg:

We can extract up to 95 percent of energy in gaseous form from practically any type of organic waste.

B. Spalding:

Many thought that I had invented the subject of computational hydrodynamics. I made it accessible.

O. Favorsky:

This work was related to improving gas turbine units that could become the future of production of very highly efficient energy.

G. Mesyats:

We discovered the possibility of extracting a practically limitless number of electrons from metal.

L. Koch:

The main topic for which I was selected is the development of highly efficient gas turbines.

B. Paton:

For our achievements in large-scale energy projects and the use of energy in our economy.

A. Rosenfeld:

In my case, it’s half a lifetime of working to improve the energy efficiency of buildings, using my knowledge of building science, and pretty much succeeding in getting it implemented into policy.

M. Yoshikawa:

What's important for us now is to build ITER, the first fusion exploratory reactor. Great meaning that if we can produce fusion energy, it, it will mean a lot for all mankind.

R. Aymar:

It will be the start of a way to produce electricity which will have no limits for mankind, for the future.

E. Velikhov:

It will be the largest project that I have been involved in from the start.

A. Leontiev:

Generally, I would divide all scientists into two categories: nerds and dreamers. And we need both types.

B. Spalding:

Sometimes I pride myself on not knowing too much. Sometimes I have done things that everybody knew could not be done, but I could do them, because I'm ignorant. So, ignorance is an important characteristic of my kind of scientist.

P. Rutberg:

In our work, integrity is a professional quality. Unless you are a decent person, you will achieve nothing.

F. Mitenkov:

Thirst for knowledge, intellectual curiosity, and persistence.

A. Sheindlin:

I would say – work really hard, guys!

R. Aymar:

You have to work day and night in such a way that you have no rest at all.

N. Holonyak:

We are all so different that we all have to work as fast and as hard as we can, and you do, because why would you waste your life?

M. Khromova:

The Tenth-Anniversary Awards Ceremony for the Global Energy Prize for 2012...

E. Goloshov:

...has now officially begun. We welcome the founders of the Global Energy Prize, the members of the non-profit Global Energy partnership.

M. Khromova:

Gazprom and its Chairman of the Board, Alexey Miller.

E. Goloshov:

Surgutneftegaz and its General Director, Vladimir Bogdanov.

M. Khromova:

FGC UES and its Chairman of the Board, Oleg Budargin.

E. Goloshov:

We also welcome the Chairman of the International Award Committee for the Global Energy Prize...

M. Khromova:

...Academician Nikolay Laverov.

E. Goloshov:

As is traditional, we welcome in this hall today the winners....

M. Khromova:

...of the nationwide competition for energy-related projects by young researchers, Energy of Youth.

E. Goloshov:

This short film will tell you more about the Energy of Youth competition and its participants.

M. Khromova:

Please take a look at the screen.

<Film>

We work at the Faculty of Biology of Moscow State University. We are microbiologists.

We are from Ufa State Petroleum Technological University.

Moscow Power Engineering Institute.

Nizhny Novgorod State Technical University.

I am from the Chemistry Department of Moscow State University.

I work at the Budker Institute of Nuclear Physics in Novosibirsk.

We are a group of young scientists from St. Petersburg.

The field in which I work is organic photovoltaics, organic solar cells.

Electricity generation from waste processing.

Changes to solar energy resources in remote areas of Russia, such as Yakutia.

I work on anaerobic power installations for submarines.

The extraction of gas from solid natural gas hydrates.

The introduction of new metal-polymer nanocomposites into fuel cells.

The operation cycle associated with the safe handling of radioactive waste, including its use, processing, and burial.

Tests are currently being carried out for powering fuel cells and thermal converters.

Our work is linked to the development of lithium-based sources of fuel.

Microbes exist that are capable of eating various types of organic waste and producing hydrogen. We purify this hydrogen so that is clean enough to be used as a biofuel.

Our goal is to store this clean and renewable form of energy in hydrogen. We believe this to be a very important and pressing concern.

You might say that we have created the world's first portable fuel processor, which should be able to produce hydrogen from available renewable fuels consisting of organic compounds.

We are convinced that, in the near future, every vehicle will use fuel that is produced with the help of our equipment.

Consumption of solar energy, which we receive free of charge, still remains too expensive. Reducing the cost of this source of energy is hence the main practical focus of all this research.

The grant we received made it possible to commence research on new materials for cascade solar cells.

...made it possible to develop our first prototype. We have made great progress and initiated partnerships.

We have shown that the mechanisms that we put in the project actually work.

We were recognized for our achievements. For us, this was also a great incentive.

It is good to know that what you are doing may be of interest to others, including financially.

I have already gone on a business trip to St. Petersburg, and was allowed to receive access to the data that I need for my project.

We are sure that the results of the work we have conducted thanks to Energy of Youth will be in high demand in Russia in the years to come.

<End of Film>

E. Goloshov:

It is now time to announce the winners of the Global Energy Prize 2012,”o and to invite them on stage.

M. Khromova:

The first laureate of the Global Energy Prize 2012 is Mr. Rodney John Allam, from the United Kingdom.

<Film>

R. Allam:

The knowledge you have just makes you want to do more and more and more. It becomes like an obsession, and I’m afraid the people around you have to put up with that.

V. Fortov:

I am left with the impression of someone who, on the one hand, is extremely intelligent and a great thinker and, on the other hand, is extremely informal.

V. Nakoryakov:

He is an enthusiast for whom people are at the heart of it all. That is how he is.

R. Allam:

My grandfather and great grandfather were both steam train engine drivers and that’s the closest we came to engineering. Really, it was a self-made interest in engineering, particularly chemical engineering, in a very obscure area in those days, which was cryogenics.

N. Laverov

He has applied the cryogenic technology and oxidizing agents used in rocket systems to purification and highly efficient combustion at European coal-fired power stations.

V. Fortov:
This man has done a great deal for ecology and the energy industry.

R. Allam:
Well I was privileged to be a member of the intergovernmental panel on climate change.

V Fortov:
He was awarded the Nobel Prize together with Al Gore for their work on climate change.

R. Allam:
The objective is to develop efficient clean cheap power systems using fossil fuel with no pollution to the atmosphere. And this has been an area which I've been obsessed with, and in which we have made very, very significant progress in the last few years.

N. Laverov:
This will be an incredible breakthrough. I believe that what the Americans were first to achieve was the pilot production. He is now working on this project and came naturally to it.
<End of Film>

R. Allam:
You have got to have a significant amount of outside interests to complement the work you are doing. You need a fairly serene existence, and that only comes with a

full life. This is part of my vegetable garden. We've got soft fruit and strawberries and onions here. I owe a lot of my success to my wife and my family. We met at a dance in London and we have been together ever since. There are an enormous amount of things I want to do, particularly in the technical field. I am obsessed with the whole area of advanced energy systems, and I intend to go on working in that area for as long as I am able.

E. Goloshov:

The second laureate of the Global Energy Prize 2012 is Boris Katorgin, of Russia.

<Film>

B. Katorgin:

I am an extremely inquisitive person, especially about natural phenomena.

Narrator:

He is a remarkable man, combining the intellect of a scientist and the practical approach of an engineer.

N. Laverov:

You have to understand that he is a decent man. That is very important.

B. Katorgin:

I have no idea whom I take after. My father was a sanitary engineer. Heating, sewage systems, plumbing, and other everyday matters were his responsibility.

N. Laverov:

He joined Energomash straight away and began work as a designer. I have to say that his life has generally been characterized by one success after another.

B. Katorgin:

I have stayed true to this decision for all of my life. I worked there for 52 years.

N. Laverov:

He also has a strong character and became a master in the martial art of Sambo.

B. Katorgin:

There is a constant need to win, make progress, and emerge victorious.

Narrator:

On the whole, he is excellent company, quick-witted, and jovial.

B. Katorgin:

You have to be bold! Our boldness made it possible for us to compose three inventions in a single day.

Before the Soviet Union collapsed, I was appointed Director and Chief Designer. I personally wrote a letter to President Yeltsin, explaining that there was an evident need to export our designs to other countries. Americans are purchasing them. They buy nothing from us, except these engines. The RD-170 and RD-171 are the world's most exquisite engines. This is also the view of foreign experts. They are highly prized by specialists from the USA and designers of rocket engines. When they saw this engine, they wanted to have something similar.

N. Laverov:

The fact that the Atlas rockets fly on our engines is down to Katorgin. This is an immense contribution.

V. Fortov:

It is thanks to such individuals that we achieved what we did in space exploration.

B. Katorgin:

To be a true scientist, the first thing you need to have is lots of friends who are scientists and a wide network. You have to know what is going on in the world and you need to help each other out...

<End of Film>

E. Goloshov:

Boris...

M. Khromova:

The third laureate of the Global Energy Prize 2012 is Valery Kostyuk, of Russia.

<Film>

V. Kostyuk:

I have had this attitude from an early age: if I start to do something, I have to be at least in the top ten, put it that way.

N. Laverov:

People at that level never devote themselves to a single area. It is extremely important that Kostyuk did not stop with cryogenic systems, but went further and is now working on creating new equipment that uses cryogenic liquids and high-temperature superconductors.

V. Kostyuk:

Do you remember when all boys wanted to become pilots and all girls wanted to be ballerinas and so on? I was not like that. My father thought that I would follow in his footsteps and become a metallurgist. That was how it was, but then Yuri Gagarin went into space and rockets started being launched.

N. Laverov:

Incidentally, he received his first State Prize in 1985 for his work in space engineering.

V. Kostyuk:

Why do I consider myself to have been fortunate in life? Because, as soon as I had finished university, I started my postgraduate studies and am still working as a scientist.

V. Fortov:

There have been breakthroughs such as hydrodynamics and heat exchange, and the stability of these processes at low temperatures. Europe's first semicommercial electric power lines stemmed from the experience gained by Valery during this period.

V. Kostyuk:

We started working on high-temperature superconductors.

V. Nakoryakov:

He has done brilliant work in cryogenic technology, in applying it to the cooling of superconducting systems. He has enjoyed great success in this for a long time.

Z. Alferov:

For us, he is the Chief Scientific Secretary of the Presidium of the Russian Academy of Sciences, but he is receiving this prize entirely independently. I would even argue that such bureaucratic posts prevented him from receiving the prize earlier.

N. Laverov:

He finds solutions to impossible situations with ease.

V. Fortov:

He is a good-natured man, who takes great pleasure in the success of others.

V. Kostyuk:

I generally try not to resent anyone else because, firstly, no one has anything handed to them and, secondly, you can never be certain that you are right.

V. Fortov:

He is extremely reliable. I do not know a single example of an occasion when he has let someone down.

V. Kostyuk:

It is a great joy for a person to have the opportunity to do what he loves for his entire life.

<End of Film>

M. Khromova:

Valery, please.

E. Goloshov:

Friends, the laureates of the Global Energy Prize 2012 are congratulated by the prize's first laureate in 2003, Ian Douglas Smith.

M. Khromova:

Please take a look at the screen.

<Film>

J. D. Smith:

I would like to congratulate the winners of the Global Energy Prize this year in 2012. This is the tenth time that the prizes have been awarded and the three prize winners this year seem to have extended the range of the prize even further with

achievements in different areas. It's most impressive. I wish you luck in the future and many congratulations.

<End of Film>

E. Goloshov:

On behalf of the President of the Russian Federation, Vladimir Putin, the Global Energy Prize is to be presented by Igor Sechin, President and Chairman of the Management Board of Rosneft.

I. Sechin:

Colleagues, esteemed laureates, ladies and gentlemen: it is my great honour to congratulate the laureates of the Global Energy Prize on behalf of the President of the Russian Federation, Vladimir Putin, to express to you his words of sincere gratitude for your selfless work for the good of both current and future generations, who will have to live on our wonderful planet, and to wish you every success in your future endeavours.

This prize is today being awarded for the tenth time. In particular, this attests to the fact that its concept proved extremely fruitful. Approximately 2,000 scientists from almost 50 countries have been involved in this exciting process, with the prize awarded to 27 scientists from nine countries. Over the course of the last decade, the Global Energy Prize has been conferred for truly outstanding work and the outstanding people behind it. So the allusion to future generations in the welcoming address of the President of Russia was a statement of the truly global significance of the work that this prize celebrates, which is recognized by both the scientific community and leading figures in the energy industry. This year, the International Award Committee for the Global Energy Prize placed a new emphasis on the word ‘global’ by recognizing the service of the creators of the powerful energy facilities used in space exploration. Given my sincere admiration for the scale of the life and work of our winners, I cannot help but recall the words of Zhores Alferov, who said that the prestige of the prize is determined by its laureates.

Academician Boris Katorgin and the team he leads have designed liquid-propellant rocket engines that run on environmentally friendly cryogenic fuel, which is recognized as the best in the world. Their work solved the problem of high-frequency combustion instability and identified the design solutions that are now used in modern Energomash engines. Boris has led the development of the RD-180 engine and its cryogenic oxidizing agents, which have now received global acclaim. The project won an international competition organized by Lockheed Martin and is now produced commercially, supplied to the USA, and successfully put to use. In recent years, both Russian and American astronauts have used these Russian-built engines. In contemporary Russia, there are not many designs of such quality, and people across the globe should know the name of Boris Katorgin, a worthy successor to his predecessors, who, fifty years ago, paved the way for the space age.

Then there is Academician Valery Kostyuk, Director of the Low-Temperature Research & Development Institute. He has solved a range of fundamental challenges related to the non-stationary transfer of heat in turbulent and two-phase flows. His designs have been used in the most diverse fields: in the aerospace and aviation industries, electronics, communications, the energy sector, superconductors, and the development of a new generation of refrigeration machines amongst others. He has researched techniques for the production of hydrogen from coal, natural gas, bitumen, and petroleum coke by means of partial oxidization using pure oxygen. He has developed and implemented a unique high-efficiency nitrogen system for cryogenic support for high-capacity superconducting systems.

Then there is the British scientist Rodney John Allam, who has made a great contribution to the development of innovative high-efficiency oxygen energy systems. He designed new processes and new equipment for the production of gases and cryogenic liquids, including for electricity generation. Thanks to his work, modern oil refineries have switched to using oxygen energy systems in their boilers. In addition, he has contributed to the creation of installations to capture carbon

dioxide in the oil fields of the North Slope of Alaska for later use in improved oil recovery. His achievements, too, are celebrated by this year's Global Energy Prize.

I would like to recall that five years ago, at this very ceremony, having discussed the political implications of finding a solution to today's global energy challenges, Vladimir Putin noted that we cannot even hope for a solution to be found without the contribution of scientists and people who have in-depth knowledge and are able to provide politicians with prescient forecasts. I think that this is even more relevant today than it was five years ago. Only with progress in the science of energy and the safe production, transport, and use of energy can mankind preserve civilization and this very planet. It is in this very field that the scientific, economic, geopolitical, and even moral interests of the countries and nations of the modern world are closely intertwined. This is the reason why, no matter how prestigious our prize or how grand the ceremony, it is impossible to exaggerate the contribution of these laureates to global development and their role in the education of a new generation of scientists and affirmation of the ideals of scientific and social progress.

Congratulations to Boris, Valery, and Rodney and congratulations to us all. Thank you very much.

M. Khromova:

For the development of new processes and equipment for the production of gases and cryogenic liquids, as well as the design of technology used in electricity generation and energy systems, the prize is awarded to Professor Rodney John Allam, of the United Kingdom.

E. Goloshov:

For his research and development of high-efficiency liquid-propellant rocket engines with cryogenic fuel to enable the reliable functioning of aerospace systems with increased power for the peaceful use of outer space, the prize is awarded to Academician Boris Katorgin, of Russia.

M. Khromova:

For the development of new processes and equipment for the production of gases and cryogenic liquids, as well as the design of technology used in electricity generation and energy systems, the prize is awarded to Academician Valery Kostyuk, of Russia.

E. Goloshov:

Thank you, Igor! Let us show our appreciation. We will now hear from the first laureate of the Global Energy Prize 2012, Rodney John Allam.

R. Allam:

Mr. Sechin, Mr. Ambassador, fellow laureates, ladies and gentlemen. First let me thank you for honouring me with the Global Energy Award for 2012. My work in the field of advanced energy systems covers a 50-year period. Cryogenic engineering involves the separation, purification, and delivery of industrial gases and cryogenic liquids such as oxygen, hydrogen, nitrogen, and carbon monoxide. My work included the development of high-efficiency process cycles and new components such as distillation columns, heat exchangers, compressors, and turbines. This enabled power consumption for gaseous oxygen production to be reduced by about 20% with increased capacity of equipment and more accurate design methods leading to the ability to produce single-train oxygen plants in the size range of 4,000–6,000 tonnes a day. Power for the liquefaction of oxygen and nitrogen was reduced by a similar amount. Hydrogen liquefaction costs were reduced from about 10 kilowatt hours per kilogram, to two and a half by integration with LNG revapourization facilities. I began working on CO2 capture from fossil fuel power generation in the late 1970s. I developed systems for burning coal with pure oxygen and recycled flue gas in a conventional supercritical steam boiler and separating pure CO2 for underground disposal. Other development areas included the production of power and chemicals from partially oxidized fuels such as coal, bitumen, and natural gas.

Energy production is the basic necessity on which our current civilization and our future development depend. Fossil fuels must continue as the major energy source for future power production systems. Current technologies for non-polluting power generation are much too expensive. We need high-efficiency fossil fuel power systems with near 100% CO2 capture and lower generating costs than the best current polluting systems. This is the objective of my current development work. I believe the answer lies with oxy-fuel systems, which use carbon dioxide as the working fluid in place of steam or air. My current work allows high-pressure oxy-fuel systems with either coal or natural gas fuel to achieve virtually 100% CO2 capture with efficiencies above 50%. I am also working on the production of liquid transportation fuels from natural gas.

So let us be optimistic. These problems can be solved, and Russia's position as a leading producer of fossil fuels will benefit from this work. This afternoon I will have the opportunity to meet the President. I know the President and I are both keen fishermen. We have a saying that a day's fishing puts a day on your life. May our lives be long and prosperous. Finally, I thank my wife Mavis and my family for their constant support and encouragement, and all my past and present colleagues. Thank you very much.

M. Khromova:

I will now give the floor to the second laureate of the Global Energy Prize 2012, Boris Katorgin.

B. Katorgin:

Mr. Sechin, esteemed ladies and gentlemen! I would like to thank the scientific community and the members of the International Award Committee for the Global Energy Prize for awarding me such a significant scientific award. My contribution to the energy sector is about the creation of liquid-propellant rocket engines for the peaceful exploration of outer space. I have devoted over fifty years' work to this at the V.P. Glushko Energomash Research and Production Association. Our Research

and Production Association is famous for its engines, which were used to launch the first artificial satellite and the first cosmonaut, and to execute all piloted programmes and many others.

I started out as a design engineer, but then I ran the company for almost 18 years as Chief Designer. Communications, navigation, television, radio, solar research, as well as space exploration as a whole, were all given new potential thanks to the development of highly efficient and reliable rocket engines, and unique technology capable of extremely impressive performance. This was needed to ensure survivability at 3,500 degrees Celsius, a pressure of 250 atmospheres, fuel consumption of two and a half tonnes per second, and 27 million kilowatts of power.

Nowadays, the symbol of the liquid-propellant rocket engine has become the RD-180 engine, designed under my leadership, which is fuelled by liquid oxygen and kerosene and has thrust of 400 tonnes. The design of this engine won a competition in America that was organized by Lockheed Martin to select the engine for the new generation of Atlas rockets. The engine was completed in a relatively short time and is today produced commercially at our Energomash Research & Production Association in Russia. It is supplied to America, where it is used successfully in the Atlas III and Atlas V rockets. So this is an example of successful fruitful international cooperation. Over 36 successful launches have taken place to date. Use of the RD-180 enabled the Atlas to reduce the number of engines from eight to two, and eliminated three of the four stage separations. This is an impressive result.

I would of course like to pay tribute to my team at the Energomash Research & Production Association. It is thanks to them that I am here, and they have shown themselves to be truly worthy of the creative legacy left behind by the Chief Designer, Academician Valentin Glushko. It is particularly fitting that the prize is being awarded to me, an engine designer and his pupil, here in St. Petersburg, where, long ago in 1929, Valentin began his rise to prominence, becoming the father of liquid-propellant rocket engines in Russia. The main challenges I now face are not only the design of new ideas for engines, but also the training of highly qualified professionals at the Physical and Power Engineering Systems Research

and Education Centre at the Moscow Aviation Institute, which I manage. New developments are up and coming, such as the tri-component engine, which will open up vast new opportunities for space programmes. I am directing the focus of the graduates of my department to this as they devote their energy to creating something new.

When the young future Academician Pyotr Kapitsa asked the renowned English physicist Ernest Rutherford why he had a picture of a crocodile above the door to his laboratory, Rutherford replied that “the crocodile never turns back”. I am very fond of this – the motto of my pupils and I is: “Only go forward, and never turn back.” Thank you for listening.

E. Goloshov:

Many thanks, Boris. It is now time to hear from the third laureate of the Global Energy Prize 2012, Valery Kostyuk.

V. Kostyuk:

Mr. Sechin, esteemed members of Global Energy and the International Award Committee! Please allow me to express my gratitude for such a prestigious prize. It should be clear that such lengthy and varied work could not have been carried out by me alone, so I want to say thank you to my teachers, colleagues, and students and, of course, I would like to add that my work would not have been possible outside the Russian Academy of Sciences. I owe a debt of gratitude to this organization.

As for my work, I would like to make the following remarks. Many of the results were obtained for the first time. This is true of the new class of electrotechnical devices that were developed with high-temperature superconductivity and allow four- or five-fold improvement compared to existing technology. This was also the case for the special cryogenic systems for high-capacity high-temperature cables, which enable a ten-fold increase in performance. Finally, this was also true of the rocket technology on which I have been working for many years. Moreover, there were the

ground installations for the heavy-lift liquid-propellant rockets, including the sort that Boris just mentioned, which are the most powerful in the world. Lastly and, in my view, most interestingly, this work was concluded only six months ago and was published just three months ago. There was also the development of hybrid power-transmission lines. Liquid hydrogen flows within this system, while the cables are made from magnesium diboride, a new and exciting superconductor. I think this solution will be available in the near future.

I would like to make one further comment. I wanted to say that the industry to which I have dedicated almost my entire life is continuing to develop. By this, I mean the cryogenics industry. This field has a bright future with regard to both the energy sector and the aerospace industry. As you are all aware, we recently saw the launch of the Russian satellite RadioAstron, in which the Academy of Sciences took part. There has also recently been the launch of an American satellite, which is the world's first-ever space truck. The European Space Agency has developed the Vega launch vehicle, which will soon be launched into space. We hope that the solutions to these problems involved the use of some of our designs, on which we worked for so long.

What would I like to focus on? My lengthy scientific career has, I believe, been spent in an exceptionally favourable environment. Science was held in great prestige by society. It was respected by the public and received governmental support. The media regularly reported on the results of the achievements of research in a rather cogent manner. Remarkable events, such as Yuri Gagarin's space flight and the launch of the first satellite, were met with sincere enthusiasm, both at home and abroad. It is for this reason that my colleagues and I would like to hope that the statement made by Vladimir Putin in his first presidential executive order, which he also expressed at the General Meeting of the Academy – declaring the common ground between science, the state, and the private sector – will be implemented, giving Russia and its scientists new motivation to attain the lofty heights of old. Thank you for listening.

M. Khromova:

Her Majesty's Ambassador to the Russian Federation, Tim Barrow.

T. Barrow:

Mr. Sechin, esteemed laureates, ladies and gentlemen! I am delighted to be here today. I have the honour of reading to you a letter from the Prime Minister of the United Kingdom, David Cameron.

T. Barrow:

The Prime Minister writes: “I would like to congratulate the British and Russian laureates for this year’s International Global Energy Award. British Professor Allam’s research in cryogenics and carbon-free energy systems has been vital for the development of energy-efficient applications, not least in the automobile and space rocket industries. This is timely given the 2011–2012 UK–Russia Year of Space. Work on improved energy efficiency is vital to the sustainability of the global economy and to our future, and I look forward to continued cooperation between the UK and Russia on global issues such as energy and climate security. I would also like to congratulate the other two prize winners from the Russian Academy of Sciences, Academicians Kostyuk and Katorgin, for their strong contributions to this area. Signed, British Prime Minister David Cameron”. I would like, as Ambassador, to add my personal congratulations to the laureates for all their work, particularly because cooperation in science is such an important and productive area of our bilateral relations.

Thank you for listening.

E. Goloshov:

Our esteemed laureates will shortly be meeting with the President of Russia. They will have the opportunity to discuss their work and their perspective on the global energy industry.

M. Khromova:

Our ceremony is now drawing to a close.

E. Goloshov:

Esteemed laureates and guests! On behalf of the Global Energy non-profit partnership...

M. Khromova:

...on behalf of the winners of Energy of Youth, the nationwide competition for youth energy-related research projects...

E. Goloshov:

...on behalf of the winners of Energy of Kids, the nationwide competition for energy-related creative projects by children...

M. Khromova:

...on behalf of the winners of Energy of Word, the international media prize...

E. Goloshov:

...and, finally, on behalf of the other Global Energy competitions...

M. Khromova:

...we would once again like to congratulate our laureates on receiving such an important scientific prize, and to congratulate all of you on the tenth anniversary of the Global Energy Prize in 2012.

E. Goloshov:

May the prize grow still further and the Global Energy competitions increase in number, benefitting our civilization and spurring scientists to find new energy-related breakthroughs and innovative solutions.

M. Khromova:

We now declare the Tenth-Anniversary Awards Ceremony for the Global Energy Prize 2012...

E. Goloshov:

...closed.