FUND FOR INFRASTRUCTURE
AND EDUCATIONAL
PROGRAMS
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FUND FOR INFRASTRUCTURE EDUCATIONAL PROGRAMS

ANNUAL REPORT 2018

FUND FOR INFRASTRUCTURE
AND EDUCATIONAL
PROGRAMS
RUSNANO Group

INNOVATIONS FOR EFFICIENT FUTURE

CREATING HIGH-TECH COMPANIES
for subsequent sale becomes a promising and effective business model

NANOTECHNOLOGIES
is one of the fastest growing and sought-after areas of science and technology

EDUCATING A NEW GENERATION OF INNOVATORS
in the paradigm of technological entrepreneurship is of particular relevance

ANNUAL REPORT 2018

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FUND FOR INFRASTRUCTURE AND EDUCATIONAL PROGRAMS
RUSNANO Group

ANNUAL REPORT 2018

FUND FOR INFRASTRUCTURE AND EDUCATIONAL PROGRAMS

CONTENTS

STATEMENT OF THE CHAIRMAN OF THE EXECUTIVE BOARD

ANATOLY CHUBAIS

CHAIRMAN OF THE EXECUTIVE BOARD OF THE FUND FOR INFRASTRUCTURE AND EDUCATIONAL PROGRAMS

DEAR COLLEAGUES,

The Fund for Infrastructure and Educational Programs is unique and stands out among other development institutions due to the fact that it focuses on the nanoindustry and high-tech sectors, which is a priority for the economy and the social sector.

It is impossible to implement the Digital Economy national program without a solid resource base — from microelectronics and composite materials to new production technologies. And the creation of smart cities in Russia goes beyond mere implementation of IT solutions. Smart cities should be warm, eco-friendly, and energy-efficient.

Creating the resource base for the Digital Economy is a complex task which requires significant investment and time. The Fund is directly involved in this task. Fund's nanotechnology centers create startups that develop promising tech products. Their progress requires large investments, professional expertise, and significant timeframe. But when they succeed, they contribute substantially to the export development and increase in productivity. These innovative companies employ thousands of highly qualified specialists — engineers, designers, technologists.

The efficiency of the scientific, technical, and innovation capacity of the country depends on the quality of the professional training system. The Fund participates in the competitive personnel training during all stages, from vocational guidance to schoolchildren to continuous skill development. Every year, thousands of students and high-tech employees take part in the educational programs developed with the Fund's support.

The Fund consistently eliminates regulatory restrictions that impede the industrial application of the latest technological advances. The Fund's specialists take part in the preparation of strategic documents that comply with the main priorities, goals, and objectives of the national science and innovation policy.

We will consistently move forward in all areas of the Fund's work, increasing its contribution to the nanoindustry development.

KIND REGARDS,
ANATOLY CHUBAIS
CHAIRMAN OF THE EXECUTIVE BOARD OF THE FUND FOR INFRASTRUCTURE AND EDUCATIONAL PROGRAMS

STATEMENT OF THE CEO OF THE FUND

DEAR FRIENDS,

ANDREY SVINARENKO

CEO OF THE FUND FOR INFRASTRUCTURE AND EDUCATIONAL PROGRAMS

You are hereby presented with the public report of the Fund for Infrastructure and Educational Programs for 2018. This was the year when the acceleration of the national technological development was set as one of the main national priorities for the next six years by the President of Russia. Objectives have been set to dramatically increase the number of innovative companies, to modernize professional education and to create a system of continuous updating of existing and the acquisition of new professional skills by employees. The Fund has a number of relevant support instruments and considerable experience in addressing the above-mentioned objectives, which enables it to already become involved in activities that contribute to achieving the target results of the national projects.

All target indicators set by the Fund Strategy until 2025 for 2018 have been achieved. Of particular note is the revenue from infrastructure projects and companies incubated by them. Its value reached 5.5 billion rubles and exceeded the target almost twice as to the planned value. The Fund network of 15 infrastructure nanocenters established 770 startups and technology companies. The top ten most efficient technoparks of the IV National Rating, compiled annually by the Association of Clusters and Technology Parks of Russia, included five of our nanocenters, and TechnoSpark heads this list for the third year in a row. In addition, the Nanotechnology Center of Composites was again included in the list of National Champions by the Ministry of Economic Development of the Russian Federation.

The transition of companies to new production technologies and the spread of Russian innovative products are impossible without the training of specialists whose activities are related to the development, manufacturing or use of such products or services. About a third of nanoindustry companies have already requested the Fund to help creating new educational programs for advanced training and retraining of their employees. With the participation of the Fund, 182 educational programs have been created and about 80 thousand specialists and students of profile specialties have been trained using their materials.

Digital training becomes more and more popular. By the end of 2018, the total number of times when portals edunano.ru and stemford.org were accessed increased by 65% in comparison to the previous year. Dozens of enterprises and educational organizations use online courses and other resources created under the Fund program on the development of electronic education to train and teach their specialists and students. And the Fund's well-known project RUSNANO School League that unites more than 1,000 schools throughout Russia serves as a solid base to address future needs of the nanoindustry in human resources.

In the interests of innovative business, the Fund helps to alleviate obstacles and to reduce barriers that hinder the use of the latest achievements in science and technology. The Fund specialists participate in the development and updating of strategic documents that take into account the main priorities, goals and objectives of the state innovation, science and technology policies, as well as suggests measures to improve national legislation and to create a favorable regulatory environment.

By the end of 2018, 240 national standards were developed with the support of the Fund. During the year, more than 70 certificates of compliance were issued for nanoindustry products and management systems, confirming the superior performance, quality and safety of products and a high level of management in enterprises. To date, 227 measurement methods and reference samples of the composition and properties of innovative materials have been developed, certified and submitted to the Federal Information Fund for Ensuring the Uniformity of Measurements. The first "green" national standards were approved. The standards developed by company Hevel with the Fund's support received the award of the Government of the Russian Federation in the field of quality. The regional centers of regulatory and engineering support of innovations are now operating in seven of the eight federal districts of Russia. The Fund together with the Center of standardization in the field of innovation continued to work on the formation of favorable regulatory conditions for free movement of high-tech products within the territory of EAEU.

The model of "innovation conveyor," laid in the foundation of the Fund's activities, focuses on initiation, creation, and development of innovative companies, as well as on providing them with systematic support and maintenance by means of comprehensive institutional measures related to education, regulatory and informational support. To implement this strategy, more ambitious and complex tasks have been set for the next year. I am convinced that we can bring a valuable contribution and ensure that Russia becomes a global leader in the development of cutting-edge technologies.

KIND REGARDS,
ANDREY SVINARENKO
CEO OF THE FUND
FOR INFRASTRUCTURE
AND EDUCATIONAL PROGRAMS

GEOGRAPHIC REACH

15 NANOCENTRES

10 TECHNOLOGY ENGINEERING COMPANIES

5 QUALIFICATION ASSESSMENT CENTRES

7 REGIONAL CENTRES OF REGULATORY AND TECHNICAL SUPPORT OF INNOVATIONS

15 OFFICES OF INNOVATIONS STANDARDISATION CENTRE

14 TERRITORIAL BRANCHES OF ANO NANOCERTIFICA

21 RUSNANO SCHOOL LEAGUE REGIONAL RESOURCE CENTRES

MOSCOW AND MOSCOW REGION
- Zelenograd nanotechnology centre
- International Innovative Nanotechnology Centre
- Nanotechnology centre TECHNOSPARK
- Nanotechnology centre T-NANO
- Nanotechnology Centre of Composites
- TEC "ARTEK COMPOSITES"
- TEC "EUV Labs"
- TEC "RFID Engineering Center"
- TEC "Engineering center
- "Gas turbine technologies"
- TEC "Gas Processing Technology"
- TEN "Engineering"
- TEC "BIPV"
- QAC in NIIME
- QAC in ANO Nanocertifica
- SCFI representative office
- ANO Nanocertifica
- RUSNANO School League resource centre
- Technology Transfer Office RAS & RUSNANO
- StartBase System for innovation process support

SAINT PETERSBURG
- North-Western Nanotechnology Centre
- St. Petersburg Nanocentre
- TEC "CML AT"
- QAC in Plastic processing plant named after "Komsomolskaya Pravda"
- ITMO University named after Peter the Great St.Petersburg Polytechnic University Branch of ANO Nanocertifica
- RUSNANO School League resource centre

BARNAUL
- SCFI representative office
- Branch of ANO Nanocertifica

BELGOROD
- Branch of ANO Nanocertifica
- RUSNANO School League resource centre

VLADIVOSTOK
- Centre of technology transfer with FEFU
- Centre of regulatory and technical support of innovations
- SCFI representative office
- Branch of ANO Nanocertifica

EKATERINBURG
- Centre of regulatory and technical support of innovations
- SCFI representative office
- Branch of ANO Nanocertifica

IZHEVSK
- RUSNANO School League resource centre

KAZAN
- Nanotechnology Centre Idea
- QAC Technopark "Idea"
- SCFI representative office
- Branch of ANO Nanocertifica
- RUSNANO School League resource centre

KRASNODAR
- RUSNANO School League resource centre

KRASNOYARSK
- Nanotechnology centre in Krasnoyarsk
- Centre of regulatory and technical support of innovations
- SCFI representative office
- Branch of ANO Nanocertifica
- RUSNANO School League resource centre

LIPETSK
- SCFI representative office

MURMANSK
- RUSNANO School League resource centre

NOVOSIBIRSK
- Nanotechnology centre SYGMA.Novosibirsk
- Nanotechnology centre Nanotechnologies in Medicine
- TEC "Energy Storage Systems"
- Centre of regulatory and technical support of innovations
- SCFI representative office
- Branch of ANO Nanocertifica

NOVY URENGOY
- RUSNANO School League resource centre

NOVOKUZNETSK
- RUSNANO School League resource centre

PERM
- RUSNANO School League resource centre

PETROZAVODSK
- Centre of regulatory and technical support of innovations
- SCFI representative office
- Branch of ANO Nanocertifica
- RUSNANO School League resource centre

PENZA
- RUSNANO School League resource centre

ROSTOV-ON-DON
- Centre of regulatory and technical support of innovations
- SCFI representative office
- Branch of ANO Nanocertifica
- RUSNANO School League resource centre

SARANSK
- Nanotechnologies and Nanomaterials Centre in the Republic of Mordovia
- Centre of regulatory and technical support of innovations
- SCFI representative office
- Branch of ANO Nanocertifica

SAMARA
- Nanotechnology Centre in the Samara Region
- SCFI representative office

SAROV
- Technopark "Sarov"

SURGUT
- RUSNANO School League resource centre

TOLYATTI
- Branch of ANO Nanocertifica
- RUSNANO School League resource centre

TOMSK
- Nanotechnology centre SYGMA.Tomsk
- SCFI representative office

TAMBOV
- SCFI representative office
- Branch of ANO Nanocertifica

UFA
- QAC of LLC "Scientific-production, engineering and consulting center "Agency of international qualifications"
- SCFI representative office
- RUSNANO School League resource centre

ULYANOVSK
- Ulyanovsk Centre for Technology Transfer

KHABAROVSK
- RUSNANO School League resource centre

CHELYABINSK
- RUSNANO School League resource centre

CHEBOKSARY
- SCFI representative office
- RUSNANO School League resource centre

ELISTA
- RUSNANO School League resource centre

YAROSLAVL
- RUSNANO School League resource centre

Nanocentres · Technology engineering companies · Qualification assessment centres (QAC) · Offices of Innovations Standardisation Centre · Territorial branches of ANO Nanocertifica · Regional centres of regulatory and technical support of innovations (SCFI) · RUSNANO School League regional resource centres · Technological transfer centers · Other

01.

ABOUT THE FUND

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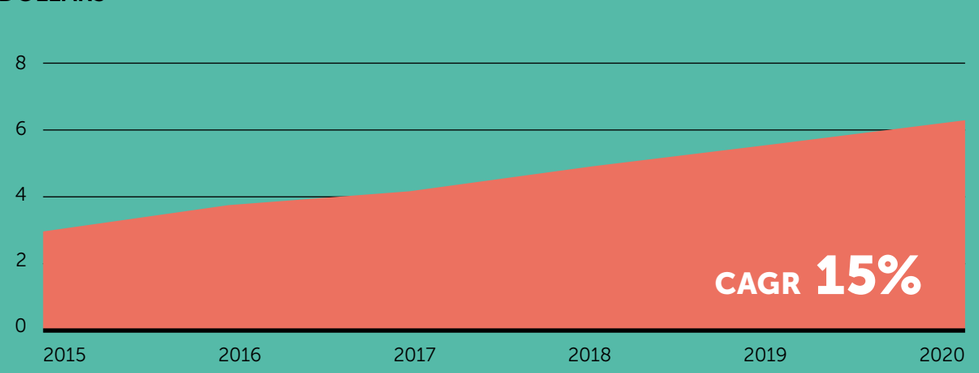
FUND FOR INFRASTRUCTURE AND EDUCATIONAL PROGRAMS IS THE ONLY INSTITUTE AIMING AT INNOVATIVE INFRASTRUCTURE DEVELOPMENT OF NANOINDUSTRY AND RELATED TO IT HIGH-TECH SECTORS IN RUSSIA.

PRIORITY ACTIVITIES OF THE FUND UP TO 2025:

- LIFE QUALITY
- NEW MATERIALS AND COATINGS
- ENERGY EFFICIENCY
- NANOELECTRONICS, OPTOELECTRONICS, PHOTONICS
- ADVANCED PRODUCTION TECHNOLOGIES

FORECAST OF GLOBAL REVENUE FROM SALES OF NANOPRODUCTS, IN TRILLION US DOLLARS



5 TRILLION US DOLLARS
REVENUE FROM THE SALES OF NANOINDUSTRY PRODUCTS IN THE WORLD

2 TRILLIOM RUBLES
VOLUME OF SALES OF RUSSIAN NANOINDUSTRY PRODUCTS IN 2018

0.5 TRILLION RUBLES
EXPORTS OF RUSSIAN NANOINDUSTRY PRODUCTS IN 2018

550
COMPANIES IN MANUFACTURED NANOTECHNOLOGY PRODUCTS IN RUSSIA BY THE END OF 2018

1. ABOUT THE FUND

FUND FOR INFRASTRUCTURE AND EDUCATIONAL PROGRAMS (HEREINAFTER THE FUND) IS THE ONLY INSTITUTE AIMING AT INNOVATIVE INFRASTRUCTURE DEVELOPMENT OF NANOINDUSTRY AND RELATED TO IT HIGH-TECH SECTORS IN RUSSIA[1].

[1] Fund for Infrastructure and Educational Programs was created on the basis of Federal law On Reorganization of the Russian Corporation of Nanotechnologies, dated 27.07.2010, № 211-FL for the purpose of infrastructure development in the field of nanotechnologies. It is included in the RUSNANO Group together with RUSNANO JSC and RUSNANO Management Company.

The Fund defines its mission as promoting innovative development of the Russian economy in nanotechnology and related to it high-tech sectors of the economy.

Sustainability of the Fund, reliability and adaptability of financial and non-financial support mechanisms for innovation, innovation ecosystems and enterprises in nanotechnology and related sectors of the economy is provided by focusing on the following principles:

PUBLICITY AND OPENNESS

The Fund understands the high public importance of its activity, uses all available channels to inform the public about how it works on the development of "markets", "culture" and "institutions" in new technology industries, and is open for cooperation with Russian and foreign entities, large corporations, small and medium enterprises, government agencies and public organizations.

PROJECT BASIS OF ORGANIZING THE OPERATIONS

The Fund carries out its activity on a project basis, seeking to obtain a complete solution for specific partners, following the rule of mutual responsibility, using co-financing mechanisms for all types of projects: infrastructure, education, institutions, information and others.

INTERDISCIPLINARITY

The Fund's activity is carried out at the interface between subject specialties of researches, development and production, providing an efficient combination of interdisciplinary competencies and capabilities to accelerate the transfer of new knowledge and the creation of innovative companies in the nanotechnology and related high-tech sectors.

COOPERATION AND PARTNERSHIP

As an institute of innovative development the Fund organizes its activity in coordination with other Russian development institutions, government agencies of the Russian Federation in terms of finding solutions to general problems of support within the framework of the innovation-oriented model of economic development, seeks to combine efforts in the field of infrastructure, education and ecosystem development in order to address quickly the current needs of participants in innovation activities and to find comprehensive solutions of goals set by all interested parties.

SERVICE ORIENTATION

As a development institution the Fund strives for the widest possible accessibility of the results obtained in the form of ready-made solutions from the implementation of infrastructural, educational, institutional and other projects and programs, taking into account the legitimate interests of other participants of such projects.

1.1. FIELDS OF ACTIVITY

CONTINUOUS MONITORING OF MARKET NEEDS, TRENDS AND PERSPECTIVE FIELDS HAS FORMED THE INVESTMENT FOCUS OF THE FUND FOR THE PERIOD UP TO 2025 THAT COMPRISES A NUMBER OF DYNAMICALLY GROWING AREAS OF APPLICATION OF PRODUCTS MANUFACTURED USING NANOTECHNOLOGIES OR NANOMATERIALS, AND NANOCOMPONENTS.

PRIORITY ACTIVITIES OF THE FUND UP TO 2025

LIFE QUALITY

- Genomic Technologies and Services
- Medical Equipment
- Industrial Biotechnologies
- Regenerative Medicine and Cell Technologies

NEW MATERIALS AND COATINGS

- Composite Materials (including natural fiber, biotextile)
- Industrial Nanocoatings (including CVD, PLD, PVD, ALD)
- Conventional Material Modification (engineering) Technologies
- Green Chemistry (including biocomponent-based)
- Fine Chemistry (including functional polymers, special plastics, polyamide fibers, polymer modifiers)

ENERGY EFFICIENCY

- Renewable Power Generation (including Wind Power Generation)
- Oil and gas industry (including equipment)
- Energy Storage Systems, Current Sources, Smart Grid

NANOELECTRONICS, OPTOELECTRONICS, PHOTONICS

- Photonics and Optoelectronics
- Micro- and Nanoelectronics (including flexible and power electronics)
- Laser Technologies and Products
- Photovoltaics (including flexible)
- Lighting Engineering
- IoT. Equipment, System Components (including sensors, systems and communication protocols)

ADVANCED PRODUCTION TECHNOLOGIES

- Additive Technologies (including printing and designing technologies, equipment)
- Robotics: Industrial and Service (including logistics, driverless, replacement of human/conventional mechanisms and solutions)
- Digital Production Technologies

THE FUND CONDUCTS COMPREHENSIVE WORK ON THE DEVELOPMENT OF TECHNOLOGICAL DOMAINS INCLUDED IN THE INVESTMENT FOCUS OF ACTIVITY IN THE FOLLOWING FIELDS:

INFRASTRUCTURE PROJECTS

- creation of a mechanism to attract investments from a wide range of sources, both internal and external, intended to finance projects and programs of the Fund, or implemented with its participation
- creation of conditions for refinancing and reproducibility of activity in terms of financing infrastructure projects — from 2023 among various projects of the network of infrastructure centers and from 2025 among various fields of activities of the Fund
- dissemination and practical implementation of infrastructure projects developed in the Fund in the field of nanotechnology in new high-tech sectors of the economy, as well as to other facilities of innovative infrastructure
- acceleration of startups and supported companies in order to reduce the time and costs required to transition to the next stages of readiness to introduce technological products and services
- increasing accessibility of technological transfers through cooperation with international companies and associations, participation in the work of technology consortia

EDUCATIONAL PROJECTS AND PROGRAMS

- creation of a comprehensive educational environment that supports nanotechnology and related to it high-tech sectors with required qualified personnel, and involvement of the widest possible audience in the development of prospective competencies in a number of core technologies and main markets
- implementation of a system of professional qualifications based on professional standards recognized in the nanotechnology and related to it high-tech sectors
- raising interest in natural sciences occupations among children and young people

INFORMATION SUPPORT

- attracting existing and potential manufacturers of nanotechnology products and related to it high-tech sectors
- development of a sustainable and relevant system of informing consumers and raising their awareness of nanotechnology products and related to it high-tech sectors, subject areas and the scope of innovative products, advanced scientific and engineering R&D and successful experience of their commercialization
- involvement of both the society as a whole and key target audiences (scientific and pedagogical communities, representatives of executive and legislative branches at federal and regional levels, business community, engineering and technical staff and professionals, representatives of mass media and expert community, schoolchildren and students) in support of innovations and nanotechnology
- raising awareness of the general public and individual target audiences about the model of the Fund activities, including in terms of awareness of its basic fields of activity
- monitoring of the current global technological agenda and its updating in Russia within the technological fields of the Fund activity
- promotion of activities undertaken in the field of nanotechnology and related to it high-tech sectors of the economy, including technological entrepreneurship and commercial implementation of innovations
- using new, modern formats while working with target audiences

INSTITUTIONAL SUPPORT

ensuring a favorable regulatory environment

- initiating and participating in the implementation of significant country-wide programs and projects in the field of innovative development of the economy, implementation of the Strategy for Russia's Innovative Development, government programs and other initiatives of high significance for nanotechnology and related to it high-tech sectors
- further developing available financial and non-financial support tools to facilitate technology-related businesses and accelerating the development of innovative companies

promoting territorial and cluster-type development of regulatory and engineering instruments to support innovation

- development of regulatory and engineering support infrastructure in nanotechnology and related to it high-tech sectors, contributing to the promotion of modern technologies and guaranteeing compliance with the interests of market participants, as well as ensuring the involvement of regional small and medium businesses in Russia in the processes of regulatory and technical support of innovation
- formation of the fundamental regulatory, legal and engineering instruments (standardization, technical regulation, safety assessment, certification, metrology) corresponding to the best practices and international standards that the enterprises operating in nanotechnology and related to it high-tech sectors can use, and that are aimed at creating conditions for sustainable market entry and turnover of high-quality and safe (competitive) products as well as establishing favorable regulatory conditions for the free movement of innovative products across the EAEU territory
- promoting the development of environmentally-friendly nanotechnology sector and a nationwide system for ensuring the safety of innovative products, including nanotechnology, as well as their compliance with international rules and regulations; formation of instruments for the development of market for "green" innovative technologies and products of nanotechnology and related to it high-tech sectors
- creation, together with the development institutions, and coordination of measures aimed at improving regulatory, legal and engineering base of innovation and import substitution that cover the early stages of the innovation cycle and optimize the manpower use and financial costs of standardization, certification, technical regulation and metrological support of new products

stimulating demand for innovative products through specific projects

- stimulating interaction between existing market participants and development institutions for the strategic development of the sector of direct and venture investments in Russia, ensuring its involvement in the global market
- stimulating demand for products and services of nanotechnology and related to it high-tech sectors, formation and development of mechanisms that contribute to its growth, including in state and municipal sectors, development of a system of sectoral and regional projects to stimulate demand and their further replication
- supporting individual groups of manufacturers, exporters of nanotechnology and related to it high-tech sectors through the developed system of interaction with specialized development institutions, including institutions supporting foreign economic activity

1.2. OVERVIEW OF THE GLOBAL AND RUSSIAN NANOTECHNOLOGY MARKET

Nanotechnology is one of the fastest growing and essential fields of science and technology. In recent years the sector has experienced explosive growth: since 2005, more than 60 states have launched national programs to develop this industry. Interest in nanotechnology as an instrument of growth has been already noted in almost every industry.

Growing demand for nanotechnology products attracts the attention of investors — the volume of investments in this sphere is constantly growing worldwide, not only through financing coming from the state budgets, but also through attracting financial resources of private investors (corporations, funds, etc.). The U.S. federal government has already invested more than US $25 billion in research and development of nanotechnology, of which more than US $1.4 billion — in 2018. Since 2001, more than US $ 16 billion has been allocated as part of Japan's Nanotechnology government program — its annual budget is about US $ 0.9 billion. Since 2011, more than US $ 3.8 billion has been invested to implement the integrated nanotechnology development plan approved by the South Korean Government. The budget of the National nanotechnology program in Germany consists of annual financing in the amount of more than 0.5 billion euros, and the total budget of the European program "Horizon 2020", which pays considerable attention to R&D in the field of nanotechnology and to the development of the nanoindustry, is 80 billion euros.

One of the clear signs of how applied research in the field of nanotechnology continues to grow steadily is the number of patents: in 2018, the number of international patent groups devoted to nanotechnology reached 191 thousand[5].

THE LARGEST NATIONAL PLAYERS IN THIS MARKET ARE

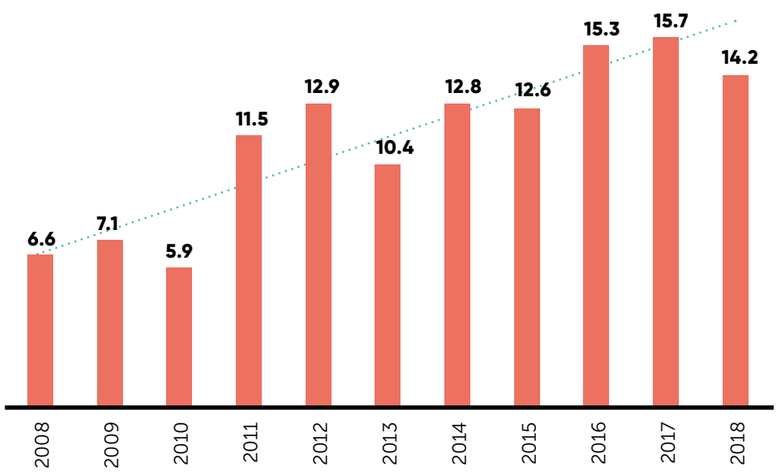
CHINA
> 54 THOUSAND
THE NUMBER OF PATENTS IN THE FIELD OF NANOTECHNOLOGY

USA
28 THOUSAND
PATENTS

SOUTH KOREA
17 THOUSAND
PATENTS

JAPAN
10 THOUSAND
PATENTS

DYNAMICS ON THE NUMBER OF INTERNATIONAL PATENTS IN THE FIELD OF NANOTECHNOLOGY, THOUSAND PATENTS.



3 OG Analysis "Global Nanotechnology Market to 2025", 2018.

4 "The nanotechnology and nanomaterials global opportunity report", Future Markets, October 2016.

5 Data from RWS & Minesoft Ltd; http://patbase.com.

THE MAIN FIELDS WHERE NANOTECHNOLOGIES ARE **INTRODUCED ARE SEMICONDUCTOR INDUSTRY, HEALTHCARE, CONSUMER ELECTRONICS, AUTOMOTIVE INDUSTRY, FOOD PRODUCTION AND AGRICULTURE[6].**

GLOBAL NANOTECHNOLOGY MARKET SPLIT BY FIELD OF APPLICATION, %

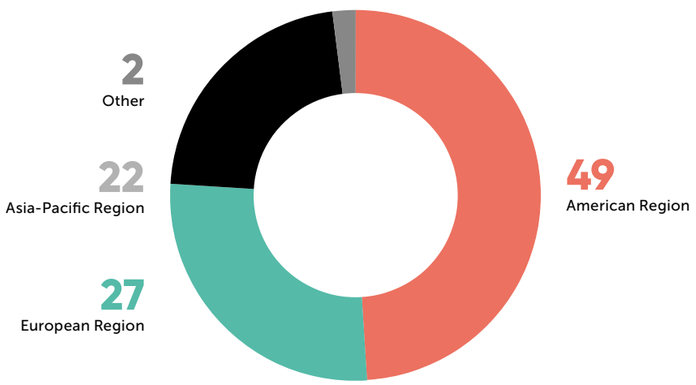
6 OG Analysis "Global Nanotechnology Market to 2025", 2018.

7 Data on the market of nanotechnology products of the Russian Federation are included in the region of Europe.

8 Lux Research, "Nanotechnology Market Update (2015-2020)".

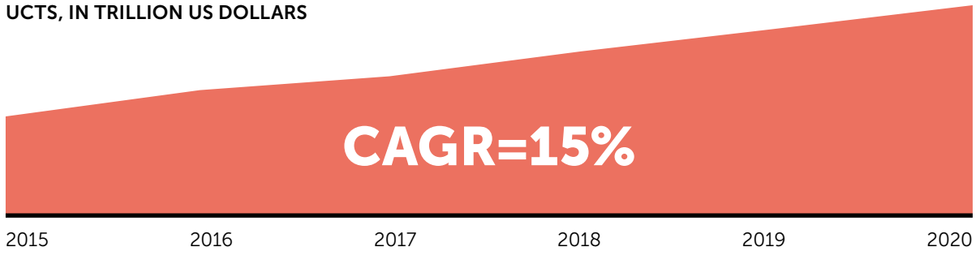
The region of America (primarily the USA) is currently the largest nanotechnology market that accounts for almost half of the global market. However, the Asia-Pacific region has become the fastest growing market in recent years.

GLOBAL NANOTECHNOLOGY MARKET BY REGION[7], %



THE GLOBAL NANOINDUSTRY MARKET CONTINUES TO GROW:
revenue from the sales of nanoindustry products in the world amounted to about
five trillion US dollars
and it is projected to exceed
six trillion US dollars[8]
in 2020

FORECAST OF GLOBAL REVENUE FROM SALES OF NANOPRODUCTS, IN TRILLION US DOLLARS



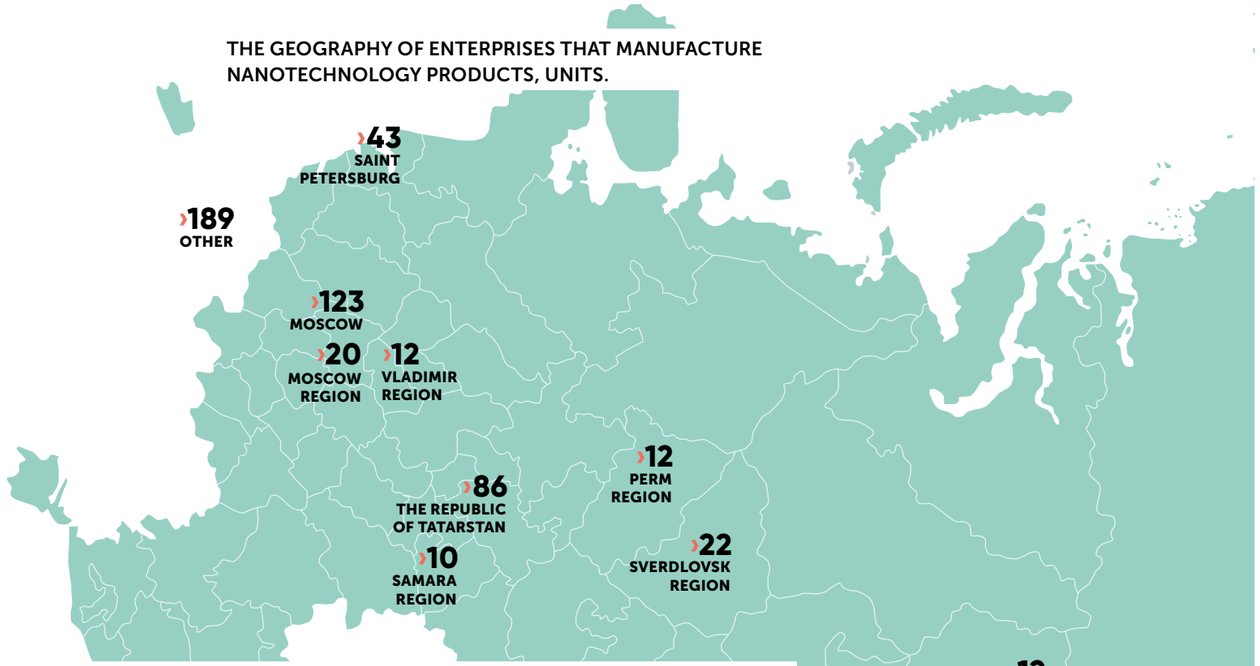
9 Study of Lux Research Nanotechnology Update: Ranking the Nations 2017

10 At the current market prices, end consumer prices.

Russia also shows a stable positive dynamics in the development of nanotechnologies. The key driver, in addition to state financing, is the availability of venture capital: in terms of the volume of venture investments aimed at financing projects in the nanoindustry, Russia takes the second place (about US 0.1 billion dollars); the USA leads (more than US $ 0.3 billion)[9].

AT THE END OF 2018, 550 COMPANIES IN 62 REGIONS OF THE RUSSIAN FEDERATION MANUFACTURED NANOTECHNOLOGY PRODUCTS IN RUSSIA.

THE GEOGRAPHY OF ENTERPRISES THAT MANUFACTURE NANOTECHNOLOGY PRODUCTS, UNITS.



The volume of sales of[10] Russian nanoindustry products in 2018 amounted to 1,963.2 billion rubles, that is 23% (by 367.2 billion rubles) higher than in 2017. Export accounts for one third of the total volume of nanoproducts shipped to consumers. The volume of Russian nanoindustry export reached 526 billion rubles in 2018, i.e. 72% (by 220 billion rubles) higher than in 2017. At the same time, the growth rate of exports of nanoindustry products in current prices exceeds the growth rate of all-Russian export by 43 percentage points (68% and 26%, respectively).

1.3. PRECONDITIONS FOR THE DEVELOPMENT AND STRATEGIC VISION OF THE FUND

The main global trends in the development of nanotechnologies, as well as big state initiatives to introduce high technologies and to support innovative ecosystems, approved by the President and the Government of the Russian Federation , has formed the basis of the Fund Strategy until 2025 (hereinafter the Strategy-2025) and paved the way for the transition of the Fund activities towards a fundamentally new model of "innovation conveyor", in which all fields of activity are employed as elements.

In 2018, the decree of the President of the Russian Federation from 07.05.2018, No. 204 "On the national goals and strategic objectives of the development of the Russian Federation for the period up to 2024" (hereinafter — Decree) approved the goal of accelerating technological development of the Russian Federation as a national objective. The goals and objectives outlined by the decree require significant growth in the number of innovative companies, the creation of a modern and secure digital educational environment that ensures high quality and accessibility of education of all types and levels, the modernization of professional education, including introduction of adaptive, practice-oriented and flexible educational programs, the formation of a system of continuous updating of existing professional skills and the acquisition of new professional skills by employees. The Fund has a number of relevant support instruments and considerable experience in solving the above-mentioned objectives, which enables it to operate within the main fields of activities that contribute to achieving the objectives and target results of the national projects.

11 The Forecast of scientific and technological development of the Russian Federation until 2030, the Strategy of scientific and technological long-term development of the Russian Federation, the Strategy for Russia's Innovative Development for the period up to 2020, the National technology initiative, the Program on improving the competitiveness of the Russian universities, etc.

THE STRATEGIC GOAL OF THE FUND IS THE FINANCIAL AND NON-FINANCIAL DEVELOPMENT OF NANOTECHNOLOGY AND RELATED TO IT HIGH-TECH SECTORS OF THE ECONOMY THROUGH THE FORMATION AND DEVELOPMENT OF INNOVATIVE INFRASTRUCTURE, THE DEVELOPMENT OF THE MARKET FOR QUALIFIED PERSONNEL AND THE SYSTEM OF PROFESSIONAL EDUCATION, THE IMPLEMENTATION OF INSTITUTIONAL AND INFORMATIONAL SUPPORT THAT CONTRIBUTE TO THE DEVELOPMENT OF TECHNOLOGICAL SOLUTIONS AND FINISHED PRODUCTS.

IN ACCORDANCE WITH THE STRATEGY-2025 THE MAIN TARGETS OF THE FUND ARE:

- expansion of the technological areas of the Fund's activity from nanotechnology to related to it high-tech sectors of the economy;
- expansion of the list of financial and non-financial support instruments used by the Fund, including in coordination with other development institutions and instruments of state support for innovational activity existing in the country.
- transition to the model of "innovation conveyor" aimed at creation of numerous small innovative companies and necessary infrastructure;

THE MODEL OF "INNOVATION CONVEYOR"

is a system that focuses the Fund's operations on initiation, creation, development of innovative companies, and providing them with systematic support and maintenance by means of complex institutional measures (through education, regulatory and legal support, provision of regulatory and engineering documentation and technical standards, informational support), while taking into account the specialization of companies (teams) in such a way that in the process of creating a technology or final product, the fundamental technological competences of one company are used as technological outsourcing for the others. The model implies the creation of numerous startups and development of their supporting infrastructure, thus forming a block of infrastructure services, which are necessary for technological entrepreneurship.

For details, see the Annual reports of the Fund for 2016-2017.

To implement the Strategy-2025, an Action Plan for the realization of the Strategy has been developed and the achievement by the Fund of the target indicators in the implementation of the Strategy is analyzed annually. When targets of the state policies on innovation and scientific and technological development change, the Strategy-2025 and the target indicators of its implementation are revised and adjusted.

All target indicators set by the Strategy-2025 for 2018 in each field of the Fund's fields of activity have been achieved. The indicator "Revenue from infrastructure projects and companies incubated by them" has exceeded the target almost twice as to the planned value, which is a fact that should be noted particularly.

TARGET INDICATORS FOR THE IMPLEMENTATION OF THE STRATEGY-2025

* Introduced in 2018.

Target indicator	Units	2018 planned	2018 actual	2019 planned	2025 forecast
INFRASTRUCTURE PROJECTS					
The number of small innovative companies (startups) supported in terms of the Fund's infrastructure projects	units (cumulative total)	750	**770**	850	1,450
The number of people employed in infrastructure projects and companies supported by them	thousand people	3.0	**3.2**	4.2	14.0
Revenue from infrastructure projects and companies incubated/supported by them	million rubles	2,800	**5,546**	5,200	17,300
QUALIFIED PERSONNEL, PROFESSIONAL EDUCATION					
The number of educational programs in areas of nanotechnology and related to it high-tech sectors	units (cumulative total)	173	**182**	185	245
The number of developed professional standards for promising engineering professions as per technological fields of the Fund operations	units (cumulative total)	63	**63**	70	100
The number of qualification certificates and professional examination reports issued following the results of professional examinations [12]	units (cumulative total)	-	**-**	800	2,400
The share of graduates of general educational establishments participating in the program of the Fund aimed at improving the quality of natural science education and early professional orientation of students according to the natural science fields chosen by the graduates at the USE exams.[12]	% (annually)	-	**-**	25	25
INSTITUTIONAL SUPPORT					
The number of production units in nanotechnology and related to it high-tech sectors, for which the minimum required set of regulatory and engineering instruments for sustainable market entry and turnover has been created	units (cumulative total)	152	**153**	170	270
The number of national, preliminary national and interstate standards developed and submitted for approval to Rosstandart	units (cumulative total)	232	**240**	245	330
The number of documents that confirm the quality and safety compliance of products, technologies and management systems issued to nanotechnology and related to it high-tech sectors, in accordance with the sign of innovativeness of the enterprises	units (cumulative total)	580	**604**	640	900
The number of developed and certified measurement procedures and reference samples for nanotechnology and related to it high-tech sectors, as well as certified product testing procedures	units (cumulative total)	225	**227**	240	300
The number of customers (contracting organizations, separate structural units) that take part in projects aimed at the introduction of products and services of nanotechnology and related to it high-tech sectors	number (cumulative total)	39	**44**	56	200

IN DECEMBER 2018, IN ACCORDANCE WITH THE CURRENT GOALS AND OBJECTIVES OF THE FUND,[13] THE WORDING OF CERTAIN ACTIVITIES AND RESULTS AS WELL AS THE LIST AND WORDING OF TARGETS (INDICATORS) OF THE STRATEGY-2025 HAVE BEEN AMENDED FOR THE COMING PERIOD.

Specifically, the introduced adjustments in the field of "Qualified personnel, professional education" were driven by transition to the new stages of implementation of the programs "Development of evaluation system of professional qualifications in the nanoindustry for the period 2019-2021" and "RUSNANO School League for the period 2019-2021". Instead of indicators "The share of applicants who have received certificates of qualification following the results of professional examination from the total number of applicants who requested the Centers to assess their qualification" and "The number of students of educational establishments (participants of the Fund programs and projects in the field of modernization of supplementary education of children and improvement of the quality of natural science education in the Russian schools) who participated in competitive educational events, the indicators "The number of certificates of qualification and professional examination reports issued following the results of professional examinations" and "The share of graduates of the general educational establishments participating in the Fund program aimed at improving the quality of natural science education and early professional orientation of students according to the natural science fields chosen by the graduates at the USE exams" were introduced.

In addition, amendments have been introduced in the targets (indicators) in the field of "Infrastructure projects": indicators "The number of created nanocenters" and "The number of created technological engineering companies" were excluded. These amendments have been introduced because the target value, set for the period up to 2025, has been achieved and because the localized regulations of the Fund, that govern its infrastructure activities, including the creation of technological engineering companies, have been changed.

[13] Minutes of the meeting of the Fund's Supervisory Council dated 17.12.2018 No. 33.

1.4 COOPERATION

02.

THE FUND ACTIVITY RESULTS

fiop.site

770

SMALL INNOVATIVE COMPANIES (STARTUPS) CREATED

94

RESULTS OF INTELLECTUAL ACTIVITY WERE PRODUCED

28

PROJECTS, TECHNOLOGICAL THEMES OF WHICH MEETS THE NTI PRIORITIES

182

EDUCATIONAL PROGRAMS WITH 80 THOUSAND SPECIALISTS AND STUDENTS OF PROFILE SPECIALTIES HAVE BEEN TRAINED USING THEIR MATERIALS

240

NATIONAL STANDARDS WERE DEVELOPED BY THE END OF 2018 WITHIN THE STANDARDIZATION PROGRAM

63

PROFESSIONAL STANDARDS FOR PROSPECTIVE ENGINEERING PROFESSIONS WITH SPECIALIZATION IN NANOTECHNOLOGY HAVE BEEN DEVELOPED

> 90% HAVE ALREADY BEEN APPROVED BY THE MINISTRY OF LABOR AND SOCIAL PROTECTION OF THE RUSSIAN FEDERATION.

44

CUSTOMERS TAKE PART IN PROJECTS AIMED AT THE INTRODUCTION OF PRODUCTS AND SERVICES OF NANOTECHNOLOGY AND RELATED TO IT HIGH-TECH SECTORS

MORE THAN 400,000

SCHOOLCHILDREN AND TEACHERS TOOK PART IN THE WEEK OF HIGH TECHNOLOGIES AND TECHNOLOGY ENTERPRISE

2.1. INFRASTRUCTURE PROJECTS

770

STARTUPS SUPPORTED IN TERMS OF INFRASTRUCTURE PROJECTS

14,1 BILLION RUBLES

THE REVENUE OF THE NANOCENTERS AND THEIR STARTUPS

6

NANOCENTERS OF THE FUND IN 2018 ARE AMONG THE MOST EFFECTIVE TECHNOPARKS OF RUSSIA

MORE THAN 10

"EXITS" OF NC'S PORTFOLIO COMPANIES FORMED

THE NUMBER OF MERGERS AND ACQUISITIONS IN THE WORLD IS GROWING ANNUALLY. THE MAIN ENGINE OF THIS PROCESS IS THE STRATEGIC CORPORATE INTEREST IN THE ACQUISITION OF TECHNOLOGIES, WHICH ALLOWS TO IMPROVE THEIR POSITIONS IN THE MARKET WITH MINIMUM TIME AND FINANCIAL COSTS, AS WELL AS THE RISKS ASSOCIATED WITH THE DEVELOPMENT OF A NEW PRODUCT/TECHNOLOGY. THUS, THE CREATION OF HIGH-TECH COMPANIES GROOMED FOR SUBSEQUENT SALE BECOMES A PROSPECTIVE AND EFFICIENT BUSINESS MODEL.

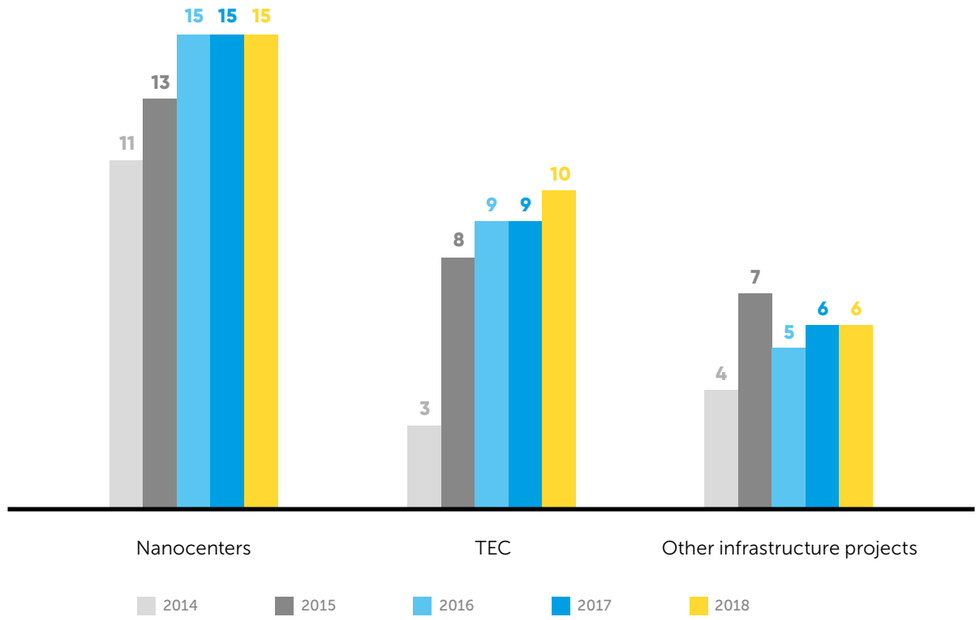
In the Russian market, the Fund is the only organization that invests in the infrastructure of new type and develops approaches that allow to realize "mass creation" of businesses in the material-based and hardware industry. At the same time, the Fund has managed to overcome the cliché established in the Russian practice stating that Russian scientific developments, regardless of the scale of investments, cannot be profitably sold. In the process of creating startups, the Fund focuses primarily on the business needs, studying in detail the existing market niches and problems: the Fund's companies are in demand, because the tasks for development of technologies and products are set not by scientists, but, first of all, by entrepreneurs.

The Fund's infrastructure projects aimed at creating technological and organizational infrastructure for the development of high-tech projects can be divided into three main fields:

- nanotechnology centers;
- technological engineering companies;
- other infrastructure projects.

By the end of 2018, 15 nanocenters, ten technological engineering companies (TECs) and other infrastructure projects aimed at the development and support of the nanoindustry in Russia were created.

THE NUMBER OF INFRASTRUCTURE OBJECTS (AT THE END OF THE YEAR)



NANOTECHNOLOGY CENTERS

Nanotechnology center (nanocenter) is a center of expertise in certain technological areas, where technical, human and financial resources are gathered to allow quick launch and development of projects as soon as a "window of opportunity" appears and up to the moment when the resulting company, in the material-based or hardware industries, is ready to be sold. The product of the nanocenter is not a technology or product, but a ready-made technological business.

Nanocenters do not support startups, but ensure the creation and development of economically sustainable companies, directly participating in their management. To assure the return on investment, the Fund does not provide support in the form of grants, but uses only repayable financial instruments — loans, capital deposits, as well as raising funds of private business.

THE NETWORK OF FUND NANOTECHNOLOGY CENTERS INCLUDE

15 NANO-CENTERS

11 IN RUSSIAN REGIONS

Nanocentr "Technospark"

A NETWORK OF NANOCENTERS

Nanocenter		Process Specialization
Zelenograd nanotechnology center	**Zelenograd nanotechnology center**	Nanoelectronics and microsystem Technology New Materials and mechnologies Green Technologies Biotechnologies
Nanotechnology Center Tatarstan Republic	**Nanotechnology Center Idea**	Chemistry and petrochemistry Biotechnologies Composite materials
SYGMA Novosibirsk	**Nanotechnology Centre SYGMA. Novosibirsk**	New materials Biotechnologies New energy Mechanochemistry
SYGMA TOMSK	**Nanotechnology Center SYGMA. Tomsk**	Electron beam technologies Modern agricultural industrial technologies Cold plasma technologies

Nanocenter		Process Specialization
НАНОЦЕНТР ДУБНА	**Nanotechnology Center Dubna**	Smart coatings New energy (transmission systems and energy sources) New materials Cosmeceutics
NCC	**Nanotechnology Center of Composites**	Composite materials
ULNANOTECH	**Ulyanovsk Technology Transfer Center**	Construction Autocomponents Aviation and space industry Biotechnologies
	Nanotechnologies and Nanomaterials Center of the Republic of Mordovia	Power electronics Lighting engineering Instrument engineering Nanotechnology in construction
technospark	**Nanotechnology Center TECHNOSPARK**	Applied laser technologies, including laser medicine; Optical and plasma technologies for micro- and nanoelectronics; Synthetic diamonds and equipment based on them for industrial and medical applications; Industrial design and highly integrated electronics; Specialized instrument engineering and precision machine processing Flexible electronics Genomics Additive technologies Composite materials
T•NANO	**Nanotechnology Center T-NANO**	Microelectronics Robotics / Artificial intelligence Big Data / DSS / HPC New breakthrough IT technologies
NWTTC	**North-West Technology Transfer Center**	Radiation technologies Nanoelectronics Nanomaterials
Нанотехнологический центр Самарской области	**Nanotechnology Center in the Samara Region**	Catalysts for petrochemistryl and gas chemistry Perspective power sources Biocompatible materials Innovations for construction of sports facilities
	Krasnoyarsk Nanotechnology Center	Polymer nanocomposites New materials
	Nanotechnology Center Nanotechnologies in Medicine	Regenerative medicine and cellular technologies Personalized medicine and target technologies New materials and medical devices based on them Hardware and software for medical technologies
	Nanotechnology Center St. Petersburg Nanocenter	Additive technologies Sensors Photovoltaics

5 COMPANIES OF THE FUND ENTER THE TOP 10 OF TECHNOPARKS OF RUSSIA ACCORDING TO THE IV NATIONAL RATING

The rating represents an assessment of the efficiency and investment attractiveness of the sites to place and develop high-tech companies. The efficiency of technoparks has been evaluated by the Association of Clusters and Technoparks on the basis of three integral indicators:

- innovative activity of residents,
- economic activity of residents,
- efficiency of the technopark management company activity.

The 5 companies of the Fund that enter the top ten of the rating are: Nanotechnology Center TECHNOSPARK (Troitsk, New Moscow) — on the 1st place,SYGMA.Novosibirsk nanotechnology center (Novosibirsk) — on the 3rd place, Innovative Technopark "Idea" (Kazan) — on the 8th place, Technopark "Sarov" (Nizhny Novgorod region) — on the 9th place, Ulyanovsk Technology Transfer Center (Ulyanovsk) — on the 10th place. For the third year in a row the rating is headed by TECHNOSPARK. This is another proof that the Fund has chosen the correct strategy to build venture businesses. The model of deliberate development of technological businesses for sale, which TECHNOSPARK was the first to switch to in 2014, has proved to be the most efficient.

In total, the rating includes 39 technoparks from 22 Russian regions. The rating is a useful tool to assess the investment attractiveness of various sites. This is an important marker, designed to help the regional authorities and technopark managing companies to improve the site operational efficiency and to develop high-tech small and medium-sized businesses.

THE COMPANIES CREATED WITHIN NANOCENTERS CAN BE DIVIDED INTO TWO TYPES:

01 CONTRACT (INFRASTRUCTURE)

02 PRODUCT (STARTUPS)

THE OBJECTIVE OF PRODUCT STARTUPS s the development, production and launch of product sales. At the same time, they do not have their own laboratory and production facilities and rely on contract companies to manufacture their products.

CONTRACT COMPANIES ARE NOT PERMITTED TO DEVELOP THEIR OWN PRODUCT: they only provide services to produce or develop products for other companies (including both product companies of the nanocenter and external clients), specializing in high-precision metal processing, composites, surface treatment technologies, flexible electronics, industrial design, etc.

This division of labor among the companies allows to run the process of creation and development of startups efficiently because:

- the work is sped up due to the close proximity of contract companies;
- contract companies are not viewed as competitors as they do not have their own product;
- risk of intellectual property theft by the contract company is minimized.

In the end, the cost of building a separate business decreases significantly, and the share of ready-to-sell technology companies increases. The target indicators of the Fund are to raise the number of ready-to-sell companies to 50% (for comparison, the European average is 10%) and to reduce the time it takes to develop a marketable startup from the scratch to 5-7 years (the European average is 12-25 years)[14].

14 European average indicator data are taken from KU Leuven Research & Development.

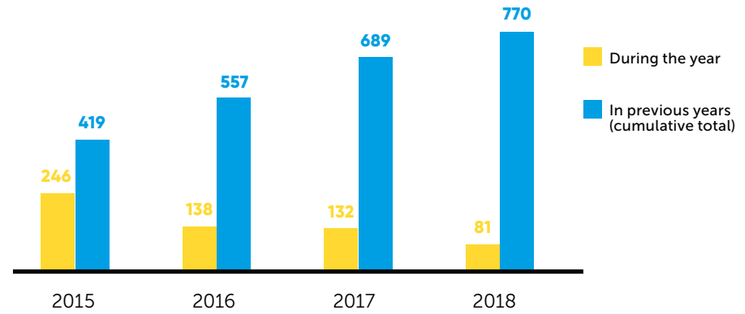
THE KEY PARAMETER OF THE CONTRACT COMPANY'S EFFICIENCY IS THE VOLUME OF REVENUE FROM EXTERNAL AND INTERNAL CUSTOMERS, THE SPEED OF ATTAINING SELF-SUFFICIENCY AND WHEN THE EXPORT PARITY IS REACHED.

The Fund nanocenters sponsor the creation of dozens of startups in the material-based and hardware industries annually in many fields such as: warehouse robots, composite arcs for bridges, lasers for ophthalmology and micromachining, flexible electronics, genomics, industrial microbiology, endoprosthetics, lenses with specialized coatings, artificial diamonds etc.

IN 2018, THE NUMBER OF NEW STARTUPS CREATED WITHIN THE FUND INFRASTRUCTURE AMOUNTED TO 81

AND THE TOTAL NUMBER OF STARTUPS WAS 770

THE NUMBER OF NEW STARTUPS



MANUFACTURE OF BLADES FOR WIND TURBINES — THE PROJECT BY ULYANOVSK NANOCENTER

In Ulyanovsk region, Vestas Manufacturing Rus is engaged in localization of composite blades for wind turbines which have no analogs in Russia. The installed capacity of the power equipment will amount to 3.6 MW with the extension capability up to 4.2 MW. The partners of the project are Vestas, RUSNANO and Consortium of investors in Ulyanovsk region, which includes the Ulyanovsk nanocenter ULNANOTECH. The volume of investments amounted to more than 1 billion rubles and helped to create more than 200 new high-tech jobs for the region residents. The annual production of wind power plant blades will be about 500 by 2021.

In 2018, the main production equipment was launched at the factory site — molds for manufacturing 64-meter blades for wind turbines.

Starting the production of composite blades for wind turbines with the participation of Ulyanovsk nanocenter ULNANOTECH

ALEKSEY ZARENBIN

CEO, FORC — Photonics

Acquiring a share in Femtotech for us is the expansion of our process capabilities of manufacturing fiber optic sensors with the use of the FBG femtosecond recording technology. Since the technology is patented, this will ensure a stable and a guaranteed operation in the market.

MUCH ATTENTION IS PAID TO THE PROTECTION OF INTELLECTUAL PROPERTY: ALL NEW PRODUCTS THAT STARTUPS DEVELOP ARE PROTECTED THROUGH PATENTS AND KNOW-HOW: IN 2018, 94 RESULTS OF INTELLECTUAL ACTIVITY WERE PRODUCED, AND FIVE FOREIGN TECHNOLOGIES WERE TRANSFERRED TO RUSSIA.

SYGMA.NOVOSIBIRSK SOLD ITS SHARE IN A LASER STARTUP

On October 2018, SYGMA.Novosibirsk has made an exit from the Femtotech startup which was involved in the development of the laser modification of optical fiber for optical sensors. The share was acquired by the manufacturer of fiber optic systems FORC — Photonics Innovation company.

SYGMA.NOVOSIBIRSK made investments in the budget of Femtotech in 2015 enabling the company to develop and patent a laboratory technology for coating of fiber optic Bragg grating using a phemosecond laser. The optical sensors measure temperature, pressure, compression/expansion, they are compact, do not require power supply, capable of operating in aggressive environments. Optic fiber is connected with the light source and the answering equipment which measurs the spectra of reflection from fiber Bragg gratings (FBG) and transmits data to the control electronics. FBG is a short segment of the modified optical fiber reflecting particular light wavelengths and passing all the other wavelengths; change of the temperature, compression/expansion, pressure my be evaluated by the change of transmitted/reflected spectrum. Application areas of fiber optic sensors are construction, composite materials oil and gas production, medical equipment, telecommunications and other fields.

The share of "SYGMA.Novosibirsk" in the startup "Femtotech", which develops the technology of laser modification of optical fiber for optical sensors, was bought by the manufacturer of fiber-optical systems

NANOTECHNOLOGY CENTER OF COMPOSITES HAS WON THE PROJECT "NATIONAL CHAMPIONS"

NCC LLC has become one of the best Russian high-tech companies, which were selected for participation in the priority project of the Ministry of Economic Development of Russia "Support of leading privately-owned high-tech companies".

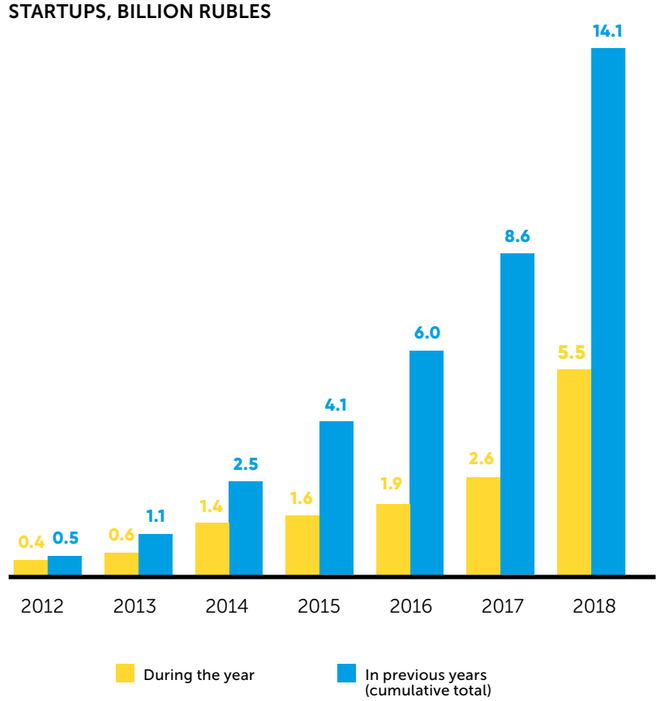
The victory has become possible thanks to the efficient work of all NCC employees in 2018, which brought the company to a top position in the national rating "TechSuccess".

One of the key products manufactured by the Nanotechnology Center of Composites is the CarbonWrap External Reinforcement System (ERS). The ERS is intended for repair and reinforcement of building structures to eliminate the consequences of concrete failure and reinforcement corrosion as a result of the long-term effect of natural factors and aggressive environments during operation.

This year, in the Republic of Belarus, the works on structural reinforcement of several objects were completed. So, for example, in a residential house located at the address 32 Yakubova Street, Minsk, ribbed plates on the technical floor of the building were reinforced. The works involved the application of the CarbonWrap carbon ribbon and CarbonWrap Lamel. Reinforcement was necessary due to the insufficient bearing capacity of plates for a temporary snow load. The application of ERS enabled considerably reducing the time and cost of repair activities with no weighting of the existing structures.

Another facility repaired using the ERS technology in the current year in Minsk is a building located at 48-2 Babushkina Str. Here the flooring plate reinforcement was necessary due to their insufficient bearing capacity. Considering high criticality of the equipment, CarbonWrap Tape with a density of 530 g/m² was applied here.

THE REVENUE OF THE NANOCENTERS AND THEIR STARTUPS, BILLION RUBLES



The revenues of the network of nanocenters continued to grow in 2018 and amounted to **5.5** billion rubles

The total value accumulated since 2011 exceeded **14** billion rubles

The number of employed in infrastructure projects and incubated by them companies amounted to **3.2** thousand workers

More than **10** "exits" of NC's portfolio companies have been formed in 2018

SERGEY ISKROVSKY

founder of Altermedika

"We estimate that the demand for such cages is 5,000 pieces per year. Since the product "3D-cages" will be much cheaper than analogues and will not be inferior in quality at the same time, we can talk not only about import substitution, but also, perhaps, about the export potential of additive products".

IMPLANTS FOR OSTEOCHONDROSIS TREATMENT WILL BE MANUFACTURED IN RUSSIA

The 3D-Cage startup by the Northwestern Technology Transfer Center announced the development of the first cages in Russia for the replacement of the damaged invertebral discs. The developed cages will be mass produced by 3D printing in standard sizes. Invertebral cages are installed in the course of a spinal column stabilization surgery (spondylosyndesis). During the surgery, a damaged invertebral disc is replaced with a solid cage which holds one vertebra above another at a required distance while retaining the spinal column segment and relieving pain. With time, the vertebrae get fused together with the cage forming a single bone block. Already on the second day of the surgery patients may stand up, and less than in a week they are discharged from hospital. Such cages do not require replacement throughout the patients' life.

The 3D-Cage startup by the Northwestern Technology Transfer Center included in the investment network of the Fund plans to develop and register a range of mass-production 3D printed cages by 2020. The partner for the market launch of the products is Altermedika, who is one of the leaders in distributing the implants and endoprostheses. The individual items, which can be used for surgeries, have already been manufactured by the Group of Companies. Nowadays approximately 10 thousand surgeries are performed in Russia involving the use of externally manufactured implants. The competitive price will be achieved due to the contract-based manufacturing of the implants by TEN.MedPrint specializing in the medical 3D printing. The start-up does not need to purchase and install expensive equipment on its own expense allowing it to significantly reduce the costs and to speed up its entry to the market.

"3D Cage" implants for the treatment of osteochondrosis production startups Northwest Center for Technology Transfer

RUSSIAN FOOTBALL FOAM FROM TECHNOSPARK WAS INCLUDED IN THE SHORTLIST OF BEST INNOVATIONS FOR SPORTS

The disappearing foam for football referees produced by the company "TEN+1" was among the best innovations for sports. That was announced by the organizing committee of the Sport Innovations Awards, publishing a shortlist on the results of online-voting of the jury.

The foam TEN+1 SPRAY, developed by one of the startups of the company group TECHNOSPARK, reached the final in the nomination "Innovative technological solution for coaches, scouts, agents and judges" together with the service on sports data analytics InStat Sport.

TEN+1 SPRAY is the first disappearing foam for football referees produced in Russia. The foam is necessary to designate lines, beyond which the players must stand when building a defensive wall during a penalty kick. For the first time the spray of this type was used at the World Cup in Brazil in 2014. The Russian spray TEN+1 passed the first tests in 2016 and was modified and upgraded afterwards. The spray is environmentally safe and does not leave a soapy residue on the lawn. The time of spray dissolution is three minutes.

Disappearing foam for football referees of the company "TEN + 1" has been declared the best innovations for sports

TECHNOLOGICAL ENGINEERING COMPANIES

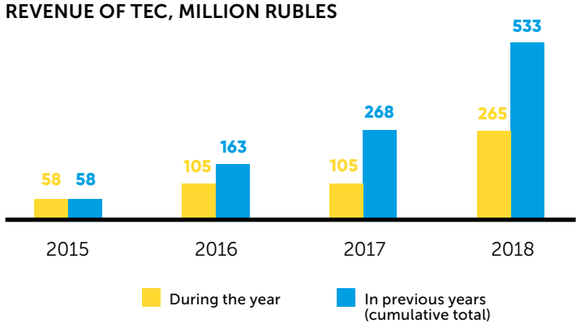
A technological engineering company (TEC) is the company developing and implementing original technologies, equipment, process solutions or products based on the available technologies through the request of third-party companies. A TEC is the link between the basic technologies available with them and customers possessing production capabilities for the production and sales of high-tech products. Engineering teams of small and medium businesses including those of innovating companies and nanocenters and higher education institutions act as the suppliers of basic technologies for establishing a TEC. Involving TEC in a production or technological process allows improving the investment attractiveness of projects due to the minimum investment of financial, time and labor resources and decreasing the risks.

TEC render the services as follows:

- technical and economic evaluation of possible solutions for the customer (process audit);
- technical designing;
- process design;
- design survey, development of technical specifications for integrating the process solution in the production process;
- development of the design documents for the manufacture of process equipment including for modernization of the existing production lines;
- development of industrial prototypes of process equipment and systems necessary for implementation of process solutions;
- production of experimental and inspection lots of products;
- creation and management of intellectual property;
- management of internal project (development of customized solutions for customers);
- installation, maintenance and repair of the production equipment developed;
- supply to the customer of the necessary OEM-components and systems as well as design documents for their manufacturing.

In the terms of infrastructure development, the Fund has already established ten TECs, formed according to the "platform" principle, which provides access to common equipment and/or technologies for several startups at the same time. In the reporting year, a new TEC "Fablite Electronics" was established.

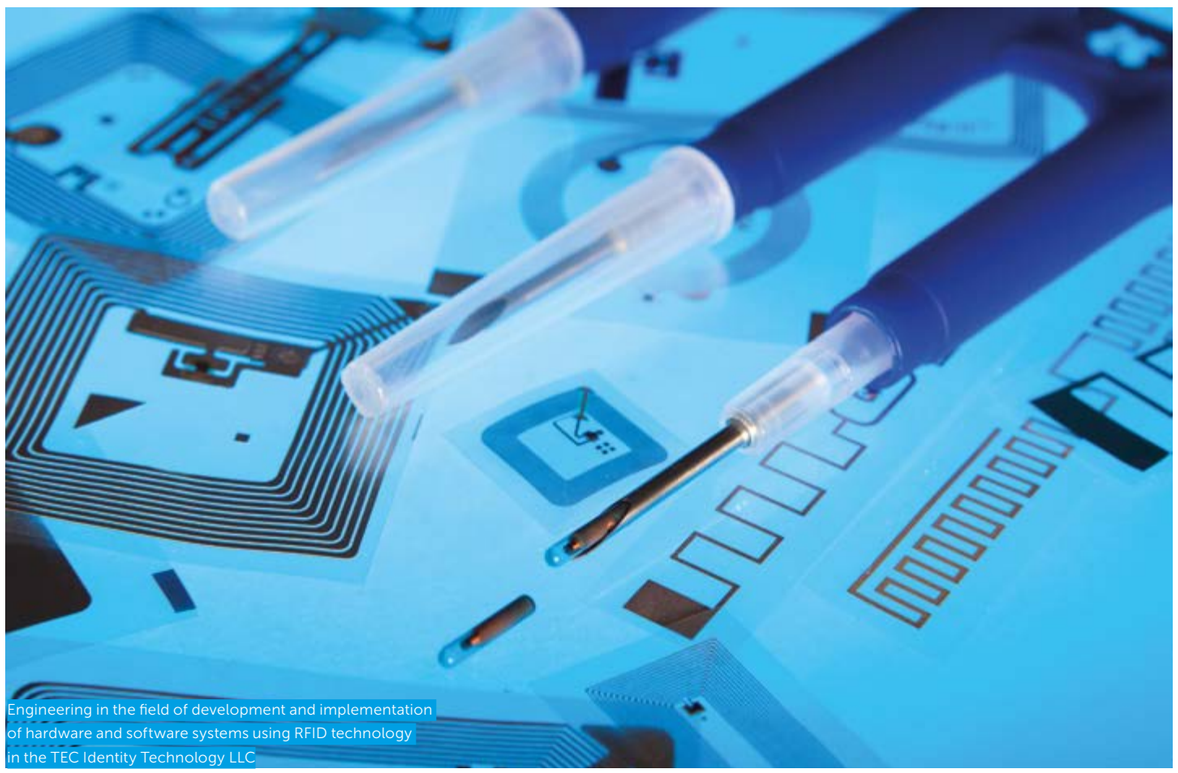
REVENUE OF TEC, MILLION RUBLES



In 2018, 6 results of intellectual activity were created; TEC revenue amounted to

265

million rubles



Engineering in the field of development and implementation of hardware and software systems using RFID technology in the TEC Identity Technology LLC

TECHNOLOGY OF IDENTIFICATION LLC (IDENTIFICATION TECHNOLOGY)

Technology of Identification LLC is involved in engineering in the field of the development and introduction of hardware and software complexes based on RFID technology. This enables automating various production and household tasks in logistics, manufacture, agricultural complexes, transportation systems, security systems, warehouse management systems.

In line with the Agreement between the Government of the Russian Federation and the Government of the Kyrgyz Republic on technical assistance to the Kyrgyz Republic within the framework of the EAEU accession process, in 2018 the company has implemented a large-scale international project on the selection and supply of readout devices, RFID tags for horses and ear tags for small cattle aimed at provision with the equipment for identification of animals by the State Inspectorate for Veterinary and Fitosanitary Security affiliated to the Government of the Kyrgyz Republic.

Key TEC's partners: Crocus Group, NRU BelSU, Cotton Way, TECHNOSPARK NC.

MAXPOWER HAS LAUNCHED THE MANUFACTURE OF ACTIVATED CARBON FOR SUPER-CONDENSERS

The design company of the Dubna Nanocenter and MaxPower Technology Transfer Center by RAS and RUSNANO has completed the development of a process line for the manufacture of activated carbon for the supercondenser electrodes and manufactured the pilot facility capable of producing 500 kg of carbon per year. The first batch of the activated carbon according to the design was manufactured as well.

The main product manufactured by the company is the high-grade activated carbon which is a key component of super-condensers which are used for producing carbon electrodes allowing to obtain a double electrical layer. Presently, activated carbons are predominantly manufactured of high-quality bituminous coal and biomass, mainly the coconut shell. The major activated carbon manufacturers for super-condensers are: Norit (Netherlands), Kuraray (Japan), EnerG2 (USA). Considering the fast-paced market of super-condensers, the global demand for high-quality cheap activated carbons is growing. In Russia presently there are no companies involved in the commercial manufacture of carbons for super-condenser electrodes. However, the carbons developed by the MaxPower project team based on wood (birch or alder) are capable to compete with world analogs in terms of their characteristics.

In the course of the projects, laboratory and pilot technologies for synthesis of activated carbons with high efficiency were developed and elaborated. Presently, experimental batches undergo testing at manufacturing plants of the main consumers: Elekond, Maxwell, etc.

MaxPower carbons have a series of advantages as compared to the coals available in the market:

- up to 30% increase of specific capacity;
- a considerably lower cost;
- unlimited (reproducible) low-cost raw material reserves (wood).

In terms of their specific and cost the developed technologies and carbons manufactured based on them may compete with all the analogues existing in the world therefore they should be in demand by both the Russian and foreign manufacturers of super-condensers.

OTHER INFRASTRUCTURE PROJECTS

In addition, the Fund implements other infrastructure projects:

- technology transfer centers (TTC);
- key and / or backbone components of social and innovative infrastructure.

The main goal of TTC is to create conditions for sharing of expertise and technologies among research institutes and businesses. The TTC combines the efforts of independent Russian research centers, and coordinates their activities with the operations of the world's leading research and development centers. TTC helps to turn the results of scientific research into the final product of specific enterprises by providing comprehensive support to potential consumers of technologies, including:

- awareness about technological development trends;
- offering the best technological solution;
- helping to select a foreign partner;
- creation of a research center that ensures the selection and training of personnel and supports the process of technology development and introduction up to the stage when series production begins.

THE REVENUE OF OTHER INFRASTRUCTURE PROJECTS AND THEIR PROJECT COMPANIES AMOUNTED TO 60 MILLION RUBLES IN 2018; 8 RESULTS OF INTELLECTUAL ACTIVITY WERE REGISTERED.

SUPPORT OF TECHNOLOGY ENTREPRENEURSHIP

One of the most important fields of the Fund's strategic work is to ensure the development of technology entrepreneurship. In this regard, one of the Fund tasks is to prepare unique analytical materials and to organize communication platforms. Communication channels continue to be actively developed on the basis of the JUMP!Venture[15] magazine (jumpventure.online) created in the beginning of 2017:

- technological magazine-digest contains translated articles from the leading foreign reports and reviews on the topics of material-based technologies, venture investments, as well as infographics and awareness-raising modules about the startups of the nanocenter network; and subscription to the digest is available to potential investors;
- news feed in Facebook — JumpVenture Media is maintained; it publishes news on global technologies within the framework of fields relevant to the network of nanocenters (mainly in English);
- technological seminars of a new generation are held on the topics relevant to the network of nanocenters — Jump!Session;
- employees of the network and companies included in the network have access to a weekly bulk messaging that presents a digest of key news — Jump!Monday.

15 The magazine is published in Russian every two months.

210

PARTICIPANTS took part in the Fund-held seminars for ensuring the development of technological entrepreneurship

In 2018, the Fund held two seminars together with the Group of companies TECHNOSPARK:

- Seminar "RFID: Russia in the world or the world in Russia?" was attended by about 60 people (the representatives of the Fund, RUSNANO Management Company, project companies of nanocenters, etc.). During the event were presented the RFID market and production technologies review, as well as key global challenges in the field of RFID. In addition, the status and capabilities of the RFID-related companies that comprise RUSNANO portfolio have been discussed.
- About 150 people (the representatives of nanocenters, the participants of the exhibition CeMAT Russia 2018) took part in the seminar "Digital transformation in logistics", held within the framework of the IX International Forum "Efficient management of enterprise intralogistics". Within the framework of the seminar were discussed the near future and leaders of digital transformation in logistics, including unmanned vehicles, warehouse robotics, solutions in last-mile zone and serialization technologies.

Panel discussion "Digital Transformation in Logistics" at the International Exhibition CeMAT Russia 2018 and the Forum "Effective Management of Enterprise Intralogistics".

In view of the acute shortage of experienced technological entrepreneurs in the Russian labor market, the careful search and education of a younger generation, that are receptive to the paradigm of technological entrepreneurship, becomes particularly relevant. In order to address these issues, the Fund implements projects aimed at the formation of favorable environment for the development of innovative creativity of schoolchildren and identifying the entrepreneurial potential of adults.

PROJECT SCHOOL IN TROITSK

The group of companies TECHNOSPARK includes the Center for Youth Innovative Creativity (CYIC), that was established in order to provide favorable environment for the development of the potential of students who, 10 years later, will fundamentally raise the level of production, science and business and set very different expectations for the concept of "quality of life."

The main objective of the Project school operating in CYIC in the city of Troitsk is to inspire schoolchildren who wish to work on their own projects, to provide them with technological and intellectual resources, to let them gain knowledge in the field of high-tech, to find partners and, ultimately, to help them to develop their own project.

The educational space, allocated in the very center of the science city on the territory of the municipal business-incubator in Troitsk, includes:

- IT-class a computer studio equipped with modern laptops whose software allows designing and creating non-standard solutions for engineering, robotic and designer tasks;
- FAB LAB — a unique digital laboratory featuring the advanced metal, wood and plastic working equipment in the field of 3D modelling and electronics.

The participants of the Project school have the choice to complete six educational modules in a self-selected sequence during a year:

- electronics and programming;
- robotics and mechanics;
- 3D modelling;
- alternative energy;
- composite materials;
- laser technologies.

By creating startups, the Fund annually opens dozens of entrepreneurial vacancies, attracting candidates who are ready, persistent and willing to engage in entrepreneurship and to establish a technological company.

"BUSINESS DEBUT 2019-2020"

A program is organized for students and graduates of universities, within the framework of which they can take part in the qualifying business game "Build a company. Sell the company", test their entrepreneurial skills and get real business-prospects right away.

100 qualified winners will get a job in a technological startup, opened by an experienced entrepreneur with the support of eight Russian venture companies from Saransk, Ulyanovsk, Kazan, Moscow, St. Petersburg, Novosibirsk, Tomsk and Troitsk (New Moscow).

Those of them who will show significant business achievements in ten months will receive investments for the development of a startup — each startup will get one million rubles to create its first product and to pay wages to budding entrepreneurs.

DENIS KOVALEVICH

CEO of TECHNOSPARK

"One of the most important components in our technology of serial construction of companies is ensuring a constant inflow of new people into start-ups. And we are talking here about very specific personnel. Through the program created in TECHNOSPARK, which we have named "Business Debut", we recruit young people without experience who intend to devote their lives to technological entrepreneurship. And we let them work within our new companies. In our vocabulary we call them venture builders, they are not managers, but those who build a company literally from the scratch."

2.2. EDUCATIONAL PROJECTS AND PROGRAMS

182 EDUCATIONAL PROGRAMS HAVE BEEN CREATED WITH 80 THOUSAND SPECIALISTS AND STUDENTS OF PROFILE SPECIALTIES HAVE BEEN TRAINED USING THEIR MATERIALS

21,000 PERMANENT USERS OF EDUCATIONAL PLATFORMS EDUNANO.RU AND STEMFORD.ORG

MORE THAN 1,000 SCHOOLS AND 21 REGIONAL RESOURCE CENTER ARE UNITED IN FEDERAL EDUCATIONAL NETWORK “RUSNANO SCHOOL LEAGUE”

63 PROFESSIONAL STANDARDS FOR PROSPECTIVE ENGINEERING PROFESSIONS WITH SPECIALIZATION IN NANOTECHNOLOGY HAVE BEEN DEVELOPED AND APPROVED BY THE NATIONAL COUNCIL UNDER THE PRESIDENT OF THE RUSSIAN FEDERATION ON PROFESSIONAL QUALIFICATIONS

The pace of modern science development, the emergence of new technological solutions, breakthrough ideas require each participant to continuously update his or her knowledge and to perfect professional competencies. That is why one of the main Fund objectives is to raise the potential of personnel working in nanoindustry and related to it high-tech sectors of the economy. Creating a sectoral system of professional qualifications, promoting the integration of knowledge-based businesses with personnel training contributes to increasing both the competitiveness of professional education and the labor productivity of enterprises.

THE FUND FOCUSES ATTENTION ON SUPPLEMENTARY EDUCATION, INCLUDING IN ELECTRONIC FORMAT, FOR A WIDE AUDIENCE: FROM SPECIALISTS OF ENTERPRISES AND TEACHERS OF EDUCATIONAL ESTABLISHMENTS TO STUDENTS AND SCHOOLCHILDREN.

EDUCATIONAL PROGRAMS ON PROMISING TECHNOLOGIES

The interest of enterprises in training is driven by the introduction of advanced technologies, production and sale of new products. Regarding education the businesses expect getting quick results and the development of relevant production skills by the employees.

THE FUND HELPS TO ESTABLISH INTERACTION BETWEEN BUSINESS AND EDUCATION SYSTEM: ABOUT A THIRD OF NANOINDUSTRY COMPANIES HAVE ALREADY REQUESTED THE FUND TO HELP CREATING NEW EDUCATIONAL PROGRAMS.

Helping enterprises of the real economy to forward relevant qualification requests to universities ensures the convergence of the education system and business, timely training of personnel in accordance with the requirements of innovative production.

For academic collectives of the educational establishments, which have qualified through competitive selection, the Fund organizes special training and provides expertise that is necessary to develop the programs of supplementary professional education focused on the skills in short supply at the labor market. Such work enables the institutions of higher education and scientific organizations as a whole to gain competence in the development of flexible educational programs and courses for professionals and students.

The programs created with the support of the Fund include electronic training courses, virtual simulators and other digital resources that ensure that the students get not only new knowledge, but also develop skills working with high-tech equipment. The modular structure of educational programs makes them a flexible constructor of educational pathways.

STANISLAV GORBATOV

Ph.D., Deputy Director of economic relations and marketing, FSBSI "FSC of food systems named after V. M. Gorbatov" RAS

"In July-September 2018, the specialists of our Center took training courses on the following topics: "Translation of qualification requests filed by manufacturing companies into planned results achieved through professional education programs", "Development of professional education programs for the nanoindustry" and "Technology for the development of evaluation tools for the implementation of the professional education program (advanced training and master course) for the nanoindustry". The provided courses were taught aptly and allowed us to prepare competently and professionally to the development of advanced training programs. The structure of the courses allows even a not very experienced user, or a specialist from a completely different field of knowledge, to understand how to build a modern advanced training program, what terminology is used, and what evaluation tools are more appropriate to apply. And it was extremely useful and interesting for us to get such experience!".

An integral requirement of the Fund is the involvement of specialists and scientists from other universities or industries, including foreign ones: that ensures the integration of advanced experience and knowledge, as well as develops network interaction among educational establishments.

The rights to the developed programs remain with the universities, which allows further successful replication of their materials, promptly training personnel of other companies and updating the content of training programs for students.

Since 2011, 180 companies, as well as nanocenters, technoparks and regional clusters have started developing new educational programs; 61 universities and 11 scientific organizations acted as their developers. Geography of cooperation is spread from the Far East to Kaliningrad.

The developed programs contributed to the transition of companies to new production technologies and to the spread of Russian innovative products. Their subject matters are related to various branches where nanotechnology solutions are used..

Among the key events of 2018 are:

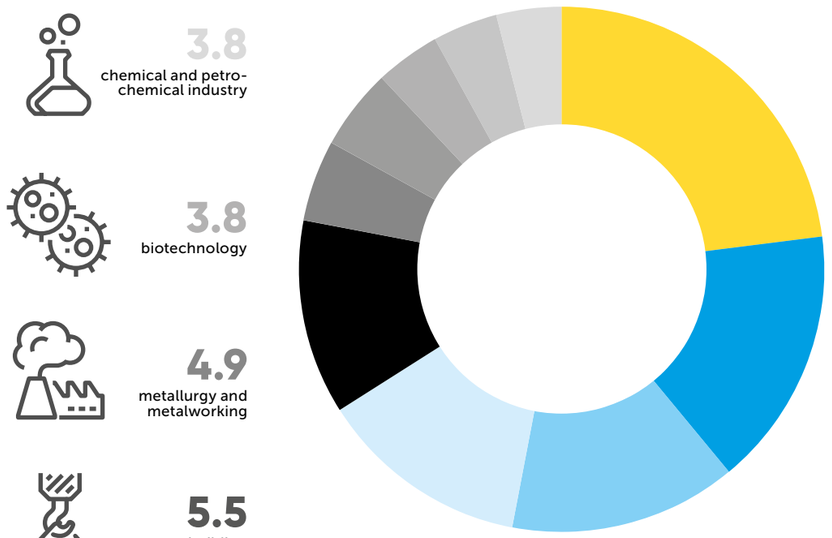
- start of the program aimed at the training of personnel for the rapidly growing sector of renewable energy sources — wind power;
- for the first time in supplementary professional education, the model of training through the Internet messenger was tested -Telegram channel services have provided efficient and flexible communication between teachers and students, completely replacing lecture sessions;
- a unique virtual simulator was developed for specialists in the production of sterile biopharmaceuticals that allows through play-based activities to develop the skills necessary for work in cleanrooms;
- a modular educational program "Internet of things" has started to get developed.

In 2018 MEPhI, Ural Federal University named after the First President of Russia B. N. Yeltsin, Voronezh State University, Novosibirsk national research state university, KNRTU, Vyatka state university, MSUT “STANKIN” and others used new educational programs to conduct training of specialists of such companies as Kriogenmash, IPG Photonics, Nizhnekamskneftekhim, Perm Scientific-Industrial Instrument Making Company, EFKO, OCSiAl, Nanolek, GS Nanotech, Microbor Composite.

180

180 COMPANIES, AS WELL AS NANOCENTERS, TECHNOPARKS AND REGIONAL CLUSTERS
have started developing new educational programs

INDUSTRIAL CLASSIFICATION OF EDUCATIONAL PROGRAMS OF THE FUND[16], %



16 The category "Others" comprises the programs related to standardization, metrology, management of innovations and technological entrepreneurship.

Graduates and teachers of the educational program on diamond composites implemented through the Telegram channel at the presentation of diplomas

ALEKSANDR ANOKHIN

acting Deputy Director of the Institute of Metallurgy and Material Engineering of the Russian Academy of Sciences, Technical Director of Microbor Composite LLC

"The educational program has encompassed all the production cycle: from the scientific idea to the creation of the final product – tool with plates of polycrystalline diamond. Using the messenger allowed to considerably save our time, which is particularly important for a private commercial company."

ADVANCED INTERNET-TECHNOLOGIES FOR PROFESSIONAL RETRAINING OF PERSONNEL

AGENDA:

The development, production and introduction of superhard composite materials (SHCM) of polyrystalline diamond (PCD) for metal working, oil and gas and ore mining industries

DEVELOPER:

MSTU "STANKIN" with the participation of specialists from Bauman Moscow State Technical University and the Vereshchagin Institute for High Pressure Physics, RAS

INITIATOR:

Microbor Composite LLC

TECHNOLOGICAL AND INDUSTRIAL CLASSIFICATION:

- Nanomaterials
- machine building and instrument building.

TARGET AUDIENCE:

- design engineers
- process engineers
- application engineers

ANNOTATION:

The program allows studying the methods for synthesis and sintering of nanomaterials of polycrystalline diamonds and physical and chemical properties of the obtained material, generates unique competencies related to the development of SHCM compositions based on PCD, researching into the properties of materials and alloys, testing of cutting tools, calculating the economic efficiency of all the processes and the product relevance in the market.

The program structure comprises an electronic academic course devoted to the issues and topical problems in the development of superhard materials based on polycrystalline diamonds, nine professional modules, production probation, and final certification.

STATUS:

Training of the first 20 specialists has been completed. Students have presented the graduation theses, on one hand, in clear practice-oriented manner, on the other hand, they have had scientific and practical value for the company.

For the first time in supplementary professional education, the model of training through the Internet messenger was tested. The retraining of personnel was implemented through the Telegram channel: all lectures, organized as nine professional modules, were carried out online. Group chat, data exchange, operational consultations provided the in-service retraining of specialists. Practical training and thesis defense were carried out face-to-face.

A number of modules of the professional retraining program are already included in the university's master programs: 15.04.04 Process and Production Automation, 15.04.05 Design and engineering support of machinery productions, 15.04.06 Mechatronics and robotics.

VIRTUAL SIMULATOR FOR THE FORMATION OF PRACTICAL SKILLS

AGENDA:

"Production of sterile biopharmaceuticals"

DEVELOPER:

Vyatka State University together with FAVEA — the leading European company in the field of design and construction of pharmaceutical facilities

INITIATOR:

Nanolek LLC

TECHNOLOGICAL AND INDUSTRIAL CLASSIFICATION:

- medicine and pharmacology
- healthcare

TARGET AUDIENCE:

- process engineers for the production of sterile biopharmaceuticals
- specialists of the validation department
- specialists of quality control department

ANNOTATION:

The development and production of sterile injected biopharmaceutical preparations represent a complex manufacturing process, coupled with technological problems of ensuring sterility, stability, non-admission of foreign inclusions, and placing high demands on personnel involved in aseptic production. The introduction of advanced technologies requires the development of the necessary competencies of engineering and technical personnel involved in the production of sterile biopharmaceuticals — the ability to develop process operations for the preparation and sterilization of solutions, bottling of biopharmaceutical preparations; develop a validation protocols for technological operations of aseptic filling; develop procedures for monitoring the sterility of biopharmaceuticals.

The program includes a 46-hour electronic training course "Media Fill Test at a pharmaceutical enterprise", part of which is a virtual simulator "MFT simulator". Training on the simulator allows through play-based activities to develop the skills necessary for work in cleanrooms, the actual training in which is hard to conduct due to the strict requirements set for these rooms. Also, the use of the simulator allows to save resources on consumable materials or equipment maintenance.

STATUS:

17 employees of Nanolek LLC have been trained.

The program's educational materials and the electronic course will be used in the operations of the Center of Excellence "Pharmaceutical Biotechnology", which was created in VyatSU, and one of the main objectives of which is the formation of a system of corporate training for enterprises in biopharmaceutical industry, as well as for development of specialized educational programs for bachelor's and master's degrees.

OLEG STRONIN

Director of technological transfer and development department, Nanolek LLC

"Technologies of aseptic filling are extremely capital intensive, so that it is important to reduce the time we need to integrate new equipment in the technological process and to start paying off the investments made. Therefore, it was extremely important to organize the training of employees in order to launch the technology as quickly as possible. The presence of such educational program will allow us to significantly reduce the period of primary training of new employees in the future."

61 AND 11
UNIVERSITIES SCIENTIFIC ORGANIZATIONS
acted as developers for new educational programs under business requests

APPLIED TRAINING OF SPECIALISTS IN THE FIELD OF INTERNET OF THINGS TECHNOLOGY

AGENDA:
"The Internet of Things"

DEVELOPER:
Voronezh Institute of High Technologies with the participation of specialists from Dubna State University, Pan-European University (Slovakia), Jerusalem College of Technology (Israel), Voronezh State Technical University

INITIATOR:
Fund for Infrastructure and Educational Programs

TECHNOLOGICAL AND INDUSTRIAL CLASSIFICATION:
- optics and electronics
- electronics, optoelectronics and telecommunications

TARGET AUDIENCE:
- project managers in the field of corporate computerization
- software developers of client-server applications
- specialists in the field of rapid device prototyping for the Internet of things

ANNOTATION:
The program is aimed at improving the qualifications of applied specialists in the field of Internet of things technology in various areas (energy, industry and manufacture, construction, health, education, transport, security and safety, buildings and structures, logistics, robotics, agriculture, etc.). Its structure consists of five modules that explain how to design the Internet of things systems (including sensors, systems and communication protocols), taking into account the economic aspects of their rollout, the development of Internet of things systems using cloud technologies, the use of additive synthesis techniques for building the Internet of things systems, issues related to their integration, etc.

STATUS:
Training of the pilot group of students will be conducted in 2019.

> 21,000
PERMANENT USERS
of educational platforms edunano.ru and stemford.org

E-LEARNING

The Fund's program "Development of the system of electronic education "e-Learning"", aimed at providing the innovation companies with highly qualified engineering and management personnel, also contributes to the continuous updating of professional knowledge and the acquisition of new skills by everyone. The program is carried out by Autonomous Non-profit Organization eNano, which is established by the Fund and has a license to conduct educational activity.
The program consists of a range of measures and includes:
- development of online courses and selection of the best digital resources of other organizations working in the field of nanotechnology, natural science and technological entrepreneurship;
- creation and development of educational platforms for supplementary education of engineering and management specialists, as well as teachers and schoolchildren;
- advanced training in the field of modern digital technologies, implementation of continuous education programs for teachers working in the system of general and supplementary education of children, university managers and teaching staff;
- network support in the implementation of educational programs, including with participating enterprises of the real sector of the economy;
- promotion of high technologies and business among young people.

70 EDUCATIONAL ESTABLISHMENTS USE IN THEIR WORK ELECTRONIC COURSES AND OTHER RESOURCES CREATED WITHIN THE PROGRAM "E-LEARNING" ON THE BASIS OF LICENSE AGREEMENTS AND CONTRACTS. 80 COMPANIES AND ENTERPRISES HAVE CARRIED OUT TRAINING OF THEIR EMPLOYEES ONLINE ON THE PLATFORM EDUNANO.RU.

To involve the widest possible audience in the development of advanced technologies and the formation of key digital economy competencies, a number of courses, created within the program, are placed on the platforms Coursera (coursera.org), "Modern digital educational environment in the Russian Federation" (neorusedu.ru/), and "Open education" (openedu.ru). The open collection of online courses comprises about one and a half thousand educational programs, electronic modules, and open resources of Russian and foreign institutes.

By the end of 2018, the number of regular users of educational platforms edunano.ru and stemford.org exceeded 21 thousand people, and the total number of times when portals were accessed increased by 65% in comparison with the previous year.

The program partners are the NTI University "20.35", MIPT, MISiS, MEPhI, RANEPA, Siberian Federal University, Tomsk State University, MIET, Institute for Strategic Risk Analysis, Moscow Pedagogical State University, Faculty of materials science of Lomonosov MSU, CYIC Nanotechnology, Zaryadye Park, School of New Technologies, Educational Center "Sirius" and others.

Four Moscow universities participate simultaneously in the network Interuniversity master's program on technological entrepreneurship, which also unites two dozen companies of the real sector of economy (OCSiAl, Mapper Lithography, InEnergy, R-Sensors, Technovision, QRate, Center of open systems and high technologies, etc.). Graduates of the network master program are professionals who have the skills relevant to employment and who understand the essence of entrepreneurial activity.

17 MIPT, MEPhI, MISiS and RANEPA.

Graduates of the Interuniversity master's program

ALEXANDER FILIPPOV

MEPhI

"They taught all of us in technical universities how to do something scientific, ground-breaking and cool. But they have forgotten to add that this can also bring money, and have not explained how.

The technological entrepreneurship gives what universities missed: how to make from a cool idea a product and how to sell it later, how to carry your idea through all stages of creating a business and adapt it to what the market needs."

In 2018, among the key results of the "e-Learning" program are:

- one of the e-learning courses of the educational platform stemford.org has become the winner of the IV International competition of the open online-courses "EDCRUNCH AWARD OOC 2018";
- six courses on entrepreneurship have been developed as mass open online courses, including a series of three courses "Present! How to present a technological project to an investor, client and partners", a course "Flexible methodologies of developing high-tech products", a course "Fundamentals of designing and developing the Internet of Things applications", and a course "Branding in innovation: a new communication reality";
- a course "Communications for technological companies" has been prepared with the participation of the Russian Association of public relations (RAPR). The course sets the objective to introduce employees of innovative companies, who are responsible for PR or marketing communications, to the basic principles, concepts, trends, methods and tools of modern communications.

ELENA SANAROVA

managing director for corporate communications and public relations of RUSNANO Management Company

"It is really very difficult to talk about technological innovations and technological entrepreneurship in a simple and accessible way. In my opinion, RUSNANO has gathered one of the strongest teams in the market of popularization of science and technology. Now, thanks to RAPR and ANO eNano we have an opportunity to take stock of the ten-year experience in popularization and talk about it systemically."

EDUCATIONAL PLATFORM COURSE STEMFORD.ORG IS THE WINNER OF THE IV INTERNATIONAL COMPETITION OF THE OPEN ONLINE-COURSES "EDCRUNCH AWARD OOC 2018"

ELECTRONIC LEARNING COURSE:

"Nanotechnology and nanoobjects in genetic engineering: benefits and risks"

AUTHOR:

Krasheninnikova Lyubov Veniaminovna, candidate of biological sciences, leading tutor of the OU Business School and IMI LINK, Ph.D., MBA (Open), the Virtual Teacher Specialization University of California, Irvine via Coursera, expert of the Department of pedagogical technologies of continuous education, MSPU

CATEGORY OF STUDENTS:

Students of 9-11 grades who are interested in natural sciences, high technology and have certain knowledge and skills in the field of molecular biology at the level of basic concepts and processes.

ANNOTATION AND CONTENTS:

The course presents introduction to the methods and results of development of genetically modified organisms (GMO). The types and use of GMO are considered in the context of the role that nanosystems and nanoobjects play in improvement of human health and quality of life. While learning the subject the schoolchildren:

- are introduced to created by nature nanosystems of life-support and their relevant nanoobjects;

- study the nanoinstruments used to construct new living systems to improve quality of life, and to protect human health and environment;

- consider the examples of successful application of genetic engineering in the field of medicine, pharmacy and agriculture, as well as the main risks in the use of genetic engineering technologies and the methods of their management.

CHARACTERISTICS AND ADVANTAGES:

Russian and English versions of the course are publicly available; they are structured as play-based activities passing through the world of genetic nanoengineering. The plot involves two characters — "good Professor" and "evil Professor" — who confront one another helping the students to recognize the complex issues covered by the course.

ONLINE ADVANCED TRAINING IN THE FIELD OF DEVELOPING MODERN DIGITAL COURSES

AGENDA:

"Designing and developing digital learning courses"

AUTHOR:

Meretskov Oleg Vadimovich, leading specialist in online learning of ANO eNano

CATEGORY OF STUDENTS:

SPECIALISTS OF HIGHER EDUCATION ESTAblishments, supplementary professional education, learning centers, corporate training departments of companies, managers and members of the team developing electronic learning courses, technical support staff of online learning centers.

ANNOTATION AND CONTENTS:

The program provides the knowledge and skills necessary for full-cycle technological production process involved in the development of electronic learning course from the scratch. The student has the opportunity to choose one of the three alternative educational paths depending on the special author's tools, using which the learning tasks will be performed (CourseLab, iSpring Suit or Articulate StoryLine). In this case, the work in a virtual team, in which each participant implements one or more roles (author, project manager, context specialist, imposer, designer, tester, etc.), is emulated and the distribution of roles in the virtual team is carried out by the participants themselves with the teacher serving only in moderation capacity.

CHARACTERISTICS AND ADVANTAGES:

The program is directed to the team-building student activities as a part of the distributed teams of specialists developing electronic learning courses. A company or a university has an opportunity to train a real team of specialists who are already engaged or will be engaged in the development of electronic learning courses.

The program is implemented entirely online allowing students to conduct their training at their place of work. Certification is provided in the format of a webinar, where students defend their projects — a full-featured prototype of an electronic learning course created as a result of implementation of applied tasks.

In the organization of group work of students by this program a number of publications were made about the experience of ANO eNano, among them — an article in a peer-reviewed scientific magazine "Open education".

DOCUMENT OF COMPLETION:

Certificate of advanced training in the established sample.

About 50 persons representing leading higher education institutions of the country — Samara University, PNRPU, YarSU, KNRTU, MISiS, MSUT "STANKIN", Sechenovskiy University, including 8 professors, doctors of sciences, 20 associate professors, candidates of sciences, 2 deans, 2 heads of departments, 5 directors of online training centers.

ELENA KAZAKOVA

scientific counselor of RUSNANO School League

"Our motto is very simple: what is interesting to us (I mean, adults), can also be interesting to children. What is not interesting even to us is unlikely be interesting to children. We do not just teach children — we learn with them. But learning together is very difficult because we, adults, are bad students."

SUPPLEMENTARY EDUCATION OF CHILDREN

Educational projects and programs for children and youth, aimed at developing their abilities and talents, as well as interest in high technologies, are carried out by the Fund in cooperation with centers and organizations of supplementary education of children: Educational Center "Sirius" (Fund "Talent and success"), "Artek" International Children's Center, "Nature Center" scientific and educational center of Zaryadye Park, a network of children's technoparks "Quantorium". Such events do not only motivate the choice of specialties related to research, engineering and technological entrepreneurship, but also contribute to improving the quality of general and supplementary education for children.

The key program of the Fund in this field — "RUSNANO School League" — is aimed at updating the content and improving the methods of teaching natural Sciences. Courses for teaching staff prepare teachers for the use of modern teaching methods in the classroom. Holiday schools "Nanograd" are organized, educational establishments are involved in network interaction. The online format of competitions and courses gives participants an opportunity to learn unique and high-quality materials in a more comfortable environment, at their own pace, and at their place of work or study.

THE FEDERAL EDUCATIONAL NETWORK RUSNANO SCHOOL LEAGUE UNITES MORE THAN 1,000 SCHOOLS AND 21 REGIONAL RESOURCE CENTERS.

More than 200 educational materials, kits and modules, including for STA-studios[18] as well as business cases, have been created through the program RUSNANO School League. STA-studios, launched already in 118 schools, give an opportunity to study the actual problems in the development of modern high-tech business, nano- and biotechnology through project and research tasks. The developed educational materials have been widely distributed through the federal network of organizations of general and supplementary education of children, formed as a part of the program and covering many Russian regions. Distribution of materials developed by RUSNANO School League helps to upgrade methodological, material and technical facilities that are required to implement basic and supplementary general educational programs related to specializations in digitalization, natural sciences and engineering.

More than 90 organizations and companies partner with RUSNANO School League. The lectures and master classes for schoolchildren are carried out and educational materials and tasks are developed with the participation of their representatives, thus contributing to the popularization of technological entrepreneurship.

Participants of one of the summer schools "Nanograd"

18 STA (Science, Technology, Art) Studio is a project that offers comprehensive design solutions for modern educational space and a line of full educational kits — project and research problems that allow to study topical issues related to the development of modern high-tech business, and nano -, bio — and cognitive technologies in the groups of up to 25 persons.

In 2018, more than 400,000 schoolchildren and teachers from more than 1,900 schools from 79 regions of Russia took part in the events of the Week of high technologies and technological entrepreneurship, chosen by the Ministry of education of Russia as one of the federal innovative platforms. Last year, the Agency of Strategic Initiatives for Promoting New Projects and Sberbank joined the project, in which Roscosmos and Rosatom State Corporations were already involved.

>50 event formats	>500 publications in mass media	44,408 downloads of lessons	>1 000,000 project audience
The week of high technologies and Techno-entrepreneurship	2016 March 14–20	2017 March 13–19	2018 March 12–18
Regions	56	74	79
Participants	350,000	280,000	400,000
Activities	>300	>800	>500
Downloads of lessons	13,754	11,339	19,315

The portal of the Week contains teaching aids — "turnkey lessons" — prepared by specialists and experts of partner companies. These lessons are available for download and are intended for students from Grade one to eleven. The whole audience covered by the project in 2016-2018 exceeded one million people.

Olympiads provide another efficient tool for identifying, supporting and developing pre-profession competencies and knowledge of children and young people.

Russian Internet Olympiad "Nanotechnology — Breakthrough to the Future!" is one of the most significant examples of cooperation developed between the Fund and the top national university, Lomonosov MSU. Annually, thousands of school and university students and young scientists from Russia and abroad get the opportunity to test their skills in solving complex interdisciplinary problems. Young people who have excelled in the course of intellectual competitions get the privilege of preferential admission to the Russian universities.

ANASTASIA LEVCHENKO

Project Manager, Polyus-NT LLC

"Educational projects are the platform where you can interact with the younger generation and test hypotheses about the future together. For example, we have a popular product — a stand-simulator for intellectual energy. High schoolers and students learn to model and manage on it the power system of the future. Also, the participation in educational projects gives us understanding of what the younger generation is, what it will need, and how to work with it."

THE INTERNET-NANOTECHNOLOGY OLYMPIAD 2018

DAMIR MYRZANUROV

leading IT-engineer in the CC of BI-technologies development of Sberbank-Technologies

"Participation in educational projects is primarily a way to talk to young and curious audience, to talk about the cutting-edge technologies, to help choose the right development path. And of course, to get interested in your company."

ABOUT THE EVENT:

Russian Internet Olympiad "Nanotechnology — Breakthrough to the Future!" has been held annually since 2007. The Lomonosov Moscow State University and the Fund for Infrastructure and Educational Programs have been its organizers for many years. The chairman of the Organizing Committee is rector of Lomonosov MSU, academician Viktor Antonovich Sadovnichy.

Any participant in the Olympiad can show his or her best skills, knowledge, experience and creativity. Most of the contests are carried out in two stages: by correspondence (qualification Internet round) and in class.

By participating in contests, schoolchildren not only develop competitiveness, but also independence, creative thinking and start viewing the world around as natural scientists

PARTNERS:

Agency of Strategic Initiatives, EuroSibEnergo, NT-MDT, Spectrum Instruments, Russian Academy of Sciences, publishing house "Laboratory of Knowledge","Chemistry and Life" magazine, Russian Chemical Society, etc.

RESULTS:

9,440 participants were involved in the qualification Internet round attempting to solve theoretical and applied tasks and qualified 154 participants from five countries (Russia — 90%, Kazakhstan — 6%, Belarus and the UK — 1%, Tajikistan — 2%), including from 33 Russian regions, were invited to compete in class. Mostly, participants has been presented by students from Grades 5-11 — 88%; students and postgraduates have comprised 5% and young scientists and teachers have been represented by 7%.

The main theory round for schoolchildren of Grades 7-11 has involved a set of subjects: chemistry (187 submissions), physics (142 submissions), mathematics (146 submissions) and biology (344 submissions). The pupils of Grades 4-7 have worked on simpler problems with emphasis on nanotechnology called "The young erudite" (56 submissions). Separately, the schoolchildren have competed in the design projects "Brilliant thoughts" (69 submissions). In 2018, the projects became more complex and interesting, with additional topic on technological entrepreneurship, developed by RUSNANO Group.

Students, postgraduates, young scientists and teachers have taken part in the traditional competition of popular science articles "Simply about complex", in which they have to explain the materials of their scientific articles published in high-ranking magazines in simple terms.

The competition of tutors has allowed to select academic research articles for educational purposes. In 2018, it was significantly changed, as it was previously focused on supporting the cooperation between the Fund and Educational Center "Sirius". International photo contest dedicated to the 150th anniversary of the Mendeleev's Periodic System of Chemical Elements has become a new event of XII Nanotechnology Olympiad.

The Russian round of the Nanotechnology Olympiad was held additionally for senior students, the winners of which together with the team 2017 have taken part in the International Nanotechnology Olympiad for students held in Tehran. The Russian team has defended a comprehensive innovative project on the development of nanomaterials and mobile complexes, capable to solve environmental and bacteriological issues related to the production of drinking water.

NANOTRACK OF NTI OLYMPIAD

Joining efforts with the Agency of Strategic Initiatives as a partner, the Fund has participated in the organization of the National Technology Initiative Olympiad. Specialization "Nanosystems and nanoengineering" is based on the interrelationship of physics, chemistry and biology within the modern scientific world and refers to such NTI markets as HealthNet and TechNet. The projects are developed by highly qualified specialists working in the sector of higher education (ITMO, NSU, Lomonosov MSU) and high-tech companies. Specialization is included in the list of the Russian Council of School Olympiads and its winners receive credits that count towards admission to universities.

> 2.5 THOUSAND

STUDENTS have taken part in three rounds on specialization "Nanosystems and nanoengineering" of the NTI Olympiad

ABOUT THE EVENT:

The National Technology Initiative (NTI) Olympiad prepares schoolchildren for employment in new advanced industries. They are the ones who determine how our country and, possibly, the whole world will look like in 2035.

THE NTI OLYMPIAD CONSISTS OF THREE ROUNDS:

- Individual contest: each participant solves problems in physics, chemistry, mathematics, biology, computer science — depending on the chosen specialization — online;
- Team contest: participants form a team and solve a complex multi-component problem facing the industry online. Online courses help schoolchildren to dive deeper into the problems that the industry faces;
- Final round: the best teams gather in equipped laboratories, where they solve the existing problems of industries for three days.

The NTI Olympiad is growing and developing rapidly. In 2018, it comprised already 17 specializations, each of which corresponded to an entire branch of engineering industry.

Specialization "Nanosystems and nanoengineering" focuses on a wide range of problems related to the use of nanotechnology in various sectors of the Russian industry: from construction to electronics and medicine. Specialization is based on the interrelationship of physics, chemistry and biology that are used to solve pressing engineering problems, it is on the list of the Russian Council of School Olympiads along with a number of other specializations of the NTI Olympiad and gives its winners 100 USE points in the chosen subject.

PARTNERS:

ITMO University; Moscow, Saint-Petersburg and Tomsk Polytechnic Universities, MAI, FEFU, UrFU and Innopolis University.

RESULTS:

In 2018, nanoengineers developed proteins, which can treat diseases. In modern medicine, proteins, such as insulin or substitutes of digestive enzymes, are already widely used but improved methods of nanoengineering can increase the number of protein drugs many times; eventually, medicine comes to the synthesis of individually selected protein types for each patient. That is what the schoolchildren worked with during the final round of the NTI Olympiad.

In total, more than 2.5 thousand students have taken part in three rounds on specialization "Nanosystems and nanoengineering" of the NTI Olympiad. The final round that involved solving of a team problem was held at the site of EC "Sirius" (Fund "Talent and success").

DMITRY CHERNEYKO

chairman of Saint-Petersburg Committee for Labor and Employment

"Digital technology, nanotechnology are useful, but, in any case, it is a human being who is in the center of the production process. The main goal is to apply human capital of necessary quality in required quantity to each point of operations. The question is about the set of competencies necessary for the completion of a specific project as professions as such will become irrelevant in ten years. Their availability can be ensured through the interaction among entire clusters of production and the pools of specialized higher education institutions, and they must necessarily interact through an independent system of qualification assessment. But the system needs to be permanently upgraded during 50 years, that is the entire working career of a specialist in terms of competencies."

In the reporting year:

- Summer school "Nanograd 2018" passed the symbolic torch to the forum of technological leaders "Island 1021", organized by the Agency of Strategic Initiatives;
- a team of Russian students, selected from the winners of the special competitions of the Internet Olympiad in nanotechnology held in 2017 and 2018, have taken part in the first International Nanotechnology Olympiad for students in which the Fund is one of the establishers and key organizers;
- science education program "Nanobiotech" for schoolchildren, the materials of which are included in the program of the "Reserved Embassy" scientific and educational center of the Zaryadye Park, was developed by the Russian national research medical university named after N.I. Pirogov with the Fund support;
- on the basis of EC "Sirius" and under the Fund authority, activity "Nanotechnology" was organized and carried out within the project "Big challenges". The activity involved children who conducted projects on the development of a variety of materials, preparations and devices using nanotechnology (nano-modifying components of concrete, gas sensor based on graphene, substrate for epitaxial filiform nanocrystals and nano-preparations of humic substances of peat) under the guidance of leading scientists and specialists of high-tech enterprises.

QUALIFICATION SYSTEM

The development of the National qualification system (NQS) has given employers an opportunity to define objective requirements for occupations and specialties: qualification profile is represented in skills that an employee has to have to conduct a certain type of professional activity in modern industry and expressed in professional standards created with the help of experts from companies, leading universities and research institutes.

Professional standards are the basis of independent qualification assessment, which allows to identify highly qualified employees and to determine the path of precise supplementary training of the employees. The results of independent assessment help specialists, as well as graduates of higher education institutions, to develop individual paths of their professional development and to increase their chances to find a job in the labor market.

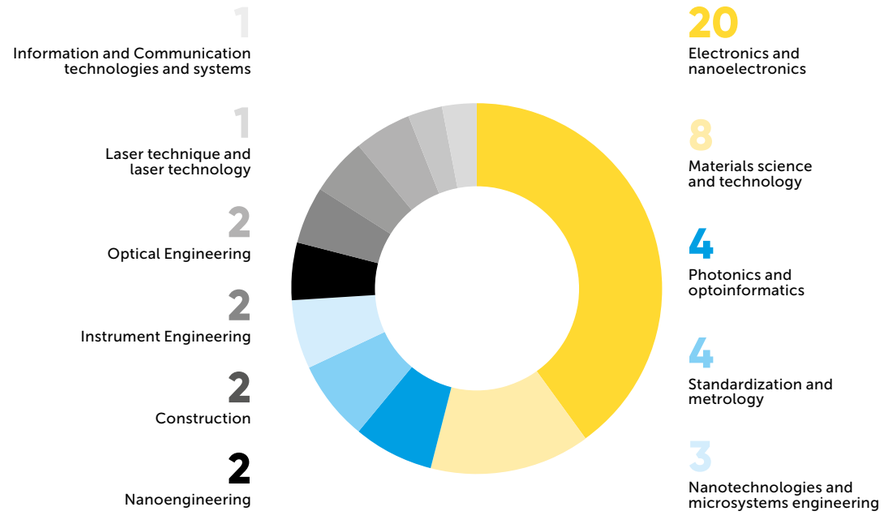
The Fund adopted the program "Development of the assessment system of professional qualifications in the nanoindustry", which provides for the creation of the necessary infrastructure and services, assessment tools based on professional standards, as well as organizes events aimed at increasing confidence in the procedures of independent assessment and provides consulting and methodical support to nanoindustry.

Jointly with the Council for Professional Qualifications in Nanoindustry (SPQ), the Fund supports the development of relevant expert community, monitors the labor market and demand for the instruments offered by the qualification system from corporate human resource offices. Considerable experience has been gained in the formation and organization the work of the regional network of qualification assessment centers and examination sites, cooperation with regional administrations and employers' associations, SPQs of other industries.

Today 63 professional standards have been developed and approved by the National Council under the President of the Russian Federation on professional qualifications for prospective engineering professions with specialization in nanotechnology. More than 90% of them have already been approved by the Ministry of Labor and Social Protection of the Russian Federation.

About 60 examinations are organized for compliance of the federal state educational standards and model basic educational programs of higher education with the requirements of professional standards. 49 programs of higher education in the field of nanotechnology have already passed professional accreditation.

ACCREDITED PROGRAMS ACCORDING TO THE FIELD OF STUDY



The qualification centers for assessment of specialists in the nanotechnology specializations and examination sites operate in 12 Russian regions. 180 sets of tests and assignments have been developed to conduct the professional examinations, more than 130 experts have been trained on assessment of qualifications.

During three years several dozen enterprises have participated in the program implementation and more than 500 applications to pass professional examinations were filed with the qualification assessment centers. 69% of applicants confirmed a high level of their competence and this information is included in the Federal Register of independent qualification assessment.

AMONG SIGNIFICANT EVENTS OF THE PAST YEAR ARE THE FOLLOWING:

a pilot project on training managers and specialists of qualification assessment centers in the field of qualification system management in high-tech industrial sectors;

an online service has been launched on the information platform of the CPQ in the nanoindustry that allows the efficient communication among all parties of qualification assessment from the applicant's request to the issuance of relevant certificate; this service is one of the first in the National qualification system;

an economic model of the qualification assessment system has been developed including the establishment of so-called multifunctional centers of competence for the CPQ of related industries;

a project on development of a unique model of staffing for knowledge-based enterprises has been launched. The project was presented within the business program of XXII International forum "Russian industrialist" and XI St. Petersburg International Innovation Forum;

a large-scale project of the Council on professional qualifications in the nanoindustry "OK!NANO-Tour" was initiated in 2018 with the goal to develop a regional system of qualification assessment in the nanoindustry. The first series of events has been held in Krasnoyarsk, Novosibirsk, Rostov-on-Don and Yekaterinburg, during which the presentations of positive effects of independent qualification assessment were given and business games that offered specialists to pass the demo version of a professional exam took place.

VICTOR LUCHININ

Director of the Department of science of St. Petersburg state electrotechnical University "LETI"

"We need scientific and technological breakthroughs, but they are impossible without people. We need thinking professionals who can implement the development of our infrastructure from a technological viewpoint."

TRAINING IN THE FIELD OF QUALIFICATION SYSTEM MANAGEMENT

COURSE:

"Training of experts of qualification assessment centers (QAC) on qualification system management and QAC development"

AUTHOR:

Olga Mitryakova, PhD in Economics, member of the expert council on business technologies in the field of publishing and printing, Associate Professor of the Moscow Polytechnic University, member of the CPQ in the field of publishing, printing and distribution of printed products

TARGET AUDIENCE:

- QAC managers and specialists

ANNOTATION AND CONTENTS:

The course consists of three modules and is intended for 72 hours. Each module includes a webinar with a presentation of theoretical material, a set of cases for practical training, and variable comprehensive assignments for the final certification of students.

This unique course materials are presented for the first time in a systematic way:

Module 1. Management of qualification lifecycle,

Module 2. Establishment of QAC and administration of its activities,

Module 3. Management of the product/service portfolio of NQS for the sphere of professional activity.

CHARACTERISTICS AND ADVANTAGES:

Training is focused on the development of expert competencies in the field of management of strategic development of the QAC, improving the following skills:

- organization of labor market research based on the targeted objectives; analysis and interpretation of the obtained results;
- decomposition of the sphere of professional activity; modeling of business processes and projection of relevant qualifications for universal and special problems of the sphere of professional activity;
- analysis and assessment of the demand for qualifications for universal and special problems of the sphere of professional activity;
- planning, organization and control of the activities of the team members, development and implementation of management decisions of strategic and operational nature at QAC;
- implementation of financial and economic calculations and planning procedures of the assessment center, development and presentation of the QAC business plan;
- planning and management of the range of QAC services;
- use of research tools and methods to evaluate consumer utility and lifecycle of professional qualifications relevant to the sphere of professional activity;
- identification and analysis of the assortment portfolio of the QAC in terms of economic, market, technological feasibility in short- and long-term.

COMPLETION CERTIFICATE:

Certificate of advanced training.

MODEL OF HR SUPPORT FOR KNOWLEDGE-BASED ENTERPRISES

PROJECT:

"Development of HR model (formation of engineering teams) used for the introduction of advanced production technologies"

DEVELOPER:

LLC Plastic processing plant named after "Komsomolskaya Pravda" with the participation of the qualification assessment centers in the nanoindustry, leading universities of St. Petersburg and Moscow

INITIATOR:

Fund for Infrastructure and Educational Programs

Target audience:

- employers
- representatives of scientific and educational establishments
- students
- departments of labor and employment
- recruiting agencies

ANNOTATION:

The purpose of the project is to determine the minimum set of principles and tools necessary to hire interdisciplinary engineering personnel for advanced production technologies with their subsequent replication.

The "turnkey" staffing model, which includes organizational and management tools adequate to address the modern problems of knowledge-based enterprises, will provide economic benefits, contribute to the development of the human potential of innovative companies and create a modern highly mobile labor market. The objectives of the project are:

- implementation of NQS tools in the current system of personnel management of knowledge-based enterprises,
- application of modern technologies in formation of efficient teams of specialists capable to solve pressing production problems of knowledge-based enterprises in rapidly changing environment of professional activities,
- finding new adaptive management solutions for high-tech companies that help to raise capabilities and competencies of their employees.

STATUS:

By the end of 2019, the formation and training of a pilot engineering team, the development and testing of a program of learning modules/trainings for engineering teams, the development of a staffing model for the introduction of advanced production technologies and mechanisms of their replication will be completed.

ANDREY SVINARENKO

General Director of the Fund

"The transformation of the Fund's accumulated experience and successful practices formed in companies into a single model of staffing can be a useful solution for the training of specialists involved in the implementation of innovations."

2.3. CREATING FAVORABLE REGULATORY ENVIRONMENT

7 CONDUCTED SELECTIONS, EXPERT EVALUATIONS OF MORE THAN

609 ENTRIES AND

9 PROJECTS APPROVED FOR IMPLEMENTATION UNDER AGREEMENT BETWEEN RUSSIA AND ISRAEL ON COOPERATION IN THE FIELD OF INDUSTRIAL SCIENTIFIC RESEARCH AND EXPERIMENTAL DEVELOPMENT WORKS

THE FUND CONTRIBUTES TO ACHIEVING THE GOALS AND TASKS OF **10** NATIONAL PROJECTS AND **28** FEDERAL PROJECTS INCLUDED IN THEM

- INVESTMENT PARTNERSHIPS
- ECONOMIC PARTNERSHIPS
- CONVERTABLE LOANS

IN 2018, THE FUND'S INITIATIVES ARE TAKEN INTO ACCOUNT IN THE CURRENT EDITIONS OF THE FEDERAL LAWS NO. 391-FZ AND № 64-FZ ON ACTUAL DIRECTIONS OF LEGISLATION

- ATTRACTING FUNDS OF APF
- GREEN BONDS
- CROWD FUNDING

TRADITIONALLY, AN IMPORTANT FIELD OF THE FUND ACTIVITIES CONCERNS THE SUPPORT OF THE INNOVATIVE COMPANIES DEVELOPMENT BY REDUCING ADMINISTRATIVE BARRIERS AND LEGISLATIVE RESTRICTIONS THAT PREVENT THE CREATION AND DEVELOPMENT OF HIGH-TECH BUSINESSES IN BOTH TRADITIONAL AND NEW SECTORS OF THE ECONOMY.

The Fund takes an active part in this field working on the development and upgrade of the goals and objectives set in the strategic documents on the state innovation and science and technology policy, as well as in the improvement of the normative legal base of innovative activity.

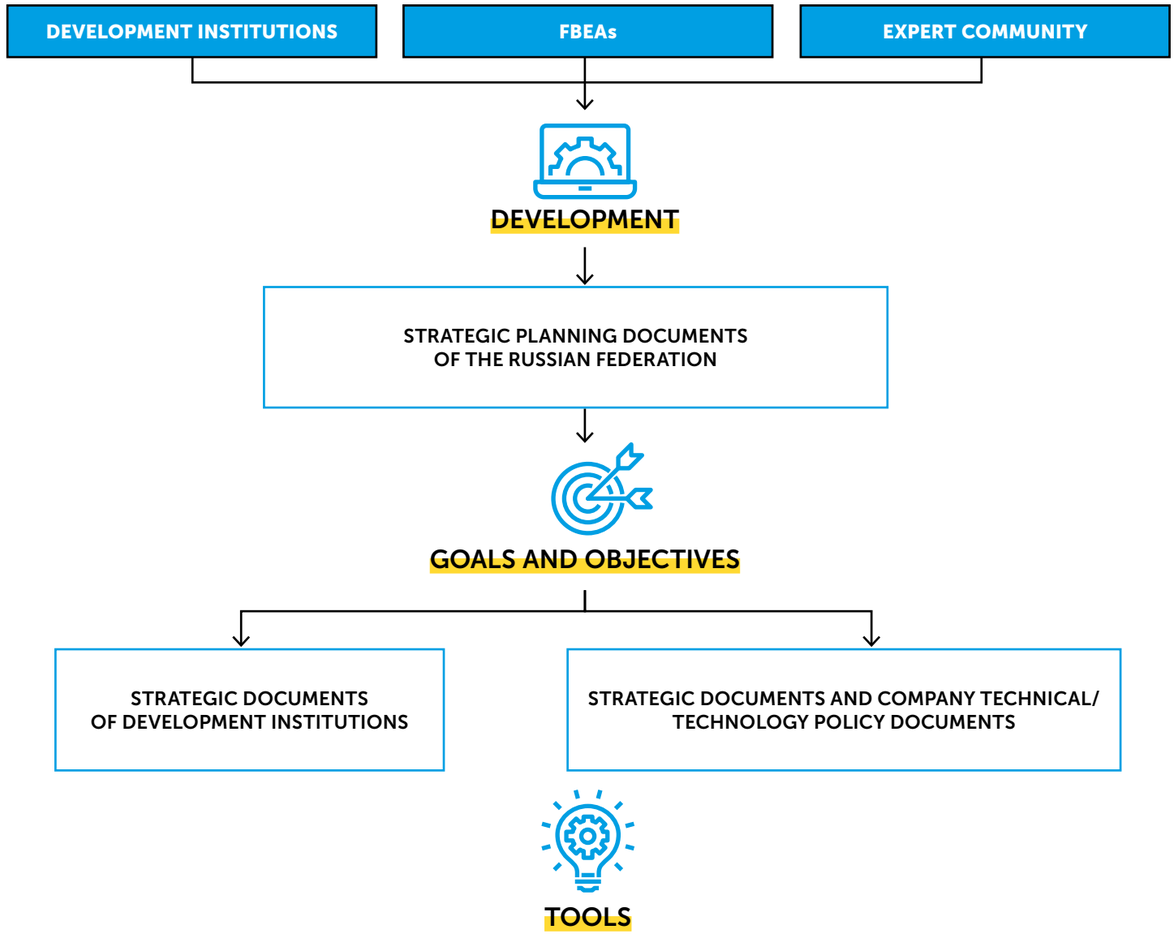
The above work is carried out in close cooperation with the executive branch of the government, development institutions, professional expert community and representatives of innovative companies, that allows to work out proposals for inclusion in strategic planning documents and to prepare timely proposals on updating the regulatory and legal framework of innovative activity.

In addition, the Fund is authorized to work within the framework of the intergovernmental agreement between the Government of the Russian Federation and the Government of the State of Israel on cooperation in the field of industrial research and development (R&D), within which the topics of joint Russian-Israeli projects are selected and implemented.

PARTICIPATION IN THE DEVELOPMENT OF STRATEGIC PLANNING DOCUMENTS OF THE RUSSIAN FEDERATION

In coordination with other development institutions in the field of innovation, the Fund takes part in the development of program documents and in the implementation of initiatives that have an impact on the development of nanotechnology and related to it high-tech sectors of the economy, including through participation in working and expert groups formed under the federal executive and legislative branches, all-Russian platforms, such as the Russian Union of Industrialists and Entrepreneurs (RSPP), development institutions, etc.

Council of the venture capital market of Russian Venture Company



19 Resolution of the Government of the Russian Federation dated 31.03.2017 No. 392 "On amendments to the state program of the Russian Federation "Economic development and innovative economy".

The Fund focuses on the goals and objectives of the strategic planning documents of the Russian Federation in the field of innovation, including the Scientific and Technological Development Strategy of the Russian Federation, the Strategy for Russia's Innovative Development for the period up to 2020, national projects (programs) developed in accordance with the decree of the President of the Russian Federation dated 07.05.2018 №204, the National Technological Initiative, the state program of the Russian Federation "Economic development and innovative economy", etc.

Being responsible duty holder for the implementation of the event "Promoting the development of modern innovative infrastructure in the field of nanotechnology, mechanisms and tools for realizing the potential of the nanoindustry" of the subprogram "Stimulating the innovation" of the state program of the Russian Federation "Economic development and innovative economy"[19], the Fund is actively involved in the updating of the state program, including taking into account the extension of its implementation until 2024.

As part of the activities envisaged by the Strategy for Russia's Innovative Development for the period up to 2020, the Fund participates in the development of financial support mechanisms for innovative projects at all stages of their implementation, including the promotion of exchange market instruments that innovative companies can use, as well as attracting collective investment in innovative companies.

In 2018, the decree of the President of the Russian Federation[20] defines the state development goals for the period up to 2024, which provide a breakthrough scientific, technological, social and economic development of Russia, improve the standards of life, create conditions and opportunities for self-realization. The national projects (programs), covering different fields of national development, have been developed to implement the Decree dated 24.12.2018 and the Presidium of the Presidential Council of the Russian Federation for strategic development and national projects approved their passports.

In order to implement national projects "Digital economy", "Education", "Science", "Labor productivity and employment support", "Housing and urban environment", etc. the Fund actively cooperates with representatives of business and expert communities and authorities, including within the established competence centers and working groups.

The Fund operations contribute to achieving a number of goals and objectives of national projects and included in them federal projects.

20 The Decree of the President of the Russian Federation dated 07.05.2018 № 204 "On the national goals and strategic objectives of the development of the Russian Federation for the period up to 2024"

National project	Total number of Federal projects	A number of Federal projects related to the Fund activity	Federal projects related to the Fund activity
Healthcare	8	1	• Provision of health care system organizations with qualified staff
Education	10	6	• Young professionals (greater competitiveness of professional education) • Digital educational environment • New opportunities for each person • Modern school • Success of each child • Teacher of the future
Housing and urban environment	4	1	• Formation of comfortable urban environment
Ecology	10	1	• Deployment of the best available technologies
Safe and high-quality highways	4	3	• System-wide measures on the development of road maintenance industry • Road network • Traffic safety
Labor productivity and employment support	3	3	• Systemic measures on improving labor productivity • Targeted support of measures aimed at increased labor productivity of enterprises • Employment support and increased efficiency of the labor market that leads to the growth of labor productivity

National project	Total number of Federal projects	A number of Federal projects related to the Fund activity	Federal projects related to the Fund activity
Science	3	3	• Development of scientific and industrial cooperation • Development of modern infrastructure for carrying out the research and • development programs in the Russian Federation • Development of personnel potential in the field of the research and development
Digital economy	6	4	• Digital technologies • Personnel for digital economy • Informational infrastructure • Statutory regulation of the digital environment
Small and medium-sized entrepreneurship (SME) and support of individual entrepreneurial initiative	5	2	• Acceleration of the SME subject growth • Popularization of entrepreneurship
International cooperation and export	5	4	• Industrial export • Systemic measures in support of the development of international cooperation and export • Export of products of AIC • Logistics of international trade

IMPROVING THE REGULATORY AND LEGAL FRAMEWORK

In order to solve the issues related to administrative barriers and to create a favorable regulatory environment for the efficient development of high-tech companies, the Fund actively cooperates with the authorities, development institutions, the expert and business community, as well as participates in working and interdepartmental groups, namely:

- Expert Council on scientific and technological development and intellectual property under the State Duma Committee on education and science;
- RSPP Committee on innovative policy and innovative entrepreneurship, as well as the Expert Group of the Committee;
- The Russian Council of the direct investment funds (RUSPEC);
- working groups of the Competence Center in the field "Normative regulation" of the program "Digital economy";
- The Coordinating Council of the IIM of PJSC Moscow Exchange;
- Committee on Development of Innovation and Investment Market of the Coordinating Council of the IIM of PJSC Moscow Exchange;
- Venture Market Council of RVC JSC
- Expert Council in preparation for the development strategy of the venture industry in the Russian Federation;
- Expert Council of the national rating of special economic zones Russia-2018.

In 2018, the main focus of the Fund activities in this field focused specifically on:

1. IMPROVEMENT OF TAXATION OF INVESTMENT ACTIVITY CARRIED OUT AS INVESTMENT PARTNERSHIP AGREEMENT[21], AND REGULATION OF INVESTMENT PARTNERSHIPS IN GENERAL.

By the end of 2018, the Fund, in conjunction with the investment community, prepared and sent to the Ministry of Finance of the Russian Federation comprehensive proposals, which deal with discrimination in taxation of investment partnerships and remove "grey areas" and unwarranted administrative "barriers". The analysis of the consequences that the proposed changes will lead to envisions their strong positive effect on the development of sector for private equity and venture capital (PE&VC), reduction of unnecessary administrative expenses, which will not only increase the attractiveness of this form of investment, but also increase the tax base for income tax and other taxes and fees. Because these proposals are very detailed and elaborated, they can be implemented quickly and become a catalyst for subsequent changes in the regulation of investment partnerships.

In addition, together with RVC JSC, the Fund has initiated the introduction of clarifications in the legislation on procurement aimed at exempting from the Federal law "On procurement of goods, works and services by certain types of legal entities" dated 18 July 2011 No. 223-FL of the contracts on supply of goods, execution of works, provision of services in case when such contracts are concluded by managing partner for the purpose of conducting common affairs, on behalf of all partners on the basis of Investment partnership contract (IPC).

On October 30, 2018, the State Duma adopted the Federal law No. 391-F3 "On amendments to article 1 of the Federal law "On procurement of goods, works and services by certain types of legal entities". The amendments exempt from the application of the Federal law No. 223 the relations associated with joint investment activity, which is carried out on the basis of IPC that provides for the return to the partner of the value of his contribution into the common property[22].

2. REAL EXPANSION OF OPPORTUNITIES FOR THE INVESTMENT OF NON-STATE PENSION FUNDS IN THE INSTRUMENTS OF PRIVATE EQUITY SECTOR (MAKING AMENDMENTS IN THE CURRENT LEGISLATION AND STATUTORY LEGAL ACTS OF THE BANK OF RUSSIA).

Analysis of the international market shows that in countries, where the PE&VC funds are important, non-state pension funds — traditional sources of "long" money" — play a significant role as the source of investment. In Russia, non-state pension funds lack access to the sector of direct and venture investments, which remains an actual problem for the investment community. Currently, the working group established under the Venture Market Council formulates the conditions that would attract the non-state pension funds to invest in such projects through an investment partnership agreement (conducts trial investment, replicates "success stories", etc.), as well how to promote their further participation in PE&VC funds.

21 The investment partnership agreement is intended to structure joint investment activity of PE&VC market participants.

NATALIA POLYAKOVA

Director of the Legal Directorate of RVC JSC

"The purpose of the investment partnership is to conduct joint investment activity in order to implement investment projects, including of innovative nature. Application of the provisions of the Law on procurements No. 223 to the IPC significantly restricted and complicated the activities of investment partnership, and could fatally affect the attractiveness of this instrument to potential private investors, as well as make impractical its use. Therefore, we are very glad that together with the Fund we managed to promote the creation of transparent regulation by clarifying the scope of the law on investment partnership".

3. IMPROVING THE REGULATION OF ECONOMIC PARTNERSHIPS AND BRINGING IT IN ACCORDANCE WITH THE BEST INTERNATIONAL PRACTICES.

Currently, the bill "On amendments to the Federal law "On economic partnerships", aimed at removing excessive regulatory barriers and bringing them in accordance with international practices, has been worked taking into account the comments of the State Legal Department of the President of the Russian Federation.

4. STIMULATING THE ENTRY OF INNOVATIVE COMPANIES INTO THE EXCHANGE MARKET.

In Russia, the exchange method to attract investments is not commonly used. At the same time, the entry in exchange market is usually accompanied by increased openness of the company, improved quality of its corporate management; and this also has a "pulling" effect on their projects at more earlier stages of development. In this regard, proposals aimed at increasing attractiveness of exchange instruments and stimulating the entry of growing innovative companies in exchange market are prepared. These proposals are both amendments to regulatory and legal acts, and programs created to support leading private high-tech companies.

5. IMPROVING THE REGULATION OF ALTERNATIVE (OVER-THE-COUNTER) METHODS TO ATTRACT INVESTMENTS.

Analysis of foreign practices on attracting investments from a wide range of entities, which could become a "preparatory" stage for growing companies before they go public, and refining of proposals aimed at the formation of practical mechanisms on the use of alternative methods of attracting investments in order to simplify the procedure, by which investors acquire corporate and property rights in innovative projects, as well as the procedure of their implementation and selection is carried out.

During the year, the Fund participated in drafting of many other bills in order to improve legislation in innovative and high-tech fields, including in the field of intellectual property, better measures to support small and medium enterprises, and currency regulation.

The Federal law dated 03.04.2018 N 64-FL "On amendments of the Federal law "On currency regulation and currency control" and article 15.25 of the Code of Administrative Offences of the Russian Federation considered the proposals prepared by Fund and possibility to use convertible loans for investment transactions, as well as expanded the list of methods, by which residents can meet obligations on the convertible loans provided to them by non-residents.

The Fund is included in the List of legal entities that provide state support of innovative activity[22]. In order to ensure the access of the Fund small innovative companies[23] (in which the Fund or its subsidiaries is a founder/participant) to the existing mechanisms of state support to SME, including tax benefits and other preferences, the Fund constantly monitors and confirms the approved criteria for inclusion in this List.

22 In the forms established by the Federal Law dated 23.08.1996 №127-FL "On Science and State Scientific-Technical Policy".

23 If they comply to the other criteria established by Art. 4 of FL "On development of small and medium-sized entrepreneurship of the Russian Federation" dated 24.07.2007 No. 209-FL.

INTERNATIONAL COOPERATION: RUSSIAN-ISRAELI PROGRAM OF COOPERATION IN THE FIELD OF INDUSTRIAL R&D

The Fund has been authorized to implement the agreement between the Government of the Russian Federation and the Government of the State of Israel on cooperation in the field of industrial research and development[24] since 2012. The agreement provides for the selection and support of joint industrial R&D projects carried out by companies of the Russian Federation and the State of Israel. On the part of Israel, the authorized organization is the Israel Innovation Authority (former Office of the Chief Scientist of Israel's Ministry of Economy)[25].

The Fund supports selected projects in the form of providing grants to Russian participants of the project. The average amount of such a grant is 30-40% (but not more than 50%) of the Russian part of the project budget. Participants from the State of Israel are supported by the Israel Innovation Authority. Financing of the project proceeds after positive decision is taken by the joint Russian-Israeli Commission following the results of the examinations.

24 Appointed by the Government Order of the Russian Federation dated 15.11.2012 No. 2108-p.

25 The selection of projects on the part of Israel is carried out by ISERD — the Israeli Industry Center for Research & Development.

OPPORTUNITIES FOR PROGRAM PARTICIPANTS:

- creation of a high-tech product;
- introducing their product into the global market;
- grant financing to carry out activities;
- stronger team of participants and greater experience;
- cooperation with foreign partners;
- possibilities of subsequent scaling of the technology (based on the results of the project implementation).

KEY QUALIFYING PARAMETERS FOR SELECTION:

- joint application from Russian and Israeli participants;
- project at the stage of industrial R&D (with the final material-based product);
- product, process or service under development has innovative character and is based on new technologies;
- the expected period of commercialization is not more than five years;
- product has significant potential in terms of market volume in the territories of the Russian Federation, Israel and globally;
- co-investment on each side of Russia — Israel is present (co-investor can be the applicant as well).

PROJECTS ARE SELECTED ANNUALLY. JOINT RUSSIAN-ISRAELI APPLICATIONS ARE CONSIDERED FOR PROJECTS IN THE FIELD OF NANOTECHNOLOGY AND RELATED TO IT HIGH-TECH SECTORS LN A WIDE RANGE OF FIELDS:

- quality of life;
- new materials and coatings;
- advanced production technologies;
- nanoelectronics, optoelectronics, photonics;
- energy efficiency.

AT THE MOMENT THE AGREEMENT HAS RESULTED INTO:

- seven selection rounds of Russian-Israeli industrial R&D projects;
- examination of more than 60 joint applications;
- nine approved for financing projects (projects in the field of medicine, biotechnology, microelectronics, energy efficiency, etc.);
- the eighth selection round is in the process, the completion of round is scheduled for the first half of 2019.

7
CONDUCTED SELECTIONS
of Russian-Israeli industrial research and development projects

9
PROJECTS APPROVED
for implementation

UNDER AGREEMENT BETWEEN RUSSIA AND ISRAEL ON COOPERATION IN THE FIELD OF INDUSTRIAL SCIENTIFIC RESEARCH AND EXPERIMENTAL DEVELOPMENT WORKS

Information about selection rounds is available on the websites of the Fund and the Israel Innovation Authority.

2.4. TERRITORIAL AND CLUSTER DEVELOPMENT OF NORMATIVE-TECHNICAL INSTRUMENTS FOR PROVIDING INNOVATIONS

7 REGIONAL CENTERS OF REGULATORY AND ENGINEERING SUPPORT OF INNOVATIONS

463 NANOTECHNOLOGY INDUSTRIES WITH A FULL SET OF REGULATORY AND ENGINEERING INSTRUMENTS FOR SUSTAINABLE MARKETENTRY AND TURNOVER OF THE PRODUCTS

240 NATIONAL STANDARDS WERE DEVELOPED

604 CERTIFICATES THAT CONFIRM THE QUALITY AND SAFETY OF NANOTECHNOLOGY PRODUCTS GRANTED

THE FUND TAKES AN INTEGRATED APPROACH TO THE FORMATION OF NORMS AND SPECIFICATION INSTRUMENTS FOR EFFICIENT MARKET PROMOTION, ENTRY AND TURNOVER OF INNOVATIVE PRODUCTS MANUFACTURED IN NANOINDUSTRY AND HIGH-TECH SECTORS OF THE ECONOMY.

The objectives of the Fund in the field of standardization, certification, provision of metrological services and safety are defined by the Fund Strategy until 2025 and the Fund Concept of regulatory and engineering activities.

The Fund is the only development institution that:

- improvement of the system of innovative standards, revision of the existing regulatory documents, special test operation and measurements, certification of products and personnel, the passage of authorization procedures when innovative products enter the market;
- has formed a territorial regulatory and engineering infrastructure that provides innovative companies with a package of authorization documents for free circulation of products in the market and contributes to overcoming regulatory barriers that limit the use of innovations;
- has ensured efficient operations of the national and interstate technical committees on standardization "Nanotechnologies" and of the Center of standardization in the field of innovations, which coordinate the implementation of the unified technical policy on standardization and on comprehensive regulatory environment for nanoindustry and high-tech innovative projects.

In 2018, the main area of the Fund activities in the field of technical regulation and overcoming the barriers that hinder innovation was the distribution of regulatory and technological instruments and standards in the regions of the Russian Federation and in the territory of EAEU with focus on the priority clusters in nanoindustry.

By the end of 2018, a network of centers of regulatory and engineering support of innovations has been formed in the context of territorial development in seven regions of the Russian Federation (Novosibirsk, Sverdlovsk, Rostov regions, Primorsk and Krasnoyarsk territories, the republics of Mordovia and Karelia). The centers provide for transfer of instruments developed by the Fund and available services in the field of innovative standardization, quality and safety validation, test operation and measurement of new products, assessment of personnel qualification for regional high-tech companies.

In terms of the cluster development, the Fund continued working on regulatory and engineering support for priority projects in the field of wind power, industrial energy storage, flexible electronics, nanomodified materials. For the existing clusters (nanoelectronics and photonics, coatings and surface modification, new materials, solar energy) have been already mostly established necessary regulatory and engineering conditions that enable the circulation of products on the market with minimum inconveniences.

The instruments of innovative standardization, assessment and confirmation of quality and safety, special measurements and test operations of new products developed by the Fund can significantly contribute to the achievement of the goals and objectives set by the national projects in the field of science, international cooperation and exports, small and medium-sized entrepreneurship and support individual entrepreneurial initiative, digital economy, safe and high-quality roads, labor productivity and employment. On the basis of the regional centers of regulatory and engineering support of innovations, the Fund has started working on the application of its tools for the implementation of national projects in the regions of the Russian Federation.

MARAT NURIEV

General Director of Ural University Complex JSC

"The expansion of the operations of the Regional center, established at the site of the Technopark of high technologies in Sverdlovsk region, to the entire Ural Federal District will increase the availability of Fund regulatory and engineering services for interested innovative companies and, together with the Technopark, organize resource cooperation among regional development institutes and provide for harmonious and comprehensive support of innovative activity."

Work meeting on areas of regulatory and technical support for innovation and the activities of the Regional Center for Regulatory and Technical Support to Innovative Enterprises of the Novosibirsk Region

TERRITORIAL DEVELOPMENT AND INTEGRATION OF REGULATORY AND ENGINEERING INSTRUMENTS TO PROMOTE INNOVATIONS

In 2018, in addition to the five existing Regional centers of regulatory and engineering support of innovations in Sverdlovsk, Rostov and Novosibirsk regions, Krasnoyarsk and Primorsk territories were opened two more centers — in the Republic of Mordovia on the basis of the Technopark "Mordovia" (Saransk) and in the Republic of Karelia on the basis of the Development corporation of Republic of Karelia (Petrozavodsk).

The regional centers support innovative enterprises together with the Center of standardization in the field of innovations, the Nanocertifica nanoindustry certification system, distributed collective testing center and the center of qualification assessment in the field of technical regulation of the Council for Professional Qualifications in Nanoindustry.

Regional centers provide a comprehensive set of regulatory and engineering services allowing to support companies throughout all stages of their lifecycle. The Fund coordinate its activities with the territorial structures of the Skolkovo Fund and the Fund for the promotion of small-sized enterprises in the scientific and technological sphere. As a result, more than 110 small and medium-sized innovative companies have received regulatory and engineering support.

ACTIVITY MODEL OF THE REGIONAL CENTER OF REGULATORY AND ENGINEERING SUPPORT OF INNOVATIONS

GOALS:

- assistance in the formation and application of the Fund regulatory and engineering instruments with focus on regional innovative companies, development of conditions for sustainable market entry and turnover of high-quality, safe and competitive regional products;
- production volume growth of regional high-tech innovative nanoindustry and related to it high-tech industries products, and provision of regulatory and engineering instruments.

OBJECTIVES:

- identifying commercializable innovative products;
- preparing maps for innovative products technical level;
- developing standards for innovative products of high-tech industries;
- updating regulatory documents in order to remove market entry barriers for innovative high-tech products;
- validating the quality and safety of innovative products, obtaining authorization documents for market entry;
- organizing development of measurement methods and test operations for innovative products and technologies;
- helping to carry out test operations and measurements of innovative products using the resources of the Distributed collective testing center.

FUNCTIONS:

- providing regulatory and engineering support in the format of one-stop shop;
- making available regulatory and engineering services for small and medium-sized innovative companies;
- introducing common operational standards for regional centers in the regions, sharing best practices;
- providing comprehensive support at all stages of the lifecycle of innovative companies.

PARTICIPANTS:

- regional executive authorities;
- developers and manufacturers of innovative nanotechnology products;
- regional development institutes;
- small and medium-sized innovative companies, startups;
- testing centers and laboratories;
- institutions of higher education.

The work on identifying the most promising innovative products with high readiness for commercialization has been carrying out, regional catalogs and registers of innovative products has been formed, including nanotechnology products of regional enterprises supported with regulatory and engineering instruments.

Regional centers, together with enterprises and organizations, have filed more than 45 proposals for the development of national standards for innovative products. The filed proposals have been taken into account when the Standardization program in the nanoindustry and National standardization program are developed.

ALEXEY VASILIEV

Minister of science and innovation policy of the Novosibirsk region

"Novosibirsk region is one of the leading regions of the country by the number of development institutes and services provided by them. Cooperation of the region with the Fund for Infrastructure and Educational Programs allows to expand significantly the possible fields of support of high-tech companies.

The presence of a wide range of regulatory and engineering services for the provision of innovations developed in the Regional center is an important tool to support companies that produce qualitatively new products."

The established territorial regulatory and engineering infrastructure in nanoindustry can contribute to the rapid launch of the unified innovation infrastructure envisaged by the national projects in the priority fields of scientific and technological development, including the formation of regional Competence centers that contribute to the market promotion of new products using the tools of standardization, certification, metrology and safety assessment.

The agenda for 2019 includes the goal of expanding the Fund's presence in the regions and federal districts of the Russian Federation, which will allow to closer the Fund's infrastructure services to innovative companies on the spot throughout Russia and to ensure significant contribution to the implementation of the national projects through the interaction of the Regional centers of regulatory and engineering support of innovations and the regional project offices of national projects.

IN 2018, THE FUND TOGETHER WITH THE CENTER OF STANDARDIZATION IN THE FIELD OF INNOVATION CONTINUED TO WORK ON THE FORMATION OF FAVORABLE REGULATORY CONDITIONS FOR FREE MOVEMENT OF INNOVATIVE PRODUCTS WITHIN THE TERRITORY OF EAEU.

Together with the National Institute of Standardization of the Republic of Belarus has been developed and implemented an interstate program on regulatory, engineering and metrological support for the priority fields of development in nanoindustry. The Fund and the National Academy of Sciences of the Republic of Belarus have signed an agreement on scientific and technological cooperation on a wide range of issues, including regulatory and engineering support for commercialization of innovations, educational projects and programs, assessment of qualifications and certification of specialists taking into account the requirements of professional standards.

The Republic of Belarus has shown an increased interest in carrying out the certification of graduates of higher education institutions, taking into account requirements of the Russian professional standards. The first experience on certification of graduates of higher education institutions has been obtained in cooperation with the Institute of training of scientific personnel of the National Academy of Sciences of the Republic of Belarus. Further, it is planned to improve and replicate this type of activity when working with other union states.

Russian experts of the Technical Committee in the field of nanoindustry participate in the work on international standardization in terms of ISO/TC 229 "Nanotechnology" and IEC/TC 113 "Nanotechnology for electrical-technical products and systems". In the reporting year were concluded reviews of 20 international regulatory documents, relating to the production and use of carbon nanostructures, magnetic nanoparticles and nanomaterials for energy storage. The main goal of the experts is to work proactively, so that international standards will not become barriers to the entry of Russian nanoproducts into the foreign markets.

Delegation of the Fund led by the CEP Andrey Svinarenko at the National Academy of Sciences of Belarus during negotiations on promising directions and mechanisms for the development of Belarusian-Russian cooperation in innovative nanoindustry

To promote nanoindustry products to the Iranian market, proposals for the development of two international standards were prepared jointly with the Iran Nanotechnology Initiative Council and sent to ISO in 2018. To converge the two countries' positions in the field of certification and to enable further joint acceptance of the certification results, the parties have identified model types of nanoindustry products to verify the compliance assessment and test operation procedures in 2019.

Territorial expansion of the Fund cooperation with innovative businesses is carried out also through the regional development of a common information resource for the subjects of regulatory and engineering infrastructure "Electronic map of regulatory and engineering competencies in the field of innovation." The project has been implemented by the Fund since 2017 and represents a simple and visual search interface that relies on visual-interactive means to allow quick identification of the necessary set of regulatory, engineering and authorization documents for the market entry and turnover of nanoproducts.

MODEL OF ELECTRONIC MAP OF REGULATORY AND ENGINEERING COMPETENCIES IN THE FIELD OF INNOVATION

GOALS AND OBJECTIVES:

- reducing commercialization time for innovative products;
- rendering assistance to innovative companies in the selection of qualified organizations for the development of documents on standardization, conducting the certification of products and management systems, confirming the innovation status of the enterprise, obtaining the necessary authorization documents, conducting special measurements and testings, assessing personnel qualifications in the field of technological regulation;
- creating new opportunities for the expansion of sales markets, searching for new clients and consumers of regulatory and engineering products and services for the qualified organizations included in the Map database.

FUNCTIONALITY:

- selection of products in the set of nanoindustry clusters;
- definition of regulatory and engineering documents necessary for the market entry by the type of product in relation to the fields of application.
- selection of the most competent organizations to prepare and register such documents and to assess their location on the map of the Russian Federation;
- sharing best practices — a database of nanotechnology products manufacturers complemented with the relevant regulatory and engineering documents, in which the user can find similar products and learn about the providers whose services the manufacturer has used;
- regional assistance — a list of the regional centers of regulatory and engineering support for innovation that can help in the selection of competent organizations;
- encyclopedia — useful information in the form of articles;
- consultation of a specialist — help with the rapid resolution of pressing regulatory issues.

ANNA MAKAROVA

General Director of Sustainable Development Enterprise

"Our company that works in the chemical industry has participated in the formation of the database and tested the Competence map. We have noted that the use of this resource allows us promptly, almost "at a glance", to determine the composition of the set of regulatory and engineering documents necessary for the entry into the market of innovative chemical products and to choose qualified organizations for their development and production. The Map also allows to assess the location of the selected organizations on the map of the Russian Federation, to share best practices with manufacturers of similar products and to contact qualified experts for prompt resolution of existing regulatory problems."

OLESYA ORLOVA

Deputy Minister of Science and Innovation Policy of the Novosibirsk Region

"The register of innovative products, including in nanotechnology, manufactured in the Novosibirsk region is maintained by the Ministry of Science and Innovation Policy of the Novosibirsk Region. It is one of the tools for the formation of sustainable and long-term demand for innovative products and creates conditions stimulating the development and marketing of innovative products, including through procurement for state and municipal needs. The joint work of the Ministry with the Fund for Infrastructure and Educational Programs on the provision of regulatory and engineering support for innovations, including the use of the certificate of "innovation" as a criterion during examination to include products in the Register, will reduce financial and time costs and increase the objectivity of the examination"

In order to promote the development of markets for innovative products, including in the Russian regions, the Fund forms and annually expands the Bank with innovative solutions completed with regulatory and engineering instruments on the portal Startbase. The Bank is based on the principle of integration of regional registers of innovative products, technologies and services, for which regulatory documents have been developed and certificates and necessary permits have been obtained.

> 80

INNOVATIVE SOLUTIONS ARE COMPRISED IN THE BANK OF INNOVATIVE SOLUTIONS
in the field of renewable energy sources, chemistry, nanoelectronics and photonics, structural and construction materials, including composite materials

The solutions provided in the Bank are ready for market entry and allow investors and customers, including state customers, to reduce risks when choosing innovative products for procurement.

Among the competitive advantages offered by innovative products included in the Bank one can mention - better consumer properties and the availability of regulatory documents and permits necessary for production and use.

As on 2018, the Bank comprises more than 80 innovative solutions in the field of renewable energy sources, chemistry, nanoelectronics and photonics, structural and construction materials, including composite materials.

COMPREHENSIVE PROVISION OF REGULATORY AND ENGINEERING SUPPORT FOR THE DEVELOPMENT OF HIGH-TECH CLUSTERS IN NANOINDUSTRY

On the basis of fundamental regulatory and engineering instruments of the Fund (standardization, quality and safety validation, systems of management, verification and measurement), the work on the formation of regulatory conditions for accelerated introduction of high-tech cluster products in nanoindustry was carried out in 2018. Together with the Center of standardization in the field of innovations, participating nanoindustry enterprises, specialized technical committees of Rosstandart, the Fund has prepared localized standardization programs, developed and continues to develop more than 30 national standards that are harmonized with IEC and ISO international standards for the promising nanoindustry clusters and priority fields such as:

- wind and solar energy;
- industrial energy storage including lithium-ion batteries and power accumulation systems;
- nanomodified materials, including universal additives based on single-walled carbon nanotubes;
- flexible electronics;
- nanoelectronics and photonics;
- new materials (including composite materials).

> 30

NATIONAL STANDARDS
that are harmonized with IEC and ISO international standards for the promising nanoindustry clusters and priority fields

LOCALIZED STANDARDIZATION PROGRAMS IN PROMISING NANOINDUSTRY CLUSTERS AND PRIORITY FIELDS

A localized standardization program is an optimal set of interrelated regulatory documents to be developed or revised in order to promote the products of high-tech clusters to the markets

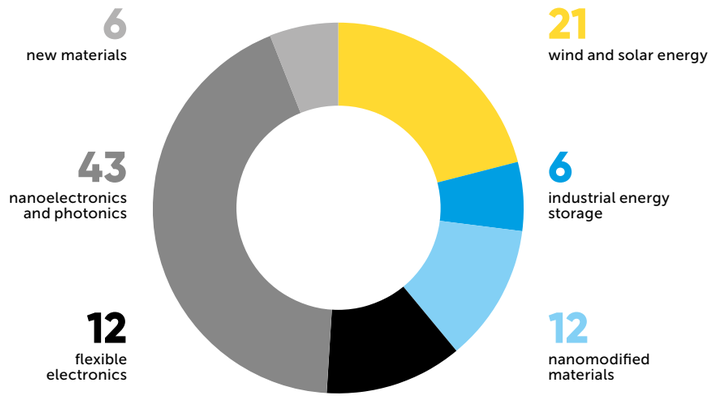
GOAL:

Formation of a regulatory base that enables comprehensive development of priority nanotechnology clusters in Russia

OBJECTIVES:

- establishment of product specifications that define its primary functional capabilities;
- formation of regulatory conditions for production and use of priority nanoindustry products;
- creation of a regulatory database harmonized with the best international and regional standardization documents;
- reduction of unnecessary technical barriers;
- promotion of products for export as a part of economic integration of the Member States of the Eurasian Economic Union and the Commonwealth of Independent States.

DISTRIBUTION OF NATIONAL NANOINDUSTRY STANDARDS DEVELOPED IN 2018 BY PRIORITY CLUSTERS, %



The Standardization program in the nanoindustry, approved by the Government Commission, continues to be implemented. It is updated annually taking into account national priorities and proposals filed by innovative nanoindustry enterprises. The update of the existing regulatory and legal documents (interstate and national standards, sanitary and construction standards and rules) allows the elimination of unnecessary barriers and the introduction of provisions that stimulate the widespread use of innovative products and technologies.

VARVARA GUZHAVINA

Acting technical director of Energy Storage Systems LLC

Energy Storage Systems LLC, together with Liotech LLC and Novosibirsk State Technical University, develops a regional industrial cluster for the production of electric energy storage devices.

Today, energy storage systems based on lithium-ion batteries are a component of new energy and smart energy technologies. Their use requires the improvement of regulatory and technical regulation.

With the support of the Fund, the work has begun on the creation of a modern regulatory base in the field of storage devices, harmonized with international requirements, and the first national standards for electric energy storage systems have been developed and approved."

ALEXANDER BUBNOV

Director of the Department of technology in the field of information support, instrument-making industry and nanotechnology of FSUE Standardinform, Responsible Secretary of TC 441

"Standardization is increasingly used as a tool for innovative development and to raise competitiveness of technologies and products.

The Technical Committee for Standardization TC 441 "Nanotechnologies" focuses on the development of a system that monitors current trends in science and technology. Such system will allow to determine the priority areas in the development of high-tech markets, to anticipate standardization of what innovative products becomes topical, to provide technological leadership in the nanoindustry and related to it high-tech sectors of the economy and to accelerate the entry of new products into the domestic and foreign markets."

Development of technical level maps for new products helps to identify and promote domestic products of high quality and technical excellence, which have a competitive advantage over domestic and foreign analogues.

TECHNICAL LEVEL MAPS PRESENT A COMPREHENSIVE SYSTEM FOR ASSESSING THE TECHNICAL LEVEL AND QUALITY OF INNOVATIVE PRODUCTS

Technical level maps represent comparative analysis of the characteristics of innovative products with the best world analogues and compliance with the requirements of international and national standards.

GOALS:

- determination of the feasibility of developing innovative products and/or their manufacturing;
- product positioning among the best world analogues;
- assessment of product innovativeness and market gain perspectives.

OBJECTIVES:

- creation of a unified database on technical perfection and competitiveness of domestic innovative products in comparison with analogues;
- raising awareness of consumers about innovative products of high technical level, providing the opportunity to choose the best products, which have competitive advantages;
- accelerated development of regulatory base for innovative products of high technical quality;
- stimulation of the development of new types of innovative products with predetermined high technical quality;
- confirmation of product innovation and its compliance with the stated requirements;
- integration of science, industry and business in the development and manufacturing of innovative products.

IN 2018, THE FIRST 30 TECHNICAL LEVEL MAPS WERE PREPARED FOR THE PRODUCTS OF COMPANIES BELONGING TO THE FUND NANOTECHNOLOGY CENTERS. THE MAPS WILL FORM, AMONG OTHER THINGS, THE BASIS FOR THE DEVELOPMENT OF PRELIMINARY NATIONAL STANDARDS THAT CONSOLIDATE THE PREDOMINANT CHARACTERISTICS OF THE PRODUCTS.

In total, 240 national standards were developed by the end of 2018 within the Standardization program in the nanoindustry with the financial support of the Fund.

For systematic activity in the field of national and international standardization in the nanoindustry, the Fund has established technical committee on standardization TC 441 "Nanotechnologies", which includes more than 60 enterprises and organizations. As the nanoindustry and related to it high-tech fields undergo dynamic development and taking into account the growing importance of digitalization, the structure and composition of TC 441 was updated based on advanced international approaches relevant to 2018 with support by the organizations-participants.

The use of regulatory and engineering instruments developed by the Fund during quality and safety assessment of nanoindustry products allowed to involve in the process of certification a number of specialized nanotechnology enterprises located in various Russian regions and having high innovative potential, but limited in their access to modern testing and measuring equipment.

IN 2018, THE FUND'S INSTRUMENTS ON ASSESSMENT AND VALIDATION OF THE COMPLIANCE OF PRODUCTS AND TECHNOLOGIES WERE FURTHER DEVELOPED AND APPLIED IN VARIOUS NANOINDUSTRY CLUSTERS.

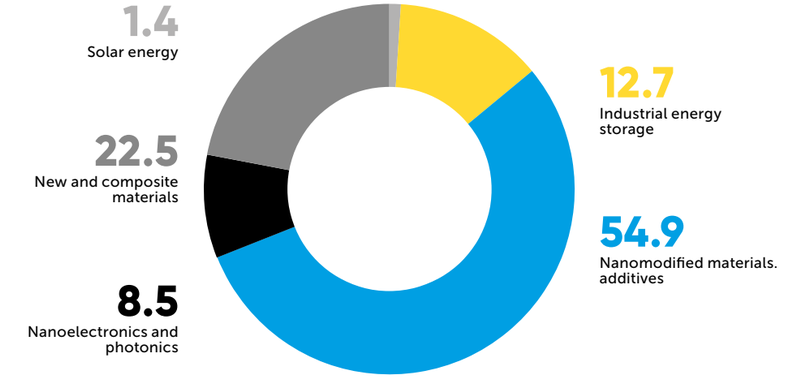
In cooperation with the Nanocertifica voluntary certification system, the quality and safety of nanoindustry products have been assessed and the conditions for its sustainable market entry and turnover have been ensured. The concept of one-stop shop has been applied meaning that following an enterprise's request, a full range of activities have been provided, including the certification of products and management systems, as well as receiving authorization documents.

The works performed in 2018 covered various clusters in the nanoindustry, including industrial energy storage (lithium-ion batteries), additives for nano-modification of materials (carbon nanotubes, aqueous dispersions, primer), nano-modified materials (mobile pavements, facade thermal panels, composite coatings), photonics (LED lamps), new composite materials (fire-resistant cable).

The use of regulatory and engineering instruments developed by the Fund during quality and safety assessment of nanoindustry products allowed to involve in the process of certification a number of specialized nanotechnology enterprises located in various Russian regions and having high innovative potential, but limited in their access to modern testing and measuring equipment.

In total, in 2018, the enterprises of nanotechnology and related to it high-tech innovative sectors of the economy applied and obtained more than 60 certificate of compliance for nanoindustry products and management systems that confirm advantageous characteristics, quality and safety of their products and a high level of management. 13 authorization documents that ensure the access of products to the market have been granted.

DISTRIBUTION OF THE INSTRUMENTS ON THE QUALITY AND SAFETY ASSESSMENT OF PRODUCTS OBTAINED IN 2018 BY PRIORITY CLUSTERS IN NANOTECHNOLOGY, %



ANDREY BATURIN

Director of FSUE VNIIOFI

"FSUE VNIIOFI (All-Russian Research Institute for Optical and Physical Measurements) actively cooperates with the Fund for Infrastructure and Educational Programs in the development and certification of measurement methods, development and approval of reference samples and measurement tools, the measurement of parameters of nanotechnology products using complex and high-precision analytical equipment, and the development of standards in the field of nanoindustry.

In 2018, the Fund and the group of companies OCSiAl implemented a joint testing project in order to validate measurement tools of a unique analyzer of carbon nanotubes in the workplace air. The analyzer determines the mass of CNT accumulated during the employee's stay in the workplace and allows to control the level of CNT exposure, which is safe to the human health, thus assuring the safety of production personnel. In 2019, the analyzer will be added to the Federal Information Fund for Ensuring the Uniformity of Measurements. Joint implementation by the Fund of projects related to testing and measuring the properties of new, often unique, products allows us to move forward and take an active part in the promotion of innovative products to the market."

IN TOTAL, SINCE 2011, 604 DOCUMENTS THAT CONFIRM THE QUALITY AND SAFETY OF NANOTECHNOLOGY PRODUCTS WERE GRANTED.

In 2018 was signed a cooperation agreement between the system "NANOCERTIFICA" and system INTERGAZSERT developed by PJSC Gazprom to conduct certification of the products supplied to the oil and gas industry. The agreement aims at complementing opportunities and resources available to the parties and will contribute to a greater use in the oil and gas industry of the products of nanotechnology and related to it high-tech sectors of the economy.

The nanoindustry certification system continues to transform in the digital mode: a distributed test center is functioning, an open register of certified nanoindustry products has been created and maintained, protected from unauthorized changes, and available to any user. A digital certificate with an electronic digital signature is going to be introduced.

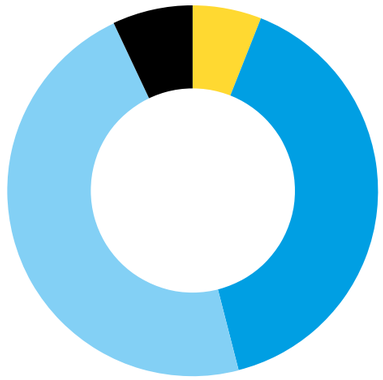
The existing territorial infrastructure and the Fund's expertise in the field of certification can promote digital transformation of the Russian economy and serve as the basis for the establishment of a Competence center for testing and conformity assessment with a network of regional centers for digital assessment of product conformity in the priority fields of scientific and technological development.

Ensuring uniformity of measurements is a necessary condition for the introduction of innovations. The accuracy indicators in the field of innovative products, including nanotechnology products, become progressively strict. To ensure the reliability and comparability of measurementsof properties of high-tech innovative products, measurement methods were developed and validated, and types of reference samples were approved in 2018 for nanotechnology enterprises located in different Russian regions (Moscow, Novosibirsk region, Sverdlovsk region, Republic of Mordovia, Chuvash Republic). The work covered products of various clusters in the nanoindustry including solar energy, photonics (fiber optics, LED lighting), nano-modified materials and additives (nanostructured ceramics, catalysts, single-wall carbon nanotubes).

At present, 207 measurement methods were developed and certified, 20 reference samples of the material composition and properties were developed and approved in 2018, including for such companies as "Hevel", "Ecoalliance", "NEVZ-CERAMICS", "Optic Fiber Systems". The developed methods include the method of measurement of museum exhibits illumination parameters with LED lighting.

Developed reference samples and methods of measurements are included in the Federal Information Fund for Ensuring the Uniformity of Measurements. They are publicly available ensuring that enterprises know about metrological support provided for the nanoindustry and related to it high-tech sectors of the economy (chart).

DISTRIBUTION OF MEASUREMENT METHODS AND REFERENCE SAMPLES INCLUDED IN THE FEDERAL INFORMATION FUND FOR ENSURING THE UNIFORMITY OF MEASUREMENTS IN THE NANOINDUSTRY IN 2018 BY PRIORITY CLUSTERS, %



6.7
Solar energy

40.0
Nanomodified materials. additives

46.7
Nanoelectronics and photonics

40.0
New and composite materials

207
MEASUREMENT METHODS

20
REFERENCE SAMPLES OF THE MATERIAL COMPOSITION AND PROPERTIES
were developed and approved in 2018

CONFIRMATION OF HIGH QUALITY OF RUSSIAN NANOINDUSTRY PRODUCTS

In 2018, the Sign "Russian nanotechnology product" was conferred to the innovative Russian-made products to recognize their high quality, safety and origin at the traditional competition of innovative products. The Sign "Russian nanotechnology product" is a motivational tool for promotion of innovative products to the market and supporting Russian nano-manufacturers.

In 2018, the Sign "Russian nanotechnology product" was conferred to 25 types of nanotechnology products (services) manufactured at 16 nanoindustry enterprises. A cumulative total of 86 companies producing 163 types of nanotechnology products (services) have been granted the right to use the Sign.

With the regulatory and engineering support and assistance of the Fund, the largest Russian manufacturer of Hevel, which develops renewable solar energy products in the Russian Federation, was the first nanoindustry enterprise to receive the award of the Government of the Russian Federation in the field of quality. The award was presented by Prime Minister of the Russian Federation D. A. Medvedev.

The Hevel success story is a proof that the Fund's comprehensive approach to removing unwarranted regulatory barriers helps promoting innovation products in the market. Together with Hevel, the Fund has developed more than 40 national standards harmonized with international standards. Hevel solar panels received certificates of an internationally recognized eco-labelling Leaf of Life. Systems of quality management, health protection, environmental management are certified in the system "Nanocertifica". The Sign "Russian nanotechnology product" has been conferred to Hevel.

Российская Нанотехнологическая Продукция

86 COMPANIES PRODUCING

163
63 TYPES OF NANOTECHNOLOGY PRODUCTS (SERVICES)
have been granted the right to use the Sign "Russian nanotechnology product"

ALEXANDER DUBROVSKY

chief industrial engineer – Acting director of Hevel LLC

"Systemic work with the Fund for Infrastructure and Educational Programs in the provision of regulatory and engineering support for innovations gave us a real chance to participate and become the laureate of the Government Award in the field of quality. Certification and standardization increase consumer confidence in innovative products as well as the volume of production and competitiveness of products in domestic and foreign markets. We have worked together for a long time and look forward to continue cooperation with the Fund to promote products to new markets with the help of regulatory and engineering instruments."

REGULATORY AND ENGINEERING SUPPORT FOR SMALL INNOVATIVE COMPANIES

In order to accelerate the growth of the Fund infrastructure centers, located in different regions of Russia, and in accordance with the principles of comprehensive support for innovative businesses, the Fund provides one-stop shop regulatory and engineering services such as:

- drafting preliminary national standards for innovative products;
- confirming competitive predominant characteristics and safety of new products;
- confirming innovativeness of enterprises;
- developing "green" standards for products and carrying out certification according to environmental requirements;
- calculating reduction in greenhouse gas emissions (carbon footprint) resulting from the modernization of production and the use of new products;
- obtaining authorization documents for products and manufacturing facilities;
- developing and maintaining technical level maps and quality of innovative products.

The creation of technical level maps of new products contributes to the identification and promotion of domestic products of high quality and technical excellence, which has competitive advantages over domestic and foreign counterparts.

REGULATORY AND ENGINEERING INSTRUMENTS FOR "GREEN" ECONOMY

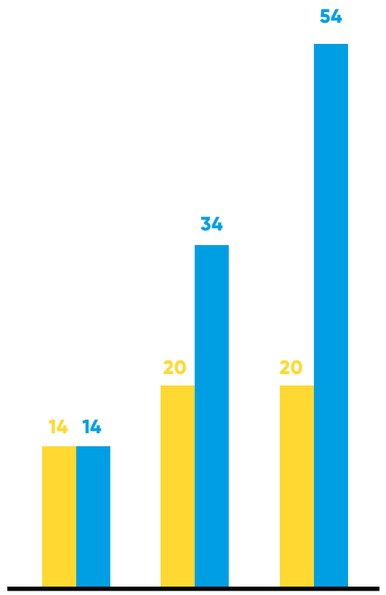
In recent years, the demand for the Fund regulatory and engineering instruments has increased on the part of environmentally-friendly nanoindustry companies of the "green" sector. The main factors affecting the growth in demand may include high ecological requirements set by foreign investors and problems with entering the foreign markets, requirements set by large Russian companies, as well as tightening of the Russian legislation regarding green economy and environmental protection.

The Fund develops regulatory and engineering instruments as well as infrastructure, including "green" standards and certification, to promote "green" innovative products to the market. For innovative companies, compliance of their products and technologies with the requirements of "green" standards, confirmed by a "green" certificate, is an additional competitive advantage helping to promote the products in various economic sectors, including construction.

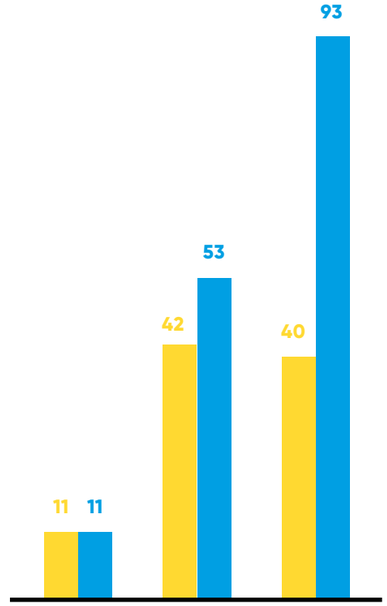
In order to develop the market for "green" innovative technologies and products and to reduce the negative impact on the environment, the Fund has established Ecological Center in the nanoindustry on the basis of the Certification System "Nanocertifica" and formed a register of "green" nanoindustry products and technologies, supported with "green" standards and certificates (more than 50 types of products)

The Fund leads the field of "green" products standardization in the National Technical Committee on Standardization TC 366 Green technology of the build environment and green innovative products. In 2018, the first 4 "green" basic technical national standards were approved and 4 "green" national standards for products were developed. 16 "green" standards for environmentally-friendly nanoindustry products have been developed and approved in cooperation with non-profit partnership Intersectoral Association of Nanoindustry and non-commercial partnership Ecological Union. 18 "green" certificates for innovative products were issued, ecological audit at ten enterprises was conducted, ten certificates for ecological management systems of nanoindustry enterprises were issued.

NUMBER OF DEVELOPED "GREEN" STANDARDS IN THE FIELD OF ENVIRONMENTALLY-FRIENDLY INNOVATIVE PRODUCTS[26], UNITS.



NUMBER OF ISSUED CERTIFICATES FOR "GREEN" PRODUCTS, REAL ESTATE FACILITIES AND ECOLOGICAL MANAGEMENT SYSTEMS, ACTS OF ECOLOGICAL AUDIT[27], UNITS.



26 Together with the National Technical Committee on Standardization TC 366 Green technology of the build environment and green innovative products.

27 Including the internationally-recognized eco-labelling Leaf of Life.

In the certification system, in nanoindustry certification was performed for the first time with issuing two "green" certificates for the design documents of multiple-dwelling premium class residential complexes "Clever Park Residential Complex" (Yekaterinburg) and TeslaDom (Bataysk, Rostov region), designed with the use of innovative products and technologies of nanoindustry including composite pipes, LED lights with built-in motion sensors, fiber optic cable, thermal insulation materials and thermal insulation and warm-keeping materials, energy saving energy-efficient facade panels, energy-saving multifunctional glass units, solar photovoltaic modules.

In 2018, carbon footprint assessment (calculation) of the production and use of ten types of export-oriented nanotechnology products was carried out. The calculations were carried out in accordance with the methods that were developed with the participation of the Fund and the requirements for which were introduced in 2018 as the standards of the Intersectoral association of nanoindustry.

EVGENY FELDMAN

Director of quarter development, Clever Park

"Construction of environmentally-friendly and energy-efficient housing complexes is a trend of the modern real estate market. The presence of a "green" certificate increases buyers confidence, add a premium to the market price and allows to improve the status of housing. In 2018, with the support of the Fund for Infrastructure and Educational Programs, Clever Park RC passed the assessment on compliance with the requirements of the "green" standard for residential housing. We are planning to continue cooperation with the Fund in the field of "green" innovative products in real estate construction and in the field of "green" certification of project documentation of constructed buildings."

ALEXANDER MAZHUGI

rector of Mendeleev University of Chemical Technology of RUSSIA

"A practice-oriented approach to education and help of the business community is the key to the training of highly qualified specialists. The successful certification of our students in the certification system "Nanocertifica — Personnel for innovation" confirms that the Mendeleev University prepares specialists who meet the modern requirements of nanoindustry."

CERTIFICATION OF GRADUATES ACCORDING TO THE REQUIREMENTS OF PROFESSIONAL STANDARDS

Discussion on modern technical regulation of smart production, digital standardization and certification, calculation and experimental methods of test operations reveals a shortage of qualified personnel in innovative organizations and enterprises. Access to certification and independent assessment of qualifications of graduates of higher education institutions allows employers to reduce the period of their adaptation at the workplace when employed and develop new functional skills by personnel.

Students and graduates of higher education institutions, who plan to start their professional activity in the field of innovation, show considerable interest in the Fund assessment of qualifications for the nanoindustry. System of voluntary certification "Nanosertifica — Personnel for innovation" has been developed to help graduates of higher education institutions to adapt to the requirements. It provides the graduates of higher education institutions with certification of their qualification compliance with professional standards.

In 2018, 145 graduates having bachelor or a higher degree from ten higher education institutions of various Russian regions and the Republic of Belarus were certified through system "Nanocertifica — Personnel for innovation":

- National University of Science and Technology "Moscow Institute of Steel and Alloys", Moscow;
- Ogarev Mordovia State University, Saransk;
- National Research University "Moscow Aviation Institute", Moscow;
- Novosibirsk state technical university, Novosibirsk;
- Mendeleev University of Chemical Technology of RUSSIA, Moscow;
- Reshetnev Siberian State University of Science and Technology, Krasnoyarsk;
- Siberian Federal University — Polytechnic School, Krasnoyarsk;
- Ural Federal University named after B.N. Yeltsin, Yekaterinburg;
- Yuzhny Federal University, Rostov-on-Don;
- Institute of training of scientific personnel of the National academy of sciences of the Republic of Belarus, Minsk.

DEVELOPMENT OF THE FUND REGULATORY AND ENGINEERING INFRASTRUCTURE IN THE TERRITORY OF THE RUSSIAN FEDERATION AND THE EAEU COUNTRIES IS PROVIDED

7
REGIONAL CENTERS OF REGULATORY AND ENGINEERING SUPPORT OF INNOVATIONS

15
REGIONAL OFFICES OF THE STANDARDIZATION CENTER IN THE FIELD OF INNOVATIONS

14
TERRITORIAL DEPARTMENTS OF THE CENTER FOR CERTIFICATION AND MANAGEMENT SYSTEMS IN THE FIELD OF NANOINDUSTRY

18
TESTING LABORATORIES AS A PART OF A DISTRIBUTED COLLECTIVE TESTING CENTER

9
EXAMINATION CENTERS IN THE FIELD OF TECHNICAL REGULATION

NANOINDUSTRY CLUSTERS

- WIND POWER AND SOLAR ENERGETICS
- INDUSTRIAL ENERGY STORAGE
- FLEXIBLE ELECTRONICS AND NANOELECTRONICS
- NANOMODIZED MATERIALS
- PHOTONICS
- COATINGS AND MODIFICATIONS

A PACKAGE OF REGULATORY AND ENGINEERING INSTRUMENTS PROMOTING THE DEVELOPMENT OF INNOVATIONS AND PROVIDING THE MARKET ENTRY OF PRODUCTS WITH MINIMAL BARRIERS HAS BEEN FORMED

153
NANOTECHNOLOGY INDUSTRIES WITH A FULL SET OF REGULATORY AND ENGINEERING INSTRUMENTS FOR SUSTAINABLE MARKET ENTRY AND TURNOVER OF THE PRODUCTS

240
NATIONAL AND INTERSTATE STANDARDS

227
DEVELOPED AND CERTIFIED MEASUREMENT METHODS AND REFERENCE SAMPLES

604
CERTIFICATES AND AUTHORIZATION DOCUMENTS

2.5. STIMULATION OF DEMAND FOR PRODUCTS AND SERVICES IN NANOTECHNOLOGY AND RELATED TO IT HIGH-TECH SECTORS

ONE OF THE MOST IMPORTANT FIELDS OF THE FUND'S ACTIVITY IS THE STIMULATION OF DEMAND IN GLOBAL AND RUSSIAN MARKETS FOR DOMESTIC PRODUCTS AND SERVICES OF NANOTECHNOLOGY AND RELATED TO IT HIGH-TECH SECTORS.

The Fund develops and implements projects aimed at initiating and increasing demand for products and services of nanotechnology and related to it high-tech sectors of actual and potential government and corporate consumers, as well as the inclusion of domestic nanoproducers in the system of state support of foreign economic activity.

The Fund partners with the following corporate and government entities: PJSC Gazprom, PJSC Transneft, Avtodor SC, Federal Road Agency (Rosavtodor), OJSC RRW, Ministry of Sport of the Russian Federation, FSUE Sport-Engineering, SUE Moscow Metropolitan, Ministry of Construction, Housing and Utilities of the Russian Federation, Ministry of Agriculture of the Russian Federation, Ministry of Industry and Trade of the Russian Federation, Ministry of Economic Development of the Russian Federation, Russian Export Center, trade offices of the Russian Federation abroad and other.

Department works in close cooperation with the following regions-partners: Belgorod region, Vologda region, Kaluga region, Krasnoyarsk territory, Nizhny Novgorod region, Novosibirsk region, Rostov region, The Republic of Tatarstan, Sverdlovsk region, Tomsk region, Udmurtia Republic, Ulyanovsk region, Chuvashia Republic, etc.

By the end of 2018, the Fund, together with regional and corporate partners, completed more than 80 projects that involved the use of domestic products and services of nanotechnology sectors at various objects of the oil and gas, construction, road and other industries.

> 80

PROJECTS
involving the use of domestic products and services of nanotechnology sectors completed by the Fund by the end of 2018

3.7%

OF TOTAL EXPENSES FOR MATERIAL-TECHNICAL RESOURCES ESTABLISHED IN THE PROJECT DOCUMENTATION FOR OBJECTS INCLUDED IN THE FEED PLAN AND OVERHAUL PLAN OF PJSC GAZPROM IS SET AS THE TARGET INDICATOR ON THE SHARE OF NANOTECHNOLOGY AND RELATED TO IT HIGH-TECH SECTORS PRODUCTS PURCHASED BY PJSC GAZPROM.

OVER 80

PROJECTS INVOLVING THE USE OF DOMESTIC PRODUCTS AND SERVICES OF NANOTECHNOLOGY SECTORS AT VARIOUS OBJECTS OF THE OIL AND GAS, CONSTRUCTION, ROAD AND OTHER INDUSTRIES COMPLETED BY THE FUND TOGETHER WITH REGIONAL AND CORPORATE PARTNERS

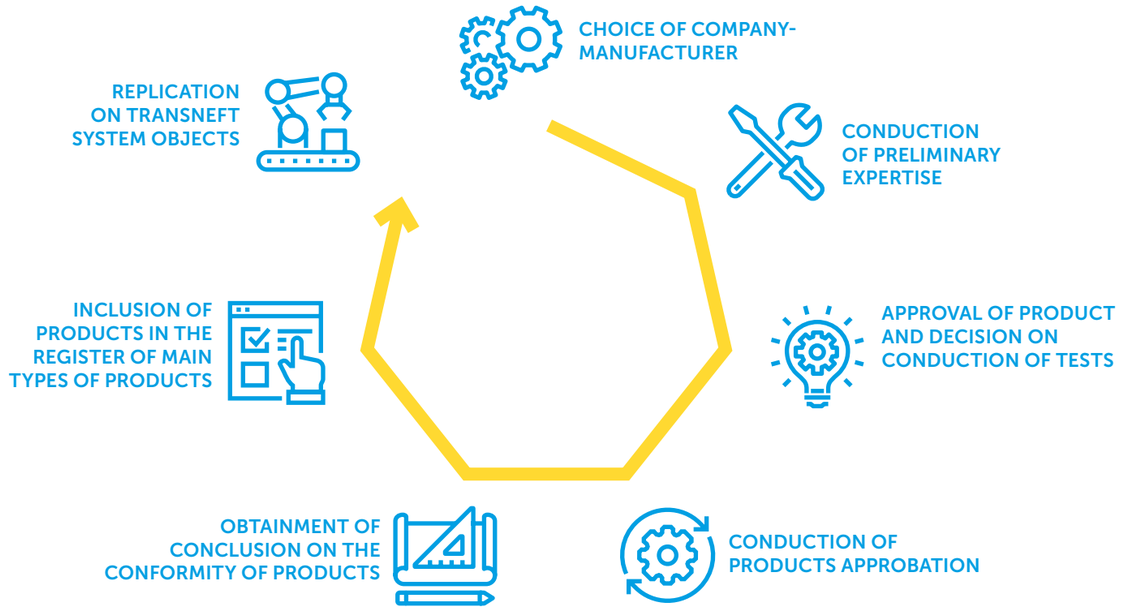
11

TECHNOLOGIES IN THE BANK OF SOLUTIONS OF THE MINISTRY OF CONSTRUCTION OF RUSSIA

2.3%

OF TOTAL EXPENSES SPENT ON PRODUCTS OF THE FUND'S PARTNER COMPANIES IN THE OVERHAUL SYSTEM

HOW A MANUFACTURER OF INNOVATIVE PRODUCTS CAN TAKE PART IN A PROJECT



PROJECT DEVELOPMENT IS BASED ON THE FOLLOWING PRINCIPLES:

- comprehensive approach;
- focus on long-term effect;
- close cooperation with state agencies;
- strategic partnership with large Russian and international funds;
- transparency and publicity.

PROJECT APPLICATION REQUIREMENTS:

- description of a proposal for the introduction of innovative solutions and the scope of expected application;
- stage of scientific and technological study of the proposed innovative solution (idea, patent, prototype, stage of pilot test operations, series production);
- technical and economic efficiency factors of possible outcomes following the implementation of the proposed innovative solution;
- technical characteristics, distinctive features and costs of innovative solutions proposed for implementation;
- comparative analysis with Russian and foreign analogues;
- comparative analysis of Russian and/or foreign experience in the implementation of the proposed innovative solutions and analogues;
- intellectual property objects, that form the basis of the proposed innovative solution, copyright holders, distribution of copyrights for intellectual property proposed by the applicant in the case of successful implementation.

3.7%

OF TOTAL EXPENSES FOR MATERIAL-TECHNICAL RESOURCES
established in the project documentation for objects included in the FEED plan and overhaul plan of PJSC Gazprom is set as the target indicator on the share of nanotechnology and related to it high-tech sectors products purchased by PJSC Gazprom.

OIL AND GAS INDUSTRY

The Fund provides general coordination services on the cooperation of structural subdivisions of the RUSNANO Group, portfolio companies, nanotechnology centers and technological engineering companies of the Fund, as well as independent manufacturers of nanotechnology products and companies of the Gazprom Group.

The Fund carries out measures to expand the range of certified innovative solutions, including in nanotechnology, used at PJSC Gazprom to design new capital project facilities of PJSC Gazprom, their repair and reconstruction on a regular basis. In 2018, the range was expanded to 19 solutions.

In the reporting year were approved the priority fields of cooperation between PJSC Gazprom and RUSNANO Group for 2019-2021, in terms of which the procedures of product certification were launched at PJSC Gazprom in the following fields:

- energy saving technology;
- composite products;
- protective anticorrosion coatings;
- concrete products modification and strengthening technologies;
- energy transfer technologies.

The decision of PJSC Gazprom Chairman of Board of Directors A. B. Miller to set the target indicator on the share of nanotechnology and related to it high-tech sectors products purchased by PJSC Gazprom became an important event of 2018. For the period of 2019-2021, the target is set at 3.7% of total expenses for material-technical resources established in the project documentation for objects included in the FEED plan and overhaul plan[28].

28 The products must comply with the technical requirements of PJSC Gazprom and be included in the Unified register of material-technical resources approved for application in production activities and corresponding the requirements of PJSC Gazprom.

In the reporting year the Fund continued cooperation with PJSC Transneft aimed at addressing the issues related to the application of innovative products and services of nanotechnology and related to high-tech sectors at the objects of Transneft system and improving the efficiency, reliability and safety of transportation of oil and oil products.

Measures on the project to develop a robotic device for in-tube inspection and cleaning of process pipelines and sections with complex geometry were realized. This project is one of the promising fields of technological development at PJSC Transneft. The company of Tubot LLC, established on the basis of SIGMA.Novosibirsk LLC and included in the Fund investment network, works on the development and production of a robotic chassis. JSC Transneft-Diascan implements the development and production of a magnetic measuring system.

Project "Digital substation" is also one of the fields of cooperation. The project involves the installation of digital optical current and voltage transformers, manufactured by Profotek JSC from the RUSNANO investment portfolio, at two PJSC Transneft oil pumping stations — OPS Desna and OPS Uvat. The experience gained by Transneft in development of "Digital substations" is unique for the Russian Federation.

The replication of nanotechnology products previously tested in the organizations of Transneft group continues. In 2018, four solutions were prepared for implementation:

- polyethylene coating systems developed by Metaclay JSC were applied on piping products manufactured by VMZ JSC, ITZ JSC, ChTPZ PJSC procured by the organizations of the Transneft system;
- independent electricity supply systems based on solar modules manufactured by Hevel LLC amounting to 840 pcs were mounted in the territory of the Central Maintenance Workshop of Transneft-Privolga OJSC (the total capacity of 243.6 kW). Previously, a similar photoelectric plant was deployed on the building roof of RED JSC, Chelyabinsk;
- Microbor metal cutting plates manufactured by Microbor Composite LLC — following the experimental operation of the Microbor plate demonstrate their resistance being up to three times higher than the foreign analog;
- low-emission glazing — in 2018 in four organizations (Transneft-West Siberia JSC, Transneft-Central Siberia JSC, Transneft-Privolga JSC, Transneft-Prikamye JSC).

In 2018, foam glass gravel manufactured by ICM Glass Kaluga LLC and composite sites for maintenance of mechanical and process equipment developed and manufactured by Artek Composites LLC, a subsidiary company of the Fund, were successfully tested and approved at the PJSC Transneft facilities.

The joint projects with PJSC Transneft continued in the following fields:

- production of microelectronic equipment for in-tube inspection instruments;
- implementation of projects on the use of FORS hydrophobic anti-icing coatings at tanks, as well as pipes made of composite materials for fire extinguishing systems, which stipulate the next steps to continue the implementation of projects.

In order to inform corporate and regional partners about the existing innovative and high-tech solutions, the Fund takes part in congress-exhibition events, such as: St. Petersburg Innovation Forum, St. Petersburg International Gas Forum, etc.

ANATOLY SOSCHENKO

Head of Innovation Development and R&D, Transneft

"We would like to point to the positive trends in the cooperation between PJSC Transneft and the Fund for Infrastructure and Educational Programs, which have resulted in increased implementation of nanotechnology solutions at the Transneft facilities and in execution of large joint projects. In particular, it is the deployment of energy-efficient and energy-saving technologies, including PV power plants and low emission glazing.

At our facilities, we test the inventions, proposed under the cooperation with the Fund, in order to implement them in the future. The priority areas of cooperation include the joint implementation of innovative efficient technologies, equipment, and materials, as well as joint projects to create and master new technologies."

THE FUND PARTICIPATED IN THE VIII ST. PETERSBURG INTERNATIONAL GAS FORUM

The Fund participated in the VIII St. Petersburg International Gas Forum, which was held October 2-5, 2018 at Expoforum. On the Fund stand in the exhibition hall were presented innovative developments and high-tech solutions of 22 portfolio companies of RUSNANO, the Fund nanocenters and other nanoindustry enterprises. The companies offered high-tech solutions that had been already applied or could be applied by gas industry enterprises. The Fund site has become a center of business contacts dedicated to the promotion of innovative products in the Russian and foreign markets.

Working meetings with CEO of Gazprom Gazomotornoye Toplivo LLC, Gazprom Energoholding LLC, Gazprom VNIIGaz LLC, Russian Highways State Company, representatives of PJSC Transneft, Gazprom invest LLC, Gazprom engineering LLC, Departments 335 and 308 of PJSC Gazprom took place at the Fund site. In addition, meetings and negotiations with representatives of foreign participants, including specialists of the largest foreign manufacturers were held at the exhibition.

During the Gas Forum, the Fund signed a general agreement on cooperation with the Association of construction organizations of the gas industry (ACOGI) that comprises 29 subsidiaries of PJSC Gazprom. The parties agreed to cooperate on the basis of joint programs on promotion of the nanotechnology products in terms of investment projects implemented by PJSC Gazprom.

The Fund Delegation at the VIII St. Petersburg International Gas Forum

ROAD INDUSTRY

In 2018, the Ministry of Transport of the Russian Federation initiated works on the national project "Safe and high-quality highways" that covers 104 urban agglomerations from 83 subjects of the Russian Federation. By the end of 2024, the project envisions that the share of highways in the category of regional importance will grow up to 50.9%, and up to 85% in urban agglomerations. Thus, the number of segments with high concentration of road accidents will be reduced by half compared to 2017.

The Fund actively cooperates with the Federal Road Agency, Russian Highways State Company, regional and municipal road agencies by offering options for the modernization of the road industry in three key areas:

- road pavement (bituminous concrete modifiers, road marking materials, composite mesh, geotextiles, pan-fiber, reinforcement, nanocement, geocells for the cloth base, foam glass gravel, metallized slags);
- side features (composite lighting poles, railings, external reinforcement systems, gutter trays, tactile displays, noise absorbing screens, fittings, local sewage treatment plants, anti-adhesive and anti-icing thin-layer coatings);
- smart transport systems (security systems, surveillance systems, incident recognition systems, LED lamps and lighting control systems, cable and wiring systems, geotechnical monitoring fiber optic systems, standalone lighting systems for pedestrian crossings).

In the reporting year, the following products were tested and implemented at the objects:

- composite lighting poles for Galen LLC, M-1 Belarus, M-4 Don;
- composite railing and trays of NCC LLC, Startup Complex No. 1 of the Central Ring Road;
- LED lights of LED-Energoservis LLC, M-4 Don;
- cable products of Uglichcable LLC, M-11 Moscow-Saint Petersburg;
- thermoplastics of road marking of InDorTech LLC, M-1 Belarus;
- foam glass gravel, ICM Glass Kaluga LLC, M-3 "Ukraine";
- recording and video surveillance systems of Elvees NeoTek JSC, M-4 Don;
- within the framework of the experimental testing of Eladorm bituminous concrete modifier by NTS LLC, construction of an experimental section at M-4 Don in Krasnodar territory is provided for.

>50

YEARS
planned service life of Galen highway composite poles

COMPOSITE LIGHTING POLES OF GALEN LLC FOR M-4 DON HIGHWAY

In 2018, within the framework of the complex furnishing of the M-4 Don highway, composite lighting poles by Galen LLC were supplied with a total of 297 pcs. Their main application areas are highway and road lighting, intra-block lighting, power and fiber-optic communication lines, flag poles.

Galen poles are designed for application in all wind zones and are resistant to sudden temperature drops. They are not destroyed due to high soil acidity, rainfalls and salt air. The poles may be installed without special equipment. Fiberglass, of which these products are made, ensures complete electrical insulation, and the low weight of the material makes it possible to reduce transportation costs. Through the use of such poles the traffic safety improves, because composite products, unlike traditional galvanized ones, are destroyed in case of accident while absorbing the impact force. Consequently, the pole is subjected to the mechanical damage instead of a car.

Other advantages of Galen composite poles include their resistance to UV radiation, long service life (at least 50 years) and low maintenance costs. Due to their high corrosion resistance, composite poles in corrosive environments have proved to be much more reliable than galvanized ones, so they are perfectly suited for building outdoor lighting networks in coastal regions, as well as in the territory of chemical and mining plants. The products are environmentally safe, do not require additional maintenance and a protective coating, while they can be painted in any color.

OVERHAUL AND CONSTRUCTION

The annual improvement of residential housing in Russia has become one of the targets of the national project "Housing and urban environment." Within the project, housing conditions of almost 0.5 million people will be ameliorated by 2024 only through overhaul of main structural elements.

In 2018, the Fund continued active cooperation with the participants of the overhaul system — the Ministry of Construction of Russia, the Housing and Utilities Fund, the Association of Regional Operators for the Overhaul, regional funds of overhaul of apartment buildings.

Residential building in Kolomna, repaired using the innovative frameless facade insulation system "Thermoland"

The Fund implements projects in the subjects of the Russian Federation in the following fields:

- smart control of energy resources of buildings;
- roof insulation and repair;
- facade insulation and repair;
- in-house engineering systems;
- repair and installation of bearing structures.

During the reporting year, the Fund:

- implemented the projects for the application of Russian innovative products at more than 20 facilities in various subjects of the Russian Federation;
- formed together with Association of Regional Operators for the Overhaul a system of continuous briefing of regional funds, responsible for overhaul of apartment buildings, on modern innovative building materials;
- held 8 webinars on the platform of ANO eNano for 85 regional funds of overhaul on the use of Russian innovative and nanotechnology products in design and installation;
- held the first Russian workshop dedicated to practical application of innovative products during the overhaul of two buildings in Tomsk as part of UNOVUS 2018.

OVERHAUL OF FACADE WITH THE APPLICATION OF TERMOLAND FACADE INSULATION SYSTEM

In several regions of Russia, a major overhaul of the facades of residential buildings was implemented using the innovative frameless facade insulation system (FIS) Thermoland, which has the following advantages:

- possibility of using for any types of buildings both in reconstructions and in the new construction;
- possibility of mounting on any type of foundation (may be applied for weak walls) without any additional preparatory works;
- high speed of installation (five times faster than other curtain wall systems) due to high level of factory readiness (up to 95%);
- lack of "seasonality", i.e. process features and "wet" processes, limiting installation due to weather conditions;
- system durability (minimum 35 years) ensured by high density of thermal insulation material as well as elimination of hazard of creeping and sagging of the insulating layer during operation;
- elimination of the possibility of replacement at the construction site a facing, heat-insulating layer and other components for materials with the worst parameters due to the factory warranty of the declared system parameters.

By stimulating the demand for products of the Fund's partner companies in the overhaul system, total market share of the products grew in 2018 to 2.3% in terms of total expenses on overhaul of apartment buildings in the Russian Federation.

In addition, the Fund works actively with regional development companies involved in capital construction. At the moment, Russian products of nanotechnology and related to it high-tech sectors are applied comprehensively in various facilities already built or being constructed.

PILOT PROJECT OF BUSINESS CENTER NOVA PARK IN IZHEVSK

The developed facility is a multifunctional center, where a unique, ecologically safe working space provides lessees with the most comfortable environment. The following innovative technologies and materials were used during the repair:

- antibacterial paints and coatings produced by Stena Group of Companies, allowing to reduce the incidence rate;
- non-combustible paint NG of fire hazard class KM0 produced by Stena Group of Companies, enhancing the safety of escape routes;
- Breather Tion O2 positive ventilation units with heating and cleaning features, reducing the spread of infections and harmful gases in the air;
- A highly cost-effective smart LED lighting system (power consumption is 20 times lower as compared to incandescent lamps and five times lower as compared to energy-saving lamps), increased service life (up to 50 thousand hours), resistance to low temperatures, the absence of toxic constituents and ultraviolet radiation;
- high-strength fiber-glass composite reinforcement for plane elements (two times higher as compared to its metal equivalent), reduced weight (six times lower than metal), increased corrosion and chemical resistance, extended service life (more than 90 years with no loss of performance characteristics), excellent adhesion with concrete, tendency to reduction of cross fracturing by 1.5-2 times, elasticity, resistance to stretching and shape retention as well as cost effectiveness and reduction of labor effort.

ANNA MAMONOVA

Executive Director, Association of Regional Operators for the Overhaul of Apartment Buildings

"The overhaul industry is gaining momentum and rising to a new level. In 2018, certain types of overhaul work were carried out in more than 47 thousand houses. Today, existing programs cover almost 737 thousand apartment buildings with a total area of 2.5 billion square meters and total residents number of 93 million people. For residents of renovated houses, comfortable and safe living conditions should be created. Reducing the wear and tear of the housing stock, preventing deterioration and increase in substandard housing, improving the energy efficiency of buildings are extremely important tasks for the entire overhaul system. To this extent, our collaboration with the Fund is strategically important for increasing the comfort of citizen of the Russian Federation. Today, the application of products and services from nanotechnology and related high-tech sectors comprises 2.3% of the total cost of the overhaul of apartment buildings in the Russian Federation. I am confident that the implementation of innovations in the overhaul industry will increase in the future."

2.3%

OF TOTAL EXPENSES
on overhaul of apartment buildings in the Russian Federation was spent on products of the Fund's partner companies in the overhaul system

PROJECTS IN THE FIELD OF COMFORTABLE URBAN ENVIRONMENT

A NEW FIELD OF THE FUND ACTIVITIES INVOLVED ITS PARTICIPATION IN THE FOLLOWING EVENTS ON THE IMPROVEMENT OF AMENITIES AND URBAN FACILITIES (INCLUDING ITS DIGITALIZATION — THE PROJECT "SMART CITY")

envisioned in the Federal Project "Formation of a comfortable urban environment" (within the national project "Housing and urban environment"). The event concerns creating comfort conditions of urban environment by 2024 by improving the quality index of urban environment by 30%, reducing the number of cities with unfavorable urban environment by half, as well as by increasing the average index of digital transformation efficiency of urban facilities in the subjects of the Russian Federation by 30%.

The implementation of these goals results, in particular, in multiple increase in the number of comfortable public territories (in particular, urban parks, embankments of central sites, etc.), implementation of comprehensive projects in favorable urban environment, as well as introduction of new Smart City technologies (technologies that let residents to have a say in local decision-making, improve the quality of urban resource management and decisions in the field of safe environment, and smart housing and utilities, etc.)

AGREEMENT WITH THE ASSOCIATION OF ORGANIZATIONS AND SPECIALISTS IN THE FIELD OF HOUSING, UTILITIES AND URBAN DEVELOPMENT "HOUSING, UTILITIES AND URBAN ENVIRONMENT"

In 2018, the Fund, the Association of organizations and specialists in the field of housing, utilities and urban development "Housing, utilities and urban environment" and the Non-profit partnership "Intersectoral association of nanoindustry" (IAN) signed at the all-Russian forum "Private operators of communal infrastructure" a cooperation agreement with the goal to develop integrated approaches to the promotion of nanotechnology solutions and related to them high-tech solutions for urban environment, housing and utilities.

The parties agreed to promote the application of modern technical solutions in housing, utilities and projects dedicated to the improvement of urban environment, including products from nanotechnology and related to it high-tech sectors of the economy. The parties of the agreement intend jointly to prepare proposals on improving the regulatory base for housing, utilities and urban environment, to carry out ecological certification of domestic innovative products, to implement pilot projects and to prepare educational programs for upgrading the qualifications of specialists in the sector of housing and utilities. The parties plan to establish a data bank of the best available technologies in the field of housing, utilities and urban environment, in particular for their inclusion in the Bank of solutions "Smart City" of the Ministry of Construction of Russia.

The Fund participated in the development of "Smart city" standard for the Ministry of Construction of Russia to formalize proposals on the implementation of nanotechnology and related to it high-tech solutions in the Russian Federation, as well to ensure the replication of best practices. The draft document forms the basis for the implementation of new technologies, in particular:

- services to involve residents in finding solutions to urban development issues;
- intelligent accounting systems of communal resources;
- reduced consumption of energy resources by public facilities;
- energy-efficient urban lighting;
- public security solutions (including integration of security systems, unified security and fire alarm systems, ACS, alarm systems, RTLS systems, UAV detection and neutralization systems, intelligent transport systems, PSIM systems, etc.);
- solutions to ensure ecological safety.

Taking into account the activities carried out on the formation of standard Smart city, which determines the list of practical measures for the introduction of advanced solutions in the system of management and operation of urban facilities, the Fund presented numerous solutions to the Bank of solutions "Smart City", developed by the Ministry of Construction of Russia.

The Fund included in the Bank of solutions the validated solutions that meet the criteria set in standard Smart city and address various issues, in the field of smart housing and utilities, as wells as in the field of ecological and public safety, in particular:

MULTIPURPOSE INTEGRATION PLATFORM FOR SITUATION CENTERS

The platform is intended for integration of security systems, security and fire alarms, ACS, alarms, RTLS systems, smart transportation systems, etc. The solution by ELVEES NeoTek CJSC ensures automatic detection and classification of targets (people, vehicles) and potentially hazardous situations (fire, left and thrown over subjects) within the radius of up to 3 km).

The advantages offered by the solution:

- efficient filtering of false alarms;
- organization of virtual perimeter;
- neural network algorithms of multispectral analytics;
- automatic tracking of objects by tilting cameras and thermal imagers.

Orwell 2k multipurpose integration platform may be applied as the top level system intended for integration of safety system, security and fire alarms, ACS, alarming systems, RTLS systems, UAV detection and deactivation systems, smart transportation systems, PSIM systems, etc.

UNIFIED DISPATCHING SYSTEM FOR URBAN HOUSING AND UTILITIES

The software package developed by the company of "My home" LLC is focused on two target groups:

1. It provides a free mobile application and website for individual users who can quickly get:
   - notifications about shutdowns and emergency operations;
   - notifications about in-house works carried out by the MC;
   - messages and reports from the MC;
   - city events and significant news;
   - alerts from the MES.

2. Agents of the public organizations working the sector of housing and utilities receive an improved administrative system with extended functionality that allows to easily address daily issues and automates most of the manual processes.

In 2018, this solution was the best in the competition of the best digital solutions, which was held within VI all-Russian forum PROF-IT.2018.

STRIZH SMART WIRELESS SYSTEMS FOR AUTOMATED ACCOUNTING

STRIZH smart wireless systems for automated accounting in the utilities sector, agricultural and city infrastructure sectors allow gathering data from thousands standalone sensors based on the wireless LPWAN (Low-power Wide-area Network) networks and transfer the information to dozens kilometers.

As opposed to Russian telecommunication operators employing only foreign encryption algorithms, the XNB protocol is compatible with domestic cryptographic standards. This is particularly relevant for governmental institutions or special projects.

As a result of implementing, the management companies reduce building losses (utility accounting becomes transparent and fraud is eliminated), utility companies also reduce mainline losses as well (infrastructure smart monitoring system allows monitoring accidents at all the water supply sections). Developers, managers of trade, production and business facilities obtain a complex smart monitoring product: from parking control to temperature monitoring.

It should be noted that the Fund participation, in particular, in the formation of the Bank of solutions "Smart City" created necessary conditions for expanding cooperation with some regions. In 2018, the Fund began cooperation with the Vologda and Kaluga regions on the implementation of joint projects of optimization of urban facilities.

2.6. INFORMATION SUPPORT

OVER **40**

POPULAR SCIENCE EVENTS

WERE CONDUCTED IN TEN CITIES OF FIVE RUSSIAN FEDERAL DISTRICTS THAT APPEAL TO YOUNG PEOPLE TO CHOOSE CAREERS IN SCIENTIFIC AND TECHNOLOGICAL SPHERE AS WELL AS IN TECHNOLOGICAL ENTREPRENEURSHIP

MORE THAN **75** THOUSAND

PARTICIPANTS

ATTENDED THE EVENTS AND WHERE MORE THAN 140 SCIENTISTS, TEACHERS, STUDENTS AND SCHOOLCHILDREN MADE PRESENTATIONS

MORE THAN **250**

ORIGINAL PUBLICATIONS

IN VARIOUS MEDIA, INCLUDING THE FEDERAL LEVEL — TASS, KOMSOMOLSKAYA PRAVDA, EURONEWS

ALMOST **0.5**

MILLION YOUNG PEOPLE

REACHED DURING THE FUND FESTIVALS, FORUMS AND OTHER EVENTS

ONE OF THE MAIN FIELDS OF THE FUND ACTIVITIES IS CONTINUOUS COMMUNICATION WITH TARGET AUDIENCES IN ORDER TO PROMOTE THE ACCOMPLISHMENTS MADE IN NANOINDUSTRY AND TO PROVIDE IT WITH PUBLIC SUPPORT.

Representatives of business, public authorities, scientific and educational community, students and young people, as well as journalists and bloggers, as transponders of opinions, should have a clear idea what are the actual accomplishments of nanoindustry, what are the options provided by nanotechnology to the humankind to address global issues, and what are promising fields of development in this knowledge-based industry.

Since 2016, the Fund has carried out "Integration program in the field of popularization of nanotechnology and nanoindustry", aimed at stimulating the interest of participants in the innovation process in nanotechnologies, their involvement in technological entrepreneurship, raising public awareness about the main components and available services of the innovation system, as well as improving the level of mass media competence on the topic of innovation and nanoindustry.

Exposition of the Fund at the VIII St. Petersburg International Gas Forum

The main objectives of the Program are:

- growing exposure of nanotechnology topics in social networks and digital media;
- emerging system of feedback from target audiences and professional communities through digital channels;
- development of a system that informs and raises consumer awareness about the areas where nanotechnology products can be used, as well as about advanced scientific and engineering developments and their successful commercialization;
- acquaintance with successful professionals, teams, and leaders of projects who work in nanoindustry;
- involvement of students and young people in the field of nanotechnology and technological entrepreneurship through the demonstration of "success stories" of practical implementation of innovations;
- support of the current global technological agenda in Russia in the areas where Fund is active.

The main tools of the program are:

- media-channels to inform the target audiences;
- forming positive view of nanoindustry;
- participation in congresses and exhibitions to promote nanoproducts.

In 2018 the Fund activity on popularization of nanotechnology was focused on:

- creation of the content for popularization of science and nanotechnology;
- development of informational infrastructure of the Fund led website, accounts in social networks, etc.;
- promotion of the Fund projects in external communication programs;
- strengthening the regional and sectoral component of the communication program;
- shifting the focus from the exhibition activity to participation of the Fund specialists in forum events.

VICTORIA KRIVITSKAYA

Head of the Development of the Aerial Capacity of the Russia-K TV Channel

"The program "Scientific stand-up "is one of the most popular in the line of informative programs of the TV channel "Russia K". The project successfully combines a serious research base, elements of the show and the style of youth communication. And the fact that its general partner is the Fund for Infrastructure and Educational Programs of RUSNANO causes the special confidence of participants and viewers in the effectiveness of this competition of ideas. I wanted to express my gratitude to the Foundation and the RUSNANO Group for their cooperation, understanding and active participation in the creation of this remarkable project."

INFORMING THE TARGET AUDIENCES THROUGH MEDIA-CHANNELS

Analysis of the sources of public information shows that the main engines of communication development are now the speed of receiving information and the presence of "click-through" option in the message. It leads to a change in the media focus towards emergence of new channels of information distribution: modern mass media become convergent, multi-platform, develop sites in social networks, provide video resources and blog channels. As a result of this process, there is a risk of lower objectivity and quality of information that journalists receive and, thus, increase the volume of incorrect information.

In this regard, the development of proprietary channels of information and content for the popularization of science and nanotechnology becomes indispensable.

THE "NANO DISASSEMBLY" PROJECT WAS AWARDED WITH "RUNET AWARD 2018" IN THE NOMINATION "EDUCATION AND PERSONNEL", CARRIED OUT WITH PARTICIPATION OF THE MOST INTERESTING POPULAR SCIENCE YOUTUBE-CHANNELS, WHOSE AUTHOR MADE A FILM ABOUT THE NANOINDUSTRY ENTERPRISES.

The Fund official website www.fiop.site, launched in 2017, continues to be developed. In particular, the site content is regularly updated and includes explanations and interpretations of the Fund activity written for general audience and professional communities (145 press releases). The most important and informative mass media materials about the Fund activity and organizations with its participation are also republished.

The Fund supported the publication of 12 issues of magazine Jump Venture that were distributed free. The total audience of the magazine jointly with its online version (https://jumpventure.online) reaches 50 thousand people.

In 2018, new fields of communication with the journalistic community appeared:

- together with the TV channel "Russia-Culture" two series containing seven TV programs "Scientific stand-up" each were filmed and released. The programs focused on showing how young scientists work on nanotechnology topics. The average audience of the program, according to the TV channel, amounted to 100 thousand viewers. The program was awarded with the II degree Diploma of the all-Russian award "For loyalty to science" in the nomination "The best TV program on science" set by the Ministry of Education and Science of Russia;
- an information and educational project for journalists "School of nanomedia" was implemented on the basis of the Academy of news TASS. The program of supplementary professional education "News journalism in the field of science and innovation" was offered online in the webinar format (duration of the program is 76 academic hours). 31 journalists of federal and regional mass media were trained;
- two contests "Nano disassembly" for the bloggers working in the field of popular science were held. The resulting stories on nanoindustry companies were presented in nine science TV channels. The project was awarded with "Runet Award";
- a special joint project with TASS "Five threats to humanity. How nanotechnologies can save us" was released. The project explored possible ways to address the five most pressing issues related to climatic catastrophes threatening the humankind;
- press tours were organized in the nanocenter TECHNOSPARK and Nanotechnology center of composites (NCC), which are parts of the Fund technological infrastructure for journalists working at federal, regional and industrial mass media outlets;
- a popular YouTube channel about science and technology SciOne was started in cooperation with ANO eNano. The channel released a series of six stories "Introduction in nanotechnology" that explained the most current trends in the world of nanotechnology;
- special projects about the activities conducted by the Fund and nanoindustry enterprises and about the solutions they offer to the market were released together with TASS, Euronews, website of "Komsomolskaya Pravda" (Kp.Ru) and magazine "Mir dorog".

1,8 MILLION

VIEWS
online of "Nano disassembly" project

GEORGIY SHAHGILDIAN

Candidate of Chemical Sciences, Assistant of the Department of Chemical Technology of Glass and Sitalls of the Municipal Technical Technological University named after D.I. Mendeleev

"Science Bar Hopping is a very cool initiative. This is not only entertainment events, they have a great educational content. Now it seems to many that it is difficult to attend lectures, there are doubts whether the content will be available. And then the scientists themselves come to you, in your habitat, talk in a popular format. I hope such events motivate listeners to create their own educational trajectory. The main goal of such events is a positive charge and incentive for self-development. "

DMITRIY POBEDINSKY

Founder of YouTube channel "Physics from Pobedinsky"

"The "Nano disassembly" contest, conducted by the Foundation among popular science bloggers, turned out to be very cool. Firstly, the project was the first large-scale attempt to support and unite the Russian popular science blogging community and their audiences in online offline platforms. He combined the most interesting video bloggers. Secondly, this is a new format in the communication of bloggers with their audience. We, the authors, came out of cozy studios and "in the field" - to modern factories. It turned out informative videos about "smart" tablets, powerful microscopes, eco-friendly batteries, durable materials and much more. "

"Battle" of young scientists Science Slam

FORMATION OF POSITIVE PUBLIC RECEPTION OF NANOINDUSTRY

In 2018, the key project on popularization of science and formation of public opinion became the project Science Slam Nano that was structured as a competition among young scientists, developers and engineers at urban public sites. Together with the Association Science, Slam Russia selected and trained 65 charismatic young scientists. Their performances were held in a modern format of edutainment, connecting education and entertainment.

Science Bar Hopping was chosen as a new format of direct communication with the youth audience. During such festivals the young scientists from different fields of science presented their works and communicated with the audience in the night bars. The first Science Bar Hopping was held in Moscow in April 2018 in eight bars of the creative cluster "Krasnyi Oktyabr" and its 16 lectures were attended by more than 700 students. In September, the second festival of Science Bar Hopping in Moscow gathered already three thousand students: 32 lectures were held in 16 bars at the "Krasnyi Oktyabr", as well as in the territories of FLACON and "Hlebzavod".

The Fund acted as a partner of the largest forums focused at technological entrepreneurial community — "Open innovations" and StartUp Village. For popularization of nanotechnology a separate interactive information and entertainment space NANOquest was created at these forums.

In 2018, the Fund continued to give support to the events related to nanotechnology research, application and education. For example, at the popular science festival "Nauka 0+" the Fund opened an interactive exposition "Vse Kraski Nano", and at the career guidance Forum "Proektoria" it acted as a usual partner in the field "Materials" offering schoolchildren for solving a technological case study on lithium-ion energy storage systems. In addition, product samples and cases of nanoindustry companies working in the field of renewable energy were provided to the participants.

All these projects, combined under the name "Nano is my Super Power", involved more than three million young people or about 15% of all active urban youth in Russia. All materials on popular science, including materials in the Internet, TV and print mass media, were viewed seven million times. As a result, Nano is my Super Power was awarded in February 2019 the Grand Prix of the National award in the field of public relations "Serebryny Luchnik (Silver Archer)" as the best PR project of 2018.

"Nano is my Super Power" series of projects was awarded in February 2019 the Grand Prix of the National award in the field of public relations "Serebryny Luchnik (Silver Archer)" as the best PR project of 2018.

PROJECT NANO IS MY SUPER POWER

A set of popular science and informational events aimed at increasing the youth interest in advanced science and technologies. Initiation of a dialogue between talented youth and established specialists and leaders of scientific projects that define the modern Russian nanoindustry.

THE PROJECT GOALS:

- Increasing interest of target audiences in scientific and technological topics;
- Development of the system of popularization of modern technologies, advanced scientific and engineering developments and successful experience of their commercialization;
- Public recognition of successful professionals, teams and project leaders;
- Professional involvement of youth and students in the fields of technologies and technological entrepreneurship..

RESULTS OF THE 2018 CAMPAIGN:

A total of more than 40 popular science events were conducted in ten cities of five Russian federal districts that appeal to young people to choose careers in scientific and technological sphere as well as in technological entrepreneurship.

More than 7.5 thousand participants attended the events and more than 140 scientists, teachers, students and schoolchildren made presentations. In total, the festivals, forums and other events involved almost half a million young people.

Partner information projects were carried out together with the top 10 popular science bloggers whose combined audience is estimated to reach between 500 thousand and 1.5 million.

PROMOTION OF NANOPRODUCTS AT CONGRESSES AND EXHIBITIONS

IN 2018, THE FUND SIGNIFICANTLY REDUCED THE NUMBER OF EXHIBITION EVENTS AND SHIFTED ITS FOCUS TO PARTICIPATION IN FORUMS.

At the same time, expositions were presented at the following exhibitions and forums:

- four exhibitions — the State Duma of the Russian Federation, the St. Petersburg International Gas Forum, the St. Petersburg Innovation Forum, Moscow International Forum "Open innovations" — at which were presented innovative "green" products of following nanoindustry companies: Hevel,Liotech Innovations,Galen,Wind Energy Development Fund,RM Nanotech,Metaclay,Akrilan,Energy Storage Systems,BioSpark,Zapad-Vostok,Podzemburstroi,SPGlass,ICM Glass Kaluga,Solartek,BT-Svap,Carbonlab,New Technologies of Construction,Metaclay,Novomet-Perm,Plakart,Profotech, etc.
- at the International forum "Technoprom-2018" in Novosibirsk on the stand Technospark were presented the product and service solutions of startups from Troitsk, Moscow, Ulyanovsk and Novosibirsk.

Official delegations and representatives of the Fund participated during the year in the following congress events, forums and round tables:

- II all-Russian conference "the Way to success: strategies for support of gifted children and youth" was held in Sochi at the site of the Educational Center "Sirius".
- 250 schoolchildren and students from 24 regions of Russia came to Vladivostok for the annual all-Russian children-youth forum "Nanograd-2018" organized by the RUSNANO School League with the Fund support. All ten days children along with teachers, scientists, engineers and technological entrepreneurs were busy solving the cases that presented real issues and goals of high-tech manufacturing enterprises, including from nanoindustry;
- representatives of the Fund participated in conference "Functioning of regional systems of overhaul for apartment buildings: experience, analysis, conclusions, problems and ways of their solving" at the Expoforum site of the exhibition and conference "Housing and Utilities of Russia 2018", organized by the Ministry of Construction of Russia and the Housing Committee of St. Petersburg.
- The Fund became a partner of the IV International forum "Innovations in road construction" held in Sochi.
- at the International industrial exhibition INNOPROM 2018 in Yekaterinburg, a plenary session "Smart cities and business: new economic opportunities" and a panel discussion "Comfortable urban environment: resource-saving technologies, projects, ideas" were organized by the Fund on the sidelines of track "Technologies for cities." The round table "Educational solutions for industry" was also held.
- at the international forum "TechnoProm-2018" in Novosibirsk, a Fund's team proposed tools to improve the efficiency of interaction between advanced science, high-tech production and education in order to promote innovative products. The Fund organized the round tables "The use of new materials in the urban facilities: technologies, projects, ideas" and "Ecological trends of technological breakthrough in the nanotechnology industry and high-tech sectors."
- in Kaluga, on the eve of the Builder's Day, an exhibition of modern construction technologies was carried out and a scientific and practical conference "Application of innovative materials and technologies in construction and repair" was held.
- at the conference StartUp Village in Skolkovo, a practical seminar "The Lean Startup Way: approach to creation of innovations" was organized and a round table "New technological wave in Russia: barriers and opportunities" was held.
- at the II St. Petersburg international forum of labor, the Fund organized a meetup "The image of future qualifications: a package of solutions", which brought together practitioners from the Industrial Councils for Professional Qualifications (CPQ) and Qualifications Assessment Centers (QAC) to discuss how the qualification system design can be improved along with the maximum utility and ease for all participants in the labor market.
- the participants of the practical conference "Qualifications assessment system in the nanoindustry and high-tech sectors" in Saint-Petersburg appealed to the Fund to support the development and implementation of the project "Model of personnel selection for knowledge-based enterprises under the conditions of ongoing innovations". An extended meeting of the Council for Professional Qualifications (CPQ) in nanoindustry was held at the conference. The Council has supported the program of development of the assessment system of professional qualifications for 2019-2021.
- at the XI St. Petersburg International Innovation Forum, the Fund organized an expert session "Modern model of personnel selection for knowledge-based enterprises: a new business culture." Its participants discussed new tools of personnel selection for knowledge-based companies and offered ideas for their development and replication of best practices.
- at RUSNANO Week in the State Duma, a round table "The position and prospects for nanoindustry development in the Russian Federation" was held. The round table was organized by the State Duma Committee on Economic Policy, Industry, Innovation and Entrepreneurship. Chairman of the Executive Board of RUSNANO Management Company Anatoly Chubais presented a report. He noted that the Fund for Infrastructure and Educational Programs is responsible for addressing the infrastructure issues related to the formation of the nanotechnology industry. The deputies commended the results of RUSNANO activities completed in ten years.
- The Fund acted as a partner of the VI International forum on energy efficiency and energy sector development (ENES). A panel discussion "Realization of Russia's potential in the global RES industry" was held. A. Chubais presented a lecture "Renewable energy in Russia: from the past to the future."

CONGRESS OF NANOINDUSTRY ENTERPRISES

Since 2012, the Congress of nanoindustry enterprises has become a traditional annual communication and discussion platform for the professionals who address the key issues in the Russian nanotechnology business and entrepreneurship.

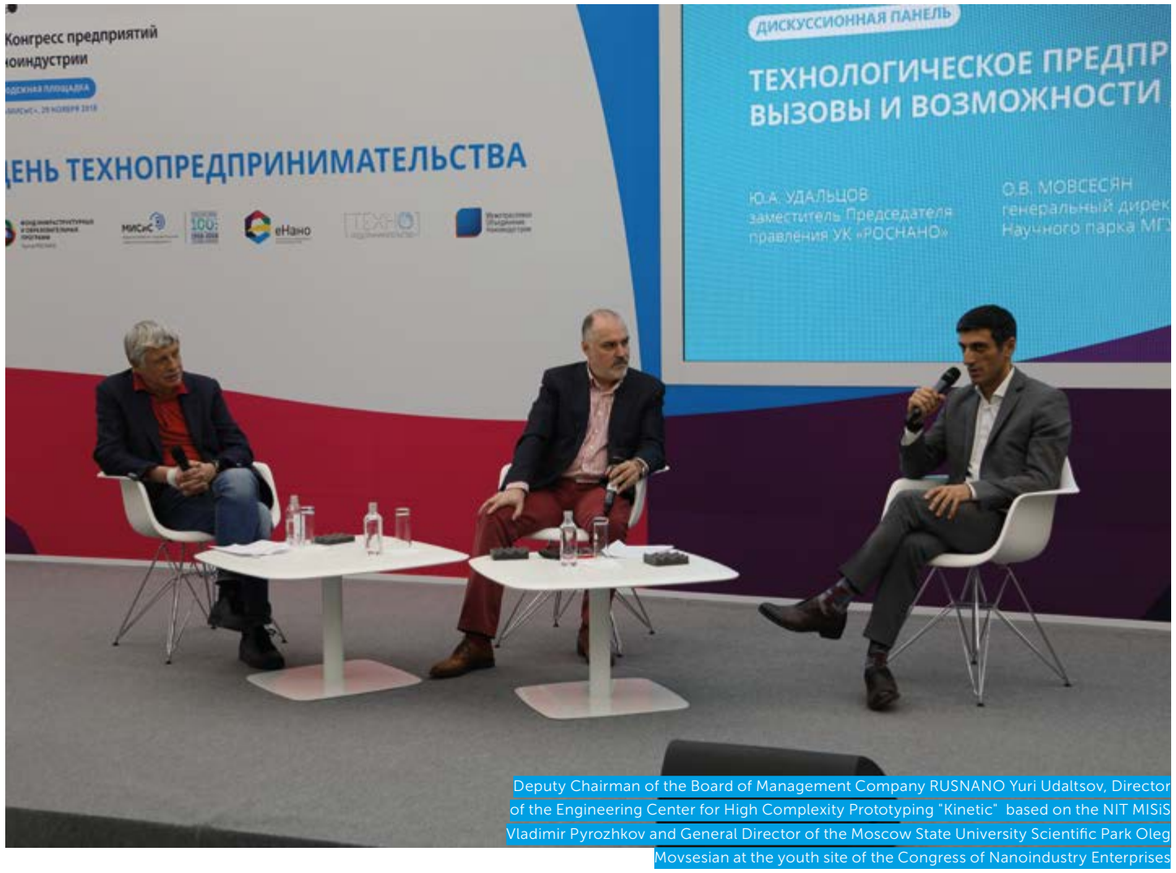
In 2018, it was decided to hold the Congress in a new format, that is at four platform: Youth platform, Jump Drive Day-1, Jump Drive Day-2, Communication platform for enterprises.

On November 29, the first event in the new Congress format "Youth platform of VII Congress of nanoindustry enterprises" was held at the engineering center "Kinetika" in MISiS.

The youth Congress platform started with a presentation by Chairman of the Executive Board of RUSNANO Management Company Anatoly Chubais "Innovative economy — what is it?".

Then, a round table "Technological entrepreneurship in higher education institutions" was held, where Deputy Chairman of the Executive Board of RUSNANO Management Company Yuri Udaltsov, Director of the Engineering center of prototyping of high complexity "Kinetika" of MISiS Vladimir Pirozhkov and General Director of the MSU Science Park Oleg Movsesian discussed what future technologies and occupations can radically change the way of human life in the next few decades.

In the end of the day of young technological entrepreneur, technology bloggers and participants of the project "Nano disassembly" participated in a Public Talk show. Popular YouTube bloggers working with scientific and technological content met with the youth audience.



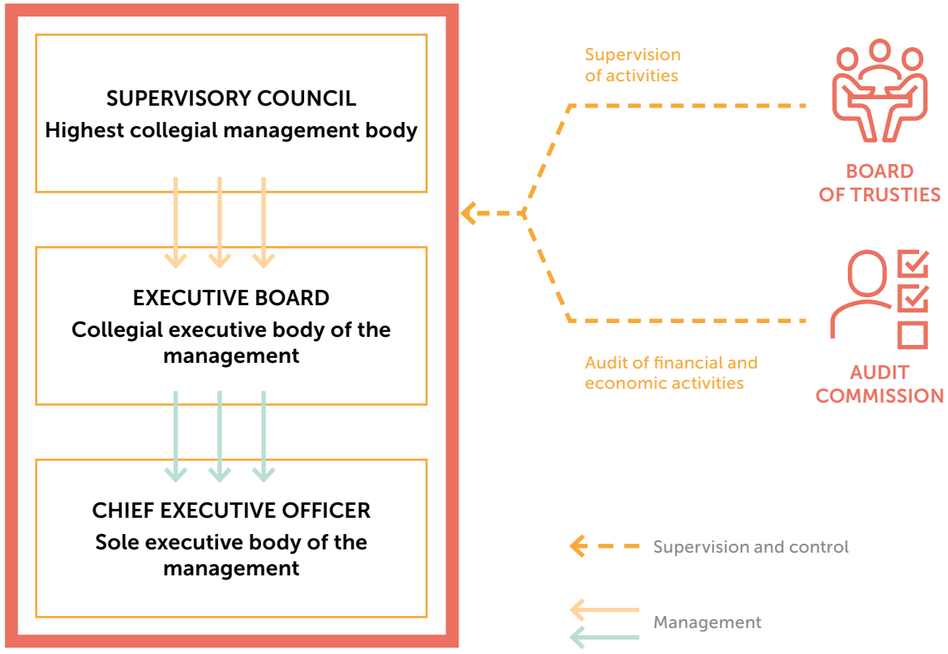
Deputy Chairman of the Board of Management Company RUSNANO Yuri Udaltsov, Director of the Engineering Center for High Complexity Prototyping "Kinetic" based on the NIT MISiS Vladimir Pyrozhkov and General Director of the Moscow State University Scientific Park Oleg Movsesian at the youth site of the Congress of Nanoindustry Enterprises

3. CORPORATE MANAGEMENT SYSTEM

3.1. CORPORATE MANAGEMENT AUTHORITIES

THE MANAGEMENT AND CONTROL BODIES OF THE FUND WERE FORMED BY THE SOLE FOUNDER OF THE FUND — RUSNANO JSC (DECISION NO. 1 DATED 06.10.2010). COLLEGIAL AUTHORITIES ARE FORMED IN ACCORDANCE WITH THE CHARTER OF THE FUND.

CORPORATE MANAGEMENT STRUCTURE



SUPERVISORY BOARD OF THE FUND

According to the Charter of the Fund, the supreme collegial management authority of the Fund is the Supervisory Board that takes decisions on most significant issues, including the definition of priority areas of activity, strategy and budget. The Supervisory Board's powers and operating procedure are determined pursuant to the Charter of the Fund and the Statute of the Supervisory Board of the Fund.

The Supervisory Board consists of 13 members (the Charter determines that the Supervisory Board is comprised of maximum 15 members), elected by the Fund's Founder for the term of office of two years.

MEMBERS OF THE SUPERVISORY BOARD AS OF 21.12.2018[29]

[29] Approved by the decision of the Board of Directors of RUSNANO JSC, minutes of the meeting №37 dated 22.02.17.

FULL NAME	Position
ALFIMOV Mikhail Vladimirovich	Member of Supervisory Board of the Fund for Infrastructure and Educational Programs
IVANOV Vladimir Viktorovich	Deputy President of the Russian Academy of Sciences
KOMISSAROV Alexei Gennadievich	Vice-Rector of the Russian Academy of National Economy and Public Administration, Director of the Higher School of Public Administration
NAZAROV Vladimir Pavlovich	Adviser to the Secretary of the Security Council of the Russian Federation
NIKKONEN Albina Ivanovna	Executive Director of the Russian Venture Capital Association
OSMAKOV Vasiliy Sergeevich	Deputy Minister of Industry and Trade of the Russian Federation
PETROV Andrey Nikolayevich	Director General of the FGBU «Directorate of Scientific and Technical Programs»
POVALKO Alexander Borisovich	CEO, Chairman of the Management Board of RVC JSC
POLYAKOV ergei Gennadievich	CEO of the Fund for Assistance to Small Innovative Enterprises in Science and Technology
PONOMAREV Alexei Konstantinovich	Vice-President for Strategy and Industrial Cooperation of the Skolkovo Institute of Science and Technology (Skoltech)
TRUBNIKOV Grigoryi Vladimirovich	First Deputy Minister of Science and Higher Education of the Russian Federation
FOMICHEV Oleg Vladislavovich	Director of Strategic Planning and Development of Renova-Holding Rus LLC
CHUBAIS Anatoly Borisovich	Chairman of the Executive Board of the Fund, Chairman of the Executive Board of RUSNANO Management Company LLC

IN 2018, SIX MEETINGS OF THE FUND'S SUPERVISORY BOARD WERE HELD: FOUR IN-PERSON AND TWO ONLINE MEETINGS. AT MEETINGS OF THE FUND'S SUPERVISORY BOARD, 35 ISSUES WERE DISCUSSED IN 2018, INCLUDING:

1. Annual reporting of the Fund for 2017

The annual report of the Fund for 2017, the report on the implementation of the Fund Strategy until 2025 for 2017 (all indicators are done), the Report on financial performance of revenue and expenses, the annual report on KPI execution were approved and the proposal on investing the profit for conducting statutory activities was agreed.

2. Program "RUSNANO School League"

The Program "RUSNANO School League for the period of 2019-2021" was approved. The Program continues the activities of the Program 2016-2018 carried out in the previous period and uses the accumulated potential for further development of scientific education and early career guidance of children and youth by:

- development of content and methods (technologies) of general and supplementary education of children and adults (formal and informal), focused on preparing children for life and professional activity in the conditions of high-tech society and the digital economy;
- creation of environment for the development and implementation of new educational practices (in the field of natural sciences, technological entrepreneurship, high technology) as a part of leisure and holidays activities of children and youth;
- formation of a sustainable networking educational community (teenagers, youth, teachers, parents), focused on new educational values and technologies, self-education in the field of natural sciences, technological entrepreneurship and nanotechnology;
- creation of electronic (digital) environment for the implementation of the Program of 2019-2021.

3. New edition of the Fund Strategy until 2025

The wording of specific events and results in the field of "Qualified personnel, professional education" was amended, as well as the list and wording of targets (indicators) of the Strategy in the fields of "Infrastructure projects", "Qualified personnel, professional education" and the wording of indicators as related to "Institutional support".

BOARD OF TRUSTEES

The Board of Trustees of the Fund supervises the activities of the Fund. The competence of the Board of Trustees include the control over the intended use of funds received by the Fund, approval of the audit organization, as well as compliance with the existing legislation of the Russian Federation by the Fund.

Currently, the Board of Trustees consists of three members (the Charter determines that the Board is comprised of maximum five members), elected by the Fund's Supervisory Board with the term of office of two years.

[30] Approved by the decision of the Board of Directors of RUSNANO JSC, minutes of the meeting №37 dated 22.02.17.

MEMBERS OF THE BOARD OF TRUSTEES AS OF 31.12.2018[30]

FULL NAME	Position of a member of the Fund's Board of Trustees
KHLUNOV Alexander Vitalievich	Chief Executive Officer of Russian Science Foundation
SALTYKOV Boris Georgievich	President of the Polytechnic Museum, Chairman of the Board of Trustees
FORTOV Vladimir Yevgenievich	Director of the Joint Institute for High Temperatures of the Russian Academy of Sciences

IN 2018, ONE BOARD OF TRUSTEES MEETING WAS HELD.

THE EXECUTIVE BOARD OF THE FUND

The Board is a collegial executive authority of the Fund, which manages the current activity, as well as preliminary consideration of issues related to Supervisory Board competence.

Currently, the Executive Board consists of ten members (the Charter determines that the Executive Board is comprised of maximum 11 members), elected by the Fund's Supervisory Board with the term of office of two years. The Executive Board consists of the heads of the Fund. Chairman of the Executive Board of the Fund is Chubais Anatoly Borisovich.

[31] Approved by the decision of the Fund's Supervisory Board, minutes of the meeting №30 dated 30.03.18

MEMBERS OF THE EXECUTIVE BOARD AS OF 31.12.2018[31]

FULL NAME	Position of a member of the Executive Board of the Fund
ZHIZHIN A.S.	Deputy Chief Executive Officer—Executive Director of the Fund
KALYUZHNYI S.V.	Advisor to the Chairman of RUSNANO Management Company LLC for Science,RUSNANO Chief Scientist
KACHAI A.R.	Deputy CEO for Strategy of the Fund
KOLESNIKOV D.A.	Deputy CEO for Economics and Finance of the Fund
SVINARENKO A.G.	Chief Executive Officer of the Fund, Deputy Chairman of the Board of RUSNANO Management Company LLC
SOBOLEVA Y.N.	Educational Projects and Programs Director of the Fund
TITOV R.V.	Deputy CEO for Infrastructure Projects of the Fund
TRAPEZNIKOV A.V.	Deputy Chairman of the Executive Board of RUSNANO Management Company LLC for External Communications
UDALTSOV Y.A.	Deputy Chairman of the Executive Board of RUSNANO Management Company LLC
CHUBAIS A.B.	Chairman of the Executive Board of RUSNANO Management Company LLC

IN 2018, 20 MEETINGS OF THE EXECUTIVE BOARD OF THE FUND WERE HELD, WHERE 66 ISSUES WERE DISCUSSED, INCLUDING:

1. Statement of Performance on key performance of the Fund's activities	Information on the implementation of projects and programs of the Fund was discussed, a number of decisions necessary for further implementation of projects and programs were made and a list of instructions for the study of specific issues/fields and their re-submission for consideration to the Board was formed.
2. Plan of the Fund's activities in 2018 on regulatory and engineering support of nanoindustry "green" products, on popularization of sustainable ecological development of the nanoindustry and the reduction of carbon dioxide emissions by nanoindustry enterprises	The list of key goals and events on 2018 was approved, including the development and approval of the Fund's green standards for products, "green" certification of buildings designed and/or constructed with the use of innovative nanoindustry products and technologies, submission of proposals to Rosstandart for the development of a preliminary national standard on methods to assess the carbon footprint in manufacturing and use of innovative nanoindustry products, etc.
3. Implementation in 2017 of the Integration program in the field of popularization of nanotechnology and nanoindustry for 2016-2020	The Board discussed the activities implemented in 2017 and aimed at increasing the Fund's brand recognition and formation of its positive image among target audiences, raising their awareness of nanotechnology and nanoindustry, positioning nanoindustry as a promising and attractive sector, developing communication platforms and promoting nanotechnology products, including through participation in congresses and exhibitions. It also considered results related to the development of media channels, interaction with popular science and technological publications, implementation of popular science program "Scientific stand-up" and other Fund's projects, as well as the Program's budget execution and the achievement of target indicators for 2017 (achieved).

CHIEF EXECUTIVE OFFICER OF THE FUND

The sole executive authority of the Fund rests with Chief Executive Officer of the Fund, elected by the Supervisory Board for a term of five years. By the decision of the Fund's Supervisory Board № 20 dated 28.09.2015 Svinarenko Andrey Gennadyevich, a Board member of the Fund, was appointed Chief Executive Officer of the Fund.

[32] Approved by the decision of the Fund's Supervisory Board, minutes of the meeting №18 dated 10.04.17.

AUDIT COMMISSION

The Fund's Audit Commission, performing on the basis of the Charter and the Statue of the Audit Commission of the Fund, is a monitoring body of the Fund that reviews financial and economic activities of the Fund on results of the Fund's annual performance, as well as upon the initiative of one of the members of the Audit Commission, on the decision of the Supervisory Board, the Board of Trustees and the Board.

The Audit Commission consists of three members, appointed by the Fund's Supervisory Board with a term of office of two years.

Members of the Audit Commission of the Fund as of 31.12.2018[32]

- Bessonova T.G.;
- Volkova L.S.;
- Kudryavtseva A.A.

3.2. THE KEY PERFORMANCE INDICATOR

The system of key performance indicators (KPIs) of the Fund provides for efficiency assessment of its managers and personnel in part of reaching the targets set in the strategic objectives of the Fund (see section 2.3.).

KPI system consists of three levels:

- Corporate that reflects the results of the Fund's activity as a whole;
- Functional that reflects the results of activity of a structural unit of the Fund;
- Individual that reflects the results of activity of an individual employee of the Fund[33].

The list and annual values of KPIs are approved annually by the Supervisory Board. The progress in achieving KPI values is assessed on a quarterly basis, a report on their implementation is regularly provided to the Board and the Supervisory Board.

[33] Employee's assessment is carried out by his or her direct supervisor. The performance is estimated in terms efficiency, timeliness and quality of workplan execution, suggested new ideas and solutions, etc.

3.3. PROJECT AND PROGRAM IMPLEMENTATION MONITORING

Project and program implementation monitoring is executed using the corporate governance system and financial controlling instruments.

Main controlling mechanisms of effective expenditures and performance of the implementation stages of projects for establishment of nanotechnology centers and TEC:

- development of internal model documents (charters, provisions on governing and monitoring bodies, etc.) for competence unification of governing bodies of the companies, including for effective financial monitoring of investment projects;
- participation of the Fund's representatives in governing and monitoring bodies of companies;
- analysis of reports on projects implementation progress, and on financial activities of portfolio companies;
- monitoring of appropriate investment expenditures.

Expenditures of the portfolio companies are in strict compliance with the budget, approved by the Company's governing bodies. Fund's departments carry out operational monitoring over the projects and programs implementation progress and financial activities.

3.4. PROCUREMENT ACTIVITY

The Fund's procurement procedures are conducted in compliance with the Procurement Regulations of the Fund, the provisions of which were updated in 2018.

Procurement activity of the Fund is based on the principles of openness in cooperation with suppliers, transparency, optimality of procedures and outcomes, as well as compliance with the interests of the Fund.

The Fund uses an electronic procurement system www.b2b-rusnano.comto improve the efficiency and observability of the use of procurement expenditures as well as to ensure compliance with the principles of procurement activity.

Procurement procedures are held in an open form (open contest, open request for proposals, open simple procurement), in which any party can participate.

IN 2018, THE FUND CONDUCTED 105 PROCUREMENT PROCEDURES.

PROCUREMENT STRUCTURE OF THE FUND FOR 2018, %