Science – Research – Education in the Russian Federation – An Overview

- Extended and updated edition -
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PREAMBLE

Russian science is moving forward at a brisk pace. Not only are the budgets allocated to scientific organisations and organisations for the promotion of the sciences on the increase, the winds of change are also sweeping through universities and academic institutes. New programmes are being launched, above all on the initiative of the universities and science foundations, which are designed to foster new generations of scientists and internationalise Russian science.

The documents assembled here give an overview of the Russian science and education system. Initially, an insight is provided into the science budget for the year 2007, as well as the initiatives planned for the period 2008 to 2010. A further section provides an introduction to Russian scientific institutions and their mandates. Besides the Ministry of Education and Science and its agencies, these include the Russian Academy of Sciences, the Russian Foundation for Basic Research, the Russian Foundation for the Humanities, and a number of others. Finally, the paper attempts to outline the ways in which the education system and scientific research in the Russian Federation interact.

This paper was compiled in cooperation with the Helmholtz Association's Moscow office, the liaison office of the Deutsche Forschungsgemeinschaft DFG (German Research Foundation) in Russia and the German embassy in Moscow. It draws on the synergies achieved by these institutions and documents their close collaboration. In response to the positive reactions we have received so far, we are planning to update and extend this report on a regular basis.

The study can be viewed on the website of both offices.

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1 RUSSIAN RESEARCH AND EDUCATION POLICY

In 2006, Russian research and education policy entered a new era with the passing of a number of important laws and the first moves to implement the **National Priority Project "Education" (PNPO)**. The head of the Russian Federation's Ministry of Education and Science (MON), Prof. A. Fursenko, referred to this as the main achievement of education and research policy in 2006 at the MON's annual meeting.

The main laws and documents of relevance to science passed in 2006 were:

- The federal law on the introduction of a national state school leaving examination (Единый государственный экзамен)
- Amendments to the federal law "on science and state policy in the fields of science and technology"
- Section 4 of the Civil Code on the "protection of intellectual property"
- Amendments to the law guaranteeing access to professional training and technical university education for members of the armed forces during their period of military service

Minister Fursenko stated that the National Education Project had introduced structural changes to the system in virtually all educational institutions, which were urgently needed to bring school and university education into line with modern standards. In 2006 the legal framework for the implementation of the National Education Project from 2006 to 2010 was established. A sum of 29 billion RUB (approx. €853 million) was allocated to the project in 2006. For 2007, this sum was planned to be increased to 48.6 billion RUB (approx. €1.43 billion) – an increase of about 68%. Teachers' salaries were raised by 30% and 20,000 schools were equipped with Internet access, and by September 2007 95% of all educational institutions are to receive Internet access.

One of the main elements of the PNPO is the Programme for the Advancement of Innovative Universities. As part of this programme, additional funds totalling between 200 and 300 million RUB (€5.8 – 14.3 million) were allocated to 17 universities (see table 5) in 2006 to enable them to set up innovative courses of study. In 2007, this funding application scheme, headed by the ROSOBRAZOVANIE Agency for Education, was repeated and a further 40 universities (see table 6) received significant funds for the establishment of innovative programmes. However, in June 2007, the Vice-Rector of Tomsk State University, Sergey N. Kirpotin, expressed some concern about the Federal government's reluctance to keep its financial promises. In 2006, funds were not disbursed until shortly before the end of the year. However, as universities are required to invite public tenders even for smaller investments, many found themselves short of time, with the result that they were unable to spend a significant portion of the funds allocated to them by the end of the year.

In the past few years, steps have been taken independently of the PNPO to put the country's 1300 regular universities and their 2200 subsidiary institutions to the test. Mr. Viktor Bolotov, Head of the Federal Service for Supervision in Education and Science (ROSOBRNADZOR) informed the MON at its annual meeting that only 30% of the 300 universities evaluated in 2006 fulfilled the requirements for a university license. In 40% of cases, individual complaints were filed against the university in question, while 30% of universities were judged to be seriously deficient. In all, 27 university branches were closed, 26 licenses were temporarily suspended and one license was revoked.

There are currently over 7 million students in the Russian Federation. The audit painted a gloomy picture of the situation: most of the nation's institutions of higher education are in a pitiful condition. Half the universities and academies are housed in buildings that have not been modernized in 30 years; the heating systems and plumbing need to be completely replaced in one out of three universities, and 60% of the buildings used for teaching purposes have roofs requiring comprehensive structural repairs. For many universities though the situation has improved significantly over the course of the last 3-4 years, with completely renovated and superbly equipped laboratories sprouting in many universities and research institutions all over the country. Many these labs are designed for collective use for scientists from universities and academy institutes.

The Rector of the State University - Higher School of Economics, Prof. Kuzminov, suggested introducing "dedicated candidacies" (целевая аспирантура) and monthly stipends of around 20 thousand RUB (approx. €600) for (doctoral) candidates. However, he is convinced that the measures currently in place will not, in the short term, succeed in ameliorating the situation of teaching staff that has taken such a dramatic turn for the worse over the past few years.

The Duma is currently debating a bill that would result in a transition to a university education split into undergraduate and graduate studies, with a Bachelor's degree as the precondition for earning an M.A. Mr. Sadovnitschij, Member of the Academy and the Rector of Moscow State University (MSU), believes that universities and institutes of higher education must have the right to decide in which fields of study they want to introduce Bachelor's and Master's programmes. Minister Fursenko believes that discussing the introduction of a Bachelor's degree is premature before compulsory school attendance is increased to 12 years, as three years is too short a time to guarantee a high quality university education. At the moment, Russian pupils generally obtain their school leaving certificates after 11 years of schooling.

In 2006, the Federal Agency for Science and Innovation continued its successful Federal Target Programme "Research and developments in priority areas of Russian science and technology 2002-2006 (up to 2012)". A total of 42 billion RUB (€1.23 billion) was allocated in 2006, while funding for the period 2007-2012 is expected to amount to 194.89 billion RUB (€5.6 billion) (www.fasi.gov.ru).

The priority areas, centring mainly on the fields of IT and nanotechnology, were defined in the course of the Council for Science, Technology and Training session hosted by the President of the RF in October 2006. The MON is currently preparing the next Federal Priority Programme, "Developing the infrastructure of the nano-industry up to 2010". Within the government, the priority programme is headed by the First Russian Vice Premier, Sergei Ivanov.

The first session of the Board of Directors for the Development of the Nano-Industry was held on 22 June 2007 and was attended by members of the government, members of parliament and representatives of major companies. The council was set up to coordinate and agree on the provision of budgetary and private funds for projects.

According to the report presented by First Vice Premier Sergei Ivanov during the session, 200 billion RUB (approx. €5.88 million) will be spent until 2015 to foster the

development of the nano-industry in Russia. A few months ago, the State Duma (the Lower House of the Russian parliament) passed a bill for the foundation of a nanotechnology association (as a public corporation). A call for tenders was issued, as a result of which the Kurchatov Institute was commissioned with establishing the nanotechnology association. The research institute is scheduled to receive the first 130 billion RUB (approx. € 3.8 billion) this year and is to be awarded the status of a national laboratory.

Sources:

1. Lectures held by A. Fursenko
   http://www.mon.gov.ru/ruk/ministr/dok/3588/
2. Summary of the MON annual meeting in the RF's magazine, VVP
   http://www.vvprf.ru/files/download/x-vvp_26_158.jpg
3. Information about the Federal Target Programme "Research and developments..."
   http://www.fcntp.ru/page.aspx?page=25
4. Press reports on education on the Russian Education web page
   http://www.edu.ru/
5. Press reports on nanotechnology
   http://www.ras.ru/news/ and http://www.opec.ru/

2 THE RUSSIAN FEDERATION'S NATIONAL SCIENCE AND EDUCATION BUDGET

2.1 National Budget 2005-2010

In his annual state-of-the-nation address in April 2007, Russian President Vladimir Putin once again emphasized the fact that the Russian national budget had increased six-fold over the past seven years.

While the main aim of the 2005 budget had been to combat inflation, the 2006 budget was described as "a development budget with a social focus". Improving the situation in the education sector was declared a national priority. In terms of the budget, this is evidenced by a nominal increase in funding for research and education of 30%.

Since 2006 the budget has been established for a three-year period in the form of a financial plan containing projected figures for the coming years (see Table 1).

Table 1 Russian Federation budget 2005-2007; budget draft 2008 – 2010

Year (all amounts in billions EUR)	**2005**	**2006**	**2007**	**2008 projected**	**2009 projected**	**2010 projected**
Total RF national budget (expenditure)	89.64	125.59	160.7	193.2	219.2	237.9
Basic research	0.87	1.14	1.41	1.69	2.03	2.45
Applied research (issues of national interest)	0.10	0.15	0.25	0.41	0.41	0.77
Education	4.57	6.06	8.17	9.09	9.28	10.03

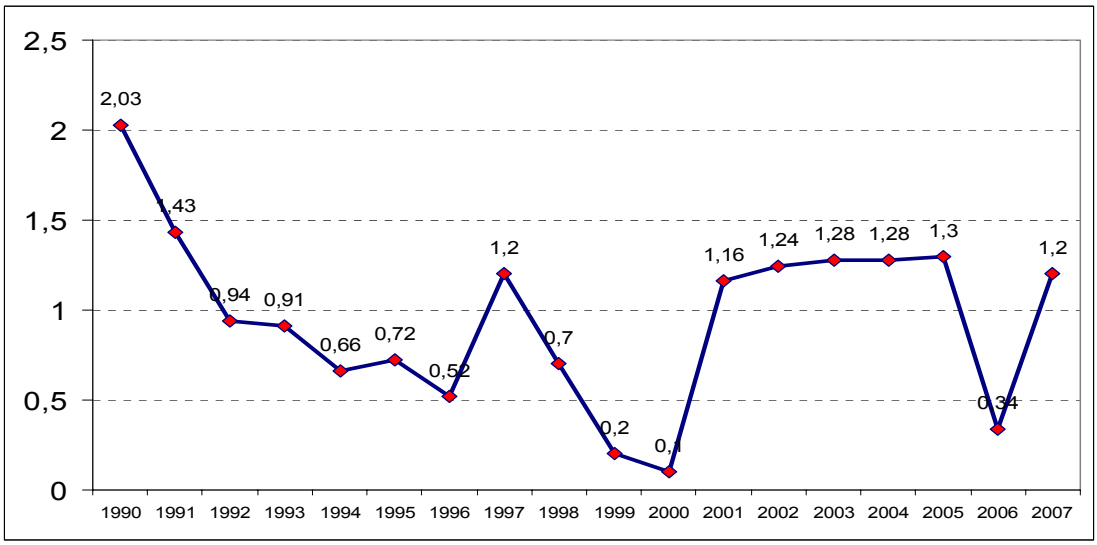
The budget of the Russian Federation foresaw expenditures of €161 billion in 2007, whereas revenues (e.g. taxes) were expected to total €205 billion. The projected gross domestic product was €918 billion. Estimates placed the inflation rate at between 6.5% and 8.0% for the period between December 2006 and December 2007.

Education is one of the stated priorities for state funding, a fact evidenced by a massive increase in funds allocated by the Federal Agency for Education (ROSOBRAZOVANIE), from €4.6 to 6.1 billion. This increase is related to the implementation of the National Priority Project "Education" (see table listing budget allocations 2005-2010). These allocations will increase at a slower rate in 2009 (compared to 2008) because most of the measures included in the Education Project will have been fully implemented by this stage.

In the longer term (up to 2010), the amount spent on scientific research and development in Russia is to be increased from the current level of 1.3% to 2% of GDP, while the proportion of expenditures in this area financed by the private sector is to increase to 55%, which is in line with the Russian government's strategy to develop

research and innovation that also aims to increase the number of smaller and mid-size companies in the innovation sector to 30,000 by the year 2011. The strategy thus intends to raise the share of revenues generated by new inventions and innovative products to 15% of total revenues from the sale of industrial products, and 20% of export revenues, by the year 2011.

Fig. 1 Expenditure on science in the Russian Federation – proportional to GDP (1990-2007); compiled from press releases; no official figures are released by the Office for Statistics



Sources:

1. Information from the II International Conference on "Modernizing the Economy in Russia" http://hse.ru/ic2/materials_2/yasin_8.htm
2. Centre for Political Data http://www.polit-info.ru/mi_1.htm
3. E.B. Lenchuk (Institute for International Economic and Political Research, RAS) http://confifap.cpic.ru/upload/conf2005/reports/doklad_467.doc
4. Russian Academy of Sciences http://www.ras.ru/digest/showdnews.aspx?id=f50f5cba-9113-4d5e-8326-a992081f87c9&_Language=en
5. State Duma expert Vladimir Babkin for the "FK Novosti" information agency http://www.fcinfo.ru/themes/basic/materials-document.asp?folder=4005&matID=113974
6. Novaya Gazeta (New Gazette) http://2005.novayagazeta.ru/nomer/2005/64n/n64n-s16.shtml

2.2 Budget of the Ministry of Education and Science 2005-2010

Although the MON is in charge of an overall budget of approx. €8.3 billion, the funds allocated to the Ministry itself are very limited (€68 million); the major part is distributed to its agencies, of which the Federal Agency for Science and Innovation ROSNAUKA (2007: €483 million) and the Federal Agency for Education ROSOBRAZOVANIE (2007: €6.06 billion) are without a doubt the most prominent.

A significant proportion is also assigned to the MON's budgetary dependent, the Russian Academy of Sciences (€674 million) and its branches in the Far East (€89 million), Siberia (€242 million) and the Ural (€70 million), and to Lomonosov University. The €164 million budget at Lomonosov University's disposal is further augmented by funds from the municipality of Moscow.

The most important organizations for the promotion of science in the Russian Federation not bound to research policy requirements is the Russian Foundation for Basic Research (RFBR). For a number of years now, the RFBR's budget has been increasing by 25% annually. According to the budget proposal, this rate of increase is set to continue until at least the year 2010. This development indicates that, following years of critical underfunding, basic research is becoming increasingly important in Russia again. The concept of allocating funds on the basis of independent peer reviews is also gaining ground in the field of scientific research in Russia.

Table 2 General Overview – Budget of the Ministry of Education and Science 2005-2010

Recipient	Actual (in million EUR, 1 EUR = 34 RUB)			Proposed (in million EUR, 1 EUR = 34 RUB)		
	2005	2006	2007	2008	2009.	2010
Russian Federal Ministry of Education and Science (MON)	**15.9**	**114.1**	**68.0**	**321.2**	**273.7**	**250.4**
proportion of applied research	4.4	6.6	8.4			
Federal Agency for Education (ROSOBRAZOVANIE)	**2520.6**	**3468.4**	**6063.4**	**6462.4**	**6120.3**	**5891.6**
proportion of basic research	19.2	59.0	89.1			
proportion of applied research			0.3			
Federal Service for Supervision in Education and Science (ROSOBRNADZOR)	**1.6**	**3.0**	**3.6**	**5.5**	**16.1**	**17.0**
proportion of applied research			0.4			
Federal Agency for Science and Innovation (ROSNAUKA)	**294.3**	**329.2**	**483.2**	**528.9**	**652.7**	**805.4**
proportion of basic research	10.6	20.6	11.7			
proportion of applied research	59.6	69.5	131.6			
Federal Service for Intellectual Property, Patents and Trademarks (ROSPATENT)	**29.3**	**32.9**	**37.8**	**49.8**	**55.7**	**58.6**
proportion of applied research	23.3	26.6	35.6			
Russian Academy of Sciences (RAS)	**421.5**	**540.7**	**673.5**	**817.8**	**869.4**	**904.5**
proportion of basic research	355.9	457.1	550.6			
proportion of applied research			20.7			
Russian Academy of Sciences, Siberian branch	**141.9**	**173.0**	**241.7**	**295.8**	**304.9**	**331.5**
proportion of basic research	120.3	144.2	201.8			
proportion of applied research			5.8			
Russian Academy of Sciences, Ural branch	**43.3**	**53.4**	**70.2**	**87.7**	**89.7**	**92.9**
proportion of basic research	38.6	45.9	62.0			
proportion of applied research			1.5			
Russian Academy of Sciences, Far East branch	**52.7**	**69.7**	**88.7**	**107.3**	**108.5**	**121.1**
proportion of basic research	44.8	55.3	71.1			
proportion of applied research			5.8			

Russian Academy of Education	**8.2**	**9.7**	**12.7**	**14.1**	**15.1**	**16.5**
proportion of basic research	7.5	8.8	11.5			
Russian Academy of Medical Sciences* *(from the budget of the Ministry of Health)	**351.8**	**422.0**	**375.2**	**395.2**	**440.1**	**476.1**
proportion of basic research	57.6	67.0				
Russian Academy of Agricultural Science	**68.2**	**82.4**	**108.1**	**121.0**	**132.6**	**141.9**
proportion of basic research	61.9	75.1	98.9			
Russian Academy of Painting, Sculpture and Architecture			**3.6**	**3.9**	**4.3**	**4.6**
Russian Academy of Arts			**23.0**	**26.0**	**29.6**	**32.7**
proportion of basic research			9.5			
Russian Academy of Architecture and Construction Sciences			**3.6**	**3.9**	**4.1**	**4.1**
proportion of basic research			3.6			
Russian Foundation for Basic Research (RFBR)	**98.8**	**126.0**	**157.1**	**194.1**	**240.9**	**300.2**
proportion of basic research			157.1			
Russian Foundation for the Humanities	**16.5**	**21.1**	**26.2**	**32.4**	**40.2**	**50.1**
proportion of basic research			26.2			
Foundation for Assistance to Small Innovative Enterprises (FASIE)	**24.7**	**31.7**	**39.3**	**48.5**	**60.3**	**75.1**
proportion of basic research			39.3			
Lomonosov Moscow State University (MSU)	**116.0**	**123.2**	**164.2**	**177.6**	**189.2**	**178.2**
proportion of basic research	8.7	10.9	17.2			

Sources:

1. Appendix 10 of the Federal Law "On the Federal Budget for 2007"
2. Federal Law project focusing on the Federal Budget for 2008 and for the period up to 2010

2.3 Items of the Budget Proposal 2008-2010 Relevant to the Fields of Research and Education

The budget proposal 2008-2010 contains a number of items of relevance to research and education, which are listed below. Over the coming years, funds totalling €1 billion will be made available for the development of the space programme and the Russian global navigation satellite system, GLONASS. Of particular significance is also the creation of a separate of budgetary item covering Russia's involvement in the international fusion reactor ITER, as well as the budget for the Joint Institute for Nuclear Research in Dubna (JINR).

2.3.1 Budget allocations for the implementation of Federal Priority Programmes

The aims of the priority programmes and the considerable funds they receive are clear indications that Russia plans to focus strongly on promoting the development of cutting-edge technology in science and industry over the coming years.

The following amounts (excluding expenditures for national projects) have been earmarked for the realization of the **Federal Priority Programmes**, the non-programmatic elements of the **Federal Investment Programme** and government **Promotion of Small Enterprises**:

2008 – 869.4 billion RUB (€25.6 billion)
2009 – 923.8 billion RUB (€27.2 billion)
2010 – 682.4 billion RUB (€20.1 billion)

Enormous sums are currently being mobilised in order to implement the Federal Priority Programmes. The full amounts and the relevant budget items are listed in the table below. Part of the total sum shown will be used to subsidise other priority programmes, e.g. for the improvement of hospital facilities, for transport infrastructure construction, etc.

Total allocations: 2008 – 671.4 billion RUB (€19.7 billion)
2009 – 724.0 billion RUB (€21.2 billion)
2010 – 499.1 billion RUB (€14.7 billion)

Table 3 Budget Allocations for Federal Priority Programmes 2007 (selected items).

Federal Priority Programmes (selected items)	Total in million EUR 1 EUR= 34 RUB
Federal Priority Programme for the Development of Education for the period 2006 - 2010	325.8
Russian Federal Space Programme for the period 2006 – 2015	717.6
Federal Priority Programme Global Navigation System	290.6
Federal Priority Programme for National Basic Technology Needs for the period 2007 - 2011	185.3
Federal Priority Programme for Research and Elaboration of Priority Aims for the Development of Science and Technology in Russia for the period 2007-2012	342.9
Federal Priority Programme for the Development of the Russian Cosmodrome for the period 2006 - 2015	54.0
Federal Priority Programme for the Development of Russia's Nuclear and Energy Capacities for the period 2007-2010 and outlook until 2015	529.4

The realization of the **Federal Priority Programme for "Research and Development of Priority Aims for R&D Capacities in Russia (2007-2012)"** will be continued, focusing on the following areas:

- Life sciences
- Nanotechnology and materials
- Information and communications technologies
- Sustainable land use

- Energy production and energy efficiency

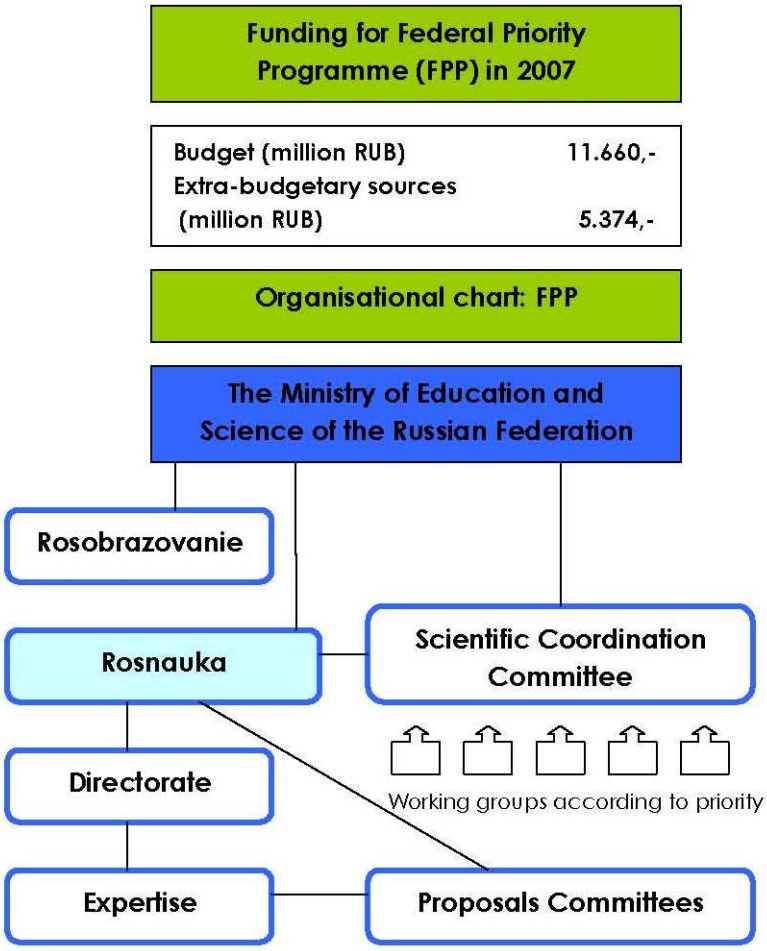
Proposed funding is as follows:
2008 – 13.8 billion RUB (€0.4 billion)
up to 2010 – 22.0 billion RUB (€0.65 billion)

Table 4 Proposed funding for various programme activities in the framework of the 2007 FPPs, in million RUB.

Activities	Total (million RUB)	Investment	NIOKR (Research and Development)
Prediction and monitoring of scientific and technological developments	320	-	320
Living systems	2,808	150	2,658
Nanosystems and nanomaterials industry	4,486	240	4,246
Information and telecommunications networks	889	48	841
Sustainable use of the environment	999	54	945
Energetics and energy conservation	2,008	108	1,900

Source:
FGU NII RINKZE press centre publication on the role of the non-commercial "Inno-V" partnership

Fig. 2 Funding of the Federal Priority Programmes (FOP) 2007



2.3.2 Budgets for basic research (budget proposal 2008-2010)

While the sums earmarked for basic research correspond to the general aim of reinforcing the academic sector, the funds granted to support universities and up-and-coming academics in particular are extremely low.

	Budget proposal		
	2008	**2009**	**2010**
Total in billion RUB	58.3	69.0	83.9
Total in billion EUR (1 EUR = 34 RUB)	1.71	2.03	2.47

Including:

- **Development of the academic sector**

2008 - 45.5 billion RUB (€1.34 billion)
2009 - 47.8 billion RUB (€1.41 billion)
2010 - 49.8 billion RUB (€1.46 billion)

- **Development of science at university level**

(Federal Agency for Education, Russian Federal Ministry of Economic Development and Trade, Lomonosov Moscow State University):
2008 - 4.0 billion RUB (€0.12 billion)
2009 - 4.3 billion RUB (€0.13 billion)
2010 - 4.8 billion RUB (€0.14 billion)

- **Funding of scientific foundations**

2008 - 7.7 billion RUB (€0.23 billion)
2009 - 9.6 billion RUB (€0.28 billion)
2010 - 11.9 billion RUB (€0.35 billion)

- **Funding of young scientists:**

Approx. 0.4 billion RUB (€0.012 billion) per annum for:
science majors entering their final phase of study
university supervisors of science
doctoral students in the sciences
leading science schools

2.3.3 Budgets for applied research and issues of national interest (proposal)

	Budget proposal		
	2008	2009	2010
Total in billion RUB	14.2	14.0	26.3

Including:

- **Science institute activities**

2008 - 3.4 billion RUB (€100 million)
2009 - 4.1 billion RUB (€120.6 million)
2010 - 4.4 billion RUB (€129.4 million)

- **Contracted research and development work**

2008 - 0.7 billion RUB (€20.6 million)
2009 - 1.8 billion RUB (€52.9 million)
2010 - 13.6 billion RUB (€400 million)

- **Subsidies for scientific measures**

2008 - 0.3 billion RUB (€8.8 million)
2009 - 0.3 billion RUB (€8.8 million)
2010 – 0.3 billion RUB (€8.8 million)

- **The Joint Institute for Nuclear Research**

2008 - 0.8 billion RUB (€23.5 million)
2009 – 0.9 billion RUB (€26.5 million)
2010 – 0.9 billion RUB (€26.5 million)

2.3.4 Budgets for applied research (national economy)

	Budget provision		
	2008	2009	2010
Total in billion RUB	72.3	80.7	89.3

Including:

- **Contractual research and development work**

2008 - 43.3 billion RUB
2009 - 50.2 billion RUB
2010 - 55.3 billion RUB

- **Science institute activities**

2008 - 1.6 billion RUB
2009 - 1.8 billion RUB
2010 - 1.9 billion RUB

- **The Foundation for Assistance to Small Innovative Enterprises– (Ivan Bortnik, Director)**

2008 - 1.7 billion RUB
2009 - 2.0 billion RUB
2010 - 2.6 billion RUB

- **Realization of the international fusion reactor project ITER**

2008 - 183.9 million RUB
2009 - 195.4 million RUB
2010 - 195.4 million RUB

3 THE RUSSIAN FEDERAL MINISTRY OF EDUCATION AND SCIENCE (MON)

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Minister: Dr. Andrej Fursenko

The Russian Federation's Ministry of Education and Science was founded on 9 March 2004 as the result of the merging of the Ministry of Education and the Ministry of Industry, Science and Technology. The new ministry assumed the role of its two predecessors and was also placed in charge of the restructured Federal Service for Intellectual Property, Patents and Trademarks.

The MON's main responsibilities are to plan science policy guidelines, draft bills for new legislation and endorse conditions of implementation and legislative measures.

Since 2004, when this restructuring process took place, the MON has been assisted by two agencies and two services:

- **The Federal Agency for Science and Innovation (ROSNAUKA)**
- **The Federal Agency for Education (ROSOBRAZOVANIE)**
- **The Federal Service for Supervision in Education and Science (ROSOBRNADZOR)**
- **The Federal Service for Intellectual Property, Patents and Trademarks (ROSPATENT)**

The Ministry is to focus on policy planning, while the agencies are to be responsible for translating these concepts into action plans and managing them. The services are in charge of monitoring the implementation of these plans.

The MON's federal budget for 2006 was 204.5 billion RUB (€5.84 billion); in 2007 it rose to 281.1 billion RUB (€8.28 billion), an increase of 37.5%. Furthermore, the Ministry was to receive an additional 52 billion RUB (€1.5 billion) to completely overhaul MON buildings and run-down student halls of residence, to boost grants and scholarships etc.
Source: http://www.ug.ru/issues/?action=topic&toid=5100

The ongoing National Priority Programme Education (PNPO) is the principal factor necessitating the increase in the MON's budget. In 2007, 49 billion RUB (€1.44 billion) of federal funding were made available for its implementation, approx. 19.6 billion RUB (€576.5 million) more than in 2006. The PNPO specifies that almost all elements are to be financed in equal part by federal and regional funds; thus the overall amount allocated to finance the project totals 98 billion RUB (€2.9 billion), which includes 4 billion RUB of unspent funds from the previous year.

As for science and innovation, the National Priority Programme entitled "Research and developments in priority areas of Russian science and technology 2002-2006" has been completed and a new programme has been drawn up for the period 2007-2012. As part of the programme, 1082 projects were funded in the priority areas and 2024 sponsorship agreements with a total value of 13.2 billion RUB (€388.2 million) were concluded. This amount includes extra-budgetary funds totalling 5.1 billion RUB (€150

million). Overall, 198 new technologies were developed and 865 patents registered in the 2005-2006 period.

In 2006, the Ministry drew up a draft programme for the development of the nano-industry in the RF up to the year 2015. The key element of the programme is a Federal Priority Programme entitled “Developing the infrastructure of the nano-industry for the period 2008-2010”. In short, over the next ten years, absolute priority will be given to developing nanotechnologies in Russia.

Fig. 3 Organizational Structure of the MON

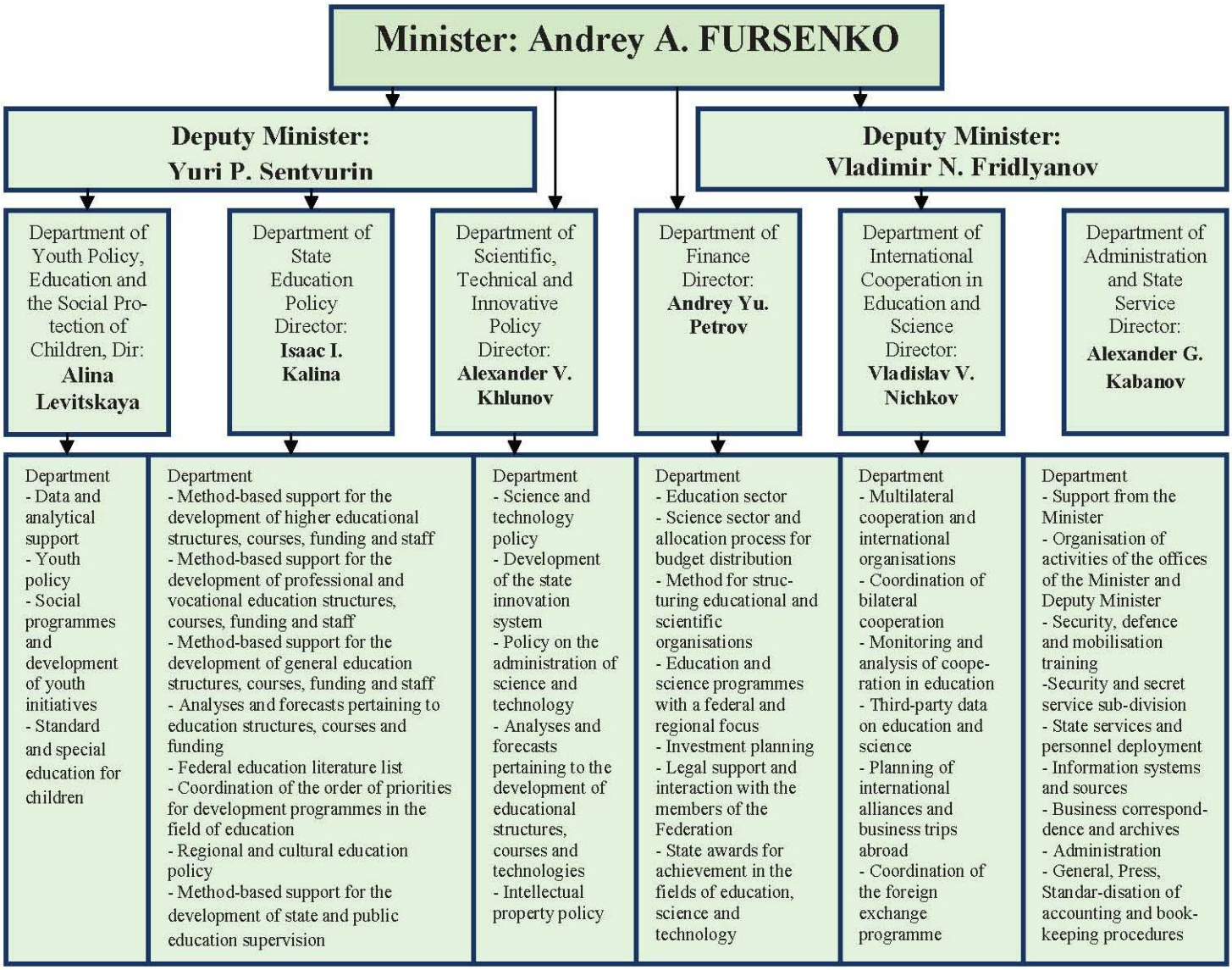
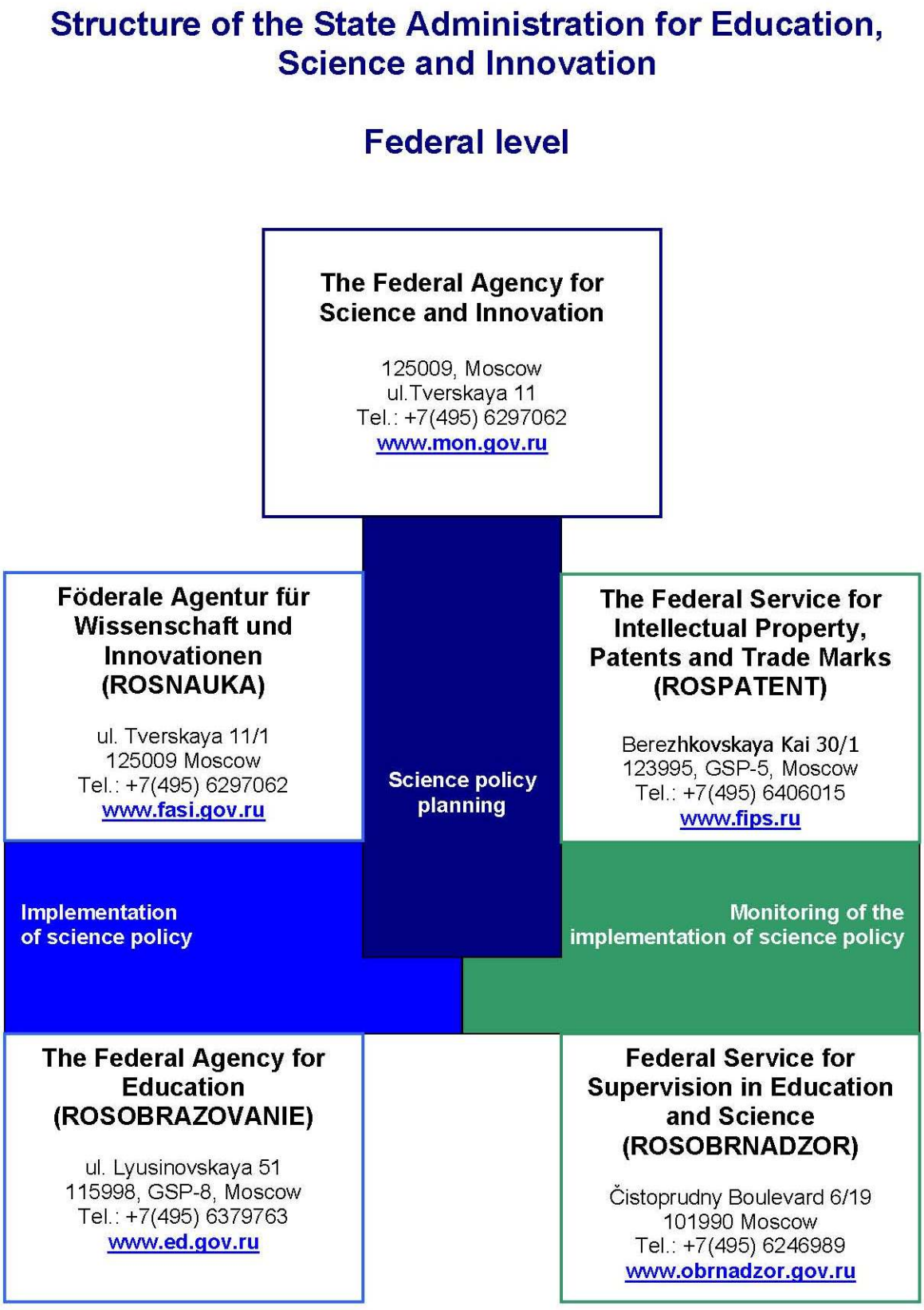


Fig. 4 Structure of the State Administration for Education, Science and Innovation



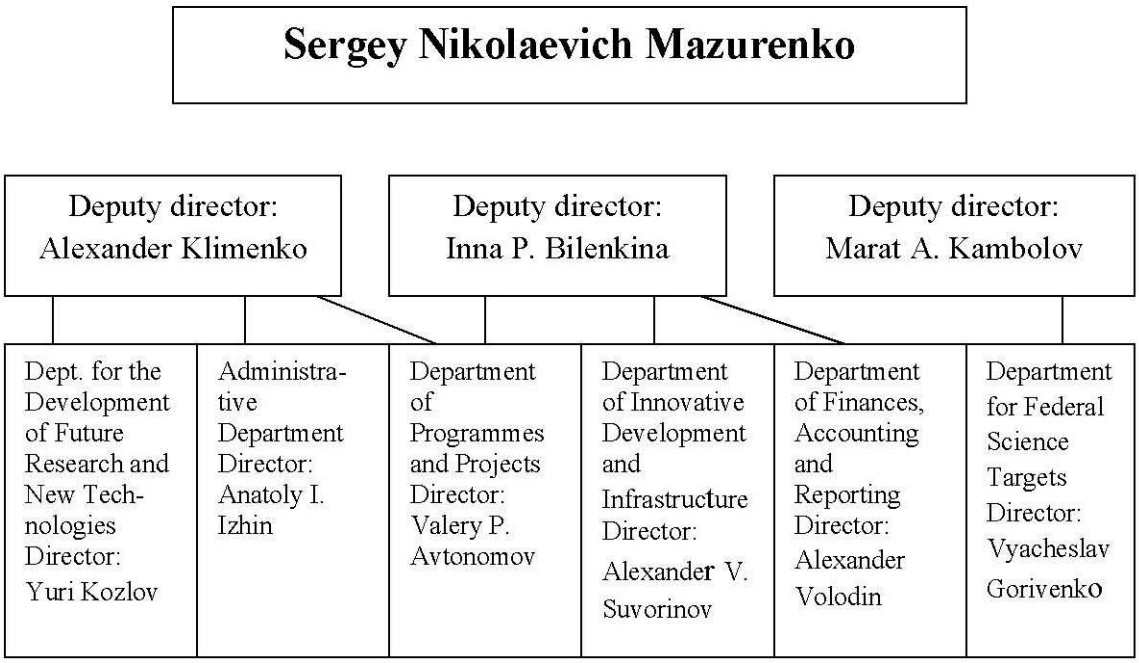
Main source: FGU NII RINKZE press centre publication on the role of the non-commercial "Inno-V" partnership

3.1 The Federal Agency for Science and Innovation (ROSNAUKA)

Address: Ul. Tverskaya 11, 103 905 Moscow, Tel: +7 495 629 14 90 Fax: +7 495 921 97 87

The purpose of the Agency for Science and Innovation (ROSNAUKA) is to implement the MON's research policies in the form of programmes and calls for proposals. To this end, ROSNAUKA receives approx. €480 million, or almost six times the amount allotted to the Ministry itself.

Fig. 5 Organizational Structure of ROSNAUKA:



As well as issuing calls for proposals and supporting innovative high-technology research projects, ROSNAUKA is also charged with implementing what are probably the most prestigious measures currently in place for the promotion of junior scientists – the so-called **presidential grants**, and the call for proposals to promote **science schools**. However, the individual sums awarded to the recipients of these grants are still very small, though these are bound to be upgraded in the next few years as the budget continues to grow.

3.1.1 Presidential Grants

The “Presidential Grants” programme is probably the most sought-after form of funding among Russian early-stage researchers today. It is jointly supervised by ROSNAUKA and a peer review commission especially established for this purpose.

The object of this scholarship contest is to support outstanding Russian **PhD candidates** (up to the age of 35) and their academic supervisors, as well as **postdoctoral scholars** (under the age of 40).

These two-year grants have been awarded since 1996 to fund basic research in the following areas:

- **Mathematics and mechanics**
- **Physics and astronomy**
- **Chemistry, new materials and chemical technologies**
- **Biology, agricultural sciences and living systems technology**
- **Geosciences, environmental science and nature management**
- **Social sciences and the humanities**
- **Medicine**
- **Technical and engineering sciences**
- **Information and telecommunications networks and technologies**

Doctoral students and their academic supervisors receive a total of **150,000 RUB/year (approx. €4,500/year)**, which includes a stipend of **60,000 RUB/year (approx. €1,800/year)** for the young scholar and a one-time payment of **24,000 RUB (approx. €700)** for the academic supervisor. The **total number** of grants awarded to support outstanding PhD students comes to **500 a year.**

Postdoctoral scholars are supported with **250,000 RUB/year (approx. €7,500/year)**, which includes a stipend of **84,000 RUB/year (approx. €2,500/year)**. In total, **100 grants a year** are awarded to support outstanding Russian post-doctoral scholars.

Fehler! Verweisquelle konnte nicht gefunden werden. and **Fehler! Verweisquelle konnte nicht gefunden werden.** provide an overview of grants awarded in 2007 according to the areas of studies.

Fig. 6 Presidential Grants awarded to PhD students in 2007

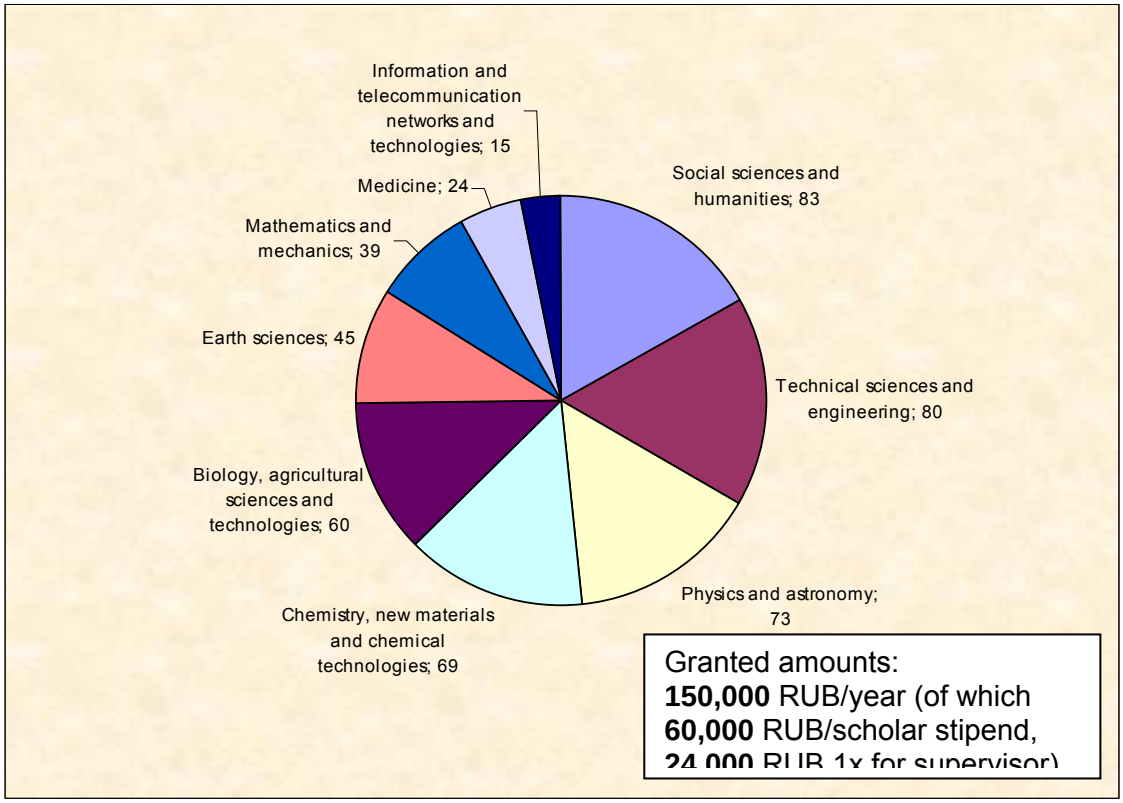
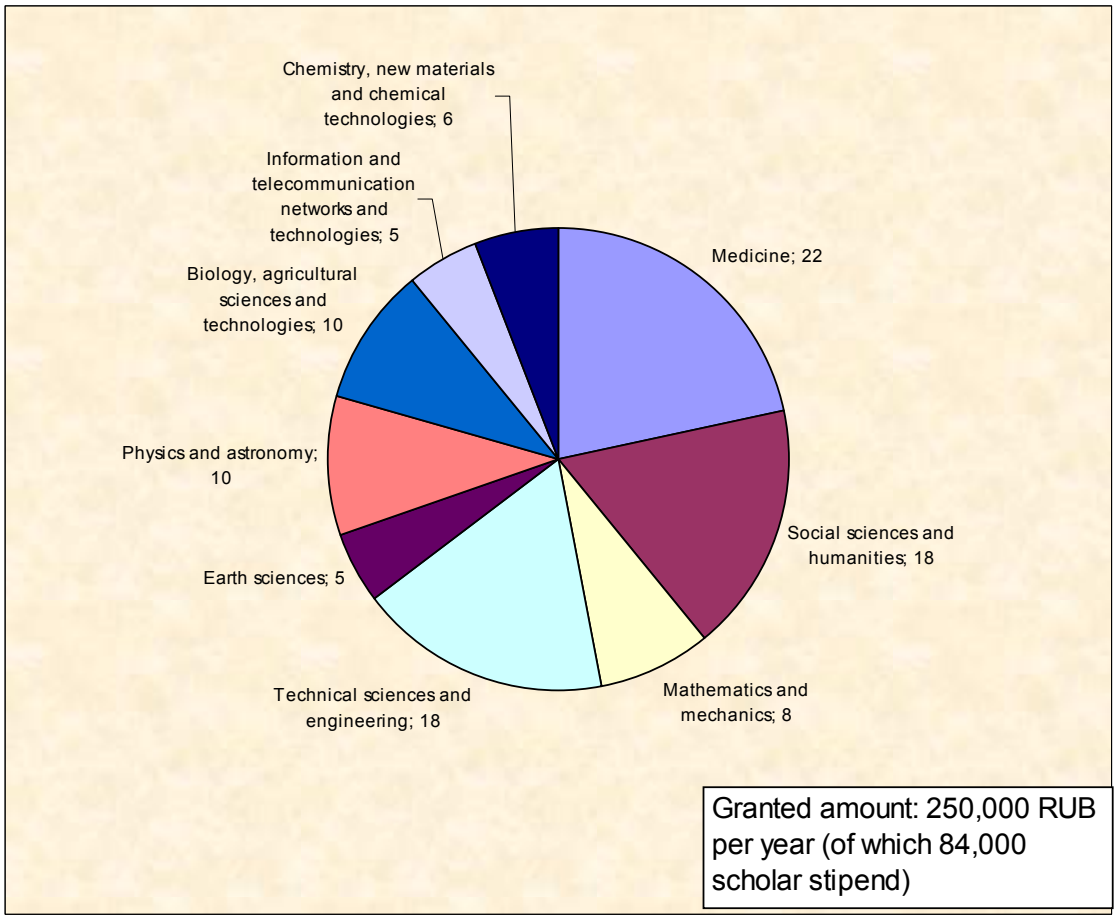


Fig. 7: Presidential Grants awarded to postdoctoral scholars in 2007



3.1.2 Leading science schools

Another way in which the ROSNAUKA programme hopes to foster promising young academics in Russia is by supporting the institutions referred to as “Leading Science Schools”.

Designed to train the next generation of scientists and scholars, these schools include scholars of different ages and varying qualifications linked by collective research projects, The schools must have at least 10-12 staff members – a director and a group of young researchers (under the age of 35).

Leading science schools can apply for two-year subsidies for the following areas:

- Mathematics and mechanics
- Physics and astronomy
- Chemistry, new materials and chemical technologies
- Biology, agricultural sciences and living systems technology
- Geosciences, environmental science and nature management
- Social sciences and the humanities
- Medicine
- Technical and engineering sciences
- Information and telecommunications networks and technologies
- Military and specialised technologies

In 2003, **740** science schools specializing in a wide range of disciplines received funding. In 2006, the number of schools eligible for subsidies was reduced, although the sum granted in each case was increased.

In 2006, **650** science schools received financial support, which derived from two separate sources. A number of the schools (225) had competed for funding in the context of the Federal Target Programme; they received 1.28 million RUB (**approx. €37.6 thousand**). Other science schools received endowments totalling 510,000 RUB (**approx. €15 thousand**).

The figures below provide an overview of science schools funded in 2006 broken down into specialist fields and geographical regions.

The regional distribution indicates where centres of academic excellence are located outside of Moscow. These not only include St. Petersburg, Novosibirsk and Yekaterinburg, but also the cities/research centres of Nizhny Novgorod, Chernogolovka and Kazan, as well as Irkutsk, Vladivostok and Tomsk.

Fig. 8: Breakdown of science schools 2006-2007 by specialist field

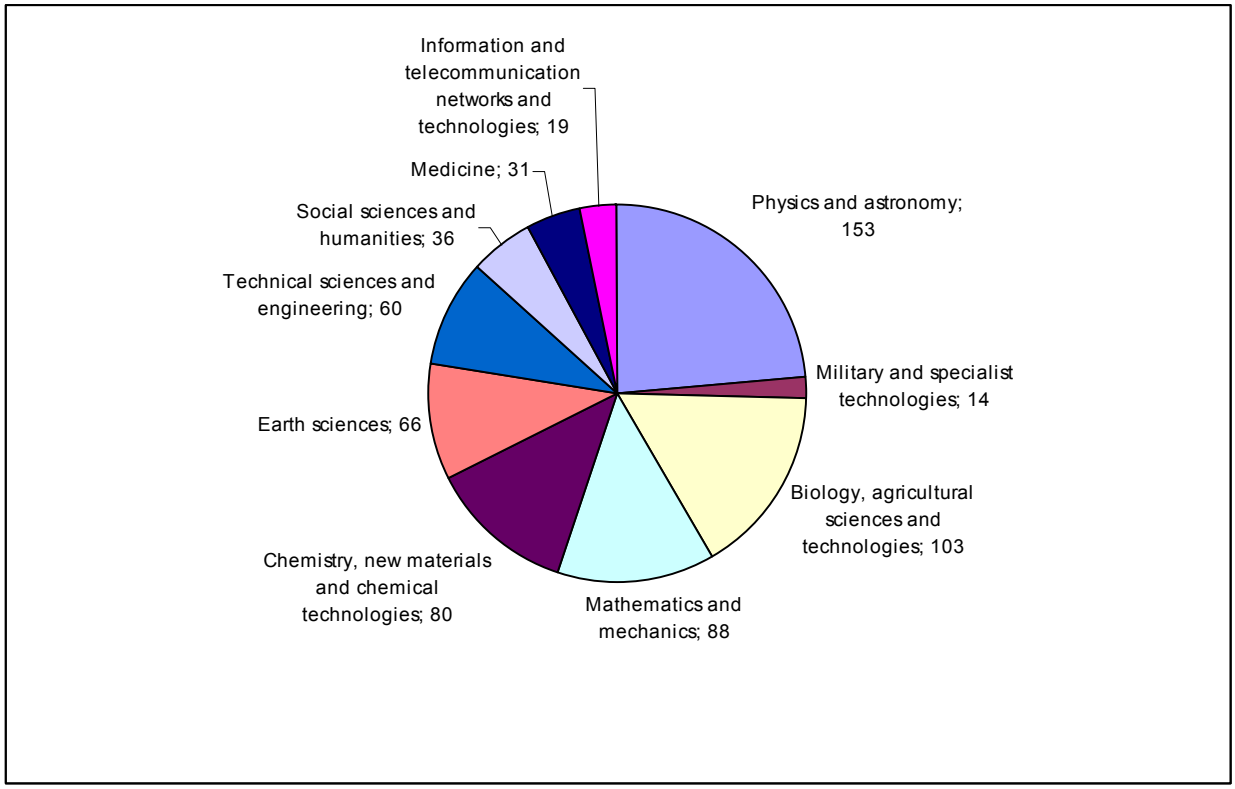
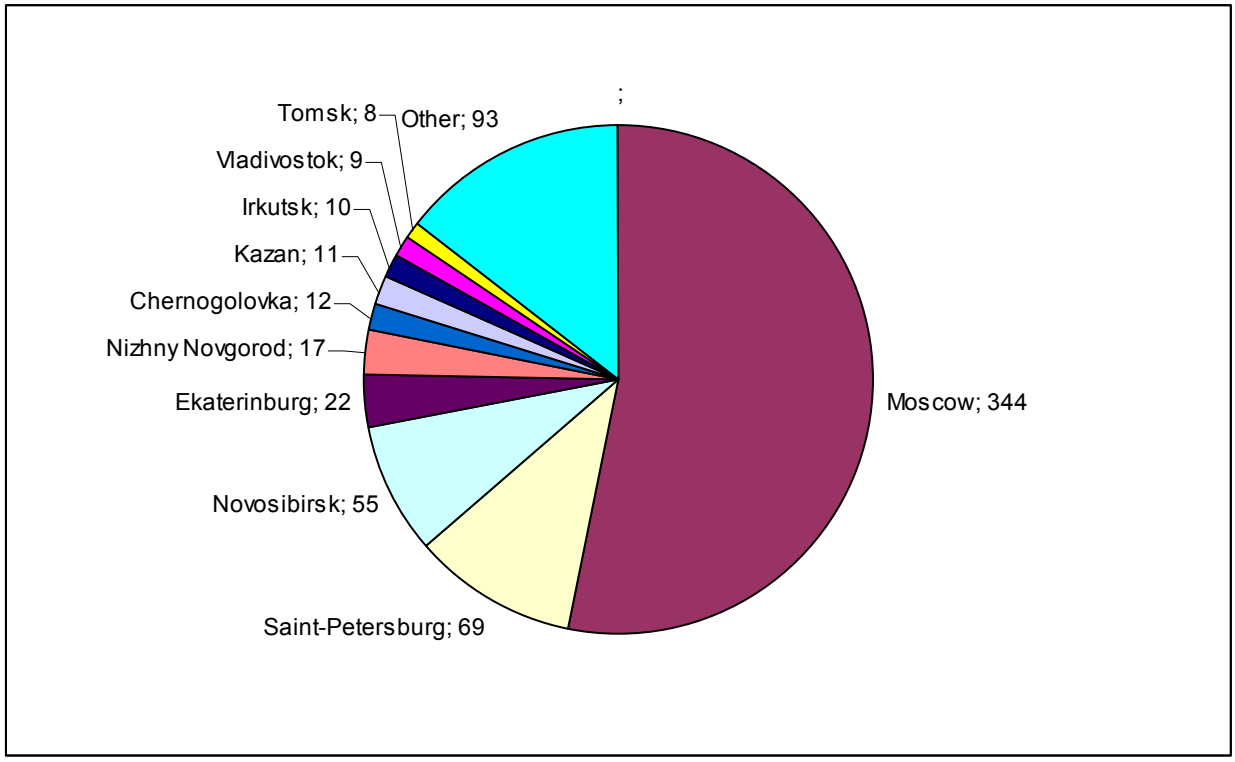


Fig. 9: Regional distribution of science schools 2006-2007



3.2 The Federal Agency for Education (ROSOBRAZOVANIE)

Address: Lyusinovskaya ul. 51, 113833 Moscow Tel: +7 495 237 67 24 Fax: +7 495 230 21 61

Director: Bulaev Nikolay Ivanovich

In 2006 the MON and the Agency for Education launched the National Priority Project Education with the primary goal of improving the education system.

To this end, the project combines two complementary approaches. The first involves establishing innovative programmes, fostering top teachers and providing grants for talented young scientists. The idea is to invest in leaders and pass their experience on to others and thus promote the most effective and successful educational programmes and practices.

On the other hand, the project aims to introduce new administrative mechanisms, such as school advisory boards focusing on upbringing and administration, and to include public bodies in educational administration.

The funding mechanisms for educational institutes will also be modified.

The National Education Project focuses primarily on:

- Promoting schools and universities that are actively implementing new and innovative programmes of education; subsidized universities receive between 200 and 500 million RUB (€5.9 – 14.7 million) and subsidized schools 1 million RUB (€29,400)
- Providing schools with Internet access
- Promoting talented and committed young people; each year, 2,500 young people are awarded individual scholarships of 60,000 RUB (€1,700)
- Organizing professional and vocational training for those in compulsory military service
- Setting up a network of national universities and business schools
- Providing salary bonuses for class teachers
- Promoting top teachers
- Provision of school buses for rural areas
- Improving school facilities in poor regions (2006 – 2.3 billion RUB)

The 2006 budget set aside 5 billion RUB (€147 million) to support innovative universities, followed by 15 billion RUB (€441.2 million) in 2007. All educational institutions that offer innovative programmes for a two-year period are eligible to apply for funding.

When the first call for proposals was issued, 200 institutes of higher education applied, from which 17 winners were selected on the basis of peer reviews (see Table 5).

Table 5: Innovative Universities receiving subsidies in 2006

	University	Total in million RUB
1.	State University – Higher School of Economics	556
2.	Far Eastern National University	856
3.	Kuban State University	400
4.	Moscow Medical Academy, named after I .M. Sechenov	748
5.	Moscow State Institute of Steel and Alloys	400
6.	Moscow State Institute of Electronic Engineering	816
7.	Moscow State Technical University, named after N. E .Bauman	594
8.	Moscow State University, named after M. V. Lomonosov	970
9.	Moscow Institute of Physics and Technology (State University)	420
10.	Nizhny Novgorod State University, named after N. I.Lobachevsky	544
11.	Perm State University	395
12.	Samara State Aerospace University, named after S.P.Korolev	486
13.	St. Petersburg State Mining Institute, named after G.V.Plekhanov	220
14.	St. Petersburg State University	970
15.	Taganrog State University of Radio Engineering	
16.	Tomsk State University	680
17.	Tomsk State University of Control Systems and Radioelectronics	580

In 2006, these universities spent 5 billion RUB (€147 million) to implement their programmes. 70% was spent on laboratory equipment, 25% on software and methodological materials, and 5% on staff training.

From 2007-2008, 267 institutes of higher education competed for the title of University of Innovation, of which 40 were eventually selected. The total subsidies allocated amounted to 20 billion RUB (€588 million) (see Table 6)

Table 6: Innovative universities receiving subsidies in 2007

	Universities	Total in million RUB
^ 1	The Academy of National Economy under the Government of Russian Federation (Moscow)	505.6
2	Belgorod State University	434.51
3	Vladimir State University	542.624
4	Vyatka State University (Kirov)	200.775
5	Far Eastern State Technical University (Vladivostok)	730.797
6	Far Eastern State Transport University (Khabarovsk)	424.226
7	Kasan State Technical University, named after Tupolev	400.0
8	Moscow City University of Psychology and Education	350.0
9	Moscow State Institute of International Relations (University)	650.0
10	Moscow State Linguistic University	600.0
11	Moscow State Medical and Dentistry University	327.9
12	Moscow State University of Civil Engineering	556.5
13	Moscow State Transport University	398.4
14	Moscow Engineering Physics Institute (State University)	450.0
15	Moscow Pedagogical State University	418.0
16	Moscow Power Engineering Institute (Technical University)	580.0

17	Novosibirsk State Technical University	600.0
18	Novosibirsk State University	930.0
19	Orel State Agrarian University	210.0
20	Perm State Technical University	586.0
21	Plekhanov Russian Academy of Economics (Moscow)	447.368
22	Russian State Agrarian University, named after K.A.Timiryazev (Moscow)	563.178
23	Russian State Pedagogical University (Saint Petersburg)	460.0
24	Russian State University, named after Immanuil Kant (Kaliningrad)	350.0
25	Gubkin Russian State University of Oil and Gas (Moscow)	405.0
26	Russian State University of Physical Education, Sport and Tourism (Moscow)	450.0
27	Peoples' Friendship University of Russia (Moscow)	600.0
28	Saint Petersburg State Polytechnical University	800.0
28	Saint Petersburg State University of Information Technologies, Mechanics and Optics	
30	Saint Petersburg State Electrotechnical University	760.0
31	Saratov State University, named after Chernyshevsky	357.8
32	Stavropol State Agrarian University	450.0
33	Tambov State University, named after G.R. Derzhavin	479.1644
34	Tomsk Polytechnical University	800.0
35	Tyumen State University	424.94
36	Ural State Technical University (Yekaterinburg)	655.0
37	Ural State University (Yekaterinburg)	510.0
38	Ufa State Aviation Technical University	600.0
39	South Ural State University (Chelyabinsk)	582.6
40	Yakut State University	362.392

3.3 The Federal Service for Supervision in Education and Science (ROSOBRNADZOR)

Director: Viktor Alexandrovitch Bolotov
Address: Sadovo-Sucharevskaya 16, Moscow K-51, GSP-4, 127 994
Tel: (495) 208-68-38
Fax: (495) 208-61-58
Homepage: www.obrnadzor.gov.ru

The main responsibilities of this federal service in the field of education and science are as follows:

- Quality assurance and management in the field of education and science
- The allocation of licenses, accreditation and certificates of inspection to scientific and educational institutions
- Inspection of scientists and teachers
- State inspection of school pupils (to guarantee the provision of standard state examinations)
- Academic mobility and adaptation of educational programmes to comply with international standards (e.g. in connection with the implementation of the Bologna Process)

This service has become increasingly important in recent times.

All scientific and educational institutions must be licensed and accredited by ROSOBRNADZOR and are subject to regular follow-up inspections.

For example, the activities and inspections carried out by ROSOBRNADZOR in 2006 led to a number of university licenses being revoked.

3.4 The Federal Service for Intellectual Property, Patents and Trademarks (ROSPATENT)

Director General: Dr. Boris Simonov
Address: Bereshkovskaya nab.30, 123995 Moscow

Tel: +7 (495) 243 55 09
Fax: +7 (495) 956 18 64
Homepage: www.rupto.ru

The Federal Service for Intellectual Property, Patents and Trademarks (ROSPATENT), run by the Ministry of Education and Science, is responsible for intellectual property rights and their registration, monitoring, commercial use, etc.

ROSPATENT has a number of other duties that do not generally fall within the scope of a patents office. ROSPATENT sits alongside a number of other ministries on a commission responsible for the strategic planning of Russian economic policy in the field of patent rights, trademark rights and copyright. Among other things, this commission discusses ways of improving the incorporation of inventions and other patent-protected objects into the economic cycle.

In the context of the strategy up to 2010, ROSPATENT sees itself as a facilitator whose role is to support the creation of a society of innovation in the Russian Federation.

4 THE FEDERAL SPACE AGENCY (ROSKOSMOS)

Director: Anatoly Nikolayevitch Perminov
Address: Ul. Shtshepkina 42, 129857 Moscow
Tel: +7 (495) 631 89 81
Fax: +7 (495) 288 90 63
Homepage: www.roscosmos.ru

4.1 Structure of ROSKOSMOS

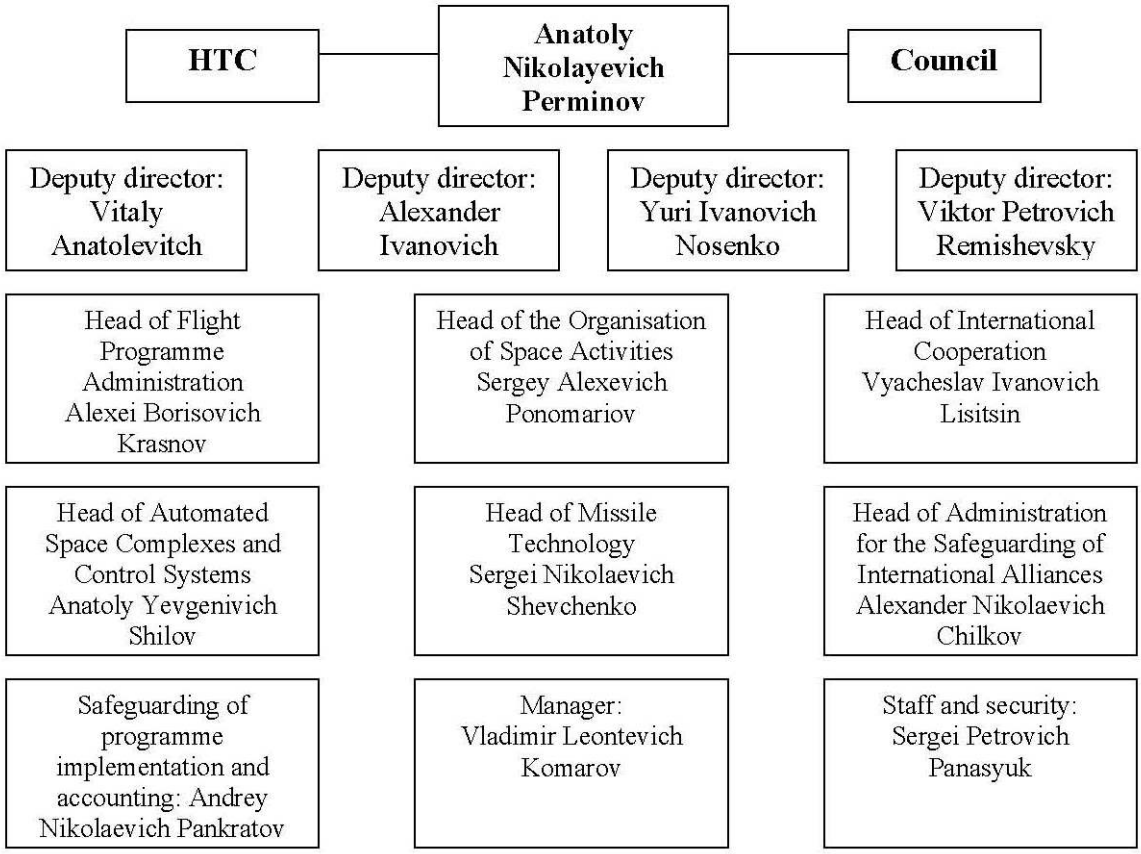


Fig. 10: Structure of ROSKOSMOS

The ROSKOSMOS agency is headed by Anatoly Perminov and represented by Alexander Medvedchikov, who is also the Russian Federation's External Relations representative. Roskosmos is divided into nine departments and the agency's main responsibilities lie in the Department for International Cooperation, headed by Vjačeslav Lisitsin, and the Department of Space Complexes and Systems, headed by Anatoly Shilov.

4.2 ROSKOSMOS' areas of responsibility

This agency was founded in 1992 following the dissolution of the Soviet Union and the foundation of the Russian Federation, and took over most of the Soviet space programme's resources. It is responsible for the country's civil space programme. For a long time, the Russian Space Authority maintained Mir, the only functioning space station after the US Skylab space station crashed. Despite financial problems, Mir

remained in service 8 years longer than originally planned. It was finally decommissioned on 23rd March, 2001 so that activities and resources could be channelled towards the International Space Station (ISS) instead.

4.3 Space programme 2006-15

On 14 July, 2005, the Russian government authorised the new space programme for the period 2006 to 2015, with the provison that additional funding options be sought until 1 September, 2005. This programme provides for investments totalling around 305 billion RUB (almost €9 billion) over the next ten years, 23 billion RUB (€680 million) of which was invested in 2006 alone. This amount is around 25% higher than the total allocated for 2005. Expenditure is planned to increase by 6% each year. On 22 October, 2005, the Russian government officially approved the Space Programme for 2006-2015. The new space programme's main aims in the period from 2008-2010 are to extend the satellite park with the addition of new communication, weather and earth observation satellites. Furthermore, the programme includes measures to modernize Russian booster rockets.

5 THE FEDERAL ATOMIC ENERGY AGENCY (ROSATOM)

Director: Sergei Vladilenovitch Kiriyenko
Address: Ul. Bol'shaya Ordynka 24/26, 119017 Moscow
Tel.: (495) 239 45 45
Fax: (495) 239 22 63
Homepage: www.minatom.ru

5.1 Structure of ROSATOM

Both the field of nuclear energy in Russia as a whole and the agency are experiencing a restructuring process. No organisational chart has currently been published by ROSATOM.
The agency is headed by Sergei Vladilenovitch Kiriyenko, its director. His deputy is State Secretary Nikolai Spassky. ROSATOM reports directly to the President of the Russian Federal Government and therefore holds the status of a ministry.
ROSATOM is divided into 16 departments; the Department for International Cooperation is headed by Vladimir Petrovich Kutshinov, which is also responsible for international and bilateral scientific and technological cooperation with regard to the peaceful use of nuclear energy.

5.2 How nuclear energy is used for the provision of energy in Russia today

In 2006, around 17% of Russia's electricity was generated by nuclear power plants. This total represents an increase of 4.8% compared to the previous year but is still classified as unsatisfactory by the Federal Atomic Energy Agency. The agency expects that this percentage will continue to increase over the coming years as the Federal Target Programme for the development of nuclear energy capacities is implemented. In particular, the proportion of electricity generated by nuclear power plants should increase further from 2010 onwards as a result of the construction of 2-3 new reactors each year, to reach approx. 25% of all electricity generated by 2030.

5.3 Nuclear fuel cycle and new developments

The success of this ambitious programme to develop the nuclear energy sector depends primarily on the existence of a functional fuel cycle. Russia has full control of the entire process (uranium mining, conversion and enrichment, the construction of nuclear power plants and their operation, uranium preparation, storage, etc.). To protect its national reserves (approx. 5% of world uranium reserves are located in Russia), Russia has formed a joint venture with Kazakhstan (the third largest producer of uranium worldwide) and thus taken preventive measures to protect its strategic interests.

In the wake of the Chernobyl disaster, the Russian government has invested in measures to ensure the safety of its nuclear energy facilities and has significantly improved them with the help of western technology, expertise and funding.

This year (when construction work started on the first reactor), the Russian nuclear economy started developing the prototype for a new type of nuclear facility equipped with small-scale floating reactors (generating 35-70 megawatts of energy and heat, with

a life cycle of 12 years). Some of these new facilities will, for example, be implemented along the coast in connection with the development of oil and gas fields, but also to provide coastal communities with electric power. The first “floating” nuclear power plant will be completed in 2010.

5.4 Russian nuclear law and status of implementation

On 19 January 2007, the State Duma passed a law to reform the nuclear industry, which came into effect in March after it was signed by the President. It decrees the creation of a vertically aligned state holding company called “Atomenergoprom”. This covers the whole of the civil nuclear sector, thus keeping it separate from the military part of this sector. One of Atomenergoprom’s main responsibilities will be to bring participating companies (including AtomEnergoMash; AtomStroyExport; TVEL) in line with the economic demands of the market.

The state will maintain control of the nuclear industry as a whole as the “Atomenergoprom” holding company will be entirely state-owned. Most of the work to establish the holding company and to implement the whole restructuring process was to be carried out and, if possible, completed in 2007.

5.5 German-Russian cooperation in the field of nuclear safety

Germany and Russia are to extend their cooperation in the field of nuclear safety and radiation protection. In 2003, an agreement to this effect was signed by the German federal environment minister and the president of the Russian nuclear regulator (ROSTECHNADZOR). The aim is to increase the level of security in nuclear facilities to protect the environment and the population more effectively. The cooperation applies to licensing, supervision and inspection activities pertaining to nuclear safety in atomic energy facilities and radiation protection measures.

The cooperation in this field is based on a series of bilateral covenants and agreements dating back as far as 1988.

5.6 Twenty years of German-Russian scientific and technological cooperation for the peaceful use of nuclear energy

On 22 April, 1987, the West German Federal Ministry for Research and Technology (BMFT) and signed a scientific and technological cooperation agreement with the USSR’s Ministry for Atomic Energy (MINATOM) for the peaceful use of nuclear energy. Following the political upheaval in the former Soviet Union, these duties were transferred to Russia. On the German side, the BMFT transferred its responsibilities to the German Federal Ministry of Economics and Technology (BMWi) in 1998. Thus the German-Russian scientific and technological cooperation has 20 years of fruitful collaboration to look back on.

The cooperation began with a series of joint seminars in the USSR and Germany. The minutes of the first meeting of the joint panel of experts held in Dubna and Moscow in July 1988 indicate a major step forward, documenting that “both sides agree that they will move on from arranging seminars to carrying out concrete joint activities as soon as

possible". This was to be the start of a long phase of joint undertakings that is still in progress today.

The nuclear accident in Chernobyl predated the scientific and technological cooperation. The safety deficits later found in the technical design of WWER and RBMK (Chernobyl type) reactors in operation in Central and Eastern Europe were to be eradicated through close collaboration. The reactors' basic design flaws included safety issues, superfluous and poorly distributed security systems, and inadequate fire and internal flooding precautions. There was a danger that several security systems could fail simultaneously if one of them were to be affected. In the case of the RBMK reactor in particular, this possibility was aggravated by the inefficient shut-down system and a positive void coefficient reading.

The cooperation initially aimed to acquaint Russian scientists with computing software developed in the West and which had until then rarely been used in this context in Central and Eastern Europe. At the same time, Russia provided the necessary detailed information about the reactors as well as data from its numerous experimental institutions, many of them entirely unique. The joint activities centred initially on the flaws identified in the WWER and RMBK reactors, and led to a series of efforts to upgrade the reactors, which increased their safety on the long-term basis. Research activities on waste repositories focused on radioactive waste processing and analyses of various locations to check their suitability for the construction of waste repositories.

What started out as a means of facilitating method transfer has long since grown into a mutually beneficial scientific partnership that has continued to develop in line with international trends. German safety research has profited in particular from Russia's detailed knowledge of WWER facilities, feedback from people using German computing software in Russia and from the comprehensive experimental data provided by the Russians in order to validate these software applications.

On the Russian side, the technical cooperation is mainly supported by the Kurtchatov Institute, as well as OKB Gidropress, VNIPI Promtekhnologii, VNIIAES and a number of other research centres. On the German side, support is provided mainly by the Society for Plant and Reactor Safety (GRS), centres in Karlsruhe and Dresden, DBE Technology GmbH and the Federal Institute for Geosciences and Natural Resources (BGR).

The joint panel of experts, whose decisions are presided over jointly by ROSATOM and BMWi, continues to meet every two years, with the location alternating between Russia and Germany. During the last meeting held in Garching near Munich in May 2007, the panel agreed on a total of 18 joint research projects.

6 THE RUSSIAN ACADEMY OF SCIENCES

Address: Leninsky Prospekt 14, 119991 Moscow, Tel. (495) 938-0309

President of the Russian Academy of Sciences (RAS):
Member of the Academy, Professor, Doctor of Physics and Mathematics
Yuri Sergeyevitch OSIPOV

The Russian Academy of Sciences was founded in 1724. Until 1991, it was the Academy of Sciences of the USSR until its original name of Russian Academy of Sciences was restored in 1991. RAS is a non-commercial, self-governed organisation with state institution status. Its activities focus mainly on basic research. In November 2007 the RAS accepted a new charter according to which the president of the Academy is first elected by its members and subsequently confirmed by the president of the Russian Federation.

The RAS' main institutions are the General Assembly, the Presidium and the President of the RAS. RAS membership is made up of Academy members (full members) and corresponding members who are elected by the General Assembly. Full members are elected for life. The average age of Academy members is currently almost 70 years. To prevent this average age from rising still further, the last General Assembly introduced an age limit of 56 for full members and 51 for corresponding members.

In keeping with the statute of the Russian Academy of Sciences, elections to appoint full and corresponding Academy members are held at least once every three years during the General Assembly.

The last election was held on 25.5.2006: there were a total of 169 vacancies to be filled.

For each available position as a full member, there were 5 candidates, compared to 10 candidates for each corresponding member vacancy.

The Academy is structured regionally and according to the different branches of sciences. It has **9 departments** (according to scientific fields), **3 regional branches**:

- **Far-east branch**
- **Siberian branch**
- **Ural branch** and

14 regional research centres.

The RAS has numerous boards, councils and commissions. For example, the RAS steering committee has a scientific council to deal with issues affecting the world's oceans, problems of energy development in Russia, and so on. Inter-office commissions such as the Inter-Office Council on Radiochemistry, the Inter-Office Council on Space Energy Issues, etc. have been set up to resolve more major problems that require the collaboration of several different institutions and authorities.

The RAS is the world's largest scientific organisation: it encompasses 451 institutes, with 115,400 members of staff. It receives approx. 20 billion RUB (€588 million) in state

funding. The average salary is 355 US$. In terms of its estate (over 4000 km²), the Academy is twice the size of Luxembourg.

The Academy is a unique institution with no equivalent in any other country in the world. It is a self-governing body, yet is funded by the state. However, the state does not have the right to intervene in the Academy's finances or staff matters. The budget is the only leverage that the state has on the Academy.

In the last two years, the government has come to accept that there is no way of guaranteeing the country's competitiveness in the post-industrial world without a functioning academic system. As a result, the RAS was promised generous funding, on the condition that its results improved significantly, particularly in the field of innovation.

In the autumn of 2005, in keeping with long-held expectations, the President of the Russian Academy of Sciences signed a decree announcing a salary increase for the Academy's academic staff that would be effective from 1 May, 2006. According to the presidential decree, from 1 May, 2006, salary increases for higher-ranking scientists would be staggered over a three-year period to reach 700-1000 USD. In return, however, the Academy of Sciences had to promise the government that it would reduce staff numbers by 20% from around 112,000 (including 55,000 scientists) at that time to 90,000 (including 45,000 scientists). The planned salary increases for the different academic categories were published in the scientific journal "Poisk" (search) on 5 May, 2006.

Table 7 Planned salary increases for different academic categories

Position	Salary, RUB (€1 = 34.5 RUB)		
	Stage I	Stage II	Stage III
Director	9,500	16,500	26,500
Deputy director	8,300	14,400	23,200
Scientific secretary (in charge)	7,200	12,500	20,100
Head of department	7,200	12,500	20,100
First lecturer in science	7,200	12,500	20,100
Leading lecturer in science	6,300	10,900	17,500
Senior lecturer in science	5,500	9,450	15,200
Lecturer in science	4,700	8,200	13,200
Junior lecturer in science	4,100	7,100	11,500
PhD student; experienced and highly-qualified laboratory assistant	3,600	6,200	10,000

According to the Minister of Education and Science, A. Fursenko, only 50 of the 450 research institutes (NII) are actively conducting research; a further 50 institutes have research groups. He notes that although the number of academic institutes has gone up by 30 since 1990, there has been no corresponding increase in the number of scientific discoveries. It is up to the scientific community to decide which institutes should be closed.

The minister also stated that the applied sciences sector should define their respective research priorities, and peer review systems be introduced. Fursenko proposed that 5 to 10 branches of science be identified as priority when budgetary funding is allocated.

The reform of the Academy, which has been on the cards for quite some time, was set in motion by an amending act “on science and state policy in the fields of science and technology”. This stipulates that the state President must approve the Academy‘s chosen president and that the government must approve the Academy’s charter. Furthermore, the Academy must provide a 5-year programme detailing its research activities.

In 1970, the German Research Foundation (DFG) and the Russian Academy of Sciences signed a scientific cooperation agreement that is still in force today. In connection with this agreement, 44 long-term projects currently receive funding and in 2006, 135 Russian scientists spent time in Germany for the purposes of carrying out research. In return, 19 German scientists attended RAS institutes. In September 2007, a high-ranking delegation of Russian chemists from the Russian Academy of Sciences visited science institutes across Germany on the invitation of the DFG. Visits are planned for their German counterparts in 2008.

The RAS and the DFG are currently discussing joint sponsorship options for international graduate colleges.

The move to develop new strategic partnerships was given fresh impetus by the signing of a cooperation agreement between the Russian Academy of Sciences (RAS) and the Helmholtz Association. As a result of this agreement, the Russian Academy of Sciences (RAS) is currently considering joining the International Continental Scientific Drilling Programme (ICDP). Plans are to work with Germany's National Research Centre for Geosciences (GFZ Potsdam) to start drilling in the far-eastern region of Chukotka in the summer of 2008 in connection with the ICD programme. The drilling site by Elgygytgyn Lake is located at the heart of a crater formed around 3.6 million years ago when a meteorite hit the earth. The composition of sediments found at the bottom of the lake will enable scientists to reconstruct the history of north-east Siberia’s climate and environment since the lake first formed.

7 PUBLIC FOUNDATIONS AND INNOVATION FUNDS

7.1 Russian Foundation for Basic Research (RFBR)

Address: Leninsky Prospekt 32 a, 119991 Moscow, Tel. +7-495-9385532

Chairman of the Board: Prof Dr Vladislav Yu. Khomitch, Full Member of the Russian Academy of Sciences
Deputy Chairman of the Board: Prof Dr Konov, Corresponding Member of the Russian Academy of Sciences

The Russian Foundation for Basic Research (RFBR) was founded on 27 April 1992. The RFBR is a state-owned, not-for-profit organisation that functions as a Federal Agency on behalf of the Russian government. Its primary goal is to fund research projects across Russia's scientific community through competitive selection (http://www.rfbr.ru/eng). The RFBR's areas of responsibility are similar to those of the German Research Foundation (DFG).

Aims of the foundation:
The Russian Foundation for Basic Research is a state-owned institution to foster scientific autonomy. It was founded in 1993 in response to a "Ukaz" (decree) by the President of the Russian Federation issued on 27 April 1992.

The RFBR promotes excellence in research, selecting projects in all areas of basic research with a focus on natural, life and engineering sciences. Projects are funded upon application; applications need to be submitted by the published deadlines and are selected through peer reviews.

Structure:
Foundation Board of the RFBR
Members: Chairman (government-appointed for a period of four years)
Deputy Chairman (government-appointed)
24 members (scientists from all disciplines and all regions of Russia; government-appointed on recommendation of the Chairman)

The RFBR funds basic research in the following scientific disciplines:

1. Mathematics, Mechanical Engineering and Information Technology
2. Physics and Astronomy
3. Chemistry
4. Biology and Medical Science
5. Geosciences
6. Human Science and Social Science

The RFBR accepts applications in the following areas:

1. Research projects by individual scientists
2. Publication of monographs, proceedings and teaching materials
3. Projects to establish and develop information databases, data centres and telecommunications systems for scientific work
4. Projects to organise national and international conferences, meetings and symposiums in Russia
5. Funding for Russian scientists to participate in conferences outside of Russia
6. Projects to organise scientific expeditions
7. Projects to disseminate scientific findings through popular science media

Between 1992 and 2004, the RFBR called for applications in all areas of natural and social science on a yearly basis. A total of 120,000 applications were received. 35,000 research initiatives and publication projects passed the competitive selection processes, funding approx. 100,000 scientists from almost 2,000 different scientific institutions. More than 3,500 national and international conferences were supported, and more than 11,000 Russian scientists received funding for international activities.

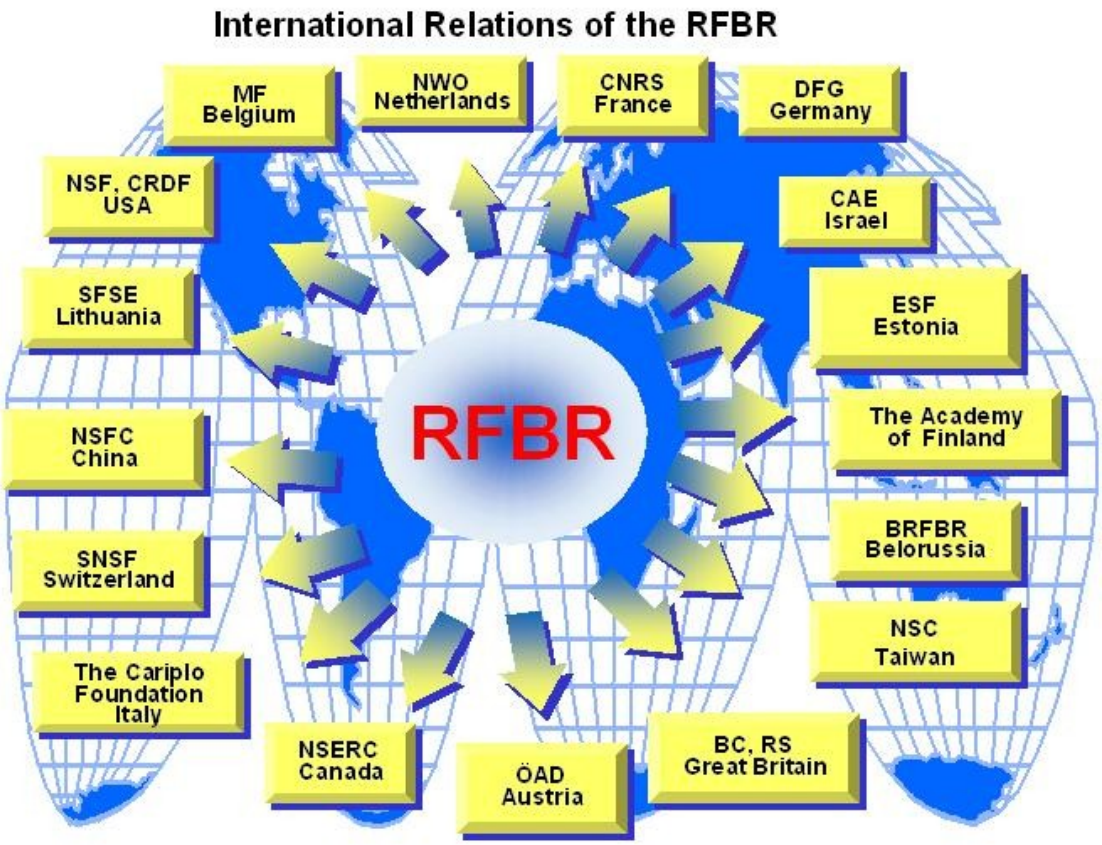
7.1.1 Agreements between the RFBR and other scientific organisations

The RFBR also organises joint project selection with other scientific organisations, fostering international scientific collaborations with Russian institutions and attracting international funding for Russia's top scientific teams.

The RFBR generally participates in international selection processes in one of the following three ways:

1. Matched funding – selection-based funding by the RFBR together with the partner organisation, e.g., INTAS and RFBR; individual selections in cooperation with DFG, CNRS, NSFC, BRFBR, NSF/CRDF; INTAS-RFBR 1997 etc.
2. Joint funding – the bulk of funding is provided by the partner organisation, with the RFBR funding only the Russian project members; e.g., cooperations with NOW (Netherlands) and NSC (Taiwan)
3. Funding of joint projects by a non-Russian partner organisation, whereby the RFBR supplies the expert panel for the selection process; e.g., project selection in cooperation with SNSF (Switzerland).

Fig. 11 The RFBR's international partners

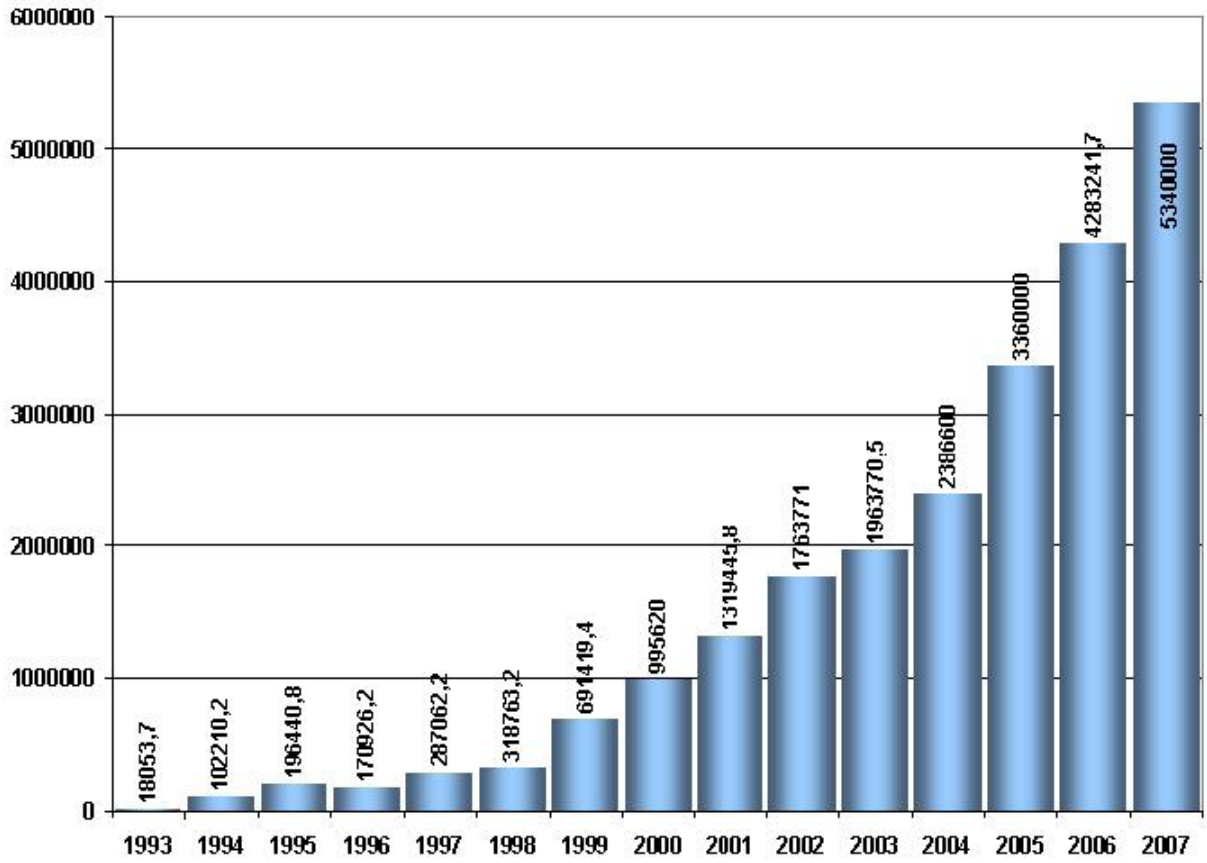


7.1.2 The RFBR's budget

The Russian Foundation for Basic Research receives 6 percent of the public budget for science and research. Between 2005 and 2010, the RFBR's budget is planned to increase by 25 percent annually. Initially receiving only a low level of funding, the foundation has not only attracted increasing finances but also increasing interest from scientists. Among Russia's scientific community, the activities of the Russian Foundation for Basic Research are generally perceived to be effective as well as objective. The main point of criticism is the level of funding, which is consistently perceived as too low.

As of 2007, RFBR funding for individual projects has been set at approx. USD 14,000 (previously USD 10,000) per year. Institutions facilitating the funded projects may retain up to 15 percent of this sum as an overhead. While the funding sum of USD 10,000 has traditionally been criticised as too low, there is also the option of submitting multiple funding applications within the framework of a larger project. In this manner, funding can be increased up to USD 50,000 (as was shown by a large-scale project at the Institute for High Energy Densities).

Fig. 12 The RFBR's budget ,1993-2007 (RUB x 1,000)



2007: RUB 5.34 billion = approx. EUR 153 million (RUB 35 = EUR 1)

The RFBR and DFG entered into a joint funding agreement for scientific projects in 1995. This agreement was renewed in June 2007 and extended to include the DFG's International Graduate College (IGK). Within this framework, funding is available for long-term projects, bilateral workshops and conferences in Germany and Russia, participation in international congresses, and research residencies up to three months. Currently, the RFBR and DFG are jointly funding 180 long-term projects and one graduate college.

A recent agreement between the Helmholtz Association and the RFBR on the joint funding of "Helmholtz-Russia Joint Research Groups" represents a milestone in strategic cooperation with Russia and the fostering of excellence among young scientists. In response to the first funding round, the Helmholtz Association received 25 applications from across the Helmholtz Centres. The funding decisions regarding the first six Helmholtz-Russia Joint Research Groups were made together with the RFBR in Moscow on 18 September 2007. Each group is being supported for a duration of three years, receiving an annual fund of €130,000. The RFBR is co-financing each group with an annual sum of RUB 700,000 (approx. €20,000). Due to the successful first round in 2007 the RFBR decided to raise its co-financing of each group unilaterally from RUB 700,000 to RUB 1,000,000 per year starting with the second call in 2008. Over the coming five years, the Helmholtz Association and the Russian Foundation for Basic Research are providing more than €6 million of funding to support Russia's top young scientists.

7.2 Russian Foundation for the Humanities (RFH)

Address: ul. Jaroslavskaya 13, 129366 Moscow, Tel. +7-495-6835540

Chairman of the Academic Board: Prof Yu. L. Vorotnikov, Corresponding Member of the Russian Academy of Sciences (since 2000)
Director and Managing Director: Dr Andrey Viktorovich Jurasov

The Russian Foundation for the Humanities (RFH) was founded in 1994 as an offshoot of the Russian Foundation for Basic Research (RFBR) with the aim of fostering the humanities and social sciences. The RFH's programmes fund academic projects (up to three years) and publications. The RFH finances conferences, seminars etc., as well as participation in such events. Funding is also available for field research projects. The foundation also runs a programme that funds academic information systems.

Applicants to the RFH must be Russian scientists who hold the academic title of Candidate of Science (PhD equivalent).

The RFH is conceived as an independent foundation which is steered by an Academic Board, which in turn is supported by a Board of Directors. The RFH is based in Moscow and operates 40 regional offices across Russia.

The RFH's budget for basic research was €16.5 million for 2005, €21.1 million for 2006, and €26.2 million for 2007.

Between 1995 and 2003, the RFH received more than 35,000 applications in response to its funding rounds. 14,074 applications were selected for funding, including 8,000 research projects, 3,000 academic publications, thousands of field research projects and conferences, and 395 projects for the development of information systems.

In 2006, the RFH received 6,480 applications, 3,612 of which were accepted for funding.

The RFH actively fosters academic development across Russia's 32 regions. In collaboration with local government, the foundation organises regional funding rounds, and supplies free copies of all RFH-funded publications to the libraries of the Russian Federation.

The RFH has an outstanding database on Russian research in the humanities, it runs research projects in the field of scientific theory, and it funds the newsletter "Vestnik of the Russian Foundation for the Humanities", and the magazine "Naukovedenie" (Sociology of Science).

In late 2005, the RFH and the DFG signed an agreement to support joint projects between German and Russian academics. Twelve projects are currently being jointly funded.

7.3 Foundation for Assistance to Small Innovative Enterprises (FASIE) – I. Bortnik

Address: 49, Leninsky Prospekt, 119334, Moscow
Tel: +7 (495) 231-1901
Fax: +7 (495) 231-1902
Email: info@fasie.net
www: http://www.fasie.ru

Director: BORTNIK, Ivan Mikhailovich

In 1994, the Russian government established the Foundation for Assistance to Small Innovative Enterprises (FASIE), in order to implement new policies in this segment of the economy. Since then, the foundation has been receiving an annual fund of 1.5 percent of the federal research budget. In 2005, this was approx. RUB 840 million (€23.33 million), in 2006, RUB 1,075.5 million (€31.63 million), and in 2007, RUB 1.34 billion (€39.3 million).

The foundation's **main areas of responsibility** are:

- Implementation of the government's development and funding policies for small enterprises with a scientific or technological orientation
- Direct financial and administrative support for innovative small enterprises that pursue research-intensive production methods and create technology based on their own intellectual property
- Development of a support infrastructure for innovative small enterprises

Between 1994 and 2006, FASIE received and assessed approx. 10,000 project applications, half of which came from regional Russia. More than 2,455 independent experts were consulted by FASIE for project selection, including 748 Doctors of Science (equivalent to PhD with senior professorship) and 1,050 Candidates of Science (equivalent to PhD).

FASIE has branch offices in 29 of Russia's regions. The foundation has provided funding support to approx. 1,000 companies in the field of technological development. Many of these companies have since flourished and now boast employee numbers in excess of 500.

FASIE has supported more than 4,000 projects with a total funding amount of approx. RUB 2.5 billion (€73.5 million).

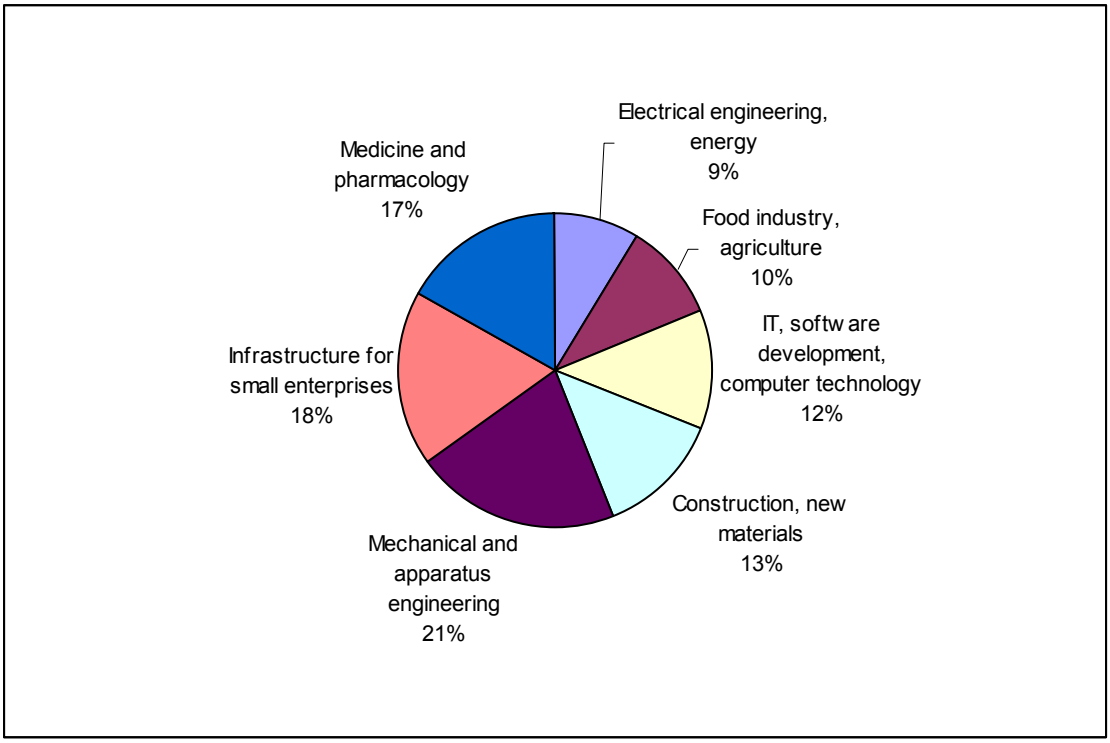
24 Innovation and Technology Centres have been established across 11 of Russia's regions thanks to FASIE funding. Between them, these centres incorporate 250 scientific-technological SMEs with a total annual production volume of approx. RUB 3 billion (€90 million).

Most companies supported by FASIE operate in the following areas:

- Machine and tool engineering (21.0%)
- Infrastructure for small enterprises (18.0%)
- Medicine and pharmacology (17.0%)
- Construction, new materials (13.0%)

- IT, software development, computer technology (12.0%)
- Food industry, agriculture (10.0%)
- Electrical engineering, energy (9.0%)

Fig. 13 Scientific and technological business areas funded by FASIE



All FASIE-funded companies base their business on their own patents and expertise. The foundation's remaining funds (approx. 15 percent) are used for Innovation and Technology Centres, development of a technology transfer infrastructure, promotion of innovative entrepreneurship to students and young scientists from the Russian Academy of Sciences and the universities, grants for innovative entrepreneurs to participate in trade fairs and workshops, and management training.

Other FASIE measures include:

1. A joint programme with the Russian Academy of Sciences – FASIE supports SMEs that develop and produce scientific devices for academic institutions to modernise their research environments.
2. A programme to support young entrepreneurs – jointly operated with the Ministry of Education and Science to develop an infrastructure for innovative activity.

FASIE runs more than 20 funding programmes per year, such as START, Rasvitie, Umnik, Inter, Fond-INTAS 2006, Stavka, Pusk, TEMP, and the Polzunov Grants.

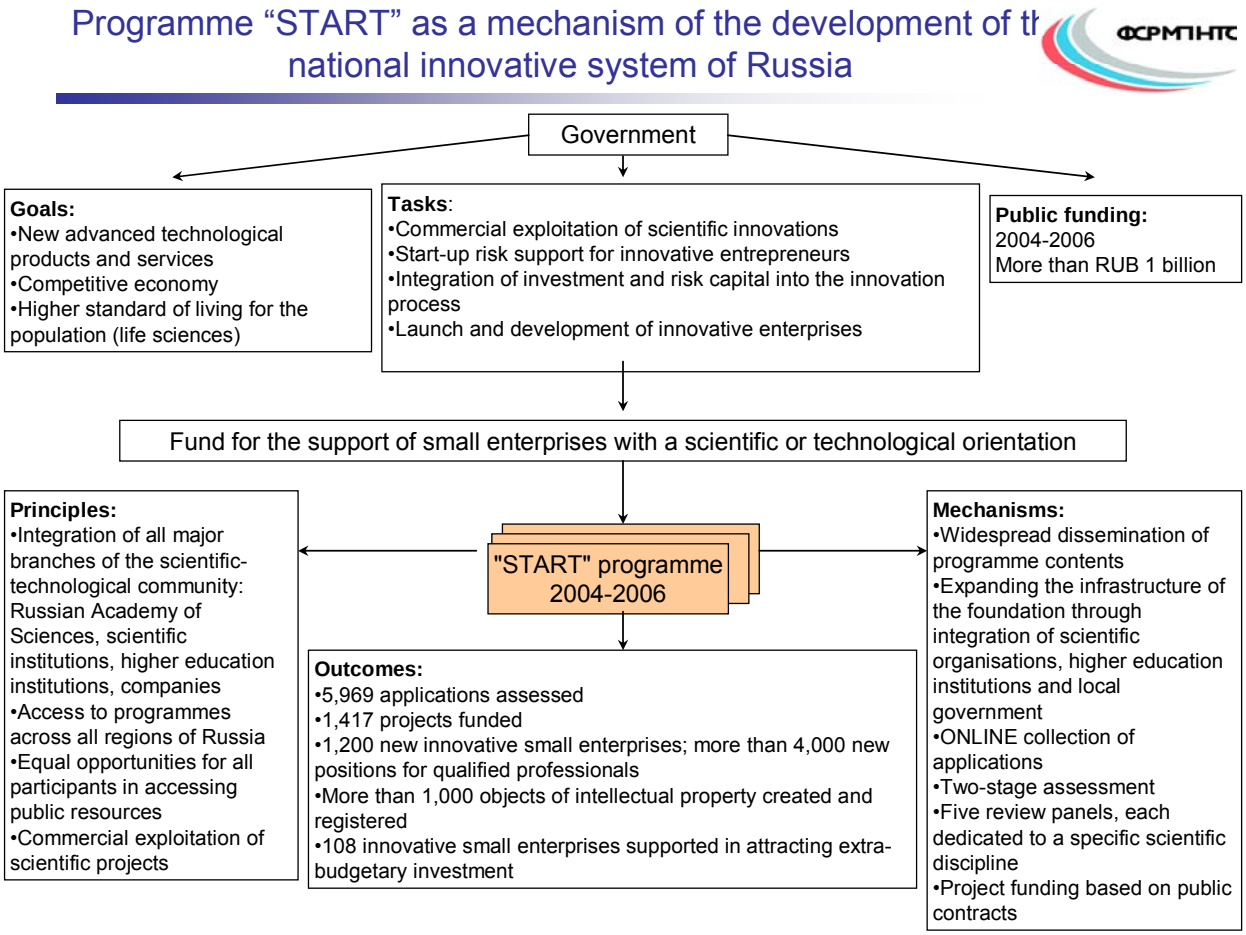
Three of these are described in detail below to illustrate FASIE's work:

START – Science and technology specialists can apply for a one-year grant of €20,000 to help them start a company with the aim of commercially establishing and exploiting

their own patent(s). If the new company manages to attract an investor within the first year of trading, it receives funding for an additional two years (€100,000).

In 2004, FASIE received 2,700 applications for the START programme and issued 500 contracts. Out of the 18 funded new companies that completed their first year of business in 2004, 5 managed to secure an investor. The START programme enjoys an excellent reputation in Russia; 1,700 applications had already been received for 2007 at the time of writing. A number of international partners are involved in the programme through training services and joint projects, including ANVAR – France; British Council and DTI – United Kingdom; CRDF – USA; TECHNO START – Germany.

Fig. 14 The "START" programme of the Bortnik Fund, an instrument for establishing and developing Russia's innovations infrastructure



TEMP (Technology for Small Enterprises) – A new programme to support the patenting of intellectual property. Target groups include universities, research institutes and small/mid-size enterprises (SMEs). SMEs wishing to apply must meet the following criteria: 1), a well-established market presence; 2), annual turnover of more than €1 million; 3), pursuing new ideas to exploit profitable market niches. If these criteria are met, FASIE will also support large-scale projects (depending on the level of funding required for commercial exploitation).

FASIE's **UMNIK** programme funds innovative projects by young entrepreneurs (up to 28 years of age). Each year between 2007 and 2010, 1,000 applicants will be granted an annual fund of RUB 200,000 (approx. €5,900) for a duration of two years. Funded projects must aim to achieve the commercial exploitation of a high-tech product before the end of the funding period.

FASIE is also the Russian "contact point" for SME participation in the EU's 7th Research Framework Programme. The foundation has already enjoyed a fruitful relationship with ANVAR when participating in the EUREKA programme. FASIE is also operating a Technology Transfer Centre to help bring Russia into the European IRC network.

7.4 Russian Fund for Technological Development (RFTR)

(Funding of applied research and development by scientific organisations and innovative enterprises)

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Tel.: +7 (495) 232-94-81; Fax: +7 (495) 737-47-94
Email: rftr@rftr.ru
Director: Dr. Andrey Georgiyevich Fonotov
Chairman of the Academic Board: Oleg Nikolaevich Favorsky, Russian Academy of Sciences
www.rftr.ru

Established in 1992, this fund aims to foster the development of science and technology in Russia by providing funding for applied research and experimental application of advanced production technologies.

The fund's objectives are instated through the competitive selection of scientific projects. Funding is granted on the basis of repayable loans. The RFTR coordinates the selection process as well as the assessment procedure, and submits its recommendations to ROSNAUKA for final approval.

Goals of the RFTR:

- Development of new, research-intensive production methods
- Development of new technologies and advancement of existing technologies
- Higher technological production standards
- Standardisation and certification of production methods
- Operational safety and security technology

Objects of funding:

Research and development projects, scientific organisations and innovative enterprises that represent the Russian Federation's development priorities for science and technology, and that aim to advance the country's key technologies.

Between 1994 and 2003, 840 projects were funded. The total amount of funding granted during this period was RUB 3.94 billion (€115.8 million).

The RFTR budget

The RFTR funding budget is regulated by law and is comprised as follows: Every year, 0.5 percent of profits from the 29 venture capital funds across Russia (public and private) are allocated to the RFTR. This regulation is based on a system that was created in the Soviet Union. At that time, all companies were required to pay 3 percent of their net production costs into an umbrella technology fund.
In addition, the RFTR receives loan repayments from outstanding funds, as well as share pay-outs from funded enterprises.

7.5 Innovation and venture capital funds in Russia

Out of the 29 innovation and venture capital funds that currently exist in Russia, 16 were formed by public bodies (ministries, agencies and services). The goal of these funds is not only to provide funding capital but also to attract outside investment, and to generate profits from shares in the founded or funded enterprises.

In 2000, Venture Innovation Funds was established, a so-called "fund of funds". The fund's opening capital was RUB 200 million. The purpose of this fund was to establish specialised funds, the first and only one of which so far is St. Petersburg's "Innovative Venture Fund for the Aerospace Industry". Currently, there are plans to increase the Innovative Venture Funds capital to €1.35 billion to stimulate further development. Provided there are successful investments, this share capital is predicted to increase to €3.7 billion within five years. The fund is managed by the Russian Federation's Ministry for Economic Development and Trade (MinEkonomRasvitiye).

Over the last year, there were two important new developments. A new fund, the "Russian Investment Fund for Information and Communication Technologies", was established. This fund receives RUB 1.45 billion from the federal budget and is designed to support projects with a registered share capital of at least RUB 100 million. The fund is managed by the Russian Federation's Ministry for Information Technologies and Telecommunications.

The other major event was the foundation of the "Russian Venture Company". This was given an opening capital of RUB 15 billion (€450 million) from the federal budget. The Russian Venture Company is to launch 10-15 venture funds that specialise in different technological and industrial sectors. A nation-wide call for tenders was held to select the partners for establishing these venture funds, and 13 tenders were received by mid-April. The selected applicants were announced on 14 May.

The first three successful tenderers are:

- ZAO "Vneshtorgbank", to manage funding assets of RUB 3.61 billion
- OOO "Bioprocess Capital Partner", to manage funding assets of RUB 3 billion
- ZAO "FinansTrast", to manage funding assets of RUB 2 billion

These figures demonstrate the determination of the Russian Federation to evolve from an economy based on natural resources to an economy based on knowledge and technology. However, the numerous measures that have been instated yet have to prove their worth over the coming years; financial investment has been considerable, and expectations are high. There is also widespread concern that the published figures and their expected outcomes are unrealistic.

8 SCIENCE AND INNOVATION STRATEGIES IN RUSSIA – SPECIAL ECONOMIC ZONES, TECHNOLOGY PARKS, SCIENCE CITIES

8.1 Special Economic Zones (SEZ)

Special Economic Zones (*osobye ekonomicheskie zony*) are government-defined territories within the Russian Federation subject to special enterprise laws (Federal Law of the Russian Federation, 22 July 2005 _ 116-FS "On Special Economic Zones of the Russian Federation").

These SEZs are administrated by a Federal Agency, RosOEZ (http://rosoez.ru), which answers to the Ministry for Economic Development and Trade. A new director was announced for RosOEZ in December 2006, Mikhail Vladimirovich Mishustin (previously Director of the Federal Agency for Land Registration, 2004-2006; Deputy Minister for Duties and Taxes, 1998-2004).

In February 2006, the public company "Vneshstroyimport" was reorganised into the "Joint Stock Company SEZ" to implement the federal policies on founding SEZs and creating SEZ infrastructures. The Federal Agency for SEZs is the company's sole shareholder. Last autumn, the Russian Federation transferred RUB 8 billion (€228.24 million) into the company's share capital. Between 2007 and 2010, the share capital is going to be increased to RUB 42.8 billion (€1.26 billion).

In 2007, the federal government transferred RUB 11 billion into the same company fund. Another RUB 41.1 billion are to be raised through the Federal Investment Programme. The regional governments are to contribute RUB 19.5 million, and the communal governments a further RUB 624.3 million. In total, infrastructure financing for the Special Economic Zones will come to more than RUB 100 billion (approx. €2.9 billion) over the next four years.

In addition, the Russian Federation's three-year state budget (2008-2010) will contribute around RUB 20 billion (€573.06 million) towards the development of Russia's Special Economic Zones.

According to law, SEZs have to comply with one of the following three types:

1.) Industrial-productive
2.) Technological-innovative
3.) Tourist-recreational

The Law on Special Economic Zones took effect on 1 January 2006. This law stipulates significant tax and customs benefits for SEZ businesses and residents; for example, Unified Social Tax is reduced from 26 percent to 14 percent in technological-innovative SEZs.

Residents of industrial-productive SEZs are exempted from land tax and income tax for five years. In addition, all imported technical equipment and materials are exempt from customs duties.

Main objectives of the Special Economic Zones:

- Development of advanced technology business
- Fostering innovation among national enterprises
- Attracting investment to increase the competitiveness of selected production sites
- Establishment of new production sites; development of industries to replace imported goods
- Development of an export market
- Development of tourism and health tourism

Main characteristics of SEZs:

- Tax and customs benefits (reductions in income tax, transport tax, social tax, land tax; suspended customs duties for imported goods)
- Five-year exemption from property tax and land tax
- State-financed infrastructure
- Removal of administrative barriers

Currently, there are two **industrial-productive** SEZs in the Russian Federation: the Lipetsk Region, and an area in the Republic of Tatarstan (Alabuga). The planned funding budget for infrastructural development until 2009 is RUB 23.1 billion (€679 million).

Main characteristics of these SEZs:

- Industrial sites
- No more than 20 square kilometres in size
- Zone status for no longer than 20 years
- Investors must contribute a capital investment of no less than €10 million, of which at least €1 million has to be made available during the first year

According to Mikhail Mishustin, Director of RosOEZ, the amount of investment for the SEZ Lipetsk until 2010 will come to RUB 40 billion (€1.18 billion). Around 5,000 new jobs have been created already. In 2007, the federal and regional budgets contributed RUB 2.3 billion to this SEZ's infrastructure. Development of the SEZ Lipetsk is planned to be finished by 2012. Around 50 production plants will be operating in this SEZ.

The SEZ Alabuga (Republic of Tatarstan of the Russian Federation) was founded in 1998. Since then, more than 30 new production plants have been established, of which more than 10 have attracted international shareholders. In 2005, the plants of "Alabuga" produced RUB 4.8 billion (€138.7 million) worth of products.

There are four official **technical-innovative** SEZs: Dubna (Moscow region), Zelenograd (on the outskirts of Moscow), St. Petersburg (Peterhof), and Tomsk. The planned funding budget for infrastructural development until 2009 is RUB 55.7 billion (€138.7 million).

Main characteristics of these SEZs:

- Production plants that implement innovative technology
- No more than 3 square kilometres in size
- Zone status for no longer than 20 years

Tourist-recreational SEZs can be found in the following regions: Stavropol, Kaliningrad, Irkutsk, Krasnodar, Altai, Buryatia.

A future option is to create **Port Zones**. A bill to foster the development of ports and airports in the Russian Federation was first presented to the State Duma (Lower Chamber of the Federal Assembly) in June 2007. The selection process (entry by competition) is still underway, but analysts have already singled out the following cities as likely candidates: Nachodka, Novorossiysk, Murmansk, and Port Ust-Luga. A city's "Port Zone" status is to be valid for no longer than 49 years. The "resident" (investor) will be required to invest no less than €100 million into the construction and development of a new port. No less than €50 million are required for investment into the construction and infrastructure of a new airport. For the modernisation and/or development of an existing port or airport, at least €3 million are required of the investor. Existing SEZs will enjoy special tax privileges in the ports of the Russian Federation, which will reflect positively on the ports' future development.

There are two Special Economic Zones with their own sets of regulations: **Kaliningrad** (since 2006) and **Magadan** (since 1999).

8.2 Technology Parks (TP)

8.2.1 Background

The concept of the "Technology Park" (TP) encompasses the entire development and production chain of a product right up to the marketed item: idea > development > prototype > production planning > production > market introduction > sales. TPs are great environments for piloting new financing models for the promotion of technical innovation and the use of risk capital. Small and mid-size enterprises (SMEs) are the primary target group of Russia's Technology Parks.

The first Technology Park in the Russian Federation was founded in 1990 – the "Tomsk Scientific-Technological Park".

Technology Parks are generally founded by universities, scientific centres, industrial enterprises and private companies, as well as public authorities, banks, and communal bodies.

Russian Technology Parks are financed from federal, regional and private sources, and they frequently receive additional funding from outside of Russia.

Today, there are 60 Technology Parks in 35 regions of the Russian Federation, of which only 40 are currently active. Approx. 1,000 innovative small enterprises have set up business in these TPs, and more than 10,000 new jobs have been created in the process.

8.2.2 Technology Parks for advanced technologies

On 10 March 2006, the Federal Programme "Creation of Technology Parks for Advanced Technologies in the Russian Federation" was launched. The programme is coordinated by the Ministry for Information Technology and Telecommunications.

The programme aims to ensure accelerated growth in the advanced technologies sector, and to turn this sector into the country's main focus for development.

8 new Technology Parks for advanced technologies are in planning for 2006-2010. Table 8 shows the planned investments.

Technology Parks received approx. RUB 3.7 billion (€110 million) from Russia's 2007 federal and regional budgets. Another €774 million from the federal budget has been earmarked for Technology Parks until 2010.

Table 8: Funding for Technology Parks in the field of advanced technologies until 2010

Technology Park	Size (sqm x 1,000)	Areas of specialisation	2007 budget investment (EUR x 1,000,000)	Total planned budget investment (EUR x 1,000,000)	Total planned investment (EUR x 1,000,000)
Dmitrovsk, Moscow region	180	Software development, IT service outsourcing for Russian and international companies, IT consultation	5	176.5	485.29
Chernogolovka, Moscow region	200	IT, development of petrochemical processes, manufacture of new medicinal products, development of nanomaterials			561.76
St. Petersburg	100	Planning and engineering of communication networks, television/video systems, high performance electronics systems	12.35	100	385.29
Kazan, Republic of Tatarstan	300	IT and telecommunications, supercritical technologies, petrochemical technologies, biotechnologies, innovative training and education	12.35	85.29	176.47
Nizhny Novgorod	100	IT and telecommunications technologies, biotechnologies and medical technology, machine and tool engineering, chemical technologies, development of new materials	19.1	91.18	441.18
Novosibirsk	160	Biotechnology and biomedicine, IT, high performance electronics, scientific equipment engineering	20	129.41	479.41
Obninsk, Kaluga region	70	IT, biotechnology and pharmaceutics, next-generation materials, nanotechnologies	23.5	102.94	520.59
Tyumen			17.64	88.24	
TOTAL (EUR x 1,000,000)			**110**	**774**	**3050**

8.3 Science Cities (*Naukogrady*)

In the Soviet Union, *naukogrady* were created as part of closed-off, large-scale military and industrial complexes ('closed cities'). They subsisted entirely on public funding. This system has now been reformed.

The title *naukograd*, which is conferred by the President of the Russian Federation, is being phased out over the next five years. Science cities enjoy individually tailored personnel, science, infrastructure and development concepts, as well as a range of special subsidies. In order to ensure funding for the future, Mr. Chlunov, Head of the Ministry of Education and Science's Innovations Department, proposed that Russia's science cities should be incorporated into the "Strategy for the Development of Science and Innovation until 2010".

Currently, there are 65 cities and settlements classed as *naukogrady*. 29 of these are located in the Moscow region. Another eight science cities (Vladimir, Kaluga, Nizhny Novgorod, Tver, Yaroslavl region) are spread across the European part of the Russian Federation. Another significant concentration of *naukogrady* is to be found in the Ural region (Sverdlovsk and Chelyabinsk). Western Siberia is also home to six science cities (Altai, Novosibirsk, Tomsk region).

Table 9: Distribution of science cities by region

Region	Total	Cities	Townships	Villages	Akadem-gorodok
Central	**37**	27	6	4	-
Including Moscow region	***29***	*21*	*5*	*3*	-
European North	**5**	5	-	-	-
Volga area	**2**	2	-	-	-
Ural	**9**	9	-	-	-
Western Siberia	**6**	2	2	-	2
Eastern Siberia and Far East	**6**	2	-	-	4
TOTAL	**65**	**47**	**8**	**4**	**6**

According to the law "On the Status of *Naukograd*", only 12 cities are officially titled *naukogrady* (February 2007): 7 in the Moscow region (Dubna, Zhukovsky, Korolyov, Pushchino, Reutov, Troitsk, Fryazino), and 1 each in the Altai (Biysk), Novosibirsk (Koltsovo), Tambov (Michurinsk), St. Petersburg (Peterhof) and Kaluga (Obninsk) regions.

In 2006, science cities received a total amount of **€24.3 million** in subsidies from the federal budget. This figure is set to increase over the next years as follows: **€35.9 million** (2007), **€44.2 million** (2008), **€47.2 million** (2009), **€50.3 million** (2010).

Table 10 shows the federal funding for the development and support of social, engineering and innovations infrastructures in science cities in the Russian Federation between 2007 and 2010.

Federal funding 2007-2010 for the development and support of social, engineering and innovations infrastructures in science cities in the Russian Federation

Table 10: Distribution of subsidies (official *naukograd*)

Naukogrady (science cities)	Amounts in EUR x 1,000 (1 EUR = 34 RUB)			
	2007 (law)	**2008** (law)	**2009** (bill)	**2010** (bill)
Altai region:	**9,180**	**9,763**	**10,426**	**11,104**
Biysk	**9,180**	**9,763**	**10,426**	**11,104**
Kaluga region:	**4,263**	**4,567**	**4,878**	**5,195**
Obninsk *Physics, nuclear and medical research*	**4,263**	**4,567**	**4,878**	**5,195**
Moscow region:	**15,650**	**22,671**	**24,213**	**25,787**
Dubna *High energy physics and nuclear research*	**2,493**	**2,674**	**2,855**	**3,041**
Fryazino *Electronics, radio technology, physics*	**2,116**	**2,266**	**2,420**	**2,578**
Reutov *Mechanical engineering, rocket and aviation technology, IT*	**3,239**	**3,467**	**3,702**	**3,943**
Korolyov *Aviation and space research, chemistry*	**6,989**	**7,488**	**7,997**	**8,517**
Pushchino *Biotechnology*	**813**	**867**	**926**	**986**
Troitsk *Space research, nuclear research, electronics*	(no figures available)	**1,521**	**1,624**	**1,730**
Zhukovsky *Aviation and space research, energy*	(no figures available)	**4,389**	**4,688**	**4,993**
Novosibirsk region:	**391**	**420**	**449**	**478**
Koltsovo *Biotechnology*	**391**	**420**	**449**	**478**
Tambov region:	**3,744**	**3,982**	**4,253**	**4,529**
Michurinsk *Plant breeding*	**3,744**	**3,982**	**4,253**	**4,529**
St. Petersburg:	**2,622**	**2,808**	**2,999**	**3,194**
Peterhof *Biology, military technology, IT, ecology*	**2,622**	**2,808**	**2,999**	**3,194**
TOTAL	**35,851**	**44,211**	**47,218**	**50,287**

Sources:

1. Appendix 18 of the Federal Law, "Federal Law for 2007"
2. Appendix 37 of the Federal Law, "Federal Law for 2008 and the period until 2010", Table 7
3. Appendix 38 of the Federal Law, "Federal Law for 2008 and the period until 2010", Table 6

9 SECONDARY AND TERTIARY EDUCATION IN THE RUSSIAN FEDERATION

9.1 The Russian educational system

9.1.1 Schooling

General school education comprises primary education (year 1-4), lower secondary education (year 5-9), and upper secondary education (year 10-11). The Russian school system is based on comprehensive schools rather than separated streams.
There are two types of leaving certificates:

- **Certificate of Incomplete Secondary General Education** (basic school / *osnovnoe obshchee obrazovanie*) after nine years of schooling; enables school leavers to pursue professional training at a technical college or vocational school.
- **Certificate of Complete Secondary General Education** (academic school / *srednee polnoe obshchee obrazovanie*) after eleven years of schooling; with the *attestat zrelosti*, school leavers are eligible for higher education. This certificate is gained by approx. two thirds of all students across Russia, and by most students residing in urban areas.

Children commence schooling at the age of 6 or 7.
There is also an established network of evening schools for working youth. Tertiary students in Russia are generally between the age of 17 and 23 when they commence their studies.

9.1.2 Vocational schools

The Russian Federation's vocational schooling system offers three different levels to match the students' qualifications – initial vocational schooling, secondary vocational schooling, and professional vocational schooling.

Vocational schools also offer further and additional professional training courses.

9.1.3 Higher education

Courses and degrees:

The following academic degrees can be attained at higher education institutions (HEIs) in the Russian Federation:

- **Bachelor** (*Bakalavr,* four-year university course)
- **Diploma** (*Diplom*, five-year specialist study course)
- **Master's** (*Magistr*, two years of postgraduate study following the *Bakalavr* course)

There are two postgraduate science degrees:

- *Kandidat Nauk* (**doctorate**): The 'aspirantura' of the Russian university system is the equivalent to the western PhD but subject to stricter academic regulation. The aspirantura has to be completed within three years, and a dissertation has to presented and defended in this time. To be eligible for the aspirantura degree, the student has to hold a Diploma or Master's.

- *Doktor Nauk* (**senior professorship**): The prerequisite for this demanding degree is a completed aspirantura. The student has to show evidence of a significant number of previous scientific publications, present a second research dissertation, and prove his/her ability to teach as a senior lecturer. The *Doktor Nauk* course takes 5-6 years and provides the student with the prestigious academic title of "Doctor of Science" upon successful completion. It is not unusual for *Doktor Nauk* students to begin this course at the age of 50 or higher.

After many higher education institutions restructured their traditional *Diplom* courses into modular degree courses during the 1990s, this tendency has now been reversed. Most HEIs are once again offering five-year *Diplom* courses.

9.1.4 Structure of the higher education system

Higher education in the Russian Federation and the GIS states differs significantly from tertiary education systems informed by Western thought. There is no perceived unity between research and teaching. **Basic research** is the domain of the Russian Academy of Sciences. This is an academic association that is entirely independent of the higher education system and that operates its own network of research institutions. Higher education institutions, in contrast, concern themselves with **teaching** and **applied research**. The Academy of Sciences also has the right to confer doctorates (*Candidat Nauk, Doktor Nauk*). The strict division between research and teaching in Russia is somewhat mitigated by the fact that many university professors are members of the Academy of Sciences, and many academy members lecture within the higher education system.

There are several categories of HEIs:

- **Conventional universities**: Long-established universities that offer a broader range of courses than other HEIs; most similar to German universities.

- **Academies** and **specialised universities**: Strongly focused on specific disciplines; e.g., architecture schools, business academies, teaching colleges, medical schools.

- **Recently founded universities** and **colleges**, or HEIs that have been restructured and renamed; these are usually limited to two or three disciplines. Many of these are privately run.

- Another distinguishing aspect is the **administrative affiliation** of the HEI; not all institutions answer to the **Ministry of Education and Science**. Other HEIs are run

by separate **government ministries**, but are nevertheless freely accessible to the public.

In contrast to Western universities, where the Chancellor/Vice Chancellor heads a body of non-academic administrative staff, Russian HEIs do not have a dedicated administrative staff structure. All administrative tasks are handled directly by the Rector, the Prorectors, and the Deans.

9.1.5 Structure and organs of a Russian university

Rector

The **Rector** is the head of all the university's staff members. He/she is elected directly by the university and is approved by the Ministry of Education and Science. The Rector heads the administration and is responsible for all major academic, technical and staff-related decisions. The Rector also represents the institution to the outside world, is a member of the Higher Education Rector's Conference, and chairs the institution's Academic Board (*Nauchnyi Sovet*).

Prorectors

The **First Prorector** is the Rector's deputy for all duties within the university. Like the Rector, the First Prorector is elected by the members of the university.
The other Prorectors also support the Rector's activities; usually, they divide the responsibilities for teaching and research, administrative matters and international relations between them.

Faculties and Deans

Similarly to Western universities, the **Faculty** is the most important structural division at Russian universities. Each faculty is headed by a **Dean**, who is elected for a term of several years by the faculty's senior lecturers.

The **Prodeans** support the Dean's work. The main tasks of the Dean and the Prodeans are to coordinate the faculty's teaching system and administration.

Unlike the faculties at e.g. German universities, Russian faculties are not comprised of institutes. The term "research institute" usually refers to an institution affiliated with the Academy of Sciences. University faculties in Russia are structured rather tightly, comparable to the German "*Fachbereiche*" (departments). For example, a Russian university may have a Faculty for Mechanical Mathematics, Biology and Physics; a Faculty for German; a Faculty for Foreign Languages, etc.

Kafedra

The *Kafedra* is the smallest division of the university's academic structure, most similar to the Western "Chair". Each *Kafedra* is headed by a senior professor and staffed with several lecturers, assistants and junior professors. The Head Professor is periodically

elected by the *Kafedra*'s academic staff. A chair is therefore staffed by several professors.

Academic Board

Academic and administrative matters pertaining to the individual faculties and the university per se are addressed by the **Academic Board** (*Nauchnyi Sovet*). On the university level, this council is constituted by all the university's professors, heads of *Kafedras* and deans. On the faculty level, it is constituted by all the faculty's academic staff.

Higher Attestation Commission

The **Higher Attestation Commission** (VAK) is an independent government body that is not part of the university as such. The VAK oversees all academic examinations and may suspend the awarding of academic titles and certificates. A relic from Soviet times, the Higher Attestation Commission significantly restricts the autonomy of academic institutions.

Source:
Dr. Klaus Waschik: Das russische Hochschul- und Forschungssystem – Ein Überblick (The Russian higher education and research system – an overview). Compiled by Ursula Justus

9.2 The division between research and teaching

In Russia's educational and research systems, the Humboldt principle of the unity of research and teaching was never embraced to the extent it was in the West. Research has always been the domain of the Russian Academy of Sciences (founded in 17XX), while the universities were traditionally the home of higher education.

In the Soviet Union, this division was further deepened; the universities became centres of mass education, while the Academy of Science understood itself to be an elitist haven for intellectual prowess.

This division is still very much apparent today, and the disadvantages are obvious: as there is no direct communication between researchers and educational staff, teaching curricula are very slow to respond to "state of the art" and "cutting edge" research findings.

Students have very little exposure to scientific practice during their studies, and university courses are not designed to stimulate an interest in science and research. Not surprisingly, the Academy's institutes are experiencing a significant lack in newcomer talent.

Do to the curriculum-focused nature of the university courses and the lack of opportunities for independent research, students tend to focus on responding, criticising and analysing rather than innovating and developing. This has a stifling effect on the learning process, and turns out graduates that display little scientific initiative.

Today, these issues have been acknowledged and are reflected in the Russian Federation's education and research policies. There is a significant push towards increasing integration between the universities and the institutes of the Academy of Sciences, most notably the "Integraciya" programme instated by the Ministry of Education and Science in 1996. Over the past years, this programme has already led to the establishment of *nauchno-issledovatel'skie centry* in numerous regional centres (incl. Yekaterinburg, Novosibirsk, Kazan, Perm, and most recently Irkutsk); these science centres provide specific teaching programmes and practical courses to foster the incorporation of scientific research at local universities. Both undergraduate and postgraduate students are being targeted by these measures.

A range of other measures are being developed to close the gap between education and research. Staff from Academy institutes who also teach at universities receive special funding to encourage further integration.

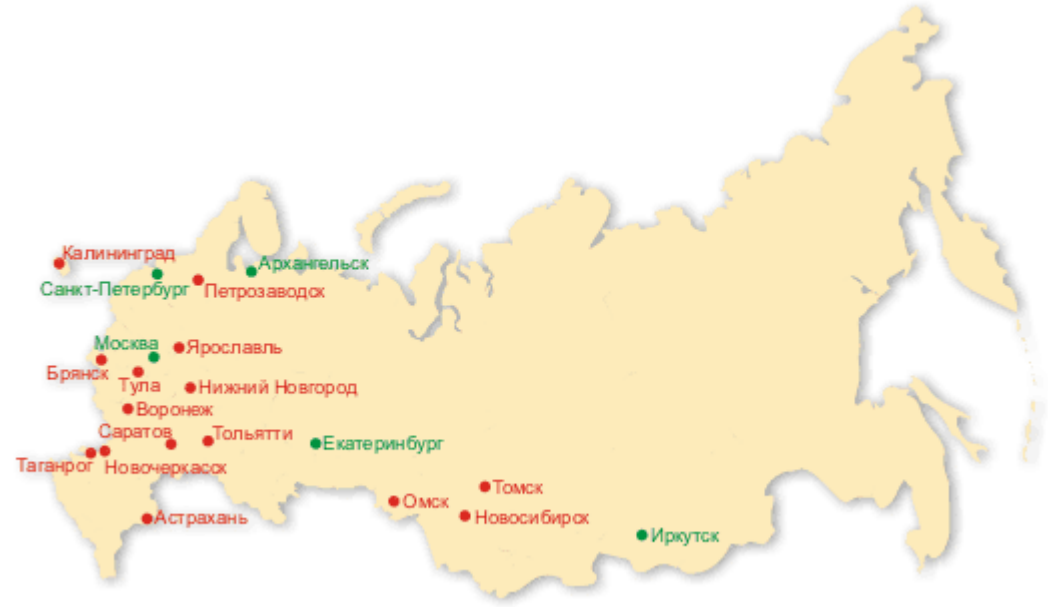
At many of Russia's major universities (e.g., St. Petersburg, Moscow, Vladivostok), institutes pertaining to the Academy of Sciences have established their own research laboratories and centres. Here, students can familiarise themselves with lab work as early as the fifth semester. Several universities and Academy institutes have started joint postgraduate programmes with the aim of attracting young scientists to the institutes.

Despite concerted efforts, however, the lack of unity between research and teaching remains a fundamental problem for tertiary education in the Russian Federation. The Ministry of Education and Science is very aware of this, and there have been numerous attempts to reform the divided system. However, such reforms crucially rely on the support and active participation of the Academy of Sciences and its executive board – who have to date been hesitant to commit to the required changes.

10 IMPLEMENTATION OF THE BOLOGNA PROCESS

The Russian Federation signed the Bologna declaration in 2003 with the aim to comply with the process by 2007. This has been causing many issues within the Russian educational system.

Fig. 15: Implementation of the Bologna process in the Russian Federation:



- Thorough educational reforms to instate Bologna principles
- Isolated introduction of Bologna principles

Changes in Educational Law to accommodate aspects of the Bologna process:

- As of September 2007, the majority of courses at the majority of higher education institutions are being restructured into Bachelor/Master's courses (effective implementation projected for September 2008). Currently exempt from the reform are courses in medicine, forensic medicine, advanced technologies, military technology and the arts; these will retain their traditional degree structures.
- Development of a new (third) generation of curricular standards; the main focus lies not in the completion of specific courses but in the development of key competencies (the first 70 curricular frameworks are being instated this year).
- Increased academic autonomy for universities – 70 percent control over curricular content instead of 20-40 percent.
- Discontinuation of up to 40 out of 120 existing BA subjects.
- Discontinuation of up to 400 out of 530 existing specialist subjects.
- Foundation of National Education Agencies to monitor the quality of higher education.
- Reduction of student workload from 54 hours per week to 45 hours.
- Master's subjects to be available for 15-20 percent of all Bachelor subjects
- Admission to three-year Bachelor degrees only for students who have completed 12 years of secondary schooling; four-year degrees to remain mandatory for all students with 11 years of secondary schooling.

Higher education budgets and student numbers in the Russian Federation

For every 10,000 Russian citizens, there are 170 state-funded university places. Currently, the Russian Federation has approx. 6 million lecturers and 34 million students across the educational system. By 2010, the number of prospective students is projected to halve as a result of demographic changes. In 2010, the standard student allowance will be RUB 900 per month, with an additional RUB 1250 for living costs. According to the 2008-2010 federal budget projections, funding for the Priority National Project “Education” will be greatly reduced: RUB 42.8 billion are allocated for 2008, whereas only RUB 21.2 billion are allocated for 2009. Currently, the Russian higher education system offers more than 500 subjects as Specialist degrees, and 110 subjects as Bachelor and Master’s degrees (Bachelor/Master’s accreditation at more than half of Russia’s higher education institutions), excepting degrees in medicine, service provision and data protection.

11 ABBREVIATIONS

Corr. Member	Corresponding Member of the Russian Academy of Sciences
DFG	German Research Foundation
FASI	Federal Agency for Science and Innovation
FASIE	Foundation for Assistance to Small Innovative Enterprises – I. Bortnik (FASIE)
HEI	Higher education institution
MON	Ministry of Education and Science of the Russian Federation
PNPO	Priority National Project “Education”
RAN	Russian Academy of Sciences
RFBR	Russian Foundation for Basic Research
RFTR	Russian Fund for Technological Development
RFH	Russian Foundation for the Humanities
RUB	Russian Rubel
SME	Small or mid-size enterprise
SEZ	Special Economic Zone
TP	Technology Park
VAK	Higher Attestation Commission