

Pashayev Elvin Nazim

## The main political directions of the USA are to support stimulation of innovations and allocate budget expenditures for scientific research programs

*The article examines US investments in research and development work, which are aimed at applying new technologies in industry. In competition for world leadership, America has to pay special attention to the development of new technologies. In other words, innovations are important for retaining leadership positions in the future, and it should be noted that the United States has a huge potential in the innovation sphere.*

**Key words:** innovative technology, science – innovative research, national laboratories, cluster, budget expenditures, patent law, energy efficiency.

*У статті розглядаються інвестиції США в науково-дослідні та дослідно-конструкторські роботи, які спрямовані на застосування нових технологій у промисловості. У конкуренції за світове лідерство Америка змушена приділяти особливу увагу розвитку нових технологій. Іншими словами, інновації мають важливе значення для утримання лідерських позицій в майбутньому, і*

*варто зазначити, що США мають величезний потенціал в інноваційній сфері.*

**Ключові слова:** інноваційні технології, науково-інноваційні дослідження, національні лабораторії, кластер, витрати бюджету, патентні права, енергоефективність.

*В статье рассматриваются инвестиции США в научно-исследовательские и опытно-конструкторские работы, которые направлены на применение новых технологий в промышленности. В конкуренции за мировое лидерство Америка вынуждена уделять особое внимание развитию новых технологий. Иными словами, инновации имеют важное значение для удержания лидерских позиций в будущем, и стоит отметить, что США имеют огромный потенциал в инновационной сфере.*

**Ключевые слова:** инновационные технологии, научно-инновационные исследования, национальные лаборатории, кластер, расходы бюджета, патентные права, энергоэффективность.

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Pashayev Elvin Nazim,  
PhD  
Azerbaijan National Academy of Sciences  
Institute of History  
named after A.A. Bakikhanov

In 2009, “A Strategy for American Innovation” was accepted in the US. By the help of this program president set a goal to consolidate fundamental research ideas before country in order to secure world leadership. Some of the crucial spheres of innovative development then alternative energy sources, modernization of energy carriers, enlargement of innovative automobiles manufacturing and high speed railways were important opportunities for that reason – bio, Nano, space technologies were listed alongside protection of health and education. In this particular document, investing to the scientific research not less than 3% and in the next 10 years increasing budget of Office of Science of the Ministry of Energetics which deals with fundamental researches were taken into account as a more important goal.

In “A Strategy for American Innovation” it was also noted that in order to “achieve the future” The US must out innovate rest of the world. Obama was trying to persuade in his address regarding to the budget that “... we are sure that a state which put out all its power for innovative development will lead world economy tomorrow. This is a sphere that the US can't waste a chance” [6, p. 15].

In the USA, Ministry of Energetics has a decisive role in investing to the citizen scientific – research and empiric – constructor works spheres and during the 2014 financial year ministry spent 6,2 billion US dollars that the main part of this allocation – 4,7 billion US dollars were budgeted for fundamental research works. It should also be noted that more allocation was budgeted for technological improvement (respectively

to strengthen sustainability of competitiveness of national economy) and physics science spheres. In accordance with scientific – research and empiric – constructor works are realized with the help of National Science Foundation and the US Ministry of Trade alongside Ministry of Energetics.

Generally, during the last 5 years structure of the expenditures of energetic science – researches focused on researches and showed itself more on the fight against Global Climate Change. During the years of 2005-2014 budgeted scale of expenditures on scientific – research and empiric – constructor works were 42,5 billion US dollars. In this situation, proportion of scientific – researches in nuclear energetics 27,4%, in carbohydrogen resources area 23,5%, in recoverable energy resources area 18,5%, in energy saving area 15,8% and in intellectual energy systems area were 14,7% [5] (Table 1).

In addition, corporations that has powerful hydrocarbon resources are very interested in the implementation of researches and their scientific potential allows them to carry out studies without any state support. One of the main features of the energy sector is scientific studies of large service companies such as Halliburton and Schlumberger which are active in the field of innovative activity. These companies established their scientific-research laboratories (on oil drilling and production technologies, and others) and only in 2011 Schlumberger Company spent 829 million dollars to the implementation of scientific researches.

Nowadays, 80% of financing of scientific and innovative research in the world fell to 10 leader

Table 1

**Table of budget expenditures (in millions) for citizen research programs by Ministry of Energetics**

	2011 Financial year	2012 Financial year	2013 Financial year (firstly)	2014 Financial year (firstly)
<b>General</b>	5652	6301	5767	6236
<b>additionally:</b>				
<b>Energy effectiveness and recoverable energetics</b>	853	910	875	875
<b>Carbohydrogen energetics</b>	288	298	300	225
<b>Nuclear enegetics</b>	388	361	112	270
<b>Intellectual energy network</b>	90	101	98	83
<b>Ecological</b>	68	46	15	24
<b>Money appendix for Advanced Research Project Agency-Energy ARPA-E</b>	-	(275)	(251)	(280)
<b>Office of Science</b>	3834	4428	4289	4743
<b>Other</b>	13	15	16	16

Source: Federal Funds for Research and Development Funding: FY 2012-2014.NSF. Washington,DC,2014; Federal Funds for Research and Development Funding: FY 2011-2013. NSF. Washington, DC, 2013

companies. This list is led by one Chinese company – Petro China (spent \$2.3 billion to scientific research in 2012) and two American companies – General Electric (2.1 billion), Exxon Mobil (1 billion dollars). This list also includes American transnational corporations such as Chevron and Conoco Phillips, electricity giant Babcock and Wilcox, as well as USEC which is involved in the enrichment of nuclear material and finally several companies that are involved in the production based on the use of solar energy – First Solar, Advanced Energy Industries and Sun Power [1; 48]. With the participation of the state in order to determine deep-water drilling operations in the country and the shale deposits, the production is expanding to the super modern equipment such as, 3D and 4D seismic intelligence equipment, efficient internal combustion engines, wind power parks, voltage panels, biofuels and energy-saving equipment for home appliances.

A key aspect of the overall scientific strategy of the Ministry of Energy is financial assistance on 28 thousand employees which concentrated in 17 of the country's 300 university science laboratories. Ministry of Energy allocated \$6.5 billion from annual fund on scientific investigations carried out in the laboratories. Although the vast majority of laboratories is under the supervision of the Ministry of Energy some of them are controlled by a group of corporations (Sandia National Laboratories), by universities (Argonne National Laboratory), by non-profit organizations (the National Renewable Energy Laboratory). The main directions of investment by national laboratories are modification of carbon cells and new types of composite based and silisium based crystals equipment for renewable energy sources, energy-capacity batteries and other systems for storing energy collected, modular nuclear reactors, advanced gas turbines, less energy running with the expansion of domestic consumption techniques, technology will change the creation of

heat energy for electricity, transport biofuels new generation of internal combustion engines expand the production of, natural gas and heating elements. We can also include here the lower energy consumption networks and researches on working with clean coal technology.

The Ministry of Energy in order to focus on a key scientific research clusters – geographic features supported by the group of companies adopting a centralized manner. The main advantage of clusters is that they are able to use the service of very expensive equipment and highly qualified staff. There are 17.000 people who are working in low-carbon energy cluster in the state of Colorado in 1500 enterprises. Here we can find, amongst the largest companies involved in the production of wind energy giants “Vestas” and “Siemens”. Michigan-based automotive cluster accumulator energy production with the participation of 16 companies is invested \$6 billion [1, p. 50]. There is possibility to construct techno parks, technopolises, science parks, business incubators, “preference centers” and “cooperation institutions” in database clusters. In order to coordinate a cluster there was created special interdepartmental working group (Taskforce for the Advancement of Regional Innovation Clusters) which is administrated by the Ministry of Energy.

Trends in the energy sector to support innovation by the government as a body in the financing of innovation in the energy innovation hubs corridors, which started in 2012 – also plays an important role. Currently operating each of the 6 hubs specific problem: energy preserve accumulators and other energy-saving technologies, search for substitute to deficit and fractional resources, solar energy, conserves energy storage technologies, modeling of processes in the innovative nuclear reactors and focused on the creation of intelligent systems able to transfer the electrical energy over longer distances.

During the fiscal year of 2012; 112 million dolar has been allocated for the above mentioned issues [1, p. 49]. Note that one of the hubs are specialized in the field of rare metals processing that this rare metal magnet motors, wind engines, motors of hybrid cars and widely used in the production of energy preserving engines. 1980, US has been a leader in the field of rare metals production in the world, however, after cessation of the above-mentioned production country of these metals, the lead was lost. China, which has 48% of the world's resources in this area (the US accounts for 13% of these reserves) concentrated in the hands of 97% of exports to the countries of the world.

In 2015, in two institutes has been allocated \$145 million to the creation of new specializing regional innovative hub. One of institutes will have to deal with the problems of flexible hybrid electronics, other will specialize in the production of smart manufacturing. The first project under the auspices of the Ministry of Defense of the United States for 75 million dollars, The second project launched by the Ministry of Energy and 70 million dollars in funding has been allocated. One of the main achievements of the Obama administration should consider changing the way the patent reform legislation. So, in 1980 Bayh-Dole Act starting with the adoption of the 1999 law on the protection of the American inventors (American Inventors Protection Act) and the ongoing reforms, in 2011, the Obama administration's "American invention adopted" (America invents Act) with the law accelerated. The main supplement to this statement is that not to the person who first to invent, preference will be given the person is the first visit by an application of the inventors (First-Inventor-to-file) and invention has to transmit to the Patent and Trademarks Office for stable funding. Law is also looking at low-quality applications and the "stolen" projects to the fight. Referring to this issue, Obama mentioned: "There are some companies that they do not create anything new, however they steal the ideas of others, and then demand money using patents that the main problem of the American patent system".

In 2012, the fuel and energy complex by the Bureau of Patents and trademarks and 8.8 thousand patents on inventions listed on the environment, it was more than 2.4 times compared to 2007. Alternative energy patents issued 5.2 thousand and 1.1 thousand has been associated with the collection of energy. In the years of 2002-2013 "clean energy" in connection with the discovery of patents issued to American inventors in the bio-energy, solar energy, coal, "clean" combustion technology, fuel cell has a special place in the directions. Preparation of the patent index of the activity by the National Science Foundation to the witness that the US production of hybrid cars and wind power facilities, as well as collection fields of energy is still behind the European

Union and Japan. In addition, although accumulators of lithium-ion initially invented in the United States but currently the leading countries in the production in this field are Japan (annual production capacity of 43%), South Korea and China. The US has 22% of all patents lithium-ion technology in the case of Japan owns 52% of the patents. Over the last few years, the US has been bankrupt small companies to remain competitive in Asian companies.

The authors of the national security strategy believe that the US current period has the unique "window of opportunity" to invest in technologies of the future generations. If they miss this opportunity, then in the future in light of the increasing requirements of new energy technologies will remain as an importer. It should be noted that 30 Nobel Prize winner in 2009 on the allocation of financial resources to the scientific research in the field of energy applied to the president have said that such activities are able to bring economic dividends. After a while, Bill Gates wanted to draw attention back to the White House the US scientific investigations in the field of energy. He noted that in order to restore its leadership the United States needs miracle and proposed that the funds allocated for scientific investigations of the national budget allocations to scientific investigations in the field of energy should be increased to 6%. This is two times more than the norm proposed by Obama.

"History must direct us. The USA could lead world economics due to innovations in XX century. Today, competence is tougher, challenges are more difficult, for this particular reason innovations are crucial than ever before. Global contests continued in order to manufacture and develop clean technology, China and other countries are working only for the sake of victory" – claimed by Obama [4].

The interagency program of "National Network for Manufacturing Innovation-NNMI" in 2013 as an initiative put forward. The participants of this program have been the Ministry of Energy, Department of Defense, the National Science Foundation and the National Institute of Standards and Technology. Under the program, based on production innovation will create a network of 15 specialized institutions. Until 2022, about 1 billion dollars to the financing of the program funds will be allocated from the federal budget. In 2014, program of "national innovation system in the field of industrial technologies" its implementation in the next development stage and has been allocated 147.6 million dollars.

In January 2014 the United States Department of Energy of the State of North Carolina State University which is specialized in the field of power electronics based on innovative new technology institute (Next Generation Power Electronics Manufacturing Innovation Institute) has announced the establishment. The institute, which is important in terms of energy efficiency for power electronics semiconductors aimed

at the development and improvement. This combines technical and research base of the 17 producers that are interested in this field, large consumers of this product, 5 universities and 3 scientific-research laboratories. Over five years, \$70 million will be financed from the budget. It is expected not less than \$70 million investments by the participants [3; 191]. In addition, during fiscal year of 2015, the innovative integral photon (Integrated Photonics Manufacturing Innovation Institute) specialize in the production of 100 million dollars was allocated for the creation of new technological institute.

In general, the above-mentioned institutions are all highly innovative technology companies, specializing in the areas of resource, technical and advisory will assist the methodology. In order to ensure the stability of the financial support from existing institutions, in the future the regional budget will be showed to business communities. It is assumed that after 5 years the companies will be able to refund themselves.

Thus, the federal government's major initiatives over the past three years was production of various raw materials, environmental protection and construction or improvement of industry based on high technology in the territory of United States.

#### REFERENCES:

1. Дмитриев С. С. Энергетическая стратегия Б. Обамы: опора на инновации и технологическое лидерство / С. С. Дмитриев. – Москва : ИМЭМО РАН, 2014. – 162 с.
2. Зеркалов Д.В. Энергетическая безопасность / Д.В. Зеркалов. – Киев : «Основа», 2012. – 920 с.
3. Семёнова Е.А. Новая индустриализация: тенденции и перспективы / Е.А. Семёнова // Проблемы Национальной Стратегии. – № 5 (32), 2015. – С. 185–203.
4. Remarks by the President on America's Energy Security (The White House Office of the Press Secretary). Georgetown University. Washington: DC, March 30; 2011 // <https://obamawhitehouse.archives.gov/the-press-office/2011/03/30/remarks-president-americas-energy-security>.
5. Sissine F. Renewable Energy R&D Funding History: A Comparison with Funding for Nuclear Energy, Fossil Energy and Energy Efficiency R&D // Congressional Research Service. Washington: DC October 10; 2014 // <https://fas.org/sgp/crs/misc/RS22858.pdf>.
6. The Budget Message of the President. FY 2015. Washington: DC, march 30; 2011.
7. A Strategy for American Innovation: Securing Our Economic Growth and Prosperity. Update. Washington, DC, February 2011.