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Bachelor Thesis

Natural resources in Russia

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The aim of the work is to reveal the concept, essence of resources and analysis of their role in the economy. In accordance with the goal, the following tasks will be solved: first, to give a theoretical description of natural resources; second, to assess the natural resources; thirdly, to characterize the role of resources in the Russian economy, and, fourth, to outline the main ways to improve the efficiency of resource use.

Methodology

The thesis consist of two parts: theoretical part and practical part. Comparative and descriptive methods will be used in thesis.

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BERRY, R A. – KANT, S. *Economics, sustainability, and natural resources : economics of sustainable forest management ; edited by Shashi Kant, R. Albert Berry.* Dordrecht: SPRINGER, 2005. ISBN 1-4020-3465-2.

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Declaration

I hereby declare that I have worked on my bachelor thesis titled “Natural resources in Russia” and that all the sources I have used and quoted mentioned at the end of the thesis in the list of preferences.

In Prague, 13th of March 2019 ……

Markarian Knarik

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Natural Resources in Russia

Abstract

In this thesis work describes the essence of natural resources, the variety of the territory of Russia and the assessment of available reserves. Also Features of the placement of fuel and gas resources and their importance in the economy of the state. It is divided into theoretical and analytical parts.

The theoretical part is based on the scientific literature and defines important concepts related to natural resources. Natural resources are divided according to the main division, and each element is correctly described.

The analytical part is devoted to the analysis of natural resources specifically in the Russian Federation, while great importance is given to gas and oil, defined these sectors as a key role in Economy of Russia. Comparative and descriptive methods have been used in the thesis to make more visible the role of natural resources in Russian economy.

Key words: Natural resources, Russia, economy, gas, oil

Přírodní zdroje v Rusku

Abstrakt

Práce popisuje podstatu přírodních zdrojů, rozmanitost území Ruska a hodnocení dostupných rezerv. Rovněž funkce umístění zdrojů paliv a plynu a jejich význam v ekonomice státu. Je rozdělen na teoretické a analytické části.

Teoretická část vychází z vědecké literatury a definuje důležité koncepty související s přírodními zdroji. Přírodní zdroje jsou rozděleny podle hlavního dělení a každý prvek je správně popsán.

Analytická část je věnována analýze přírodních zdrojů konkrétně v Ruské federaci, zatímco velký význam se věnuje plynu a ropu, sektoru, který definuje tyto průmyslové odvětví jako klíčovou roli v ruské ekonomice. Srovnávací a deskriptivní metody byly využity při práci na posílení role přírodních zdrojů v ruské ekonomice.

Klíčová slova: Přírodní zdroje, Rusko, ekonomika, plyn, ropa

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1 Introduction

The long history of the development of mankind is, first of all, the history of nature management, the development of productive forces, human cognition of the laws of nature and society, the replacement on this basis of socio-economic formations. Therefore, it is quite natural that the relationship of man with nature and its resources is subject, on the one hand, to the nature of resources in the broadest sense of the word, beginning with the size of the territory itself and ending with mineral deposits in the bowels of the earth and, on the other, the state of the productive forces. Including - the level of development of science, technology and those production relations that are formed in a particular society throughout its history.

The current stage of development of the world economy is characterized by ever-increasing levels of consumption of natural resources, a sharp complication of the process of interaction between nature and society, intensification and expansion of the sphere of manifestation of specific natural-anthropogenic processes arising from techno genic impact on nature. In the context of increasing interdependence and interdependence of states, world social progress increasingly depends on the solution of global problems - human problems affecting the interests and destinies of all countries and peoples that are important for the progress of human civilization as a whole. In the beginning of the century it is the successful solution of the main global problems that will lay the foundation and will predetermine the possibility of the world community's transition to sustainable development.

One of the main global problems is raw materials. The functioning of national economies and the entire world economy is based on economic resources (production factors) -natural, labor, capital (in the form of real capital, in the form of means of production, and financial, that is, in cash), entrepreneurial, as well as scientific (scientific, technical, information knowledge). In aggregate, economic resources form the potential of a national economy or a region of the world, or the entire world economy.

In this connection, the study of the natural resource potential of the world as a whole, of individual continents and countries, the analysis of the systems of their economic use, developed in various socio-economic structures of the modern world community, and the

development of ideas about the optimal development of natural resources become very important.

2 Objective and methodology

2.1 Objectives of thesis

The aim of the work is to reveal the concept, essence of resources and analysis of their role in the economy. In accordance with the goal, the following tasks will be solved: first, to give a theoretical description of natural resources; second, to assess the natural resources; thirdly, to characterize the role of resources in the Russian economy, and, fourth, to outline the main ways to improve the efficiency of resource use.

2.2 Methodology

The thesis consist of two parts: theoretical part and practical part. Comparative and descriptive methods will be used in thesis.

3 Theoretical essence of natural resources and their role in the economy.

3.1 The concept, essence and classification of natural resources

Natural resources are components of nature, which at this level of development of the productive forces are used or can be used as means of production (objects and means of labor) and consumer goods. In terms of their material form, they are objects and forces of nature, genesis, properties and location of which are conditioned by natural laws; in terms of their economic content, these are consumer values, the usefulness of which is determined by the degree of study, the level of scientific and technological progress, and the economic and social expediency of use.

The availability and diversity of natural resources largely determines the possibilities of the economic mechanism. Because of this, along with labor, capital, science, entrepreneurial ability, natural resources are one of the economic resources. Man has always used natural resources to satisfy his needs. But along with the growth of needs, the volume of elements of nature that are drawn into the process of economic circulation is growing. This is due not only to the growth of the population, but also to qualitative changes in people's needs. What once lay untouched in the "storerooms" of nature, is increasingly involved in economic circulation.

For a more simplified understanding of economic phenomena and processes affecting the concept of "economic resources", they are classified according to various criteria. The most fundamental character is the classification of natural resources on the basis of their genesis. Genesis distinguishes land, water, biological, mineral resources, resources of the World Ocean and others. Classification according to the method of use is based on the division of resources into sources of means of production and commodities: the resources of material production (resources of industry, including its individual branches, resources of agriculture and other branches), and resources of the non-production sphere (including direct and indirect use resources).

Due to the limited availability of free areas, the idea of a territory as a kind of resource has emerged, which is viewed from different perspectives: as an integrated resource, the carrier of elementary (traditional) resources, with its size, location, natural and anthropogenic properties; as a special kind of elementary resource - a place, a spatial basis of activity.

In connection with the problem of the limited availability of natural resources, the importance of classification is increased on the basis of their exhaustibility: exhaustible, including renewable (biological, land, water) and non-renewable (mineral) natural resources; and inexhaustible natural resources (climatic, energy of flowing water, etc.). Unlike renewable resources, which, when properly used, are practically inexhaustible, minerals can be used only once, after which they disappear. These resources are irretrievable. The pace of their formation is immeasurably slower than the rate of extraction. Therefore, throughout the future history of mankind, in all probability, the search for means and methods for more effective use of non-renewable resources, including methods for processing secondary raw materials, will be required. But while such effective methods have not been invented, therefore, it is necessary to fulfill such basic conditions. First, it is necessary to use carefully, rationally, what nature gives to a person (especially with regard to irreplaceable resources). Secondly, where it is available, effective measures should be taken to replenish natural resources. Thirdly, it is necessary to make maximum use of secondary raw materials and other waste products. Fourth, it is necessary to fully support the ecological purity of production and nature management.

As we know, inexhaustible resources are resources that can not be controlled by humans and are essentially intangible. Exhaustible resources are a kind of matter in different substances and aggregate states. (J. Mburu, 2007)

Accordingly, these resources can be bought and sold, and, naturally, they have a price. Prices of economic resources are in the market economy in the form of money income: profit (entrepreneurial income), wages (income from the sale of labor), rent (land income). Consequently, pricing for resources is the formation of certain revenues - profits, wages, rent. The price of resources is formed, as in any market, depending on demand and supply. The supply of resources reflects the direct relationship between the price of them and the amount actually available; in the interests of the owners of resources themselves, to supply

the latter at a higher price. Thus, the payment of high wages to workers in certain professions stimulates the growth of supply of the relevant categories of labor. Demand for the same resources increases, enterprises either buy them in smaller quantities or are replaced by other, relatively cheaper resources. (M. A. Sazhina, G. G. Chibrikov, 2011)

Ever since the earth was inhabited, humans and other life forms have depended on things that exist freely in nature to survive. These things include water (seas and fresh water), land, soils, rocks, forests (vegetation), animals (including fish), fossil fuels and minerals. They are called Natural Resources and are based on life on earth.

All the above-mentioned are natural, and they exist in nature. No human created them. We tap into their supply to survive. Natural resources are all connected in a way. Therefore if one is taken away, it will affect the supply or quality of all others. For example, if water is eliminated from an area, the vegetation, soils, and even the air in that area will be affected negatively.(Yermakov Yu.G., Kurakova L.I., Romanova E.P, 1993)

Natural resources are classified based on the genesis and method of use:

- Mineral Resources
- Water
- Land
- Hydropower
- Biological
- Forest
- Recreation
- Fuel
- Agro-climatic

3.2 Mineral Resources

Almost all Earth materials are used by humans for something. We require metals for making machines, sands and gravels for making roads and buildings, sand for making computer chips, limestone and gypsum for making concrete, clays for making ceramics, gold, silver, copper and aluminum for making electric circuits, and diamonds and corundum (sapphire, ruby, emerald) for abrasives and jewelry. Mineral resources can be divided into two major categories - Metallic and Nonmetallic. Metallic resources are things like Gold, Silver, Tin, Copper, Lead, Zinc, Iron, Nickel, Chromium, and Aluminum. Nonmetallic resources are things like sand, gravel, gypsum, halite, Uranium, dimension stone. (Stephen A. Nelson, 2012)

Mineral resources are minerals that are extracted from the bowels of the earth. Under the mineral resources understand the natural mineral substances of the earth's crust, which can be applied on the farm in its natural form and after pre-processing. The use of mineral resources is currently constantly growing, nearly 200 types of mineral raw materials are being used.Mineral raw materials are the main base for the production of industrial products. Every year in the world more than 100 billion tons of various mineral raw materials and fuels are extracted from the depths.

Mineral resources are the recorded reserves of mineral deposits (ore and non-metallic), deposited superficially and in the waters of lakes, seas (salt, placers) used by the national economy.

Among the ore minerals distinguish ore:

1.ferrous metals (iron, manganese, chromium, titanium, vanadium);

2.non-ferrous metals (copper, tin, aluminum, zinc, tungsten, molybdenum, lead, cobalt, nickel);

3.noble metals (gold, platinum, silver);

4.radioactive metals (radium, uranium, thorium).

Ore deposits are complex, they contain useful components of several minerals.

Non-metallic minerals are non-combustible and non-metallic hard rocks and minerals, including:

1.construction materials (clay, sand, gravel, chalk, limestone, marble);

2.chemical raw materials (sulfur, apatite, phosphorite, potassium salts);

3.metallurgical raw materials (asbestos, quartz, refractory clays);

4.precious and ornamental stones (diamond, ruby, jasper, malachite, crystal, etc.).

The distribution of mineral resources on the planet is associated with differences in tectonic processes and the conditions of their formation in previous geological epochs. The ancient mountains are richer in minerals. In the mountains and ancient shields on the continents are ore minerals. In sedimentary rocks of foothill troughs and platforms, in intermountain depressions there are deposits of oil, natural gas, and coal.

Large reserves of iron ore are concentrated in the United States, Russia, India, China, Latin America. Large stocks of aluminum raw materials are located in France, USA, India, Russia, and lead-zinc - in Canada, Australia, USA.

The main share of world coal resources is concentrated in North America, Europe and Asia, the largest coal basins are in Russia, the USA, and Germany.

Oil and gas resources are mainly concentrated in North America, Asia and Africa.

Changes in the geography of production and consumption of raw materials, price dynamics on the world market have a significant impact on the socio-economic situation in individual countries. The reserves are quite dynamic, their sizes change in the process of the development of science and technology, in the exploration and development of all new mineral deposits, their rational use. Found large reserves of manganese, iron, cobalt, copper and other minerals at the bottom of the oceans.(N. Burkhanova, 2010)

3.3 Water resources

Water is perhaps the only natural resource that affects all aspects of human civilization: from agricultural and industrial development to the cultural and religious values of society. (Koïchiro Matsuura, 2002)

In the economic evaluation of any kind of resources usually proceed from their quantitative evaluation. The qualitative characteristics of resources are taken into account when analyzing the use of a given resource in a particular area of its application, since each area of application imposes specific requirements on the quality of the resource used. Water resources are no exception. Under the water resources refers to the amount of water in nature (on Earth), suitable for use in human life. Water is one of the most common substances in nature and its reserves are practically inexhaustible, since water in general refers to renewable resources, being in constant circulation and moving from one state to another. Virtually all the water on the planet is used by mankind for one purpose or another. But most of the water is used without removing it from nature (shipping, hydropower, timber rafting, aquaculture, etc.). Therefore, more specific ideas about water resources are made up of their total volume in nature and renewable reserves in the process of water circulation. The question naturally arises about the total reserves (or total volumes) of water on earth.

If this data is translated into percentages, you get the following picture:
-the salt waters of the oceans and seas, which occupy more than 70% of the Earth's surface, make up 97.2% of all the waters of the Earth;
-fresh water, respectively, only 2.8%;
-of these 2.8%, about 2.2% are glaciers;
-liquid water makes up 0.6% of the total volume of fresh water on Earth;
-of these, 98% are concentrated underground.
(Great Soviet Encyclopedia, 1971)

Water resources suitable for satisfying the physiological and production needs of mankind directly constitute a tiny fraction of the total amount of water on earth. In practice, these are surface (river) and groundwater, renewed in the process of water circulation in nature, which forms the water balance of the Earth. Today in the reference literature, the water balance of

the Earth is presented as follows:
Precipitation - 525,100 cu. km., evaporation - 525 100 cu. km;
75% of precipitation falls in the ocean, 25% - on land;
of these 25%, only 1/3 flows into rivers or seeps into the ground, the rest evaporate. In absolute figures, 113,500 cubic meters of land fall annually. km of precipitation, of which river runoff is 44,230 cubic meters. km, the rest evaporate. Together with groundwater, the volume of which is more difficult to measure, only about 0.03% of water is available for consumption out of the total amount of water on Earth, for consumption. Today, only this part can be considered as water resources. Despite the scanty share in the total volume of water, in absolute terms, for every inhabitant of the Earth there are about 6,300 cubic meters. m renewable water resources. With the current needs of this volume of water is enough to meet all domestic and industrial needs of mankind.

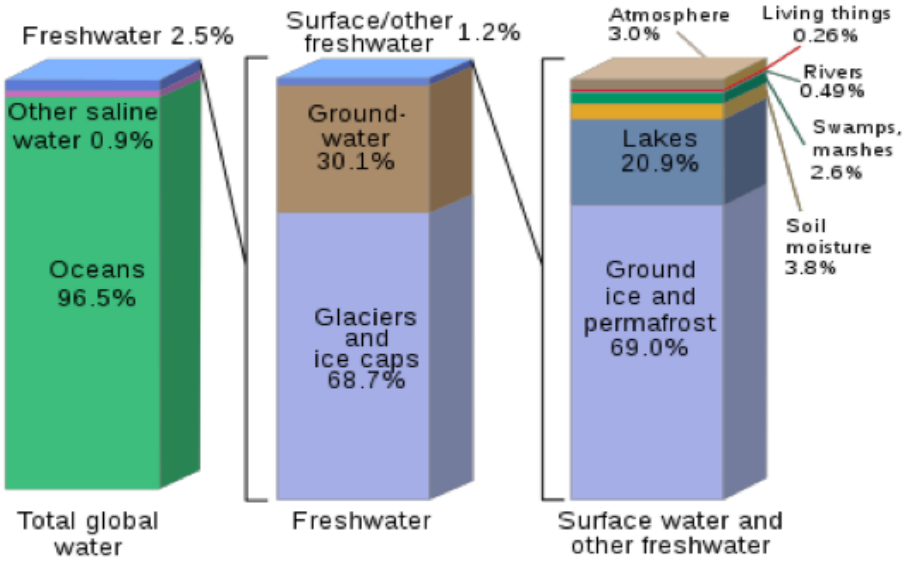
It can be stated that the current fears of mankind about water resources are connected, as well as with many natural resources, not so much with their absolute shortage as with their uneven distribution in time and space, as well as with the structure and methods of water consumption. The most wetted part of the world is South America (445 mm. River flow per year), and the least wetted - Africa (139 mm. River flow per year). But for practical purposes, records are kept for countries and regions of the world. The top ten with the highest annual volume of renewable water resources for 2001-2010.: Brazil, Russia, Canada, Usa, Indonesia, China, Colombia, Peru, India, DR Congo

There are countries where surface runoff is practically absent, such as Kuwait, the United Arab Emirates, Qatar, Oman, etc. If it were not for the property of water to flow across borders, life in such countries would be impossible. Almost all the major rivers on Earth are trans boundary, that is, it flows through at least two countries. The basins of such rivers are called international. The absolute majority of modern international water problems are connected precisely with the use of resources of international river basins. Countries have to calculate the “own” resources generated on their territory, and the resources “supplied” from the outside, that is, the flow from a foreign territory. It turns out a kind of natural "export and import" of water resources. (A.B. Lihacheva, 2013)

There are over 260 river catchments in the world that are international. 71 of them are in

Europe, 53 - in Asia, 39 - in North and Central America, 38 - in South America, 60 - in Africa. In about 50 countries, at least 75% of the territory is located within international river basins. More than 40% of the world's population lives in the catchments of international rivers. Over the past 50 years, more than 500 international conflicts have occurred over the division of freshwater. Unfortunately, one of the most conflict-prone regions in the world is our Central Asian region. (Great Soviet Encyclopedia, 1971)

Figure 1: Locations of water on Earth



Source: Igor Shiklomanov's 1993, Oxford University Press, New York

3.4 Land resources

Land resources are among such natural resources, without which human life is unthinkable. Land resources on the planet as much as sushi.

Land resources are the earth's surface, which is suitable for human habitation, construction and other types of economic activity. Land resources are characterized by relief, soil cover and a complex of other natural conditions. The structure of the land fund is a characteristic of land resources. The land fund is the ratio of the areas that are used for sowing crops, forests, pastures, industrial enterprises, etc.

Land resources and the soil cover of the Earth were created for thousands of years - it is the basis of wildlife and agricultural production.

A third of the land fund of the planet is agricultural land, that is, land used for food production. About 3/4 of all the soil resources of the planet have a reduced productivity due to insufficient provision of heat and moisture

.

Agricultural land is arable land, perennial plantings, natural meadows and pastures.

The land fund consists of uncomfortable lands (deserts, high mountains). The structure of the land fund: cultivated land - 11%, pastures and meadows - from 23 to 25%, forests and shrubs - 31%, human settlements - 2%, and the rest of the territory is occupied by unproductive and unproductive land (mountains, swamps, glaciers, deserts) . Cultivated land provides about 88% of the food needed for a person. Humanity is fighting for the expansion of lands that are becoming suitable for agriculture and for habitat. Russia, the USA, Kazakhstan, China, Canada, Brazil are engaged in land development.

Conservation of land resources of the planet is one of the most important tasks of mankind.

Land resources are reduced, as productive land is allotted for mining and construction, destroyed by cities and other settlements, flooded during the construction of reservoirs, etc.

The problem of farming is the degradation of the soil due to improper land use

.

Soil erosion reduces their fertility, damages crops. Inconvenient land in agricultural areas are due to potholes, ravines, ravines.

In connection with the erosion process, 6–7 million hectares of land are eliminated from the world agricultural turnover, and due to salinization, waterlogging - another 1.5 million hectares.

The top fertile soil layer is gradually being depleted.

The process of desertification is the expansion of the area of deserts, their advance on agricultural land. This process is characteristic of many regions of the world. (N. Burkhanova, 2010)

Each continent and each country has its own specificity of land resources and their geography. In our time, land use is very dynamic and the overall picture of the spread of anthropogenic landscapes is constantly changing. Each landscape-geographical zone of the Earth also has a peculiar land use.

The share of cultivated land in Europe abroad accounts for 30% of land resources, and in the European part of Russia about 10%. Soils of deciduous forests of the temperate zone and evergreen forests of subtropics, gray forest soils and steppe chernozems were involved in agricultural use.

Currently, there is a clear trend in the change of land resources of the world, expressed in the onset of urban and rural areas and mining and transport complexes on arable land, which in turn are expanded at the expense of pastures, and the areas of the latter are growing at the expense of forests and deserts. In the USA, for example, 350 thousand hectares of arable land is lost from the expansion of cities. Hence, the constant reduction of forest area on Earth: over the past 300 years, a decrease of more than half. Hence the growth of the desert. (Land resources of the world, 2004)

3.5 Hydropower resources

Hydropower is electricity generated using the energy of moving water. Rain or melted snow, usually originating in hills and mountains, create streams and rivers that eventually run to the ocean. The energy of that moving water can be substantial, as anyone who has been whitewater rafting knows.

Humans have been taking advantage of this source of energy for centuries. Farmers since the ancient Greeks have used water wheels to grind wheat into flour. Placed in a river, a water wheel picks up flowing water in buckets located around the wheel. The kinetic energy of the

flowing river turns the wheel and is converted into mechanical energy that runs the mill.
In the late 19th century, hydropower became a source for generating electricity. The first hydroelectric power plant was built at Niagara Falls in 1879. In 1881, street lamps in the city of Niagara Falls were powered by hydropower. In 1882, the world's first hydroelectric power plant began operating in the United States in Appleton, Wisconsin.

A typical hydro plant is a system with three parts: an electric plant where the electricity is produced, a dam that can be opened or closed to control water flow, and a reservoir where water can be stored. The water behind the dam flows through an intake and pushes against blades in a turbine, causing them to turn. The turbine spins a generator to produce electricity. The amount of electricity that can be generated depends on how far the water drops and how much water moves through the system. The electricity can be transported through long-distance electric lines to homes, factories, and businesses.

Hydroelectric power provides almost one-fifth of the world's electricity. China, Canada, Brazil, the United States, and Russia were the five largest producers of hydropower in 2004. One of the world's largest hydro plants is at Three Gorges on China's Yangtze River. The dam is 1.4 miles (2.3 kilometers) wide and 607 feet (185 meters) high.

Hydropower is the cheapest way to generate electricity today. That's because once a dam has been built and the equipment installed, the energy source—flowing water—is free. It's a clean fuel source that is renewable yearly by snow and rainfall. Hydropower is also readily available; engineers can control the flow of water through the turbines to produce electricity on demand. In addition, reservoirs may offer recreational opportunities, such as swimming and boating. (National Geographic, 2009)

Hydropower is a renewable resource and practically inexhaustible, even under the most pessimistic climate change scenarios on the planet. It has a minimal impact on the environment and therefore is one of the cleanest sources of energy. But along with these positive properties, hydropower has some features that to a certain extent are its drawbacks.
First of all, hydropower, in contrast to oil, gas and even coal, is not a universal resource - its use is tied to the zone of its formation – rivers.

A significant drawback of hydropower as an energy resource is its variability. Even in the mid-year section, the flow of water in rivers varies by more than two times, and daily in the dozens of times.

All this shows that hydropower has rather limited capabilities as an independent resource. To the full, its advantages are manifested only in cooperation with other energy resources, primarily with thermal energy. A serious problem of hydropower is that its energy resource, water, is also used in other sectors: the domestic sector, industry, and especially, in irrigated agriculture, where recently there has been an ever-increasing shortage of water.

Thus, both positive and negative properties of hydropower clearly indicate the feasibility, usefulness and even the need for its cooperation, both with other types of energy and other sectors of the economy (G.N. Petrov, 2009)

3.6 Biological resources

The most important component of the human environment are natural resources. These are plants, animals, fungi, algae, bacteria, and their aggregates — communities and ecosystems (forests, meadows, aquatic ecosystems, swamps, etc.). Biological resources also include organisms cultivated by man: cultivated plants, domestic animals, strains of bacteria and fungi used in industry and agriculture.

Thus, biological resources are natural sources of obtaining material goods necessary for man (food, raw materials for industry, material for selection of cultivated plants, farm animals, microorganisms, for recreational use).

Bioresources is a living substance of the Earth, mainly - flora and fauna. For assessing bioresources at the most general level, the most commonly used concepts are:

-Biomass - the mass of all living organisms;
- Phytomass - the total mass of plants;
- Zoomass - the total mass of animals;
-Bioproductivity - the increase in biomass per unit of time.

Bio resources are probably the most difficult object to assess. Firstly, bio resources are fundamentally different in terms of utilization, and estimating total biomass in itself gives little information (as opposed, for example, to estimating oil reserves or even hydrocarbons in general) .For example, forest - It is a building material, fuel and at the same time a source of oxygen and the main natural atmosphere cleaner. Finally, it is a resting place, i.e. recreational resource. In addition, in some regions, both in Russia and other countries, the economic importance of hunting, fishing, gathering berries, mushrooms, medicinal herbs, and other trades remains. The habitat continues to feed man.

The biological resources of the World Ocean, primarily fish, are also mainly a source of food. It turns out that 70% of the surface of the Earth occupied by the ocean is dominated by the “primitive”, “appropriating” type of economy, albeit using modern technical means.

Secondly, it is difficult to distinguish between bio-and agro-resources. Expansion of agricultural land can only go at the expense of wildlife - forests, steppes, peatlands. In this case, we consider it as a bioresource in the form in which it is now, or as an agro-resource - potential or already existing.

Now more than a third of the land surface is occupied by agricultural land. Crops can be considered part of the total phytomass of the Earth, and domestic animals - part of its zoomass.

Thirdly, bioresources are renewable and at the same time vulnerable. Their volume is variable and depends on many factors. In addition, the ratio of volume and productivity for different types of bioresources differs dramatically. Therefore, for economic activity, “interesting” biomass is only in relation to its quality, possible use, and growth rate. (G.N. Golubev, 2002)

3.7 Forest resources

World forest resources are characterized primarily by indicators of forest cover, forest area and standing timber.

The forest area indicator reflects the size of the area covered by forests, including per capita. Forest cover shows the ratio of the forest area to the total territory of the country. The stock of standing timber is usually determined by multiplying the average amount of wood (in cubic meters) from 1 m2 to the area occupied by forests.

Worldwide, forest covered areas reach 40.1 million km2 (including 25-28 million km2 of the forests most suitable for exploitation), Russia — 8.1, Brazil — 3.2, Canada — 2.6, United States - 2.0 million km2. But over the past 200 years, the forest area on earth has decreased by about half. The area of forests from I960 to 1990 decreased by 13%, and the tropical forests of Asia suffered the most. The forests of the Asian part of Russia, Canada, the Amazon and Congo river basins remained relatively intact. Total standing timber reserves in all forests of the world are 340–370 billion m3. Russia ranks first in the world in terms of wood reserves (23% of world reserves).

According to various estimates, the annual current increment of wood, which determines the possibilities for the exploitation of forests without undermining their reproduction, is 3.6 billion to 5.5 billion m \ but in the available developed forests it is only 1.8 billion M3. In the mid-90s. the volume of logging amounted to 3.4 billion m3 per year (in I960, 1.9 billion m3). Thus, the volume of logging approached the annual growth of wood. The development of logging depends not only on the available timber reserves, but also on the quality of forest management.

Despite the seemingly huge reserves of wood in Russia, North America, Northern Europe and South America, the possibilities of extensive exploitation of forest resources are currently close to exhaustion. Therefore, to meet both the needs of the economy and the requirements for nature conservation is possible only by moving to resource-saving technologies in the forest complex of the world economy.(A. Bulatov, 2003)

3.8 Recreational resources

Recreational uses of an area for the purposes of this Environmental Impact Statement (EIS) may include any type of outdoor activity in which area residents, visitors, or tourists may participate. Typically (though not exclusively) focused on weekends or vacation periods, such activities may include hiking, fishing, beachcombing, spelunking, and boating.

Recreational opportunities and resources can be a very important component of an area's economy and the lifestyle of its residents. Recreational resources analyzed in this chapter are primarily assets pertaining to the physical geography of Guam, from the mountains to the oceans, and terrains in between; there are various man-made recreational resources in urban and semi-rural settings as well. Recreational resources have been organized into the following categories with similar uses grouped in parentheses: trails (pedestrian hikes, mountain bike trails, "boonie stomping," or hiking through "boonies" of large areas of undeveloped forests and beaches); historic and cultural attractions (historic monuments, parks, and cultural sites); scenic points (vistas, lookouts, and overlooks); dive spots (snorkeling, self contained underwater breathing apparatus, or SCUBA diving, and free diving); beaches and parks (also including conservation areas, preserves, and refuges); spelunking, or cave exploration; fishing; and others (golf courses, hunting, sailing, resorts offering day uses, and marine activities not listed above, etc.). However, a particular resource may provide several recreational opportunities. For instance, a resource organized under trail may offer hiking as well as swimming, snorkeling, and picnicking at the trail terminus. Due to the volume of recreational resources available on the island of Guam, lists and descriptions are provided in Volume 9, Appendix G, Recreational Resources. Many of Guam's recreational resources are managed by the Guam Department of Parks and Recreation (GDPR), which administers approximately 70 public parks and recreational facilities, including beach parks, community parks, skate parks, historic parks, baseball fields, a baseball stadium, a sports complex, tennis courts and a public pool. All other community centers and parks fall under the 19 village mayors on the island, who work closely with GDPR. GDPR also runs sports leagues and provides swimming and tennis lessons among others. (M.Corps, 2010)

3.9 Fuel resources

Fuel minerals are of sedimentary origin. Therefore, their deposits are often located on the flat areas of our planet. The most important types of energy raw materials are oil, gas and coal.

To say that oil is the most important type of fuel is not enough. On the basis of oil synthetic

rubber, plastics, synthetic fibers are made. Therefore, oil is also an extremely valuable chemical raw material.

Oil and natural gas occur in marine environments. Currently, almost a third of the world's oil and gas is extracted from the seabed, and this proportion is gradually increasing. Due to this, oil has grown by about 25% over the past ten years.

Oil is a fairly common mineral. It is mined on all continents, in all parts of the globe. However, the demand for oil is very high. That is why oil is produced in huge quantities. As a result, the world's oil supply is not so great. According to some calculations, it does not exceed 50 years.

The largest oil reserves are concentrated in Asia. The world's largest oil basins are in the Persian Gulf, where Saudi Arabia, Kuwait, Iraq, Iran, and the United Arab Emirates produce oil, as well as the region of the West Siberian Lowland. These two largest basins are complemented by deposits in China, Indonesia and the Caspian littoral states.

Natural gas is akin to petroleum origin. Therefore, very often gas fields are adjacent to oil fields. Thus, the distribution of gas fields throughout the world largely repeats the distribution of oil fields. Gas reserves are depleted much less than oil reserves. Therefore, the resource availability of this type of fuel is much higher and is estimated at approximately 100 years.

Coal is a mineral of sedimentary origin. In contrast to oil and gas, coal accumulation occurs on land. All coal deposits are located at a considerable distance from the shores of the seas, and even in the mountains. The largest coal basins of the world are the Tungussky, Lensky and Kuznetsky - in Russia, the Ruhr - in Germany and Appalachian - in the USA. Huge stocks of this raw material in China, Australia, South Africa.

Coal is a very common mineral. The reserves of coal are extremely large, and the resource supply of the world economy with coal, according to some data, is about 3 thousand years.

In addition to these three types of fuel resources, there are so-called local fuels. These

include peat, lignite and oil shale. The reserves of these minerals are very large, but they have a small heat of combustion and high ash content. Their combustion is accompanied by the release of a large volume of hazardous gases. Therefore, this fuel is used only in areas where there are no other sources of energy. (Natural and social sciences, 2011)

3.10 Agro- climatic resources

Agro-climatic resources are climate properties that make it possible to conduct agricultural production: light, heat, and moisture. These properties largely determine the placement of crop production. The development of plants is favored by sufficient light, warm weather, good moisture.

The most important factor for plant life is air temperature. The main life processes of plants occur in the range from 5 to 30 ° C. The transition of the average daily air temperature through 0 ° C with its increase indicates the beginning of spring, with a decrease - the onset of the cold period. The interval between these dates is a warm period of the year. The frost-free period is a period without frost. Vegetation refers to the period of the year with a stable temperature above 10 ° C. Its duration approximately corresponds to the frost-free period. Of great importance is the sum of the temperatures of the growing season. It characterizes heat resources for crops.

An important condition for plant growth is a sufficient amount of moisture in the soil. The accumulation of moisture depends mainly on the amount of precipitation and their distribution during the year. Rainfall from November to March in most parts of the country falls as snow. The accumulation of them creates snow cover on the soil surface. It provides a reserve of moisture for plant development, protects the soil from freezing. (economic geography , 2014)

4 Analysis of the condition and operation economy in Russian

4.1 Characteristics of the Russian economy

The structure of the Russian economy is dominated by heavy industry, especially

metallurgy, chemistry, engineering and energy. The forest industry is well developed: Russia's forest resources are the largest in the world. Russia also has the world's largest proven reserves of natural gas and the second largest oil reserves. Large deposits of coal in the Republic of Komi, in Eastern Siberia and the Far East. Russia is also rich in iron ore, bauxite, nickel, tin, gold, diamonds, platinum, lead and zinc. Many of these resources are located in Siberia, where long distances, low population, harsh climate and permafrost create significant difficulties for the economically efficient extraction and transportation of raw materials to processing and consumption sites.

Economic areas. Russia is divided into 12 major economic regions: North, North-West, Central, Central Black Earth, Volga-Vyatsky, North Caucasus, Volga, Ural, East Siberian, West Siberian, and Far Eastern.

Oil and gas production is concentrated in Western Siberia, hydroelectric power plants, non-ferrous metallurgy (gold) and the forest industry (other goods) - in Eastern Siberia. In the Far East, mined gold, diamonds, it is famous for fish and seafood. In the Northern region, the main industries are the extraction of coal, oil, gas, apatite, nickel and other metals, as well as logging and fishing. In the North-Western, Central, Volga-Vyatka, Uralsk and Volga regions, mechanical engineering, chemical, light, food industry, energy and services are developed. The Central Chernozem Region and the North Caucasus have a developed agriculture and food industry.

4.1.1 Agriculture.

Russian agriculture, which produces more than one fifth of the country's gross national product, specializes in regions. Three fifths of arable land are sown with wheat, barley, oats and rye. The main producers of grain are the Volga region, the North Caucasus, the Central Black Earth region and Western Siberia. Industrial crops (especially sunflower, sugar beet, flax), vegetables (in the middle zone and in the north west) and melons and gourds (in the south) are also grown.

4.1.2 Transport.

The railway, most of which is located in European Russia, carries three-quarters of all cargo. River and road transport carries about 15% of cargo. In many areas of the North and the Far East, the only mode of transport is aviation. The economic crisis of the late 1990s effectively isolated most of the northern regions from the center, because as a result of poorly developed infrastructure, the state was not able to pay for the transportation of goods.

4.1.3 Export and import of Russia

Russia's foreign trade turnover amounted to a record 821.3 billion US dollars, compared with 2010 it increased by 31.2%, including with non-CIS countries - 698.8 billion dollars (an increase of 30.7%), and with CIS countries - 122.5 billion dollars (an increase of 34.2%).

The trade partners of Russia in 2011 among the far abroad countries were:
- China, with which trade amounted to 83.5 billion US dollars (an increase of 40.8%),
- Germany - 71.8 billion dollars (37.2%),
- The Netherlands - 68.5 billion dollars (17.2%),
- Italy - 46 billion dollars (22.6%),
- Turkey - 31.8 billion dollars (26.3%),
- United States - 31.2 billion dollars (33.3%),
- Japan - 29.7 billion dollars (28.7%),
- France - 28.1 billion dollars (25.2%),
- Poland - 28 billion dollars (35 %%),
- South Korea - 25 billion dollars (40.9%).

The following goods predominate in the structure of Russian exports: fuel and energy - over 70% (coal, fuels, natural gas, oil, gasoline, diesel fuel, electricity); metals (about 10%) - cast iron, ferroalloys, semi-finished products from iron and unalloyed steel, copper, nickel, aluminum; chemical products (about 5%) - organic chemical compounds, potash and mixed fertilizers, plastics, rubber, rubber; machinery and equipment (about 3%); food products (about 2%) - grain, sunflower seeds, vegetable oil.

Russian imports are represented by the following goods: machinery and equipment (over

50%) - electrical equipment, means of land transport; food products and raw materials (about 25%) - butter, tea, sugar, meat, fish, coffee, cocoa, grain, barley, corn; chemical products (over 15%) - varnishes, paints, cosmetics, detergents, rubber.

Russia provides most of the CIS countries' needs for oil and oil products, gas, timber, machinery and equipment. For most neighboring countries, Russia remains the main trading partner.

4.2 The role of natural resources in the Russian economy

The Russian Federation has almost the entire diversity of natural resources. The diversity of natural resources is combined with very large reserves of certain types of them, significant volumes of extraction and use.

This determines the special role of the resource potential of Russia in the global natural resource complex.

The overall role of natural resources in the Russian economy is determined by three major circumstances.

Russia is among the richest in its natural ¾ both renewable and non-renewable ¾ resources of the world. The vast territory (more than 1,700 million g), water resources, mineral reserves (primarily oil, gas, non-ferrous and ferrous metals, building materials) create extremely favorable potential opportunities for economic development. According to the estimates of the State Statistics Committee and the Russian Academy of Sciences, the cost estimate of Russia's resource potential reaches a fantastic amount of 340-380 trillion (!) Dollars.

In terms of land supply - the amount of territory per inhabitant - (11.6 ha / person), the Russian Federation ranks 3rd in the world after Australia and Canada. For agriculture (including reindeer herding), 43% of the land is used. However, due to adverse climatic conditions, arable land in Russia has a low biological productivity. So, in the USA this indicator is 1.87 times higher than in Russia. The largest effective territory of the Russian

Federation ranks 5th after Brazil, the United States, Australia and China.

The Russian Federation is the main storehouse of raw materials in the world: its underground wealth is estimated at 30 trillion. dollars, while the US - at 8, China - 5, the whole of Europe - 0,5. Russia's fields contain over 13% of the world's proven oil reserves, about one-third of gas, 12% of coal, 24% of iron ore, and a significant portion of proven reserves of non-ferrous and rare metals. By the number of proven reserves of gold, platinum and platinum, the Russian Federation ranks second in the world, diamonds and silver - the first. There are large reserves of apatites, potash salts, fluorspar and other non-metallic minerals.

Table 1: Mineral Resource Statement of Russia

Mineral Resource Statement, Talbot Deposit, Manitoba, RPA, January 26, 2016

		Grades				Contained Metal			
Zone	Tonnes (kt)	Cu (%)	Au (g/t)	Zn (%)	Ag (g/t)	Cu (Mlb)	Au (koz)	Zn (Mlb)	Ag (koz)
Talbot Main	1,441.0	3.4	2.6	2.4	61.0	107.0	118.6	76.4	2,827.8
Talbot Main FW	443.9	2.2	2.0	2.4	55.6	22.0	28.5	23.2	793.8
North Lens	283.4	0.7	2.0	1.3	20.6	4.6	18.3	7.9	187.6
Total	2,168.3	2.8	2.4	2.2	54.6	133.6	165.4	107.4	3,809.3

Source: Federal State Statistics Service [online]. [cit. 2016-01-08]. Available from: http://www.gks.ru/

In terms of reserves per capita, Russia also surpasses the world average: in oil - by 5.5 times, natural gas - by 13.5 times, coal - by 4.6 times, iron ore - by 10.7 times. From the depths of industrial production, 9-10% of world oil production, 24% of gas, 20% of nickel and cobalt, 5-7% of coal and iron ores, a significant part of non-ferrous and rare metals, platinum, diamonds, and apatites , potassium salts. Mineral raw materials continues to be the main component of Russian exports, providing about 70% of all foreign exchange earnings of Russia.

The Russian Federation has 20% of the world's reserves of fresh surface and groundwater. River runoff in the Russian Federation is more than 1 thousand km3. However, 90% of this flow falls on the basins of the Arctic and Pacific Oceans and less than 8% - on the basins of the Caspian and Azov seas, where 80% of the Russian population lives and where the main industrial and agricultural potential is concentrated.

Especially important in the natural recreational potential of Russia are specially protected

natural areas.

The Russian Federation has a great tourist potential of recreational resources, which includes unique natural landscapes in all their diversity and uniqueness, historical and cultural monuments, various cities and other settlements. Old Russian cities Vladimir, Suzdal, Sergiyev Posad, Pereslavl-Zalessky, Rostov, Uglich, Yaroslavl, Kostroma and others that belong to the Golden Ring of Russia route can be considered the most visited tourist sites. Also famous routes in the North Caucasus and the Black Sea coast, in the Elbrus region, in the Urals and Altai, as well as in the Khibiny. A unique complex recreational resource of international importance is Lake Baikal.

Figure 2: Lake Baikal

Source: Recreational resources in Russia [online]. Available from: /www.wantseeproject.com/lake-baikal/

Russia is the largest forest power. The index of its forest fund is more than 1 billion hectares. The percentage of forest cover in the whole Russian Federation is 45.3%. In terms of forest security, Russia is ranked 1st in the world, with 22% of the world's forest resources and about 1/5 of the world's timber resources concentrated on its territory. However, only 55% of the forest area is of interest for exploitation. Their predominant part, located in the north of the European part of Russia and along the BAM route, has been significantly depleted as a result of intensive exploitation during the last century

Table 2: Forest resources

Years	Overall land area of forest and other land areas where forests are located, mln. ha	Including forest lands	of them wooded	Total stock timber bln. M3
1992	1180,9	886,5	763,5	80,7
1997	1178,6	882	774,3	81,9
2002	1179	883	776,1	82,1
2009	1183,7	892	797,5	83,5
2010	1183,3	891,8	797,1	83,4
2011	1183,4	891,8	796,8	83,1
2012	1183,5	890,9	795,2	83
2013	1183,4	891,2	795,3	83

Source: E-library [online]. [cit.2016-03-07]. Available from:http://window.edu.ru/

At the same time, Russia is characterized by the preservation of the largest areas in the world with intact (unaffected or poorly affected by economic activity) natural ecosystems. According to various estimates, they occupy from almost 8 to 11 million km2, that is, more than half of the state's territory. Such unique conditions, abundance and diversity of natural components determine the special role of the country's natural-ecological potential in the global natural resource complex. This area is of great value to humanity, since its biotic resources make a significant contribution to the sustainability of the biosphere. This implies both a certain responsibility of Russia before the world community, and well-known rights as a unique territory of the Earth.

Unfortunately, in Russia a significant part of natural resources has not yet been put at the service of production and is not even on its threshold, but is a potential, that is, very uncertain property. Nevertheless, the role of natural resources in the modern economy of the country is exceptionally large, and perhaps even hypertrophied. The fact is that the process of adaptation to the market for resource-extracting industries turned out to be easier than for the processing ones. In conditions of competition with the world's leading manufacturers, it is much easier to sell, for example, oil created by nature than cars. Compared with the pre-

reform era, the so-called weighting of the production structure, i.e., the increase in the value of raw materials industries and the decline in the share of manufacturing, technically complex, high-tech industries. At the same time, the main focus of the use of non-renewable resources was not domestic consumption (it fell sharply during the crisis), but export. (P.Savchenko, 2006)

> Russia's acquisition of sovereignty led to fundamental changes in its economic basis. Having received 76% of the territory of the former USSR, Russia received 62% of basic production assets,

retaining the richest raw material potential. Russia owns the largest in the CIS fund of proven reserves of raw materials. Especially important is the presence of the largest reserves of oil, gas and coal, as well as iron ores, non-ferrous metals and diamonds. Russia is also a full monopolist in the CIS in forest resources, we also have a significant part of energy and water resources. There are also large resources of agricultural land, but they are in a zone of harsh climatic conditions - (risky farming), which does not guarantee a good harvest. The most important factor in strengthening Russia's economic independence is and will be the scientific and technical potential concentrated in its military-industrial complex, which is profiled in civilian production. (V.M. Sokolov, K.K. Waltukh, 2007)

In the national economy of the Russian Federation, resource-exploiting industries dominate, raw materials constitute the bulk of exports, and the revenue part of the state budget is to a decisive extent formed at the expense of mining, not processing industries. Such a situation is highly undesirable, since an economy with a similar structure is overly dependent on external factors, is doomed to a technological lag, its inherent distribution of income inevitably causes dissatisfaction in society, threatening to turn into social protest. In specific Russian circumstances, the commodity orientation of the economy threatens with stagnation to regions with relatively developed infrastructure and favorable climatic conditions, where the bulk of the population is concentrated, but there are no effective reserves of natural resources. However, due to the inertia of economic processes, structural imbalances will remain in the foreseeable future (10–15 years) under any possible scenarios. The tendency to exacerbate these imbalances needs to be reversed and within five to seven years to form the conditions and structures that in the future will ensure the reorientation of the Russian

national economy, its turn towards post-industrial development. The paradox, however, is that the source of funds for the implementation of measures that can provide a turn from commodity specialization to the development of high-tech, information-intensive industries can be primarily commodity industries. Therefore, it is not surprising that in recent years the problem of distribution of natural (natural resource, mining) rent has become the most acutely debated among all economic problems. For a resource-based country, issues of state management of the use of natural resources should be of top priority. These issues are especially aggravated if a public desire arises to carry out a structural economic maneuver, a transition to post-industrial development. Realization of such a goal is inevitably connected with the problem of natural rent, although it is erroneous to believe (and this point of view is not uncommon) that one has only to "figure out" the rent and everything else will immediately fall into place. "Correct", "fair", "optimal" distribution of natural rent, even if we assume that it is achievable, does not solve all the issues of environmental management. Moreover, as in any other area of state activity, there arises the task of reconciling various interests (including multidirectional components of state interest), and attempts to cope with this task exclusively through the redistribution of natural rent only harm the cause.

The problem is analyzed, for the most part, in relation to mineral resources, and to a lesser extent, water resources. Appeals to land, forest and other biological resources, for which the rent problem is relatively clear, are mainly aimed at comparing with or opposing mineral and water resources. (I. Gorbachevsky, 2002)

4.3 The gas and oil sectors as a key role in Russian Economy

Oil and natural gas have been a key part of the Russian economy for decades, even though Russia is, strictly speaking, not an oil state. It is difficult to assess accurately the importance of oil and natural gas for the Russian economy but, according to the latest estimates, oil and natural gas have accounted for approximately one fifth of Russia's GDP1 in the 2000s. They have accounted for nearly 30% of consolidated budget revenue and over half of export revenue. The largest Russian companies operate in the oil and gas sector, and their weighting in the Russian stock market index amounts to more than half. Both the Russian stock market and the ruble exchange rate therefore closely follow the development of the oil price. From a labour market perspective, the significance of the oil and gas sector is, in

contrast, small: production and transport of oil and gas as well as the oil refining industry employ approximately one million people in Russia, i.e. 1.5% of the employed.(M. Dulaev, 2015)

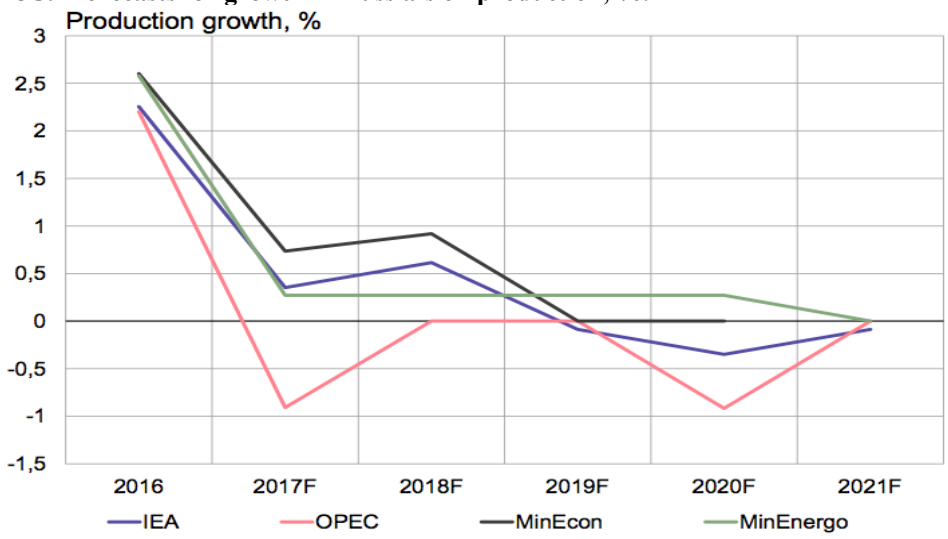
4.3.1 Oil production

Russia's oil production during the last decade has grown on average at an annual rate of one per cent. Growth has slowed markedly compared to the first years of the millennium, as the production of the traditional largest fields in Western Siberia has begun to decline. The introduction of new fields in the Russian Far East, Eastern Siberia and the Arctic region has replaced the production of the traditional fields, but this has not been sufficient to maintain the previous growth rate. Investment in new production has been constrained by, among other things, high taxation of oil production and exports as well as the higher political risks associated with the sector following the Yukos case in the early 2000s.

Russia's oil production is dominated by 11 vertically integrated companies, whose share of oil production is nearly 90%. The largest of them is majority state-owned Rosneft, whose share of oil production has grown significantly in recent years through the acquisition of other companies in the sector. Including its most recent acquisition, Bashneft, Rosneft accounted for nearly half of Russia's oil production last year. In addition, nearly 200 smaller companies operate in the oil production sector as well as three foreign companies within the framework of production-sharing agreements.

Most experts, both international and Russian, have for a long time now expected the country's oil production to begin to decline, so the continuation and even an acceleration of growth in last couple of years has come as a surprise to many of them. The decline in production of the traditional fields has been contained by better-than-expected improvements in production efficiency, and replacement production has been obtained from new fields more quickly than expected. Most forecasts, however, still expect production growth to at least level off in the next few years and for production even to decline

Figure 3: Forecasts for growth in Russia's oil production, %.



Sources: IEA Oil Market Report 2017, OPEC World Oil Outlook 2016, April 2017

Economic forecast of the Ministry of Economic Development of Russia, draft energy strategy up to 2035 of the Ministry of Energy of Russia.

It is expected that it will be possible to improve further the production efficiency of traditional fields, but this will become increasingly difficult and expensive, so investment would have to be increased. Production of many of the newer large fields is estimated to have already reached its peak level, so they, too, will no longer be able to maintain growth in the coming years. Completely new fields will be continually developed, but bringing them on-stream will take time and require investment. In recent years, the investment required to maintain growth has been limited by the decline oil prices, greater difficulty in obtaining financing, and the Western sanctions, which restrict the scope for purchasing the technology needed in oil production from abroad. The sharp weakening in the ruble, however, has significantly softened the impact of the decline in oil prices on Russian oil companies. In recent years, too, investment in oil and gas production has increased at a reasonably brisk annual rate of just over 10% (nominally), but due to high inflation the real growth of investment has been modest.

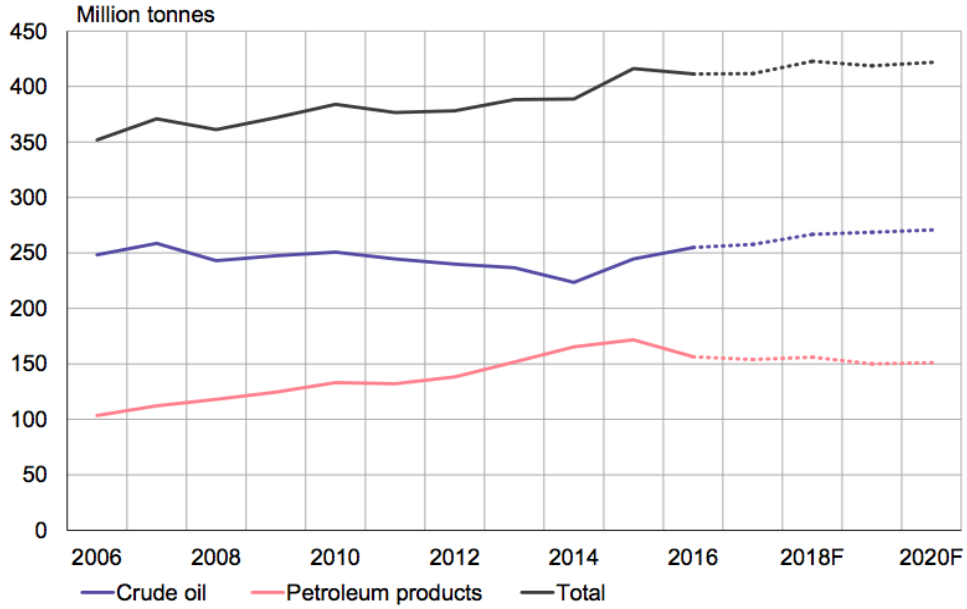
Slightly more than half of Russia's crude oil is domestically refined and the rest is exported. In the 2000s, the proportion of domestically refined crude oil gradually increased as output of refined petroleum products grew – that is until recent years, when the trend has been reversed. Of refined petroleum products, gasoline production has been supported

particularly by growth in domestic demand, because gasoline production goes mainly to domestic consumption. Unlike in many other oil producing countries, in Russia the consumer price of gasoline and other petroleum products is not subsidised nor regulated administratively; on the contrary, they are taxed relatively heavily. For example, in a Bloomberg international comparison, the price of gasoline in Russia was among the lowest at the end of last year, but relative to average income it was significantly higher than in most European countries (including Finland).

An effort is also made to control the structure of oil sector production through taxation. In the early 2000s, the goal was to increase domestic refining as well as the share of refined products in exports instead of crude oil. The goal succeeded, in principle, because exports of crude oil declined and exports of petroleum products grew. Refined products produced for export were, however, mainly very low added value products, and the price obtained for them could be even lower than for crude oil exports.

During the last couple of years, production and exports of low added value petroleum products have begun to decline significantly, whereas exports of crude oil have increased. During the past decade, the combined volume of Russia's crude oil and petroleum products exports has grown by just under 2% per year, while the export trends for crude oil and petroleum products individually have been mainly in opposing directions

Figure 4 : Russia's exports of crude oil and petroleum products

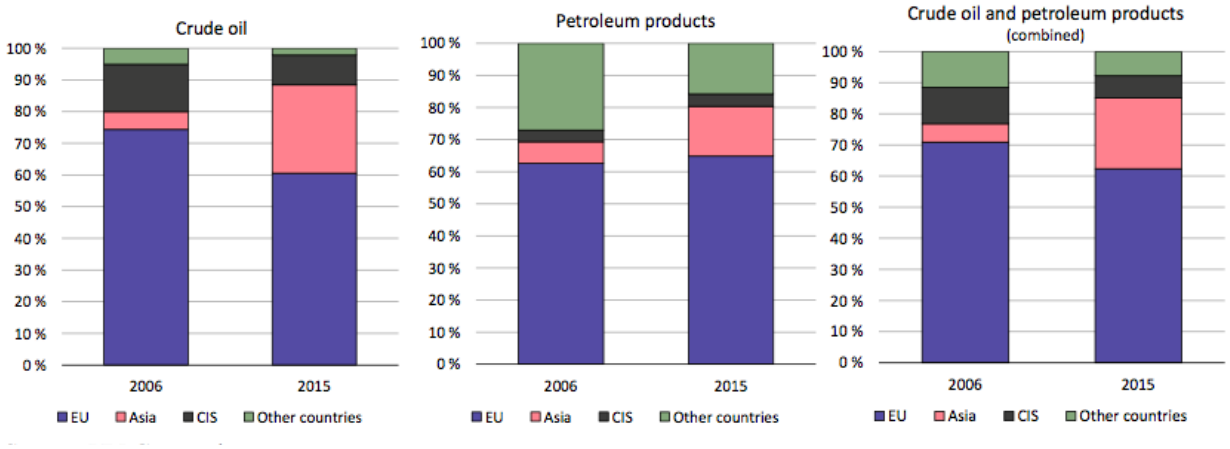


Sources: Central Bank of Russia, Ministry of Economic Development of Russia (forecast).

In the next few years, Russia's oil exports are expected to increase moderately at best, as output growth is limited, and domestic demand is gradually increasing as the economy recovers from the recession of recent years.

Geographically, there have been significant changes in Russian oil exports over the last decade. The proportion of crude oil exports accounted for by EU and CIS countries has markedly declined, while the proportion going to Asia has correspondingly increased (Figure 3). Changes in exports of petroleum products have been smaller. Here, too, Asia's share has grown, while the shares of EU and CIS countries have remained nearly unchanged. The EU, however, remains Russia's largest oil export market, accounting for just over 60% in exports of both crude oil and petroleum products. Russia's share of the EU-28's combined crude oil imports (from outside the EU) has, on the other hand, remained at around a third throughout the past decade, and in imports of oil products it has fluctuated between 40% and 50% annually.

Figure 4: Russia's crude oil and petroleum products exports by region in 2006 and 2015



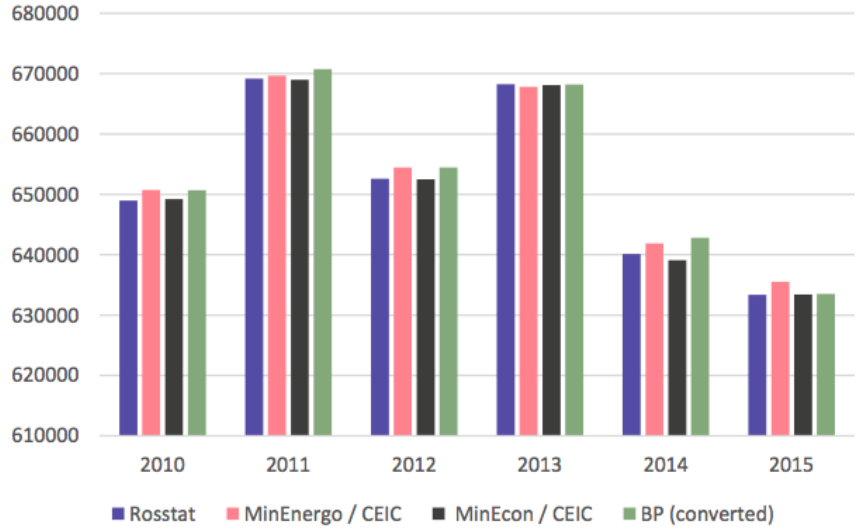
Source: UN Comtrade

There are many factors behind the change in the geographical structure of exports. Oil demand has grown significantly faster in Asia (particularly in China) than in Europe. Russia's new oil production regions are located mainly in Eastern Siberia and the Russian Far East, so it is significantly less expensive to transport their production to the closer Asian market. With the onset of production from the new oil fields, Russia has also built the transport infrastructure necessary for this, particularly the Eastern Siberia Pacific Ocean (ESPO) pipeline, which was commissioned in 2009. Through the pipeline, oil produced in Eastern Siberia can be transported to the Port of Kozmino for forward shipment as well as directly to China via a branch pipeline. After the opening of the China branch, Russian oil exports to China have multiplied, and China has become one of Russia's most important oil export markets. Due to the same factors, Asia's share of Russian oil exports is likely to continue growing gradually in the coming years. (H.Simola, L.Solanko, 2017)

4.3.2 Gas production

Publicly available statistics on Russia's gas production are generated by at least three bodies: the Federal State Statistics Service (Rosstat), the Ministry of Energy and the Ministry of Economic Development. The figures they produce are approximately the same on an annual basis, but the monthly variation between the different sources can be very large. All the same, Russia's gas production in 2015 was approximately 630 billion m3 and in 2016, according to provisional data, significantly higher, approximately 640 billion m3.

Figure 5: Russia's gas production 2010-2015. million m3 (Russian unit of measurement)

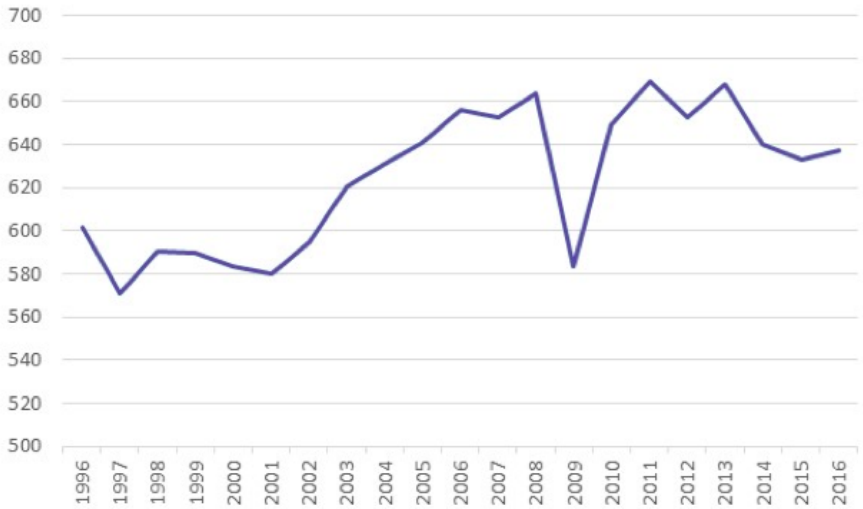


The figures include both natural gas as well as associated gas generated and captured in oil production, but not liquefied natural gas production.

Source：UN Comtrade

Because gas storage capacity is limited, fluctuations in gas production follow changes in demand. In the early 1990s, gas production declined to nearly half of its 1990 peak level. Output growth began as the economy recovered, and in 1999–2009 gas production grew by around 2% annually. Production growth was mainly based on more efficient utilisation of the giant fields of the Yamal region, which had been opened in Soviet times. Since the global financial crisis, growth of demand both domestically and abroad has been very volatile. As production at the old giant fields declines, new production areas have been brought on-stream, the largest being the Bovanenkovo field, where production began in 2012.

Figure 6: Russia's gas production 1996-2016. billion m3 (Russian unit of measurement)



The figures include natural gas and associated gas production. The associated gas share of total production has grown in the period under examination from 4% to 13%.

Source: Rosstat

In 2014–2015, demand again fell sharply both domestically, due to an economic downturn, and in one key export market (Ukraine), due to political problems and price competition. Last year's production growth, on the other hand, is explained by increased demand, particularly in the EU countries. Estimates of Russia's current production capacity vary, but generally it is considered that production growth is constrained by lack of demand rather than production capacity.

Gas production is by no means the monopoly of one producer; according to a Ministry of Energy listing, around 230 companies are engaged in gas production. The gas giant Gazprom's dominant positions is undeniable, however. In 2015, Gazprom accounted for around two-thirds of the country's gas production. The Russian oil companies (e.g. Rosneft and Lukoil) accounted for around 18%, the private gas producer Novatek for around 8% and other gas producers for a total of around 10% of Russia's gas production.

Gazprom's share of production has, however, declined significantly in recent years. Until 2009, Gazprom's share was around 85%, but thereafter this has declined steadily from around 80% in 2009 to around 64% in 2016. Gazprom has become a swing producer, adjusting its output according to fluctuations in demand. Since 2009, Gazprom's production has been limited by a decline in export demand and greater domestic competition for

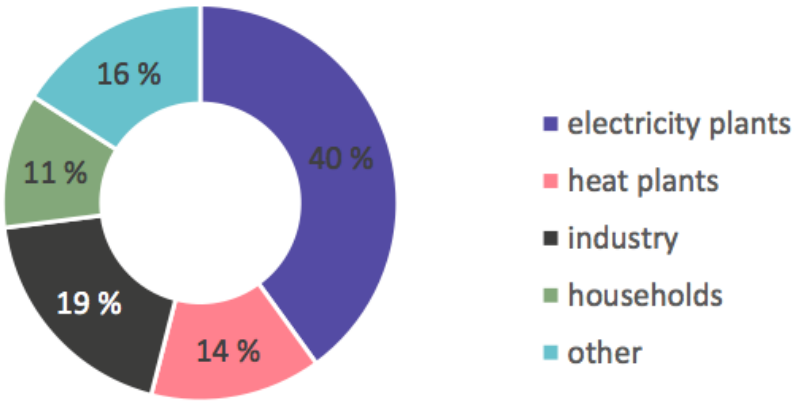
business customers.

Until the global financial crisis, Gazprom imported nearly 60 billion m3 of gas annually from the Central Asian republics. Since then, import volumes have declined, and in 2009–2013 approximately 30 billion m3 of gas was imported annually (IEA 2014). Gas imports from Turkmenistan have fallen steadily, and have ceased almost entirely from early 2016 onwards. In 2015, Gazprom still purchased 22 billion m3 of gas from Kazakhstan, Uzbekistan and Turkmenistan, of which 3 billion m3 went to customers in Kazakhstan and 19 billion m3 in exports to "far abroad countries", namely outside the former Soviet Union.12

There are many factors behind the decline in imports. Traditionally, natural gas purchased from Central Asia has largely been re-exported, particularly to Ukraine and the EU market. A decline in consumption after the global financial crisis (particularly in the CIS countries), growth of Russia's own gas production and an increase in the price of Central Asian gas have all contributed to reducing interest in purchasing gas from elsewhere.

Approximately two-thirds of Russia's natural gas production is consumed domestically. Natural gas is the main fuel for power generation in Russia's thermal power plants, and around half of Russia's electricity production is generated from natural gas. Heat and power generation accounts for over half of total domestic consumption. The industrial sector, mainly the chemical industry, and raw materials use represent almost 20% of domestic consumption. Households' share in gas consumption is small, only around 10% of the total .

Figure 7: Natural gas consumption by sector, percentage



Source：IEA, 2014.

Russia’s gas transmission system is owned and operated by Gazprom. During the last fifteen years, the domestic natural gas pipeline network has been expanded so that it now covers 70% of all cities and nearly 60% of the rural population centres. Expansion of the distribution network has certainly brought new users, but has not increased overall consumption.

Natural gas is a special type of product, since its transportation requires a separate infrastructure (pipelines or plants for liquefaction and gasification), its storage is extremely difficult, and trade, as a rule, is carried out under very lengthy supply contracts. For these reasons, there is no real gas price in the global market. The price of gas in different countries and continents varies widely, and the price is based on various types of calculation formulas. Consequently, this is not a feature of the Russian gas trade.

In Russia, export of pipeline gas is a state monopoly, which is controlled by Gazprom. Only export of liquefied natural gas (LNG) from Sakhalin bypasses the network of Gazprom’s export pipelines. In particular, the private gas company Novatek and the oil giant Rosneft have loudly demanded the dismantling of the export monopoly, but so far no progress has been made on this issue. Although the development of internal competition is welcome, decision makers want to avoid a situation where Russian gas suppliers compete with each other in the international market. Since Russia is the world's largest gas exporter, full export liberalization can lead to serious price changes in both European and Asian markets.

All Russian export gas pipelines run from east to west; mainly from Western Siberia to Central Europe and Turkey. The vast majority of the pipeline carrying capacity (the Soyuz and Urengoy-Uzhgorod pipelines) pass through Ukraine and Slovakia in the direction of Western Europe. The EU market is also served by Nord Stream, which began operations in 2012, and the Yamal-Europe pipeline, which opened in 2006. The total annual capacity of these three routes is more than 200 billion M3, i.e. significantly more than gas exports to the EU. country. In addition, Turkey is serviced by the Blue Stream pipeline, whose capacity is less than the annual export of Gazprom to Turkey. Therefore, part of the export to Turkey passes through Ukraine.(H.Simola, L.Solanko, 2017)

Table 3: Gazprom's export pipelines to the EU countries and Turkey, design capacity, m3annualy

	Capacity, billion m^3
Blue Stream (to Turkey)	16
Nord Stream (to Germany)	55
Ukraine-Slovakia*	100
Ukraine/Romania*	19
Yamal-Europe (via Belarus)	33
Total	223

** In some sources, the combined capacity of the Urengoy-Uzhgorod (Brotherhood) and Soyuz pipelines is reported to be 140–160 billion m^3. In terms of the available capacity of the pipelines, there are also estimates that are significantly lower this.*

Sources: Gazpromexport, Gazprom, Pirani and Yafimaya (2016)

4.4 Prospects for the development of the Russian economy

Analysis of the economic potential of natural resources, the state of fixed assets and the technologies used in the mining complex gives reason to draw some conclusion about the significance and place of the natural resource complex in the structure of the country's economic development:

1. Natural resource potential is an important potential for the economic development of the country.
2. Comprehensive assistance to the development of the domestic processing industry on the basis of the mining complex is the main reserve for the transformation of Russia in the relatively near future into a leading economic state with a high standard of living for the majority of the population.
3. The development of the mining complex should be regulated by the state by purely market methods, and the state should in every way promote the development of the processing industry on the basis of the mining complex.
4. The condition of fixed assets and applied technologies of the country's extractive complex with the richest reserves of natural resources is such that in the coming years they can not provide additional significant financial revenues to the country's budget for large public investments in their own processing industry.
5. Due to the low share of labor in the cost of raw materials extracted and the relatively high cost of a workplace in the extractive industries, raw materials cannot be the basis for raising the living standards of the majority of the country's population.

The sustainable development of the Russian economy in the coming years should be based on the planned growth of its components and, above all, at the expense of the natural

resource potential.

The potential value of the balance reserves of mineral resources in Russia allows us to consider the natural resource complex as the basis of the country's sustainable development for the long term. The presence of a large natural resource potential of Russia determines its special place among industrialized countries. Resource potential with its effective use will be one of the most important prerequisites for Russia's sustainable entry into the world economy.

The Russian natural resource complex plays an important role in all spheres of the state’s life activity: provides a sustainable supply of industries with natural resources. It is the development of the raw materials industry that contributes to the formation of a solid industrial base, which is able to satisfy the necessary needs of both industry and agriculture.

It makes a significant contribution to the formation of a profitable part of the country's budget; its products continue to be the main source of foreign exchange earnings.

Promotes the development of integration processes between countries. Mutual addition of states, within the framework of a single economic space, will ensure the possession of almost all types of minerals, which will have a very large impact on the global commodity market.

The strategic factor of economic growth in Russia in the near future should be a restructuring of the national economy based on the country's available natural resources in order to significantly improve its efficiency. (I.K Larionov, 2017)

5 Conclusion

Going to the conclusion of my work, I would like to say that in any case, natural resources are not infinite and not eternal. This necessitates constant concern for their preservation and reproduction.

For this there are the following basic conditions.

- Firstly, it is necessary to carefully and rationally use what nature gives to man (especially with regard to irreplaceable resources).
- Secondly, where it is available, it is necessary to take effective measures to replenish natural resources (restore and increase the natural fertility of the land, plan the forests, reproduce the reserves of water bodies).
- Thirdly, it is necessary to make maximum use of secondary raw materials and other production wastes.
- Fourthly, it is necessary to fully maintain the ecological purity of production and environmental management.

As a final general conclusion, it should be noted that the existing socio-economic prerequisites, as well as the strategy for Russia's exit from a deep crisis and the acquisition of its former power on a qualitatively new basis indicate that the state's natural resource potential remains a major factor in the development of the state in the near future. The speed of overcoming the crisis in the country, the creation of the material and technical base for the production of high-tech products, including durable goods, depend on the level of rationality, thoughtful responsibility and the scale of using the potential of natural wealth. Solving the food problem, including ensuring the state security of Russia in the field of food; changes in the structure of foreign trade, corresponding to the trade in the developed countries of the world the solution of many social problems and a number of factors determining the future of the Russian Federation.

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