International environmental indicators of sustainable development within Russian energy companies (using the example of PJSC Inter RAO)

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Abstract. In this paper, we consider the problems of implementing the principles of sustainable development, which in recent years have been actively implemented in developed countries and adopted by international ESG rating agencies into the scope of business activity of Russian companies within the fuel and energy sector (hereinafter referred to as energy companies). The paper also analyzes the potential positive effects that the implementation of energy conservation programs has on the ecological, economic, and the social aspects of the energy companies.

1. Introduction

Today, the International community has already recognized the need to care for the environment. One of the main ways to conserve resources and inflict less damage to the environment is the transition to renewable energy sources and the conservation of energy in general.

In Europe and the USA, environmental standards have been developed based on a regulatory and legal requirements such as (Carbon Disclosure Project (CDP) [1], Task Force on Financial related Disclosure (TCFD) [2] and Sustainability Accounting Standards Board (SASB) [3]’, which determine trends and requirements for socially oriented investors, in turn, broadcasting them to Russian companies. The global capital and investment market determines the need for public companies to comply with such requirements.

The purpose of this article is to provide an overview of the current level of compliance of Russian energy companies with these international standards, highlighting current issues in this area and to suggest a possible development path based on the ongoing example of the success of PJSC Inter RAO.
2. What is sustainable development?

2.1 Definition and objectives

The definition of sustainable development first appeared in the report of the UN Commission on Environment and Development, which was published in 1987. The commission was led by Gro Harlem Bruntland, a political and public figure from Norway, who made a significant contribution in promoting the idea of sustainable development and the international cooperation in order to achieve it. [4]

One of the main ideas of sustainable development is that human development should not go against and infringe on the interests of future generations. Sustainable development is development that takes into account the interests and optimality of the use of limited resources and the use of eco-friendly - environmental, energy, and material-saving technologies. It is also an incentive for innovation and new opportunities that create long-term value for business and society. Sustainability reporting can help organizations measure, understand and develop their economic, environmental, social and managerial indicators, and more effectively manage development dynamics.

2.2 Sustainable development in the Russian Federation

At present, the 1996 Sustainable Development Transition Concept remains the basic document defining the Russian Federation’s policy in the field of sustainable development. The idea of sustainable development was further developed in the draft document “Strategy for the sustainable development of the Russian Federation” [5], which was initiated by the Russian Government.

At the moment, the Analytical Center for the Government of the Russian Federation is coordinating work on the preparation of a Voluntary National Review of Sustainable Development Goals (SDGs) in Russia [6]. The work is being carried out in a collaboration with the Russian Foreign Ministry, Rosstat (the main statistic agency), other interested federal executive bodies and organizations within thematic working groups for each goal.

3. ESG ratings and Russian Energy companies

3.1 ESG factors in the modern world

At the corporate level, goals and objectives in the field of sustainable development are often defined by the term - ESG factors, that is, factors in the field of environment, social responsibility and corporate governance (the abbreviation for the first letters: E - environment, S - social, G –governance). ESG issues are becoming increasingly important for investors around the world in the face of tougher legislation, improved reporting and disclosure standards, the conclusion of the Paris Climate Agreement, and growing confidence that ESG factors will increase the return on investment. Currently, the global size of ESG assets under management for 2018 is estimated at approximately $ 30.7 trillion [7].

3.2 Scope of company analysis for compliance with ESG principles

There are a number of internationally recognized companies specializing in analyzing companies in terms of their level of compliance with ESG principles. For example, MSCI, a global provider of various analytical tools (including stock, bond, and other index performance indicators), developed MSCI ESG Research [8]., It is designed to support common investment approaches according to sustainability standards, and supporting institutional investors to better match their ESG investments. This index also manages, measures and reports ESG mandates. The size of investments assets covered is approximately 58 billion dollars. RobecoSAM [9], founded in 1995, specializes in sustainable development investments. The company offers asset management, index calculation, impact analysis, sustainability
assessments and benchmarking services. The Carbon Disclosure Project (CDP) assesses companies, cities, states, and regions for their environmental performance. CDP transforms this data into a detailed analysis of critical environmental risks, opportunities and impacts. Investors, businessmen and politicians use the data and ideas to make more informed decisions and identify opportunities. The FTSE4Good indexes [10], designed to measure company performance, provide insights into companies that demonstrate strong environmental, social, and management practices (ESGs). The size of assets is about 200 billion dollars. Sustainalytics [11] is an independent ESG research company that also supports investors around the world in the development and implementation of socially responsible investment strategies.

3.3 Growth Factors for ESG Principles

Growing interest in investing, based on the principles of ESG, can be interpreted as a kind of derivative of how markets and society are changing, and how business valuation concepts are adapted to these changes. A major challenge for most corporations is to adapt to a new environment that fosters smarter, cleaner and healthier products and services, and leave behind the dogma of the industrial era, when pollution was free, labor was simply a cost factor and scale was the dominant strategy. For investors, ESG data is becoming increasingly important to identify those companies that have strong positions and good prospects in the future, and to identify companies that may be ineffective. Today, investments in ESG have reached a level where they can significantly accelerate the transformation of the market for the better. Provided that political and economic decisions are based on the principles of openness and transparency, and do not deteriorate in the future, market changes will have a great positive effect on a truly global scale.

3.4. ESG standards in the Russian Federation

The integration of ESG standards into Russian society is less developed than in Europe and the USA. Nevertheless, the Russian Federation seeks to enhance its image as an environmentally friendly country at the international arena. An example of this is the improvement in international ESG ratings that can be observed in a number of Russian energy companies. The MSCI ESG Scoring data is shown in Table 1. (ranging on a scale from AAA to CCC)

It is worth noting that there are significant differences between the Russian and foreign methodologies for assessing environmental indicators in the energy sector. An example of this is the difference in the estimation parameters for greenhouse gas emissions (hereinafter GHG). So, according to the GHG Protocol [12], the gross volume of GHG emissions may differ from the value of a similar indicator calculated according to the methodology approved by Order of the Ministry of Natural Resources of Russia No. 300 [13] for two reasons:

- firstly, in the calculation according to the GHG methodology, the coefficients are used not only for carbon dioxide (CO₂), but also for other greenhouse gases, such as methane (CH₄) and nitric oxide (N₂O) that are converted into CO₂ equivalent values
- secondly, according to the GHG methodology, Energy companies also include their operations connected to transport, for example, vehicles, special equipment, ships and aircraft, which are included in the total calculation of GHGs

Despite some differences in the assessment methods, a number of leading Russian companies in the and energy sector comply with international standards and requirements and are not lagging behind foreign companies in terms of energy efficiency and energy saving.
Table 1. ESG rating scores (01/05/2020) of Russian energy companies according to MSCI ESG

| Energy Company               | Evaluation of the MSCI ESG (AAA - CCC) |
|------------------------------|----------------------------------------|
| PJSC Inter RAO              | A                                      |
| Rosneft Oil Company          | B                                      |
| PJSC Gazprom                 | BBB                                    |
| PJSC Lukoil                  | BBB                                    |

In the framework of this article, we review the successful example of PJSC Inter RAO and explain the relationship between high energy conservation rates and their environmental ratings/scores by international ESG rating companies.

4. Energy Conservation and Energy Efficiency Improvement Program (ECEEIP) in PJSC Inter RAO

4.1 Objectives of the program

In 2019, Inter RAO Group released its Annual Report, which consistently showed its achievements in energy conservation and compliance with international ESG factors for a number of parameters.

PJSC Inter RAO has developed a program aimed at improving management efficiency in the field of energy conservation and Energy Efficiency (ECEEIP) for 2019-2023 - One of the target programs of the group. The Commission on Energy Supply and Energy Efficiency Improvement of PJSC Inter RAO and its subsidiaries is closely related to the implementation of this program.

4.2 Evidence of program effectiveness

The program has already proven its effectiveness. According to the annual report of the company, for 2019 the implementation of the ECEEIP program has contributed to the following energy savings:

1. standard fuel - 46.877 thousand tons of fuel equivalent;
2. thermal energy - 39.002 thousand Gcal;
3. electricity - 3.699 million kWh;
4. water - 19.69 million m3.

Table 2. Energy Saved

| Types of energy saved | Measurement unit | 2017   | 2018   | 2019   | Change vs. 2018, % |
|-----------------------|------------------|--------|--------|--------|-------------------|
| Total reduction in fuel and energy consumption that was achieved as a direct result of energy conservation and energy efficiency initiatives | thousand tons of fuel equivalent | 134.8  | 105.7  | 46.9  | -56% |
| Fuel                  | TJ               | 3,951  | 3,098  | 1,374  |                   |
|                       | min kWh          | 14.2   | 15.1   | 3.7    | -76% |
| Electricity           | TJ               | 51.0   | 54.2   | 13.3   |                   |
|                       | thousand Gcal    | 22.4   | 7.5    | 39.0   | 423% |
| Heat                  | TJ               | 93.9   | 31.2   | 163.2  |                   |
| Water                 | min m3           | 0.0    | 4.7    | 19.7   | 317% |
Table 3. Energy intensity indicators

| Measurement unit | 2017    | 2018    | 2019    | Change vs. 2018 |
|------------------|---------|---------|---------|-----------------|
| Specific fuel consumption for electric power output | g of fuel equivalent/kWh | 303.14  | 296.99  | 295.22          | -0.6%           |
| Specific fuel consumption for thermal power output  | kg/Gcal | 143.90  | 144.36  | 144.79          | 0.3%            |
| FHUF             | %       | 48.35   | 49.49   | 49.5            | 0.0%            |
| Specific overconsumption (overburning) of fuel equivalent | g/kWh | 1.75    | 1.935   | 1.5             | -22.5%          |
| Total relative heat losses during transmission via heat networks | % | 17.05   | 18.61   | 18.31           | -1.6%           |
| Relative electricity costs for the transmission of heat via heat networks | kWh/Gcal | 6.51    | 6.125   | 6.49            | 6.0%            |

It is worth noting that the energy intensity indicators reflected in “Table 3” that are achieved through the Energy Conservation and Energy Efficiency Improvement Program (ECEEIP) are as follows:

- the coefficient of fuel heat utilization factor (FHUF) was increased to 49.54% by 0.06 p.
- reduced specific overconsumption to 1.5 g / kW • h;
- reduced specific fuel consumption for electric power output by 0.31 g / kW • h to 295.22 g / kW • h;

5. Other ways to reduce the negative influence on the environment

5.1. Changing the structure of the fuel balance

The main non-renewable energy sources in the activities of PJSC Inter RAO are natural gas and coal. It is a known fact that coal-fired power generation produce the largest amount of air emissions. In regards to this, the Group is changing the structure of the fuel balance of its generating assets towards the use of natural gas. This is evidenced by the following data: in 2019, compared to 2018, the share of coal in the fuel balance decreased from 20.1% to 19.1%. An additional factor in reducing the share of coal was the sale of Ekibastuz GRES-2 in December 2019, the coal-fired power plant with an installed capacity of 1,000 MW.

5.2 Equipment upgrades

Another way to reduce the negative impact on the environment is the modernization of generating equipment. This allows you to significantly reduce emissions of harmful substances into the atmosphere. Inter RAO Group is actively involved in improving the efficiency of its ash collecting plants. Upgraded
plants are more able to capture particulate matter. Also, in order to prevent environmental damage at the generation facilities, continuous emission control systems are installed.

5.3 Application of cogeneration technology

Another effective tool to reduce the negative impact of the energy companies on the environment is to use the cogeneration mechanism. Cogeneration is the process of generating both electric and thermal energy at one power plant, as a result of which, the consumer receives both electric and thermal energy at a lower specific fuel consumption rate. One of the features of cogeneration is that with an increase in the production of thermal energy at the installation, its efficiency increases - this in turn reduces fuel consumption for energy production and emissions of harmful substances and greenhouse gases into the atmosphere. As a result of this, it is most advantageous to install such facilities near large cities, where there is a high demand for heat energy.

An economically feasible increase in the share of medium and high power condensing and combined cycle cogeneration plants and gas turbines in the structure of gas generation generating capacities (including the use of Russian gas turbine engines) with energy efficiency (efficiency or Specific fuel consumption rates) and environmental safety (specific emissions) at the lowest level among global energy companies.

Power facilities operating in the cogeneration cycle that are part of the Inter RAO PJSC Group are located in the cities of Ufa, Tomsk, Omsk, Kaliningrad, St. Petersburg, Sochi and others. In 2019, these stations generated 25% of electricity and 79% of heat in the heating cycle.

For the MSCI ESG research question on improving the carbon emissions mechanism and reducing greenhouse gas emissions, Inter RAO scored 8 out of 10 due to the company’s fulfillment of medium and long-term goals to reduce specific greenhouse gas emissions with an analysis of measures and projects that will facilitate implementation these goals. Such a high estimate was achieved thanks to the commitment to reduce CO2 emissions per unit of generated electricity, CO2 (g) / kW * h. This is stated in the company’s plan of innovative development (PID) [15] for the period 2020-2024.

6. Paris agreement

In November 2015, 21 conferences were held in Paris under the UN Convention on Climate Change. The purpose of the conference is the signing of an international agreement to reduce global warming.

In preparation for the Paris Conference of COP21, more than 140 participating countries made their statements and identified their national contributions to the global environmental goal. Projects were announced aiming to reduce greenhouse gas emissions and to further develop national economies. Russia announced its intention to reduce greenhouse gas emissions to 70-75% in 1990. The obligations of our country are based, first of all, on the large scale of land and forest use.

On September 21, 2019, Russian Prime Minister Dmitry Medvedev signed a government decree on the adoption of the Paris Climate Agreement [16]

Taking into account the role of forests in carbon sequestration and the role of non-forest terrestrial ecosystems as global carbon reservoirs is certainly important in terms of including new national environmental obligations in the Paris Protocol. However, in our opinion, in determining the national contribution of our country, it is imperative to assess the possibilities of reducing carbon emissions as a result of the implementation of several additional activities within the framework of the implementation of the “Energy Strategy of Russia 2035” [17]:
- the introduction of energy-efficient technologies in industry and utilities;
- reduction in the use of coal fuel with the simultaneous development of renewable energy;
- reduction of methane emissions in the production of oil and natural gas.

7. Renewable energy development in Russia

According to experts of the Association Number Seven [18], the integrated effect for the Russian economy from the development of renewable energy will be more than 160 billion rubles, of which more than 70 billion rubles will go directly to budgets of various levels and extra-budgetary funds in the form of duties, taxes and insurance premiums. Additional export revenue will amount to more than 60 billion rubles, and environmental costs will be reduced by 28 billion rubles. In the renewable energy industry, 25,000 jobs will be created, in related industries - more than 100,000 jobs.

The obtained calculation results do not show a multiplier effect, suggesting the impact of the renewable energy industry on Russia's GDP through the development of industries such as metallurgy, power engineering, electrical engineering, power electronics, transport, telecommunications, information technology, new building and construction materials, etc.

The consensus forecast for the development of the global energy sector until 2050 from various organizations and companies suggests that more than 50% of the energy sector will consist of energy sources with zero carbon dioxide (CO2) emissions. Renewable Energy will account for more than half of the new generating capacities, which will commissioned in the next 25 years. Investments in global renewable energy will make up about 70% of investments in the energy sector in the amount of about 15 trillion dollars.

The authors of the forecasts indicate that the main driver of the rapid growth in the use of renewable energy will be the economic aspect rather than the political one. By 2050, the cost of capital of wind energy projects will decrease by an average of 35%, and solar projects by 50%, thanks to new technologies, accumulated experience and financing. With the increase in the share of renewable energy, it will be necessary to solve a number of technical issues, such as the creation of additional balancing capacities to meet peak loads, the creation of energy storage systems, demand management and energy consumption.

The development of renewable energy in Russia is taking small steps in comparison with the leading economies of the world. Currently, in the register of the “Association NP Market Council” [19] out of all qualified Renewable Energy Objects in Russia, there are 126 projects with a total capacity of about 1860 MW. In recent years, the Government of the Russian Federation has adopted a comprehensive regulatory framework that has created investment incentives for the development of renewable energy sources.

We cannot cast a doubt that by 2025 in Russia, renewable energy generating facilities with a total capacity of about 5 GW will be constructed. In hindsight 10 years ago, this number deserved credit and was a factor in investment attractiveness in this sector. Today, many countries that have neither significant natural renewable resource potential, nor developed industries, nor qualified specialists are implementing more ambitious national renewable energy programs. Currently, 164 countries have strategic plans for the development of renewable energy, and green tariffs have been approved in 108 countries of the world.
8. Conclusion

The concept of future energy is a combination of a number of factors: the rational use and conservation of resources, the limitation of consumption. All this should become the basis for creating a new energy system. Energy of the future - these are new technologies that will reduce losses in production processes; this is the widespread introduction of energy-saving technologies and non-waste production; this is a restructuring of the economy from energy-intensive to science-intensive industries; this is a broad participation in global and national cooperation in the field of sustainable development; it is the formation of people's understanding of the importance of responsible resource consumption.

An analysis of the ECEEEIP of energy companies using the example of PJSC Inter RAO suggests that Russian companies are already taking into account international environmental requirements and are constantly improving their indicators in the field of energy conservation and efficiency and are paying more and more attention to the environment for future sustainable development.

Russia strives to become a high-tech country and meet high requirements in the field of ecology, social development, corporate standards, thereby following the ESG trend, despite a number of differences in emission assessment methodologies.

Thus, the main steps for the Russian energy companies to achieve European standards and high ESG-indicators should be the following activities, which have already proven their effectiveness and the possibility of practical application without serious economic damage:

- development of energy saving programs and company development in accordance with their requirements
- gradual shift in the fuel and energy balance towards gas assets that are more environmentally friendly than coal.
- modernization of generating capacities
- introduction and active application of cogeneration technology.
- Continued development of incentive renewable energy programs that continue to prove synergistic

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