

# Sustainability and Future Energy Contours

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**Abstract.** The key factor for sustainable development is the transformation of the energy sector through the growth of investments in environmentally friendly electricity. Its consumption in emerging market and developing countries will grow about three times faster than in advanced economies, and the low cost of wind and solar power should make them the preferred technologies to meet growing demand if the infrastructure and regulatory frameworks are put in place. Also important are investments in digital electricity grids, energy efficiency and electrification, which will provide the largest share of emission reductions. An important component of transformations in the electric power industry are the mechanisms of international support for the refurbishment or decommissioning of obsolete generation facilities.

## 1 Introduction

Energy is central to development and transition strategies, but cannot solve all the problems in countries undergoing urbanization and industrialization [1]. In order to significantly reduce emissions, participation in the climate agenda of fuel-and-energy-intensive industries and transport is essential, which requires increasing the efficiency of equipment, switching to new types of fuel, mainly electricity, but also natural gas in areas where cleaner energy is not yet available. can be used to the extent required. It is necessary to ensure accelerated growth in the use of low-carbon liquids and gases, including hydrogen, the introduction of carbon capture technologies. Emission reduction actions in emerging market and developing countries are estimated at about half the cost in advanced economies, clean energy investment in emerging market and developing countries is the most cost-effective way to address climate change []. Commissioning of environmentally friendly facilities is much more efficient than subsequent modernization. Transition processes must be based on the economic affordability of electricity, which is a key factor for consumers, while governments are forced to pursue other goals of socio-economic development [3]. Today, about 800 million people in the world do not have access to electricity, and 2.6 billion people do not have access to sustainable cooking. The energy transition opens up new economic opportunities, in particular through the creation of new jobs associated with investments in clean energy.

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## 2 Research methodology

At the end of September 2021, the Russian Ministry of Economic Development sent a new version of the strategy to the federal executive authorities for approval, in which the intensive scenario was chosen as the main one for achieving carbon neutrality by 2060. The implementation of such a scenario will require investments in the amount of 1% of GDP in 2022-2030 and 1.5-2% of GDP in 2031-2050 [4]. The Energy Strategy includes the goal of reducing the negative impact of the fuel and energy industries on the environment and their adaptation to climate change, contributing to the contribution of the Russian Federation to the transition to a low-carbon development of the world economy, to efforts to preserve the environment and counteract climate change.

In October 2021, the Government of the Russian Federation presented a set of strategic initiatives<sup>53</sup> (Decree of the Government of the Russian Federation dated 06.10.2021 No. 2816-r). Among other things, they include goals for the development of clean energy, electric transport, hydrogen, LNG in the Technological Breakthrough block [5]. For each initiative, specific results are indicated for two planning horizons - up to 2024 and up to 2030. Initiative 27 (Clean Energy) has set the following goals: – increase in renewable energy capacity to 5.4 GW by 2024, to 12.4 GW by 2030; – creation of a Russian system for the circulation of certificates of origin of electricity from renewable energy sources and low-carbon generating facilities (including nuclear power plants and large hydroelectric power plants); – serial production of a line of industrial products necessary for the production and use of hydrogen, the creation of test sites for hydrogen energy, including in the Arctic zone; – the amount of funding for sustainable improvement of the environmental friendliness of energy and transport - 169.7 billion rubles; – reduction of financial losses from the EU carbon tax due to cleaner energy up to 240 billion rubles. Initiative 28 provides for the development of nuclear energy [6]. By 2030, 4 small floating nuclear power units and pilot small land-based nuclear power plants should operate in Russia, CO<sub>2</sub> emissions have been reduced by 1.1 million tons per year due to the replacement of hydrocarbon generation by nuclear power plants, Russia's share in the world market in terms of the capacity of small nuclear power plants will be 20%.

## 3 Results and Discussions

The European Union is gearing up for another major overhaul of climate, energy, transport, building and forestry regulations to achieve a Green Deal for carbon neutrality by 2050. The previous EU target of reducing greenhouse gas emissions by 40% by 2030 compared to 1990 levels was approved by the European Council in 2014, and targets for the share of renewable energy in final energy consumption and for energy efficiency improvements were set by the “fourth energy package” in 2018 . The Green Deal, announced in December 2019, outlined plans to make Europe the “first carbon-neutral continent” by 2050 [7]. In this regard, a number of subsequent documents, including the European Climate Law<sup>30</sup>, set an interim goal of reducing emissions by up to 55% by 2030. Targets for renewable energy, energy efficiency and transport for the implementation of the Green Deal and the Climate Act are contained in the “Fit for 55” proposal package published in July 2021. The European Commission claims that its July legislative initiative is the most comprehensive of all that have been adopted in the field climate and energy. The package includes both drafts of new regulatory legal acts and amendments to existing ones. Together they should create a regulatory framework for a comprehensive restructuring of the entire EU economy. The second part of the package will be presented by the European Commission in December 2021 [8]. It will include projects to revise the Energy Efficiency in Buildings

Directive, the Third Gas Energy Package to regulate competitive decarbonized gas markets, and a project to reduce methane emissions in the energy sector.

The UN Conference on Climate Change is the supreme body of the negotiation process for the implementation of the provisions of the UN Framework Convention on Climate Change (UNFCCC), adopted in 1992 [9]. Russia ratified the Convention in 1994. Sessions of the Conference have been held annually since 1995 and over time have become one of the largest forums convened under the auspices of the UN and other international organizations. Annual Sessions of the Conference of the Parties are held on a rotational basis in a country belonging to one of the five UN regional groups and are official Sessions Conference of the Parties to the UNFCCC, as well as meetings of the Conference of the Parties to the Kyoto Protocol or the Paris Agreement [10]. The conferences solve the following main tasks: - consideration of the implementation of the UN Framework Convention on Climate Change, the Kyoto Protocol and the Paris Agreement; – making decisions on the further development and implementation of the above international legal acts. The Parties are also developing new mechanisms and committing themselves to implement the goals of the UNFCCC [11]. In 2015, the Conference of the Parties adopted the Paris Agreement, and in 2012 the COP/CPC adopted the Doha Amendment to the Kyoto Protocol, with final decisions being reached through a collective decision-making process that is the result of complex negotiations and compromises.

The objective of the Paris Agreement is to keep the increase in global average temperature below two degrees Celsius compared to pre-industrial levels. Implementation of the Paris Agreement requires the economic and social transformation of national economies, provides for a five-year cycle of updating climate change targets, and involves sending Nationally Determined Contributions (NDCs) to the UN Climate Secretariat [12]. In their NDCs, countries report on planned measures to reduce greenhouse gas emissions to achieve the goals of the Paris Agreement, as well as information on planned actions for sustainable development in order to adapt to a changing climate. In order to achieve the long-term goal of the Paris Agreement, the document called on countries to develop and submit to the UN Climate Secretariat by 2020 Long-term development strategies with low greenhouse gas emissions [13]. The Paris Agreement emphasizes that developed countries should play a leading role in mobilizing financial resources to support more vulnerable states, and also calls on other countries to provide the appropriate financial assistance needed to mitigate climate change and adapt to a changing climate. Agreement aims to develop and transfer technologies to increase resilience to climate change and reduce greenhouse gas emissions. The agreement also gives an important role to climate change-related capacity building in developing countries and calls on developed countries to strengthen related measures [14]. In the Paris Agreement, the Parties provided for the creation of an Enhanced Transparency Framework (ETF), according to which, starting in 2024, states will report on their actions to combat climate change and progress towards climate change mitigation. The agreement provides for procedures for reviewing reports with the participation of international experts. The information generated by the ETF will form the basis of the Global Stocktake, a process for assessing collective progress towards long-term climate goals, and will result in recommendations for governments to set new goals as they are further revised [13]. Nationally Determined Contributions (NDC) (EU, PRC, RF, USA) The EU is the most active participant in the international climate agenda, develops and uses political and financial instruments within the Union, promotes the climate agenda in the activities of the UN, uses bilateral and multilateral relations with countries , outside the EU, provides funding to developing countries in the fight against climate change. A number of EU documents declare that the green transformation of the economy is intended not only to achieve environmental goals aimed at preserving nature and human health, but will also serve as the basis for creating new sectors of the economy,

provide new jobs, and improve export potential [14]. At the Climate Ambition Summit 2020, the President of the People's Republic of China stated the need to strengthen the goals and create a new climate governance architecture in which each side will contribute, following the principle of common but differentiated responsibilities, taking into account national circumstances and capabilities, and also stated on the need to increase support for developing countries in the areas of finance, technology and capacity building [15]. Previously, the Chinese President announced that China will increase its nationally determined contribution and take stronger measures to achieve peak carbon emissions by 2030 and carbon neutrality by 2060. Released in March 2021, China's 14th Five-Year Plan includes new targets to reduce the energy and carbon intensity of the economy by 2025. At the end of November 2020, the Russian Federation announced its first nationally determined contribution as part of the implementation of the Paris Agreement. The statement was based on the Decree of the President, signed in early November 2020, according to which the volume of greenhouse gas emissions on an economy-wide scale by 2030 is limited to 70% of the 1990 level, taking into account the need for sustainable socio-economic development and maximum consideration of the absorption capacity of forests and other ecosystems.<sup>7</sup> At the same 2020 Climate Goals Summit, the US announced it would achieve carbon neutrality by 2050. Since the Summit, 24 countries have announced new commitments, strategies or plans to achieve zero emissions or carbon neutrality [16]. A number of G20 countries at the Summit announced that they would shift the deadlines for achieving zero emissions "to the left": Finland (2035), Austria (2040), Sweden (2045).

## 4 Conclusions

The Russian Federation takes an active part in the processes of the Climate Agenda, an impetus has been given at the federal level, discussions have been launched at the level of the Government of the Russian Federation, the State Duma and at the level of economic sectors. Today, most of the global climate policy instruments, such as carbon regulation, renewable energy incentives, green financing mechanisms, the green certificate market, and the ESG taxonomy, have been implemented in Russia or are under development. In this situation, it is important to analyze international experience, global challenges and trends, take into account the changing legislation of trading partners, the experience of stimulating the transformation of the economy and energy. International cooperation is certainly an important component in the technological and financial fields. The current international financial architecture provides some support for sustainable development, but financing strategies and mechanisms are not yet up to the challenge of fundamentally transforming the energy sector in emerging and developing economies.

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