

THEORETICAL APPROACHES REGARDING ENERGY SECURITY IN THE CONTEXT OF ECONOMIC RESILIENCE

Dumitru STRATAN, PhD, Senior Researcher,
National Institute for Economic Research,
Academy of Economic Studies of Moldova
E-mail: dumitru.stratan@gmail.com
ORCID: <https://orcid.org/0000-0002-4909-1324>

Nicolae POPA, Researcher,
National Institute for Economic Research,
Academy of Economic Studies of Moldova
E-mail: nicolae.popa@ase.md
ORCID: <https://orcid.org/0000-0001-8081-3498>

DOI: <https://doi.org/10.36004/nier.cecg.I.2024.18.09>

Abstract. *The energy sector represents one of the basic pillars in sustainable development and in the restructuring of the national economy, its importance being directly proportional to the level of economic development of the state, or one of the basic indicators of economic prosperity is the increase in the population's income, which generates an increase in the demand for energy. Energy audits are essential to demonstrate the effectiveness and economic and environmental impact of energy efficiency projects. The research examines the possibility of using energy performance contracts for energy efficiency investments in heat supply. Amendments to tax legislation are proposed to increase the attractiveness of ESCO contracts, including VAT exemptions and tax incentives. The energy sector is crucial for sustainable development and the national economy, and the increase in population income leads to an increased demand for energy. The Republic of Moldova has committed to adopt an Integrated National Energy and Climate Plan (PNIEC) by 2030, in accordance with EU standards. In order to fulfill these objectives, Law no. 139/2018 on energy efficiency, which transposes EU directives in this field. The article was developed within the framework of Subprogram 030101 „Strengthening the resilience, competitiveness, and sustainability of the economy of the Republic of Moldova in the context of the accession process to the European Union”, institutional funding.*

Keywords: vulnerable, resilience, renewable sources, stability, security, energy.

JEL: P18, Q40, Q42, Q50

UDC: 351.862.62

Introduction. The energy sector represents one of the basic pillars in development sustainable and in the restructuring of the national economy, its importance being directly proportional to the level of economic development of the state, or one among the basic indicators of economic prosperity is growth incomes of the population, which generates an increase in energy demand. Well, according to

data provided by EIA1, energy consumption per per capita increased by 18.34% in 2021 compared to 2020. By Law no. 117 of December 23, 2012, the Republic of Moldova acceded to the Treaty establishing the Energy Community, and the capacity of the Republic of Moldova as a contracting party generated the obligation to adopt a Plan Integrated National Committee on Energy and Climate (PNIEC). PNIEC is drawn up for a determined period of time until the year 2030, guaranteeing thus fulfilling the EU's commitment within the framework of the Paris Agreement, in at the same time presenting a vision of achieving climate neutrality towards the year 2050.

At the moment, the energy security issues are becoming increasingly relevant in the light of the ongoing world events, as well as within the developing international economic relations. Therefore, there is a significant number of the scientific works that contain the definitions of the basic concepts, in which it is established the framework of the research of the process of the energy security provision in the context of the integration, globalization processes and the sustainable development processes. However, the theory does not reveal fully the economic aspects of the direct integration of the fuel-energy complex of the Republic of Moldova into the European energy system, which was the basic vector of the research in the given scientific work. At the same time, regulated energy companies must include in the annual investment plans, submitted for examination and approval to the National Agency for Energy Regulation, the measures energy efficiency that cumulatively meet the following conditions:

- energy savings are determined according to the calculated savings method;
- investments are economically efficient.

When concluding energy performance contracts, the difference between the total value of the financial obligations assumed within the energy performance contract and the total value of the fixed assets will not exceed the profitability determined in accordance with the appropriate methodologies for calculating and applying tariffs, approved by the National Agency for Energy Regulation. From a practical point of view, an example of the application of the counted savings method is elucidated in the framework of art. 16/1 para. (3) from law no. 139/2018, according to which "the thermal energy supplied for heating and/or preparation of domestic hot water, and/or cooling, delivered within a centralized supply system with thermal energy and/or cooling, is metered (emphasis - n.a.) with measuring equipment that correctly reflects the actual energy consumption" (EEA, 2019).

Following the above, we conclude that the conclusion of the contracts of energy performance is an effective way of attracting investments by regulated energy companies in the electricity, natural gas and thermal energy sectors.

Literature review. The study of the issues of the evolution and formation of the concept of the energy security was carried out by the following authors: Yergin D., Kalicki J.H., Goldwyn D.L., as well as by the researchers who studied the development of the international relations of the Republic of Moldova with the countries that supply and transit the energy resources: Mihailescu V., Coreakin S.,

etc. The issues of the sustainability of the energy security development of the countries are fully disclosed in the works of Meadows D., Randers J., Harris J., Timothy M., Dreier O.C., Losi V.A., Calasnicov T.V., etc. The author analysed also the current strategies in the field of the development of the energy complex of the countries at the global and regional levels. This demonstrates a rather high degree of knowledge of the issues and the problems of the energy security provision. The issues of the strategic development are indeed given a great attention in a number of the countries of the world, and in the European countries structurally the strategies are practically unified. This proves the existence of the single and complex approach to the given issue. The most important theoretical concepts, approaches, conceptual framework in the field of the establishment of the international relations for the purpose of the effective integration processes in the field of energy are disclosed in the works of the domestic and foreign authors: Muntean M.A., Sumilo P.S., Princen T., Finger M. and several others.

Research methodology. The methodological basis of the study is the general methods of scientific research (analysis, synthesis, induction, deduction), as well as the specific methods of scientific knowledge (division and decomposition of results, grouping, comparison according to a predetermined level and special comparisons). In this research, the authors analyze the problems faced by the Republic of Moldova in the field of renewable energy. In that field, research was carried out within Subprogram 030101 "Strengthening the resilience, competitiveness and sustainability of the economy of the Republic of Moldova in the context of the process of accession to the European Union", institutional funding. As information support, the authors used legislative and normative acts in the field of renewable energy, reports and publications of the Ministry of Energy of the Republic of Moldova. The research was also based on statistical data collected from the National Bureau of Statistics and the Energy Efficiency Agency. On an international level, important methodological studies were developed within the European Commission (EC), the European Environment Agency (EEA), the European Agency for Sustainable Development (ADD), etc., which were taken into account in the present research.

Results and discussion. The energy infrastructure of the Republic of Moldova consists of a set of installations and networks that allow the production, transport, distribution and consumption of electricity, natural gas and petroleum products, as well as energy storage capacities and interconnections with other countries. Infrastructure includes production facilities, pipelines and transmission lines, power plants, substations, transmission lines, distribution pipelines and other facilities needed to deliver energy efficiently. These facilities must be operated and upgraded in accordance with best practices and safety standards.

The concept of sustainable development is closely related to the energy trilemma. The energy trilemma is necessary for the provision of the balance through the mutual integration of the energy systems. This is obvious, because, for example,

the achievement of the exclusively energy security in isolation from the ecological sustainability and energy equality does not make sense and does not meet the requirements of the modern world, and vice versa. The achievement of the balance between the components of the trilemma is possible under the ideal conditions of the international cooperation at various levels and with the developed integration processes in the energy field. In other words, each state needs to maintain the balance in three directions of the trilemma. The energy trilemma is necessary for the assessment and change of the effectiveness of the actions within each of its directions. For these purposes, the index of the world energy system was developed, the objectives of which are presented in the figure 1.

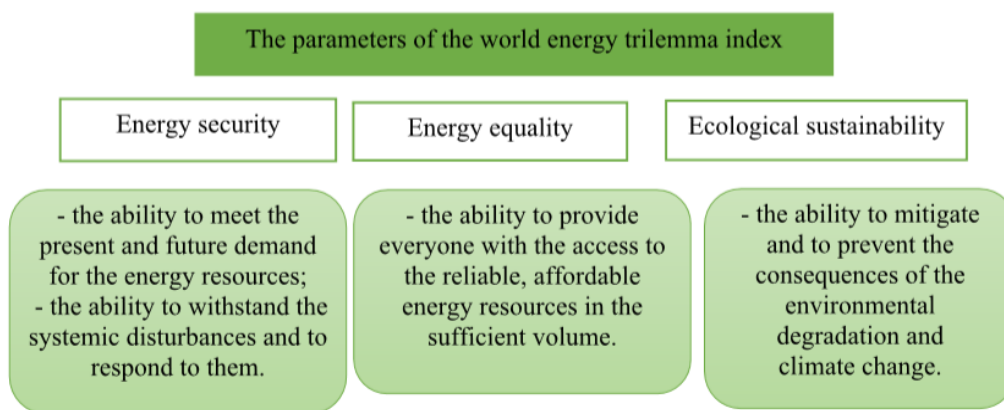


Figure 1. The parameters of the world energy trilemma index

Source: *Trilemma Index, 2021. Available:*

https://www.worldenergy.org/assets/downloads/WE_Trilemma_Index_2021_-_Executive_Summary_-_Russian.pdf.

According to the author for the achievement of the leadership in this index the governments need to continue the evolution of the energy sustainability in the following directions: the transformation of the energy supply, the expansion of the energy access, the cost effectiveness, the increase of the energy efficiency and the improvement of the demand management, the decarbonization of the energy sector. For the minimization of the impact of the barriers and the continuation of the progress in the development, in accordance with the directions of the energy trilemma, it is necessary to develop the appropriate energy regulation policy and to create the regime of the fuel-energy complex support that will contribute to the achievement of the strong energy trilemma, regardless of the resources, geographical location of state. The progress in this regard must be carried out according to the principles of the safety, fairness, environmental friendliness, sustainability, competitiveness, in order to meet the modern consumer demands.

According to the Energy Union (2015), the five main aims of the EU's energy policy are to:

- Diversify Europe's sources of energy, ensuring energy security through

solidarity and cooperation between EU countries;

- Ensure the functioning of a fully integrated internal energy market, enabling the free flow of energy through the EU through adequate infrastructure and without technical or regulatory barriers;
- Improve energy efficiency and reduce dependence on energy imports, cut emissions, and drive jobs and growth;
- Decarbonise the economy and move towards a low-carbon economy in line with the Paris Agreement;
- Promote research in low-carbon and clean energy technologies, and prioritise research and innovation to drive the energy transition and improve competitiveness.

Article 194 TFEU makes some areas of energy policy a shared competence, in which each Member State maintains its right to ‘determine the conditions for exploiting its energy resources, its choice between different energy sources and the general structure of its energy supply’ (Article 194(2)). The current European energy policy is based on the Energy Union strategy, which aimed to give EU households and businesses a secure, sustainable, competitive and affordable energy supply. The current EU energy targets for 2030 include:

- An increase in the share of renewable energies in final energy consumption to 42.5%, with the aim of achieving 45%;
- An 11.7% reduction in primary (indicative) and final energy consumption, compared to 2020 projections;
- The interconnection of at least 15% of the EU’s electricity systems.

The current European regulatory framework for energy was built on the EU’s substantial ‘Fit For 55’ package, which was initially aimed at aligning all climate and energy targets. This was successively modified by the REPowerEU plan, whose aim was to rapidly and completely phase out dependency on Russian fossil fuels (V., Ceban, 2016). The framework is composed of several provisions covering the promotion of renewable energy (Directive (EU) 2018/2001), energy efficiency (Directive (EU) 2018/2002), governance and electricity interconnectivity (Regulation (EU) 2018/1999), electricity market design (Directive (EU) 2019/944 and Regulation (EU) 2019/943), risk-preparedness (Regulation (EU) 2019/941), the energy performance of buildings (Directive (EU) 2018/844), decarbonised gas and hydrogen markets (Directive 2009/73/EC and Regulation (EC) No 715/2009), energy taxation (Directive 2003/96/EC), trans-European energy infrastructures (Regulation (EU) 2022/869), cooperation of energy regulators (Regulation (EU) 2019/942), batteries (Regulation (EU) 2023/1542), and air and maritime transport initiatives (Regulation (EU) 2023/2405 and Regulation (EU) 2023/1805). Under the current framework, EU countries need to establish 10-year integrated national energy and climate plans for the period from 2021 to 2030, submit a progress report every two years and develop consistent national long-term strategies to meet the agreed energy targets and the goals of the Paris Agreement (EEA, 2019).

At present, there are a number of initiatives at EU level which are applicable both to the community framework of states and to the states that tend to become EU members.

1. REPowerEU Plan, or "Repowering Europe"⁴¹: Broad initiative of the European Union aimed at accelerating the transition to the sources of renewable energy and reducing dependence on fossil fuels. The plan involves significant investments in green energy infrastructure, promoting energy efficiency, and strengthening the security and sustainability of the EU's energy system. The main objective of this plan is to transform the European energy sector into a cleaner, more efficient and more sustainable one.

2. Germany's "Energiewende"⁴² (energy transition) program: Main objective is to reduce greenhouse gas emissions and increasing energy efficiency. Germany introduced strict standards for buildings and promoted the use of renewable sources in the heating system. We mention that the Program regarding the renovation of the buildings of the specialized central public administration authorities for the years 2024-2026, approved by the Government of the Republic of Moldova on March 6, 2024, is to be started. The purpose of this Program is to ensure the energy efficiency of public buildings, namely the renovation of 3% of public institutions in the Republic of Moldova, by investing 90 million euros over three years by the Government of the Republic of Moldova.

The allocation of the above-mentioned amount was carried out with the support of development partners within the project "Energy efficiency in the Republic of Moldova" co-financed by the European Union, the European Bank for Reconstruction and Development, the European Investment Bank, and partially from the funds allocated within the project "Production of ecological energy and energy efficiency", financed by the Government of the Federal Republic of Germany and partly from the means allocated within the project "Ecological energy production and energy efficiency". Based on the above, we certify that the implementation of energy efficiency projects is viable if it is accompanied by external financing sources, especially from development partners whose financing conditions are favorable to the economic circumstances of the Republic of Moldova (UE, 2023).

Referring to the situation in the Republic of Moldova, the two ongoing projects financed by the development partners were reviewed. One of them is the Project to improve the efficiency of the centralized thermal energy supply system PIESACET – 2, the second being a Feasibility Study Termoelectrica Energy Security Project (financed by the EBRD).

From a statistical point of view, the number of buildings (from the management area SADDLE. "Termoelectrica") connected to SACET during the last 5 years showed a stable trend, varying between 4398 and 4797 connected buildings. But of particular interest is the evolution of the number of apartments connected to the horizontal distribution. In 2019, there were 2378 apartments with horizontal distribution, and in 2023 this figure reached 3759 apartments.

The second producer and supplier of thermal energy that was analyzed is S.A. "CET-Nord", which is in the second phase of the project "Thermoenergy system of

the municipality of Balti, financed by the European Bank for Reconstruction and Development (EBRD). In the course of in Phase I of the project, PTI were installed in 166 residential blocks, replacing the thermal energy distribution system from vertical to horizontal with individual metering of thermal energy consumption in 296 residential blocks.

Conclusions and recommendations. The global energy image of the world demonstrates the general trends in the development of the globalization processes. The given research would be incomplete without a more detailed study of the energy security of the integration associations of the European Union (EU) and the Commonwealth of Independent States (CIS). The choice of the comparative analysis of the energy policies of the EU and the CIS is conditioned by two basic factors. The traditional infrastructural relationships of the Republic of Moldova with the countries of the post-Soviet area (CIS) certainly have the potential for the further development in the future. On the other part, given the strategic course of the Republic of Moldova aimed at the broad European integration and the status of the EU candidate country, it is necessary to analyse carefully the European trends in the energy field and the prospects of the Republic of Moldova as the participant in these processes. The results of the researches of the policies and strategies of the provision of the energy security in the EU and the CIS demonstrate the importance of the international cooperation context.

Following the above, it is necessary to reevaluate and adjust the "business model" to include consulting and implementation services in the field of energy efficiency and renewable energies. This would also involve the development of technical and management skills in these new areas.

Another important step would be to establish strategic partnerships with innovative technology developers, financial institutions and other entities involved in promoting energy sustainability. These collaborations could support Termoelectrica SA in offering integrated solutions and accessing financing for large energy efficiency projects. In addition, adaptation to a legislative and regulatory framework supporting Super ESCO activities, including financial support mechanisms and customer incentives, would be crucial.

Moldova has made significant efforts for the diversification of its supply sources. The stable and reliable gas and electricity supplies was the major problem for Moldova, and the country has taken the notable steps for the improvement of the supply security. Despite all these notable achievements, the energy sector of Moldova still faces the significant problems that need to be solved in the timely manner for the improvement of the energy security, the acceleration of the transition to a more sustainable, clean and efficient energy system and the support of the development of the competitive energy markets.

The Government of the Republic of Moldova should, in the near future, consider the possibility of the provision of the basic funding of the scientific research institutes and the project funding for the increase in the efficiency and the increase in the practical relevance of the scientific work in the field of energy. It is also

important to strengthen the international relations and the intrastate cooperation between the scientific institutions and industries for the solving of the specific energy problems that require the scientific justification and developments. It is also relevant for the country to support the involvement of the local experts in the field of energy in the funded technical assistance and grant projects.

REFERENCES

- Agency for Energy Efficiency (EE). (2023). Renewable energy sources. <https://www.aee.md/ro/page/source-de-energie-regenerabila>
- Ceban, V. (2016). The development of renewable energy in the Republic of Moldova: realities, capacities, options, perspectives. APE. http://www.ape.md/wp-content/uploads/public/publications/2144156_md_aneza_nr_2_vad.pdf
- European Parliament. (2023). Energy from renewable sources. European Parliament, European Union. <https://www.europarl.europa.eu/factsheets/ro/sheet/70/energia-din-surse-regenerabile>
- Guide on the economic evaluation of projects in the fields of energy efficiency and renewable energies. (2014). <https://aee.gov.md/storage/eficienta%20energetica/Interes%20public/Ghid%20privind%20evaluarea%20economic%c4%83%>
- International Energy Agency (IEA). (2021). World Energy Outlook 2021. <https://www.iea.org/reports/world-energy-outlook-2021>
- International Renewable Energy Agency (IRENA). (2019). Report Evaluation of the degree of preparation regarding the exploitation of renewable energy in the Republic of Moldova. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2019/Feb/IRENA_RRA_Moldova_2019_RO.pdf
- Ministry of Energy of the Republic of Moldova. (2024). The current state of the field of renewable energy in the Republic of Moldova: Potential, challenges and perspectives <https://energie.gov.md/ro/content/starea-actuala-domeniului-energiei-regenerabile-republica-moldova-potential-provocari-si>
- Ministry of Infrastructure and Regional Development (MIDR). (2022). Report on monitoring the security of electricity and natural gas supply of the Republic of Moldova for the period 2020-2021. <https://midr.gov.md/files/shar>
- Rugină, V. (2017). Energy efficiency indicators and calculation of energy savings using Top Down methods. EMERG, 5 <https://emerg.ro/wp-content/uploads/2019/11/Indicatori-de-eficien%C8%9B%C4%83-nergetic%C4%>
- World Energy Council. (n.d.). <https://www.worldenergy.org/>
- World Energy Council. (2021). Trilemma Index. https://www.worldenergy.org/assets/downloads/WE_Trilemma_Index_2021_-_Executive_Summary_-_Russian.pdf
- World Energy Council. (2024). World energy scenarios: composing energy futures to 2050. <https://www.worldenergy.org/publications/entry/world-energy-scenarios-composing-energy-futures-to2050>
- Yergin, D. (1988). Energy security in the 1990s. Foreign Affairs, 67(1), 111-130. <https://doi.org/10.2307/20043677>