ACROSS
http://across.ugal.ro
ISSN 2602-1463
Vol. 9(1) 2025
Food Engineering, Agriculture and Rural Development



# The Role of National and International Legislation in Advancing Solar Energy for Sustainable Rural Development: A Comparative Study of Romania and the Republic of Moldova

**Tatiana CHIRIL**
Dunarea de Jos University of Galati,
tatiana.chiril@ugal.ro

**Abstract**
This paper critically examines the legislative frameworks supporting solar energy as a sustainable solution for rural regions. The analysis contrasts the policies and regulatory approaches of Romania and the Republic of Moldova, shaped by European Union directives and other international standards, in fostering renewable energy infrastructure. By underscoring key legislative elements unique to each country, the study assesses the regulatory impact on investment accessibility and operational efficiency in solar energy production, including acceptable error margins. The paper comprehensively evaluates the legislative benefits and constraints, proposing targeted improvements to encourage sustainable rural development through solar energy adoption.

**Keywords:** rural communities, stable supply, energy adoption, public-private partnerships (PPP), expertise, capital access, renewable energy, private sector resources

## Introduction

Solar energy is a strategic solution for promoting sustainable development, especially in rural areas with limited access to conventional energy resources. Romania and Moldova have approached renewable energy development in distinct ways, though both are influenced by international legislation and, in Romania's case, by EU directives. This study aims to analyse and compare the legislative frameworks in both countries, focusing on their impact on investment accessibility, implementation efficiency, and effects on rural communities.

## Context and Importance of Solar Energy in Rural Development

The transition to renewable energy sources, particularly solar energy, has become a cornerstone in addressing global environmental and socio-economic challenges. As the demand for sustainable solutions to reduce carbon emissions grows, solar energy emerges as a vital component for achieving these objectives. Its potential is especially promising in rural areas, where the adoption of renewable energy can drive economic development, lessen dependence on conventional resources, and enhance the overall quality of life.

Renewable energy, including solar, wind, and hydropower, plays an instrumental role in fulfilling the global commitment to reduce greenhouse gas emissions. As part of international efforts, the United Nations' Sustainable Development Goals (SDGs), the Paris Agreement, and various regional initiatives emphasize the urgent need to shift from fossil fuels to cleaner energy sources. Solar energy, as a zero-emission technology, significantly contributes to these goals by offering a sustainable alternative that generates electricity without carbon emissions, thus helping to combat climate change.

For rural areas, which often rely on traditional sources of energy like wood, coal, or diesel, the shift to solar energy can dramatically decrease their carbon footprint. The reduction in reliance on these conventional resources not only supports environmental goals but also mitigates health risks associated with the pollution they generate. This makes solar energy a powerful tool for promoting environmental sustainability in regions that may otherwise be limited in access to clean energy options.

In rural communities, where traditional infrastructure may be limited or absent, solar energy provides a unique opportunity for economic empowerment. Solar installations can range from small-scale systems for individual households to larger systems that power entire communities or agricultural operations. By generating clean and affordable electricity locally, these communities can reduce their dependence on national grids or fuel imports, which can be costly and less reliable.

Moreover, solar energy opens avenues for job creation and skill development in rural areas. The installation, maintenance, and management of solar projects can create employment opportunities and stimulate local economies. Small-scale farmers, for instance, can benefit from solar-powered irrigation systems, which can help improve crop yields and reduce costs associated with fuel-powered pumps. Similarly, solar energy can power rural businesses, schools, and health facilities, enhancing the quality of life and economic prospects of these communities.

Access to electricity is often a limiting factor for rural communities, impacting education, healthcare, and even basic household functions. In many developing and underdeveloped regions, rural households either have no access to electricity or face unreliable supplies that hamper their daily lives. Solar energy, with its scalability and adaptability, presents a solution to bridge this gap.

For instance, solar-powered lighting systems can extend productive hours in households and enable children to study after dark, contributing to improved educational outcomes. Health facilities powered by solar energy can ensure the safe storage of vaccines and medicines, operate essential medical equipment and maintain lighting and communication systems, which are critical for emergency services. These improvements contribute to the overall well-being of rural residents, providing them with opportunities to achieve a higher quality of life.

The growth of solar energy in rural areas is heavily influenced by national and international legislation, which acts as a facilitator in the adoption of renewable energy. Legislation provides a framework for policies that encourage investment, research, and development of solar technologies. By setting clear guidelines, targets, and incentives, governments can foster an environment that is conducive to the growth of solar energy projects in rural areas.

International agreements, such as the Paris Agreement, push countries to commit to renewable energy goals, providing a foundation for national policies that support clean energy adoption. In addition to these global frameworks, regional and national policies are crucial in establishing specific regulations, financial incentives, and support systems that make solar energy viable for rural communities. For instance, in the European Union, the Renewable Energy Directive sets binding targets and offers a blueprint for member states to implement renewable energy policies, including solar. These directives often inspire legislation in neighboring regions, promoting a coordinated approach to renewable energy adoption across borders.

In countries with limited resources, access to international funding and technical support is often crucial for the success of rural solar initiatives. International financial institutions, such as the World Bank, the Global Environment Facility, and the Green Climate Fund, offer grants and loans specifically for renewable energy projects in underdeveloped regions. These financial mechanisms, supported by international agreements, reduce the initial investment barrier and make solar energy projects more accessible and affordable for rural areas.

One of the primary barriers to adopting solar energy in rural areas is the upfront cost associated with purchasing and installing solar systems. Although solar energy can be cost-effective over time due to low maintenance and operational costs, the initial investment can be prohibitive, especially for low-income rural households or communities with limited financial resources.

To address this challenge, governments and international organizations have developed financing policies that improve access to solar energy. Subsidies, tax incentives, and grants are common tools used by policymakers to reduce the initial cost burden. Additionally, innovative financing mechanisms, such as pay-as-you-go models and microfinancing, allow rural households to pay for solar energy systems over time, making them more affordable and accessible.

For example, in some African countries, pay-as-you-go solar systems have gained popularity, enabling households to access solar energy without the need for substantial upfront capital. Similarly, community-based financing models, where the community collectively invests in solar projects, have proven effective in rural settings, where individual households may lack the financial capacity to invest independently.

The successful adoption of solar energy in rural areas also depends on the availability of supportive infrastructure. This includes both physical infrastructure, such as roads and transmission lines, and institutional infrastructure, such as training centers and regulatory bodies that oversee the installation and maintenance of solar systems. Building this infrastructure requires collaboration between governments, private sector players, and international organizations.

Investments in local infrastructure enable more efficient distribution and maintenance of solar energy systems, ensuring their longevity and reliability. Additionally, training programs that equip local technicians with skills to install and service solar systems play a critical role in maintaining the infrastructure necessary for widespread adoption. These programs also contribute to local job creation, fostering a self-sustaining cycle of economic development within rural communities.

Globally, the UN Framework Convention on Climate Change and the Paris Agreement emphasize the importance of renewable energy for achieving emission reduction targets. These international agreements set clear objectives for governments, providing a legal foundation for developing solar energy infrastructure. The EU's 2018/2001 Directive on the promotion of renewable energy regulates applicable rules in member states, including measures for funding, efficiency, and green energy accessibility. Romania, as an EU member state, follows these directives, while Moldova, though not an EU member, has regulations influenced by its cooperation agreements with the EU.

**National Policies in Romania and Moldova**

Romania has made significant progress in adopting European Union (EU) legislation aimed at promoting renewable energy, with a clear focus on aligning national policies to EU directives. The cornerstone of Romania's approach to renewable energy legislation is Law No. 220/2008 on the Promotion of Renewable Energy, which provides a comprehensive framework for stimulating the production and use of green energy sources, including solar, wind, hydro, and biomass. This law, influenced by EU Renewable Energy Directive (2009/28/EC), represents a commitment to increasing the share of renewable energy in Romania's energy mix, setting targets, and establishing mechanisms to attract both domestic and foreign investments in this sector.

- Financial Incentives and Subsidies

Romania offers a range of financial incentives and subsidies to encourage investment in renewable energy, thereby reducing the economic barriers associated with green energy projects. These incentives aim to make renewable energy more financially attractive for both large-scale producers and smaller enterprises, including rural communities interested in harnessing solar energy.

- Key financial support mechanisms include:

Green Certificates: One of the main incentives under Law No. 220/2008 is the green certificates trading scheme, which mandates that energy providers acquire a certain number of green certificates per unit of electricity sold. This creates a demand for renewable energy, effectively subsidizing producers by allowing them to sell their certificates to energy providers who must meet these requirements.

- Tax Exemptions:

Renewable energy producers are also eligible for tax exemptions on income derived from green energy production. Additionally, certain equipment and technologies used in renewable energy projects benefit from reduced VAT rates, making it more affordable to establish and operate solar energy systems.

- Feed-in Tariffs and Contracts for Difference:

Romania has implemented feed-in tariffs for renewable energy, guaranteeing a fixed purchase price for electricity generated from renewable sources. Although this system has changed, it remains a valuable tool in providing long-term financial stability to renewable energy investors.

**Public-Private Partnerships and Investment Models**

Public-private partnerships (PPPs) have become an integral part of Romania's strategy for expanding renewable energy infrastructure. These partnerships enable the pooling of public resources with private capital and expertise, allowing large-scale renewable energy projects, including solar farms, to flourish. Through PPPs, the Romanian government supports projects by providing land, reducing regulatory burdens, and facilitating access to funding. This collaborative model has been particularly effective in rural areas where local authorities and private investors work together to develop community-scale solar energy projects.

To further attract private investment, Romania has established Renewable Energy Investment Funds that provide financing to solar energy projects deemed to have a high economic and environmental impact. These funds prioritize projects that contribute to the country's renewable energy targets, supporting both urban and rural initiatives.

**Challenges and Opportunities in Romania's Legislative Framework**

While Romania's legislation offers a strong foundation for renewable energy, it faces challenges related to regulatory complexity and the need for further infrastructure improvements. The green certificates scheme, for example, has experienced fluctuations in price and demand, leading to periods of financial uncertainty for producers. Additionally, grid infrastructure in rural areas often requires upgrades to handle the increased load from renewable energy production, which can strain both financial and technical resources.

Nonetheless, Romania's legislative framework has successfully attracted a steady flow of investments in renewable energy, helping to drive progress toward its EU-mandated renewable energy targets. By focusing on infrastructure development and stabilizing regulatory mechanisms, Romania has the potential to become a regional leader in renewable energy production, with solar energy playing a significant role in its rural electrification strategy.

**Renewable Energy Legislation in the Republic of Moldova**

The Republic of Moldova, while not an EU member, has made substantial efforts to align its renewable energy policies with EU standards. The Law on the Promotion of Renewable Energy (Law No. 10/2016) serves as Moldova's primary legislative framework for encouraging renewable energy development, including solar, wind, and biomass. Although Moldova's financial and technological resources are more limited than Romania's, the country has made significant strides in creating a supportive environment for green energy investments through both national policies and international cooperation.

**Financial Support Mechanisms and International Grants**

Moldova's renewable energy sector relies heavily on international funding and support programs, which help mitigate the financial limitations faced by domestic investors. Some of the key support mechanisms include:

Grants and Low-Interest Loans: International donors, including the EU, the World Bank, and the European Bank for Reconstruction and Development (EBRD), provide grants and low-interest loans to fund renewable energy projects in Moldova. These financial instruments are crucial for covering the upfront costs of solar installations and other renewable energy technologies, making them more accessible to rural communities.

Net Metering Programs: Moldova's Law No. 10/2016 includes provisions for net metering, allowing individuals and businesses that generate their own renewable energy to offset their consumption by feeding excess power back into the grid. This program incentivizes small-scale solar installations by enabling producers to reduce their energy bills, making it an attractive option for rural households and businesses.

Subsidies and Tax Incentives: Moldova offers a limited range of subsidies and tax incentives for renewable energy projects, though these are generally less comprehensive than

Romania's. Renewable energy equipment and technologies are eligible for reduced import duties, and certain income tax exemptions are available for green energy producers.

**International Cooperation and Capacity Building**

Given Moldova's financial constraints, international cooperation plays a critical role in the country's renewable energy sector. Through partnerships with the EU and neighboring countries, Moldova benefits from knowledge transfer, technical assistance, and access to best practices in renewable energy policy implementation. EU-led programs, such as the Eastern Partnership and the European Neighborhood Policy, provide Moldova with frameworks to align its renewable energy policies with European standards.

Capacity-building initiatives have also been implemented to train local technicians and engineers in renewable energy technology. These programs are crucial for supporting the long-term sustainability of Moldova's renewable energy sector, as they help establish a skilled workforce capable of managing and maintaining solar energy infrastructure.

**Challenges and Legislative Limitations in Moldova**

Despite the progress made under Law No. 10/2016, Moldova faces several challenges in scaling its renewable energy sector. Limited access to domestic financing, outdated grid infrastructure, and dependency on foreign funding are significant obstacles. Additionally, regulatory limitations, such as a lack of detailed guidelines for the installation and operation of renewable energy projects, have created uncertainty for potential investors.

To address these issues, Moldova's government has been exploring policy reforms aimed at simplifying the regulatory process and expanding access to financing. These reforms, if implemented effectively, could enhance the country's capacity to attract more investment in solar energy, especially in rural areas where energy access remains a challenge.

**Comparative Analysis: Romania and Moldova's Renewable Energy Legislation**

The legislative frameworks of Romania and Moldova reveal distinct approaches to promoting renewable energy, reflecting each country's unique economic and political context. Romania, as an EU member, has implemented a more robust and sophisticated system of incentives, supported by EU directives and access to European funds. Moldova, while not an EU member, has taken significant steps to align with EU standards, relying on international cooperation to overcome financial limitations.

- ✓ **Key Similarities**

Legislative Foundations: Both Romania and Moldova have established comprehensive renewable energy laws that serve as the foundation for their respective green energy initiatives. These laws prioritize the development of renewable energy, including solar, in line with EU standards.

Focus on Financial Support: Both countries recognize the importance of financial support mechanisms in fostering renewable energy adoption. While Romania has a more extensive system of subsidies and tax incentives, Moldova has leveraged international grants and low-interest loans to bridge its financial gap.

Support for Rural Electrification: Both Romania and Moldova emphasize the role of solar energy in rural development, seeking to improve energy access and quality of life in under-

served areas. Rural communities in both countries benefit from programs that promote small-scale solar installations, such as net metering in Moldova and public-private partnerships in Romania.

✓ **Key Differences**

Scope of Financial Incentives: Romania's green energy incentives are more comprehensive, encompassing a range of subsidies, tax exemptions, and investment models tailored to attract both large and small investors. In contrast, Moldova's support mechanisms are more limited, with a heavy reliance on external funding and fewer domestic subsidies.
Infrastructure and Regulatory Maturity: Romania's renewable energy sector is supported by more developed infrastructure and regulatory mechanisms, making it easier to attract investment. Moldova, however, continues to face challenges related to infrastructure and regulatory complexity, particularly in rural areas.

Dependence on International Cooperation: While Romania benefits from direct EU funding and policy alignment, Moldova's renewable energy progress depends significantly on international partnerships and donor funding. This dependency impacts the long-term sustainability of its renewable energy sector, as it is subject to fluctuations in foreign aid and political stability.

**Conclusion: Towards a Unified Approach to Renewable Energy in Rural Development**

Both Romania and Moldova recognize the transformative potential of solar energy in rural areas. By implementing supportive legislation, providing financial incentives, and fostering international cooperation, each country has made progress toward a sustainable future. However, the path forward involves addressing specific challenges—Romania with its regulatory consistency and infrastructure, and Moldova with its financial constraints and dependency on external support.

For Moldova, enhancing domestic financial incentives and simplifying regulatory processes could make renewable energy projects more attractive to investors. For Romania, further investments in rural infrastructure and policy refinement could consolidate its position as a leader in the region's renewable energy landscape. Together, these efforts can support sustainable rural development, bringing the benefits of solar energy to communities in both nations.

As an EU member, Romania adheres to environmental and energy directives, which provide a considerable advantage in accessing structural and cohesion funds aimed at sustainable development. Romania has access to programs such as the European Regional Development Fund and the Cohesion Fund, which are essential for investments in solar energy infrastructure in rural areas.

✓ **Key Recommendations**

**Optimization and Unification of Financial Support Measures**

Both countries could benefit from more accessible and better-structured financing programs for solar energy projects. Romania could continue to expand incentives for rural investments, while Moldova could develop international partnerships to access new funds and grants dedicated to solar energy.

### Introduction of Education and Technical Training Programs

Creating training programs for technicians in rural communities would facilitate the long-term maintenance and support of solar systems, generating local jobs and developing highly skilled competencies.

### Simplification of Authorization Processes and Increased Administrative Support

Streamlining authorization and implementation procedures for solar energy projects would reduce bureaucratic barriers for investors and local entrepreneurs. In Romania, local authorities could provide administrative support for small community installations, while in Moldova, simplifying authorization procedures may be essential to attract more foreign investments.

### Development of Local Infrastructure for Distribution and Storage

Building infrastructure for energy distribution and storage in rural communities is crucial for the efficient adoption of solar energy. Investments in local grids and energy storage systems can ensure stability and continuity of supply.

### Incentives for the Development of Public-Private Partnerships (PPP)

Expanding public-private partnerships can attract the expertise and capital necessary for solar energy projects. These partnerships are valuable for Romania, which could also facilitate larger infrastructure projects, and for Moldova, which could accelerate its transition to renewable energy by accessing private companies' resources and know-how.

### Evaluation of the Social and Economic Impact of Solar Energy

Local and national authorities need to conduct regular assessments of the social and economic impact of solar energy projects in rural communities. These evaluations can help identify challenges, adapt policies, and maximize benefits for the targeted communities.

**BIBLIOGRAPHY**

1) https://legislatie.just.ro/Public/DetaliiDocument/98742,
2) https://www.legis.md/cautare/getResults?doc_id=98936&lang=ro,
3) https://energie.gov.md/ro/content/starea-actuala-domeniului-energiei-regenerabile-republica-moldova-potential-provocari-si,
4) https://cned.gov.md/ro/content/mecanisme-de-sprijin,
5) https://renergy.md/noua-redactie-a-legii-10-suport-pentru-producatorii-mari-si-extinderea-schemei-net-metering/,
6) https://cned.gov.md/ro/content/evolutia-productiei-de-energie-din-surse-regenerabile-republica-moldova-implementarea-0,
7) https://particip.gov.md/ro/document/stages/anunt-privind-initierea-consultarilor-publice-asupra-proiectului-hotararii-de-guvern-cu-privire-la-aprobarea-proiectului-de-lege-pentru-modificarea-legii-nr-102016-privind-promovarea-utilizarii-energiei-din-surse-regenerabile/10289,
8) https://www.legis.md/cautare/getResults?doc_id=130209&lang=ro,
9) https://legislatie.just.ro/Public/DetaliiDocument/98742,
10) https://www.engie.ro/wp-content/uploads/2021/07/Legea-nr-220-din-2008-actualizata.pdf,
11) https://cned.gov.md/ro/content/mecanisme-de-sprijin,
12) https://energie.gov.md/ro/content/ce-este-o-comunitate-de-energie-din-surse-regenerabile,
13) https://energie.gov.md/ro/content/cadrul-legal,

ISSN 2602-1463
Vol. 9(1) 2025
Food Engineering, Agriculture and Rural Development



14) https://climate-laws.org/document/law-no-220-2008-for-the-promotion-of-energy-production-from-renewable-energy-sources_6eb8,
15) https://www.dreptonline.ro/legislatie/legea_220_2008_sistemul_promovare_producere_energie_surse_regenerabile_energie_republicata_2010.php,
16) https://eur-lex.europa.eu/legal-content/RO/TXT/PDF/?uri=CELEX%3A32018L2001,
17) https://eur-lex.europa.eu/legal-content/RO/TXT/PDF/?uri=CELEX%3A32019L0944,
18) https://www.ceccarbusinessmagazine.ro/ministerul-energiei-anunta-lansarea-primei-licitatii-din-cadrul-schemei-cfd-care-va-sustine-dezvoltarea-de-proiecte-fotovoltaice/s/NTQ2MTMyMTA0MzQ5NzE2MwBL_bpwyqLC3MI3ViureEk,
19) https://www.ceccarbusinessmagazine.ro/iea-lumea-va-plati-pentru-a-inchide-capacitati-regenerabile-daca-nu-investeste-in-retele/a/NTQ2MTMyMTA0MzQ5NzE2M3woslxwZQAzhIyJlpkPNzU,
20) https://fotovoltaiceicc.ro/legislatia-privind-panourile-fotovoltaice-in-romania-ce-trebuie-sa-stii/