REGIONAL DEVELOPMENT STRATEGIES AND THE GROWTH OF THE RENEWABLE ENERGY SECTOR: AN APPLICATION OF SWOT METHODOLOGY

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Abstract

The current development strategies are oriented towards the development of the green economy, where the energy sector plays an important role. In this sense, including at the regional level, development strategies are being built that primarily support the growth of the renewable energy sector. Thus, strengthening the economic environment of regions in society should lead directly to economic growth. This paper focuses on regional development strategies and renewable energy consumption in the European countries. Firstly, the paper will present sustainability of regional development strategies and renewable energy consumption from the perspective of the literature. The second objective is to analyse the environment of the renewable energy sector of European countries at the regional level with the help of SWOT methodology. The analysis reveals a maturity of renewable energy sector in Sweden based on national and regional development strategies and a transition process of most of the European Union countries from the conventional energy to the renewable energy.

***Keywords**: regional development, strategy, growth, renewable energy, SWOT methodology*

***JEL Classification**: O13, P18, P28, Q42, F68*

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1. Introduction

Energy is one of the most important factors determining the development of civilization, all actions of human beings and each management process must be powered by energy. At the same time, global climate change has been a commonly recognized challenge worldwide and one of the most important steps involved in combating this phenomenon represents the transition from conventional energy to the renewable energy. In this sense, there is a global mobilization to create the necessary infrastructure for the development of the renewable energy sector and each country develops green economy strategies, in which the energy sector plays an important role. The development of the state starts primarily from the perspective of the principle of subsidiarity, where the authority closest to the citizen establishes and implements the development directions, so that the green economy starts from the basic level of the state's organization, namely the local communities. In this sense, including at the regional level, development strategies are being built that primarily support the growth of local communities and renewable energy sector. Thus, strengthening the economic environment of regions in society should lead directly to economic growth of the entire state. Given that sustainable energy technology innovation and consolidated public mechanisms are instruments capable of removing financing barriers and supporting clean energy sector growth, increasing the consumption of renewable energy is a major priority where both companies and public authorities are involved.

This paper focuses on regional development strategies and renewable energy consumption in the European countries. Firstly, the paper will present sustainability of regional development strategies and renewable energy consumption from the perspective of the literature. The second objective, based on SWOT methodology, is to analyse the internal

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and the external environment of the renewable energy sector of European countries with the help of SWOT methodology to explore such factors that are key drivers of or impediments to the adoption of renewable energy strategies at both the local/regional levels.

2. Literature review

Along with the awareness of sustainable development from an economic, social and environmental perspective, special attention was paid to environmental protection from the perspective of the energy sector and the identification of ways to develop the renewable energy sector. As we identify a maturation of the renewable energy sector in each state, on the one hand, (De Laurentis and Pearson 2021, Köhler et al. 2019, Chlebna and Mattes 2020) and of the decentralization process based on the principle of subsidiarity, on the other part, we can consider that the center of gravity of decision-making falls at the level of local/regional authorities in the form of local/regional development strategies where the transition to the renewable energy sector has a priority place (De Laurentis and Pearson 2021, Fuchs and Hinderer 2014). Of course, according to the authors (De Laurentis and Pearson 2021), each region presents particularities from the perspective of human, institutional, industrial, infrastructural, and material assets that local/regional public authorities must be aware of and should be taken into consideration in their strategies, because local/regional public policies and the vision of local/regional development can support or create barriers in the development of the renewable energy sector.

The SWOT methodology is used by every strategy to identify the strengths and weaknesses of the internal environment and the opportunities and threats of the external environment of the development. Several studies are using SWOT methodology for the development of renewable energy sector strategies in different countries or regions (Qaiser 2022, Igliński et al. 2022, Markovska et al. 2009, Chen et al. 2014, Jaber et al. 2015, Madurai Elavarasan et al. 2020, etc.). Each study highlighted that each country presents a degree of sustainability in the implementation of renewable energy, but this is conditioned by a series of threats that should be eliminated and the correction of weaknesses.

3. Data and methodology

The SWOT methodology is used by management domain to evaluate projects, strategies, policies, or businesses. The acronym (SWOT) defines the identification of strengths, weaknesses, opportunities, and threats associated with the aspects that are under research, which in our case is related to renewable energy sector. The block diagram representing the framework of SWOT methodology is presented by Figure 1.

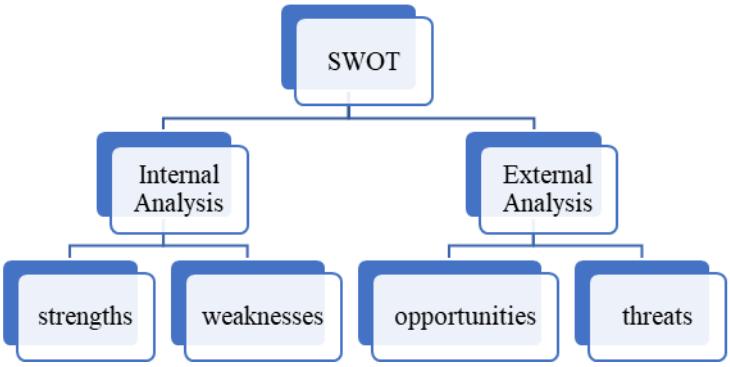

Figure 1. Block diagram representing the SWOT methodology
Source: computed by authors

The SWOT analysis was conducted on the European Union countries at the regional level by reviewing various studies, such as development strategies (European Commission 2022a, 2022b), research papers and institutional reports on the state of sustainable energy in European countries at national and regional level. For European Union the most ambitious strategies are REPowerEU Plan, EU solar energy strategy (European Commission 2022a, 2022b). Furthermore, personal observation can be included in the analysis.

To support the SWOT methodology, we will use the descriptive analysis as a methodology to highlight the status of the European Union countries in terms of the renewable energy sector according to a series of economic indicators. The database is created with the help of indicators taken from EUROSTAT (European Commission 2022c) in the period 2000-2020.

4. Results and discussion

Renewables are the cheapest and cleanest energy available, and can be generated by each community, reducing the use of centralized conventional energy based for some countries on high energy imports. The Commission (European Commission 2022a) is proposing to increase the EU's 2030 target for renewable energy sector from the current 40% to 45%. The REPowerEU Plan (European Commission 2022a) should bring the total renewable energy generation capacities to 1236 GW by 2030, in comparison to the 1067 GW. As part of the REPowerEU plan (European Commission 2022a) is the EU solar energy strategy (European Commission 2022b) that outlines a comprehensive vision to drastically accelerate the deployment of solar power across the European Union countries. The target is over 320 GW of newly installed solar photovoltaic capacity by 2025, and almost 600 GW by 2030. These frontloaded additional capacities should displace the consumption of 9 bcm of natural gas annually by 2027.

To achieve these targets, the Strategy presents three concrete initiatives (European Commission 2022b):

i) A European Solar Rooftop Initiative anchored around a legally binding EU solar rooftop obligation to ensure accelerated installation of solar panels on buildings;
ii) an EU large-scale skills partnership to develop the necessary skilled workforce to produce, install and maintain these panels; and
iii) an EU Solar Industry Alliance to support the EU industry in expanding the domestic production of PV panels.

These initiatives are necessary to be included inclusively in the local/regional strategies as part of the national strategies, so that to encourage citizens to engage in the energy transition, either as individual prosumers or via energy communities to self-produce, consume and sell or share renewable energy.

Regarding the status of each European Union country on the share of renewable energy in gross final energy consumption over the period 2000-2020, Figure 2 is suggestive.

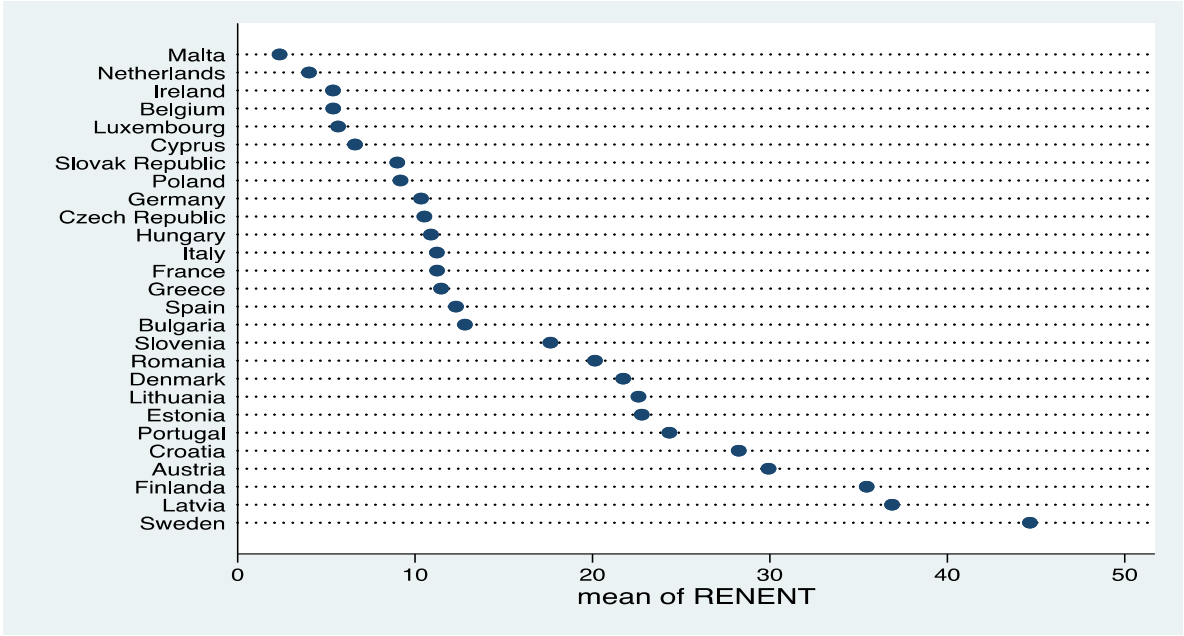

Figure 2. Mean of share of renewable energy in gross final energy consumption in the EU countries over the period 2000-2020

Source: computed by authors using Stata 15.1

According to the results, it can be observed that the mean of the renewable energy sector in gross final energy consumption over the period 2000-2020 is different in the states of the European Union. The country that registers a consolidation of the renewable energy sector and stands out significantly from the level of the other countries, with over 40%, is Sweden. A good status is registered by Latvia and Finland, which is located after Sweden, with an average very close to 40%. The renewable energy sector is the least developed in Malta and the Netherlands. This state status can also be viewed via the evolution of the energy sector in each country over the period under analysis.

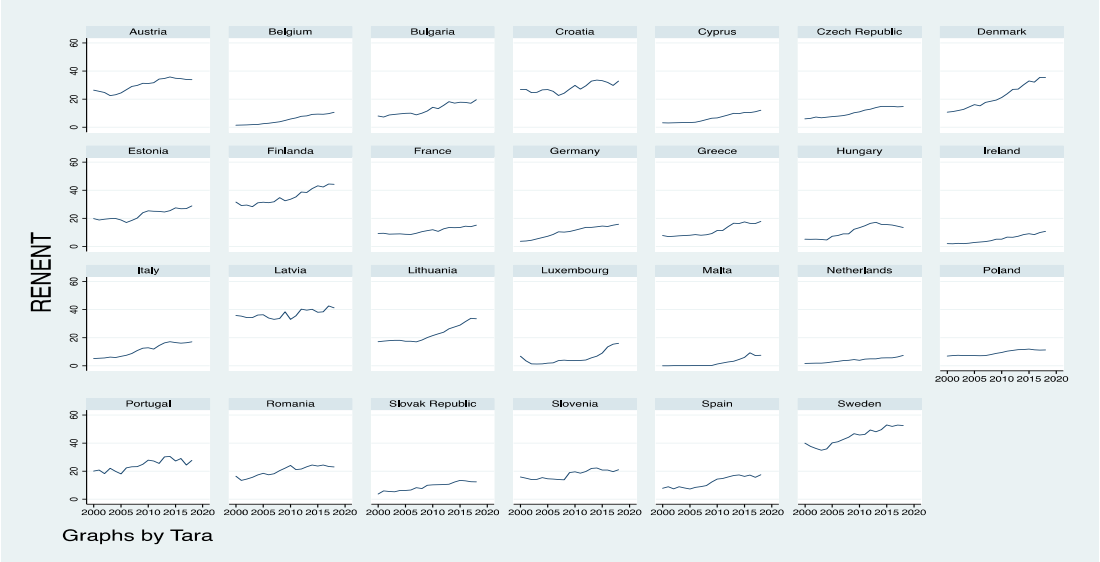

Figure 3. Evolution of share of renewable energy in gross final energy consumption in the EU countries over the period 2000-2020

Source: computed by authors using Stata 15.1

According to Figure 3, Sweden is the only country that presents a maturity of the renewable energy sector right from the beginning of the period under analysis, followed by a high level and in

the process of consolidation the renewable energy sector by Latvia and Finland. The states that currently have a share of less than 20% of renewable energy in gross final energy consumption and we consider that should be made significant efforts to comply with the targets proposed by the European Commission (European Commission, 2022a) are Germany, France, Slovakia, Czechia, Cyprus, Ireland, Poland, Netherlands, Hungary, Belgium, Luxembourg, and Malta. Romania has a level of 24.48% of renewable energy in gross final energy consumption.

It is also important to identify and consider the economic status of the states based on GDP per capita (Figure 4).

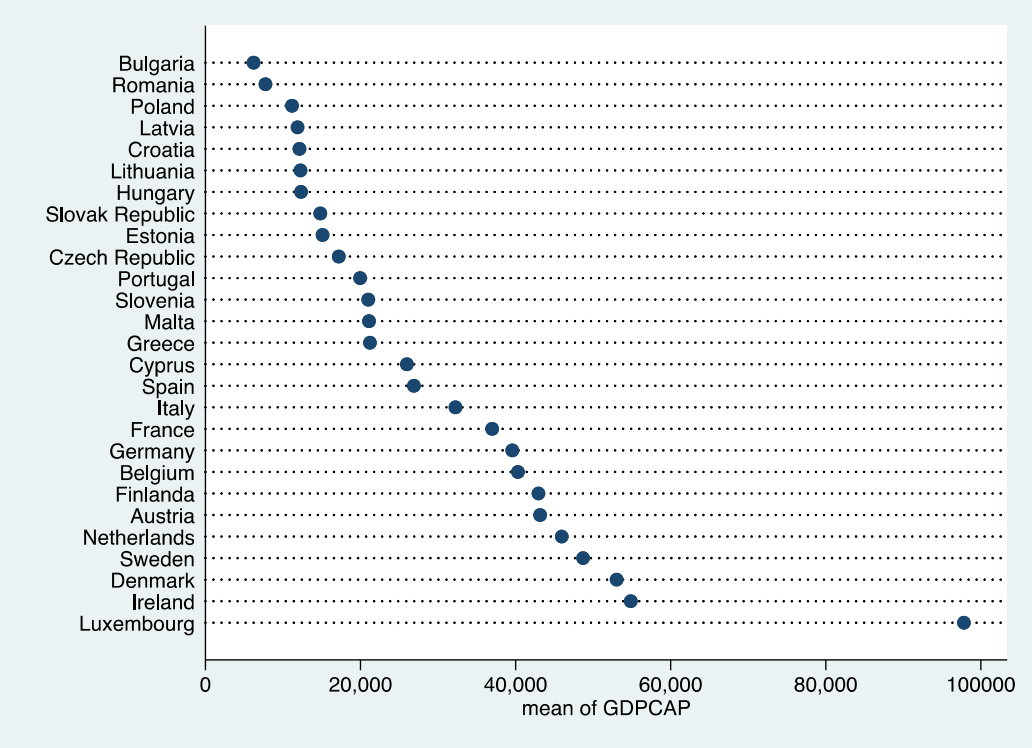

Figure 4. Mean of GDP per capita in the EU countries over the period 2000-2020
Source: computed by authors using Stata 15.1

According to Figure 4, we can consider that the states that exceed a level of GDP per capita above the European Union average, have the necessary financial capacity to implement renewable energy sector development strategies in the shortest possible time. Cyprus, Spain, Italy, France, Germany, Belgium, Finland, Austria, Netherlands, Sweden, Denmark, and Luxembourg register a high percentage and are eligible for rapid development. Of course, this financial capacity is not sufficient, but must be accompanied by coherent public policies, high administrative capacity of the governing institutions. States with a lower status of economic development are in a position to make the entire governance and management system efficient at national and local level based on the 3E principle: efficiency, effectiveness, economy.

Next, we will apply the SWOT analysis and the results can be highlighted in Table 1.

Table 1. SWOT analysis

Strengths	Weaknesses
• Each Region develops a regional strategy where renewable energy sector is a priority • The renewable energy is the cheapest and cleanest energy available that can be generated by each community • There is an enormous potential of renewable energy for European countries: solar, hydro, wind, etc.	• Economic and social Inequalities between regions in the same country • Different geographic infrastructure for each region • The public network of renewable energy transport and distribution is inadequate • Financial inability of local public authorities to generate their own revenues to cover major investment expenses

Strengths	Weaknesses
• Can be generated domestically (especially solar energy), reducing the need of centralized conventional energy based for some countries on energy imports • REPowerEU plan (European Commission 2022a) and The EU solar energy strategy (European Commission 2022b) are under implementation • Best practices regarding a sustainable renewable energy sector in other European countries: Iceland, Norway, and Sweden	• Dependence of local authorities on transfers from state budgets • Low investment of the private sector in transmission and distribution network for public
Opportunities	**Threats**
• European Union countries based on their regions can use EU funds: The Recovery and Resilience Facility- RRF (as the heart of the REPowerEU Plan implementation), Cohesion Policy funds, European Agricultural Fund for Rural Development, Connecting Europe Facility, Innovation Fund, National and EU funding in support of REPowerEU objectives, etc. • European countries can develop National fiscal measures and can use Private investment • The European Investment Bank and other international financial institutions are involved in the development of renewable energy sectors of the EU countries • Tax exemption for individuals and companies developed by each region in accord with region economic strategy	• Macroeconomic and microeconomic instability based on energy crises especially • Inflation and depreciating exchange rate making imported renewable energy equipment expensive • Insecurity because of the war in the East of Europe

Source: computed by authors

Regarding the Strengths, one can take into account the enormous potential of the existing natural resources on the territory of each state and each region, such as sun, water and wind that are the main resources for renewable energy sector. At the same time, this type of natural resources requires minimal exploitation costs and a very clean infrastructure in their processing and transformation into renewable energy. The awareness of these natural resources is made by the European Union and appears in Europe's development strategies such as REPowerEU plan (European Commission 2022a) or The EU solar energy strategy (European Commission 2022b).

From the perspective of the main weak points, we can list the specificity of each region in terms of geographical infrastructure (mountains, plateaus, plains, waters, sun) and therefore the type of renewable energy that could be produced, which differs from one region to another to another. Another important aspect is the disparities between regions regarding the level of economic and social development that led to a different management of budgets. The regions cannot generate sufficient own revenues to create an efficient public distribution network of renewable energy and are forced to use transfers from the state budget. From the perspective of the private sector, the interest is limited to its own renewable energy supply, with network investments being very low.

From the perspective of external factors on the line of opportunities, we can specify that there are numerous national and European Union funds sources that can be accessed by regions for financing the renewable energy sector through sustainable projects included as

objectives in regional development strategies. From the perspective of the threats, the most important is the economic crisis that started based on the tensions in Eastern Europe.

The analysis highlights the possibility of developing the renewable energy sector under the conditions of effective governance at the national and regional level.

5. Conclusion

The paper presented the sustainability of regional development strategies regarding renewable energy consumption in the European countries with the help of SWOT methodology. The analysis reveals a maturity of renewable energy sector in Sweden based on national and regional development strategies and a transition process of most of the European Union countries from the conventional energy to the renewable energy.

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