

Success Factors for Achieving Urban Sustainability. Case Study on Regional Sustainable Development in Romania

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Abstract: The issues of urban sustainability and regional development have become major priorities for public policy makers across the globe. Today, more than ever, there is a need for urban sustainability, and this cannot be achieved without taking into account the global dimension of the environmental problems. Various problems and requirements of the society and of the development of cities and regions may be solved by implementing renewable energy projects. Therefore, the aim of this study is to reveal recent research focused on the regional sustainable development. The paper discloses some success factors for achieving urban sustainability and emphasises a case study regarding the regional sustainable development in Romania. Moreover, the results of applying a questionnaire in order to find out students' opinion regarding the regional sustainable development through renewable energy are presented. The findings of this study may be helpful for upcoming research in the area of urban sustainability and regional development.

Key words: urban sustainability, regional development, sustainable development, renewable energy, environment, industrial revolution.

1. Introduction

Europe is an urban society, with many environmental challenges to face. All European regions are now interdependent in terms of guaranteeing energy supplies, creating stable economic conditions and effectively combating climate change, taking into account the global dimension of the problem. All actors play an essential role in managing this change, at local, regional, national and European level [1].

Nowadays almost half of the world's population lives in cities and the consequences of the urban growth on the environment are significant [2]. Urban areas are crucial engines of local socio-economic development, but at the same time are concentration points of environmental decay [3].

The important role of cities to the regional development is more and more recognized at global level. Cities are providing a wide range of services to residents and businesses, are creating jobs, are stimulating research and development within and outside the economic sector. However, these functions are not only limited to administrative boundaries of cities, but also create benefits for the whole region in which cities are included. A modern city is truly successful only if it can convincingly demonstrate that it complies with environmental requirements, and thus renewable

energy became an important success factor of competitive cities and regions [4].

Generally, cities are prolific users of natural resources and large generators of waste [2]. In addition, cities are producing the highest amount of greenhouse gas emissions which are the main cause of global climate change. However, cities and regions have been leaders in addressing the issue of climate change. Many cities and regions are adapting themselves to the so-called "green economy" with programs related to recycling, waste prevention, green buildings, sustainable public transit, etc. Mayors and regional leaders around the world are reducing their city's carbon footprint by renewing investment in public transit and enforcing land use provisions. Local authorities have mandated renewable energy requirements, recycling standards, clean energy service provision, and limits on urban sprawl [4].

In this respect, after revealing some success factors for achieving urban sustainability, we have briefly described in this study a case study on regional sustainable development in Romania. This case study comprises three subsections. The first one is dedicated to revealing some arguments that sustain the statement that in Romania urban sustainability may be achieved by developing renewable energy. The second subsection discloses a case study resulted from the class debate of the statement

“Renewable energy may help the development of the region you live in”. The third subsection reveals the results of applying a questionnaire in order to find out students’ opinion regarding the regional sustainable development through renewable energy.

2. Success factors for achieving urban sustainability

As [5] sustains, the humankind is now in front of the Third Industrial Revolution, which will have a significant impact into the XXI century, by fundamentally changing all aspects of working and living. The conventional top-down organization of society that characterized much of the social, economic and political life of the previous industrial revolutions based on fossil fuels is rapidly giving way to the distributed and collaborative relations of the emerging green industrial age [5].

Until now, the three pillars of the sustainable development were economic, social and environmental development [6]. Currently there is a need for co-operation, for a strong partnership between the local stakeholders such as the business community, the public authorities and the civil society in order to develop competitive green cities and to achieve urban sustainability (figure 1) [4].

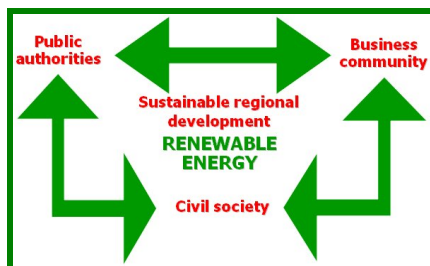


Fig. 1 Local stakeholders’ partnership

The pillars of the Third Industrial Revolution are specifically five: (1) the transition from fossil fuels to renewable energy, (2) the transformation of the building stock of every continent in electrical micro power plants that produce and use renewable energy, (3) the deployment of hydrogen technology and other energy storage systems in all buildings, and across the network infrastructure, in order to accumulate renewable energies, which are of intermittent flow, (4) the use of Internet technology to transform the electricity network of every continent in a "interred" of shared power that works just like Internet (millions of buildings may generate locally - in situ - small amounts of energy and can sell the surplus to re-enter the network,

sharing that electricity with their continental neighbours), and (5) the transition from the current fleet of transport vehicles to electric motor power supply vehicles able to buy and sell electricity within an interactive and intelligent continental electrical grid [5].

We can identify some success factors for achieving urban sustainable development (figure 2). Renewable energy, innovation, specialized human capital, knowledge, environmental requirements, environmental technologies, research on environmental issues, green buildings, infrastructure, security, efficiency, local and regional innovation strategies are the main success factors for urban sustainability, among which renewable energy plays an important role.



Fig. 2 Success factors for achieving urban sustainability

The technological development in the urban development of cities may take into account the following prioritized areas: (1) sustainable management of the place and use of soil; (2) renewable and alternative energy; (3) sustainable management of water; (4) ecological materials; (5) comfort in the constructed environment; and (6) other resources and processes [7].

The distinctive potentials and contributions of renewable and efficient energy to sustainable and regional development have been recognized, however its widespread implementation was delayed [8]. A higher degree of solar, wind or biomass use as sources for heating, cooling and electricity production could change the buildings’ design concept and a series of new standards have to be developed. The architecture of the new or revamped buildings will take into account different new elements (solar panels, photovoltaic walls and roofs, wind generators, etc.) integration in buildings’ envelope and resistance structure [9].

Urban managements in more prosperous advanced countries are rapidly and seriously transiting from conventional to sustainable energy technologies [8].

The new environmental technologies applicable to urban sustainable development depend on the degree of the development of the country, its infrastructure, specialized human resources and management of the plans and programs of urban development, in addition to other tools such as methodologies and procedures that help their application. On the other side, regulation, lineaments and rules alike play an important role in the use and advantageous exploitation of these new technologies, as well as the way to apply public policies in the region does [7].

Innovation, knowledge and innovation capacity are essential elements in achieving the regional sustainable development [10]. Geographic position and natural resources are not key concurrence advantages anymore, because knowledge and abilities of employees are becoming key factors for success [11].

3. Case study on regional sustainable development in Romania

In this part of the study we state that in Romania urban sustainability may be achieved by developing renewable energy. Therefore, the next subsection is dedicated to revealing some arguments that sustain the above mentioned statement. Afterwards it is presented in the paper a case study regarding renewable energy and regional sustainable development and the results of applying a questionnaire in order to find out subjects' opinion on the statement that "renewable energy may help the development of the region they live in".

3.1. Arguments for achieving regional sustainable development in Romania through renewable energy

Regional sustainable development in Romania may be achieved through developing renewable energy. This statement is based on the fact that all 8 Romania's development regions have good potential of this type of energy (figure 3) [12].

Furthermore, renewable energy should be increasingly used because it may lead to long term economic growth and may contribute to sustainable urban planning. This statement is based on what [13] found in their study regarding the ways of obtaining economic growth from energy consumption in urban areas. They investigated if there is a relation in the short and/or long run between economic growth and energy consumption by fuel in Romania. The only renewable source of this study was hydro energy and it has established a

long term relationship with GDP, however the relationship is not valid in the short term [13].

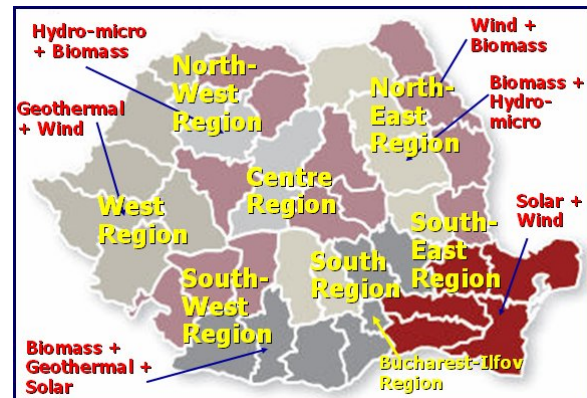


Fig. 3 Map of renewable energy potential in Romania's development regions [12]

Regional development is a concept that aims at boosting and diversifying economic activities, stimulating investment in the private sector, bringing contribution to unemployment cut-down and last but not least leading to an improvement of the living standards [14].

The concept of natural advantage of the region may be seen as a process to integrate innovation and sustainability policies and actions at a regional scale. The natural advantage manifests in three overlapping areas: (1) policies and initiatives for ecological modernization and cleaner production in industry, government, and civil society; (2) conservation and restoration of natural systems and maintenance of ecosystem services; and (3) innovation, knowledge transfer and partnerships between public, private and community based organisations [15].

The renewable energy sources available at regional level can make a major contribution to regional economic development. Moreover, important progress in energy efficiency can be made at regional and local level. In addition, the investment in energy efficiency can often give a major boost to local industries (for instance, the restoration of buildings). While regional energy strategies are implemented in the context of European integration, the role of regions as economic players is also becoming increasingly important and therefore, regions must work to create an overall framework which is conducive to action [1].

The investments in renewable energy projects may play a role within the regional policies and they should be part of an integral development policy because the benefits of renewable energy may increase regional cohesion, and this may lead to a

positive synergy between renewable energy support and local development policies [16].

3.2. Case study regarding renewable energy and regional development

This subsection presents a case study regarding renewable energy and regional sustainable development from students' point of view. These results derived from the analysis of the empirical data collected during the class through personal observation and questionnaire. The target group consisted in third year students, distance learning, Faculty of Management, Bucharest Academy of Economic Studies, based in Bucharest and Piatra Neamt territorial centres situated in two different regions of Romania.

The professor chose as subject the analysis of the statement "Renewable energy may help the

development of the region you live in" in order to find out students' opinion related to this subject. The students have identified the premises, the arguments and counter-arguments of the statement and together with the teacher have drawn the argument map (figure 4) and have evaluated the logical strengths of arguments [17].

The class activities have been divided in three sessions: (1) firstly, each group of students from Bucharest and Piatra Neamt has drawn an argument map and has refined it; (2) secondly, the teacher has presented to the students the map drawn by their colleagues from the other city and based on this, new ideas were generated; and (3) thirdly, a common argument map resulted from the mixture of the two argument maps designed by the students from Bucharest and Piatra Neamt.

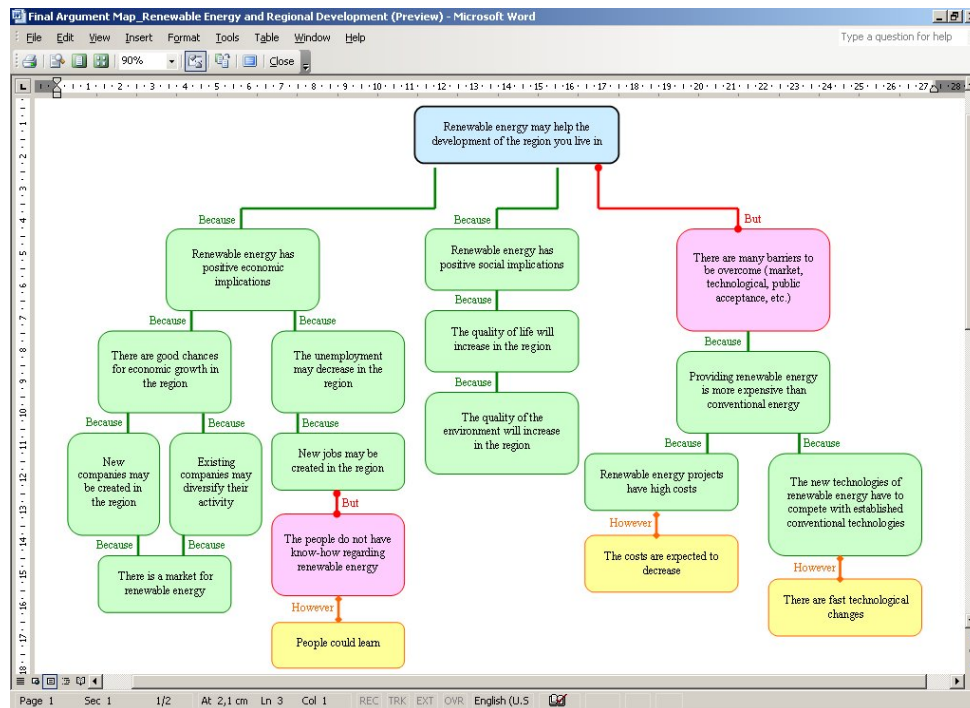


Fig. 4 Argument map regarding renewable energy and regional development [17]

3.3. Results of the questionnaire regarding regional renewable energy development

In the end of the third session a questionnaire was used in order to reveal students' opinion regarding the regional sustainable development through renewable energy. The questionnaire used was construed based on a five-level Likert scale of increasing intensity where 1 indicates strongly disagree (very badly) and 5 designates strongly agree (very good). The questions used to find out the students' opinion and the average values

(scores) of the responses of students from the two territorial centres for each question are presented in table 1 and compared in figure 5.

According to the performed study, the students from Bucharest obtained a total average score of 4.44, while the students from Piatra Neamt obtained a total average score of 4.41. These values symbolize a high degree of agreement, which means that the students from both regions appreciate that regional sustainable development may be achieved through renewable energy.

Regarding the first question “To what extent the renewable energy may contribute to the regional sustainable development?” the average scores obtained were 4.92 for the students from Bucharest and 4.86 for the ones from Piatra Neamt. These scores indicate that both students from Bucharest and Piatra Neamt appreciate as “good” to “very good” the contribution of renewable energy to the regional sustainable development.

No	Question	Average scores	
		B	PN
1.	To what extent the renewable energy may contribute to the regional sustainable development?	4.92	4.86
2.	Do you consider that renewable energy has positive economic implications?	4.33	4.69
3.	Do you consider that renewable energy has little negative economic implications?	4.15	4.39
4.	Do you consider that renewable energy has positive social implications?	4.65	4.48
5.	Do you consider that renewable energy has little negative social implications?	4.34	4.27
6.	Do you consider that the development of environmental technologies has an impact on the urban sustainability?	4.89	4.36
7.	To what extent the research on environmental issues contributes to achieving urban sustainability?	3.74	4.22
8.	To what extent local and regional innovation strategies are influencing urban sustainability?	4.11	3.98
9.	Do you consider that the barriers to the development of renewable energy will be overcome in the near future?	4.58	4.76
10.	Do you know examples of renewable energy projects developed in your region?	4.73	4.12
Total average score		4.44	4.41

Note: B – Bucharest; PN – Piatra Neamt

Table 1 Average scores obtained

Furthermore, as regards the second question “Do you consider that renewable energy has positive economic implications?” the average scores obtained were 4.33 for the students from Bucharest (indicating a “good” degree of agreement) and 4.69 for the students from Piatra Neamt (indicating a degree of agreement from “good” to “very good”). These results may be corroborated with the scores obtained for the third question “Do you consider that renewable energy has little negative economic implications?” (4.15 obtained for the students from Bucharest and 4.39 for the students from Piatra

Neamt), indicating that the subjects are aware of the fact that there are little negative economic implications of renewable energy.

The fourth and fifth questions are related to the positive and negative social implications of renewable energy. The average scores obtained for the fourth question were 4.65 for the students from Bucharest (indicating a degree of agreement from “good” to “very good”) and 4.48 for the students from Piatra Neamt (indicating a “good” degree of agreement). For the fifth question the average scores obtained were 4.34 for the students from Bucharest and 4.27 for those from Piatra Neamt.

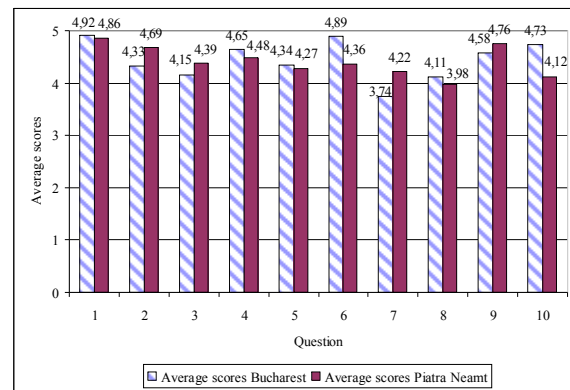


Fig. 5 Average scores of the responses

The sixth, seventh and eighth questions are referring to the development of environmental technologies, research on environmental issues, as well as local and regional innovation strategies and their influence on urban sustainability. The average scores obtained for these questions generally indicate a “good” degree of agreement.

To the ninth question the students from Bucharest obtained an average score of 4.58 and those from Piatra Neamt of 4.76, indicating a “good” to “very good” degree of confidence in the fact that the barriers to the development of renewable energy will be overcome in the near future.

For the tenth question the average scores obtained were 4.73 for the students from Bucharest and 4.12 for those from Piatra Neamt, indicating that they know examples of renewable energy projects developed in their region.

4. Conclusions

This study has revealed some success factors for achieving urban sustainability and has emphasised a case study regarding the regional sustainable development in Romania. The main conclusions of this study may be summarized as follows: among the success factors for urban sustainability

renewable energy plays an important role; regional sustainable development in Romania may be achieved through developing renewable energy; and the students from both regions comprised in this study appreciate that regional sustainable development may be achieved through renewable energy.

The findings of this study may be helpful for upcoming research in the area of urban sustainability and regional development.

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