

MANAGEMENT OF RENEWABLE ENERGY AND REGIONAL DEVELOPMENT - CASE STUDY: BRASOV COUNTY

Ion PLUMB

Andreea ZAMFIR

The Bucharest Academy of Economic Studies, Romania

Faculty of Management

ionplumb@yahoo.com

zamfir_andreea_ileana@yahoo.com

Abstract

The topic of the management of renewable energy and its implications on the regional development is highly debated nowadays. Therefore, the aim of this study is to reveal recent research focused on the management of renewable energy and regional development. Firstly, the renewable energy's role in regional development is revealed, and secondly, some strategic developments of Brasov County through the use of renewable energy are disclosed. The findings of this study reveal that there are some trends for the strategic development of Brasov County through the use of renewable energy. The results of this study may be helpful for upcoming research in the area of implementing renewable energy projects for urban development of the regions.

Keywords: management, renewable energy, regional development, Brasov County, strategic development.

JEL Classification: Q42, R00, O30, M10.

1. Introduction

This study investigates the correlation between the renewable energy and regional development through a case study regarding Brasov County. Firstly, this study briefly discloses the renewable energy's role in regional development, and identifies some success factors for the environmental technologies applicable to regional development. Secondly, this study identifies some trends for the strategic development of Brasov County through the use of renewable energy.

The research was conducted using a large variety of sources, such as statistics, research reports and articles. Analyzing and evaluating evidence and interpreting and reorganizing concepts answered the research question. Answering the research question was difficult, due to the variety of approaches, concepts and definitions found in the literature.

2. Renewable energy's role in regional development

There are various problems and requirements of the society and of the development of cities and regions which may be solved by using environmental technologies. One of the prioritized areas that may be taken into account for the technological development in the urban development of cities is the management and use of the renewable and alternative energy (Hernandez Moreno, S., 2009, p. 126). The distinctive potentials and contributions of renewable and efficient energy to sustainable and regional development have been recognized, however its widespread implementation was delayed (Ingwe, R., et al., 2009). Nowadays, the European Union's member states are trying to solve this problem by initiating more energy-efficiency and renewable energy investments. For instance, the European Commission is negotiating with member states to include more energy efficiency improvements and renewable energy schemes in housing in all member states (Rădulescu, C. V., Ioan, I., 2009, p. 66).

Urban management in more prosperous advanced countries is rapidly and seriously transiting from conventional to sustainable energy technologies (Ingwe, R., et al., 2009, p. 39-57). Nowadays, a wide variety of technologies provide energy from different renewable sources, such as biomass, wind, solar, hydro, and geothermal sources that have their unique technologies which convert the energy of the resource into a usable form. The elements that differentiate those sources from the conventional ones is their strong spread of the exploitable potential over quite extended areas and the immediate dependence of the season and weather conditions.

We can identify some success factors for the environmental technologies applicable to regional development (figure 1). 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 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 (Hernandez Moreno, S., 2009, p. 138).



Fig. 1. Success factors for the environmental technologies applicable to regional development

The persistent durability of regional successes and failures, as well as of the digital divides, suggest that only the knowledge regions may be good “hosts” to the (networked) knowledge-based economy (Alfirevic N. et al., 2009, p. 112-116). Moreover, learning ability and innovations making are considered key factors of the regional development in institutional economics (Hajkova V., Hajek P., 2010, p. 46-51). In this context, universities can have the largest impact on regional economic growth by excelling in advanced research and by augmenting the region’s stock of human capital (Popa G. et al., 2010, p. 285-289). Under the regional development, the innovative process is more important than innovation production, because it potent the human capital.

Within the knowledge-based economy there is a strong correlation between knowledge, education, information and communication technologies, economic growth and regional development. The new economic growth models are connected to other more dynamic factors, as: human capital, knowledge, innovation and entrepreneurship. Innovation, knowledge and innovation capacity are essential elements in achieving the regional sustainable development (Ionescu R., Moga L., 2010, p. 234-240). Geographic position and natural resources are not key concurrence advantages anymore, because knowledge and abilities of employees are becoming key factors for success (Mandic D., Lalic N., Lalic S., 2010, p. 102-107).

There are some current technologies that may be applied to urban sustainable development, such as new-generation photovoltaic panels, systems of passive heating of water, wind energy, geothermal energy, mini-hydraulic energy, etc. (Hernandez Moreno, S.,

2009, p. 135). These technologies may be applied at the households, places of work, offices and any building so as to ensure an efficient energy management in cities and regions.

A higher degree of solar, wind or biomass use as sources for heating, cooling and electricity production could change the buildings' design concept. 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 (Muşatescu, V., Comănescu, M., 2009, p. 198).

Romania has a significant share of renewable sources, amounting to 12% of gross inland consumption and 29% of electricity production (Eurostat, 2009, p. 85). The proposed target for 2020 is 24% in final consumption, and although the target is ambitious, there is a significant potential in Romania for wind and biomass as well as for further hydro expansion, particularly smaller-scale hydro.

In terms of theoretical potential, biomass and biogas account for an overwhelming 65% of the total renewable energy sources potential (excluding large hydro) of around 135 TWh/year (cumulating both electric and thermal energy), with wind and solar accounting for 17% and around 13%, respectively. Small hydro (under 10 MW) and geothermal energy register a relatively low share in the total, with 4% and 1%, respectively (Roland Berger, 2010, Iluţiu-Varvara, D.A., et al., 2009, p. 100-104). Taking into account the significant potential of renewable energy sources in Romania, it is reasonable to use it in order to develop Romanian cities and regions.

3. Strategic development of Brasov County through the use of renewable energy

Brasov County is incorporated in the Centre Region (figure 2), the fifth largest of the eight Romanian regions. It is situated in the south-eastern part of Transylvania and covers 5363 square kilometres, i.e. approximately 2.2% of Romania (Consiliul Judeţean Brasov, 2008).



Fig. 2. Geographic positioning of Brasov County in Romania's Centre Development Region

Source: Agenția de Dezvoltare Durabilă a Județului Brașov, 2010, p. 11

Within this county, the Metropolitan Area of Brasov plays a significant role for the development of Centre region. According to The Metropolitan Agency for Sustainable Development Brasov (2010, p. 3) the Metropolitan area of Brasov is a compact geographical space, which ensures a coherent and coordinated framework for the development of the town area of Brasov, starting from the idea that it represents, together with the surrounding localities, a coherent functional system, structured as a result of a long historical process. The space-related support for the multi-sectorial strategic developments in this area and the facilitation of access to the European financing resources can thus be ensured. Due to its potential and tradition, Brasov accedes to the European urban development tendencies, by means of public policies regarding space development that may take into account the complex interests of the entire surrounding territory (The Metropolitan Agency for Sustainable Development Brasov, 2010, p. 3).

The Metropolitan Area (figure 3) is built around Brasov (including other 13 localities surrounding it), which is the only national growing pole from the Centre Development Region. Brasov is one of the most developed industrial centres in Romania and geographically is situated on the most important development axis that is Bucharest-Ploiesti-Iasi axis, which may be more important in the future, both from economic and logistic points of view (Popescu, R.I., Corboș, R.A., 2010, p. 69-85). Brasov has the greatest urbanization degree within the Centre Region (74.7%) and takes the first place in terms of GDP/inhabitant and work productivity (The Metropolitan Agency for Sustainable Development Brasov, 2010, p. 6).



Fig. 3. The Metropolitan Area of Braşov

Source: The Metropolitan Agency for Sustainable Development Braşov, 2010

Brasov County accounts for 0.07% of total green energy production in the Centre Development Region. It stands in the Centre Development Region as an important source of hydroelectric energy production, the most favorable area for hydropower being in the Fagaras Mountains. Furthermore, Brasov County has high potential of forest biomass that can be used to produce thermal energy. The big areas of forests allow wood and other fibrous plants recovery in order to produce bio-fuels. The mountain area has high biomass energy potential, which could replace significantly the consumption of primary resources of energy (Agenția de Dezvoltare Durabilă a Județului Braşov, 2010, p.143).

The local government authorities and academia have taken the initiative to establish partnership structures that have expertise in renewable energy and environmental protection, in order to develop the sector of renewable energy within Brasov County. Thus, there are within the county: an agency created at the initiative of the authorities (The Agency for Energy Management and Environmental Protection Brasov) and also the Center Product Design for Sustainable Development – “Transylvania” University of Brasov. The objective of the Agency for Energy and Environmental Management Brasov is to identify and assess the local energy and environment problems, and to promote energy efficiency and the use of renewable energy sources. The Center Product Design for Sustainable Development – “Transylvania” University of Brasov has a complex partnership structure, with Romanian and foreign partners. The Center acts as a pole of expertise and guidance in the fields of renewable energy sources and environmental management (Agenția de Dezvoltare Durabilă a Județului Braşov, 2010, p.144).

In order to develop Brasov County within Centre Development Region through the use of renewable energy there some strategic trends that include five priority axes and several domains of intervention (table 1).

Table 1

Strategic trends for the regional development of Brasov County through the use of renewable energy

No.	Priority Axes	Domains of intervention
1.	Management of energy through local policies and modernization of the local and regional structures of energy management	<ul style="list-style-type: none"> - Establishment of the energy policies at regional and county level in order to develop the energy efficiency and renewable energy; - Promotion of Mayors Convention and including new administrative units from the Centre Region into the European network.
2.	The use of Centre Region's natural potential in order to produce energy from renewable sources	<ul style="list-style-type: none"> - Encouragement of the use of renewable energy through the use of the local renewable sources and supporting public-private partnerships; - Establishment and supporting regional networks for technologic transfer and innovation in order to achieve the interface between Research & Development institutions and companies in renewable energy field.
3.	Stimulating the companies in the region to use renewable energy	<ul style="list-style-type: none"> - Supporting the introduction of innovative and modern technologies and advanced equipment for the use of alternative energies; - Promoting the participation of firms in the region at fairs and exhibitions presenting the technologies, as well as production and consumption systems for renewable energy; - Promoting the creation of new innovative companies in the field of alternative energy and supporting the innovative activities of the existing companies.

4.	Increasing dissemination of the research results, and development of the innovation potential in the field of renewable energy	<ul style="list-style-type: none"> - Supporting research and innovation in the field of renewable energies within the regional development policy; - Research & Development institutions' involvement in investment projects, research projects and research and development international networks; - Infrastructure development support in the field of applied research and technology transfer.
5.	Improvement of workforce' skills and development of managerial skills for the people involved in the renewable energy field	<ul style="list-style-type: none"> - (Re) Qualification and training of the workforce in the field of renewable energy; - Developing an entrepreneurial culture through a new approach within the regional educational system.

Source: Adapted from Centre Regional Development Agency, 2010, pp. 8-9

Very few projects regarding the generation of green energy and the use of renewable energy sources have been implemented in Brasov County so far. However, there are some examples of success, especially in energy efficiency field, implemented by the Agency for Energy and Environmental Management Brasov. For instance, starting from 2010 at Feldioara is scheduled an investment to produce green energy (biomass) with a capacity of 4 MW power (Sustainable Development Brasov Agency, 2010, p.144). There is a strong need for new projects to be implemented for the regional development of Brasov County through the use of renewable energy.

4. Conclusions

We have emphasized in this study that there are some current technologies that may be applied to urban sustainable development and we have identified some success factors for the environmental technologies applicable to regional development. Furthermore, taking into account the significant potential of renewable energy sources in Romania, we may conclude that it is reasonable to use it in order to develop Romanian cities and regions. In addition, we have identified some trends for the strategic development of Brasov County through the use of renewable energy.

Another conclusion of this study is that there is a strong need for new projects to be implemented for the regional development of Brasov County through the use of renewable energy.

The results of this study may be helpful for upcoming research in the area of implementing renewable energy projects for urban development of the regions.

Acknowledgments

This work was supported from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/89/1.5/S/59184 “Performance and excellence in postdoctoral research in Romanian economics science domain”.

References

1. Alfirevic, N., Pavicic, J., Znidar, K. (2009), *Knowledge and Information Technology and Urban (Regional) Development*, Proceedings of the 10th WSEAS International Conference on Mathematics and Computers in Business and Economics, Prague, Czech Republic, WSEAS Press
2. Hajkova, V., Hajek, P. (2010), *Analysis of Regional Innovation Systems by Neural Networks and Cluster Analysis*, Proceedings of the International Conference on Communication and Management in Technological Innovation and Academic Globalization, Puerto De La Cruz, Tenerife, WSEAS Press
3. Hernandez, Moreno, S., (2009), *Current Technologies Applied to Urban Sustainable Development*, Theoretical and Empirical Researches in Urban Management, 4(13)
4. Iluțiu-Varvara, D. A., Fițiu, A., Vladu, D. E., Sandor, A., (2009), *Research Regarding the Biomass Energy Potential of Romania*, Bulletin UASVM Agriculture, 66(2)
5. Ingwe, R., Inyang, B., Ering, S., Adalikwu, R., (2009), *Sustainable Energy Implementation in Urban Nigeria*, Management Research and Practice, 1(1)
6. Ionescu, R., Moga, L., (2010), *Regional Development Partnership under Innovation and Learning Processes*, Proceedings of the International Conference on Development, Energy, Environment, Economics, Puerto De La Cruz, Tenerife, WSEAS Press
7. Mandic, D., Lalic, N., Lalic, S., (2010), *Decision Support Systems in Educational Technology*, Selected Topics in Applied Computing, Applied Computing Conference 2010, Politehnica University of Timisoara, Romania, WSEAS Press

8. Muşatescu, V., Comănescu, M., (2009), *Energy – Climate Change Package Impact on Romanian Urban Areas*, Theoretical and Empirical Researches in Urban Management, 4(13)
9. Popa, G., Rizescu, C. Z., Robescu, O. V., Necula, C., (2010), *Environmental Policy and Industrial Innovation: Integrating Environment and Economy through Ecological Modernisation*, Recent Advances in Mathematics and Computers in Business, Economics, Biology and Chemistry, Iasi, Romania, WSEAS Press
10. Popescu, R. I., Corboş, R. A., (2010), *The Role of Urban Tourism in the Strategical Development of Brasov Area*, Theoretical and Empirical Researches in Urban Management, 7(16)
11. Rădulescu, C. V., Ioan, I., (2009), *Economical Crisis and the European Union's Cohesion Policy*, Management Research and Practice, 1(1)
12. Roland Berger Strategy Consultants, (2010), *Green Energy in Romania*, last accessed March 17, 2011, <http://rbd.doingbusiness.ro/ro/5/articole-ultima-editie/1/373/green-energy-in-romania>
13. Centru Regional Development Agency, (2010), *Strategia Regiunii Centru pentru utilizarea resurselor regenerabile de energie 2010-2020*, 7th FP Project: Renewable energy resources - a solution for a sustainable development of two European Regions (RenERg EuReg), last accessed March 17, 2011, http://www.renerg.eu/Document_Files/Evenimente/00000064/b9ogm_Strategia_SER_Regiunea%20Centru_2010-2020.doc
14. Consiliul Judeţean Braşov, (2008), *Judeţul Braşov – Prezentare generală*, last accessed March 17, 2011, <http://www.judbrasov.ro/cjbv/page.php?cat=2&pag=140&sec=85>
15. Eurostat, (2009), *Panorama of energy. Energy Statistics to Support EU Policies and Solutions*, Luxembourg: Office for Official Publications of the European Communities, last accessed March 17, 2011, http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-GH-09-001/EN/KS-GH-09-001-EN.PDF
16. The Metropolitan Agency for Sustainable Development Brasov, (2010), *Key Numbers in the Brasov Metropolitan Area*, last accessed March 17, 2011, <http://www.metropolabrasov.ro/files/download/AMBv.pdf>
17. Agenţia de Dezvoltare Durabilă a Judeţului Braşov, (2010), *Strategia de dezvoltare a Judeţului Braşov orizonturi 2013-2020-2030*, last accessed March 17, 2011, http://www.addjb.ro/fileadmin/user_upload/Documente_pdf/PODCA/ADDJB_Strategia.pdf