The Cost of Going Green in the Jiu Valley

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Abstract. The current study aims to argue, as objectively as possible, the importance of a transition to green energy, and also tries to cover several perspectives, but with an emphasis on the social and financial economic perspectives. It is an attempt to raise awareness of the importance of the growing eco-friendly economy, and also to educate as much as possible the civil society and the political class as well as the businesspeople and the citizens, trying to convince them that this transition to green and renewable energy is profitable from all points of view. Transitioning to green energy is more difficult in the mining areas due to the non-industrial aspect and must take into consideration all the socio-economical aspects that arise from the closing of the mines. Also, we have to be aware of the fact that the transition to green energy is a long process that will reshape communities and futures.

Keywords: Sustainable development · Eco-friendly growth · Transition from coal

1 Introduction

The purpose of sustainable development is to ensure a strong and lasting balance between the economic, environmental, and social aspects of human activities.

The Brundtland Report, published by the World Commission on Environment and Development (WCED), states that "sustainable development is the development that seeks to meet the needs of the present, without compromising the ability of future generations to meet their own needs" [1].

Economic development, although it is desirable, has a negative and continuous impact on the environment, which is certainly threatening the future of humanity. This problem was discussed for the first time during the Conference on the environment organized in Stockholm in 1972 and thus the premises of what today we call sustainable development were created. In 1983, the WCED headed by Gro Bruntland, begins its work, following a resolution adopted by the United Nations General Assembly.

Two years later (in 1985) the hole in the ozone layer above Antarctica is discovered and, through the Vienna Convention, attempts are made to find solutions to reduce the consumption of substances that damage the protective ozone layer that surrounds the planet. In 1986, one year after the Chernobyl catastrophe, the Brundtland Report of the WCED appeared. At the same time, the Brundtland Report admitted that economic development cannot be stopped, but that strategies must be changed to fit the ecological

J. A. Benítez-Andrades et al. (eds.), *Global Challenges for a Sustainable Society*,
Springer Proceedings in Earth and Environmental Sciences, https://doi.org/10.1007/978-3-031-25840-4_13

limits provided by the environment and the planet's resources. At the end of the report, the commission supported the need to organize an international conference on sustainable development.

Thus, in 1992, the "Earth Summit" took place in Rio de Janeiro, attended by representatives from approximately 170 countries. Following the meeting, several conventions were adopted, related to climate change (reducing methane and carbon dioxide emissions), biological diversity (conserving species) and stopping massive deforestation. Also, a plan to support sustainable development, Agenda 21, was established.

Ten years after the Rio Conference, in 2002, the Summit on Sustainable Development was held in Johannesburg.

Lester R. Brown created the "Worldwatch Institute" in 1974 and is the promoter of a series of studies, materialized in the annual reports on the progress on the path of structuring a sustainable society: "The State of the World" or "Vital Signs". He draws attention, in the work "Plan B 2.0" to the conflict between industrial civilization and the environment, and mentions related aspects such as:

- the tendency to exhaust natural resources of energy, raw materials and food;
- consumption of renewable resources at a rate higher than their regeneration capacity;
- physical damage and pollution of vital environmental factors: water, air, soil.

In this context, Brown points out the importance of waste recycling.

A sustainable society is a society that shapes its economic and social system so that global natural resources and life support systems are maintained.

Sustainability starts from the idea that human activities are dependent on the environment and resources. Health, social security and economic stability of society are essential in defining the quality of life.

How do we reduce or manage to stop consuming so much? how do we keep energy consumption as low as possible? There are several "levers" we can pull to reduce energy consumption or replace it with clean energy: energy efficiency is one, dematerialization is another, the circular economy—to reuse as much of what we have and so on—yet another, and increased taxes on energy or ideally carbon yet another. And, of course, the rapid expansion of low-carbon, nuclear and renewable energy sources. "Renewable energy is an important piece of the puzzle in meeting growing energy demands and mitigating climate change, but the potentially adverse effects of such technologies are often overlooked" [2].

Hence the difference between sustainability and efficiency.

2 Importance of Going Green and the Financial Benefits of Being Eco-Friendly

The concept of eco-friendly growth was originally linked to environmental issues and the crisis of natural resources, especially those related to energy 30 years ago. The term itself is very young and was imposed in the summer of 1992, after the Conference on Environment and Development, organized by the United Nations in Rio de Janeiro.

There is a continuous growth in number of businesses going eco-friendly as the fight for climate change goes on. There are several entrepreneurs who are doing this transition out of sheer morality, and there is other who is making this eco-friendly step just so that they don't get left behind.

"Lately, it has become rather popular to change a business so that it is environmentally friendly and sustainable. There is a plethora of information available to the general public that describes the advantages of such an operating model, but somehow very few sources providing a clear description of how a business can estimate the financial benefit from the transition to a "green" model" [3].

Among the multitude of the financial benefits of being eco-friendly, we are going to focus only on the following:

(1) **Eco-friendly goods are in high demand.**

Even though the prices of eco-friendly goods are higher, there is an increased demand for them, and they generate higher profits. The top deciding factors in choosing eco-friendly services are:

- the quality and source of the ingredients;
- the environmental policy of the company;
- the policy of social responsibility of the company;
- environmentally friendly packaging;
- the social and environmental benefits of using these products.

(2) **Financial incentives.**

Governments in the EU region and the USA government understood very well the need for sustainable and renewable energy, therefore they are offering financial incentives to all the businesses that go green. These advantages are translated into tax credits, bonuses, or business deductions. These incentives are offered for businesses that:

- reduce the power use by installing hvac, economic lighting or hot water systems;
- use of alternative energy properties;
- use of vehicles with high fuel-efficient standards;
- recycle and reuse certain equipment or machinery.

(3) **Grants and financing programs.**

The financial incentives are one of the advantages offered by the governments for the green businesses. The companies can also access one of the numerous grants and financing programs in order to be more eco-friendly. Also, grants are provided for qualified programs related with environmentally responsible approaches.

These are but a few of the many government subsidies available to companies that effect environmentally friendly practices and solutions.

(4) **Increased savings from the use of organic and natural materials and smart energy use.**

All eco-friendly business measures naturally lead to savings. Using this kind of energy conservation, use of water saving devices, use of alternative energy sources, and reduction of waste can significantly reduce the costs. The effect is keeping costs down, and by doing that it is proven yet again to be more efficient and cost effective compared to traditional energy use.

Most of us knows that in these days being eco-friendly is a much more positive way to be seen while being an entrepreneur. This means that partners with wide perspectives are more likely willing to collaborate with you (due to shared values) and will hold you in higher regards.

3 The Financial Implications of Going Green in the Jiu Valley

"Ensuring a balance between economic and ecological well-being has emerged as a key concern for governments worldwide. In the contemporary era, the global economies, especially the developing ones, emphasize the relevance of achieving eco-friendly growth whereby the ecological footprint figures are aimed to be contained alongside higher economic growth" [4].

The energy sector, both at the European level and in Romania, is in full transition to "green, clean energy". The most important component of this transition is the decarbonization of the energy systems, simultaneously with the increase in energy production from renewable sources, without affecting the security of the electricity supply, on the one hand, nor the well-being of the final consumer, on the other hand. Another objective of this transition is to reduce greenhouse gas emissions. The role that Romania will assume in approaching the energy transition will determine whether our country will succeed in benefiting from this change or whether it will rather bear its costs.

The main positive aspect of this transition will be the development of the industry in the field of renewable resources. This will primarily lead to the creation of new jobs. The positive effects will not be limited only to this area, but, according to the snowball principle, the effects will also be felt in other areas and sectors of the national economy, such as: the automotive industry, transport, industrial production and last but not least in constructions. According to a Deloitte Ramania study, the investments in wind farms and in all these related fields will have a positive direct impact on Romania's GDP in the 2021–2030 period.

But these benefits cannot materialize without a well-defined strategy at European, national and local level.

Even today the Jiu Valley is strongly associated with the exploitation and production of electricity and thermal energy based on coal, but there is a tendency to transform the area.

The pillars on which sustainable development in Jiu Valley must be based are:

- improving the quality of life and creating a healthy and sustainable environment for future generations;

- economic diversification, innovation and entrepreneurship;
- sustainable exploitation of local specifics;
- accessibility, mobility and connectivity [5].

EU member states are obliged to re-engineer energy production units, so that starting from 2021 they comply with the limits provided by European regulations. The Paroseni Power plant underwent major transformations as a result of the decline of the mining activity. Thus, the power plant situated in the Jiu Valley has to be modernised.

In order to modernize the power plant from Paroseni, the investments already planned, or in progress, must be completed. The cost–benefit analysis takes into account the maintenance of subsidies for operation until 2024, and the granting of compensatory salaries following the redundancies, estimated at a value of 75.1 million lei, provided that both plants operate.

This scenario starts from the idea that the Paroseni power plant and the Vulcan and Livezeni mines will remain functional until 2030, and the Lonea and Lupeni mines will be closed in 2024.

The University of Petrosani has carried out an analysis that shows that the annual expenses for the operation of the thermal power plant would increase by 21.4 million lei. It is necessary to buy material for the desulfurization installation, but also other variable expenses [6].

The unit cost related to the electricity produced thus adds a cost of 21.1 lei/MWh produced, and 25.4 lei/MWh delivered. This results in a higher production cost for the plant, which leads to the maintenance of higher production costs. If we consider that the selling price of electricity covers 30% of the production cost, this additional cost will deepen even more the problems faced by the unit. Moreover, if we analyse the budgetary impact and consider only the salaries and jobs lost as a result of the reduction of the mining activity, in the conditions of a sector interdependent with other economic sectors, the resulting effects are translated into losses of almost 2 billion lei cumulatively and another 1231 of jobs in the rest of the economy, most of which are in the manufacturing industry (448) and constructions (73). This scenario, in which the 2 mines and one factory are kept, will lead to the loss of more than 2000 jobs by 2030. The cost-benefit analysis of preservation of two mines and one power station is presented in (Table 1).

The Jiu Valley has the chance to remain a traditional area in the production of electricity, but by changing the sources it uses. The potential of renewable energy sources, especially solar and wind can be a development factor, and thus the Jiu valley can be kept on the energy map of Romania.

The study done by Deloitte [8] shows that the investments in renewable sources of wind energy returns in a proportion of 42% in the local economy, which leads to the creation of new jobs and also an increase in added value. An in-depth technical understanding of the area's potential is necessary; the estimates are based on some minimum investment values for the installation of 10 MW of solar energy and 10 MW of wind energy until 2030 [9].

Therefore, a total investment of 102.7 million lei is necessary to be able to develop the 2 sectors simultaneously, taking into account a cost of approximately 5.1 million lei per MW.

Table 1 Cost–benefit analysis of preservation of two mines and one power station

Preservation of Livezeni mines and Vulcan and the Paroşeni Power Station up to in 2030 (and mine closure Lonea and Lupeni in 2024)	Direct costs until 2030 (million lei)	Direct benefits until 2030 (million lei)	Costs (−)/direct benefits (+) net by 2030
Subsidies	563.5		− 563.5
Involvement of European funds + private business	7367.0	4772.5	− 2594.5
Wages paid		1510.1	1510.1
Total	7930.5	6282.6	**− 1647.9**

Source Greenpeace Report: "Just Transition in Hunedoara", 2019 [7]
Bold indicates the estimated loss by the year 2030 in the scenario that Livezeni mine, Vulcan mine and Paroseni Power Station will be preserved and Lonea mine and Lupeni mine will be closed

For this reason, considering the possibility and potential of creating new highly qualified and well-paid jobs in this sector, it is automatically necessary to carry out feasibility studies that provide in detail both the technical aspects of the investment and the economic effects.

In accordance with the ITCU methodology regarding the creation of jobs in a green economy, it can be observed that in the case of investments in solar energy, 32 new jobs are created in the installation stage, and a job in the operation stage per MW. If we look at wind energy, installation creates 2.7 jobs per MW in the installation phase, and approximately 1 job for operation.

The phases of the investment assume the maintenance of jobs from one stage to another, and additional investments generate new jobs. Therefore, a direct impact of 257 jobs is obtained (Table 2).

Table 2 Cost–benefit analysis in the renewable energy sector

The renewable energy sector	Direct costs until 2030	Direct benefits until 2030	Costs (−)/direct benefits (+) net by 2030
Involvement of European funds + private business (million lei)	102.7	48.3	− 54.4
Jobs		257	257

Source Greenpeace Report: "Just Transition in Hunedoara", 2019 [10]

In essence, the modernization of the power plant brings both costs and greater benefits, and thus the balance tilts clearly towards the benefits.

4 Conclusions

Post-coal transition is possible and as proof stands the many rehabilitated mines and reintroduced into the economic circuit, and also the transformation of the economic profile of the affected regions, but it is a difficult process, which requires a lot of involvement and mobilization from the numerous actors and decision-makers, everything starting from local communities.

On the social side, the impact of closing the mines will be a major one. Unemployment is the one that will increase, thus leading to the layoff of more than 4000 people by 2024.

There are of course alternative activities that offer opportunities for some of them, and which opportunities would create over 2500 jobs.

In the end, all the proposed alternatives can be carried out with the aim of ensuring the optimal operating framework, with multiple perspectives: the creation of a coherent framework for training and instruction, the increase of administrative capacity and last, but not least, the development of the area's promotion identity, in order to attract new opportunities.

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