

Chapter 11

Solar Energy Potential as Support for Sustainable Development of Romanian Economy

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ABSTRACT

Energetic resources represent one of the most important factors in the process of consolidation of competitive market economy, having also a very important role in assuring the functionality of the economic system components. The decline of oil and gas production imposes the necessity to identify and implement new energy sources. Another reason to identify new energy sources is the pollution that is generated by the fossil fuel burn. The chapter presents a methodology about the solar energy potential evaluation for Romania. As a result of the tax incentives that are offered to investors in renewable energy, many projects were developed in Romania in the recent years, especially about wind and solar energy. But many projects have been done without a realistic assessment of potential wind or solar energy, as the consulting firms had presented an exaggerated image of the financial potential of these investments.

INTRODUCTION

The sustainable development of a country involves finding a balance between internal consumption of resources and the potential of resources that are owned, so that the depletion of these resources is never reached. Also, sustainable development involves the harmonization of the technologies that are used in order to ensure an environment that is as clean as possible.

All these requirements are contradictory because the resources (materials and energy) are often exhaustible and technological processes are generating environmental pollution.

Energy resources occupy an important role in the sustainable development of any economy because energy is needed both for basic needs such as home heating and cooking, but also to ensure the production of material goods and services. Because of this, the evolution and de-

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velopment of human society is closely related to the existence and the exploitation procedure of the energy resources.

The energetic resources that are used mostly are the fossil fuels: coal, oil and natural gas, hydraulic energy of rivers, uranium and renewable resources. The use of coal as an energy resource has led to a rapid development of the technology and production at an industrial level, generating the first industrial revolution. But the extraction of charcoal requires a high volume of work and it generates CO₂, other toxic or greenhouse gases and a quantity of ashes after combustion.

The transition to oil derivatives and natural gas as an energy resource has allowed the accelerated development of the technology and of the world economy, because their extraction is much simpler than that of coal, and the combustion process only generates CO₂ and other gases, without ash.

But the development of technology did not have only beneficial effects. During the pursuit for profit, there has been a growth in the production of goods, involving a higher level of the consumption of energy that is obtained by burning fossil fuels. This led to discharges of huge amounts of CO₂ and other products of combustion (gas, ash, etc.) leading to intense environmental pollution.

Ascertaining the direct link between pollution from industrial processes and the number of cases of diseases of various kinds, from mild allergies to complicated and difficult-to-treat cancers, measures to limit the emission of CO₂ and of other substances in the atmosphere were adopted, in order to gradually decrease the amount of CO₂ that is released into the atmosphere.

This problem, which is manifested globally, can be solved by modifying the current technologies in order to reduce flue gas emissions, especially CO₂ and sulfur compounds, or by substantially reducing the quantity of fossil fuels burned to produce energy.

The reduction of the quantity of fossil fuel that is burned can only be achieved by replacing them with other energy sources. A viable alternative, but

more expensive and sometimes more risky, is the nuclear energy. This is a clean way of producing energy but an accident can cause pollution effects more dangerous than a coal or gas plant (long term radioactive contamination). Another possibility is the renewable energy that includes wind, solar, hydro, geothermal and biomass energy. These sources are practically inexhaustible because all stem from the same source, which cannot ever be exhausted: the energy radiated by the Sun to Earth.

The replacement of traditional energy sources based on fossil fuels with renewable sources is also needed because conventional sources are depleting. The finite, exhaustible nature of these energy sources has been reported for the first time by the American geologist Marion King Hubbert in 1956.

The twentieth century has been dominated by the search and the insurance of the opportunities to exploit oil and natural gas resources. These resources have generated various economic effects, from economic crises (such as those in the years: 1973, 1979 and 2011) to the outbreak of armed conflicts between states. Along with the traditional sources of energy in the second half of the twentieth century, nuclear energy developed, which although it is much cleaner than energy from coal or petroleum products, it is much less used due to the dangerous radioactive waste.

The limited energy resources raises the question of energy options in the future, especially since in many specialized studies such as (Apergis & Danuletiu, 2012; Shahbaz, 2013), a number of correlations between the consumption of energy and industrial development of a society and national income have been highlighted, which shows a strong correlation between these factors.

Unfortunately, the volume of oil and gas reservoirs in use is declining, and other deposits are found increasingly difficult, at higher depths and / or in very difficult conditions for operation. The decline of oil reservoirs has been provided by American geologist Marion King Hubbert ever since 1956, in "Nuclear Energy and the Fossil Fuels", which was presented at a meeting of the

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