

ECONOMIC AND ECOLOGIC RISKS WITHIN THE ENERGY SECTOR

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Abstract

Climate change represents a real effect of the human activity – more exactly it refers to the variability of the main weather's features on the long term. This paper focuses on how coal and other classic energetic resources have determined global warming, leading to an increasing level of greenhouse gas emissions. Still, a difference between the classic resources and the renewable energy endowments must be mentioned, especially that they can be very vulnerable to climate change. Thus, in this study, we explore various approaches in terms of economic and ecologic risks. USA is taken more as an example. For instance, an assessment ecological risk framework is given as well as a statistical picture regarding the fuel mix for power production in The Midwest Region of the USA. However, good planning can substantially reduce the loss and risks associated with natural disasters.

Keywords

renewable energy endowments, global warming, sustainable development, ecological risks, energy system

Introduction

Over the last centuries, risk has received many meanings thanks not only to the business enhancement, human activities but also to the greater number of goods and services. It is a fact that humanity has developed itself being accompanied by risk. The economic growth would have not happened if it were not for uncertainty and risk. Still, an important effect would be globalization and its impact upon financial economy and environment. Specialists talk about both positive and negative aspects, but what this paper really focuses on is the current risks in terms of energy field.

The human pressure upon natural resources is in the verge of reaching to more and more unexpected problems. That is why sustainable development encourages an essential connection between people and environment, represented by some principles such as (Bari, 2001):

- Nature is a complex system – what we cannot see causes a certain risk, whenever something is wrong, an action must be done in order to have minimal disruption;
- Environment business does not behave as it would be obliged to offer everything; as it happens in each and every other sector, the total price of the goods must be balanced with the effect, do resources worth the money?
- There is no possibility for a restart – it is unlikely to establish ecosystems as they used to be – therefore, minimum disruption is recommended.

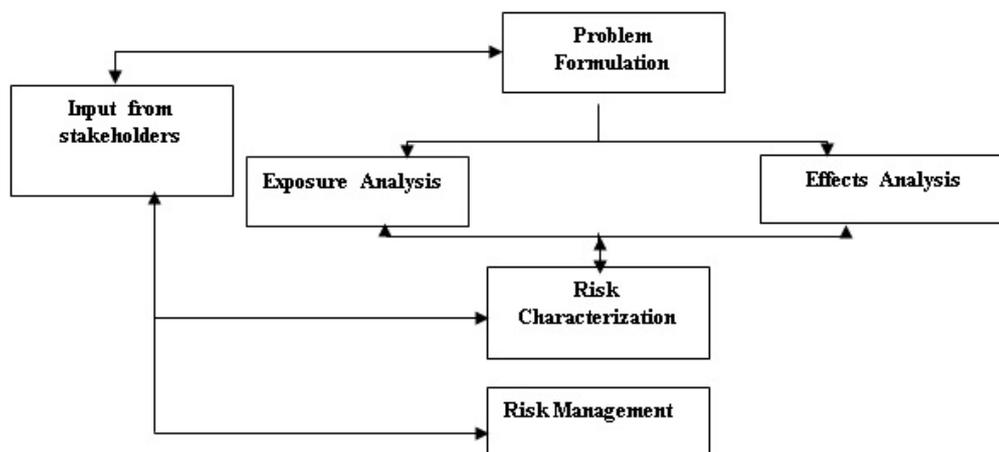
1. Risk and its economic footprints

Before one mentions the economic risk, one must know its primary meaning. Firstly, analysing risk represents a great modality to understand the strategic management of a company: identify risk, analyse and evaluate it, determine priorities so as to reduce risk as much as possible (Mironiuc, 2006). Based on the information within the paper *Basic*

Concepts of Risk Management and Risk Defined (2014), the most common approach in terms of risk is the relationship between one's probability of an incident's occurrence and the consequence of that occurrence. Nonetheless, few understand the real difference between uncertainty and risk. *The International Organization for Standardization Guide (2009a)* points out that risk is nothing more than the effect of uncertainty on objectives. From the economic perspective, risk means using the proper indicators as: dispersion and standard deviation of their average results (profit, cost) as well as the elasticity coefficients (profit) related to the activity of the enterprise – the fiscal value (Vintilă, 2006). Of course that any company would focus more on its highest value and less on its effect upon environment no matter the sector, even on the energetic one. However, from our point of view, the economic risk may express the incapacity of a company in adjusting its costs at the fiscal value variation.

2. Ecological risks

The human activities impact upon nature has been obvious over the last 50 years. It should be better understood and monitored: the development of cities, the growth of the transport sector and even deforestation have led to a malfunctioning of nature that has started turning against man (Bran et al., 2011). If we are to have a look upon the economic growth, the costs of natural disasters increased tenfold. We consider ecological risks every natural negative event happened because of the human activity such as: natural disasters (floods, landslides, volcanic eruptions, storms, cyclones, earthquakes and even fires), industrial pollution, desertification, deforestation, climate change, the excessive waste production, the urban environment, the high level of the greenhouse gas emissions. Therefore, all our activities lead to an increasing number of uncharacteristically intense events. However, significant controversy remains the corrective assessment management practices, largely because of uncertainty in predicting when, where and what intensity an event might happen as well as the consequence and really understanding it to all possible management options.



Source: (U.S. EPA – Environmental Protection Agency, 1992)

Fig. 1 Ecological risk assessment framework

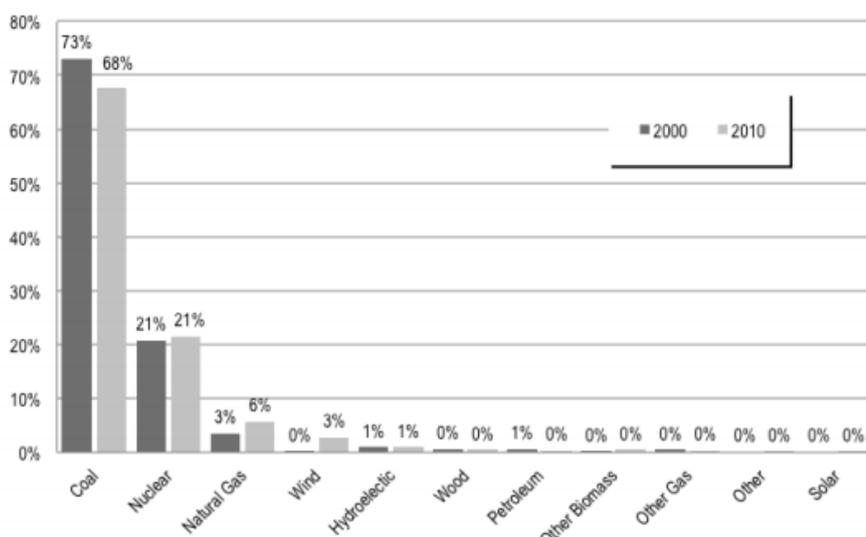
Ecological risk assessment appears to be the process of predicting somehow the magnitude of an occurrence of an unwanted, adverse effect. Its roots are within the insurance sector and it was first used to help to the nuclear science development. However, what is worth

mentioning is that model has been used from the very beginning by the Environmental Protection Agency (EPA) in 1990, in its scientific paper *Framework for Ecological Risk Assessment* and the later *Guidelines for Ecological Risk Assessment*. On the whole there is nothing more than some management decision tools that can be used in order to organize and integrate different types of information, as it can be seen in fig.1.

The types of risk earlier mentioned have determined people to have less confidence in the industrial sector. Negotiations for reducing effects entail a bargaining process during which whole population remains in distress. The safety of installations, corporate responsibility and the effectiveness of national and international regulations are increasingly being called into questions. It is well known that zero risk does not exist but those in charge can no longer continue to avoid their responsibilities.

3. Climate change versus energy sector

Most reports regarding environmental degradations mention the energy system as a the main source of pollution. Out of the emissions, the greenhouse gases represent the largest and also most harmful ones. In many states, environmental and energy policies promotes the switching from fossil fuels (particularly coal) to renewable resources. For instance: wind, photovoltaic, geothermal, hydroelectric, bioenergy, many implications so as to assure a clean, reliable energy. Such an initiative may be considered to be the existence of the Inter-Governmental Panel on Climate Change that raised the awareness of energy use. According to Danny H.W. Li (2012), China seems to be the first country with the highest energy consumption, especially in 2009. Despite of the fact that carbon emissions per capita in China are low the rate overtook the US in 2007 and it is expected to reach to more than 10Gt in 2050.



Source: Janice A. Beecher and Jason A. Kalmbach, Institute of Public Utilities, Michigan State University,

Energy Sector Midwest Technical Input Report National Climate Assessment

Fig. 2 Fuel mix for power production in The Midwest Region of USA (2000 and 2010)

Public enterprises that provide energy services have a great contribution of the US economy in terms of gross domestic product and even employment (Beecher, 2012). The Midwest

region of the United States appears to rely mainly on coal for generating coal (as you can see in the above figure). Many investments have been done more on peaking facilities specially that the power production fleet is quite old. However, thanks to some special economic and environment regulations initiated by authorities – Security and Exchange Commission, Federal Accounting Standards Board as well as the North American Electric Reliability Corporation – some investment decisions continue to shape with regard to both fossil and renewable energy (EIA, 2012).

One might really ask what the connection between climate change and the energy sector is. Well, to begin with, specialists sustain that it exists because of the continuous anthropogenic changes in the composition of the atmosphere or in land-use. According to the Third Assessment Report on Climate Change (2001) within the Intergovernmental Panel, the atmospheric concentrations of carbon dioxide, methane and nitrous oxide have grown by about 31%, 15% and 17% during 1750 -2000. On the other hand, climate change is considered to express a statistically significant variation either in its state of the climate or its variability. That is why, most of the common features of climate change are related to the small variations in Earth's orbit that change the amount of solar energy that our planet receives (Raman, 2012). However, all global initiatives encourage mitigating climate change that requires not only government action but also cooperation and involvement from consumers. Moreover, it has had a great impact upon energy sector, for example: energy transportation and infrastructure. As we mentioned earlier about USA situation, there is worth mentioning the fact that there is a great concern towards this matter as vulnerability, adaptation and resilience indicators (VAR) were used for sub-Saharan African countries.

The energy chain: resources, conversion, transportation, and the final use is also affected by the climate change. Let us have a deeper look upon the first stage – natural resources. They express the amount of primary energy available whereas the fossil fuels endowments refer to a stock. Renewable energy endowments express a flux of energy as they depend mostly on climate conditions. For this reason and other more, procedures and planning within this field are based on decisions under uncertainty (not risk) as weather variability is just one of the many elements of uncertainty. Coal is an important resource for producing energy. Its quality may be changed because of the bad climate conditions (floods) and negatively interfere in the last steps in the quantified reservoirs. It would also increase the costs for coal preparing thanks to the need for drainage (Bull, 2007).

Conclusions

Climate change, sustainable development and the energy sector have been addressed in separate areas in both research and policy. There are strong connections between the two realms. Zero risk does not exist, but still there has been a long debate and many studies have appeared over the last centuries in terms of reducing as much as possible pollution, greenhouse gas emissions and consequently, pay a high attention to what we call global warming. *The Third Assessment Report of the Intergovernmental Panel on Climate Change* reveals that *there is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities*. Therefore, there are real concerns that fast development of the developing countries will lead to some global certain economic and especially ecological risks and exacerbate resource problems. It does depend on the humanity not only to write, initiate, shape policy, regulations but also to take action and encourage the other ones to pay attention to natural resources, no matter the field.

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