Chapter 13

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ABSTRACT

The penetration of the Renewable Energy Sources (RES) and the development of the Energy Efficiency (EE) is related to the synthesis of an appropriate action plan by each state for its energy business environment (companies such as “clean” energy producers, energy services companies etc.). The aim of this chapter is to present an information intelligent system which consists of an expert subsystem, as well as a Multi Criteria subsystem. The system supports the state towards the formulation of a modern business environment, since it incorporates the increasing needs for energy reform, successful energy planning, rational use of energy as well as climate change. The system was successfully applied to the thirteen “new” member states of the EU.

INTRODUCTION

The Brussels European Council of 8 / 9 March 2007 adopted an Action Plan for energy market 2007–2009 and committed the EU to achieving at least a 20% reduction in greenhouse gas emissions by 2020 compared to 1990. The European Council also endorsed a binding target of a 20% share of Renewable Energy Sources (RES) in overall EU energy consumption by 2020, supplemented by a binding minimum target of 10% for the share of biofuels in petrol and diesel consumption for transport. Furthermore, the European Council stressed the need to increase Energy Efficiency (EE) in the EU so as to achieve the objective of saving 20% of energy consumption compared to projections for 2020. In particular, the European Commission has made a first assessment of National Energy Efficiency Action Plans (NEEAP), which Member States were required to submit by 30 June 2007. The Plans present national strategies
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on how Member States intend to achieve their adopted energy savings target by 2016. As a result, the European Community has undertaken an ambitious program aimed at improving the sustainability of energy use across Europe (Wu, 2007).

According to the basic literature of the economy’s science, Chandler (1962) outlines that the business environment (operational environment of companies) determines substantially the main long-lasting objectives and aims of each company, fires a line of action and indicates the necessary means for the accomplishment of these objectives. Johnson and Scholes (1999) note that the environment directs decisively the activities of a company in the long run. In addition to this, Ansoff (1985) supports that the existence of the companies’ operational environment is the base of creation of common lines between the activities of a company.

In the above context, one of the most important parameters for the RES penetration is the enhancement of the producers. These producers can be either companies deriving from utilities producing energy from conventional sources that have decided to be activated in the field of RES or Independent Power Producers (IPPs) (Patlitzianas, Ntotas, Doukas, & Psarras, 2007). The positive impacts of an increasing share of renewable energy on the mitigation of climate change as well as on the decrease of the dependency of energy imports are indisputable.

Moreover, Energy Service Companies (ESCOs) have been developed and their role is crucial for the promotion of Energy Efficiency (EE) in demand side (Patlitzianas, Doukas, Psarras, 2006). The success of the above energy companies is based on the formulation of a modern environment especially in each Europe Union (EU) member state. As a result, each member-state needs to formulate an up-to-date energy companies’ environment, which has to be enhanced, giving thus the opportunity to more companies in these member-states to be properly activated.

Nowadays, sustainable energy is about delivering affordable energy with reduced environmental impacts in ways that are financially viable. This helps to tackle fuel poverty, contributes to fighting climate change and boosts economic benefits to communities and businesses alike. Traditionally, energy companies have prioritised financial benefits over other objectives. Their need to deliver shareholder value obliges them to require financial returns that marginalise technical options which could provide lower carbon impacts and better energy services to end users. Typically, investment decisions are taken remote from the communities where delivery occurs.

Based on the international literature, a large body of scientific papers examines the external factors of the energy companies in terms of policies, regulations and financing support schemes of these states. However, there are no studies investigating the operational environment of energy companies in an integrated way.

On the other hand, the use of the expert systems, as well as the use of the Multi Criteria Decision Making (MCDM) systems, can help states assess and evaluate the companies’ operational environment. In particular, during the last years the expert systems are considered to be programs with a wide knowledge base in a limited space which use complex knowledge for the execution of works that an expert human could do. An expert system is the incorporation in the computer of a component based on knowledge, so that the system can be able to provide a logical advice regarding a processing function or to have the ability of decision making. A conventional system uses mathematical models for the simulation of the problem, while the expert system simulates the human arguing regarding the problem (Welbank, 1985). Furthermore, the purpose of MCDM systems is to correlate efficiently the various characteristics of any given problem (Prastakos, 2008) and as a result to demonstrate the best possible solution to any problem (Greening, & Bernow, 2004).