

Chapter 11

Renewable Energy Sources: Comparison of Their Use and Respective Policies on a Global Scale

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ABSTRACT

Sustainability concerns resulting from the consumption of natural resources, life-threatening levels of pollution, global warming, climate change and the ever-increasing worldwide energy use have brought renewable energy sources to forefront. Given the possibility of depletion of fossil fuels in the near future, the utilization of clean and renewable energy sources have become inevitable. Consequently, governments and global organizations adopted respective regulations to ensure the production and use of renewable energy and promote the respective new investments. In the light of these developments, the aim of this study is to conduct a detailed review and evaluation on the current literature and global energy statistics. The respective projects, binding regulations, incentives, and pricing mechanisms have also been studied to analyze and compare the renewable energy policies adopted worldwide. Ultimately, the goal is to make certain suggestions and lay out possible solutions regarding global energy problems.

INTRODUCTION

Renewables excluding large hydro accounted for 9.1% of world electricity generation in 2014, up from 8.5% in 2013 with a corresponding increase of 17% in global investment (\$270.2 billion invested in 2014 in renewable power and fuels excluding large hydro-electric projects) (Frankfurt School-UNEP Centre/BNEF, 2015). The reason behind this is the concern for sustainability resulting from factors including but not limited to the depletion of natural resources, life-threatening levels of pollution, global warm-

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ing, climate change and the ever-increasing worldwide energy consumption (Komor & Bazilian, 2005; Apergis & Payne, 2010). The effective utilization of renewable energy is critical across the world, where 1.3 billion people still do not have access to modern sources of energy (WEF, 2013). Societies have much to gain from the effective use of renewable energy with certain issues to consider while making this happen (see Table 1).

In order to make use of these advantages stated in Table 1 and to address the critical issues, countries have developed government policies and adopted respective regulations to ensure the production and use of renewable energy and promote the respective new investments. This has been realized both individually and also as a part of global organizations and networks such as the Organisation for Economic Co-operation and Development (OECD), European Union (EU), United Nations (UN) and International Energy Agency (IEA) (Arioglu Akan et al., 2014).

The government policies on renewable energy constitute a “highly complex policy subsystem that lies at the intersection between environmental policy, economic policy, and energy policy” (Yi & Feiock, 2014). Within this perspective, a detailed review and evaluation have been conducted in this study on the current literature, projects, binding regulations, incentives, and pricing mechanisms together with the respective energy statistics to analyze and compare the renewable energy policies adopted worldwide. It has ultimately been aimed to make certain suggestions and lay out possible solutions regarding renewable energy based on the relationships between the current policies and use throughout the world. To this end, the third part of the study provides the broad definitions on the main concepts discussed in this study. A comparative analysis of renewable energy use (both on a general basis and also by source) throughout the world has been given in the fourth part. The fifth part summarizes the global renewable energy policies adopted worldwide. In this part, the policies of the OECD, the EU and some countries

Table 1. Advantages and disadvantages of renewable energy

Advantages	Disadvantages
Provides low operating and maintaining costs	High up-front investment
Provides long life period	Entails long-term planning
Service cost is low	Entails long-term agreements
Reliable source	Entails multidisciplinary involvement
Induces technology development	Could involve resettlement
Fosters regional development	Entails new legal codes
Provides efficient energy production and safety	Excessive competition
Generates revenue and tax	
Creates new employment opportunities	
Protects environment and saves environmental protection costs	
Enhances living conditions	
It is waste-free	
Improves air quality	
Preserves ecosystems	
Helps slow down climate change	

Gökmen & Temiz, 2015.

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