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Review of policies encouraging renewable energy integration & best practices



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ABSTRACT

This article provides policy-makers and renewable energy project developers with background information and analysis into the successful penetration of renewable energy policies. The analysis emphasizes on the different mechanisms to establish an encouraging regulatory framework for renewable energies and examines examples of both successful and failed experiences, through case studies and analysis of various countries. This analytic survey attempts to shed light on the factors which led to successful implementation of renewable energy depending not only on different countries experience, but also on the different sources and technologies for renewable electricity. The main objectives through the provision of this overview are to help policy implementers learn from each other's experiences and contribute to the efforts to meet indicative renewable energy targets. The methodology applied in this document is to collect all applied mechanisms helping deploying renewable energy projects with a reviewing of study cases analysis for some specific experiences. Then the information are classified and discussed from the financial, fiscal, legislative, political, technological and environmental points of view in order to make it a reference and a guideline for other renewable energy policies studies.

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1. Introduction

There is no doubt that the world energy demand has recently witnessed a remarkable increase and is expected to reach a growth of 56% between 2010 and 2040 [1]. On the meantime, the energy market is facing much more challenges, such as limitation of fossil fuel reserves, population increase, lack of energy security, economic and urbanization growth, and water scarcity especially for the desert and arid regions.

To overcome this future gap between energy supply and demand, as well as taking into consideration the risks from global climate change due to the greenhouse gas (GHG) emissions and other pollutants from excessive fossil fuel combustion, a lot of attention was oriented to Renewable Energy Sources (RESs) and Energy Efficiency (EE) measures. That is why developing Renewable Energy (RE) project is considered as a huge opportunity not only from the strategic and financial points of view, but also from the technological and environmental ones [2].

On the other side, governments have the biggest role on developing REs through establishing strategic plans and adopting the adequate mechanisms. These policies can affect the price of both conventional and renewable generated electricity not only through subsidy reform and taxes, but also thanks to dedicated funds, power production and grid access related laws [2].

Therefore, among the first steps to elaborate a transition from a conventional power system to a diversified portfolio for electricity generation including RESs using smart grid technologies for a more efficient system, preparing a road map including the regulatory framework and strategies is a key study.

To do so, the deployed strategy for advising on first steps toward an encouraging RE regulatory framework, was to start with a survey of successful and failed experiences of policies around the world to promote renewable energy technologies (RETs), and conclude with the most effective measures and lessons learned.

1.1. Research task objectives

This research task aims at providing an overview about policies deployed and lessons learned, presenting a benchmark for comparison between different countries experience with RE policies in the world.

A literature review of the most relevant publications, reports and scientific papers dealing with policies encouraging RE and a

classification of the different types of support (financial, fiscal, political, legislative and technological) are reported in this document.

Through this study, the following objectives are expected to be attained:

- To have a complete and updated picture of the different policies and mechanisms encouraging RESs adopted around the world.
- To understand the reasons behind the success or the failure of each policy and mechanism.
- To learn lessons for future planning and development of policies and mechanisms.

This report is organized as follows. Section 2 presents and classifies the different factors affecting RE development and integration in the grid. Section 3 surveys and compares different international policies. Section 4 summarizes best practices and lists some recommendations. Finally Section 5 concludes this study and opens discussion to the future challenges facing RE integration.

2. Factors affecting renewable energy integration

Successful integration of RE can be only achieved after overcoming varied obstacles. However, there is no single identified factor that can have alone a significant positive effect on RE integration in a country. It is rather the association of benefits from supportive measures that determine the extent to which a renewable technology can be successfully or not exploited. This section summarizes the essential components affecting RE implementation and helping to create a positive environment in which RE exploitation can succeed. These factors are classified, described and discussed below, under the following aspects: financial, fiscal, legislative, political, technological and environmental.

The same classification will be also used in the following sections to evaluate different international practices on policies for RE integration and to conclude with lessons learned.

2.1. Financial aspect

Investment in RE projects requires financial incentives because such projects not only have typically higher capital costs than

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