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Renewable Energy: A Solution in Modern Era for Energy Sector

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A B S T R A C T

This paper discusses the role of renewable energy in developing sustainable development plans [1]. Three primary technological developments are often included in such strategies: energy savings on the demand side, energy production efficiency improvements [2], and the replacement of fossil fuels with alternative renewable energy sources. As a result, techniques for integrating renewable sources into coherent energy systems impacted by energy savings and efficiency measures must be included in large-scale renewable energy[3] implementation plans. The focus of this study is on the emergence and evolution of new technical systems, rather than on the life cycle model of industry evolution. The importance of describing success and failures in transitioning from a formative to a positive feedback phase is highlighted. In today's society, it is critical to use and create renewable energy in order to save future generations. Technology for converting transportation and the advent of flexible energy systems [4] are particularly important.We will further enlighten our readers and enthusiasts with the help of the survey to have a clear understanding of how far our modern technology [5] has progressed, where we can acquire more energy with less effort and complexities as a result of installing and implementing modern technologies in the renewable energy production domain. It's also one of science's best blisses

Keywords: renewable energy, energy saving, sustainable development, coherent energy systems,

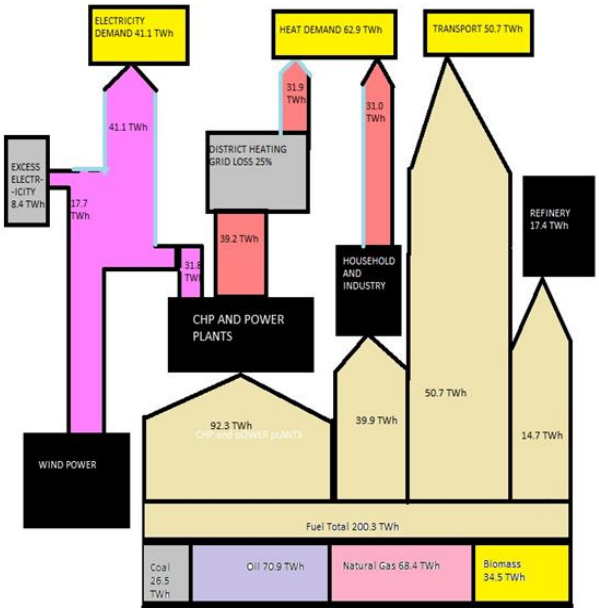
1. Introduction

Three primary technological advancements are often included in Sustainable Energy Development Strategies: energy savings on the demand side, energy production efficiency improvements, and the substitution of fossil fuels with alternative renewable energy sources. The global stock of wind turbines expanded by 27% per year on average in the 1990s, resulting in an electrical supply of around 56 TWh in 2001. During the same time period, the stock of solar cells climbed by 22% per year, producing roughly 2 TWh of electricity in 2001, while the stock of solar collectors throughout Europe increased by 12% per year, supplying nearly 6 TWh of heat in 2001.

The first big difficulty is to increase the amount of renewable energy available. Renewable energy is seen as a valuable resource in many nations throughout the world, however as shown in Figure 1, renewable energy accounts for less than 15% of worldwide primary energy consumption, with hydropower and wood fuels accounting for the majority in developing countries[6]. Renewable energy sources like wind and solar account for a very small portion of total usage. However, there is a lot of promise. And, in some places and countries, the share of renewable energy has increased significantly in recent decades, posing two fundamental obstacles to renewable energy programs for long-term development. One is to include a large proportion of intermittent resources into the energy system, particularly in the power supply. The other option is to integrate transportation in the plans. This study examines the issues and suggests potential solutions based on the situation of Denmark [7]. 1st correspondent author Since the first oil crisis in 1972, Denmark's energy policy has prioritized savings and efficiency improvements. As a result, Denmark has been able to maintain the same primary fuel usage for more than 30 years by conserving energy and expanding CHP and district heating. Furthermore, renewable energy has replaced 14 percent of fossil fuels. Both transportation and electricity usage, as well as the size of heated space, have increased significantly over the same time period [8].

The realistic biomass potential for energy uses, according to the Danish Energy Agency, is 20-25 percent of current total primary energy supply. Meanwhile, other forms of renewable energy, particularly wind power, have a big promise in Denmark. As a result, Denmark's situation is eerily similar to that of many other countries: the transportation sector is entirely fueled by oil, biomass capacity is insufficient to replace fossil fuels, yet intermittent renewable energy sources have significant potential. This paper examines the challenges and prospects of transitioning current energy systems to a 100 percent renewable energy system, using Denmark as a case study.

While their current contribution to global energy supply is insignificant (less than 0.5 percent of the 15,000 TWh of power generated worldwide), their potential is enormous. By 2020, EWEA et al., 1999, Greenpeace and EPIA, 2001, envision wind power generating 10% of the world's electricity and solar cells contributing 1% (EWEA et al., 1999, Greenpeace and EPIA, 2001). The goal of this study is to contribute to the present (energy) policy debate by synthesizing a variety of research on renewable energy technology development and diffusion in Sweden, Germany, and the Netherlands. 3 three Before we go any further, there are three characteristics of the energy sector that define the larger framework in which any examination of how policy could influence the transformation process must be placed [9].



To begin with, the energy system is massive. Wind and solar power may not begin to displace conventional energy technologies until long after 2020, even with anticipated high growth rates over the next two decades. However, a change of the energy sector after 2020 is dependent on a variety of policy efforts implemented today and during the previous decades. As a result, policymaking must be done with a long-term perspective.

Second, markets are difficult to create for a variety of reasons. New technologies are frequently more expensive than existing technologies [10], and they may not provide any direct advantages to the individual consumer or investor (though they may reduce society's costs, such as CO2 reduction). Furthermore, incumbent technologies are frequently subsidized. This includes not just the considerable R&D subsidies of the past (Goldberg, 2000; Norberg-Bohm, 2000; Watson, 1997), but also various types of direct subsidies. For example, UNDP (2000) estimates that in the mid-1990s, "conventional energy" received annual subsidies in the range of $250-300 billion dollars. Although the scale is difficult to assess, the European Commission estimates that "the cost of producing power from coal or oil would double...if external costs such as environmental and health damage were taken into account" (Milborrow, 2002, p. 32).

Third, proponents of the existing energy system frequently try to stifle the spread of renewables by influencing the institutional framework to keep it in their favor. Indeed, in the current discussion over the future of the energy system, there is a lot of lobbying going on for both policy goals and institutional framework design. As a result, policymaking is a highly political endeavor.

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RELATED WORKS & METHODOLOGY

The central enticement and obstructing mechanisms for the diffusion of renewable energy technology were identified in the previous part, and the dynamics of the transformation process were investigated in both successful and unsuccessful situations. As a result, we discovered six obstacles.

The first task is to create a conducive environment for cumulative causation processes to emerge in a variety of new energy technologies. Such mechanisms are necessary for the transformation process to become self-reliant in the long run. The second difficulty is to comprehend each technological system so that technology-specific inducement and inhibiting mechanisms may be identified, as well as policies to impact the system's functional pattern. The third policy difficulty is that policy collaboration is essential to develop policies. The second task is to participate in a process of institutional alignment during the early stages of a technology system's development, and the fifth is to assign different people to experiment with alternative design perspectives. The move from the formative stage to a stage of rapid and persistent diffusion of new technologies is the final obstacle. Predictable, powerful, and persistent pricing strategies are required to generate favorable conditions for investors in renewable energy technology.

We'll discuss some of the issues that policymakers will have to address in order to meet the challenges. To begin, there are inherent difficulties in forecasting the outcome of policy intervention in complex systems. Policymakers must have a thorough understanding of any technological system's complex structure and dynamics. Finding, tracing, and assessing the strength of multiple mechanisms that induce/block the diffusion process is difficult empirically. Even "basic" relationships, such as what prevents markets from forming, can be unknown. It could be due to a lack of legitimacy, location issues, or pricing disparities (or a combination of several factors). The presence of feedback loops contributes to the system's complexity. Nobody could have predicted the success of the German wind turbine business or the failure of the Dutch wind turbine sector in the late 1980s, for example. The feedback loops, of course, make the outcomes of any intervention even more unpredictable. As a result, policy outcomes are difficult to predict. The second issue is the length of time involved, which spans decades: After around twenty years of activity in Germany, traces of a self-reinforcing process could be noticed. After entering self-reinforcing diffusion processes, more time is required for the creation of technological systems capable of having a considerable impact on the energy system. Building new systems necessitates time, in order to allow cumulative causation to emerge, as well as flexibility, in order to adjust to situations that are bound to change but do not alter the certainties. The political character of the process of aligning new technologies and institutions is the final point to consider. As a result, policymakers must devise a flawless strategy for confronting and defeating required actors in order to match the institutional structure with emerging technology. Dealing with these issues necessitates the development of certain characteristics in policymakers: high analytical competence, in-depth knowledge of relevant technological systems, patience, flexibility, coordination skills, and political strength, to name a few. These are characteristics that policymakers cannot expect to develop automatically or over time.

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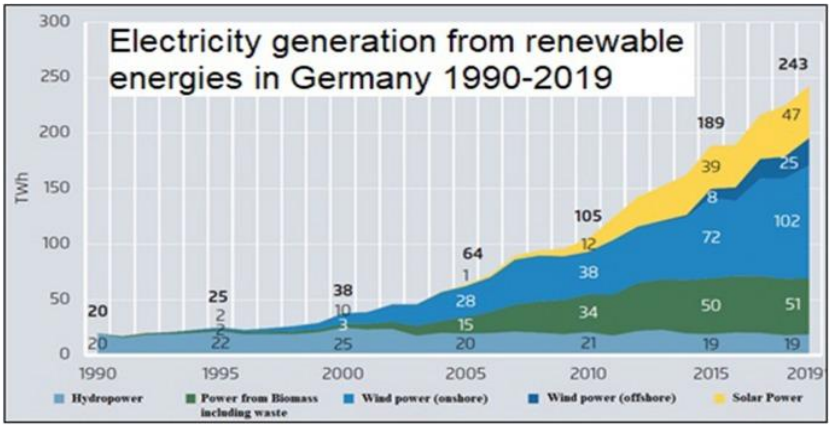
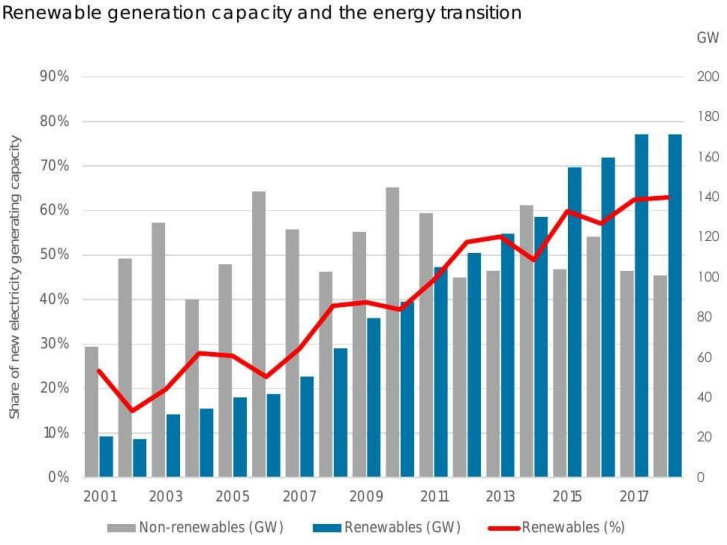


Here, we are graphically representing the electricity generation from renewable energy in Germany from 1990 to 2019.

Experimental results



With the growth of technology in today's society, we can observe that the use of renewable energy has increased dramatically over the previous few of decades.

Conclusion:

The purpose of this paper was to contribute to the policy debate with regards to the management of the process of transforming the energy sector. In the preceding sections, we revealed central inducement and blocking mechanisms for the diffusion of renewable energy technology and analysed the dynamics of the transformation process in both successful and in less successful cases. In doing so, we identified six challenges for policy.

Sustainable Energy Development Strategies typically involve three major technological changes:

- energy savings on the demand side,
- efficiency improvements in the energy production, and
- replacement of fossil fuels by various sources of renewable energy.

Consequently, large-scale renewable energy implementation plans must include strategies of how to integrate the renewable sources in coherent energy systems influenced by energy savings and efficiency measures.

However, reaching a stage of a high share of intermittent resources in combination with CHP and savings the making of sustainable energy strategies becomes a matter of introducing and adding flexible energy technologies and designing integrated energy systems solutions. Such technological changes are required in order to bring about further sustainable development.

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