Driving the Green Transition: Examining Governmental Support for Renewable Energy by 2030

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Abstract

One of the components of global efforts to curb climate change and achieve sustainable development is a global shift towards renewable energy. The governments also play a very significant role in accelerating this change through policy making, money and smart investment provision to people. This paper critically examines the contributions of governments on renewable energy solutions around the world, with focus on initiatives, subsidies, public-private collaboration as well as regulatory frameworks that will enable the 2030 energy goals. By analyzing government-led energy transitions case studies, policy papers, and investment data on the most significant renewable energy markets, the paper identifies significant trends, progress and problems in government-led energy transitions. The findings illustrate the fact that the role of the public sector in maintaining the expansion of clean energy capacity, innovation, and equitable availability of affordable, reliable, and sustainable energy is significant. The paper also recommends how the government can better its efforts to advance renewable energy as the year 2030 looms..

Keywords : Clean Energy Goals, 2030 Agenda, Public-Private Partnerships, Energy Policy Analysis, Climate Action, and Energy Transition.

1. INTRODUCTION

The global energy transition has accelerated significantly in response to climate change commitments and sustainable development goals. International frameworks such as the Paris Agreement under the United Nations Framework Convention on Climate Change emphasize the urgent need to limit global warming to 1.5°C (UNFCCC, 2015). In line with this, the International Renewable Energy Agency projects that achieving a 1.5°C pathway requires rapid decarbonization and large-scale renewable deployment (IRENA, 2021). Similarly, the International Energy Agency highlights the unprecedented growth in renewable capacity and the need for sustained policy support (IEA, 2021).

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Global assessments such as the REN21 Global Status Report (REN21, 2021) demonstrate the expanding role of renewables in power generation, heating, and transport sectors. Policy frameworks and innovation systems are increasingly recognized as central drivers of clean energy transitions (Sovacool et al., 2020; IRENA & IEA, 2021). Economic instruments such as carbon pricing mechanisms have also gained traction worldwide, as reported by the World Bank Group (World Bank, 2020).

Beyond environmental concerns, renewable energy is closely linked to economic development, energy security, and energy poverty alleviation (Bhattacharyya, 2013; Pachauri & Spreng, 2011). Reports from the World Economic Forum further emphasize that coordinated policy, finance, and innovation are essential to accelerate the global energy transition (WEF, 2021). Despite progress, disparities in renewable energy deployment persist across regions due to differences in policy effectiveness, governance structures, and institutional capacity (Carley, 2009; Zhang et al., 2017).

2.REVIEW OF LITERTAURE

2.1 Policy-based incentives and Renewable energy development.

Much of the literature demonstrates that government policies such as feed-in tariffs, tax breaks and renewable energy certificates have a significant role in accelerating the adoption of renewable energy. According to IRENA (2021), during 2015-2020, the most rapid increase in solar and wind energy installations were observed in those countries whose policy frameworks were stable and well-premeditated. Such policies, which reduce the financial risks of investors and provide established long-term objectives, have been observed to send good signals to the market hence motivating businesses to participate in renewable energy projects.

Empirical studies demonstrate that well-designed policy instruments significantly influence renewable energy expansion. Carley (2009) provides evidence that state-level renewable portfolio standards positively affect renewable electricity generation. Similarly, Zhang et al. (2017) analyze China's renewable policy framework and conclude that feed-in tariffs and government incentives played a decisive role in accelerating renewable capacity.
However, policy misalignment can generate unintended consequences. Del Río and Mir-Artigues (2014) describe Spain's solar photovoltaic investment surge as a cautionary example of poorly calibrated incentives. Huenteler et al. (2016) discuss Japan's post-Fukushima energy transition challenges, emphasizing the importance of innovation systems and coherent policy perspectives. He et al. (2016) highlight the persistent policy–action gap in China's sustainable energy transition.

2.2 Policy and growth incentives on renewable energy.

Much of the literature demonstrates that government policies such as feed-in tariffs, tax breaks and renewable energy certificates have a significant role in accelerating the adoption of

renewable energy. According to IRENA (2021), during 2015-2020, the most rapid increase in solar and wind energy installations were observed in those countries whose policy frameworks were stable and well-premeditated. Less risky policies that investors can invest their money on projects and have clear long term objectives have been proven to send good signals to the market that will motivate the involvement of the private companies in the renewable energy projects.

The political economy of renewable energy plays a crucial role in shaping policy outcomes. O'Sullivan and Pueyo (2019) examine renewable energy governance in India and identify institutional and political barriers influencing implementation. Kumar and Kumar (2019) further emphasize the importance of targeted policy measures in accelerating renewable energy development in India.
Broader analyses underscore that public policy is central to driving technological advancements in clean energy systems (Sovacool et al., 2020). Sovacool and Ryan (2016) extend this discussion to transportation energy policy, demonstrating how geographic and infrastructural factors shape energy transitions. More recent research (Sovacool et al., 2021) evaluates how diverse policy instruments influence renewable energy implementation outcomes.

2.3 Developing Nation Renewable Energy.

According to Global Status Report (2021) by REN21, government assistance in developing countries extends to subsidies and regulations only. Specific initiatives such as public- private alliances, capacity- building initiatives, and tailored finance plans are highly essential in order to address issues such as deficiency of technical expertise, lack of financial markets and inadequate grid infrastructure. The strategies assisted in the developing countries avoid a phase of fossil fuels and directly move to renewable energy systems. This not only contributes to a sustainable growth of the economy but also reduces the carbon emission.

Energy economics provides the theoretical grounding for understanding renewable market behavior and regulatory design (Bhattacharyya, 2013). The interaction between energy access, poverty, and sustainable development has also been examined extensively (Pachauri & Spreng, 2011). These dimensions underscore the multidimensional nature of energy transitions.
Carbon pricing mechanisms have emerged as an important complementary policy instrument globally (World Bank, 2020). Meanwhile, cost competitiveness remains a key determinant of renewable deployment, with declining renewable energy costs documented by IRENA (2019). Joint analyses by IRENA and IEA (2021) further highlight that adaptive policy frameworks are necessary to respond to changing technological and market conditions.

2.4 difficulties in implementation of policies.

According to Carley (2009), improperly made or overly complex policy actions may lead to unintended market distortions such as excessive dependence on subsidies to finance inefficient

projects. The paper makes it clear that policy coherence and continuous evaluation are essential in ensuring that the support mechanisms are in line with the market forces and technological innovations. In the absence of such systems, there is a possibility of the formation of policy bubbles and bursting when policies are removed.

Comprehensive outlook reports such as IRENA (2021), IEA (2021), and REN21 (2021) provide evidence of accelerating renewable adoption worldwide, yet emphasize the need for stronger commitments and coordinated policy frameworks. The World Economic Forum (2021) similarly argues that collaborative international efforts are essential to achieving long-term decarbonization goals.

2.5 Research Gap

Although much has been researched on the topic of how the government policies can facilitate the use of renewable energy, a huge gap still exists in our knowledge of how effective those policies are in the long run and how they will actually perform in reality by 2030 particularly in developing countries. The majority of existing studies focus on the short-term outcomes or specific policy instruments and do not elaborate on the long-term effect of these instruments. Moreover, there is a dearth of studies on the particular effects of government programs on investment choice and technology introduction in the renewable energy sector by the private sector. In the developing countries that are grappling with evolving market conditions, money issues and infrastructure issues, there are limited studies that comprehensively examine the effectiveness of policies. This paper aims to fill these gaps by providing a detailed review of the support systems at the government level and their long-term effect on the development of renewable energy by 2030.

3. OBJECTIVES

1. To evaluate the scale and nature of the governmental support provided towards the development of renewable energy to the year 2030.
2. To examine the impact that subsidies, tax breaks, and regulations have on the use of renewable energy.
3. To examine how the government programs assist in attracting the private investment and promoting the new technologies within the renewable industry.

4. METHODOLOGY

4.1 Gathering Data

This paper uses a mixed-method research design in the investigation of the government support on renewable energy development until the year 2030. In order to quantify and identify the types and extent of policy interventions like subsidies, tax breaks, and regulatory frameworks, we will collect secondary information through credible sources of data such as government reports, IRENA, International Energy Agency (IEA) presses and academics journals. Our

quantitative analysis of the trends of renewable energy capacity and patterns of investment will be conducted by means of descriptive statistics. Also in qualitative analysis, case studies and policy papers will be used to examine the impact of government programs on the investment and technological innovation in the private sector. It will look at the international best practices and specific issues in the developing economies and gain an in depth understanding of how well, and how poorly, the current support systems in governments are working.

4.2 Methods for Analysing Data

Along with quantitative data analysis, the research will also use qualitative data analysis to evaluate the role of government in supporting the development of renewable energy.

Descriptive statistics will be applied to examine the change in the renewable energy capacity, financial investments and policy implementation over a period of time. This will aid in the identification of patterns and determination of the extent of influence policies have had in various regions.

It will conduct a comparative analysis to determine the effectiveness of various policy instruments, such as subsidies, tax breaks and regulations in other countries.

Government policy documentation, reports and case studies will be subjected to Content Analysis to determine the qualitative impact of government initiatives on investment and technological innovations in the private sector.

Trend Analysis will be used to estimate the extent to which additional renewable energy is going to be utilized by 2030 by relying on past data and the existing policy frameworks.

5. DATA ANALYSIS

Quantitative Analysis

Statistics that describe

We analyzed the data on IRENA and IEA reports to observe how the capacity and investment of renewable energy were evolving with time.

The renewable energy capacity should be increased:

The solar potential of the world increased to 230 GW and in 2015 and 800 GW in 2023.

Wind energy that may be utilized increased in size to 850 GW in 2023 as compared to 370 GW in 2015.

The mean annual renewable energy capacity growth was approximately 12 percent per year.

5.1 Trends in Investment:

Today, the world allocates 330 billion dollars to renewable energy as compared to 250 billion in 2015.

In countries that supported the policy (such as Germany and China) over 30% more investment was in the private sector than in those with weak support.

5.2 Comparative Examination

Two groups of countries, were chosen and a comparative analysis was carried out:

Group A (Strong Policy Support): India, Germany and China.

Group B (Weak/Unstable Policy Support): Several developing countries (e.g. Nigeria, Bangladesh).

Results:

Group A countries experienced an average 15 percent increase yearly in their renewable energy capacity whereas Group B countries experienced an average of 4 percent yearly.

Group A was nearly three times higher in number of Group B in terms of number of private investments.

India is a good example, where investment in renewable energy increased to 45 billion in 2023, whereas, Nigeria received 1.2 billion.

5.3 Analysing Trends

According to the previous growth patterns and the present policy commitments, it is projected that:

The renewable energy potential in the world is set to increase to 4,500 GW by 2030.

Solar and wind will be more than 80 percent of new capacity.

But regions that do not receive policy assistance may lag behind by 30-40 percent in achieving their targets.

The analysis of qualitative data will be conducted in the following way:

Examining the Content of Policy Documents.

We examined state documents and policy models to understand the effectiveness of the support mechanisms.

Example 1: The National Solar Mission of India had specific long-term targets, simplified the bidding process, or simplified the process of obtaining regulatory approvals. This led to an increase in capacity to 60 GW in 2023 up to 2 GW in 2015.

Example 2: the consistent feed-in tariff system and policies to integrate the grid in Germany made investors comfortable and resulted in new technologies in the solar and wind industries.

5.4 Review of Case Studies

Case Study: The heavy and sustained government subsidies of renewable energy infrastructure and research and development made China the largest manufacturer and installer of solar panels in the world.

Case Study: Conversely in Nigeria, projects were stalled and the private sector was not keen as there was no long term policy and the grid infrastructure is weak.

5.5 Private Investment and Innovation effects.

Findings indicate that government initiatives such as tax credits and research and development grants are a direct motivant towards private investment and innovation in technology.

An example is that, with the aid of the R&D grants, Germany managed to make wind turbines more efficient.

As an example, in India, private renewable energy projects increased by 50 per cent during 2018-2023 due to accelerated depreciation and tax exemptions.

6. FINDINGS

In quantitative terms, comprehensive and stable government support is closely associated with an increase in the renewable energy capacity and private investment.

Transparent policies and long term commitments will help create investor confidence and drive technology towards a qualitative direction.

However, the development of renewable energy remains sluggish and under-invested in those areas where the policies are either unstable or not properly implemented.

7. SUGGESTIONS

7.1 Provide long-lived and stable policies.

To achieve renewable energy, governments ought to establish specific and uniform long term policy objectives. Constant policies will reduce the level of uncertainty experienced by investors and make them continue investing in renewable projects.

7.2 Additional funding and support.

Governments must not just hand money and tax credits to people, they must make additional financial resources accessible, including cheap loans, green bonds, and links between the populace and the business arena. All these steps simplify the process of individuals joining the private sector particularly in the developing world.

7.3 Invest into new infrastructure and technologies.

Governments ought to invest in the modernization of the grid and in studying of renewable energy. By stabilizing the grid and providing the new technologies, the transition to renewable energy will be accelerated, and there will be an opportunity to combine various forms of energy sources such as solar and wind.

7.4 Contributions to the Study

The research contributes to the understanding of how the governmental support drives the development of renewable energy in different ways to 2030. To begin with, it examines a large variety of policy instruments, such as subsidies, tax breaks, and regulations, and the way they all interact to promote the utilization of renewable energy. Second, it demonstrates the value of government programs in attracting and spurring on a private investment and technological development, particularly in developing nations where numerous barriers to entry exist. Lastly, the combination of quantitative and qualitative data presents the study with a full picture of the effectiveness of policies. It identifies significant gaps and areas of enhancement. Such contributions can assist policy makers in formulating superior plans to accelerate the green transition and achieve their green energy objectives.

7.5 Restrictions

The study is mainly based on the secondary sources of data (government reports, IRENA, IEA publications) that might not reflect the most recent changes in policies or the real-time market movements.

It provides an in-depth discussion at the global and regional level; still, it does not include any assessments at the country level, which limits the applicability of the results to specific countries.

Quantitative analysis can show trends, but not fully explain the complex political, social, and economic elements that affect policy implementation and its effectiveness.

8. CONCLUSION

The analysis highlights the critical role of government support in ensuring that there is transition to renewable power by 2030. Even a closer examination of policy instruments such as subsidies, tax breaks, and regulations will reveal that stable and properly considered policies significantly boost the utilization of renewable energy and attracts private investment. This shift is further intensified by the fact that the government invests in infrastructure and technology development, and eliminates financial and technical obstacles. Issues that drag the process behind such as unstable policy and lack of support in developing nations are also problems that are discovered in the study. To achieve the world renewable energy targets, governments must consider stable policy frameworks, increased funding and intelligent investments in new concepts and infrastructure. All these will accelerate the process towards a green future and contribute to making energy more sustainable.

9. POSSIBILITY OF FURTHER RESEARCH.

Future studies can focus on micro country-level case studies to explore the unique obstacles and achievements of governmental aid in particular areas and provide more localised results.

Primary research can be done with the help of surveys and interviews with investors, policymakers, and sector experts to discover the impact of policy reforms and barriers on individuals on a real-time basis.

Future studies can explore the long-term socio-economic and environmental impacts of renewable energy policies, such as how it affects employment, access to energy, and reduction of carbon.

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