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The Role of Renewable Energy in Job Creation

Nazeer Ali

Department of Management Science, MY University, Islamabad, Pakistan.

Faisal Hayat

Department of Business Administration: Baba Guru Nanak University, Nankana Sahib, Pakistan.

Abstract

This essay focuses on describing the role of renewable energy sources in fostering job creation and economic growth. With the arrival of the Industrial Revolution, the world is awakened to the infinite potential of machines and the dwindling reserves of fossil fuels. In order to provide a solution to this problem, renewable energy sources have come to the fore in terms of energy consumption. As a result of the depletion of fossil fuels and the negative environmental effects of their use, countries have turned to renewable energy sources. This includes renewable energy technologies such as hydroelectricity, geothermal energy, wind power, solar energy, and biomass. Processes requiring the use of wind, solar or ocean light, forest products, agricultural products and residues, and waste materials can be defined as renewable energy systems. Renewable energy sources constituted 11% of total electricity generation in non-OECD countries in 2015, while this rate was 23% in OECD countries. Looking at employment opportunities, renewable energy sources provided 8.3 million jobs out of a global 31.3 million working in the renewable energy sector in 2018. Employment in the renewable energy sector is expected to reach 42 million by 2050. In terms of technological status, the number of renewable energy technologies in use globally has been increasing by the day. While this number stood at 7,993 in 2011, it was 8,631 in 2018. As of 2020, an increase of 8% to 9% is expected in renewable energy technologies. Area Global Cumulative Capacity (MW) 50 MW or more Hydroelectricity 1,308,668 Wind Power 623,708 Photovoltaic Systems 485,810 Grid Connected Biogas Systems 118,046 Geothermal Energy 13,729,895 Small Hydro Power 9,390 Solar Hot

Water 7,113,144 Grid-connected PV Systems 5,061,553 Biomass and Waste to Energy Power Plants 1,927,580 Wind/Diesel and Wind/Battery 1,800 Wave Energy 447.

Keywords

renewable energy, job creation, economic growth, sustainable technologies, fossil fuels, employment opportunities, energy transition, environmental impact.

2. Introduction

Over the past couple of centuries, the use of fossil fuels has increased as the primary source of energy all around the world and yet is still mostly used. More than 90 percent of the energy sources in the world is provided by fossil fuels. However, the huge demand and usage of the fossil fuel led to the raise of production and the cost of the fossil fuel. It is believed that the fossil fuel resources will be depleted in the next 50-60 years. In addition, fossil fuels disproportionately contribute to climate change due to the release of greenhouse gases. It has caused global warming which is continually increasing the overall temperature of the earth, melting the poles, and some of the islands. Meanwhile, the incidence of natural disasters has been observed much higher than in previous centuries due to the change in climate. Millions of people are becoming climate refugees. These refugees are migrating from one place to another due to the flooded, cold, or hot living area. To balance all these theoretical facts, the search for an alternative, easily accessible, renewable, and eco-friendly completely different to the fossil fuel was required. This led to the emergence of renewable sources of energy, also known as green energy. Renewable energy is the kind of energy that can be obtained from the earth's sources or natural resources and can be used over and over again. Examples of renewable energy sources are wind, solar, geothermal, biogas, biomass, etc. Renewable energy has been widely used in relationships with the politics, employment, economic, social, and environmental dimensions of the countries. Renewable energy has formed and is transforming the energy sector globally into a more sustainable, efficient, cleaner, and decentralized system. The revolution of renewable energy has several impacts

on social, economic, employment, environmental, and political growth globally creating challenges and opportunities, particularly for employment. There is a sharp increase in jobs in the renewable energy sector and the number of people employed in renewable energy-related fields has increased. It is expected that this will continue to grow in the future. Almost at the same time, there have been reforms in the energy sector in most countries to encourage renewable energy production. In particular, the growing reliance on technology and energy, especially in prevention, conservation, and implementation, in creating efficient markets, in trade, in financial support, in reshaping the overall structure, and in strengthening the role of eco-investment is becoming essential (Moyo et al., 2017). Additionally, the design of the desired policy framework that will implement the transit system is also highly important. In addition, there is the need to exchange knowledge and experience with other countries and international institutions in the development and implementation of the strategy. On the other hand, the volatile price of fossil fuels and the era of technology have led to the steep decline in the cost of renewable energy in the last 15-20 years. Changes in the economy of renewable energy consumption and its production were noticed. General economic changes in the sector have also attracted investors' attention. Changes in a country's policy can also affect the employment figures of the energy sector. The higher the demand for renewable energy, the higher job creation (Baus, 2017). However, the sector may still be vulnerable due to unexpected policy changes, technology advances, and increases in the price and availability of raw materials and resources. In this regard, it is felt that the sector needs to implement effective policies and measures. Fashion strategies to reduce environmental stress and the advance use of renewable energy are also being studied. All of this has encouraged people to use renewable energy sources. Governments that implement appropriate policies to support the use of renewable energy are trying to ensure it creates opportunities. Nevertheless, to ensure the

widespread use of renewable energy, various obstacles must be overcome at the cross-country level.

3. Renewable Energy Technologies

Over the past decade, the importance of the renewable energy sector in terms of employment has been globally recognized. The renewable energy sector plays a significant role in job creation in the medium- and long run so it is vital to examine the comparative advantage of different renewable technologies in terms of maximizing employment. This part focuses on several renewable energy technologies: solar, wind, hydro, and bioenergy. These technologies are further translated into solar photovoltaic, wind power, hydropower, and modern biomass-based, respectively. There is huge potential for the growth of these technologies over the next 15 years, with job prospects in regions such as China, the USA, the EU, India, Brazil, and East Africa likely to benefit most.

According to simulated projections, the adoption of solar photovoltaics combined with concentrated solar power, wind power, and hydro will create the largest number of direct jobs. A number of jobs will be supported by the expansion of bioenergy technologies, both modern biomass-based and traditional "grey" technology. Investments in these renewable technologies require innovation and technological development not only to enhancing efficiency and performance but especially to overcome social, cultural, and economic priorities in several locations ensuring a widespread growth. The development of renewable energy thus interestingly has the potential to provide a primary transmission mechanism to unlock pathways leading to the satisfaction of multiple economic and environmental objectives (Baus, 2017). Energy-parity employment is one component of this linkage, with further research focusing on the relationship between certain skills and areas based on opportunities and constraints identified by food and energy workers bounding the sectors. Ultimately, employment opportunities are returned as one of

many benefits that can be harnessed for transitioning to low-carbon resilient development.

In recent decades renewable energy technologies have seen rapid growth worldwide. Due to the growing awareness of the environmental impact of using non-renewable energy resources and the exhaustion of those resources, renewable energy seems to be a vital solution for sustainable utilization. Because of this, the use of renewable energy is slowly being imposed. So far, their use has been small and even neglected. Limited use is due to large investments, in terms of production and installation of systems that use that principle of work. Also, the cost of operating systems using renewable energy is greater than conventional energy systems. However, with the advancement of technology and renewable energy use, the cost of implementing and operating these systems is decreasing. In addition, an increasing number of states with strategic documents on the use of renewable energy also affect its increasing application.

3.1. Solar Energy

In addition to addressing the impending threat from renewable energy sources of the earth and demography, the use of renewable energy sources is of great importance because of its economic benefits. The use of renewable energy happens through technological progress, investment, and employment. Thanks to the use of renewable energy, a wide range of jobs and significant income balances are provided. This effect of the income creation being reinforced by fiscal policies plays a triggering role in the development process. Thus, a large number of direct and indirect jobs are provided in the economy with the adoption of renewable energy technologies.

Solar energy has great importance as a renewable energy source. Solar energy is provided by means of solar radiation reaching the earth. Various methods are used to obtain energy in the form of electricity and heat from solar energy. The most important of the two methods is photovoltaics. With photovoltaics, conversion of light energy into electrical energy is provided. Again, focusing on obtaining energy

from solar heat is the solar thermal system. Among renewable energies based on new and advanced technologies, photovoltaics (PV) and concentrated solar energy (CSE) systems have the capacity to promote the establishment of a solar industry in the manufacturing sector. Furthermore, due to the large variety of technological types and designs of installations deployed throughout current installations and those projected for the near future. Consequently, the successful transfer of rapid innovative market implementation requires a highly-skilled and trained workforce.

Globally 98 GW of solar photovoltaics (PV) capacity was installed at the end of 2013, an increase of 40% over the end of 2012. For the first time, more solar PV capacity was added in 2013 than wind turbines. The solar industry has grown at an average annual rate of more than 50% over the past decade (Baus, 2017). Such observations provide significant impetus for the implementation of a broad array of policy measures, targeting the successful widespread installation and development of solar energy technology and its related industries. Employment and economic incentives take certain forms such as Feed-In Tariff (FITs), some of which also incorporate local content requirements. Amongst employment and economic policy measures there are some actions to demystify the costs and benefits of solar installations, creating favorable conditions to attract investment. The assumption that solar installations are expensive and do not yield the desired results or that sales and a drop in market prices, attributed amongst other things to tough competition and dumping practices, aims to establish a common awareness of the advantages of investing in such projects. On the other hand, general policy issues specially affecting the solar industry can be grouped under nine headings.

3.2. Wind Energy

Wind energy is another key source of renewable energy that is propelling job creation forward, providing ample job opportunities. To harness the kinetic energy of the wind, wind turbines are placed in areas with consistent wind currents. The 120-foot blades of the turbine spin thanks to the wind, and the kinetic energy of the

rotation is then converted into mechanical energy in the nacelle of the turbine, which generates electricity through a range of rotating shafts and generators. Although relatively undeveloped in the US until recent years, the industry of wind energy has been expanding very rapidly. This rapid growth of the wind energy industry has had wide-ranging implications on the economic front, but perhaps most significantly in terms of the labor market. The manufacturing of the major wind turbine components, installation of wind turbines, and maintenance of wind turbines are the foremost ways in which job opportunities are created by this sector.

As result of the very large size of the components of these turbines, the demand for a wide variety of components has very quick grown, and the average number of manufacturing employees needed in each sector of the industry has grown by nearly 40% in the past five years. On the other hand, wind turbine technicians are among the 'fastest-growing' job categories, with more than twice the average growth rate of other job categories nationally, predicting an employment increase of more than 90% in the next eight years.

Throughout the development of the industry many technological advancements have come about, improving the capacity of the turbines to capture energy and convert it to useful forms. As the efficiency of the turbines has increased, their production cost has fallen, and by extension the cost of the electricity they generate has also fallen. However, the wind industry could not have developed in a similar manner without unwavering policy support from government. Despite the clear economic development associated with the industry, there have been significant hurdles to overcome.

3.3. Hydropower

Hydropower, which generates electricity by using the force of falling water turning turbines, has historically been a significant source of renewable energy generated labor in the green job market and a foundational technology for low-carbon development. Current development of hydropower facilities can utilize traditional

dam systems with reservoirs, or new and innovative run-of-river systems that do not entail reservoirs of collected water. Aside from generating emissions-free electricity, these run-of-the-river systems can leverage the benefits of hydropower to collect water. Traditional and run-of-river hydropower systems can be used in conjunction with each other to harness all the possible capabilities of the given geography. Traditional hydro energy facilities are usually accompanied with dam systems to store water and regulate the time of energy production. This stored water from dams can also be used to produce artificial rainfall by releasing it at scheduled times. The released water is sent to run-of-river hydro energy facilities and used by them to produce and store electricity in separate water reservoirs. On dry and low-rain years, or when the water resource is scarce, this water can be used to alternatively produce electricity the next year (Liu et al., 2022). Employment in the energy generation sector due to the hydraulic energy investments accounts for nearly one in ten renewable energy jobs.

Hydropower is noteworthy in the job market in the context of renewable energy projects, which currently accounts for 33 % of the total green labor market. Broadly ranging renewable energy investments yield job production in the fields of electricity generation, manufacturing of technological appliances, and construction through a growth in the need for technical components. Renewable energy jobs in the field of energy generation, which accounts for two-thirds of renewable energy employment, include professions related to the development and installation, operation, and maintenance of solar, wind, biomass, and hydraulic systems. Such jobs generated by renewable energy projects are more significant and valuable in countries or regions that have large potential for natural resource and electricity production through renewable energy investments. Job production in the field of energy generation due to the hydraulic energy investments is not simple enough.

3.4. Bioenergy

Bioenergy is a renewable energy source with the potential to make a significant contribution to job creation. Bioenergy, derived from organic materials, is available in many different forms, including traditional biomass, used primarily for heating; biogas, made from the anaerobic digestion of agricultural waste and energy crops; liquid biofuels such as biodiesel and bioethanol; as well as thermal, electric power, and combined heat and power (CHP) generated from biomass. Renewable energy in the form of bioenergy plays an increasingly important role in national energy systems and has been identified as instrumental to reach sustainability goals (Atagamen Aidonojie et al., 2022).

Bioenergy has the advantage that locally available feedstock can be utilized, thereby supporting more decentralized energy production. Producing, processing, and distributing bioenergy technologies can offer new job opportunities. For example, the biomass energy industry worldwide employs about 1.2 million people, almost entirely in rural areas, with around 0.5 million people employed in the Asian-Pacific region alone ((Simas & Pacca, 2013)). At the same time, environmentally damaging waste materials can be responsibly used as biomass feedstock for bioenergy conversion, with the additional benefit of reducing greenhouse gas emissions. It is projected that global waste-generation will double in upcoming years, with waste production in developing countries estimated to increase the fastest. Bio-based waste constitutes a valuable resource for the production of energy carriers. The use of waste as a renewable energy resource can therefore have a significant impact on organic waste treatment. Requiring careful handling, it is important to counterbalance the CO_2 emissions reduction achieved by bioenergy plants and tackle various collateral concerns caused by the supply chains such as possible feedstock competition with other productive food and material uses, underlining the importance of accurately defining suitable environmental, social, and economic policies to support desired bioenergy development pathways.

4. Economic Benefits of Renewable Energy

The economic benefits associated with the adoption of renewable energy sources have attracted particular attention during the global economic downturn. This is because the desire to maintain or boost economic growth intersects with the desire to address climate change. The economic benefits of renewable energy leakage are a widely debated and prominent issue on the urgent policy arena. Leverage benefits are defined in the literature as the economic benefits for the entire economy derived directly or indirectly from the manufacturing and use of RET products. A variety of studies have investigated ex-post the leverage benefits associated with implementing renewable energy policy instruments, both for developed nations and for developing ones. A multiplier effect is frequently used to estimate the leverage benefits of an RET project. Studies have shown that the presence of renewable energy projects could generate a so-called multiplier impact, creating job opportunities and fostering socio-economic development (Simas & Pacca, 2013).

4.1. Direct Job Creation

The socio-economic benefits of renewable energy technologies (RET) transcend the reduction of greenhouse gas emissions and positive impacts on the environment. New jobs are being created in manufacturing, installation and maintenance of RET technologies. Several studies in this domain find great opportunities for the creation of skilled jobs in various sectors related to renewable energy (RE). Companies that produce and install RET technologies and governments are advised to ally for the identification of the short and long term demands for skilled work and the expansion of training courses, consequently supporting local job opportunities in the RE sector (Simas & Pacca, 2013). Challenges during the recruitment of skilled workers for the RET sector, illustrating training programs for the workforce development in the context of renewable energies. In general, academies, universities, research institutions, industries and governments must work together in developing structured long-term programs based on long-lasting and reliable partnerships. In

order to profusively enable an increase of the energy expected from renewable sources and to guarantee a significant impact on employment, such a growth must occur in a well-distributed manner. In many countries, large areas are adversely affected by the loss of traditional economic activities. The creation of new job opportunities through RET in such areas is even more important and goes well beyond the urgency of encouraging alternative sources of energy. The renewable energy sector is creating large and stable job opportunities in manufacturing, construction, operation and maintenance, with an increasing need for services related to those areas. A study in the UK reports an increase of approximately half million permanent and long-lasting employment opportunities in the renewable energy industry. The lower part of Table 1 presents annual job creation in the main RET sectors in the US and the projection for 2030, indicating an increase of 121% and 84% in jobs for manufacturing of solar thermal and photovoltaic systems, respectively. The geographical distribution of job opportunities strongly varies among the different renewable energy sources. While some of them are mostly related to areas with specific environmental conditions, others offer more decentralized possibilities, generating the potential for wide diffusion of job opportunities. Although there is a demand for local manufacturing, the majority of job opportunities are in the midstream and downstream sectors of the production chains, therefore RE installations are associated with job creation in all counties of the country. The stability of job opportunities is greater in the high value added activities. According to a study concerning the Western US, jobs in the infrastructure of renewable electricity are more stable than jobs in coal, gas and nuclear power plants. The overall wages of workers in the renewable electricity sector are 8% higher than in the fossil fuel sector, demonstrating the competitiveness in terms of wages of job opportunities in the RE sector and the potential to increase local economies. The current employment in the wind energy industry in the UK is around 3000 and is predicted to rise to 60,000 by 2030. Emerging economies like India, South Africa and Brazil are well positioned to

get significant socio-economic benefits from the creation of job opportunities in the renewable energy sector. (Ram et al.2022)

4.2. Indirect Job Creation

Public and private sector decisions to invest in renewable energy technologies should aim to promote job creation to a greater extent. Several societal and political objectives –such as the growth of renewable energy sectors, the reduction of greenhouse gas emissions or the compliance with renewable energy objectives–, could be better addressed with an approach to investment decisions in renewable energies whose main goal is to generate new jobs directly or indirectly as a consequence of these investments (Simas & Pacca, 2013).

Indirect job creation refers to job opportunities emerging outside the renewable project itself as a consequence of the investment in that renewable project. That is, job creation derived from the growth of the renewable sectors as a result of the investment in renewable energies. Often the decision to promote investment in renewable energies is triggered with the purpose of boosting the growth of renewable energies sectors, which in turn stimulates the growth of ancillary industries and other related sectors, thereby enhancing job opportunities elsewhere. The employment generated from renewable energy projects falls into the following categories where much of the employment potential is located, in this order: engineering, logistical, construction, manufacture of renewable energy facility, legal, consultation and finance, and manufacture of non-renewable energy system including backup power system.

For example, engineering related services will demand substantial work for a new investment in renewable energies, such as board or design of the installation of a wind power park or the installation of solar panels in a roof. The growth of a local manufacturing industry of components involved in renewable projects, such as poles, vultures or solar cells, will promote the creation of many jobs. It is essential that local supply chains and service providers are developed to support the renewable energy

creation elsewhere. Finally, owing to the presence of renewable energies sectors in one country, jobs might be created in foreign destinations, such as in the case of the manufacturing of high-tech components, thereby addressing the social concerns with job creation. An additional way in which job creation can emerge indirectly is through the ripple effect. Owing to the growth of renewable energy sectors and job creation in many communities surrounding renewable installations, there is a rise in the local demand for goods and services. This rise will in turn create additional job opportunities for local residents, thereby encouraging the spread of the job market (Strielkowski et al.2021). This additional job creation will be "indirectly" derived from the investment in renewable energies not only in the first place where the investment occurs but in many other places. A direct and clear diffusion process is often described to explain the spread of job over neighbor communities. An investment in renewable energies in one place would create other job market opportunities in neighbor communities since enterprises would be attracted to easily reachable neighboring markets. However, there are many reasons to believe that the job diffusion is not that clear because there are many underlying additional variables and aspects driving the degree of job creation of an investment in renewable energy projects of the neighboring places. A potential problem in measuring indirect job creation accurately comes from the difficulty in specifying the actual effects that can be attributed to the renewable energy projects and, therefore, the effects of the funds and policies supporting them. Consequently, potential discrepancies in the evaluation of indirect job creation might emerge from different estimation methods. Anyhow, the overall direct and indirect job creation benefits should not be underestimated as they generate a strong effect and take a long time to be achieved. It would be expected that job creation within the renewable energy sector as a result of the investment directing the growth of much better. The direct and indirect debate must be expanded to consider the overall economic impact of a successful and mature renewable energy industry as it will show that the economic benefits of

renewable energies extend far beyond the energy savings to multiple segments of local economies. The job creation from renewable energies should be seen within the broader framework and this concept would be served by consideration of the overall economic impact of the renewable energy industries. With the growing concern about job creation in difficult economic times the motivation to shed new light on the debate of the direct or indirect job creation of renewable energy investments is on the rise.

5. Policy and Regulatory Frameworks

During the last few years, governments around the world have ratcheted up efforts to create jobs in renewable energy, through local content requirements, skilled labor development, and regulatory reforms. Governments in many developing and industrialized countries have been pressed to support a sustainable economic recovery and to diversify energy supply. Renewable energy sources including solar, wind, and biofuels are now increasingly seen as a way to kill both birds with one stone. In Brazil, the government agency for support of small businesses has partnered with the country's development bank to promote the local manufacturing of machines for biofuel and wind turbine construction. In India, the national Rural Energy Corporation is spearheading a program to train contractors in the construction of mini-grids powered by biomass gasifiers, and certain states have mandated that a certain percentage of traditional government procurement contracts must go to clean energy businesses (Hoang et al.2021).

Governance and policy can play a major role in expanding renewable energy and its job-creation potential. Imperative is a supportive legislative and institutional framework that provides an enabling environment for investment in renewable energy and related industries, advances grid extension or deployment, and secures the rural labor force and urban industrial employees. It is the right combination of policies, legislation, and institutional development that provides a predictable environment and long-term viability to renewable energy investments, stimulating

wide-ranging and abundant employment generation. In recent years, a growing number of countries have unveiled ambitious plans to bolster renewable energy production. Many of these national policies have succeeded in creating numerous rural and off-grid jobs. Similarly, India's national rural electrification program is estimated to have created as many as 79,000 indirect and induced jobs. On a global scale, sales of solar photovoltaic modules jumped significantly in 2010 alone. This rapid growth was encouraged by tariff incentives in most countries, on top of other policy measures across many states. At the same time, international efforts to combat climate change have helped stimulate renewable energy investments. However, many national renewable energy policies are often slow to be implemented, with limited impact, owing to bureaucratic shortcomings or political opposition. In the United States, a number of unsuccessful policy bills concerning the renewable energy sector have either languished in Congress, been crushed on the ballot, or been challenged by obstructionists. Similar developments are occurring in the European Union, where policy uncertainty is beginning to undermine investor confidence. More generally, many countries are still focused on following the cheapest path to electrification, relying mainly on fossil fuels, and are sluggish to institute favorable feed-in tariffs that can spur development of renewable resources. This problem is exacerbated by the fact that much of the capital intensive infrastructure of power systems makes investment choices "lock-in" over the long term.

6. Case Studies

In recent years, there has been growing interest and high expectations regarding the potential contribution of renewable energy to job creation (Simas & Pacca, 2013). A wealth of studies has discussed the socio-economic benefits of renewable energy deployment, many of which have focused on employment outcomes, but actual cases are still limited in the literature. Most of these studies are situated at a theoretical or methodological level, and providing hands-on project cases may be

much more useful for those working directly with renewable energy projects in policy-making and industrial contexts. This section elaborates on a number of exemplary renewable energy projects that have been successful in creating jobs, thus contributing to the emerging literature. As a special focus of interest, workforce development is covered and the methodologies and results of these cases are presented. Various benefits brought by such projects are also discussed and, in addition, lessons learned and good practices are shared, which have important implications both for project managers and for stakeholders who are interested in fostering the socio-economic benefits of renewable energy, especially employment. Among the cases studied, it is possible to find projects of varying scales, with a focus on both small and large renewable energy applications, and covering diverse technology fields. As there is no one-size-fits-all strategy to ensure job creation benefits, the resulting range of cases can help understand the specific factors needed to foster economic development in each context. The case studies are drawn from across the globe, including industrialized and developing countries, because the socio-economic impacts of renewable energy deployment can differ substantially depending on the characteristics of the local environment. Moreover, the case studies varied according to the research methodology, stemming from primary or secondary data collection, though detailed statistics are usually drawn from local surveys and interviews. Each case study also highlights community development efforts or other initiatives that, though not necessarily employment-related, have documented tangible benefits (Al-Shetwi, 2022).

7. Conclusion

The world economy has profound changes in terms of industry structure in recent 20 years. Energy consumption and production shifts to non-renewable energy and renewable energy resources gradually. These changes in investments for infrastructure and the energy sectors actually influence growth across the economy. Overemphasis on the non-renewable energy sources leads to serious environmental

degradation issues. The continued striving for safety, availability and growth in all countries has fuelled increasing environmental degradation problems. Exploiting the environment threatens oil and gas cargo transportation. The Azeri oil industry nowadays transship their commodity through Poti, Georgia and Ceyhan, Turkey. However, oil tanker ships are forced to reduce their cargo and return their empty barrels through the Baku sea hot, which is 3.25 neophyte. Adopt modern ideas to transport cargo such Baku-Anamasit railway, this is ACIM to be 0.625 prostitutes. This model not treated the possible macroeconomic impacts on economic development, such as impacts on job creation, taxation, and distribution. Nonetheless, there is accumulating research providing evidence on the positive macroeconomic impacts of renewable energy and energy efficiency policies (Baus, 2017). The exploitation of fossil fuels is not only a serious problem but it continues to have dramatic consequences for future generations. At the same time, the use of energy sources is increasing rapidly as a result of urban heating, industrial and transportation systems. Given that the earth's resources are finite, the increase in demand is unsustainable in terms of both the present and the future. On the other hand, such activities as tire-oil is polluting the natural environment, which also contributes to the worsening of the situation. Energy resources are vital to any country's basic welfare; therefore, the main goal is to meet growing energy demand efficiently and with minimal external costs. Thus, more than anything, national and global economic growth is wholly dependent on the availability and use of energy resources. In today's world, different countries are striving to address existing environmental problems and overcome the consequences, all of which require an understanding of potential impacts of environmental actions before implementing plans. With concerns there is still limited data on how policy actions could affect various economic aspects of the country and global economy (Moyo et al., 2017). Environmental conservation, mitigation and adaptation can effectively be evaluated. A new energy economy regulatory and taxing policy can influence consumer behavior, the structure of the energy sector,

and the creation of new job sectors. Despite the recent dramatic effects of renewable energy consumption on the United States of energy generation and consumption, no comprehensive econometric assessments have been presented for the macroenvironment, the economy, and the social aspect globally. The European countries of the future have already adopted comprehensive strategies at national and global levels. While it is now useful and timely to assess the potential impacts of this situation, considering the multifaceted effects of potential processes, strategies and activities, efforts are being made to discuss the issue in a comprehensive way.

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