A Review of the Impact Factors on Renewable Energy Policy-Making Framework Based on Sustainable Development

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Abstract: One of the critical challenges and issues of today's societies is disrupting the environment's order, then getting the environment out of balancing; consequently, the degradation and increasing pollution of the world's remaining environmental resources. However, humans have long influenced the environment and interacting with the environment; the effects that humans have placed on the environment have consistently included negative trends. Besides, the ever-increasing human energy needs and using fossil plants and fuels have intensified environmental harm. Furthermore, if these resources are exploited without observing any considerations, man's future will be amid ambiguity and destruction. Therefore, given the importance and necessity of achieving sustainable electrical energy production, developing social goals, preserving the environment, and promoting the country's development goals, it requires an algorithm for governmental and nongovernmental policymakers so that they can recognize the process of policy-making over time and consider their interactions each other; Thus, the purpose of this paper is to review the evaluation of the affecting renewable energies factors on Sustainable Development (SD) for decision-makers, in order to reduce environmental, social and economic issues and achieve sustainable energy within the framework of sustainable development objectives.

Keywords: Renewable Energy, Sustainability, Environment Issues, Social Issues, Economic Issues.

1. Introduction

Sustainable Development is a dynamic concept that covers many dimensions. The word sustainable means that it is stable and continuous, and it has clear and practical consequences to achieve its indicators. Renewable Energy (RE) plays a crucial role in meeting the national sustainable development goals, resolving climate change and environmental problems, and maintaining national energy stability. Energy resources are the most critical elements which contribute to sustainable development. Having the right energy is the most important economic factor for the industrial societies after human capital because electrical energy is an essential requirement for continued financial development and economic growth, social welfare, quality of life, and community security. When power is created and used in such a way as to ensure human development in the long term in all facets of the economic and social environment, then the spirit of the essential concept of renewable energy can be realized [2-16].

Economics has a vital role to play, as many economies depend on competing demands. However, it is also evident that economic processes' allocation of environmental resources is very weak in particular market economies. In other words, market failure occurs [17]. Although the relative prices are set correctly, the pricing mechanism cannot overcome the absolute shortfall. Only with the careful use of resources and population limits will this issue be solved. In the national and international scenes, the government position, therefore, becomes more critical [18-27].

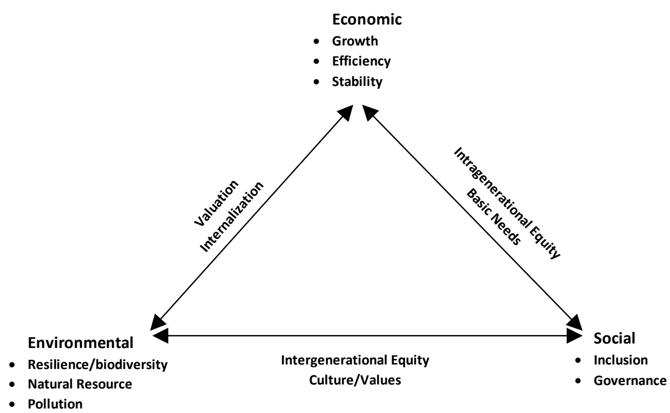

Fig. 1. The Dimension of Sustainability and their Interrelationships [1]

Some researchers include the non-integration of the measures, product-related assessments, and integrated assessments to categorize sustainability assessment methods. Unintegrated measurements facilitate decision-making processes by knowledge translation into functional information units. They can be described as the "operational representation of a system attribute," which may be the system's environmental, economic, or social state [28-31]. Examples include the UN Division's indicators and the National Indicators on Sustainable Development. The article addresses the renewable energy framework to explain the policy maker's sustainable growth policies. Factors such as the cost of energy generation, the energy demand, and emissions and fuel prices have made clear in many articles that the improved energy system can be achieved, especially by increasing renewable energy production [4-6, 32-34].

Renewable energy plays a crucial role in achieving national sustainable development goals, addressing climate change and environmental problems, and maintaining national energy security. The triangular strategy considers three dimensions of system dynamics (financial, social, and environmental), which seeks to assess a development proposal (Fig. 1) [35-38]. Thinking profoundly about three pillars of sustainability involves thinking about systems. By observing the universe as an interconnected system collection, three sustainability pillars with the most significant environment, Standard diagrams are simple to visualize the three pillars. Observing the general scheme in this manner clarifies that the most significant priority should be environmental sustainability. The reduced the environmental capacity and reduced the social system's common good and the economic system becomes less productive [26, 39, 40].

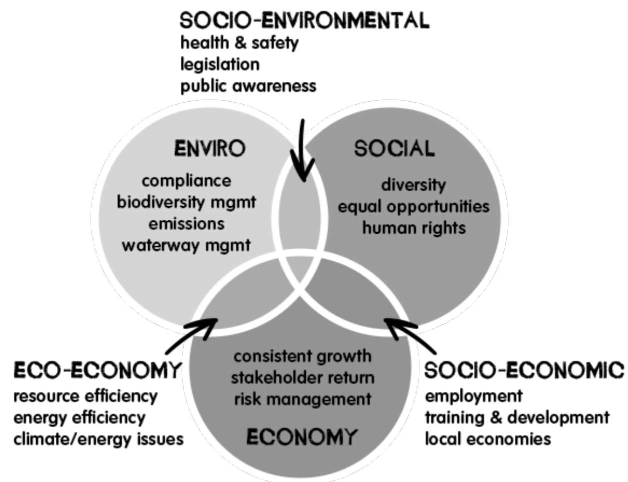

Image 1. Three Pillars of Sustainability [41]

Social sustainability is a social system's capacity to operate forever in a specified stage of social wellbeing and harmony, such as a nation, family, or organization. Environmental sustainability is the environment's ability to sustain a defined level of environmental quality and natural resource extraction rates indefinitely. Economic sustainability is an economy's ability to sustain a defined level of economic output indefinitely. Renewable energy sources have a huge potential to contribute to social, social, and natural supportability. Rapid deployment of renewable energy was motivated primarily by a broad spectrum of goals, including fostering economic development, improving energy security, improving access to power, and mitigating climate change [42-45].

2. Technique of Review

This research followed simple literature review guidelines that Webster and Watson established [46]. For example, in top-tier journals, the first step is critical papers. Step two is then a backward review of past studies. The literature is analyzed in step three by structuring it with a conceptual model. Figure 1 indicates and further clarifies each move in the text below.

2.1 Primary literature search

The first step is a literature search using the search words 'Renewable' and 'Sustainable' and 'Energy,' ordering the literature base of Google Scholar and Mendeley to scan for 'any time' Publications of references were taken into account; from one quote to several hundred references. It has been not taking into account papers that had no citations. For each of these articles, abstracts and keywords were used to determine if it deals with renewable energies and/or their sustainable growth and whether it was published in an established, high-quality scientific journal. Listed papers are dealing related to "sustainable development" and/or "Renewable Energy" and published in a journal with an impact greater than 1.0. That provided the first list of 100 publications.

Table 1. Literature review steps (based on [47], author adapted)

1. Basic Search	
Article Search Engine:	Scholar.Google.com, www.Mendeley.com
Search String:	"Sustainable development," "Renewable energy," "Sustainability indicators," "Sustainable energy."
Search Filter:	Time: Any Time – Publication: Top Pubs. – Sort: Relevance
Selection criteria:	Impact Factor > 1.0 – Result: 100 Articles
2. Search previous article history	
Search Approach:	Review the title in the reference list of the 100 articles
Selection criteria:	Select the title in the reference list that deals with "Sustainable Development" and/or "Renewable Energy" Result: 93 Articles
Search Approach:	Scan article text in the 189 (100+89) articles for text blocks containing the word "Renewable" and/or "Sustainable."
Selection criteria:	Select the literature that serves as a reference for these text blocks. Result: 89 Articles
3. Analyzing and Focus on Case Study	
Article Base:	277 (100+89+88) Articles
Search Approach:	Scan article text in the 277 (100+89+88) articles for text blocks containing the word "Sustainable Development" and/or "Renewable Energy."
Labelling Procedure:	Label each text block with its reference and 1-2 original words.
Analytical Procedure:	Analyzing the text blocks by structuring these with the analytical model.

2.2 Prior literature search

The publications were screened and traced in the reference lists of those 100 posts in Google Scholar and Mendeley's literature base. The second list consists of 89 publications, contained publications in the reference lists of the first 100 publications concerned with "Sustainable development," "Renewable energy," "Sustainability indicators," "Sustainable energy." The full texts of publications on two lists (100+89) were all screened using the 'Renewable' and 'Sustainable' screening strings. Reference was made to the third list of publications when it was discovered that another publication specifically refers to 'Renewable' and 'Sustainable' components. The third list consisted of 88 ratings. They were built up the three lists, culminated in a final list of 277 publications. However, they may not have been used fully, and only their abstract or introduction, or conclusion maybe have been used.

Table 2 lists the publishers who have published more than one related article. Much of the articles were published in Elsevier's journals. Besides, many articles are published in business and economics journals.

This review discusses 6 papers before 2000, 74 articles from 2000 to 2010, 95 from 2011 to 2015, and the remaining (102) from 2016 to 2021. The most important renewable energy technologies in the literature reviewed are CO2 capture and storage, energy-efficient construction and retrofitting, wind power, biomass, biofuels, and Photovoltaics (PVs).

Table 2. Distribution of articles (based on [47], author adapted)

Journal category	Journal title and references	#Articles
Energy Science	***Renewable and Sustainable Energy Reviews***	107
	Energy Policy	11
	Energy	3
	Energy for Sustainable Development	3
	Energy Procedia	2
	Energy Sources, Part B: Economics, Planning, and Policy	2
	Renewable Energy	9
	Applied Energy	2
Business and Economics	***Technovation***	2
	Ecological Economics	3
	Knowledge	1
Sustainability	***Journal of Cleaner Production***	4
	Sustainability	3
	Sustainable Development Solutions Network	2
	Nature	2
	Global Responsibilities. Implementing the Goals	3
Remainder		118
Total		277

Furthermore, a few articles have been published with little reference to clean energy technology, focused on green energy technologies. Numerous publications focused predominantly on sustainability as a medium to advance naturally without a clear emphasis on renewable energy technologies' environmental growth. Energy contributes to a cycle of social, natural, and social changes required for nations to attain economic advancement (Fig. 2). Adequate renewable energy supplies are the premise for raising living benchmarks, progressing the quality and amount of human capital, progressing the economy and the common environment, and the proficiency of government arrangements. Figure 2 shows links between energy and human, economic, and social development [48-50].

3. Impactive parameters

3.1. Social impacts

Electricity technology has a broad array of social consequences, both positive and negative. Renewable energies are not affected by fossil fuel imports and cost volatility. Table 3 lists the impacts of the technologies under consideration and their relative magnitudes [31, 51]. Without depending on coal, traditional plant requirements, and reduced mining activities, solar cells provide an attractive energy source. The production of solar cells does not require a variety of toxic, inflammable, and explosive chemicals [52, 53].

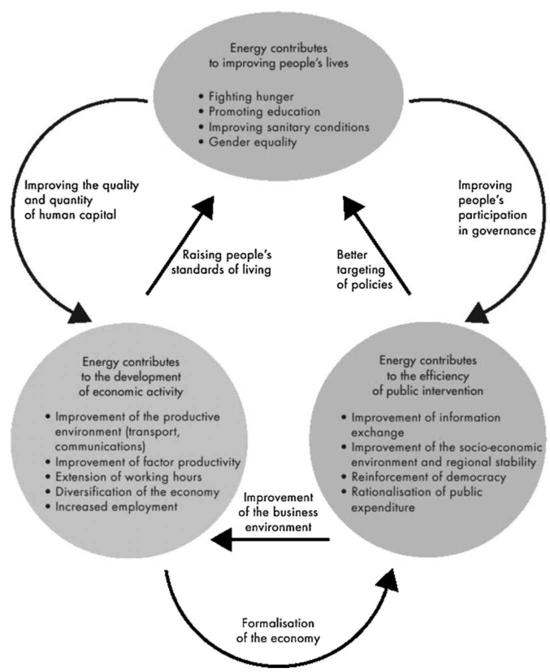

Fig. 2. Links between energy and human, economic, and social development [8, 54]

The thinner cells minimize the masses and thus the risks, so decreasing the mass cell use in the manufacture [55]. However, all chemicals must be carefully controlled to ensure minimal interactions between people and the environment. In order to minimize agricultural competition, soil erosion, and compaction, solar farms have to be carefully chosen. Because of environmental disruption, noise, and possible bird attacks, the wind is subject to public anxiety. Some scientists have [16, 56, 57] found that public assistance has increased since a local wind farm has been built. A thorough analysis of the proposed site before installation will significantly reduce the risk of bird strikes [58-60].

Table 3. Qualitative social impact assessment [31]

Technology	Impact	Magnitude
Photovoltaic	Toxins	Minor-Major
	Visual	Minor
Wind	Bird strike	Minor
	Noise	Minor
	Visual	Minor
Hydro	Displacement	Minor-Major
	Agricultural	Minor-Major
	River damage	Minor-Major
Geothermal	Seismic activity	Minor
	Odor	Minor
	Pollution	Minor-Major
	Noise	Minor

3.1.1 Socio-Economic Impacts

The theoretical ways of collected papers reviewed many case studies in which renewable energy projects' socio-economic benefits were discussed, i.e., solar, wind, and biofuel projects. The main objectives of these papers were to recognize the contribution made to local sustainability by renewable energy projects, which include political, cultural, and environmental sustainability, as well as the socio-economic benefits of REPs in the respective societies [1, 3, 39, 61, 62]. Several criteria have been used, including job creation, educational impacts, efficient use of energy, income growth, demographic effects, building social bonds, and community development. It was concluded that REPs had a good effect on employment, that indirect jobs were high relative to the population's size, while direct jobs were moderate [63-65].

3.1.2. Socio-political impacts

Usually, solar panels are mounted on building roofs, thus improving employment in photovoltaic system construction. This boosts regional growth and decreases energy demand for projects involving non-renewable resources. This is also useful in areas where no energy is available [66, 67]. High production and maintenance costs are the key problems with the solar system. Local employment growth and rural development are heavily affected by biomass energy programs. These types of power plants have great potential for work in the construction, management of plants, maintenance of plants, biomass production, and planning industries. The adverse effects of these plants are mostly noise and unpleasant smell [68, 69]. Due to their high construction costs and electricity demand, fuel cells' implementation is slow. Their construction and operation generate employment in virtually all technical activities. With hydropower plants, the main socio-policy issue is the move from the areas on which the plant would be constructed on population. These plants provide significant jobs to the local population and play an important role in the area's economic development. Tidal power plant construction does not affect individuals but contributes more to local official employment, but these are very costly, not popular, and uncommon [70, 71]. On the other hand, there have been no issues with emigration. Wind energy ventures generate many jobs for engineers in particular. The following socio-political advantages can be found in the geothermal energy projects: better education for people, improved quality of employment, and improved health care [12, 72].

3.2 The Environmental Consequences

Renewable energy policies have also contributed to environmental impacts being mitigated, including the reduction of emissions of carbon dioxide and global societies' awakening. Review in some papers found that the effect on people living in the region, tourism, energy, and education has been minimal. Significant effects have been identified in rising living conditions, building social links, and developing societies. They also noted that renewable energy projects are difficult to implement and sensitive to local conditions and environments. More analysis and experience are needed for their modeling, implementation, and planning compared with other projects [73, 74]. The air and water, typically produced by the discharge of water from houses, factories, and polluted soils, are the two main environmental aspects. In addition to water pollution, discharge for the waste oils and liquids are toxic chemicals as well as for heavy metals like mercury, plumes, etc. As can be seen in Table 5, good use of renewable energy sources will minimize greenhouse and air pollution, and different electricity generation energy choices can offset carbon dioxide emissions in Table 5. Many greenhouse gasses are produced in the environment through several economic activities. Table 5 explains the source and current status of greenhouse gases [75, 76].

Table 4. Summary of environmental effects [77]

Category of impact	Relationship to conventional sources	Comment
Exposure to harmful chemicals		
Emission of Hg, Cd, and other toxic elements	Reduced emissions	Emission was reduced a few hundred times.
Emission of particles	Reduced emissions	Much less emission.
Exposure to harmful gases		
CO_2 emission	Reduced emissions	A big advantage.
Acid rain, SO, NO_x	Reduced emissions	Reduced more than 25 times.
Other greenhouse gases	Reduced greenhouse gases	Big advantage- global warming.
Other		
Spouts off fossil fuels	Total or partial elimination of oil spills	Heavy fuel oil and other petroleum product spills.
Water quality	Better quality water	Reduced water pollution.
Soil erosion	Smaller loss of land	In most cases, there is no penetration deep into earth.

3.3. Economic Impacts

The concept of an economy on a sustainable energy system encompasses the whole market and its supply-side and demand, which provide energy and economic opportunities based on sustainable development. It aims to highlight the role of supplier energy products/services in terms of resources and demand (especially energy technology). Around the same time, customer and producer demands as primary factors for renewable energy progress are have been considered in these models. Models of renewable energy analyze renewable energy technologies' impact on the energy system and their optimum structure. They mark the most critical point of growth for renewable energy-driven economic development [74, 76, 78].

Table 5. Role of different substances in the greenhouse effect [77]

Substance	Ability to retain infrared radiation compared to CO_2	Preindustrial concentration	Present concentration	Annual growth rate (%)	Share in the greenhouse effect due to human activity	Share in greenhouse effect increase due to human activity
Alpha	1	275	346	0.4	71	50 ± 5
Beta	25	0.75	1.65	1.0	8	15 ± 5
Gamma	250	0.25	0.35	0.2	18	9 ± 5
Delta	17,500	0	0.00023	5.0	1	13 ± 5
Epsilon	20,000	0	0.00040	5.0	2	13 ± 5

As a theoretical model, the energy-economy system is considered an appropriate structure based on some researches. In promoting renewable energy technologies, the advantages include direct economic benefits, such as job creation, which promote the development and revitalization of local economies, Include local development, engineers, designers, and business opportunities [74, 79].

New technologies in the energy industry are linked to innovations. Energy procurement systems drive these to improve sustainable production market processes and economic growth. Technological advances and creativity often generate the need for professional labor. Renewable energy-based economic growth is defined as increasing energy efficiency and energy self-sufficiency; Also, it creates new jobs, preserves other jobs, and promotes regional prosperity. The diversification of renewable energy is a trend that leads to the growth of regional prosperity and generates new employment [80]. Green energy production's significant financial advantage is reducing the number of fossil fuels that will typically be required in traditional plants to generate the same amount of electricity. Technologies used for renewable energy reduce imports, especially imports of power and fossil fuels [6, 39].

RETs in rural areas could improve the economic growth of renewable energy technologies and local people's needs and ensure sustainable development. Renewable resources provide much-needed electricity in areas where the electricity grid is underdeveloped, such as remote villages and islands. Microgrid plants using advanced clean energy production technologies are could as on-grid or use as off-grid. Renewable energy technologies ensure a secure supply of energy to the entire energy system that increases sustainability [81, 82]. The industrial sector must define itself as the critical end-use sector and then improve efficiency in all operations related to green energy technology deployment to reach sustainable development, leading to economic growth. Increasing renewable energy consumption plays an essential role in Small and Medium-sized Enterprises (SMEs). Regrettably, research and development of renewable energy production need considerable investment. One of the significant limitations of the daily use of renewable energy technology is the reliability of renewable energy supply. The volatility and unpredictability of renewable sources are significantly limited and challenging to produce [17, 67].

Table 6. Renewable energies impact the economy [61]

Advantages	Disadvantages
• Development and economic growth • "Green" growth, Sustainable Development • New employment opportunities • Local economic revitalization • Innovation and technical improvement • Import reduction • Enhancing the trade balance • Development of capacity for rural electrification • Energy production • Manufacturing industry development and other related industries • Improved productivity • Generation Cost reduction	• Ensuring huge financial incentives • The high price energy production relatively. • Food price increases (Due to biofuels) • Reliability of supply

Therefore, in the form of plants' available installed capacity, a robust energy system grid must always include sufficient reserves. Therefore, this can lead to an increase in the maintenance costs of this type of power plant [83, 84]. The following table summarizes the advantages and disadvantages of renewable energies and their effects on economic issues [85, 86].

3.4. Sustainable Development Evaluation

The economic, environmental, and social sustainability possible trends of scenarios are assessed using the criteria that have been outlined based on system dynamics in Section 2.3. Within this context, Life Cycle Assessment (LCA) could use to measure sustainability in the environment, cost the economy over the life cycle, and various social sustainability initiatives. In total, there are 17 indicators of sustainability, and any scenario can be calculated on each indicator. The assessment methods are included in the multi-criteria decision review to analyze the results and identify viable options as defined in the next section [87].

MCDA methods are helpful because they tend to overcome diverse and often conflicting e criteria structurally and take traditional meanings of criteria into account and enable common definitions of criteria to be taken into consideration. This is especially important in energy discussions since many environmental principles, and the numerous parties' viewpoints concerned being more diversified and usually opposed to viewpoints [56, 87].

Various approaches to assessing MCDA exist, and those methods may be used to help evaluate in that sense. One of the most popular representations is the Multi-Attribute Value Theory (MAVT). For each parameter, MAVT shall require the calculation of partial value functions and a weight analysis of the value function V(s) as follows:

$$V(s) = \sum_{i=1}^{I} w_i u(s) \quad (1)$$

"V(s)" is Value Function, representing the overall sustainability score for scenarios; "iu(s)" value function, which represents scenarios performance on indicator I; "w_i" shows criterion weight (Sustainability Indicator); "Ie" refers to total Sustainability Indicators.

Second, the calculated value "u(s)" function representing scenario production in the predictor "i." In this case, the value functions "u(s)" represent the mitigation steps' measured values for each situation. Moreover, examples are categorized into a 1 to N ratio, with N being the overall and 1 being the best, and N being the worst. For each case, the sustainability value "V(a)" will be determined by Equation. Instead, the scenarios are again measured according to the global sustainability ranking, this time with a scale between 1 and N. A sensitivity analysis is done to assess the robustness of the MCDA indicators and assess when and how the scenarios rating varies with various variables weightings. The basic multi-attribute ranking methodology (SMART) can, for example, be used for these purposes [15, 88]. In SMART, their relative importance determines the parameters from the lowest to the highest. The minimum criterion is set to a ten-point value, and the number of point numbers (without a specified upper limit) is allocated to such parameters to represent their importance in relation to minor criteria.

$$w_i = \frac{v_i}{\sum_{i=1}^{I} v_i} \times 100 \quad (2)$$

The "vi" significance of the points allocated to show the relevance of the "I" predictor of sustainability for other indicators; "Eq" uses the MAVT approach again as weights for each variable are calculated. Then should estimate the scenario's durability and scale it from 1 to N. In accordance with the results, the weighting of the initial cases is used to assess whether and if the weight change could have been changed. Then the robustness of the sustainability ratio can be measured according to the changes, and different evaluations can be calculated based on it [56, 89].

4. Discussion

The policy-making and evaluation process can be divided into four phases: (a) the development of the plan, (b) systematic decision-making, (c) the execution, (d) the assessment. The first step of the agenda is the discovery, description, and recognition of problems. The first level. The second section centered on the systematic decision-making mechanism regarding the execution of a particular program. Efforts to enforce policies are made on the third level. However, the actions taken during the implementation process should not lead to the accomplishment of the political objectives. In addition, the fourth level of policy evaluation. During this point, government policy leads to an estimation of the potential and unintended consequences. During the analyzed policy-making process, all sorts of operations have to carry out. In the above model (Fig. 3), the model involves two big policy kernels. The first part is the regulation of the environment, and the second section is the decision-making for plants. In the environmental portion, national and international priorities for emissions control and the increase in public awareness through the increase in social metrics are being discussed in the framework in problems. The restructuring of political actions and improvements in the environmental policy then takes shape. This shift in government systems is a common desire that can be expressed by systematic decision-making. The citizens take up positions in the third step of these initiatives, and the governments play other positions. An analysis of the outcomes of adopting a policy is made against the priorities identified by foreign bodies, as opposed to regional sustainable growth strategies. The review of the policies enacted and applied takes place. In addition, NGOs carry out the results of certain decisions concerning the magnitude of the deviations from the measures.

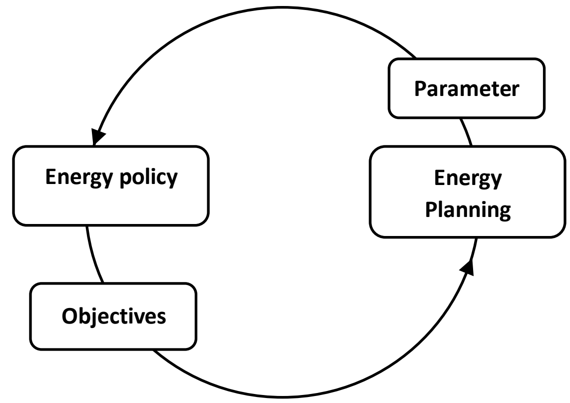

Fig. 4. Energy Policy and Energy Planning interactions [5]

The problem structure is defined in plant development policy-machining, through social objectives and the probability of economic growth on investment outcomes, through the supply of energy demand, overall satisfaction, and social issues metrics for the making of environmental policies. If such decisions are taken with global metrics and sustainable development targets, they achieve the optimized power plant model in terms of form, scale, and operating system. Energy policy priorities tend to be obsessed with significant issues affecting modernized politicians facing the "climate players." Energy policy is, in fact, an environment that has been heavily influenced by decisions taken mostly by political parties while backed by scientific approaches, e.g., the energy outline. Energy policy options were still a sort of 'Blackbox.' Energy analyses also rely mainly on methods that assign empiric analyses in the energy research process. The conclusions are not what politicians want to read and appreciate. Perhaps the most relevant decision-making techniques in the experimental energy industry are technology plans. The ultimate aim of energy forecasting is to optimally cover potential electricity usage, with the best results based on multiple financial and social issues. Energy planning has started to develop progressively in integrated resource planning based on sustainable development, which integrates the option and control of demands as the best scenario for production type.

Energy planning and energy forecasting are scientific methods for analyzing information on energy supply and demand, as well as presenting the outcome approach to decision-makers to organize an action plan. It is important to see how political preferences shape this mechanism or how they balance-up all the criteria associated with it. Power strategy provides targets and objectives on the basis of and basic principles for the evaluation of power planning. By comparison, power planning findings are intended to educate policymakers on future developments of the power sectors and offer potential responses to expected impacts. On the other hand, Power policy offers the objectives and priorities that power planning should base on and the fundamental assessment parameters. The following Fig. 4 demonstrates the meaningful power planning and power policy connection.

5. Conclusion

The policy-making framework to assess the impact of Renewable Energy Technology on sustainable growth was developed, built, and evaluated due to the sustainable development steps. The current energy network is one of the cornerstones of our future lives. Nevertheless, the current energy supply and usage network is extremely unsustainable, and in the immediate future, the absence of major new policy interventions will become even less so. The Sustainable Development framework aims to reduce environmental, cultural, and political issues by maintaining future capital generations. Improving today's and tomorrow's human, cultural, social, and environmental conditions needs even greater energy services. It also calls for such programs to be provided in a more readily accessible, effective, secure, healthy, and environmentally friendly manner. Sustainable development can achieve through the following practical ways: (a) Minimizing the excessive use of natural resources; Effective and strict governing Policy-making for smooth growth and administration, (b) Awareness programs conducted for the importance of sustainable development on social issues sector, (c) Providing formal as well as informal education for better knowledge on sustainable development. Indeed, considering energy trends and integrating various and often conflicting goals and parameters, energy policy-making is a significant method for the energy sector's sustainable development. Energy policy-making will have to foster the following purposes: (a) power supply safety, (b) energy market competitiveness, (c) environmental protection. Now, with the issues as mentioned earlier and above framework, it can be concluded that energy policymakers in governments, from a top-down perspective, and policies for sustainable development should take the following actions: (a) Optimal use of skilled professional capacities and potential for improving systems and planning strategies of energy, (b) Increasing the accuracy and reliability of data and predictions needed for power and energy planning, (c) Facilitate the financing of energy planning studies.

Energy production and use should be put in the sense of sustainable development to ensure that no dimensions, resources, or policy instruments are overlooked. The energy policy-making process is an important method of sustainable development in the energy sector, in fact, taking account of energy trends and integrating different, often conflicting aims and parameters. Generally, it should be considered that all these energy policy-making, renewable energy sources, and sustainable development models are entirely non-linear decisions and multimodal equations with multi-level decision-making models due to their presence on the basis of human functions.

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