

Renewable Energy Is an Essential Variable in Achieving Sustainable Development

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Abstract

Purpose: Accelerated life change due to globalization drives global organizations, and companies who are interested in environments and their effects; to think deeply in renewable energy and its importance, especially after many researches and studies that related to the side effects of traditional sources of energy on societies and nature as well. **Design-Methodology-Approach:** The current research aims to investigate the importance of renewable energy and its contribution to achieve sustainable development; the structure of this research divided into four parts; started firstly with explanation of the main idioms of renewable energy; secondly explanation of the main idioms that related to sustainable development; and third one worked on finding the correlation between renewable energy & sustainable development; while the fourth part tried to analyze certain statistical numbers that reflect the consumption of renewable energy due to different source of data. **Findings:** Most obvious results are related to the positive role of renewable energy in achieving sustainable development due to its role in recurring clean energy consumption at acceptable margin of prices. **Research Limitations-Implications:** Still there is a power resistance to understand this phenomenon, due to the lack of knowledge of the important role of both renewable energy and sustainable development, in addition to the lack of trust towards certain governments especially in developing countries like Iraq. **Practical Implications:** Researchers depended only on describing the phenomena in general and tried to build a virtual successful case if it is adopted positively in certain community. **Social Implications:** Decreasing the side effects of using traditional sources of energy especially after the international fear of climate change as a result of increased emissions that announced recently in (COP 26). **Originality-Value:** It is a unique paper that dealt with this dynamic phenomenon especially for Iraqi society who characterized as complicated one due to the power resistance towards any change.

Keywords

Component, Formatting, Style, Styling

1. Introduction

Recently, never the less many global and international organizations which are interested in climate changes call out for transferring their activities & attentions toward renewable energy due to the negative effects of climate under the condition of using normal sources of energy that is characterized as scarcity energy; in addition to the high level of pollution that most countries are suffered from especially those overcrowded ones. Traditional sources of energy or which is known as fossil fuels i.e. (coal, oil, and natural gas) are pulsed due to the high demand since many decades according to many international reports

(<http://www.ipcc.ch>). These facts led to serious efforts to adopt novel strategies, polices and producers to overcome those threats, and seized the opportunity to transfer those threats into real booty of investment in other sources of energy joined by real desire of societies to adopt their way of using energy. Furthermore, renewable energy has its positive effects upon many life aspects e.g.; decreasing the medical and/or environmental side effects that related with fossil and nuclear fuels, enhancing the educational opportunities, creating novel job opportunities, decreasing the level of poverty and developing the gender equality.

Energy in general considered as one cause of existence, it has many shapes according to its usages; thermal, mechanical, chemical, nuclear and others; it characterized as transformational energy from one shape to another by adopting simple or complicated techniques as in transferring the chemical into electrical ones (Al Alwani & Al Kenani, 2022).

In this context, and before many decades General Council of United Nations exactly in 1987 reported that sustainable development has great role in protecting generations for future through addressing many programs that interested in environment protection and technology usages to save societies and economies as well (Baker & Al Berezanchi, 2020).

In this sense, and according to International Energy Agency, renewable energy could be generated naturally such as solar energy, wind energy, hydropower and biofuel energy and so on, that characterized as low level of carbon and sustainable (<https://www.iea.org/reports/global-energy-review-2021>).

2. Background

To understand the purpose of this research, it is very important to think deeply about the role of renewable energy towards achieving sustainable development; trying to investigate the coins and/or bros of adopting new technologies of renewable energy. Renewable energy considered as clean source of energies, in which there is no trace emission of carbon or, if there is; it would be less than

harming environment compared with fossil fuel, meanwhile it is safety for use. Moreover, it could be a good chance to create many opportunities for those who live in countryside or villages to develop their places and so on (Tripathi et al., 2021). On the contrary, many disadvantages such as, using the current techniques of renewable energy is harmful for wildlife especially by using Solar & Wind energies, another disadvantage, the high level of startup working have to be considered.

Many threats have been raised during last decades concerning the fossil fuels and it could be as one of the main threats that global organizations and unions have to challenge; many social responsibility efforts should be taken accordingly during 21st century

(https://www.oxfordmartin.ox.ac.uk/downloads/reports/ClimateMetricsforRuminantLivestock_Brief_July2022_FINAL.pdf); due to the high level of requirements and novel systems to transfer the use of traditional shapes of energies into renewable ones with consideration to environment protection (Faeh & Abdullah, 2022). Moreover, renewable energy has its further dimensions toward achieving sustainable development (Hussain et al., 2021) through encouraging the private project investments that leads to independent economy then achieving social prosperity (Al Mahmadi, 2017).

3. Related Literature Review

Recently and after the announcement of International Energy Agency, many efforts and expertise have been taken to discover other sources of energies, studies refer that for time being, there are five kinds of renewable energies for instance, Solar, Wind, Hydropower, Geothermal energy; and Biomass energy (Zohuri & McDaniel, 2021). In this context, many studies were interested as well in the positive effects of using renewable energy upon having green environment in which there is no polluted emissions (or little), in addition to its role to fight the greenhouse effect (Kahar & Al Jawazi, 2020). Renewable energy is a unique sample of infinity which is considered as sustainable energy that paved the path towards achieving the target of International Energy Agency when it announced earlier in 2015; that every human by the year (2030) has the right to live in peace and prosperity (<https://digitallibrary.un.org/record/3952474?ln=en>).

21st century distinguished as a dynamic century due to many changes as expected, many threats and opportunities are struggled to enhance life in general and toward achieving sustainability in specific; moreover studies refer that many dimensions of achieving sustainable development are in parallel with the use of renewable energy

(<https://resources.unsdsn.org/2022-arab-region-sdg-index-and-dashboard-report>); in this sense, fossil fuels (Oil, Coal, and Natural Gas) considered as a sample of unsustainable phase of consuming due to the high level of waste energy, regardless the side effects upon environment and societies as well, meanwhile, advanced countries adopted certain mechanism procedures to achieve sustainable development through reducing the level of consuming in both energy and other

natural resources, especially after many global calls out that warnings from the greenhouse effect & reduce pollution emissions especially for those advanced countries like USA that consumes around (33 times) greater than India.

While, in developing societies the situation is different, they have to develop their way of thinking, developing human mentality towards the importance of having green environment, tangible efforts have to be taken by both governments and societies to adopt new technologies, imitate other experiences of renewable energies usages through creating many projects to absorb labor intensity that results in sustainable development accordingly

(<https://resources.unsdsn.org/2022-arab-region-sdg-index-and-dashboard-report>).

Another consideration is that, most of developed countries especially in (Middle East), their countryside & villages are suffered from negligence and the lack of resources; but on the contrary they have many other kinds of resources that stands as benefits for many renewable energy projects i.e. (Solar, Wind, Hydro-power etc.).

Taha et al. (2018) noted that many initiations which interested in environment are raised from United Nations and/or many international organizations to adopting renewable energies as an alternative choice instead of fossil fuels due to damages of greenhouse and other polluted emissions, especially after the increasing of global population as noted in (REN 21) report, and how these renewable energies have a great role in decreasing the negative effects of climate changes on both environmental and economic life; whereas environment will be green enough for creating safety life for human beings; meanwhile, economic will be developed accordingly when many projects established and the level of unemployment would reduce as well; even the level of education & health treatment ranking would be affected positively as a result of prosperity which leads to sustainability (Taha et al., 2018).

In brief, there are many serious responsibilities have to be taken by governments, public institutes, universities and research centers in addition to private organizations towards explaining & enhancing the knowledge of the great role of using renewable energy; live workshops, conferences could help as well. Resistance to change cannot be broken without concrete steps depending on aligning the efforts of both governments and societies to convince and explain the importance of using renewable energy and its positive effects upon their prosperity.

4. Research Method

This section, researchers tried hardly to exam and analyze certain published statistical indicators of selected years of global energy consumption from 1990-2013. They tried to shed their focusing on the consumption of renewable energy through benchmarking technique depending on the historical data (that published during the period of preparing this paper), then exploring its role in achieving sustainable development which considered as one of seventh objective of obtaining clean energy; therefore, having this duration is large enough to

serve the research's purposes. **Table 1** shows the growth of renewable energy usages in percentage which concluded by using Excel equations (Al Swdani & Al Athari, 2018).

According to A/M table, although there is an obvious evidence of high level of energy consumption especially after 2010 for all kinds of renewable energies, but these increasing trends are wobbly; another notable point is that, Hydropower consumption was started with high rank of consumption in 1990, it was (483 Million ton/EQ Oil) comparing with others, it was (23/time) larger than other competitor renewable energy source; while after 2005, this kind of renewable energy was declined dramatically, but again it started to increase in 2010 and 2013.

5. Results & Discussion

Table 1 handles us with many indicators and researchers tried to translate this table into readable figures to facilitate understanding and interpretation of each type of renewable energy, starting with Solar energy in which there is high demand of it and the level of consumption increased continuously for the selected studied duration and the highest level was in 2013. Then, for Wind energy, Hydropower, Biomass, and other kinds of energies respectively; also increased continuously where the peak was in 2013 as well.

Briefly, increasing level of renewable energy consumption is good evidence for future, in addition, using renewable energy is one of the sustainable development goals, especially after reviewing the global trends of investment; where three main areas are known as; APAC (Asia, Pacific Ocean), EMEA (Europe, Middle East & Africa); while third one is AMER (United State) are specified for renewable energy investment as figured below.

Researchers noted that **Figure 6** divided world into regional distribution which reflects a tight alignment between renewable energy and sustainable development due to the balance of high demand in these regions, with the high level of job opportunities that could be raised through establishing new projects,

Table 1. Growth of renewable energy usages (**Figures 1-5**).

Year	Solar Terawatt/hour		Wind Terawatt/hour		Hydropower Million Ton/EQ Oil		Biomass Million Ton/EQ Oil		Others Million Ton/EQ Oil	
	Qty	Growth%	Qty	Growth%	Qty	Growth%	Qty	Growth%	Qty	Growth%
1990	0.4	-	3.6	-	483	-	19	-	21	-
1995	0.6	0.50	8.3	1.31	570	0.18	29	0.53	32	0.52
2000	1	0.67	29.5	2.55	616	0.08	39	0.34	43	0.34
2005	3.7	2.70	104.3	2.54	661	0.07	78	1	85	0.98
2010	31.4	7.49	343.4	2.29	783	0.18	138	0.77	168	0.98
2013	134.5	3.28	640.7	0.87	943	0.20	198	0.43	279	0.66

Source: Al Swdani & Al Athari, 2018.

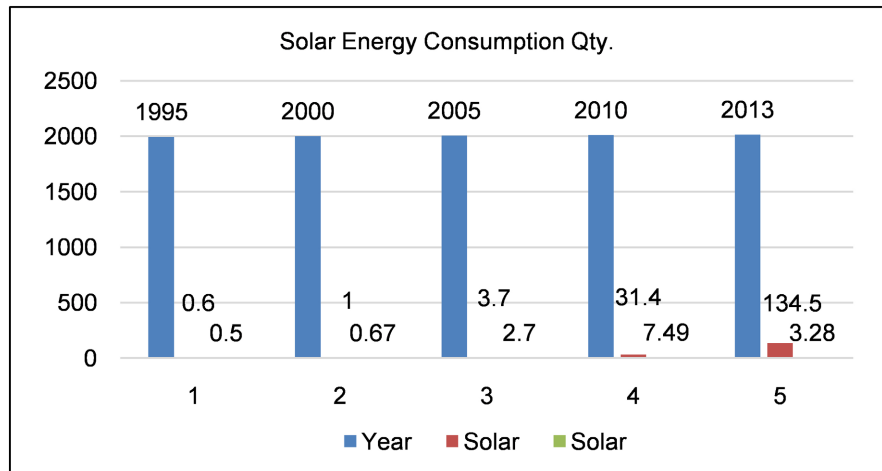


Figure 1. Solar energy consumption for (1990-2013). Prepared by researchers depending on data of Table 1.

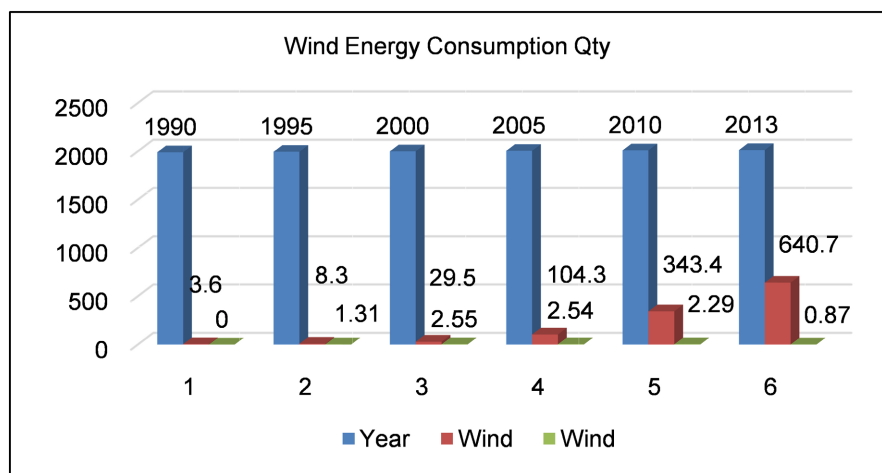


Figure 2. Wind energy consumption for (1990-2013). Prepared by researchers depending on data of Table 1.

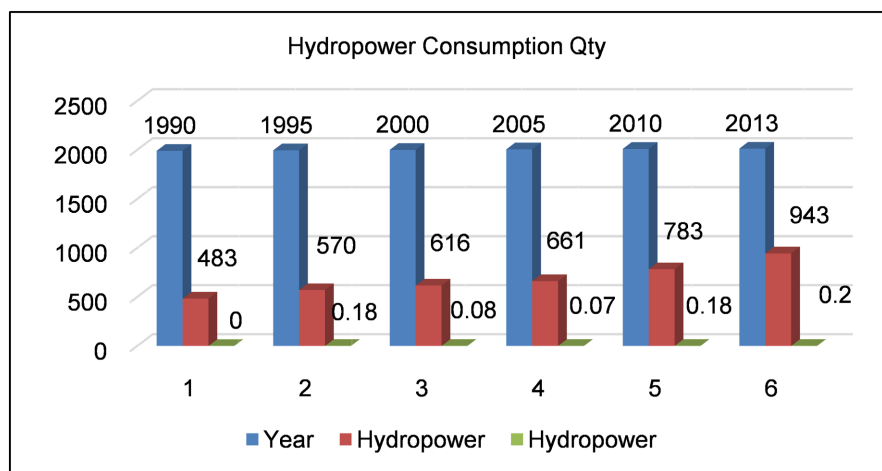


Figure 3. Hydropower consumption for (1990-2013). Prepared by researchers depending on data of Table 1.

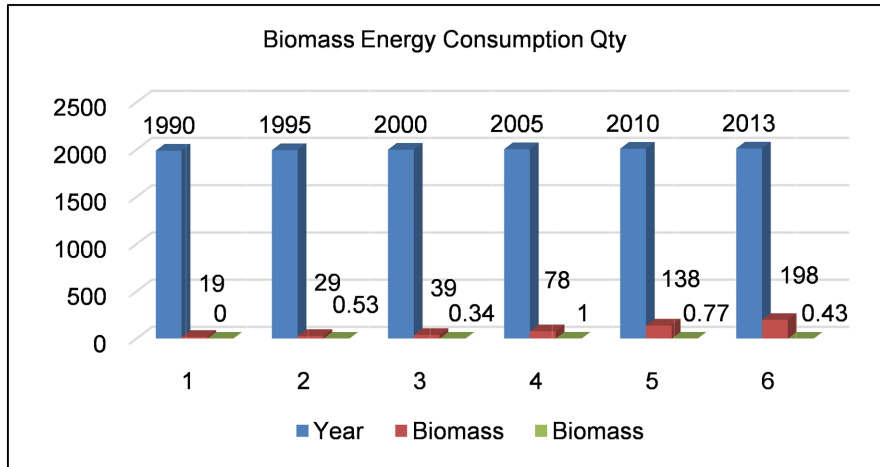


Figure 4. Biomass energy consumption for (1990-2013). Prepared by researchers depending on data of Table 1.

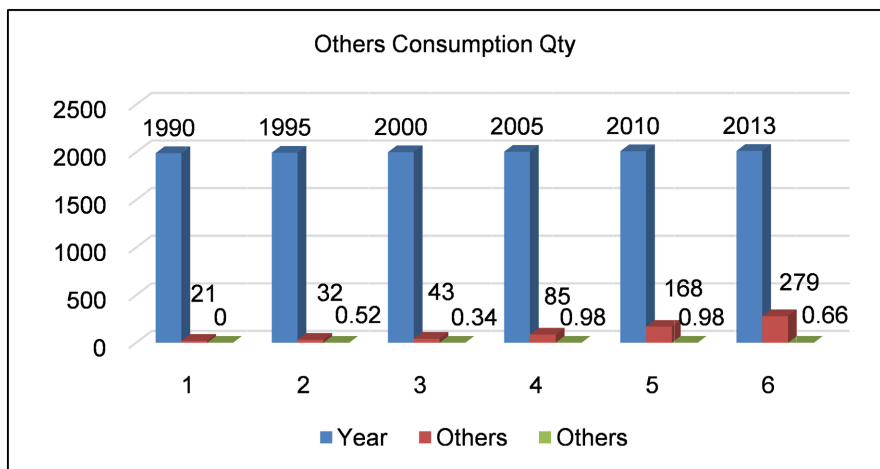


Figure 5. Others renewable energies consumption for (1990-2013). Prepared by researchers depending on data of Table 1.

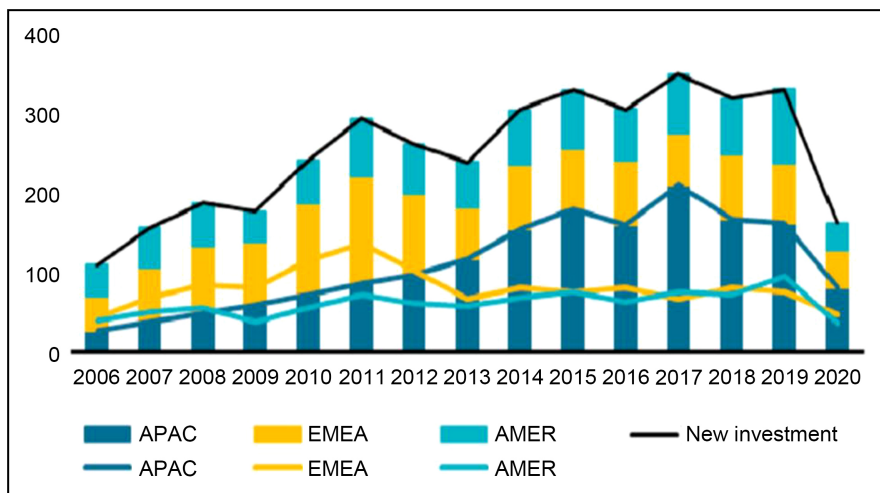


Figure 6. Global trends of investment in renewable energy. Source: Zhou et al., 2021.

high demand of technologies mean high demand of qualified employees; so, all these facts lead to development of educational social, economic aspects of life. But on the contrary, there are a number of limitations or threats that stands against; high costs of startup projects, vast spaces for establishing any renewable energy projects; and in some cases, certain outsourcing technologies.

6. Conclusion, Limitations & Further Research

Although there is a high level of demand towards renewable energy usages, but still it is out of expectation; and many organizations and unions have to sacrifice more efforts toward encouraging these kinds of projects; polices and legislations have to be formed into structured ones that serve this purpose; developing and enhancing societies to be aware enough towards the importance of using these kinds of energies, aligning experiences with knowledge is very useful then participating societies with the importance of renewable energy usages by adopting intensive courses through many channels such as social media, TVs channels, schools, universities and others. In addition, governments could adopt certain polices to encourage the investment of renewable energy project through banks especially for those developing countries like Iraq, which still most of its banks are operating by government; moreover, government in Iraq e.g. could establish many renewable energy projects that have many objectives starting from decreasing the level of unemployment, investing in vast desert lands and investing in solar projects due to the long duration of sunshine in Iraq.

The researchers' point of view is that, more studies and researches are very important to enrich the knowledge of these renewable energies, especially if these studies depend on benchmarking of certain regions and compare the effects of using renewable energies before and/or after.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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