

Research titled

**Renewable Energy in Jordan: The Social Aspects of Using Renewable Energy
in Residential Buildings in Jordan**

prepared by

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Abstract

The increasing demand for energy sources determines the need to search for other sources that are more economical and suitable for the needs of the local community due to the limited resources of fossil fuels. Focusing on renewable energy sources and their wide range can be the strongest solution. In addition, producing renewable energy has many benefits, the most important of which are the social and economic aspects that improve the efficiency of living for the local environment. This research aims to investigate the social aspects use of these sources in residential buildings in Jordan to determine the social impact of using photovoltaics on the local society's life. The use of renewable energy sources contributes to the sustainable development of local communities and the preservation of the living environment.

المخلص

ان الطلب المتزايد على مصادر الطاقة يحدد الحاجة للبحث عن مصادر اخرى اكثر اقتصادية وملائمة لاحتياجات المجتمع المحلي وذلك بسبب محدودية موارد الوقود الاحفوري، والتركيز على مصادر الطاقة المتجددة ونطاقها الواسع يمكن ان يكون الحل الاقوى، بالاضافة الى ان انتاج الطاقة المتجددة له فوائد عديدة اهمها الجوانب الاجتماعية والاقتصادية التي تعمل على تحسين كفاءة المعيشة للبيئة المحلية، ويهدف هذا البحث الى دراسة الجوانب الاجتماعية لاستخدام هذه المصادر في المباني السكنية في الاردن لتحديد الاثر الاجتماعي لاستخدام الخلايا الكهروضوئية على حياة المجتمع المحلي، حيث يساهم استخدام مصادر الطاقة المتجددة في التنمية المستدامة للمجتمعات المحلية والحفاظ على البيئة المعيشية.

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Introduction

The general problem that I interested in:

Energy is one of the main components of civilized societies, the energy problem is gradually increasing worldwide, especially with the growing demand for it at least 1.2 percent a year, and is expected to rise significantly in the coming period.

The interest in conducting research in this field is constantly increasing to seek alternative sources of energy, taking into account the environmental, economic, and social aspects.

The rate of energy consumption in Jordan is rising rapidly with population growth and the large increase in the number of industrial and service establishments.

Jordan is among the highest in the world in dependency on foreign energy sources because of scarcity of energy sources, it imports 96% of its energy resources, which leads to pressure on the balance of payments and affects human life and the environment.

The use of renewable energy sources is a suitable solution especially since Jordan has good solar and wind energy, scientific studies show that Jordan is one of the countries of the solar belt, and the number of days the sun rises in the Kingdom is 316 days per year and 8 hours per day, also Many regions in the Kingdom are characterized by wind speeds ranging from 7-8.5 m / s, which is an appropriate speed for building stations that use wind energy to generate electricity.

The share of renewable energy in the total energy mix is anticipated to reach 20% by 2030, then it is very important to take into account the impact of renewable energy on human life in Jordan, especially solar energy.

The importance of this research:

Where the world now depends on solar energy, fossil fuels, oil and its derivatives, coal, and natural gas, which are characterized by limited quantities of resources and high costs of demand and consumption, in addition to the environmental damage resulting from their use. This situation leads to a concentration of efforts to exploit renewable energy. Renewable energy is characterized by several features and benefits to humans, the environment, and the economy. It is constantly renewed, as it originates from natural resources such as wind, water, and the sun. The most important characteristic is that it is clean and environmentally friendly, as it does not emit harmful gases such as carbon dioxide. In contrast, non-renewable sources lead to global warming and thermal harm.

These systems can provide job opportunities and electricity to people in easy and accessible ways, such as the use of solar panels, and they offer opportunities to extend electricity to villages and remote areas that lack it, which raises the levels of living and education. Many studies show that the use of renewable energy contributes to reducing many environmental problems and protecting human health. It also encourages the improvement of the internal environment and thermal comfort, which increases the satisfaction and effectiveness of users. Designers attend to integrate this system with the design process to achieve zero net energy buildings. In addition, increasing awareness among people about the advantages of using these systems is essential.

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Recent development in the field of renewable energy sources:

Renewable energy provides a range of innovative technologies that can be used in many social and economic aspects.

- **Smart grids:** Smart grids are advanced electricity networks that use renewable energy sources, energy storage, and intelligent control systems to optimize electricity use.
- **Energy-efficient buildings:** Renewable energy sources, such as solar panels and geothermal heat pumps, can power energy-efficient buildings. Moreover, buildings may consume the least amount of energy possible by employing insulation and solar shading methods. Buildings consume the second-highest amount of energy after industry.
- **Solar power windows:** Solar power windows, also known as photovoltaic (PV) or solar windows, are a building-integrated photovoltaic (BIPV) technology that can produce electricity from sunlight. Solar power windows have several advantages over traditional solar panels.

Definition of the major construct:

This paper will study the specific area of interest to investigate in **social aspects of using renewable energy in Jordan**, if using these systems achieves a more **good and comfortable life** for users than before they used these systems, also if using these systems increases **the levels of satisfaction and wellbeing** of the users in residential building, in the same time investigating if **the average of energy consumption increase**, where these systems maybe encourage the users to use higher **numbers of electric devices** and for longer time to get more

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comfortable environment.

on other hand study **if the most users of these systems are rich or poor people.**

which this study led to increased awareness of the renewable energy importance, and more suitable solutions to rise the ratio of using these systems in residential building because of their advantages in human life and on environment.

Problem statement:

As mentioned previously Reliance on non-renewable sources of energy leads to damage to human life and the environment in addition to high costs.

As Jordan enjoys renewable sources of energy, the solution is focused on the applications of renewable energy sources, especially in the field of housing, and its impact on the life of the user in more than one aspect.

Therefore, the gap in this research on the social aspects of using renewable energy on human life.

Then this research aims to investigate the social aspects use of these sources in residential buildings in Jordan through survey and archival data to know the relationship between the use of renewable energy and its impact on the life of the users.

Research objectives:

based on the problem statement The following are the objectives of this study:

- Highlighting the importance of using renewable energy sources to improve the quality of life and encourage using them for all income levels in Jordan
- Bridging the gap in research on the social aspects of using solar energy in residential buildings.
- Investigate the impact of using renewable energy on human life quality, well-being level, satisfaction of the users, and energy consumption in residential

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buildings by comparing these variables before and after using renewable energy.

Anticipated benefits of the research:

As this research studies the impact of using renewable resources on quality of life, it is useful for more than one side. It encourages people to use renewable energy as their effective role in improving life, raising living levels, and providing a more comfortable environment. On the other hand, the government is encouraged to provide suitable ways to use renewable energy sources effectively and cost less for all categories of people, and also raise the people's awareness of the positives of these sources.

because of the aspects of these sources, it helps the architect to focus on integrating these sources effectively with architectural designs to create a comfortable environment and improve the quality of life for the user which are the most important architectural designer's goals. This assists in creating a Sustainable environment.

Research hypotheses:

Studying many kinds of literature shows the importance of renewable energy in the life of people and their impact on all aspects, whether economic, social, or environmental, some of the results indicate the importance of encouraging the use of renewable energy because it has an impact on the quality of human life, also take in consider Their impact on energy consumption, electric bill, and wellbeing level.

I have developed many hypotheses:

- There is a positive relationship between using renewable energy systems and increasing people's well-being. (figure 3)
- There is a positive relationship between using renewable energy systems and increased user satisfaction.

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- There is a positive relationship between using renewable energy systems and increased energy consumption. (Figure 1)
- There is positive a relationship between using renewable energy systems and an increase in the number of electric devices. (figure 4)
- There is a relationship between using solar panels and an increasing of high-income houses (rich people) that use solar energy. (figure 2)

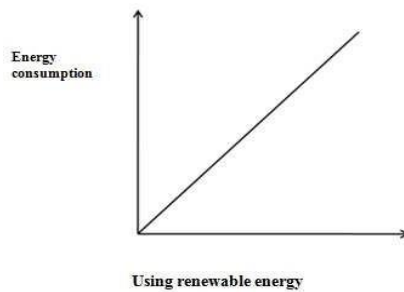


Figure 1

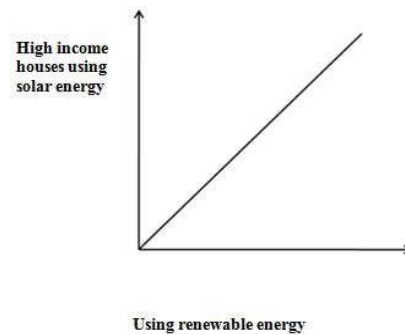


Figure 2

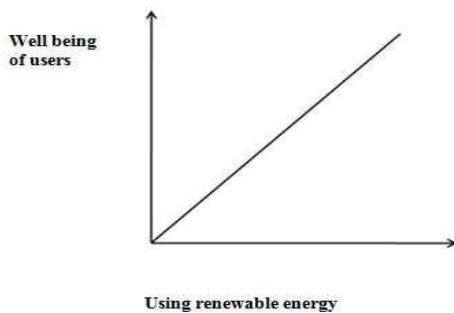


Figure3

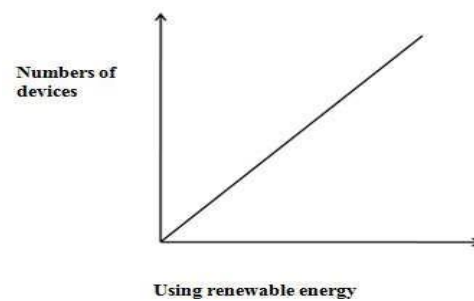


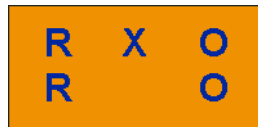
Figure 4

<https://jaspss.com>**Type of study design:**

Many questions must be answered to find the type of this study, what makes human life levels and their well-being better? Then, if there are differences in these aspects of using renewable energy systems, what is the effect of using these systems on the social life of people?

While answering these questions we found that, if we assume that we have used these systems then we have a better quality of life, more satisfaction, and more energy consumption. This type can be considered a causal-experimental design.

R will be the groups that use renewable energy, and X the use these systems.

**Target population:**

The target population for this research is defined to include the people in Jordan who use solar energy in their houses in Jerash.

Sampling strategy:

Study the social effects of the use of renewable energy sources on people through a simple random sampling of 100 people who use solar energy in their homes in different areas to get more accurate information this area was in Jerash.

I get information about the people who use solar energy from the Electricity Company, then there will be a comparison of the variables related to social impact after they use renewable energy sources and before using them.

<https://jaspss.com>**Variables to be used to test hypotheses:**

As mentioned above, several variables will be investigated to test hypotheses about the social impacts of using renewable energy sources on human life

The impact of using these resources on level of the of living, will be studied through the following variables, **the level of well-being** of users and **their satisfaction with the use of these sources**, in addition to their impact on the **quality of the internal environment**. On the other hand, they will be studied as a result of the use of these resources on people to give them more an incentive t to use a larger **number of electrical devices** and for longer duration to raise the quality of the internal environment and thus know the impact **on the consumption of electric energy** if increased or decreased or not also to test the latest hypothesis that looks at **whether most users of renewable energy sources are represented by high-income people (rich people)**.

The study of these variables in the reality of Jordanian society and knowing how users respond to these sources helps to encourage the importance of using renewable sources of energy and work to make them available for use by all income categories of society.

Validity:

This study shows that there is a relationship between the use of renewable energy sources and the level of well-being and satisfaction of people and this represents the conclusion validity, the households that use these sources are encouraged to use larger electrical advances and for a longer period, which leads to an increase in the well-being and consumption of electricity (cause and effect relationship), this reflects the internal validity.

On the other hand, the method used in the investigation of hypotheses and variables related to the social effects of using renewable energy sources was

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appropriate to obtain results on the relationship between the use of these sources and increased well-being of electricity by comparison before using the specified sample of renewable energy sources and after using them. Construct validity

Also, it is possible to mention the generalization of the results to other people to encourage the use of sources of renewable energy because of the effects on increasing the satisfaction of people and raising the quality of the internal environment. Which confirms this result in the data from electricity company about the energy consumption in the dwelling which use solar energy. external validity

Reliability of this methods:

This study targets a sample of people who have been chosen randomly Sampling to make a survey, this sample was chosen carefully to get a reliable survey to minimize the error. They give all their attention by taking their time to answer the survey, and also the questionnaire and interviews were clear to them, then I considered the relation between answers to be sure of the result, to make the measure more reliable we can use different techniques for the same purpose so we can make observations for the respondent in addition to the survey.

Recommendations

- Enact policies that regulate and encourage citizens to use renewable energy sources efficiently and at a reasonable cost.
- The use of alternative energy sources contributes to improving comprehensive sustainable development, which raises the efficiency of the standard of living for the local community
- Preserving the local environment from the negative effects of fossil fuel sources

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leads to preserving the health of communities and thus better production efficiency.

- Taking into account the external appearance of the architectural environment when relying on renewable energy sources such as solar panels.
- Spreading widespread awareness about advanced applications of solar energy sources, their types, and their economic, social, and environmental benefits, and providing offers that meet the needs of different income groups in the local community.

Conclusion:

Based on previous researches in this area which show the importance of renewable energy sources in human life on many sides and due to Intensify efforts to implement them in Jordan For many reasons mentioned earlier in this research, then this research focuses on the social aspects of these source in the Jordanian community, and show their effect on the quality of life and the role of them in provide comfort environment which all that encourage to develop techniques for using renewable systems and makes them available to all people.

When satisfaction is achieved with well-being, it leads to a positive impact on human life and is therefore reflected in society. Especially if the reliance on renewable sources of energy, reduces the use of traditional sources that are harmful to human life and the environment also costly.

This will support the level of sustainability in Jordan and the development of people's awareness about this term, and on the other hand emphasizes the role of the architect in the integration of renewable energy systems with architectural design to raise the level of human life, especially the house space is considered a place not only for living but to also to achieve comfort for the users.

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However, the application of these systems may face some obstacles such as the initial cost of these systems. On the other hand, the process of integrating them with the architectural design requires extensive knowledge and here shows the role of the architect in the development of his background in this area, but with the importance of these systems and their impact on people and society and thus on the whole city, it must

increase research in this field and discuss the obstacles in addition to finding solutions to achieve a level of well-being and better quality of life in the presence of these systems in a balanced manner with the consumption of electricity.

This also underlines the role of the Government in developing appropriate strategies to develop the level of use of these systems and make them available for use by all categories of society and increase the awareness of people necessarily using these systems in their residential dwellings.

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