International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 04, 2020
ISSN: 1475-7192

Solar Radiation in Babil Governorate, between Investment Incentives and Obstacles

Dr.Ali Jabbar Abdullah

Abstract--- *The energy shortage issue remains one of the biggest challenges facing the study area, and this crisis is exacerbated with an increase in the consumption of electric energy by (6-7) %. This increase in electricity consumption is mainly due to the increase in population and the significant increase in temperature, especially in the summer, where temperatures reach (50) degrees in some days, and now after this significant increase in temperature due to the abundance of solar radiation due to the ideal astronomical location can be a great incentive to invest in electric energy production, and indeed, those characteristics that characterized the study area F. contributed to being of great importance in the planning field, both today and in the future, in addition to what this type of energy does (Renewable Energy) has an importance on the global and local levels due to its cleanliness and its limited environmental impacts in addition to the inaccessibility of it, as the Earth receives massive solar energy equivalent to three thousand times the global energy.*

Keywords--- *Lack of Energy, Consumption, Population, Problems, Babil Governorate*.

I. INTRODUCTION

The Investment energy renewable sources of global priorities in the development of new sources of energy, to clean and raised environmental limited , as well as being non - viable sources of access , and the limited fossil resources used now which) oil, coal and natural gas (and raised by the large environmental , an important factor for investment , It is worth mentioning that the world consumes very large amounts of energy per day , and this means that the world is facing a major problem in the field of energy saving, especially clean energy , which has taken the international conventions emphasize the need to use because of the few environmental effects due to him Unlike consequential than traditional sources of energy other.

Research Problem

1. How far can solar radiation be invested in the study area to produce solar energy.
2. What are the obstacles that prevent the solar radiation from investing in the production of solar energy?

Research Hypothesis

1. The study area is characterized by huge potential and abundant solar radiation that can contribute greatly to the production of solar energy.
2. The weak administrative and technical capabilities are among the most important obstacles that hinder the investment of solar radiation for energy production .

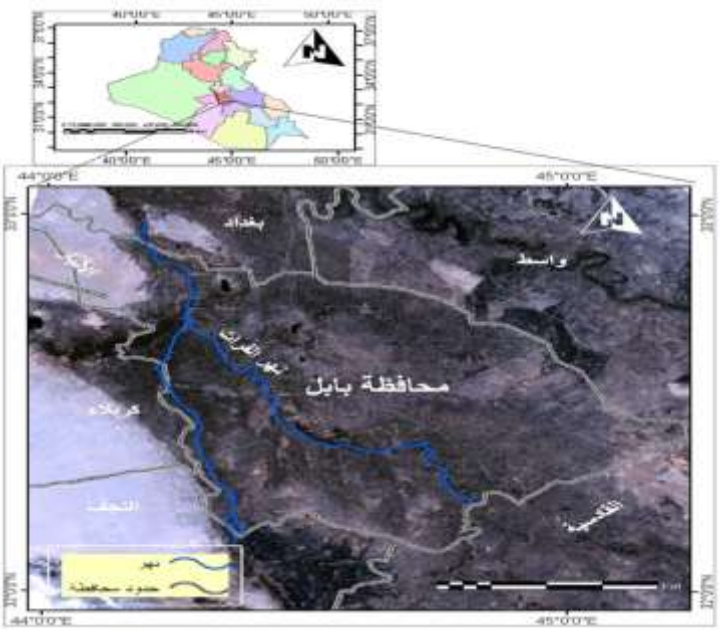
First :Geographical capabilities stimulating solar energy investment in the study area

Dr.Ali Jabbar Abdullah, Assistant Professor, Geographical Department, Faculty of Basic Education, University of Babylon, Iraq.

DOI: 10.37200/IJPR/V24I4/PR2020750
Received: 21 Mar 2020 | Revised: 30 Mar 2020 | Accepted: 20 Apr 2020

1. Astronomical Location

The study area represents the eastern part of Iraq between the electoral districts (-32.9 - -33.5) north, and longitudes (-43.97 - - 45.21) an eastern map (1). If the impact of this site is significant on the next amount of solar radiation and it is a great indication that this huge amount of radiation can be used in energy and renewable production, Map (1) the location of the study area.



Source :The work of the researcher ,based on the satellite image Iandsa

2. Solar Radiation

Solar radiation can be defined as the radiation emitted by the sun, and it is in the form of electromagnetic waves traveling at speeds equal to the speed of light (300 thousand km) / t) (1). The amount of solar energy reaching the Earth's surface is less than outside the atmosphere, and the reason is due to the exposure of solar radiation to a group of dispersal factors * and the absorption of atmosphere components that include gases and clouds, fumes and dust (2). Solar radiation consists of two types: the first type is the type that reaches directly without any absorption or dispersion occurring to them, and is called direct radiation (direct solar radiation), while the second type is originally to the Earth's surface in the form of different angles as a result of exposure to solar radiation or absorption Diffuse, then called radiation B, is diffuse solar (diffuse solar radiation), and the amount of solar radiation varies with changing atmosphere components and sun elevation angles, as this type increases when the sun's angles and clouds increase and dust in the atmosphere decreases, since the algebraic sum of both types gives Total radiation Gradual Solar Radiation ((3)). Solar radiation is the main generator for all elements of weather, climate and all that stimulates it, either directly or indirectly. Without radiant energy, there is no heating on the surface of the earth or air, the air stops, precipitation and water evaporation, the flow of water stops in rivers, and energy is the driving force system And regions on the surface of the Earth, and they are exposed to changes and changes in spatial and temporal actions directly and indirectly to address the diverse climatic conditions of the yen and climate change on

DOI: 10.37200/IJPR/V24I4/PR2020750
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the surface of the earth, and therefore the radiant energy (solar energy) is a sustainable thermal energy source to electric power (4).

Solar radiation is the main generator of energy in the atmosphere, as it is the main source of energy that reaches the Earth's surface, and is considered one of the elements responsible for weather phenomena and fluctuations. The intensity of solar radiation and the duration of daylight on the surface of the Earth vary, depending on the difference in the angles of the solar radiation that falls, and the difference in the length of day throughout the year as a result of the difference in the Earth's annual rotation around the sun as well. There are many natural factors influencing and responsible for the power of solar radiation that reaches the surface of the earth, and solar rays differ between different regions on the surface of the earth with different heights in the atmosphere, and this difference is due to the exposure of solar radiation in the study area to several factors that affect up to the surface Earth, and therefore we can show the most important factors that affect the production of solar energy that reaches the surface of the study area with the following:

3. The Angle of Solar Radiation Fall

It can be defined as the angle between solar radiation and the horizontal plane of the Earth's surface (5). The effect of the angle of solar radiation fall on the amount of radiation received by the Earth's surface, depending on the angle of inclination depending on the region where it is vertical or semi-vertical angle may be very strong and focus either tilt or semi-tilted in this case the focus is little and the increase of scattered x-rays (6). The angle of solar radiation fall varies from place to place and from season to season, and this difference even in one day, according to the location of the coordinates, which determines both the angle of fall of the solar radiation and its falling amounts. It is clear from Table (1) and Figure (1) that the lowest rates of solar radiation angles were recorded in the study area during December and January, where it reached (6), 33, 9,36) consecutive degrees, and this decrease is due to the clear and vertical transmission of the sun To sunlight throughout the Capricorn on (December 21), after which the sun moves in the direction of the equator's circle and is accompanied by a gradual increase in the values of the angles of solar radiation decreases. This rise begins during the month of March, specifically on (March 21) and reached (8) And 55) degrees, and this gradual rise due to the movement of the clear sun towards the northern hemisphere.

Table 1: Monthly and Yearly Averages of Solar Radiation Fall Angles (Degrees) for the Study Area for the Period (2008_2018)

Month	**Januar y**	**Fe b**	**Marc h**	**Apri l**	**Ma y**	**Jun e**	**Jul y**	**Augu st**	**Sep .**	**Octobe r**	**Nov .**	**Dec .**	**annu al rate**
Average ang le of incidence	36.9	39. 5	55.8	67.3	75. 9	80.2	78. 3	71.6	61. 7	49.2	44	33. 6	57.8

Source: Republic of Iraq, Ministry of Transport, General Authority of Meteorology and Meteorology, Climate Department, unpublished data, 2018.

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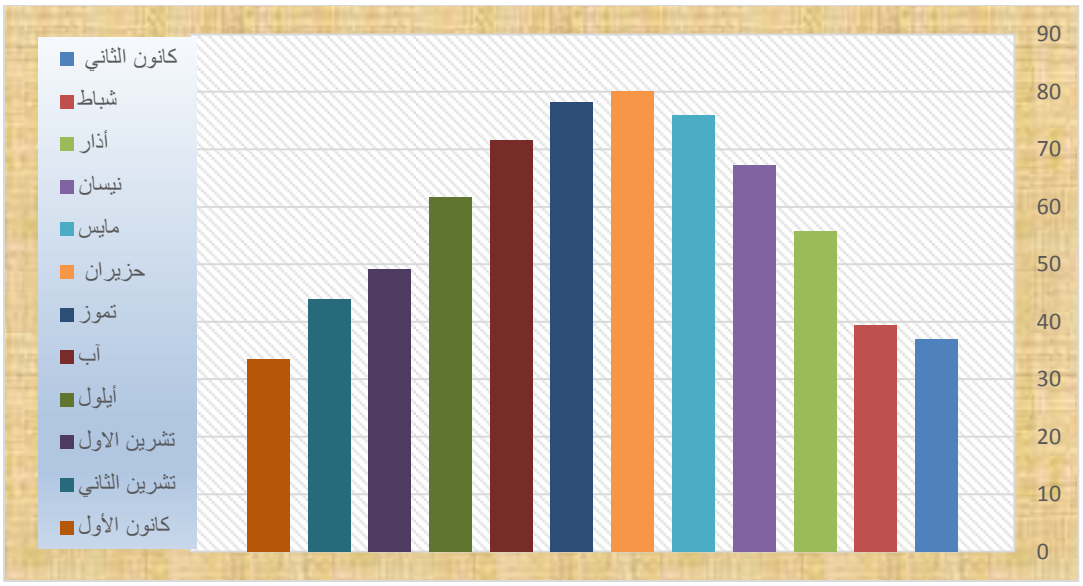

Figure 1: Monthly and Yearly Averages of Solar Radiation Fall Angles (Temperature) for the Climate Period Study Area (2008-2018)

Source :The researcher based on Table(1)

After the day (March 21), the sun moves vertically towards the orbit of cancer (June 21). Consequently, the angle of solar radiation fall in June reaches its highest rate, reaching (2), 80 ° degrees, and the quantities of solar radiation angles began to decrease gradually from September, due to the direction of the sun's movement towards the equator circle, where it was average The angle of solar radiation decreases during this month by (7), 61 degrees, while the annual average of solar radiation angles in Hilla station was about (8), 57 degrees, and therefore the number of months in which the monthly average exceeds Annual average of solar radiation fall angles (six months) from April to September in the study area, and this is reflected in the increase in d Acquired temperatures during those months.

It is worth noting that the angle of solar radiation fall controls the direction of placing the solar cells in a manner appropriate to the angle of occurrence of solar radiation because the angle of incidence controls the amount gained from the solar radiation of the Earth's surface.

4. Illumination Length (Hour's Theoretical and Actual Brightness)

The amount of solar radiation varies spatially and temporally, which in turn is reflected in the difference in the length of solar radiation, which is determined by the theoretical and actual brightness hours, where the hours of solar brightness are affected by the location relative to the latitude, in addition to being affected by the number of clouds and dust suspended in the atmosphere and water vapor. Theoretical brightness hours are the number of sunrise hours from sunrise to sunset or is the period between sunrise and sunset (7). Since the hours of brightness, theory depends entirely on the rotation of the Earth around its orbit affected by the hypothetical movement of the sun and the sale of its hand on the factors that influence solar radiation from dust storms, clouds, etc.

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As for the actual period of brightness, it is defined as the period when the sun's disk is seen bright during the day, as it is not related to the day's shortness and length, and the day may be long, but it is full. Clouds or the period of brightness may be few and vice versa, and the actual period of brightness affects the amount Solar radiation that reaches the surface of the Earth has a clear effect, and when it increases, the rates of solar radiation increase, and this means that the relationship between them is constant (8). Actual brightness is defined as the actual daylight length and is measured by special devices represented by the Campbell Stokes, and is affected by many weather phenomena such as fog, dust storms, and clouds, and also at the beginning of sunrise and sunset, where the sunlight is weak and tilted, so the actual daylight length is Less than the length of the day, in theory, the actual length of daylight has an effect on the difference in the amount of sunlight that reaches from one place to another on the surface of the earth, the lower the phenomenon of dust, clouds, and water vapor, the greater the amount of solar radiation that reaches the surface of the earth and vice versa (9). As the theoretical and actual brightness hours vary in the study station from month to month during the study period, it becomes clear to us through the analysis of the data of Table (2) and Figure (2) that brightness rates are the number of theoretical brightness hours that reach the study area whose value begins to increase and increase Starting in the month of March has reached about (12 hours) / day), and the average theoretical hours of brightness continue to rise, and the maximum reaches in the summer, especially in June when it arrived during this month about (14 hours) / day), and returns This rise to sunlight interferes with cancer, and theoretical brightness rates are high in both months (July, August, and September) reached about (2), 13, 2,12 and 2,11) hours/day respectively, and theoretical brightness rates will decrease during the winter, with the lowest values theoretical brightness was recorded in December when they reached About (10 hours/ Day), while the average annual number of theoretical brightness hours in the study station was about (71), 11 hours/ day), and therefore the number of months in which the month was, and the average has increased over the annual average (six months) from April to September, coinciding with the period when the solar irradiance angle is large, thus increasing the temperature to increase the amount of continuous solar irradiance associated with the angle of sunlight falls and the number of hours theoretical brightness.

It is also evident from Table (2) and Figure (2) that the actual number of hours of brightness begins to rise from April, when it reaches (1). , 8 hours/day), and the actual hours of brightness continue to rise until the highest levels are recorded in the months (June, July, and August), reaching about (7, 9, 1,11 and 9,10) hours/day, respectively, and return This increase to the length of daylight on the one hand and the purity of the sky frees it from clouds, dust, and fog to a great degree, in addition to the angle of solar or vertical radiation fall on the other hand.

Table 2: Monthly and Yearly Rates for Actual and Theoretical Solar Radiation (Hour) / Day at the Climate Study Station for the Period (2008_2018 AD)

Month	Januar y	Fe b	Marc h	Apri l	Ma y	Jun e	Jul y	Augus t	Sep .	Octobe r	Nov.	Dec .	annua l rate
Theoretica l daytime	**10.04**	**11**	**12**	**13**	**13.5**	**14**	**13.2**	**12.2**	**11.2**	**10.3**	**10.0 4**	**10**	**11.71**
The actual daytime	**6.07**	**6.9**	**7.4**	**8.1**	**8.7**	**9.7**	**11.1**	**10.9**	**9.5**	**7.9**	**6.5**	**6.4**	**8.3**

Source: the Republic of Iraq, Ministry of Transport, General Authority of Meteorology and Meteorology, Climate Department, unpublished data, 2018.

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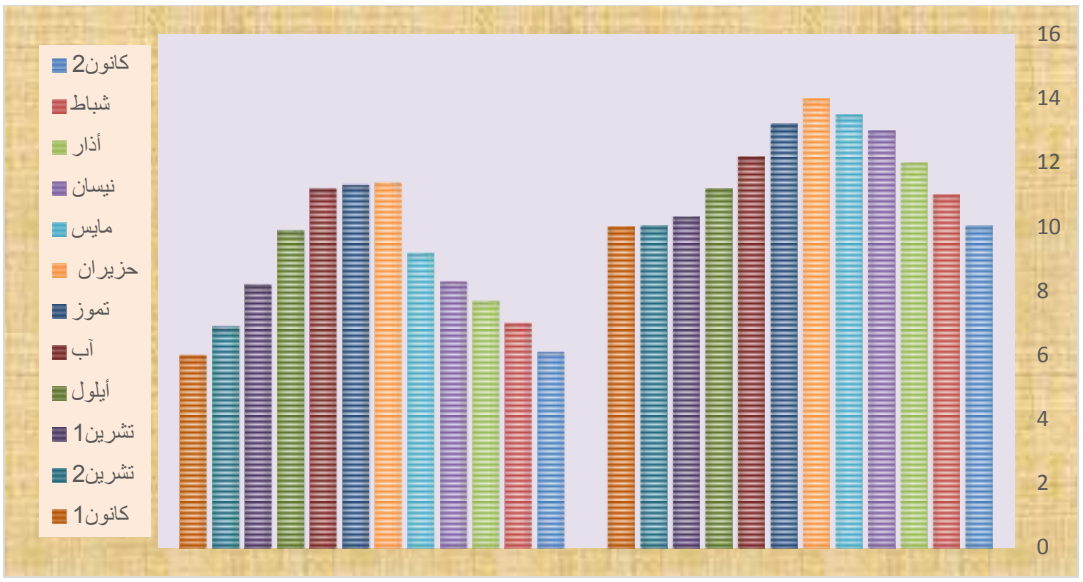

Figure 2: Monthly and Yearly Rates for Actual and Theoretical Solar Radiation (Hours)/ Day in the Climate Study Station for the Period (2008_2018 AD)

Source :The researcher based on Table(2)

Actual brightness hour rates decrease as of September, when they reached (5), 9 hours/ day), and their lowest levels were recorded in the months of December, January and February, where they recorded around (6.4, 07, 6, 6.9) hours/ day, respectively, the reason for this decrease is due to the fact that the winter season is the rainy and sky season flooded with dense clouds that prevent sunlight, as well as short daylight, the length of this season and the increase in the inclination of solar radiation decreases and increases humidity Relative to air, it is noted that the month of September reaches its monthly averages for solar radiation values higher than in March, and this is because of the period (1_23/ September) the sun's rays are in the northern hemisphere, so the amounts of the solar radiation angles that are located in a station are raised Study, but in the month of March, the sun rays are until today (March 21) and fall c the equator shifted, causing this difference to decrease the amounts of solar radiation between March and September (10).

Thus, it becomes clear to us through that, that the hours of theoretical and actual brightness increase during the summer months (June, July and August), as well as high brightness rates continue during the spring months (March, April and May) and autumn also (September, October, November), but during Winter season, despite the short daylight length and few hours of brightness, but it has high and good rates for solar energy generation, and through this it is possible to generate electric energy for remote and remote areas and work on investing them in the development of agricultural projects and various economic and service activities in the study area, and thus this can To say The study area has an abundance of solar radiation , which can be invested in the production of renewable electrical energy in various sectors .

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Chapter Two

II. OBSTACLES TO INVESTING SOLAR RADIATION IN THE STUDY AREA

The process of investing in solar radiation faces many technological obstacles in the process of transportation and storage, as well as technical and economic aspects. The following is a review of the most important of these restrictions:

1. Economic Constraints

That economic viability and the cost of investing any resource is a decisive factor in the direction towards its investment, the lower the economic cost, the greater the demand for it and the more economical to use, and this is what applies to Investing energy sources in the study area .Also, weak legislation Legal investment that supports solar radiation to produce the affect robbed of the trend towards this resource investment

2. Technological Constraints

The amount of solar energy that reaches the globe is about three thousand times the demand for Global energy, but the economic and technological reasons are represented by the low rate of solar energy investment from photovoltaic cells causing its low efficiency Also, the difficulty of transferring or storing electric energy will affect the investment of solar energy because of time The peak of energy varies from season to season and from a geographical and astronomical position to another, just as peak hours differ during Today, the maximum is at midday and less at night .These conditions require technical capabilities And high-level technology so that you can overcome these obstacles. It is worth noting that the systems used in the study area are the use of medium and high temperature systems and this of course requires to Use one-way mirrors to match the sun's rays and focus them on a special material Heat and then exploited to generate steam and electricity, which is still in the stage of the global experiment .As for the systems The solar with a high temperature of 1000 m, it depends on advanced mirrors that work continuously and from a variety The trends follow the sun and these systems are still in the experiment stage. As you convert solar energy directly) Photovoltaic systems (Photovoltaic systems are also present Into electricity via silicon cells made of silicon, which is the simplest and best exploitation technology Solar energy, but the efficiency is low for these systems, which are about 12-13%, and it needs to store electricity, as well as the need for large areas of land, which limited the spread of this method commercially

3. Technical Constraints

These constraints are energy storage and transmission .That any commodity or commodity takes on its international importance after that They are self-sufficient and transfer the surplus from them to areas of need or need thereof .As the resources are distributed irregularly on the surface of the globe, the need to store and transport surplus becomes very necessary, an influential and decisive factor in the increasing importance of production .Perhaps the subject of the transfer and storage of traditional energy sources (Fossil) acquires the largest

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quantity and value of the product due to the flexibility and ease with which the storage and marketing process can be accomplished.As for solar energy, it faces many obstacles that increase its investment costs due to the variance in quantity Radiation on a daily and seasonal basis due to geographical location and climatic conditions, which makes the need for solar energy storage and transmission operations (electrical energy generated from solar energy) a crucial issue in developing solar energy investment Perhaps the most important experiments in storing and transferring solar energy are carried out in an electrical, chemical and mechanical manner. As solar energy is converted into electrical energy, then it is transferred to long distances or to consumption areas By giant cables or other electricity transmission networks As for the best way to store it, scientists expect to produce chemicals that can be used to store energy Some time and then return it to its initial state and invest the energy stored in it.Also, the storage of solar electric energy can be done through the electric battery, by By investing electrochemical reactions into a battery, methods of energy storage have now taken place Electrical by means of fuel batteries and hydrogen generation, where hydrogen can be generated as an exploited fuel Solar energy by analyzing water into hydrogen and oxygen and using hydrogen as a fuel for purposes It can be stored in special bottles for this purpose and then transported by tubes or cylinders Another innovative way to store energy is to use some water salts where possible That excess heat is used for solar energy during this day in salts and obtained from them during the night when there is no solar radiation.

III. CONCLUSIONS

1. The most important characteristic of the study area in terms of the possibility of investing solar radiation is the astronomical location that characterizes the study area, which enabled it to receive an amount of radiation sufficient to produce energy in a way that exceeds many other regions in the world.
2. Renewable energy is the lifeblood of the future due to the environmental problems that have occurred and are occurring as a result of investing in traditional energy.
3. It is necessary to seek to find technical cadres that are able to overcome all obstacles, which can hinder the path of investment. .
4. Benefiting from international experiences in this field, especially from countries that do not enjoy the same conditions as the study area in terms of the availability of this resource. .
5. Investing in this type of energy is one of the best solutions to reduce the risks of climate change, the effects of which seemed to be evident..
6. Establishing a specialized research center in the field of investing these resources with the need to benefit from the experiences of successful countries in the field of investing this type of energy.

REFERENCES

[1] Ali Hassan Musa, the Climate of the Thesaurus, *Dar Al-Fikr, Damascus* 1986, p. 7.
[2] Latency: Reflection of light and electromagnetic radiation in different directions as a result of gas and dust particles, and the same thing happens in the Earth's atmosphere from the scattering of sunlight. *Blue light with short waves spreads more than red light, so the sky looks beautiful blue Zia Aziz Bilal Al-Hassani, Solar Radiation Attenuation in the City of Baghdad, Master Thesis, Al-Mustansiriya University, College of Science,* 2004, p. 1

DOI: 10.37200/IJPR/V24I4/PR2020750
Received: 21 Mar 2020 | Revised: 30 Mar 2020 | Accepted: 20 Apr 2020

[3] Virgin Hussein Khalaf, Wasit Governorate, from the possibilities of wind and solar radiation and its role in investing in renewable energy, *Master Thesis, University of Baghdad, College of* Education (Ibn Al-Aghlabiya) 2012, p. 50.
[4] Nader bin Muhammad Siam, previous source, p. 12.
[5] Abdul Aziz Sharaf - Climatic and Climatic Geography, *Sixth Edition, Kuwait, Kuwait,* 1974, p. 49 University Press.
[6] Sabah Mahmoud Al-Rawi, Adnan Hazza Al-Bayati, Foundations of Climatology, *Dar Al-Hekma for Printing and Publishing, Mosul,* 1990, p. 43.
[7] Salam, Ahmad al-Jubouri, The effect of climate on the frequency of dust storms and dust on the governorate of Baghdad, *Iraq Geographical Magazine, Baghdad,* No. 54.2008, p. 121
[8] Salim O. M and Abdullah H. J. et al., 2019" Synthesis, characterization, and properties of polystyrene/SiO2 nanocomposite via sol-gel process" *AIP Conference Proceedings,* 2151 (1), 020034
[9] Peace Phone Ahmad Al-Jubouri, Geographical Climate, *1st floor, Dar Al-Raya for Publishing and Distribution, Amman,* 2016 p. 74.
[10] Ali Mahdi Al-Dujaili, Analysis of the Relationship of Solar Radiation Values in Iraq, *Journal of the Humanities, College of Education Safi Al-Din Al-Hilli,* No. 8, 2011, p. 234.

DOI: 10.37200/IJPR/V24I4/PR2020750
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