

Solar energy the suitable energy alternative for Iraq beyond oil

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Abstract. This brochure aims to shed the lights on alternative energy to the era of beyond oil for a rich oil country like Iraq, where I will show the opportunities and reasons that make solar energy the best alternative source after oil.

Keywords: solar, energy, oil, gas, Iraq, sunny hours.

1. Introduction

Due of the obvious climate changes taking place in the world in general and Iraq in particular and the cause of rising temperatures and low rainfall and thus drought and blowing dust storms and water shortages, and what we are witnessing of the low water levels in rivers, such as the Tigris and Euphrates, it is necessary to think in reducing carbon dioxide, emissions resulting from the use of fossil energy sources that have closely related to this climate changes. For all of this and due to the possibility of depletion of oil after years(may be does not exceed a century from now), as confirmed by many researchers, it became necessary to go to alternative energy sources, and solar energy is one of these kinds of clean energy that can be used for different purposes if it is available naturally.

Iraq is suffer from a scarcity of services, processing power since the nineties and till the present time, and spread the phenomenon of interruptions in electric power, which resulted in curbing the wheel of everyday life and cast a shadow on the different levels of health, economic, social, and increased the suffering of Iraqi citizens with increased hours of electric power cutting.

This reason push the Iraqis to look for alternatives such as generators(large and small), and the estimated four million generating and perhaps more. The form of the additional consumption of money, fuel and energy drain on the environment of Iraq and the increasing pollution of gases that cause global warming, which is the source of climate change and the subsequent deterioration of other natural resources.

Currently there is a growing global trends in Europe and America to invest in renewable energy , which will cause a huge economic results in the coming years For ex. The British government announced recently that it will raise the level of consumption of renewable energy to ten times during the next 12 years in such a plan knows as (the green revolution)

2. IRAQ and the depletion of oil

2.1. Iraq position on world oil map

Iraq is the second country in the world in terms of crude oil reserves with a quantity estimated of 115 billion barrels of oil according to reports of OPEC and associations of the world's energy but according to figures and reports from the Iraqi Oil Ministry which believed the presence of more than 148 billion barrels of crude oil in Iraqi oil fields, the reason for this increasing is half of the Iraq's oil fields almost not being explored so far, giving Iraq a great opportunity to be one of the biggest players in this market, despite all this we must look for alternatives to the energy of crude oil , since the seventies and the world is interested in the theory of crude oil depletion and the peak production , that theory launched by King Hubbert in 1956.

warned by which that oil will reach the peak of world production during the seventies and after that the world's oil fields will gradually running out and depletion.[1] That theory, which released the alarm and put the experts and scientists in a difficult challenge to find an alternative that will fill the void left by oil in the state ratified the theories of depletion of oil, the trend began to renewable energies and alternative or so-called clean energy such as natural gas and solar energy, wind power and other alternatives .

2.2. Solar power in Iraq

In Iraq, the current government concerned with the necessary and appropriate studies of development alternative energy for crude oil and which of these energies is the most appropriate use and economic cost and of course the most environmentally friendly, the solar energy is the favorite among these alternative solutions and for several reasons, namely:

- Iraq atmosphere is characterized by high number of sunny hours during 12 months of year.
- high percentage of sunny days to rainy and cloudy days, even in winter
- Easy installation of solar systems

All these factors lead to the result to make solar energy the first choice for alternative energy source after the crude oil in Iraq .

2.3. Iraqi steps to solar era.

At the end of 2010, The Iraqi Ministry of Science and Technology set up a conference on the use of solar energy as an alternative energy of crude oil and as a means of clean energy, the Iraqi researcher (Mahmoud wasfi), said that

((Iraq is poised to produce energy from solar panels and this method is not expensive and long-lived)). It is known that the biggest problem facing the solar power generation in this way is the accumulation of dirt and dust on the panels because of the Iraqi atmosphere known to frequent tides dirt and leading to reducing the efficiency of solar panels by 30%.

Solution to this problem is to use the nanotechnology in the manufacture of flexible panels, with the ability to prevent adhesion of dust on them, in 1988 the Iraqi Ministry of Science has proposed the use of solar power stations in the communication of the remote and desert areas because of remoteness from sources of electrical energy and the high cost of extending electrical power transmission towers to it, Iraq's has been suffering for decades because of the problem of power shortages, despite its oil resources and aquatic giant, but the mismanagement of these resources was the result of several crises, one is the crisis of electricity.

2.4. best place for solar plants.

The vast desert areas in western Iraq is a strategic place to generate solar energy and at low cost and modest effort to end the power crisis plaguing the country, in Iraq the use of approximately 130 thousand barrels per day to generate electricity in ways that are almost primitive and is sensitive to the environment and leave residues and contaminants difficult to get rid of them, if been replaced by the solar energy which is cheap, clean, friendly and non-polluting to the environment this will be add 130M b/d to be exported or approximately \$ 13 million per day (for oil price 100\$ per barrel as an average).

"Investment cost for the use of solar energy for electricity production is currently estimated at 7 thousand and \$ 500 per kilowatt, while the cost of running up this energy to \$ 100 per kilowatt per year." This is the opinion of Mr. Hussein al-Shahristani, Iraqi Deputy Prime Minister and Minister of Electricity ,attributed the reason for the reluctance of Iraq's use of solar energy now because of the high investment cost of the project.

3. Iraq nature

3.1. Geographical nature of Iraq

Iraq is located within the high solar belt, which requires not to miss this opportunity, and to take advantage of this feature which is lacking in the European countries which they do their best to take advantage of the sun's energy to maximum levels.

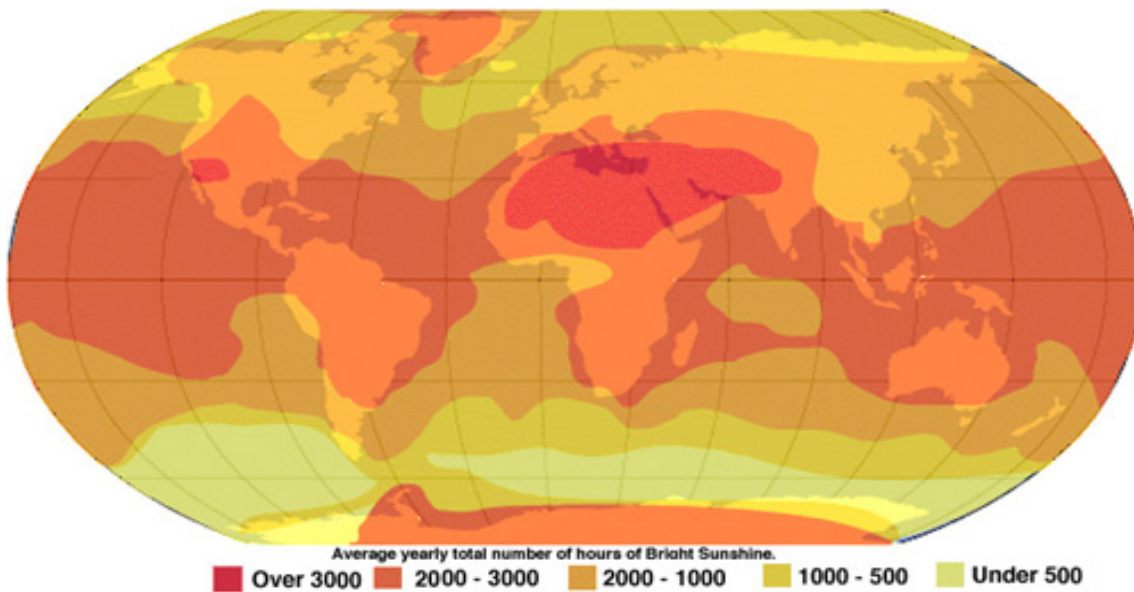


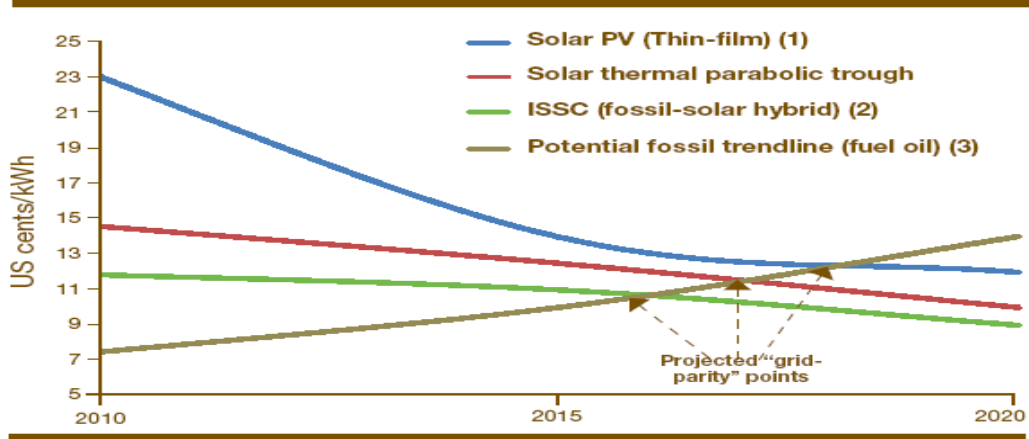
Fig 1: shows that Iraq position in area of over than 3000 yearly number of hours of bright sunshine

And Iraq receives the amount of solar radiation reaching an average of (6.5 - 7) kWh / square meter range from periods of sunshine ranging from 2800 to 3300 hours per year that ensuring access to large amounts of energy if it comparison to Canada and Russia, for example, which does not exceed the number of sunny hours about 1000 hours a year and although it is used to generate solar energy.(see fig 1.) All that gives Iraq the necessary qualifications for the exploitation of solar energy, which exploited already since (1981-2006) in large projects at the Center for Energy Research and the environment, including building energy research center and the environment (five-storey -6361 sq m), heating and cooling systems, lighting (solar) , home solar Iraq (guest house - 600 square meters) Heating and cooling (solar), nursery Solar (120 children) heating and cooling, electricity (solar), manufacture of the heater solar home to four generations of development, projects heating schools and halls, solar energy with the Ministry of Education, heating and cooling greenhouses plastic solar Fudhaliyah and Jadiriyah Baghdad projects, solar water pumping in Rabia, Samarra and Fudhaliyah, manufacturing of vehicles the ability of solar, manufacture battery chargers and distillate, solar lighting airport runways, processing repeaters broadcasting electric power from solar energy in the Hamrin, the completion of the research station, the model of exploiting solar energy and wind energy in Abu Ghraib, processing the traffic light and the illumination of parks, squares, and manufacture of the refrigerator and chilled operative solar energy. [2]

3.2. Anbar province

According to studies, geographical location and take advantage of solar energy are broad, the best place to build an integrated solar power plant which knows as ((Integrated solar combined cycle plant))ISCC is in the state Anbar, which is wide and characterized by desert open spaces and long hours of solar relative to the rest of Iraq, the estimated engineering procurement and construction costs for this plant—US\$4 million to \$5 million per MW—should result in power costs around \$0.17 per kilowatt-hour (kWh): several times higher than natural gas or coal-fired generation, [3] solar energy is not cheap, which is the primary reason that solar power contributes only a tiny fraction of global energy production. Solar remains many times more expensive than power derived from fossil fuels, even as oil and natural gas prices rise. The lowest-cost, most commercially proven large-scale solar technology is the concentrating solar parabolic trough system, which uses mirrors to heat a fluid that generates steam and in turn drives a steam turbine.(See fig. 2)

FIGURE 1: CURRENT AND POTENTIAL FUTURE COSTS FOR LARGE-SCALE SOLAR POWER SYSTEMS IN HIGH-RESOURCE LOCATIONS VS. FOSSIL POWER



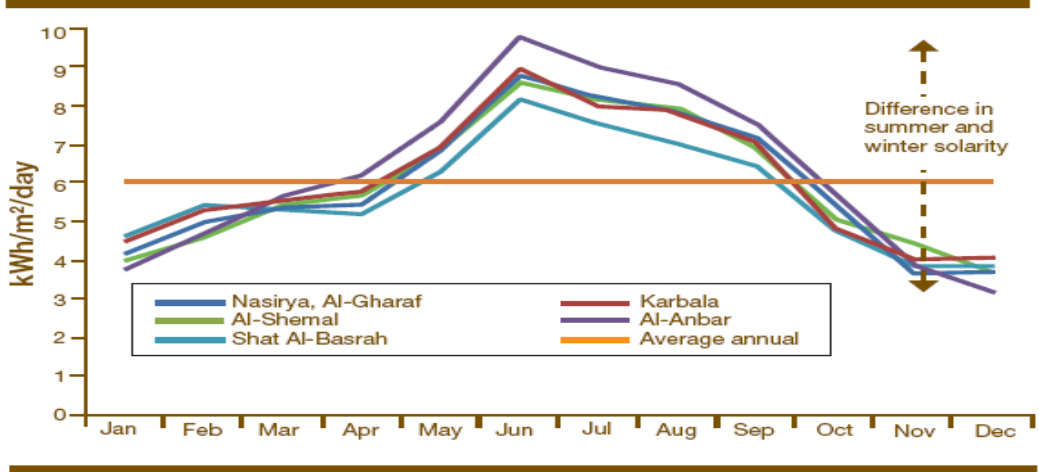
Source: National Renewable Energy Laboratory, Energy Information Administration, International Energy Agency

Fig 2 compression between the cost of different energy sources

combining a solar plant with a gas-powered plant would reduce the overall cost of the solar thermal system by 20 percent or more.

This combined type of plant (solar + natural gas) has a good options of energy consumptions so, through the summer the solar energy is used while through the winter the natural gas take its position to produce the same amount of energy .and you can see the different of sunny hours in Iraq between summer and winter (see fig 3.)

FIGURE 2: MONTHLY AVERAGE DIRECT NORMAL RADIATION FOR SELECTED SITES WITH PLANNED FOSSIL FUEL PLANTS



Source: NASA Surface Metrology and Solar Energy

Fig 3 the difference between summer and winter solarity in Iraq

3.3. US-Iraqi cooperation

The organizers of the U.S. program (ISEP) promised to start cooperation in Iraq to provide assistance for solar power projects in Iraq. Dean Sinclair, Executive Director of the program, said that "the U.S. side will provide support to Iraqi institutions based on the implementation of this project will happen as a quantum leap in the field of energy technology in Iraq." Iraq has a favorable environment for solar energy production and utilization in fields such as agriculture, industry.

4. Conclusions

- World oil is depletion day by day with increasing in demand and we must find the alternative source.
- We must use the high solar energy intensity in Iraq especially that its located in the most sited area and the maximum sunshine hour's is approximately more than 3000hr/year.
- Iraq could be a global source for the clean energy due to the natural reserves of solar, wind..
- global warming is a serious problem and its treatment by reducing carbons emissions is humanist duty and the alternatives are exist.

So what are we waiting for??

5. Acknowledgements

I would like to show my deepest thanks to Dr. Hussien ALshihrestany Iraqi Deputy Prime Minister for his continued support for the sustainable energy researches

Also I would like to thank Mr. Hamed Al-Saaady general manager of NOC for his guidance and advice through the work.

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