

RUNNING AUS ON SOLAR ENERGY

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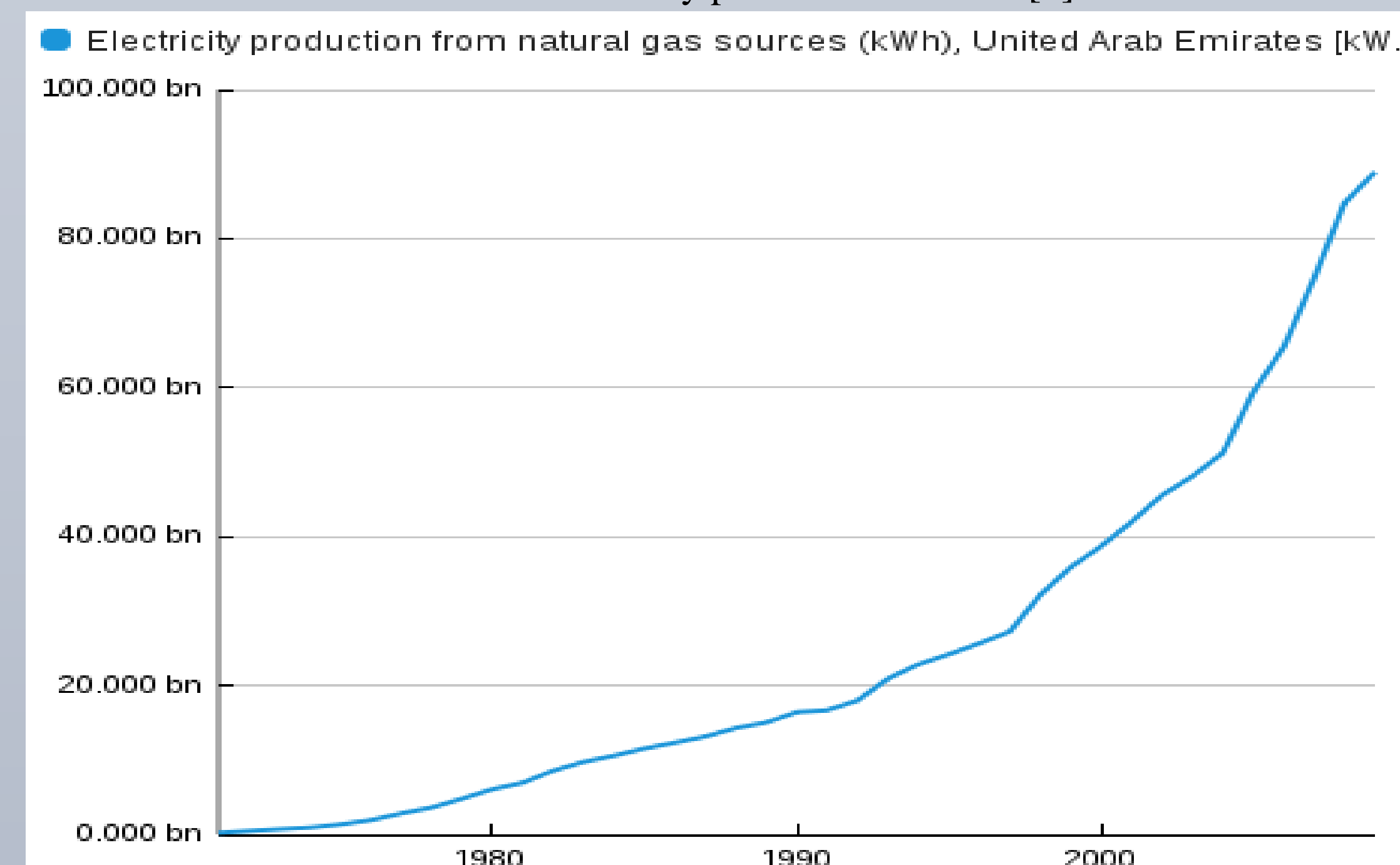
OVERVIEW

- The Middle East depends on oil based reserves, and as the UAE is expected to run out of non-renewable energy sources by 2030[1][2], there is a need to start using renewable energy. In this project, the American University of Sharjah (AUS) is planned to run on Solar Energy.
- AUS uses immense amount of energy to power the entire campus which includes all the different colleges, dorms and sports facilities. By switching over to solar energy, not only will it be beneficial to the environment, but also will prove to be cost effective for the university.
- If the university does not begin to convert to renewable energy sources, then in the coming years the cost of electricity will keep increasing with the resultant financial burden.
- Alternative energy refers to any way of producing energy that does not require fossil or nuclear fuels. Alternative energy is non-polluting and helps to decrease the emissions of gases. Since these energy sources are natural and do not need to be processed, they have very little effect on the environment.

PROBLEM

- The production of electricity has increased because of the increasing demand despite the introduction of new technologies such as Wind, Solar Energy and Nuclear Power Generations. Energy costs continue to increase as shown in Table 1.
- Electricity costs increase when production is dependent on fossil fuels.
- Diminishing reserves.
- The university will also be contributing to global warming and harming the environment, which is compromising the future of Earth.
- Fuel is one of three major causes of CO₂ emission, other two being industry and transportation.

Table 1 – Electricity production in UAE [3]



SOLUTIONS

1. Solar Plant

Solar power plant is based on the conversion of sunlight into electricity, directly using photovoltaic, or indirectly using concentrated solar power.

- Large land area
- Energy loss while being transferred to locations of use
- Entire campus can be compromised during a system failure
- Needs specialists to install



Figure 1 –Solar energy absorbing panels [4]

2. Solar Towers

They use mirrors to focus sunlight on the bottom of the tower which heats the liquid that forms the steam to rotate the turbines

- Need to be distributed on different parts of campus
- Alters the landscape
- Safety concerns from authorities due to location (close to Sharjah International Airport)



Figure 2 – Ivanpah Solar Tower [4]

3. Solar Panels

Solar panels are a system of photovoltaic cells wired together to form a large system called an array.

- Least expensive of all three solutions
- Does not need a dedicated land
- Does not need specialists to install and run



Figure 3 – Solar Panels on the roof top [4]

EVALUATION

- We propose fitting each building in AUS with Solar Panels to charge up that building during the day, and for non-renewable energy to be distributed only at night when required.
- The reason Solar Energy has become a leading alternative energy source is because more energy from the sun falls on the Earth in one hour than is used by everyone in the world in one year [5].
- As pointed out by Dr. Ahmed D. AlJaberi, Assistant Professor in Masdar Institute, Masdar runs solely on Solar energy through solar panels attached to the rooftops and from the solar farm beside the Institute. Masdar generates a lot of solar energy which they do not need, and therefore feed it to Abu Dhabi's energy grid in order to not waste it.
- The primary concern for the implementation of Solar Panels is the upfront cost [6]. The larger the system, the higher the costs. Installing a system to harness Solar Energy at a university could cost millions of dollars. However, looking at it for the long run, after the initial cost, solar energy costs next to nothing.
- Solar panels will help cut down on electricity costs. AUS has roughly 15 buildings that are probably viable on which to put solar panels would generate a lot of clean energy. AUS would also gain national recognition which could help boost admissions and alumni support which would defray expenses. The university would cut down its carbon dioxide emissions which would reduce greenhouse gas in the atmosphere and allow the environment to recover and flourish.

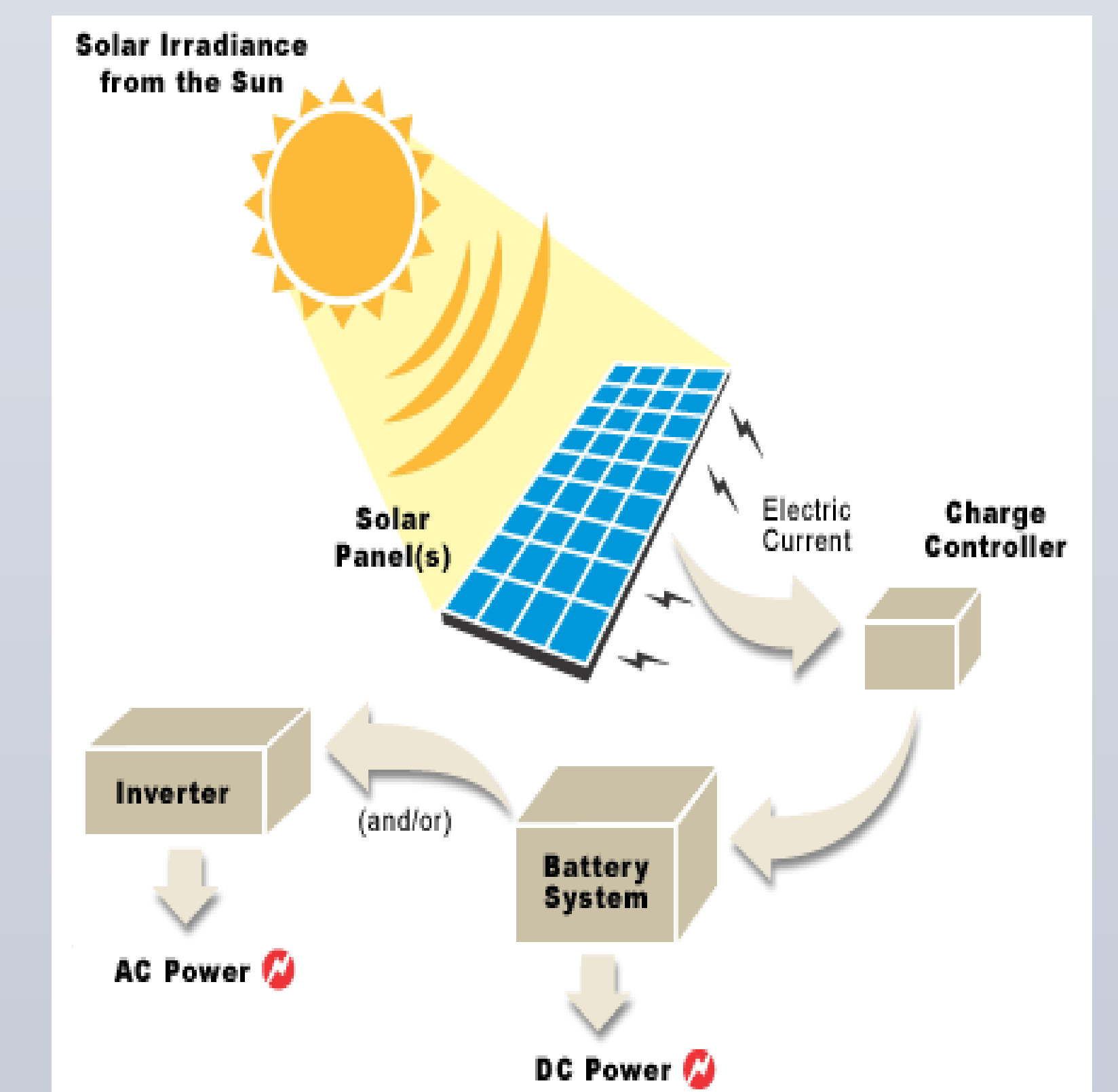


Figure 5– Process of producing power from Solar radiation [7]

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