

Hydroelectricity In The Neom City

[Students Name]

INTRODUCTION

Saudia Arab produces crude oil and offers tourism and pilgrimage as its significant business. Being the largest oil exporters around the world, the country was unable to accomplish their economic goals with the falling prices of oil globally.

To boost the country's tourism and economy, the crown prince Muhammad Bin Salmon announces a mega-city to be developed in Tabuk, Saudia Arabia. The city was said to have completely dependent on renewable power and would possess its own laws and judicial system. According to sources, it is also announced that there would be a separate parallel government rule in the city which will have no interference from the actual government framework.

Background

The city NEOM was named after the Latin word “NEO” which means new and the fourth word M was the abbreviation from the Arabic word “Mustaqbil” which means future. As the name suggests, the meaning of the city defines to be “a new future”.

Since the project is located in the far north-west of Saudi Arabia. The project shares its marine land located within the Egyptian and Jordanian borders. The total area of the project is 26,500 km² (10,200 sq mi) and will extend 460 km on the coast of the Red Sea. The city would be thirty-three times greater than the New York City.

This project is a tiny part of Saudia Arab’s grand economic VISION 2030. The prime aim of this project is to bring many foreign direct investments (FDI) to the country and to convert the country into an advanced global model for a better tomorrow for the human race. It will focus on many advanced aspects like renewable energy, The city will focus on a variety of industries, including energy and water, biotechnology, food, advanced manufacturing, and entertainment. All this being adequate to supply all of NEOM and past with minimal effort regenerative vitality. The pillars, extensions, and openings of this excellent goal will be impeccable, untainted by contamination. Structures will stay flawless and the air crisp and clear. What's more, NEOM researchers will pioneer the eventual fate of vitality creation, utilize and capacity – for water, gas, oil, sun powered, wind, green growth... what's more, entire new sorts of vitality the world still can't seem

Energy

"Energy moves life" we regularly use to hear that however energy does past that for us. We utilize energy to do work. energy lights our urban areas. energy controls our vehicles, prepares,

planes, and rockets. It warms our homes, cooks our sustenance, plays our music, and gives us pictures on TV. Vitality powers apparatus in production lines.

When we eat, our bodies change the sustenance into vitality to do work. When we run or walk, we "consume" sustenance vitality in our bodies. When we think or read or compose, we are likewise doing work

Work implies moving something, lifting something, warming something, lighting something. All these are a couple of the different sorts of work. In any case, where does vitality originate from? Beginnings of energy. We will take a thorough look at the energy that makes our reality work. energy is a vital piece of our day by day lives.

The types of energy we have around incorporate sun based energy, Wind Energy, Hydroelectric Power, Biomass, Hydrogen power devices, Geothermal and so on.

Hydroelectric Power

This type of energy is derived from the water after which electricity can be obtained. It uses a water Reservoir preferable from Dams or from River. Water is then allowed to flow through a turbine, since the water flows from immense pressure, this rapid flowing of water spins the turbine very fast resulting in producing a mechanical energy. This mechanical energy is then converted into electrical energy, the conversion takes place through a generator.

Hydroelectric power in NEOM

The increased greenhouse effects and environmental degradation issues have become most concerning and debating issue in today's world. This has been because of the reason that the environment of today's world has been greatly affected by the increased industrialization which has created an alarming condition in today's world because of the survival. In realization of this concern, the advancement in the technology sector is playing a key role in mitigating and

reducing the causes that are degrading the environmental values. It is a notable fact that the increased industrialization and expansion of power generation sector is the one most significant factor that greatly affects the environment. It is due to the reason that conventional methods of power generation that is in the form of coal electricity and the generation of power through crude oil are the one most significant cause that increases the ratio of pollutants in an environment. Furthermore, the generation of power through these conventional methods are also cost ineffective that greatly effects the economies of states. Therefore, in this manner, this can be stated that the conventional methods of power generation are just only the major cause of making the environment degrade but at the same time, these methods are also quite ineffective in terms of cost and from other perspectives. In this manner, the need of the development of efficient power generation processes has become the necessity in order to fight against the environmental challenges that have become intensified along with the saving of important resources in the form of natural resources and capital that can be invested in some other sectors.

The development of renewable power generation in the form of hydro-electric, solar and wind turbine power generation are some of the most commonly observed forms of renewable source of energy. The increased awareness and implementation of renewable source of energy can be understood by observing several renewable energy projects that are being implemented and in operation in different parts of the world especially in the developed countries. However, last year October, the Kingdom of Saudi Arabia has made the foundation of the megacity of worth \$550 billion that will be based upon 100% renewable source of energy. The worth of the proposed project of the development of the megacity is also high because of its characteristics feature that that the city will be unique to its kind because it aims to operate on 100% renewable source which the investors and other stakeholders find interesting and profitable. It has been decided

that the city will mainly be dependent on the hydro-electricity that will allow the city to reuse the water resources in the course of power generation. Furthermore, it has also been decided that the city electric or power needs will also be fulfilled through the renewable source of power generation such as solar energy and turbine. However, the most significant and important source of power generation that will meet the electric demand of the proposed city will be the hydro-electricity.

The investors and eye of the world on the development of this mega city project is because of the high investment which has been proposed to be made on the development of its energy sector.

As the renewable source of energy generation will also make the utilization of energy more cost effective, therefore, it has attracted the majority of the investors from all across the world to invest in the mega project. The significance of this mega city project is also high for many reasons. For instance, the 100 dependencies of the city will allow the city to maintain a healthy environment within the city. It is evident in most of the cases the implementation and encouragement of renewable source of energy not only saves a significant amount of capital and resources that are utilized in power generation but also it plays a significant role in the reduction of the negative environmental effects that are caused by conventional methods of power generation. The hydro-electric generation within the sector has greatly reduced the negative environmental degradation effects in the regions where it is being practiced. It is evident from different well-developed countries that by focusing on the renewable source of energy generation, countries or regions has not only achieved sustainability within the energy sector meanwhile, but it is also associated with the overall sustainability of regions in terms of finance and the preserved resources.

The development of Green cities is the desire and focus of developed and developing, It is due to the reason that the energy sector plays an important role in the development and sustainability of the region or state. The most significant aspect of the development of green cities in the form of 100% renewable source of energy is that it encourages the production or power generation units to utilize sustainable approaches. Consequently, this allows cities or regions to maintain the environment-friendly and to preserve the important resources that were previously got wasted in the generation of power by means of conventional and orthodox methods of power generation. It is a notable fact that the development of green cities or the cities that produce electricity and power from renewable sources provides electricity at lower prices. This is mainly been because of the reason that the renewable source of power generation methods uses resources such as wind, solar and water that can be reused at multiple times because of their high abundance and occurrence in an environment. Furthermore, the renewable source such as wind and solar does not spread a single negative harmful element in an environment that can be responsible to degrade the environment. However, in the case of hydro-electricity, a very fewer amount of waste is generated as a by-product during the generation of electricity when a generator starts and make when it is hit by the stream of water. The prevalence, advancement, and awareness of the importance of the implementation of the renewable source of energy in the form of hydro electricity have also enabled the Saudi's to initiate and develop the mega green city, NEOM.

Conclusion

The world is shifting from the fossil energy dependence to renewable and sustainable mix. Solar and wind energy systems are particularly important in the energy mix in contemporary time. Despite the lack of appropriate government's policies and legal framework, countries in the Middle East, including Saudi Arabia have reformed their energy policies leading to an increase

in the number of renewable projects initiated. Continued efforts to attract more investment in research and development, human resource training, and the uptake of the new technology are highly recommended moving forward. The efforts, in this case, would assist countries such as Saudi Arabia to realize their renewable energy mix objectives. Freiburg, Germany and Masdar city have proved that a country does not need other complex structures such as nuclear plants to provide sufficient energy for a nation. Naturally existing sources of energy, which not only provides clean energy but is also friendly to the environment, can be depended upon effectively. All that is required to restrict policies imposed by the government and also citizens that are willing to work to achieve it. Although challenging to implement, renewable energy sources are better than any other energy sources. The wind turbine designers frequently define this values. Nonetheless, it is important to realize the connection between all of these factors. It is also necessary to use the equation to calculate the power at wind speeds. The knowledge of the differences in a turbine operation in various wind speeds significantly influence the income lost. It is also necessary to understand the theoretical maximal power of a turbine to be able to indicate potential problems. The energy market requires to make predictions about the potential of a turbine to produce a certain amount of energy since the sell of energy goes first then its production. The accurate calculations are significant for the balanced distribution of energy in the market and for the company's income forecasting. Solar power tower system is one of the innovations that are making it possible for the world to carry on with the objective of the shifting from the conventional to renewable sources of energy. The solar tower and the heliostat/mirror field assist in trapping solar energy from which it is converted into electricity. The size of the heliostat field defines by number and sizes, and the surface area of the tower determines the amount of solar trapped and generated. Solar power

tower plants such as Solar Two Power Plant, PS 20 plant in Spain, and Ivanpah Project are the attestation of how successful solar towers can assist in the utilization of green energy.

Nuclear energy is a highly reliable alternative power supply compared to coal and oil sources. In Saudi Arabia, the government is in the planning phase of implementing the first nuclear power plants. The energy source is highly efficient and reliable because it does not depend on weather conditions. Nevertheless, the power plant developers and managers should be aware of the risks associated with the potential explosion. Appropriate technology and effective management of nuclear reactors are fundamentally required. Natural battery underground is a technology that is in the development phase. The technology is likely to assist in addressing the challenges associated with fluctuation in energy generation in some of the renewable energy sources such as wind and solar. The technology involves the use of brine from the sedimentary rocks and carbon dioxide in the storage of thermal energy, which is then used in generating

Future Work

electricity when the demand is high. It is imperative to note that technology would play an important role in reducing the greenhouse impact of fossil energy by locking a huge amount of carbon dioxide in the underground system. However, since the technology is not yet fully developed, there is no tangible example of such facilities. Researchers and developers involved should speed up the development phase and assist in the spread of the technology as soon as possible. The exploitation of the alternative energy, particularly the wind and solar energy sources are characterized by a wide range of challenges. Some of the challenges arise from the nature of the sources while others arise from the capability to exploit the sources into energy. However, considering the importance of renewable energy in the reduction

of the greenhouse effect, strategies to reduce the challenges have been developed. As discussed in the solution to the issues, the energy sector stakeholders, including innovators, grid operators, private energy producers, and suppliers as well as domestic and commercial consumers should play their respective roles towards this end. The continuous exploitation of the alternative energy sources should be highly encouraged for optimal reduction of the effects connected to conventional/fossil energy production and consumption.

Although the rigorous qualitative analysis has been drawn while extracting the scholarly opinions and research results, still due to the time constraints, several experiments, tests, and techniques were not incorporated. It is important to note that experiments regarding solar panels require standardized materials, expensive coatings and panels, and time-consuming methods. For instance, for a single run, several days are required on each sample. Therefore, the empirical and more rigorous analysis based on different mechanisms, techniques, and methods are taken into consideration for the future work. The quantitative approach whilst utilizing the experiments and empirical work are important to understand the relationship between different methods and their relative accuracy. Since the green energy is advancing rapidly, the up-to-date methods are necessary to be played (even those under consideration). The most natural and organic means should be adapted to produce energy-efficient appliances that consume less energy and follow eco-friendly regulations. The best recommendation for future work is building the NEOM Institute of Science and Technology as will be discussed below.

References:

NEOM. (n.d.). Retrieved from <http://www.neom.com/>

Garfield, L. (2018, February 22). Saudi Arabia is building a \$500 billion mega-city that's 33 times the size of New York City. Retrieved from <https://www.businessinsider.com/saudi-arabia-mega-city-jordan-egypt-oil-2017-10>

What does Saudi Arabia's mega project 'NEOM' actually stand for? (n.d.). Retrieved from <http://english.alarabiya.net/en/business/economy/2017/10/24/What-does-NEOM-mean-.html>

Neom. (2018, October 16). Retrieved from <https://en.wikipedia.org/wiki/Neom>

Davison, A. (n.d.). Renewable Energy. Retrieved from <http://www.altenergy.org/renewables/renewables.html>

Hydropower. (n.d.). Retrieved from <https://www.renewableenergyworld.com/hydropower/tech.html>

World Energy Council. (n.d.). Retrieved from <https://www.worldenergy.org/data/resources/country/saudi-arabia/hydropower/>

Writer, S. (n.d.). Top 10 power and water projects in Saudi Arabia. Retrieved from <https://www.arabianbusiness.com/top-10-power-water-projects-in-saudi-arabia-16169.html>

Oil to solar: Saudis push to be renewable energy powerhouse. (n.d.). Retrieved from <https://phys.org/news/2018-04-oil-solar-saudis-renewable-energy.html>

Neom: Saudi Arabia's new mega-city that will project the country into the future | (n.d.). Retrieved from <https://www.belex.com/en/news/neom-saudi-arabias-new-mega-city-that-will-project-the-country-into-the-future/>