

Everyone's Smart University

Project (Spring 2021)

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PROJECT Risk Management

Risks Assessment in Solar Powered Cattle Watering System

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Introduction

Solar energy is the secret of life, and without it, life on Earth would disappear. Most of the basic processes that support life on Earth, such as photosynthesis, the rain cycle, and the wind cycle, are driven by solar energy. The Riley-Jeans Law Since man's inception on Earth, it has recognized the importance of renewable resources and their direct and indirect impact on our life. people have benefited from these resources in meeting their needs of food, drink, mobility, and energy. In the past, humans continued to conserve the environment by using their primitive energy, until other sources with high energy content appeared, such as fossil fuels, oil, and gas. In recent times, where technological progress and the rise of the industrial revolution, countries have colluded over oil and gas resources to control them and meet their energy needs to a point that has reached the outbreak of wars between countries. Unfortunately, these fossil fuel sources are limited and non-renewable sources, and their use causes severe pollution to the environment in addition to being nearing depletion.

In our project, Effective ranch land management is difficult under ideal circumstances, but it's particularly challenging in Wadi Ad-dwasir where average rainfall of around 75 mm per year makes two key resources, strong grass especially in the Winter and Spring, and a few Water swamps, precious for cattle grazing. A lush piece of land without accessible surface water is virtually worthless for ranching due to water consumption requirements for cattle (107 heads of camels). However, there is a well on another part of the property that was drilled 90 meters deep. Also, the pasture is 13 kilometers from the nearest power source, so it needs to be locally driven by solar power. Since the grid-connected electric pumps are cost prohibitive due to the expense of running electrical lines to remote locations. Contemporary technologies like electric pumps, solar panels, and rechargeable batteries present an opportunity for a reliable, low-maintenance solution.

Surely, there are many risk factors that we must assess and evaluate before starting off the project. These risks are as follows:

1. **Sand encroachment:** Where the project is located in a desert area that is full of sandstorms, and this matter may greatly affect the future of the project. As sands may cover the solar panels which are the main source of energy for the system, and protection cannot be made for them as happened with the well on the site.
2. **Cost of maintenance:** the system is reliable, but in case of failure, a garage full of tools can not be easily moved on-site if a repair is required.
3. **governmental policies:** the government may issue any sovereign decision that will threaten the survival of the project, such as a decision to convert the project site into a nature reserve, or a decision to close the project due to the fear of depleting the groundwater reservoirs.
4. **New technologies:** There is no doubt that we are in the time of technology race and maybe one day we will have energy source more efficient than using solar panels
5. **Keep animals away:** because we will basically deal with camels in this ranch, we should build the system in a far location to prevent the curiosity of camels from reaching the solar system which may lead to damage the system and hurt camels.

Literature Review

According to the National Council of Structural Engineers Associations, sand and dust storms have been placed among the most prominent emerging environmental, urban, outdoor structural challenges. Threats and damages that result from sand and dust storms that are formed by the impact of strong stormy winds in dry and semi-arid lands, which erode rocks and erode grains of sand and silt, and move them close to the ground, and then blow with fine particles to farther distances and at higher levels in Atmosphere. Moreover, The Sahara Desert and the Middle East are the most important regions for originating dust and sandstorms in the world. It is witnessing a remarkable increase in wind erosion and associated storms, especially in some areas of the Arabian Peninsula, the eastern Mediterranean, and southern Mesopotamia. In many

cases, the increased frequency and intensity of these storms were the result of human activities that include dislodging the soil surface, desertification, and land degradation, as well as climate change.

Methodology

we are going to determine the probability and impact of all risks.

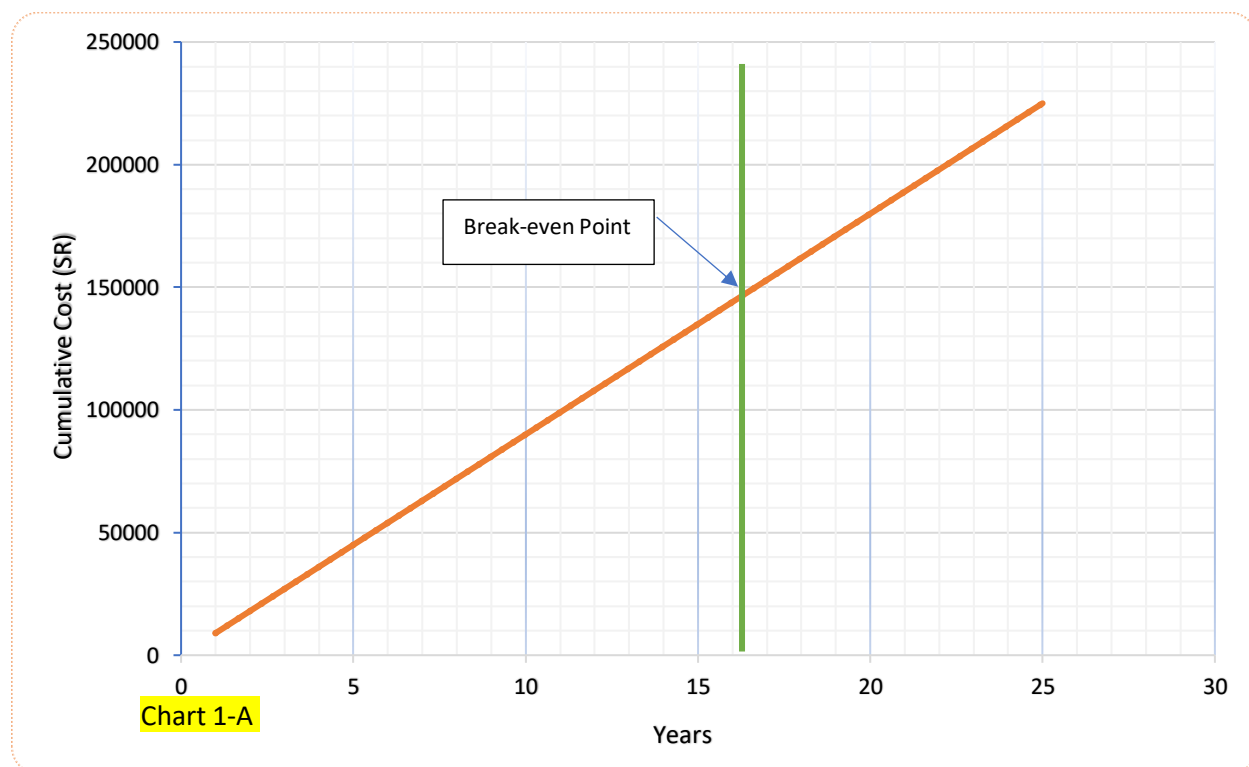
(Low= 0-1.9, Medium= 2.0- 3.9, High= 4.0- 5.9)

	Risk	Probability	Impact	Severity	Response plan	Mitigate Action
1	Sand encroachment	5.9	5.5	High	Removing sand continuously	Afforestation of the surrounding area
2	Cost of maintenance	1.3	4.2	Medium	Sing a contract with a reliable company to do an emergency fix	always make sure the main tank and reservoir tank full
3	governmental policies	2	5.9	High	Ask governmental sectors to give several months to papering for moving on	Talk to the governmental offices before the start
4	New technologies	0.5	2.2	Low	Evaluate the new technology first	See if two systems can be emerged and work together
5	Keep animals away	5.9	2	Medium	You can put camels in a faraway location	Fenced the whole system

Results and Discussion

Reliability is key. Because the well is on the far end of the ranch, it can not be inspected daily, and a garage full of tools can not be easily moved on-site if a repair is required. If it could somehow report when watering tanks/troughs are low, this would be ideal.

Anyways, the owner of the farm brings the water trucks three times a month with a total cost of 750 Saudi Riyal per month. On the other hand, the completely solar-powered watering system will cost 140,000 Saudi Riyal. In the below chart, we calculate the cost of bringing water trucks for 25 years which is the period of time that can solar energy last without losing efficiency. (see Chart 1-A)



Finally, we are going to calculate the Expected Monetary Value (EMV)

	Risks	Probability (P)	Impact Cost (IC) Saudi Riyal	Contingency Cost (PX IC) Saudi Riyal
1	Sand encroachment	5.9	20,000	118,000
2	Cost of maintenance	1.3	5,000	6,500
3	governmental policies	2	70,000	140,000
4	New technologies	.5	7,000	3,500
5	Keep animals away	5.9	3,500	20,650
TOTAL			105,500	288,650

References

- 1- Hopkin, Paul. *Fundamentals of Risk Management: Understanding, Evaluating, and Implementing Effective Risk Management*. Kogan Page, 2018.
- 2- "Civil Engineering Projects." *CivilEngineeringProjects*.
www.civilprojectsonline.com/. Accessed 27 Sept. 2017.
- 3- "National Council of Structural Engineers Associations." www.ncsea.com/. Accessed 10 Nov. 2017