Memorandum

To: Professor Heather Hamilton

From: Ankit Gupta

Subject: Proposal for Recommendation Report

Date: February 28, 2022

Purpose

The purpose of this proposal is to discuss my recommendation report topic and plans. I will discuss a theoretical situation in which the Ministry of Power in Rajasthan, India is looking for alternatives to replace a thermal power plant with a wind farm or solar power plant. Additionally, I will discuss the criteria that will be used to evaluate each alternative. The criteria include cost, maintenance requirement, availability of energy/power, production, and effect on the environment. Furthermore, I will analyze the audience in terms of their education, goals, and concerns. Finally, I will present a work schedule and budget for this project.

Case Study

The Ministry of Power in Rajasthan is looking for ways to reduce carbon footprints as pollution caused while producing electricity is increasing. Many power plants run on fossil fuels and are polluting the environment around them. The plan is to remove existing power plants with plants that produce electricity from renewable energy like solar or wind. The plant must be carefully engineered to properly support the current power grid and still be safer for the environment. In this theoretical situation, a client wishes to replace a thermal power plant from the grid with renewable energy. They must choose the type of renewable energy to replace fossil fuels. It is preferred that the replacement must be able to produce at least the same amount of electricity to a thermal power plant. Other options might incur unplanned or unpleasant costs and may make the project undesirable to continue. This impacts homeowners as well as the business owner, who may need to pay extra for electricity due to storage

Thermal Power Plant

The thermal power station is a power station in which heat energy is converted to electricity. Typically, heat is used to boil water in a large pressure vessel to produce high-pressure steam, which drives a steam turbine connected to an electrical generator. The low-pressure exhaust from the turbine passes through a steam condenser and is recycled to where it was heated. This is known as a Rankine cycle. Natural gas and fossil fuels are burnt directly in a gas turbine to heat the water so it can run the steam turbine.

Figure 1-Thermal Power Plant

Alternatives

The two system providers that I am recommending which are solar power plant and wind farm. These two alternatives are the most suitable because both are widely well known and can provide renewable energy with less manpower and best suitable for the geography of Rajasthan. These alternatives also have received high ratings and positive reviews from people across the state. Both alternatives have advantages and disadvantages that are discussed in terms of the criteria. In the recommendation report, one of these alternatives will be recommended for the client to go with.

Solar Power Plant

Solar power plant is a large-scale grid-connected photovoltaic power system (PV system) designed to store energy or to supply it to the electric grid. They are differentiated from most building-mounted and other decentralized solar power because they supply power at the utility level, rather than to a local user or users. Solar Power Plant converts sunlight into electricity. This is an idle alternative because most part of Rajasthan is a desert area and receives a lot of sunlight. There are different types of large solar projects, like community solar farms and utility-scale solar farms. Some solar projects, like those built to power data centers or other large users of solar power, have solar farms built purely for their use—sometimes onsite, sometimes offsite.

Figure 2-Solar Power Plant

Wind Farm

Wind Farm is a group of wind turbines in the same location used to produce electricity. Wind farms vary in size from a small number of turbines to several hundred wind turbines covering an extensive area. Wind farms can be either onshore or offshore. Wind turbines work on a simple principle: instead of using electricity to make wind—like a fan—wind turbines use the wind to make electricity. The wind turns the propeller-like blades of a turbine around a rotor, which spins a generator, which creates electricity. Wind farms are built in areas known to be especially windy regularly like on mountain tops. The winds turn the blades of the turbines. Then, the turbines turn the energy of the wind into mechanical power. Generators then turn the mechanical power into electricity. This can be a good alternative because Rajasthan has a lot of mountains that are suitable for wind energy like Aravalli hills where temperatures rarely go below 0o Celsius, so it doesn't damage the wind turbines.

Figure 3-Wind Farm

Criteria for Evaluation

In order to determine which plant, the ministry will choose, the following criteria will be used to evaluate both alternatives:

- *Cost* – how much each plant cost
- *Maintenance* – how much maintenance is required for each plant.
- *Availability of energy* – how much energy is available in that area for each plant.
- *Production* – how much energy each plant produces in given time.
- *Environment* – Which is better for the environment around the area.

Audience

There are three audience groups for this recommendation report: primary and secondary. I will be analyzing the audience based on the following criteria:

- Level of knowledge/experience
- Assumptions/concerns
- Learning needs
- Goals

Primary

The primary audience for the recommendation report will be the Ministry of Power. They have plenty of knowledge and experience in using and analyzing data for power plants. Their goal is to provide clean and safer energy to people, and they are motivated by the current state of pollution and global warming. Their concerns for the new systems are safety, production rate, installation time, and possibly cost. Since it is their responsibility to overview, the new systems being implemented, they must choose the right alternative for the thermal power plant. They may have assumptions that the process of switching is complicated or that it is not necessary to switch. Due to this, the recommendation report will include all information required to make the best decision such as safety, installation, and efficiency. Overall, they have a very positive attitude regarding the switch from fossil fuels to renewable energy. They believe that the new system will ultimately provide less

pollution and easier maintenance. The Ministry will be able to make the final decision after reading the recommendation report that addresses all specific information she requires to learn about renewable energy and the two alternatives.

Secondary

The secondary audience group is the managers, consumers, and anyone working in a workspace who will use electricity on a large or small scale like factories. Their level of knowledge and experience varies and may not be at the same level as the Ministry of Power. However, they are still very knowledgeable about renewable energy and its uses. Their attitude toward the system may be either positive or negative. It may be positive since the new system will be more efficient as it will produce clean and efficient energy. The new system will also reduce the cost of electricity as it would require less maintenance. On the other hand, their attitude may be negative since they may have assumptions that the new system will be difficult to understand. Since the secondary audience may have various assumptions and concerns about the new system, their learning needs of the program must be met in the recommendation report.

Schedule

The following work schedule highlights how I will be working on the recommendation report:

Task	3/9 - 3/15	3/16 - 3/22	3/23 - 3/29	3/30 - 4/5	4/6 - 4/12	4/13 - 4/19	4/20 - 4/26	4/27 - 5/3	5/4
Research and Writing									
Initial Draft									
Draft									
Front and End Matter									
Completed Draft									
Revision and Editing									
Final Report									

Budget

The following table provides possible costs that will be necessary to print and bind the final report:

Supplies	Cost
Paper	$3.00
Color Ink	$6.00
Binding	$5.00
Total:	$14.00

Citation

I will be using the MLA citation style because I am most familiar with this style. The sources I plan to use for the recommendation report are scholarly journals and reports. Additionally, I will be using various scholarly websites in order to gain information on both plants, as well as any reviews provided by owners themselves. The following citation entries are sample entries that follow the MLA citation style.

1. Al-Dousari, Ali, et al. "Solar and wind energy: challenges and solutions in desert regions." *Energy* 176 (2019): 184-194.
2. Swarnkar, Norat Mal, and Lata Gidwani. "Economic and financial assessment of integrated solar and wind energy system in Rajasthan, India." *2017 International Conference on Computation of Power, Energy Information and Communication (ICCPEIC)*. IEEE, 2017.
3. Mills, David. "Advances in solar thermal electricity technology." *Solar energy* 76.1-3 (2004): 19-31.

Images:

1. Figure 1. Available at https://en.wikipedia.org/wiki/Thermal_power_station
2. Figure 2. Available at:https://pumps-africa.com/malawis-first-solar-power-plant-goes-into-operation/
3. Figure 3 Available at https://www.nationalgeographic.org/encyclopedia/wind-energy/

Approval

Based on the information provided in this proposal, I would like to ask for approval to continue to move forward with my recommendation report on alternatives to thermal power plant.

Reference List

1. Wind Energy https://www.nationalgeographic.org/encyclopedia/wind-energy
2. Solar Energy https://www.nationalgeographic.com/environment/article/solar-power