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Increasing Solar Energy in New Jersey

1. Overview of Sustainability Issue

In the global energy consumption, the current major sources contribute to negative impacts on the environment. Fossil fuels are a limited resource that will eventually diminish over time and contribute to climate change and air pollution. In the U.S. about 79% of the nation's energy comes from fossil fuels, 8.4% from nuclear, and 12.5% from renewable sources (*Center for Sustainable Systems*). Renewable energy has significantly less negative impact on the environment and is much more sustainable. However, as mentioned, energy from fossil fuels is significantly more consumed than from renewable sources. Overtime, there is an opportunity to decrease the usage of fossil fuels and increase the usage of renewable energy sources such as solar energy.

Solar energy is electromagnetic radiation that is emitted by the sun. Solar technologies, such as photovoltaics (PV) and concentrating solar-thermal power (CSP), capture this radiation and turn it into renewable and clean energy. PV uses solar panels to absorb the sunlight into PV cells to create electrical charges that move in response to an internal electrical field in the cell, causing electricity to flow (*Energy.gov*). For larger facilities, CSP systems use mirrors to reflect the sunlight onto receivers that convert the sunlight into heat that is used to produce electricity.

The implementation of solar technologies is still a growing effort globally. However, the effort starts at a smaller scale such as the state of New Jersey.
A dataset can be used to pinpoint opportunities for improvement on the installment of solar energy technologies. This includes, where solar grids are currently located and what areas have the best solar infrastructure, areas that lack solar energy technologies and where there are opportunities to add solar technologies in the state.

2. Proposed Plan of Action

Our plan is to analyze and compare databases available to us on the Sustainable Jersey website as well as other trusted sources. More specifically, we want to look into using Sustainable Jersey's "Solar Installation Data" and "Community Profile Data by Municipality", as well as NJ Clean Energy's "Solar Energy Installation Data". By looking at the community profile of each municipality, we are taking into consideration the varying population count within each municipality and its effects on the amount of solar installed within the municipality.

In terms of how a user will interact with this information, we want to provide administrative and regular user interaction capabilities. An administrator will have the ability to update the database, if new installations occur. When this updated database is given, the system will adjust accordingly by updating information and county statistics. A regular everyday user will have the ability to view these statistics by county and by municipality through an appealing and easy to use user interface while also having the ability to view it straight from the database.

We want to provide a database that allows a user to see exactly where areas are lacking solar energy technologies as well as where it is thriving. Doing so will highlight

counties and municipalities that are paving the way towards a more clean environment, while also showing concern for areas that need more environmental improvement.

3. Impacted Stakeholders and Ethical Issues

When we define stakeholders, this specifically refers to those who are affected by the utilities and actions that they perform. If we were to look at the stakeholders of solar energy, this would be not only those who have a monetary and financial stake in solar, but also those who have societal and future interests in the environment. This can include energy advocates, solar energy initiatives and programs, as well as the everyday person who believes in better and cleaner energy.

When looking at the United States, New Jersey is one of the leading states on solar energy with enough energy to power more than 600,000 homes with more than 370 solar companies in the state (Lutz). Solar energy and taking action for solar energy is so important in New Jersey and there are many companies, businesses, and individuals who take interest in this issue. This does stem to a broad environmental interest as well, but looking at just solar energy, there is clear intrigue of maintaining clean and effective energy.

However there seem to be some ethical dilemmas whether we implement solar energy or not. One of the main issues with initially implementing solar energy is the cost. There is the idea of pay now or later. This idea emphasizes that you either pay an increased price for solar energy now, or pay at the risk of the environment in the future (“The advantages and disadvantages of Solar Energy”). We do see ethical dilemmas of which prioritization we hold higher. Would we rather save money at the cost of the environment? This is an ethical dilemma to face as many groups and individuals

advocate for solar energy and clean energy in general. Solar energy is not free, by any means, however the health and longevity of our environment should take precedence. There are also tax cuts and other incentives that help with paying for and maintaining solar energy in New Jersey, among other states (“Solar rebates and Solar Tax Credits for New Jersey”).

4. Current State of Solar Energy Across New Jersey

Per New Jersey’s Clean Energy Program (NJCEP), there have been over 137,000 solar installations across the state between 2000-2020. Since 2015, there has been a noticeable increase in installations, as over 100,000 of the 137,000 (roughly 75%) have taken place across the state. While not listed on the file, new data from the NJCEP confirms that through January 2021 and December 2022, 32,000 solar installations have taken place across New Jersey. Out of the total number of installations through December 2022, approximately 9,000 projects were for commercial properties, while the majority were for residential homes. With where we stand today, New Jersey has a capacity of 3.3 gigawatts of solar photovoltaic (PV) energy which is a crucial aspect that will allow the state to meet its clean energy goals. With a PV energy capacity this high, New Jersey is currently ranked top 10 in the nation for 2022.

With that being said, there are still opportunities for us to propose positive change in the state when it comes to solar energy. Per Solar Energy Industries Association (SEIA), only 6.7% of the state gets their electricity from solar energy. Despite the $12.3 billion investment that has been made in solar infrastructure, still has ways to go before the state is on track to reaching its *Clean Energy Future* bill, signed by Governor Murphy in 2021.

5. Opportunities to Propose Positive Change

Gathering and analyzing our data on solar energy use and sustainability can provide valuable insights that can be used to propose positive change in a variety of ways. By identifying areas where the state is doing well and areas where there is room for improvement, you can propose policies or incentives that encourage more widespread adoption of solar energy in underserved areas. Additionally, data can be used to create compelling arguments for why transitioning to solar energy is a smart investment for individuals, businesses, and the state as a whole, which can help build public support for sustainable energy initiatives. This data can also be used to inform policy decisions related to sustainable energy. For example, if you find that certain policies or incentives have been effective in promoting solar energy adoption in other states, you can recommend similar policies for New Jersey. Moreover, data can help attract investment in sustainable energy projects. By showing that there is a strong demand for solar energy and a supportive policy environment, you may be able to attract investors who are interested in financing solar installations or other renewable energy projects.

Overall, data can be a powerful tool for proposing positive change in the area of sustainable energy in New Jersey. Gathering and analyzing data on solar energy use can help identify areas for improvement, build public support, inform policy decisions, and encourage investment in this important area. By using data to propose positive change, you can help New Jersey move towards a more sustainable and environmentally-friendly future.

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