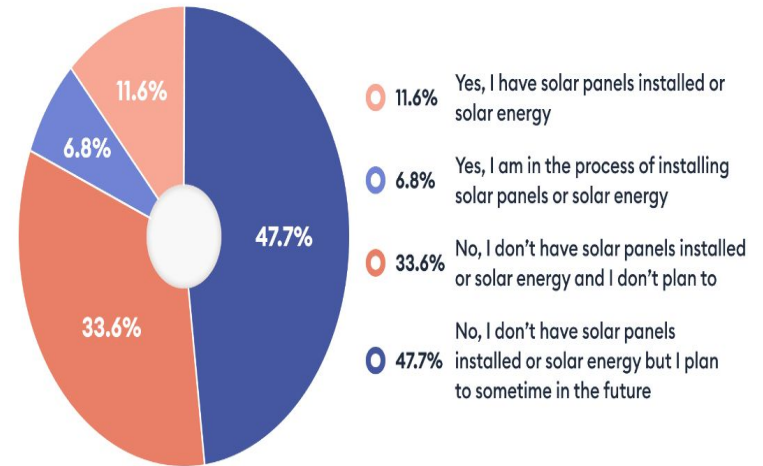

Solar Energy: Should I Make The Switch?

— By: John Tian and Jayden Bautista —

Introduction: With the rising costs of energy prices nationwide and constant threats of global climate change, Americans are searching for ways to save money while simultaneously fighting global warming. One way Americans can tackle both problems is by **switching to solar energy**.

But are sentiments to install solar panels enough? Expert opinions have showed that while the desire is there, the preparedness may not be. In our machine learning model, we will be analyzing 6 parameters that determine the likelihood that an average person in each state would switch to solar energy. Our machine learning model is trained with data from January 2014 to September 2018.

Do you currently have solar energy/solar panels, or are in the process of solar panel installation?



Source: OnePoll 2022

Forbes HOME

What Are the 6 Parameters?

- Net Generation of Solar Energy per State, per month of 2014 to 2018 (gigawatthours)
- Average Retail Price of Electricity Overall, per month of 2014 to 2018 (cents per kilowatthour)
- Average Retail Price of Solar-Sourced Electricity, obtained by modifying the previous data with a 1.4x multiplier in cold months, 1.5x multiplier in warm months, and 1.6x multiplier in hot months (cents per kilowatthour)
- Average Monthly Temperature, which is the same for each year, per State (Fahrenheit)
- Weights assigned to statewide political affiliations, which is the same for each month, based on the ratio of Republican Candidates voted into election in the past 4 elections (25 = Republican voted in 4 of 4 elections, 50 = Republican voted in 3 of 4 elections, 75 = Republican voted in 2 of 4 elections, 100 = Republican voted in 1 of 4, 125 = Republican voted in 0 of 4 elections)
- Median Household Income per State, which is the same for each month (dollars)

Target Variable

The target variable correlated with these parameters is a variable from 0 to 1, where 0 means that the user does not switch to solar energy at all while 1 means that the user definitely wants to switch to solar energy. The target variable was obtained from a pre-existing dataset, and it was generated through a heatmap of relative features for each state and through logical guesses from user responses.

Our Model!

<https://github.com/snugpenguin968/HackTech2023>

Our App!

<https://snugpenguin968-hacktech2023-app-7zly34.streamlit.app/>

Limitations:

1. Because we were only able to train our model with datasets from January 2014 to September 2018, our model has no exposure to recent data. There could have been great change in our features since then, and the model would not account for that, affecting its reliability if one were to make predictions based on the current state of the economy or climate.
 2. There is a lack of individuality for users who want to make predictions since all of the data is based on the state level. They will have to input information that generalizes a large, diverse group of people over a wide geographic area.
- These limitations stem from the data itself. In an industry setting, we would ideally have access to a larger, up-to-date dataset that presents features like energy costs or median income that describe smaller entities such as cities.

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