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Converting Aurora to SAM

In the Solar District Cup competition the team is using two different software to model our designs. Aurora is used to create a 3-D model that allows us to display the design while SAM only outputs graphs and data. SAM is more detailed and has an extremely useful financial analysis function which will help to optimize the PPA. Aurora was used to visualize the PV designs to help others understand while SAM is used for more detailed analysis. There are 3 designs in Aurora that need to be implemented into SAM. These designs are the parking structures, the American center and the solar spanish tiles. The solar tiles are not in SAM, Daniel will analyze the solar tiles to determine what module could be used for modeling the design. The only two designs analyzed in the report will be the American center and the parking structures.

The parking structures were initially tilted to the east because that is how the parking lot was structured. We realized it would be more beneficial to create south facing modules and redesign the parking lot itself. The parking lot contains 6,175 modules with a tilt of 10 degrees, the parking structure is unique because the modules are in an extremely long row where the entire structure is tilted 10 degrees. This allows us to tilt all of the panels while still providing shade for the parking lot. To input an aurora design into sam I only need to input the panel, inverter, and the system design. The output data consist of Annual production, Monthly production, Energy loss, After tax cash flow and monthly energy and load data.

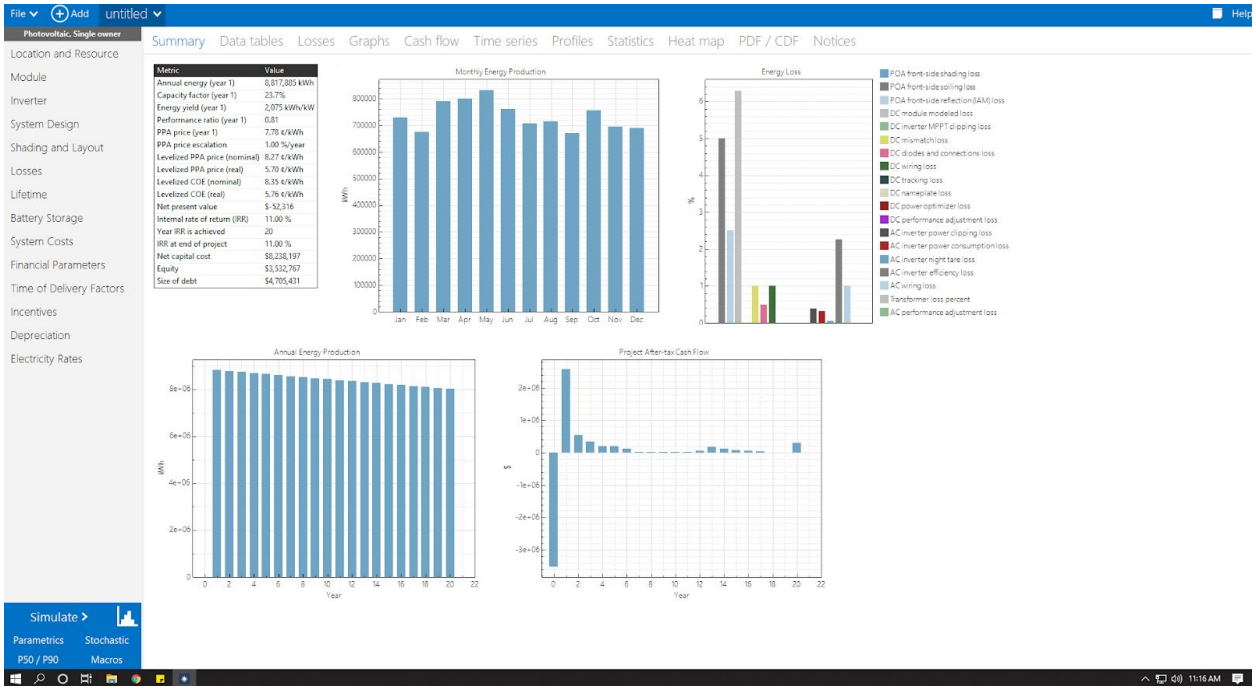

Fig.1

The american center is more difficult to input into sam because there are 3 different sets of solar panels facing East, West and South. The team believes this is a crucial building because it is so large and east and west facing panels will help produce energy in the morning and evening. By utilizing all 3 useful sides of the building we are able to create an energy plateau. It would be

ideal to have the energy production stay consistent throughout the day but is near impossible to achieve. The American center is the largest building on campus and will provide the most energy besides the dirt lot design. For the system design we will set 12 panels in a string to create the ideal voltage and then all these strings in parallel to create more power. The Building is also at a 15 degree angle which will affect the azimuth angle of the panels. For the west side of the building there are 1,520 panels at a 6 degree tilt, the tilt of the roof. The south facing side has 483 panels with a 10 degree tilt and the east facing side is 1,474 panels with a 6 degree tilt. Altogether the data for the american center is in the figure below.

Fig.2

The financial aspects of these two designs are not 100% accurate because our financial model still isn't complete. Once the financial model is completed we will go back and full optimize the final design based on their PPA price. You may notice our excess generation exceeds the electrical load of the building. This problem is why solar storage is so useful for PV generation, It allows us to store energy at peak hours when we are producing too much to use. The final designs are all great and have their own benefits that will hopefully give us an edge in the competition.