*You were presented with two options to supply City Hall and the Depot with the annual energy needs. You will make a data-based recommendation to the City for either placing solar panels on carports; or for placing solar panels in the open grassy field - with or without solar tracking ground mounts.*

*You are going to type up the following. Include your question in the answer, then erase the question. Your recommendation will be in paragraph form and in the order outlined below. Type font will be Ariel, black, point 12. Once you have finished, please erase the directions (everything blue and italicized) and submit into Google Classroom.*

*Name:*

*Date:*

**Introduction:**

1. How much energy is currently required for the Depot and City Hall?
2. What were the three alternatives? Describe each.
3. Should all three options be considered? Why or why not?

**Option A:**

4) Are all parking spaces covered? If not, which area(s) is excluded and why?

5) What tilt and azimuths did you use in PVWatts to calculate the kWh output and annual value?

6) How did you modify those numbers? And why did you modify those numbers?

7) What is the total amount of adjusted kWh that can be generated on the carports?

8) What will the cost be for covering the parking with parking structures?

9) What is the adjusted annual value for the solar panels?

10) The return on investment for the parking structure option is

11) The benefits of covering the parking include:

12) The drawbacks of covering the parking include:

**Option B:**

13) Will the solar panels be placed on fixed ground mounts or on tracking ground mounts? Why?

14) How much will it cost to place the solar panels in the field?

15) What is the return on investment for placing the solar panels in the field option?

16) What are the benefits of placing the solar panels in the open field?

17) What are the drawbacks of placing the solar panels in the open field?

**Conclusion:**

18) Based on the above considerations, what would you recommend to the City and why? *(The why is a summary of the most important benefits)*

MB

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Currently, the energy required for the Depot and City hall is 101,300 kWh. The three options for meeting that goal is; either putting carports over the parking spaces, with solar panels on top; organizing some solar panels in the field by city hall with fixed platforms; or, solar panels in the field with sun tracking platforms. Not all three options should be considered, however, because the sun tracking panels are very expensive and will take much longer to pay off and will cost too much to the city.

**Option A: Panels in the Parking Lot**

There are 4 different areas, on the Northwest side of the Community Center, the Northwest side of City Hall, by the train tracks on the Southwest side, and the Southwest side of City Hall; all of which the parking spaces are covered. Were not covering the islands though, we have multi-spaced carports that can be put around them. The tilt we used is 32 degrees, and the azimuth was at 124 degrees. We modified these angles so they’re facing southeast, and have the best tilt shown from the labs we did. The total amount of adjusted kilowatts that can be generated out of these carports is ……. The carport costs about $22,640, the carport installation costs around $68,376, and the solar install costs $295,282. The return on investment for the parking structures is 23 years. The benefits of the parking structure include; They cost less in the long run, and there's no parking loss in the field hence the opportunity to use that space for future opportunities. They provide shade for cars, they're available for the 25,000 rebate. It also creates more energy than needed, so we can use the extra to power other buildings. Now, the drawbacks of the carports include; Almost no parking for bigger trucks, a car could hit the ports, maintenance costs, and they may need to be cleaned for snow and such.

**Option B: Panels in the field**

The panels will be placed on the fixed ground mounts, because data shows with the sun tracking mounts, it will take six more years for a return on investment, which is too expensive. The fixed racks will cost about $216,000 for install, and the return on investment will take about 18 years. Some benefits of the field panels include; There’s less instal cost, and the return on investment doesn't take as long. It's easier to maintain, and easier access to the panels. It's also suitable for the 25,000 dollar rebate. Some drawbacks include; it takes harvest festival parking, the neighbors may not be too happy about this arrangement, we also might need to add an attachment for storm water to drain.

Based on the above considerations, I would recommend the carports (Option A) to the city, because the energy generation is more sufficient for the city’s needs, and the benefits seem to be more convenient for us. For starters, the carports provide shade for the cars, and this will be extremely convenient, especially in the warmer months and for the darker colored cars. Also, using the carports would leave us with space in the field for harvest festival parking, as well as any other even the city might put on in that area. Yes, the panels in the fields are actually cheaper, that's because you don’t need as many solar panels or the actual ports for them to sit on. Also, if we put them in the field, we’ll need to set up an irrigation system or something, and what will we do with them when it rains? Or snows? The carports will actually be better protected from the elements, because of the buildings shielding them. The carports actually create more energy than needed, so we can put that energy back in the grid for future uses.