CM

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**Introduction:**

 The amount of energy that the Depot and City Hall uses is 101,300 kWh.The three alternatives for providing that energy were covering the parking spots with carports that have solar panels on them, putting solar panels in the field, and putting solar panels on tracking mounts in the field. All three options should not be considered, the tracking mounts for the field cost way to much for the output they produce, and it increases the return on investment by 10 years.

**Option A:**

 Not all of the parking spaces are covered, the parking spots that aren’t covered are the Community Center NE parking spots because all the other solar panels covering the other parking spots are providing more than enough electricity to provide for the Depot and City Hall.The tilt and azimuths I used in PVWatts are for the NW side of the Community Center and the NW Side of City Hall, the tilt is 32, and the azimuth is 119. For the SW Side of City Hall and the SW side of City Hall (Railroad side), the tilt is 32, and the azimuth is 213. I chose a tilt of 32 degrees because with a tilt of 32 degrees you will get the highest electrical output, and I chose those azimuths because the solar panels have to face the same way as the carports and the carports have to face the same way as the parking spots.The total amount of the adjusted kWh that can be generated on the carports is 122,009. This exceeds the goal by 20,709 kWh.The cost for covering the parking with the parking structures is $22,640.The adjusted annual value for the solar panels is $12,668.The return on investment for the parking structure option is about 23 years.The benefits of covering the parking include: it saves us money, no parking loss( harvest festival) ,non-overheating, leaves the field open for future use, and allows water to flow freely when rains.The drawbacks of covering the parking include: a car might hit a structure, if all parking is covered, no space for oversized parking, if damaged, a pain to replace.

**Option B:**

The solar panels will be placed on fixed ground mounts in the field because if you have the 1-axis tracking it increases the return on investment by 10 years and if you use the 2-axis tracking it increases the return on investment by 12 years.To place the solar panels in the field it will cost $191,000 to install.The return on investment for placing the solar panels in the field is about 18 years.The benefits of placing the solar panels in the open field are: room for growth, less install cost, faster return on investment, saves money in the long run, easier to maintain and more accessible. The drawbacks of placing the solar panels in the open field are: it takes the harvest festival parking space, we need to add abatement for the storm water, install road and fire access, potential conflict with neighbors.

**Conclusion:**

Based on the above considerations, I would recommend to the City that they install solar panels on carports on the 4 parking areas around the Community Center and around City Hall. I recommend that because it is the cheapest option that has the best outcome and installing carports over the parking spots would provide shade for the cars that park underneath them so they don’t overheat.