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T306: Concept Generation

Summary of Methods

We began working on our Concept Generation following the conclusion of our first Virtual Design Review. We had the plan in place to use resources provided by our sponsor, and other background research findings all of which point toward numerous actions other counties, municipalities, and even businesses have done to meet similar requirements.

Following a couple days of reviewing our findings we spent a couple of hours brainstorming, making exceptional use of the Crap-Shoot methodology, going down the line, discussing ideas, and building off of previous ideas. We would jot these down, which is the reason for the abbreviations used in the descriptions, with the goal of generating 100 ideas. In our minds, we had already come up with a number of ideas prior to generation and been given these ideas by our sponsor and advisor, so these were our starting points.

After we had written these down our next job was to assign our confidence levels to these. This was in essence our highest level of concept selection criteria. The criteria for that confidence level, which is congruous with fidelity in this instance, would be a few questions:

1. Is this doable by us as a team?
2. Would this increase sustainability for the county?
3. Would the public be able to see it?
4. Most importantly, is it a good use of county funds?

With this in mind, we went back through our list of concepts and answered these and other questions to give us our confidence level. Obviously, the ones we had initially thought about and worked over in our minds met these criteria and were our “high” confidence levels. The majority were “low” confidence levels however the “med” levels were interesting because many of these were ones we had not even considered until we had begun concept generation. Thus, with our target of having multiple tiered proposals in mind, these are some that could very well play a role going forward.

Concept Generation List

High Fidelity Concepts:

1. Model solar panel generation capacity
 - Determine estimated output based on inclusion/exclusion of battery storage
 - Present estimated output based on maximum monthly available kVA
 - Determine baseline estimate of output based on NREL PV Watts tool
 - Model useful life of battery storage
 - Model useful life of solar panels and equipment
2. Determine diversity factorization based on weather
 - Use NREL GIS Atlas for Leon County Irradiance Data
 - Determine monthly generation diversity based on past NWS data
 - Tabulate daily daylight hours over a year
3. Model Park kWh usage
 - Use past Leon County electric data for parks as baseline of model
 - Model based on general Florida load distribution

Medium Fidelity Concepts:

1. Model Park Attendance
 - Create daily model over year (365 rates of people/day)
 - Average daily usage into monthly model (12 rates of people/day)
 - Estimate mean rate for park attendance ($\frac{\# \text{ people in park in a year}}{\# \text{ days in a year}}$)
 - Calculate monthly diversity factor to account for park usage
 - Tabulate days with cloud cover rate based on NWS data
2. Determine highest usage equipment in the park
 - Directly probe connected equipment
 - Use recorders to gather data
 - Use manufacturer or Leon County facilities data for connection
3. Determine kVA usage per one charging station
 - Gather multiple manufacturers' data and estimate from these
 - Directly probe current and voltage at installed power strip charging station
 - Use time integrated usage recorders at installed facilities
4. Determine kVA usage per one automated trash compactor
 - Gather multiple manufacturers' data and estimate from these
 - Directly probe current and voltage when trash compactor operated
 - Use time integrated usage recorders at installed facilities

5. Determine kVA usage per one wi-fi connection
 - Gather multiple manufacturer's data and estimate from these
 - Directly probe current and voltage at installed Wi-Fi connection
 - Use time integrated usage recorders at installed facilities