

Smart Grid Design Presentation

Team: Har-Khu-Ali-Fa

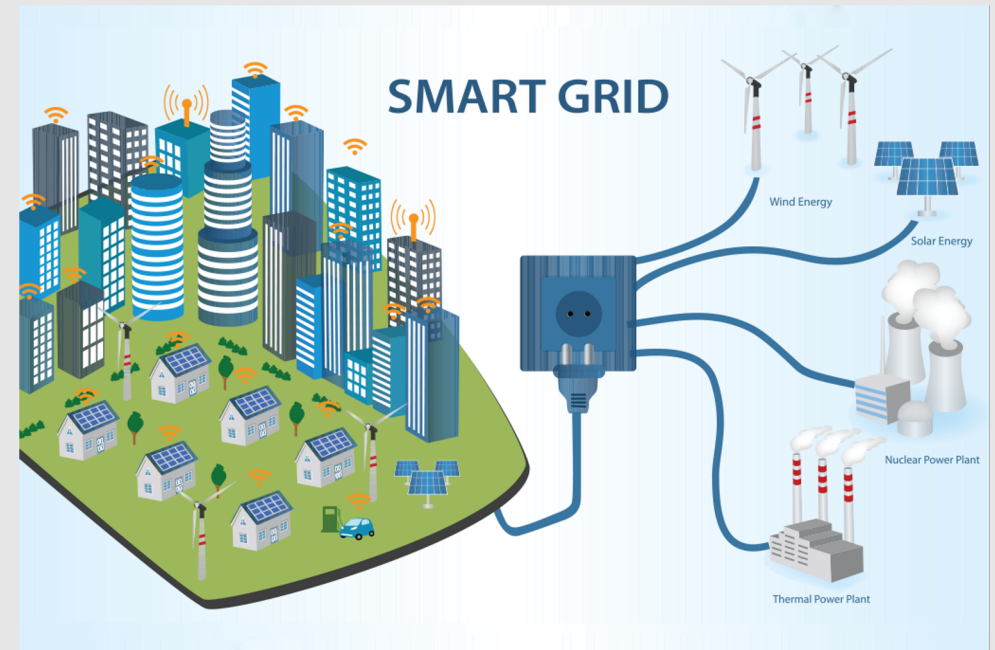
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Background Information

Why do we need a smart grid or microgrid?

We need a smart grid or micro grid so electricity and power can be evenly distributed to different types of buildings and areas. These grids give access to power for consumers efficiently, as well as help organize power into areas more quickly and efficiently. Also, the facilitator of the smart grid is able to see what buildings are prioritizes and in case of emergencies, they are able to take necessary actions with ease.



Design Process

Research done to help organize our design:

We used websites given such as energystar.gov to better understand the amount of power usage used by different building types such as hospitals and schools. Knowing this information will help us form our smart grid in a way that is efficient and easily power-accessible for consumers.

We also used Google websites such as costanalysts.com to gain a better understanding of why each building type needs the amount of power that it needs. This was incorporated into our design and help us split up the energy between each area.

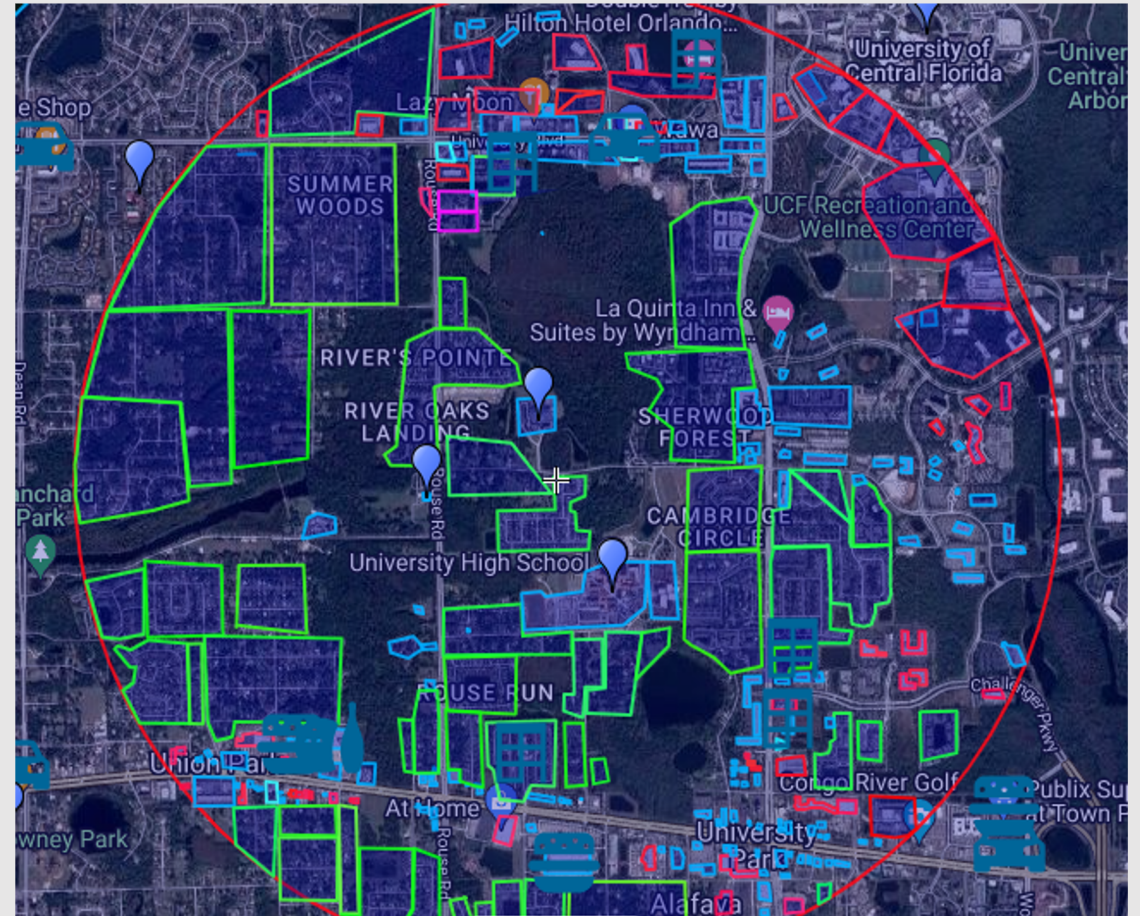


Data

What decisions/priorities were made and why?

We went through our 1.5 mile radiance and prioritized all the buildings that consumed energy from most important to least:

1. Hospitals
2. Senior care
3. Housing
4. Grocery stores/restaurants
5. Gas stations
6. Banks
7. Retail
8. Schools
9. Offices/Workplaces
10. Malls
11. Places of worship



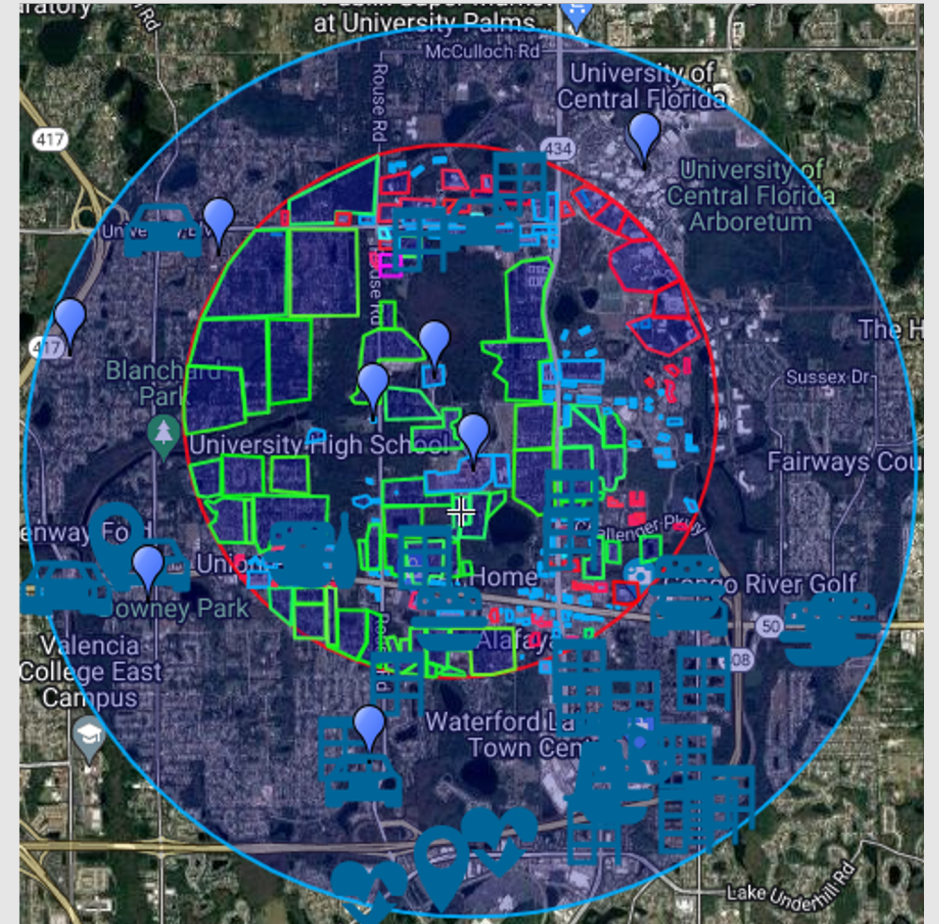
The Math

Final Design			
Grid Level	User Type	How much power is supplied? (kW)	When is the power supplied or cycled?
Highest Priority(Purple)	Hospitals(7)	1,715	Always
Highest Priority(Purple)	Senior care(3)	42	Always
High Priority(Blue)	Housing(36)	8,640	Always
High Priority(Blue)	Grocery stores/ restaurants(36)	792	Always
High Priority(Blue)	Gas stations(5)	120	Always
High Priority(Blue)	Banks(4)	40	9AM-5PM <input type="text"/>
Least prioritized(All other colors)	Retail(43)	25.6	8AM-12AM
Least prioritized(All other colors)	Places of worship(6)	Near 0	Depends on the place
Least prioritized(All other colors)	Offices/ Workspace(16)	365.28	8AM-10PM
Least prioritized(All other colors)	Malls(4)	More than 15 Megawatt (Around 44000kW)	10AM-12AM
Least prioritized(All other colors)	Schools(4)	More than 15 Megawatt (Around 30000kW)	7AM-4PM

The Design

Design Description: The design includes on the micro grids for residential areas in green, restaurants in blue, and retail/other places (offices, schools, hospitals, stores, senior living, entertainment, and gas stations) in red. We set up our microgrid this way because it was the most organized for us. A lot of the same building types such as residential are clumped in the same area to organize the power.

Why you should choose our design: You should choose our design because our map marks all of the important places that need electricity and use the highest amount of electricity in the 1.5 mile radius from our school. This design is very efficient when it comes to the organization of power because of the placement of the same type of buildings in the same area.



Extra

We would also incorporate sensors and backups to our microgrids. Sensors can alert consumers when power is unstable or affected in the area. For example, environmental emergencies can happen at anytime, and they are very frequent in our city. Orlando experiences a lot of rainfall and hurricanes, which can make the power go out in all types of buildings. Sensors will alert people in the building that there is an emergency and precautions should be taken immediately. We planned and created our microgrid so that we would use less power than we need. So, with leftover power, in case of an emergency, backups will provide power to buildings that need it until the power is restored.



References

- scribblemaps.com (Placement of smart/microgrids)
- costanalysts.com (Cost/Usage of power for different buildings)
- energystar.gov (Usage and information of amount of power for different buildings)
- freeconverter.com (Convert BTu (British Thermal Unit) to KWh (Kilowatts per hour))