Smart Grid Protocol Proposal

Team 3: SHARD

Savana Pham, Alyssa Rae Connelly, Andre Graves, and Denisha Guerra

Mentor: Victoria Stevenson

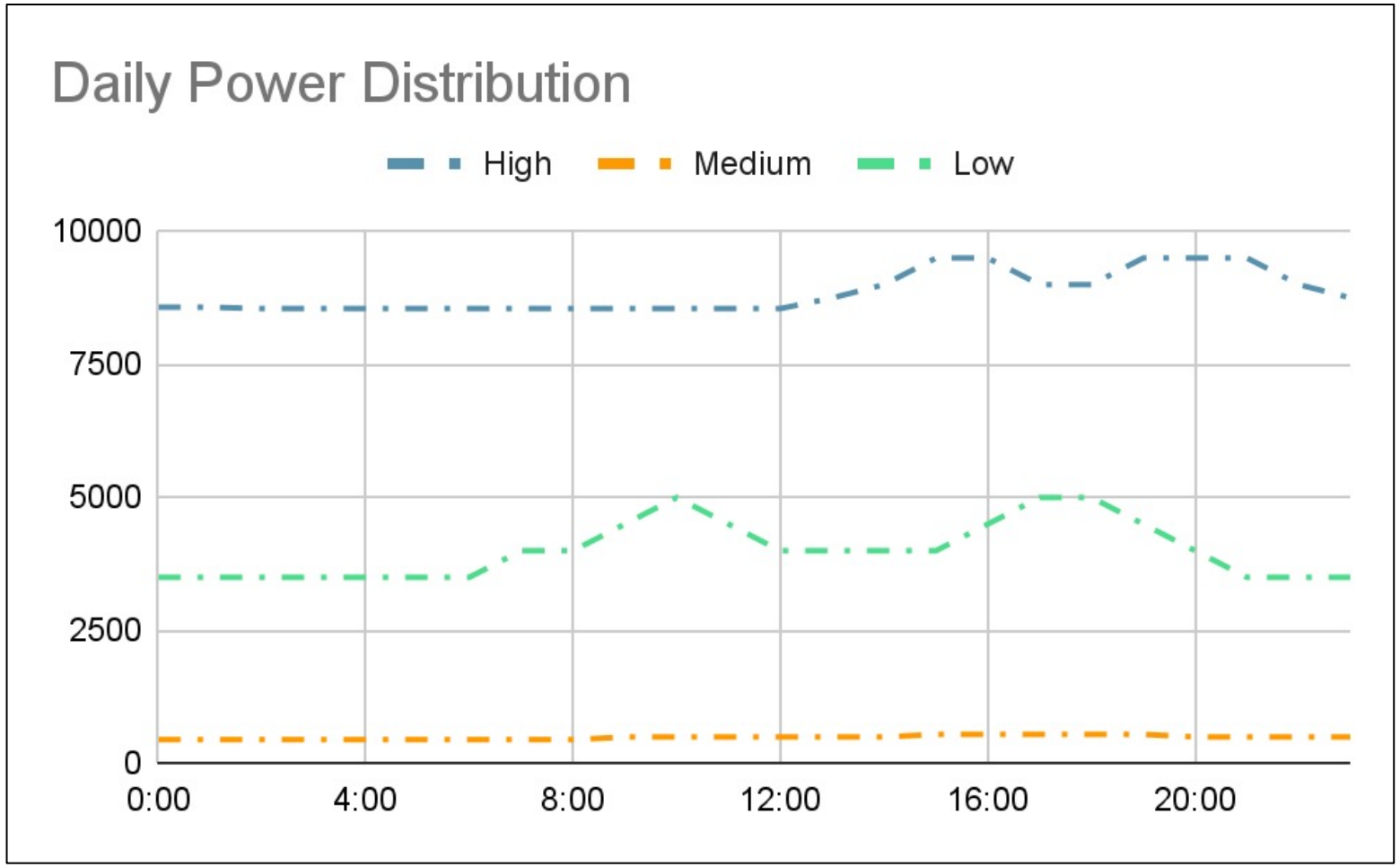
Background Information

- Us:
  - Designer: Andre
  - Facilitator: Denisha
  - Editor: Savana
  - Presenter: Rae
- Our challenge: 15MW to power an area with a 1.5-mi radius with a smart grid.
- Smart & micro grids: Organize and manage power reserves in a self-responsive manner.

Design Process

- Activity 2 - Mapping our system:
  - Created 2.5 mi radius around our school.
  - Chose user types to mark.
  - Categorized micro-grids based on priority level.
- Activity 3 – Estimating power usage:
  - Researched energy star score and average load area of each user type.
  - Calculated total power load per square foot.
- Activity 4 – Prioritizing power restoration:
  - 1. Hospitals/ER
  - 2. Grocery Stores
  - 3. Senior Living Center
  - 4. High Density Housing
  - 5. Medical Office
  - 6. Medium Density Housing
  - 7. Schools(K-12)
  - 8. Post-Secondary Schools
  - 9. Low Density Housing
  - 10. Non-Fridge Warehouse
  - 11. Retail
  - 12. Religious Worship
  - 13. Recreation

The Design


Daily Power Distribution
High
Medium
Low
10000
7500
5000
2500
0
0:00
4:00
8:00
12:00
16:00
20:00

Design Protocols

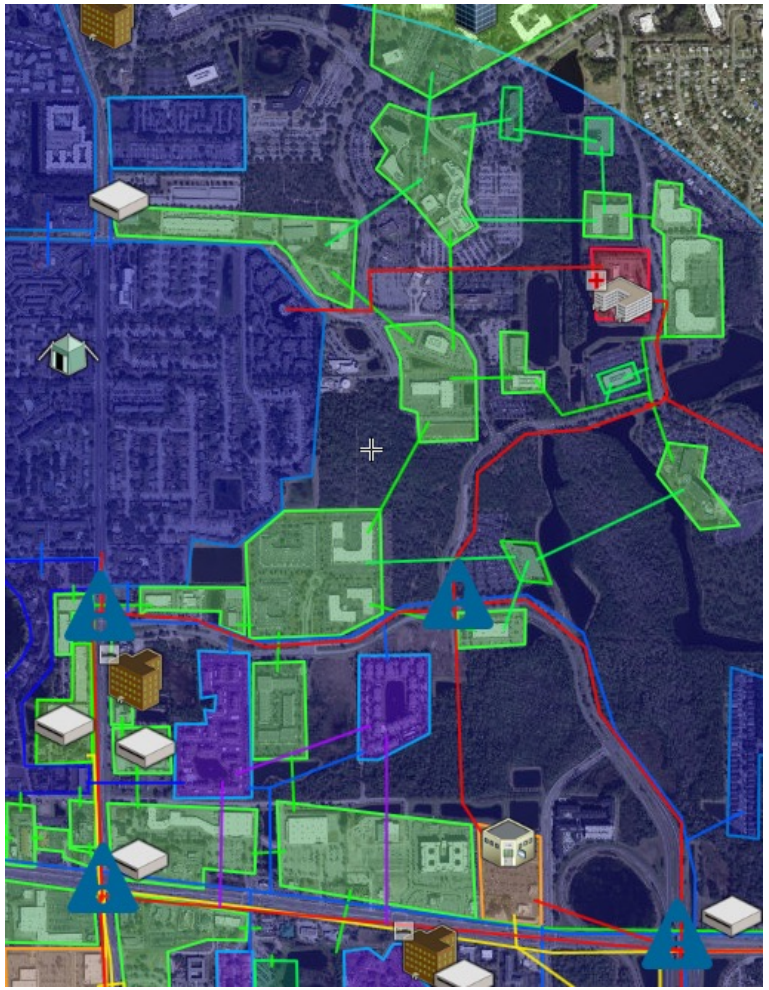
- Sensors: Any major junction of connections.
- Dual Connection Protocol: At least 2 connections.
- Prioritization Protocol: Prioritizes certain building types during peak hours or emergency.

Our map

Color	Micro-Grid Level
	High Priority Emergency
	High Priority Commercial
	High Priority Residential
	Medium Priority Residential
	Medium Priority Other
	Low Priority Commercial & Other

Waterford, Alafaya x Colonial Junction, Apartments

Research offices, hospital



Our Unique Design

- Maximizes energy use: Provides power to a larger and more demanding range of buildings.
- Convenient: Structured around pre-existing power lines.
- Efficient: minimizes outings due to our unique features.

References

- https://www.energystar.gov – Average power load per area
- https://www.commercialcafe.com/commercial-property/us/fl/orlando/waterford-lakes-town-center-target/ & https://www.mallscenters.com/malls/florida/waterford-lakes-town-center - Information on Waterford Lakes
- https://www.theatlantic.com/family/archive/2019/09/american-houses-big/597811/ - Information on housing in America
- https://guides.ucf.edu/statistics-ucf/buildinginventory – Information on UCF
- https://www.osti.gov/servlets/purl/1656655 - Average load area
- https://www.energystar.gov/buildings/benchmark/understand_metrics – Metric conversion

Thank you! ☺
Any questions?