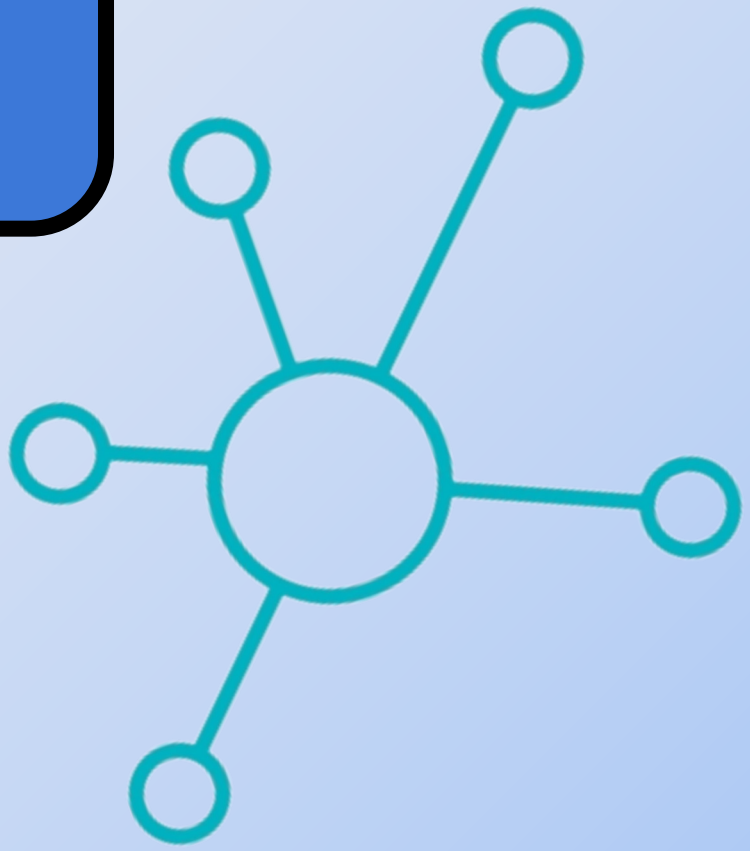
Smart Grid (Reimagined)



NaN – Boone 3

Brady Graham

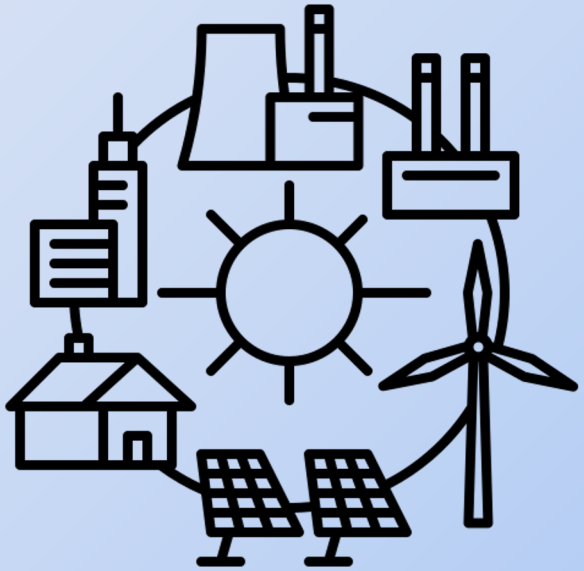
Joshua Anderson

Isabella Sanglade

Michael Roberts

Background Information:

- **Why isn’t our current power grid perfect?**
  - **Redundancy** isn’t used frequently and our system **isn’t fault tolerant**
  - Utility companies are **unable to monitor** energy once it leaves their plants
  - Current power plants are only made **aware of outages** if a customer calls
  - The companies must go directly to the site to **diagnose an issue**



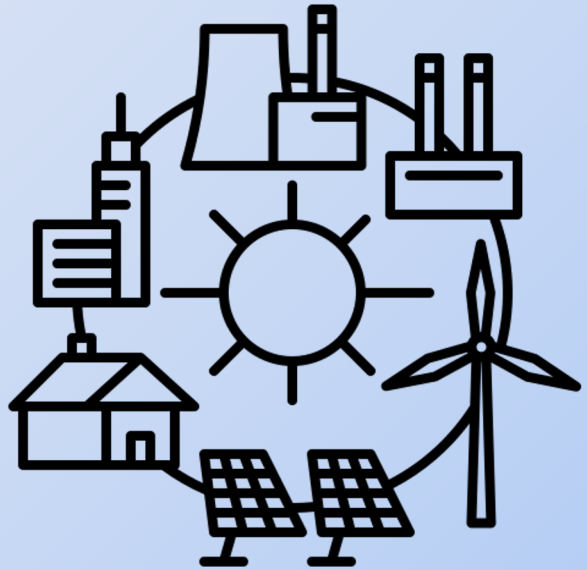
Background Information:

- **What is a Smart Grid?**

  A power grid that utilizes new technology to provide two-way **remote communication** and **management**, **decreasing cost** and **increasing efficiency** for a microgrid

- **When is it needed?**

  In outages, smart grids allow utility companies to **immediately** and **automatically diagnose** the issue and **reroute** power



Our Design Process:

- **Research**
  - **Emergency response** by utility companies
  - The **peak hours of power usage** for the users on our list
  - The **total power load** of our users, **individually** and **cumulatively**
  - **Environmental interaction** with power

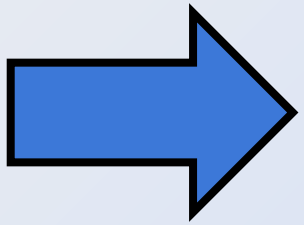
Our Design Process:

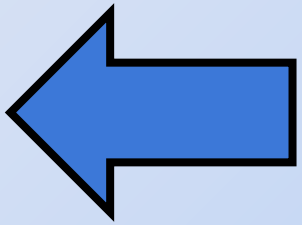
- **Priorities**
  - To **minimize** or **eliminate** wasted energy
  - To **measure** and **monitor** power usage to **make decisions** with that data.
  - To have our grid be as **fault tolerant** as possible
  - To have an efficient method for restoring power in **emergencies**

Our Design

GRID 1

- Users organized into 4 levels of priority
- Optimized for emergency power restoration





Our Design

GRID 1

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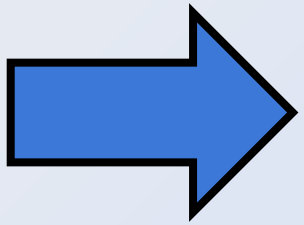
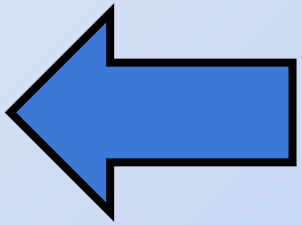




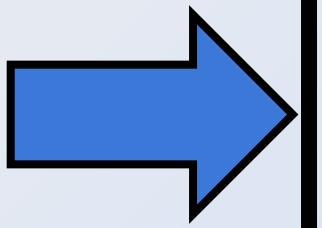
GRID 2

- Users organized by time of peak energy need
- Optimized for power usage to avoid wasting energy

Our Design

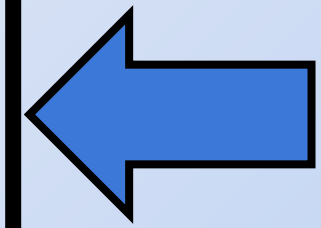
GRID 1

- Users organized into 4 levels of priority
- Optimized for emergency power restoration



COMBINED GRID

- Emergency backup grid and everyday use peak energy organized grid
- Mostly fault tolerant, efficient, and versatile



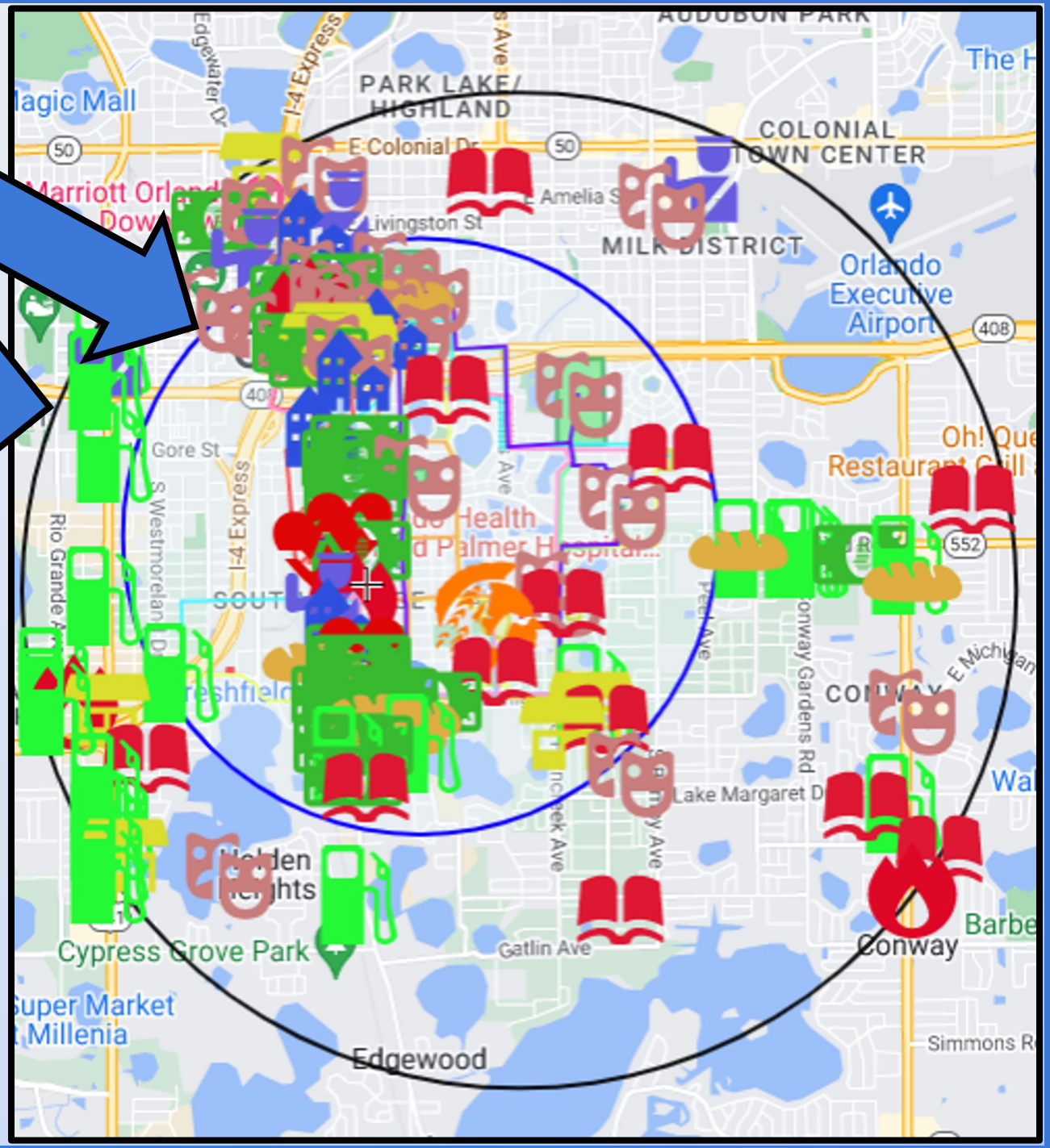
GRID 2

- Users organized by time of peak energy need
- Optimized for power usage to avoid wasting energy

Our Grid-

1.5 Mile Radius Smart Grid

2.5 Miles Around Boone HS



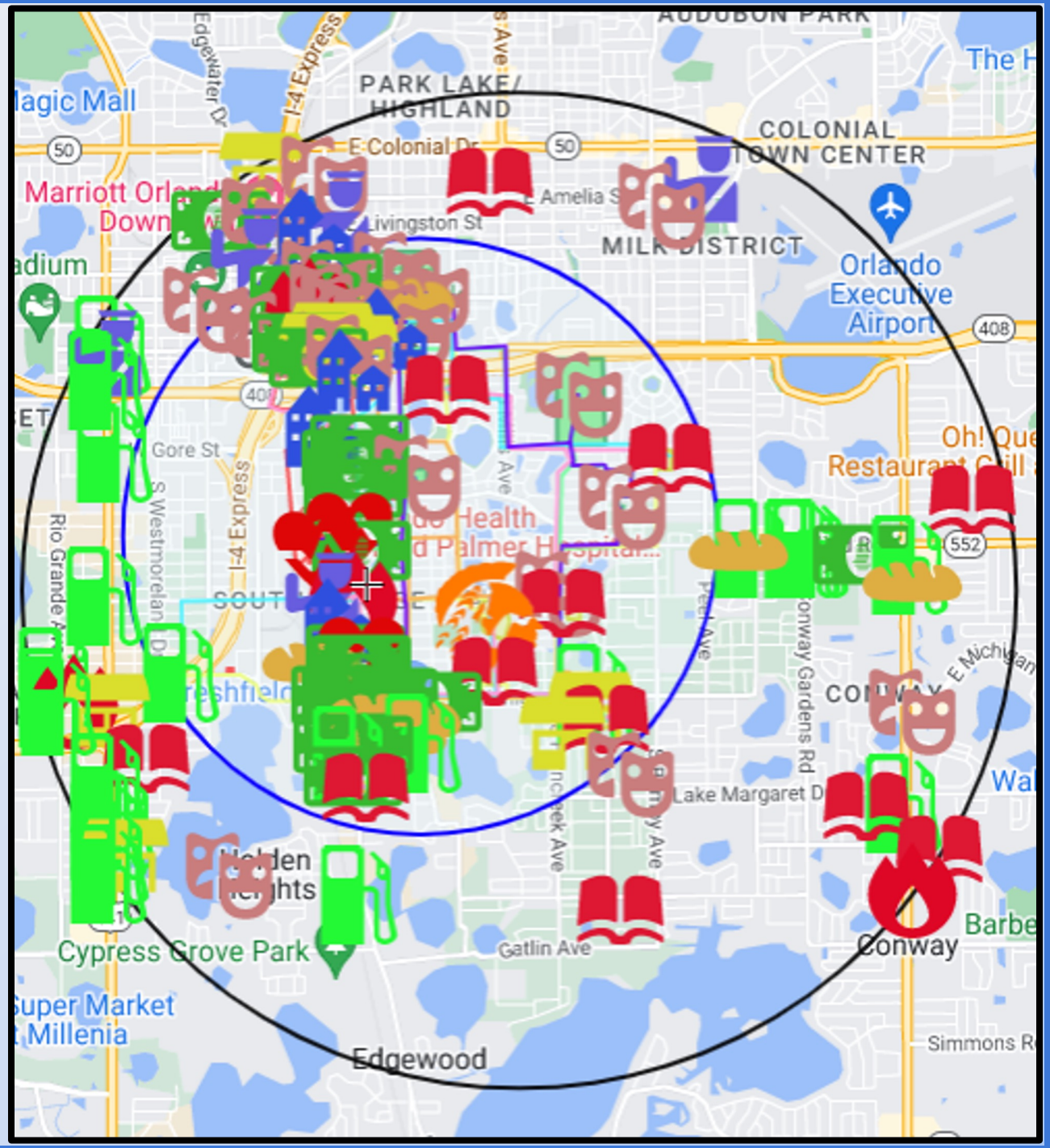
- Evening to Morning
- Noon to Evening
- Morning to Noon
- Least Important
- Middle Importance
- Second Most Important
- Most Important
- Least Importance
- Middle Importance
- Second Most Important
- Most Important

- Boone
- High Tourist Locations
- Convenience Stores / Gas Stations
- Bank
- Shelters
- Fire Stations
- Police Stations
- Senior Living Centers
- Grocery Stores
- Schools
- Hospitals

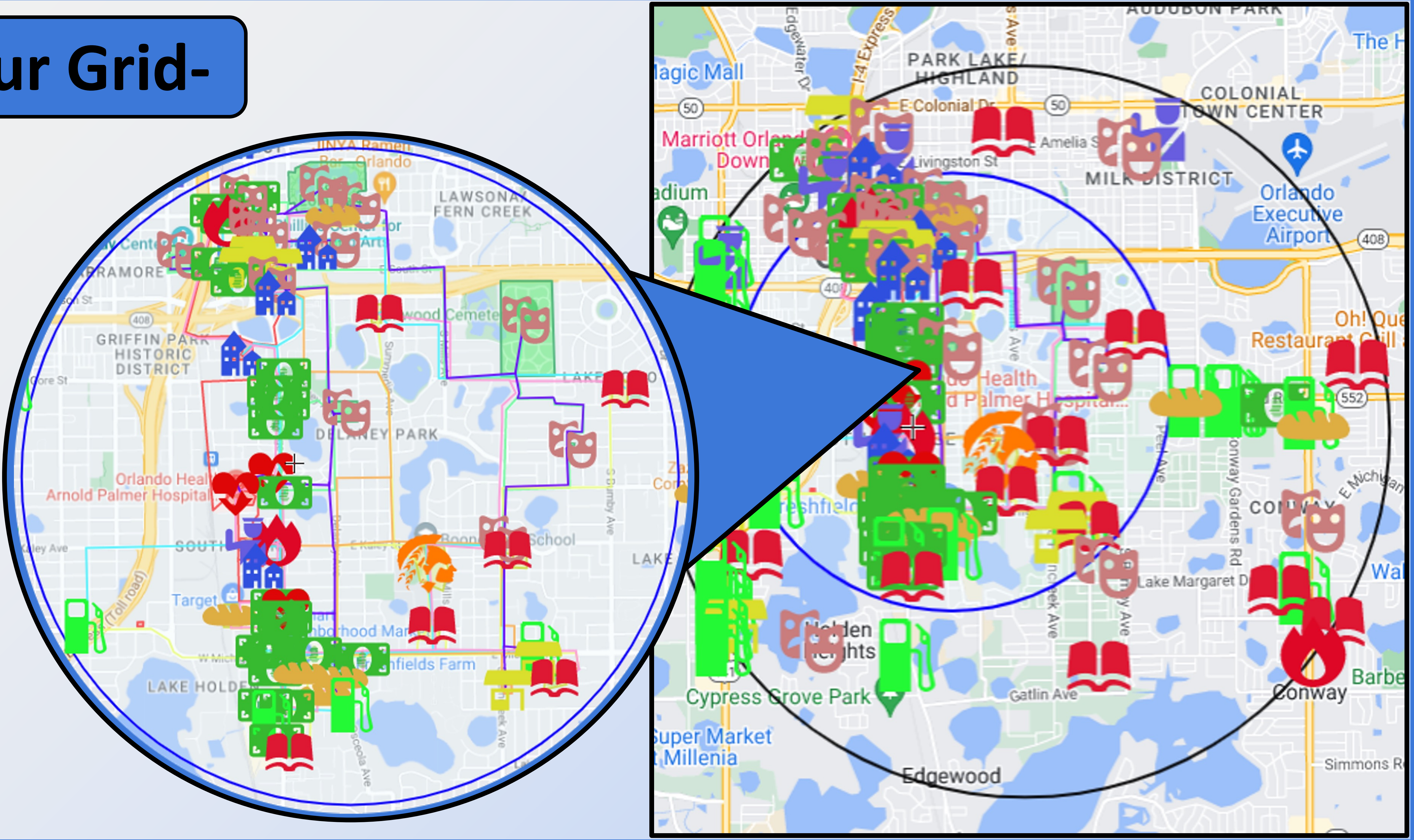
Our Grid-

Overall Power Load:
14,693 KW

User (Needing Energy)	Count	Power Load (TOTAL, In KW)
Hospital	3	4312
Senior Living Centers	4	1644
Fire Stations	2	84
Police Station	1	46
Shelters	5	270
Schools	6	1560
Convenience Stores	4	195
Grocery Stores	5	3725
Banks	23 (That's Excessive)	656
High Tourist Dest.	3	2201

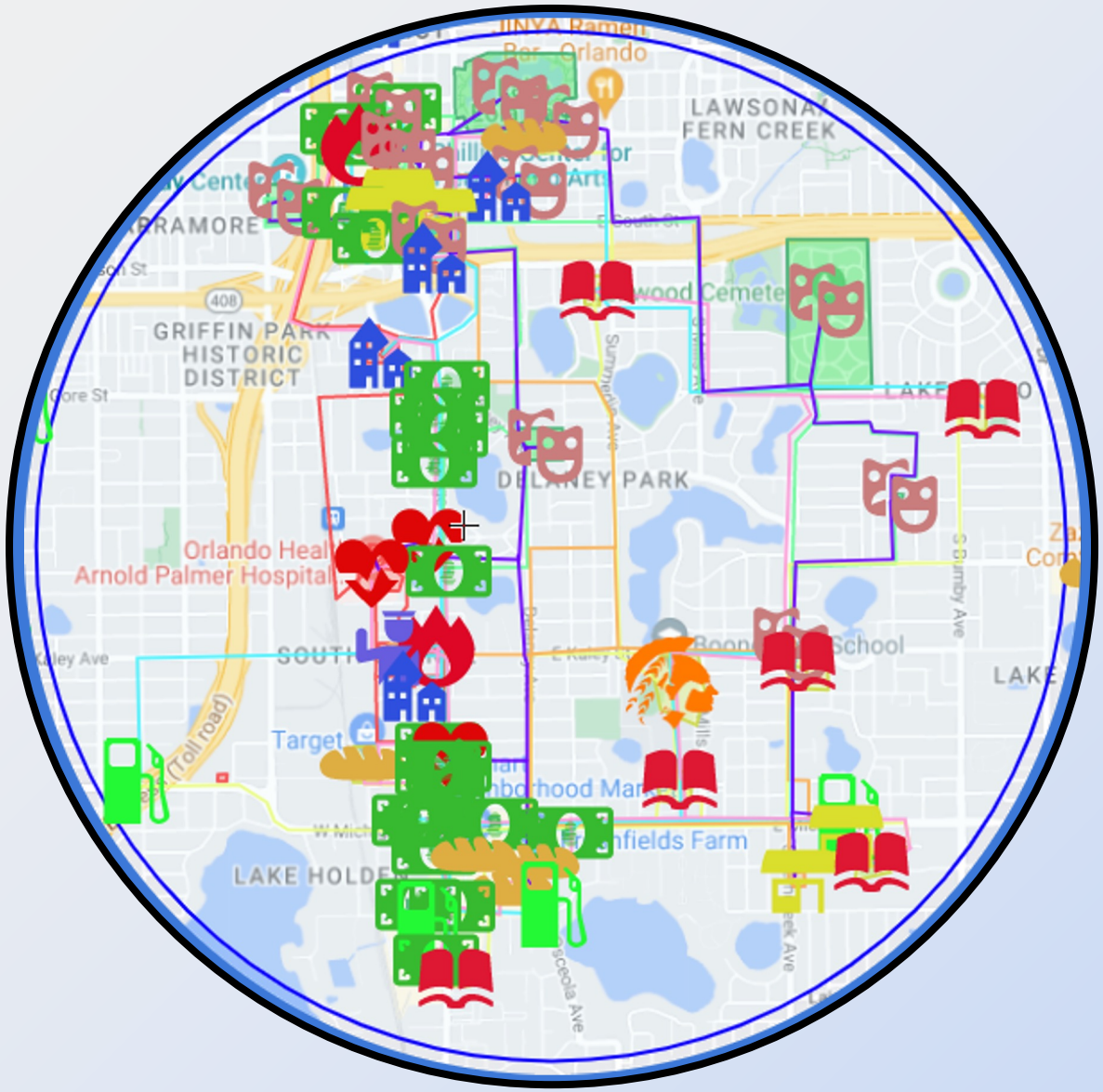


Our Grid-



LAWSONA/FERN CREEK
GRIFFIN PARK HISTORIC DISTRICT
DELANEY PARK
Orlando Health Arnold Palmer Hospital
Target
LAKE HOLDEN
PARK LAKE/HIGHLAND
COLONIAL TOWN CENTER
MILK DISTRICT
Orlando Executive Airport
Magic Mall
E Colonial Dr
Livingston St
Lake Margaret Dr
Gatlin Ave
Cypress Grove Park
Edgewood
Conway

Our Grid-



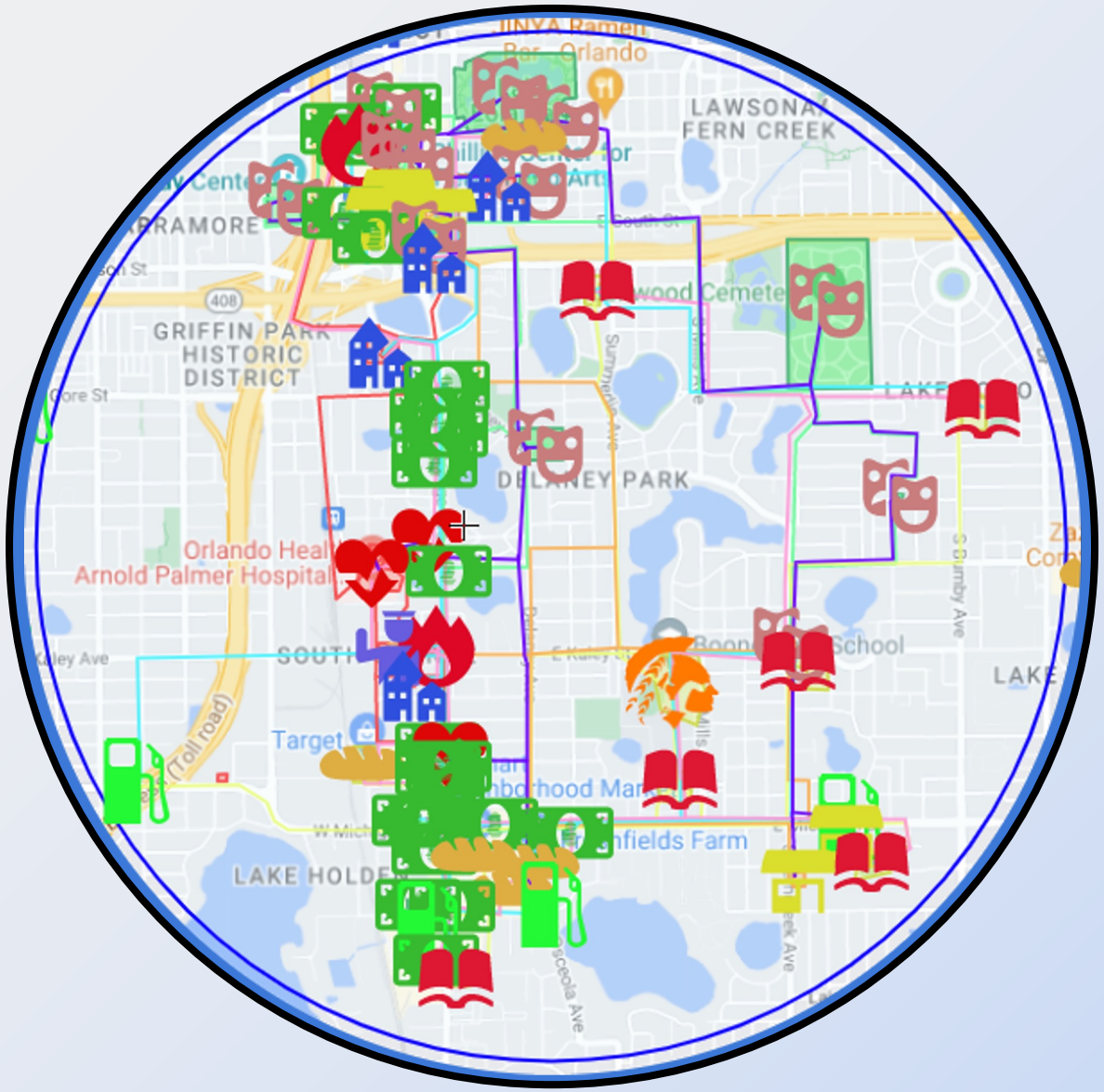
Lines based on peak energy use

- Evening to Morning
- Noon to Evening
- Morning to Noon

- Least Importance
- Middle Importance
- Second Most Important
- Most Important

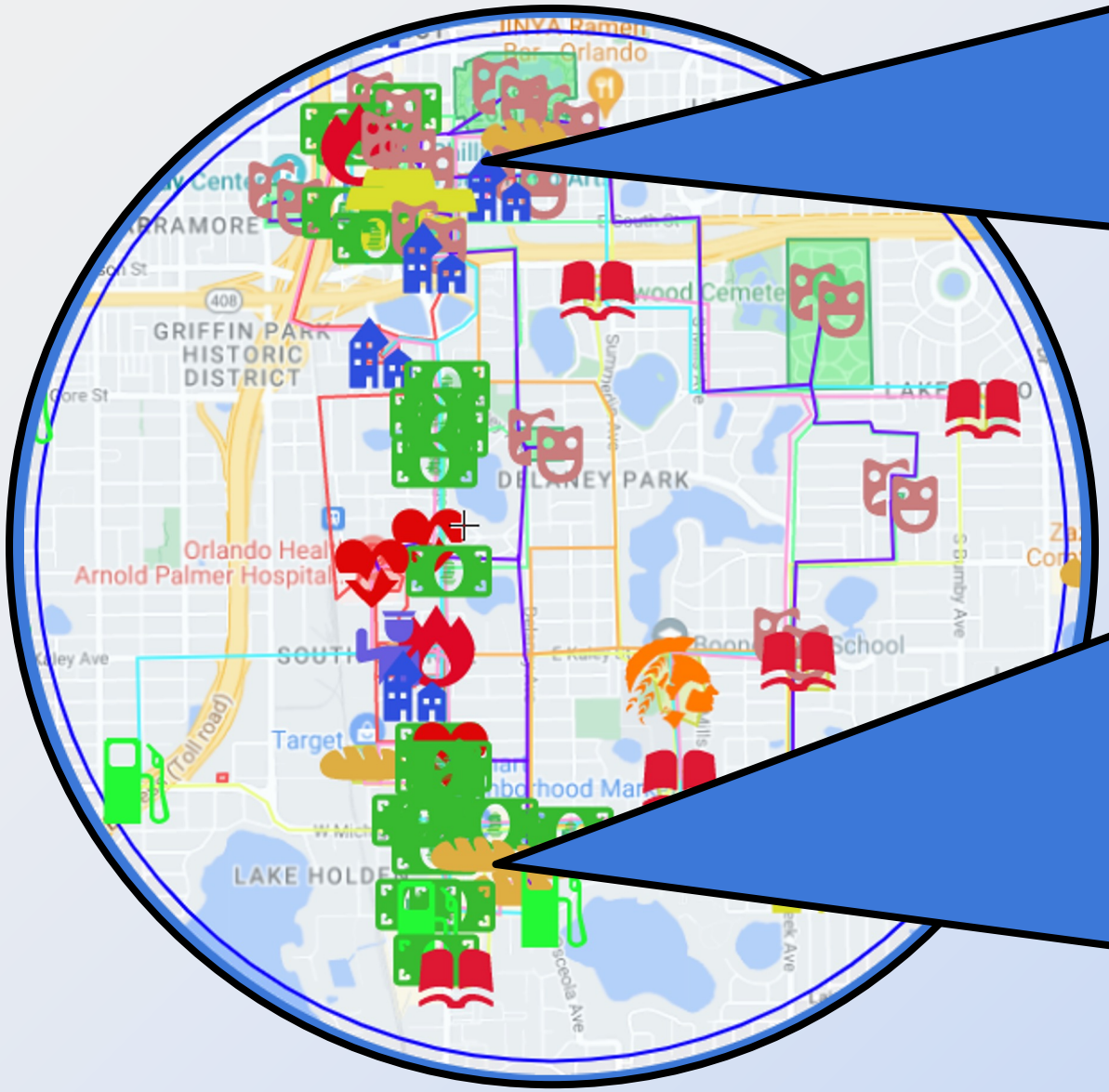
Lines based on emergency priority

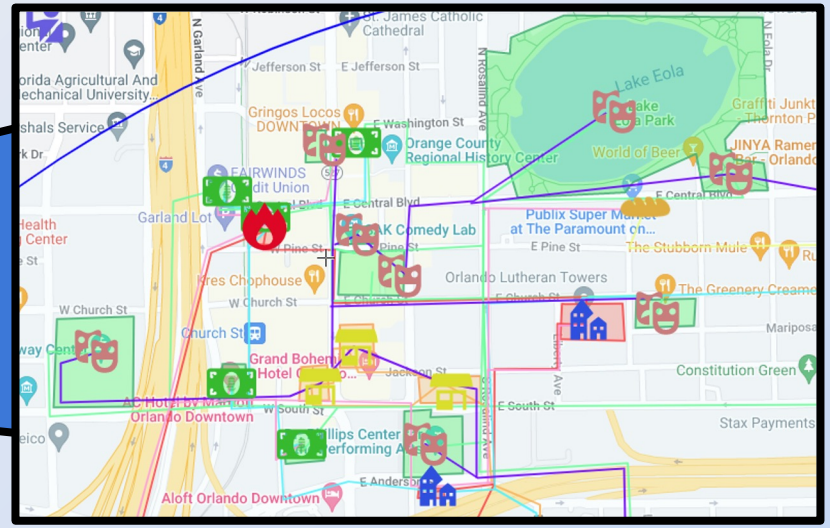
Our Grid-

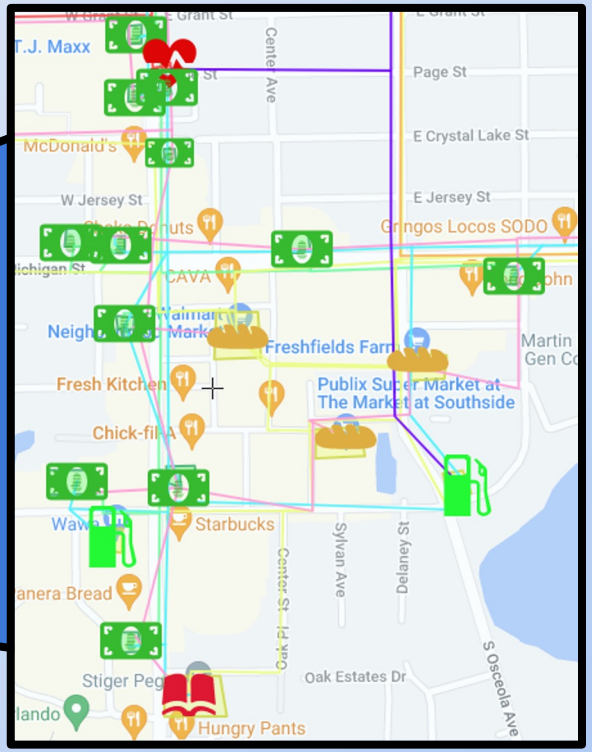


- **Features**
  - **Sensors** and **heat monitors**
  - Utilizes **renewable energy sources**
  - Is equipped with “green” cables, which comply with the **UN Sustainable Development Goals**
  - Power can be **remotely rerouted** in most areas of the grid
  - Lines run along the road for **easy construction**
  - Uses machine learning to **predict fluctuations** in power demand

Our Grid-

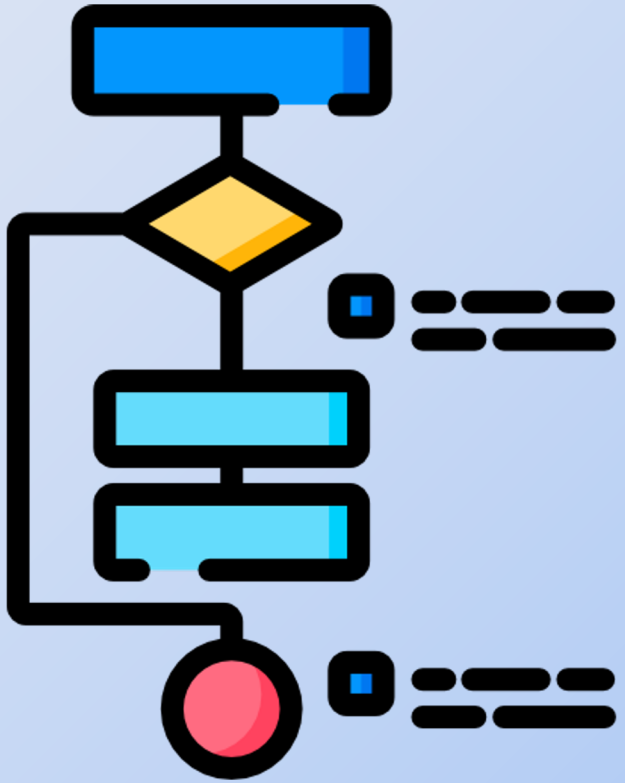

GRIFFIN PARK
HISTORIC
DISTRICT
DELANEY PARK
SOUTH
LAKE HOLDEN
Target
Orlando Health
Arnold Palmer Hospital
408
(Toll road)


Lake Eola
Orange County
Regional History Center
Orlando Lutheran Towers
Constitution Green
Aloft Orlando Downtown
Stax Payments


T.J. Maxx
McDonald's
Gringos Locos SODO
CAVA
Freshfields Farm
Fresh Kitchen
Publix Super Market at
The Market at Southside
Chick-fil-A
Starbucks
Hungry Pants
Oak Estates Dr
Page St
E Crystal Lake St
E Jersey St
W Jersey St

Why choose us-

- Our grid is mostly **fault tolerant** and well equipped to handle most issues by utilizing **constant monitoring**, **remote diagnosis**, and **easy redirection of power**
- Our grid will help **save money** and save the environment, incorporating **smart power distribution** and allowing for **easy alterations** to the amount of power transmitted to various users
- Our grid is **very versatile,** with both a framework for everyday use, optimized for the **timing of energy peaks**, and an **emergency backup grid** that allows power to be **quickly provided** to the most important users in an emergency



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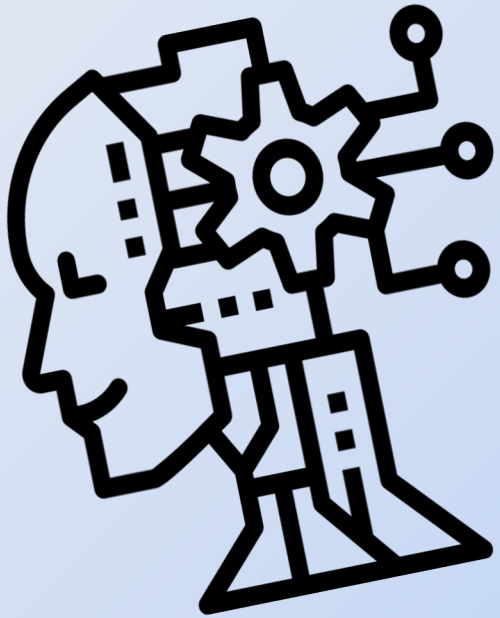

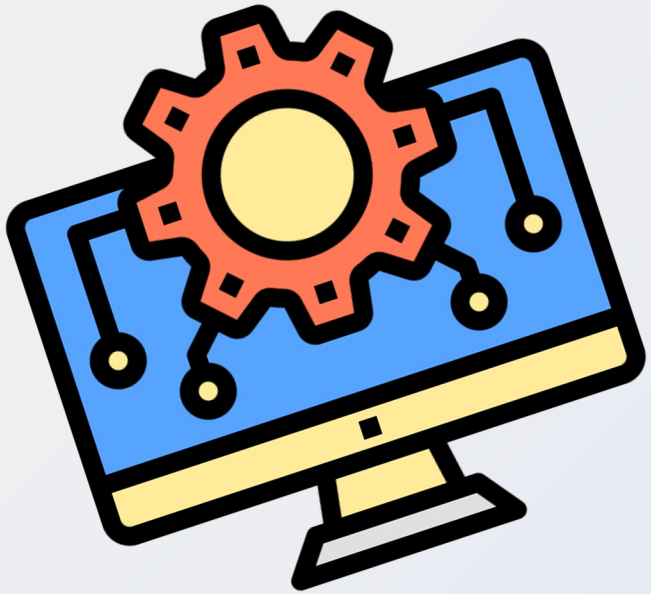

Thank you,
Any questions?