# PTC – Our Smart Grid

### Code: Autosave

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# Background

Over two months we were challenged to create a smart grid for our local community.

The Smart Grid is defined through three separate sections.

- 1. User Prioritizations
- 2. Power Distribution
- 3. Microgrid Designs.

# User Prioritization



Rank	User		
1	Fire Station		
2	Hospital		
3	K12 School /		
	Shelters		
4	<b>Grocery Store</b>		
5	Gas Station		
6	Fast Food		
	Restaurant		
7	<b>Full-Service</b>		
	Restaurant		
8	Hotel		
9	Warehouse		
10	Medical Clinic		

#### **Daily Energy Consumption for 10 Selected User Types**



### Yearly Energy Consumption for 10 Selected User Types



## Normal Power Distribution



## Power Distribution in an Outage



# Microgrid(s) Design



R	ank	User
	1	Fire Station
	2	Hospital
	3	K12 School / Shelters
	4	Grocery store
	5	Gas Station
	6	Fast Food
		Restaurant
	7	<b>Full-Service</b>
		Restaurant
	8	Hotel
	9	Warehouse
	10	Medical Clinic

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Main Tak	eaway	<ul> <li>Priorities of this de O This design prio provide</li> </ul>	esign oritizes users that can
		<b>500</b> 0	

SAFETY	SHELTER	FOOD	OTHER NECESSITIES
FIRE STATION	K-12 SCHOOL	GROCERY STORE	GAS STATION
HOSPITALS		FAST-FOOD RESTAURANTS	HOTEL
MEDICAL CLINICS		FULL-SERVICE RESTAURANTS	WAREHOUSE

# References

- Information
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  - [3] M. A. Judge, A. Khan, A. Manzoor, and H. A. Khattak, "Overview of smart grid implementation: Frameworks, impact, performance and challenges," *Journal of Energy Storage*, vol. 49, p. 104056, May 2022, doi: <u>https://doi.org/10.1016/j.est.2022.104056</u>.
  - [4] O. M. Butt, M. Zulqarnain, and T. M. Butt, "Recent advancement in smart grid technology: Future prospects in the electrical power network," *Ain Shams Engineering Journal*, vol. 12, no. 1, Jul. 2020, doi: <u>https://doi.org/10.1016/j.asej.2020.05.004</u>.

# Thank you! Any Questions?