

# Microgrid Implementation for Large Scale Power Outage Conditions & Smart Data Collection and Modeling Tool

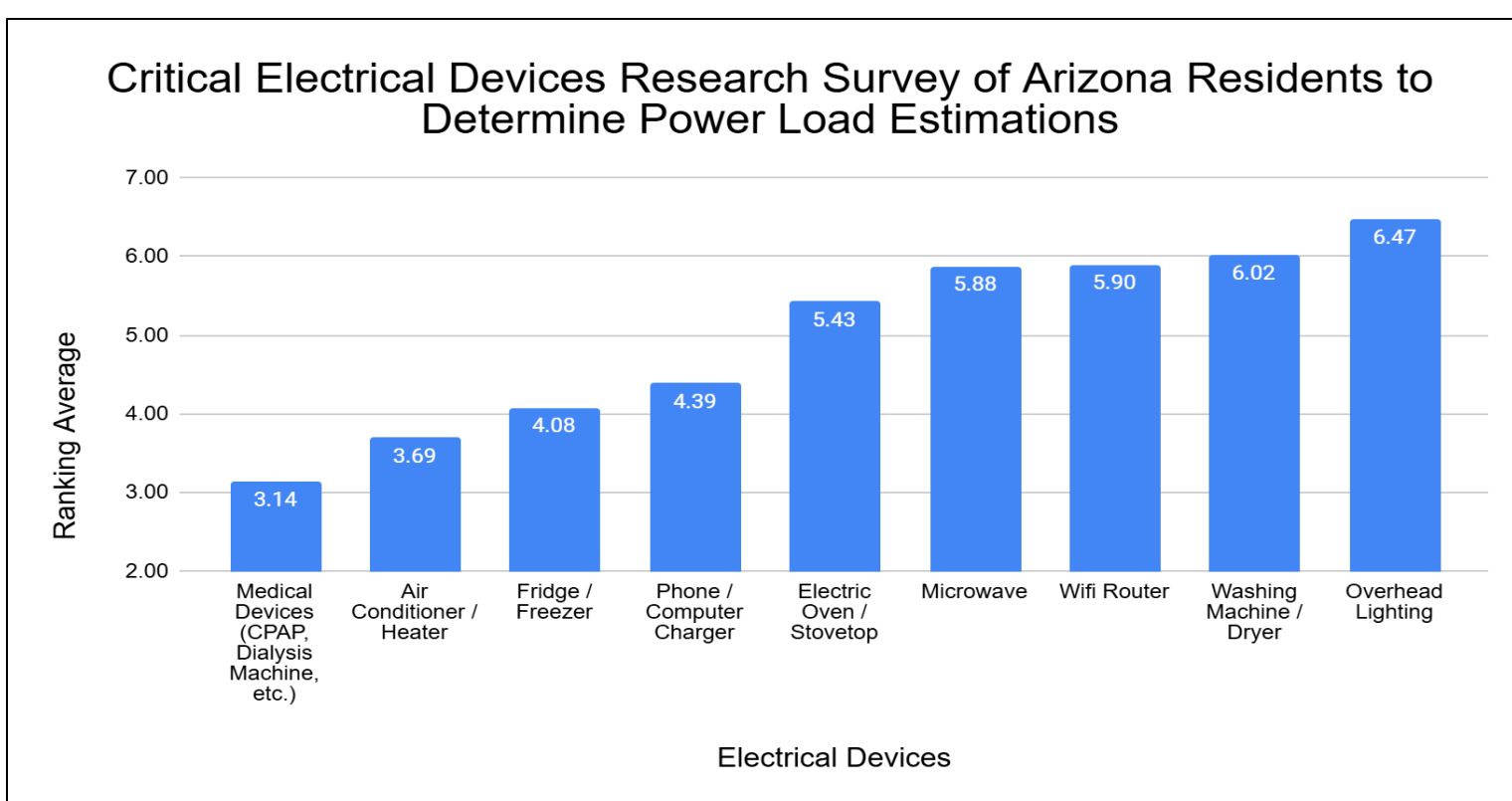
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## Project Motivation

The objective of this project is to design a microgrid system with supported mobile applications that, when needed, will automatically provide backup power for impacted communities, allowing these communities to run critical electrical equipment at a reduced load until full power is restored

## Introduction/Background

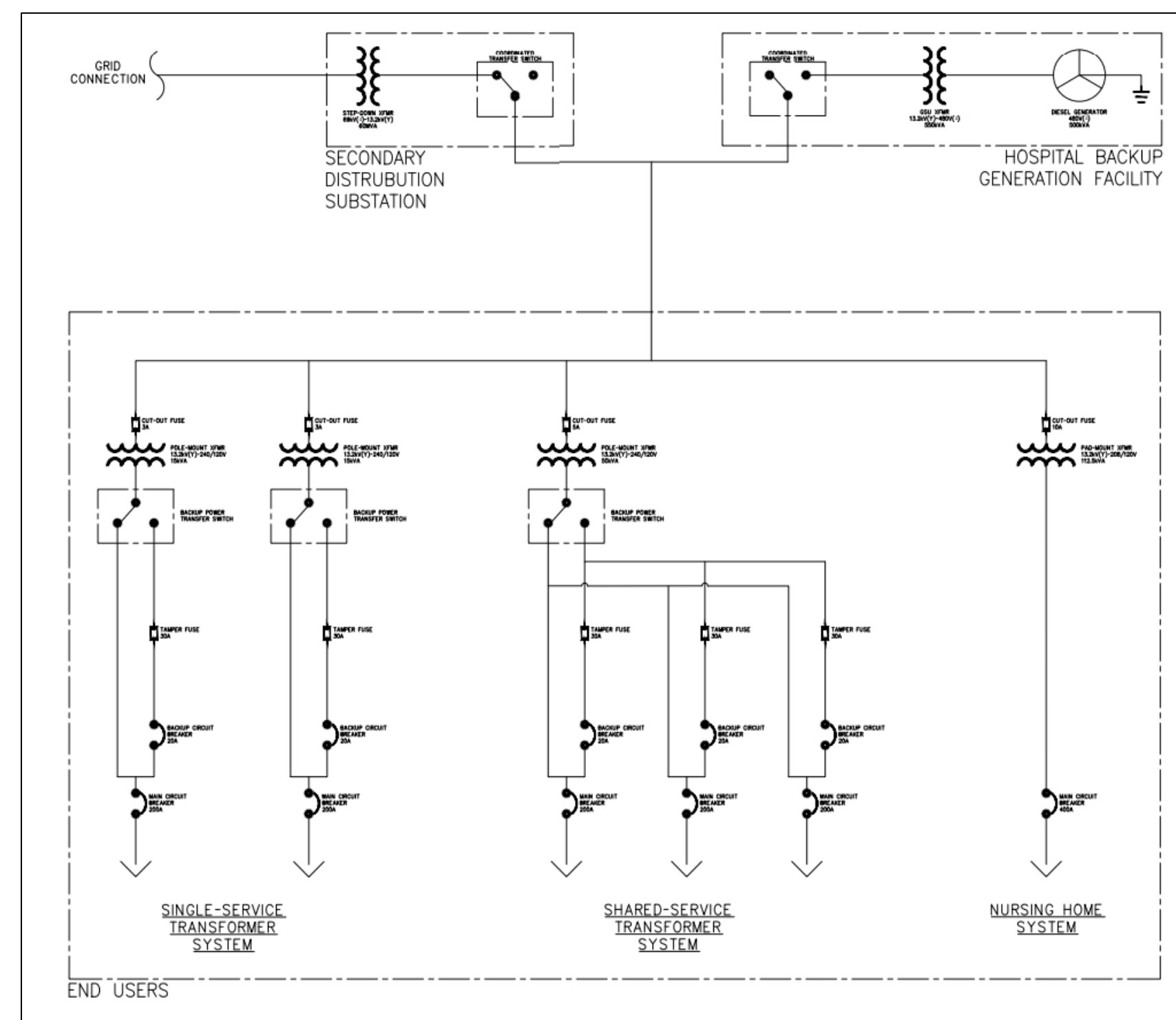
- As climate change continues to make weather patterns increasingly volatile, the need for reliable power generation is growing
- Power utility companies need assistance in mapping and monitoring DERs in their electrical distribution networks
- Solution should be sustainable and easy to implement



## Project Scope

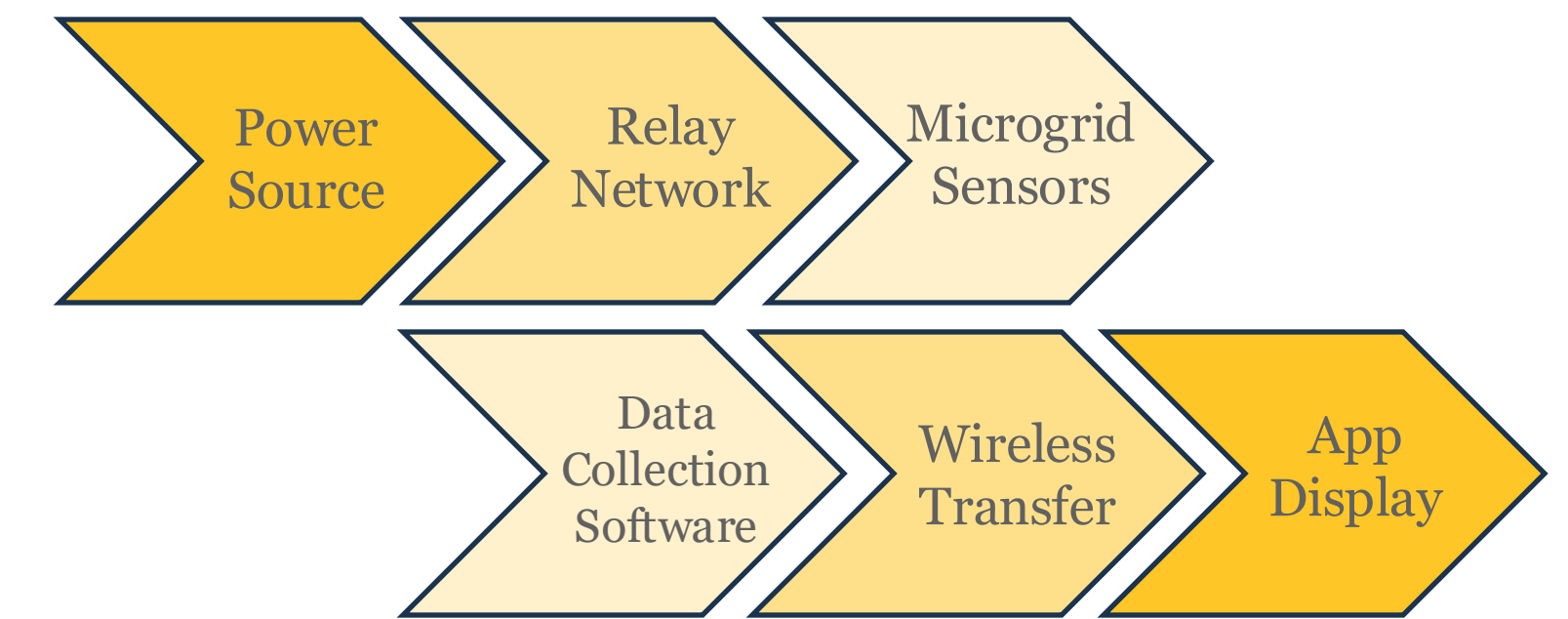
Microgrid	Power Management App	Smart Modelling App
Automatically detects outage then switches to backup power at a reduced power allowance	Gathers and displays data about individual power usage and grid operation status to customer	Reads scanned QR codes containing power device specifications and uses these values to update utility asset database and OpenDSS network model

## Microgrid System Design



- Distribution Substation**: Steps down voltage from main grid for local distribution
- Hospital Generation Station**: Acts as backup power generation
- Transfer Switches**: Coordinated to select power from main grid or backup
- End Users**: Models potential power restriction implementations

## Final System Integration



## Future Work

- Further develop Python code to include Wi-Fi for proper wireless communication
- Create an OpenDSS simulation to assist communities in testing the layout before physical implementation

## Conclusion

- Proposed microgrid and apps show how any community can implement this system in their emergency electric distribution network
- System could be adapted for non-renewable and future net-zero renewable energy technologies, making it easy for any community to create and use across locations and income classes

## Acknowledgements

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## Smart Data Collection & Modeling System Design

Smart Data Collection & Modeling mobile application will assist utility companies in automating equipment tracking for ease of monitoring and modeling power systems

