

Team 14: Resilience Against Electrical Outages in Stockton, CA

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Introduction

- Census tract 1
- Poverty rate: 16.3%, about 5% above the national average (11.6% in the US)¹
- Frequent extreme weather events like heatwaves/winter storms cause outages
- Inadequate resources to respond, gets less support from the government
- Outages have negative impacts on health and the local economy.
- Disproportionately affect certain populations- homeless, low-income, minorities
 - Energy Burden

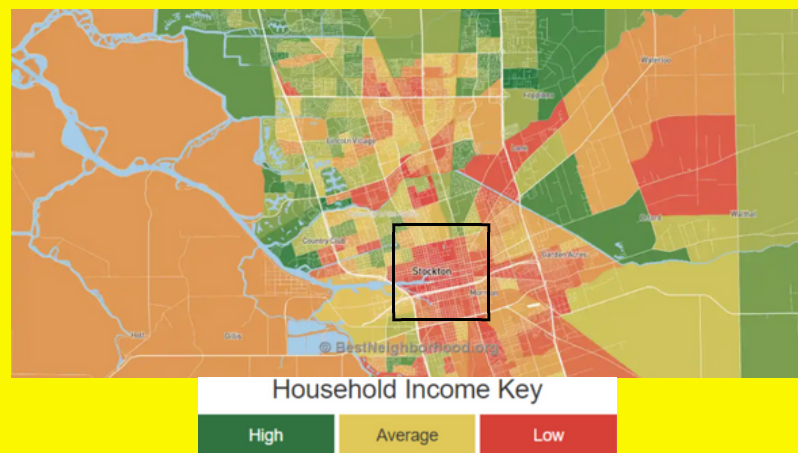


Figure 1. Stockton income map and location of Census Tract 1



Figure 2. Insulation injections are non-invasive

Solutions

Solution 1: Solar/Battery Microgrid

- Census Tract 1 (1,141 households)
- 5-megawatt solar array²
- 11.6 megawatt-hour battery storage
- Capable of providing power to Census Tract 1 for **2-days without main grid**³

Solution 2: Upgrading Insulation

- Need to reduce energy usage by **25 percent** to prevent outages⁴
- Spray foam insulation injection method
- Retrofitting is better than building new infrastructure⁵
- Home insulation **reduces energy usage and cost by 11 percent**⁶

Chart 164 – System SAIFI Performance

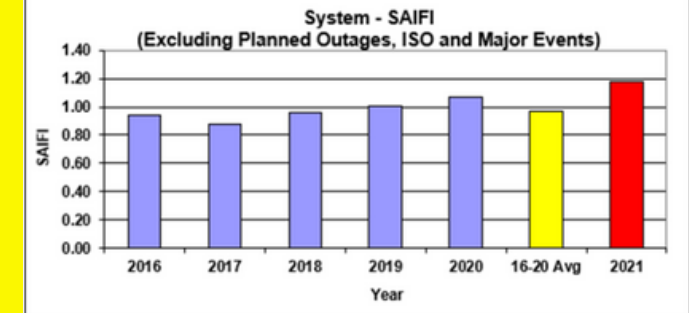


Figure 3. Rising trend in yearly outages experienced by customers

Cost Benefit Analysis

- Average cost of one outage: **\$16-19 million**⁷
- Microgrid can save up to **\$10+ million/year** on electricity expenditure²
- Five years with **one** prevented outage per year avoids cost of nearly **\$150 million**
- **Total Cost of Solutions: \$55 Million**

Funding and Conclusion

- Funded by government grants/subsidies
- Federal Government funding:
 - Bipartisan Infrastructure Law and the Inflation Reduction Act: **\$97 billion**
- State of California Energy Commission grants
- Solutions are feasible and cost-effective ways to make Stockton more resilient.

Literature Cited

Figure 1. Poverty rate in Stockton, California. Welfare Info.

Figure 2. (2021, Aug. 16) Spray Foam and Injection Foam; Why You Need It and What's The Difference? RetroFoam.

Figure 3. Learn About PG&E Reliability Reports. Pacific Gas and Electric Company.

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3. (2019, Sept. 4) Megawatt - Definition: Solar Terms. Sunrun.

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