



# Remotely and Cost Effectively Control Fleets of Microgrids How Microgrids Can Change the World

MICROGRID FLEET MANAGEMENT

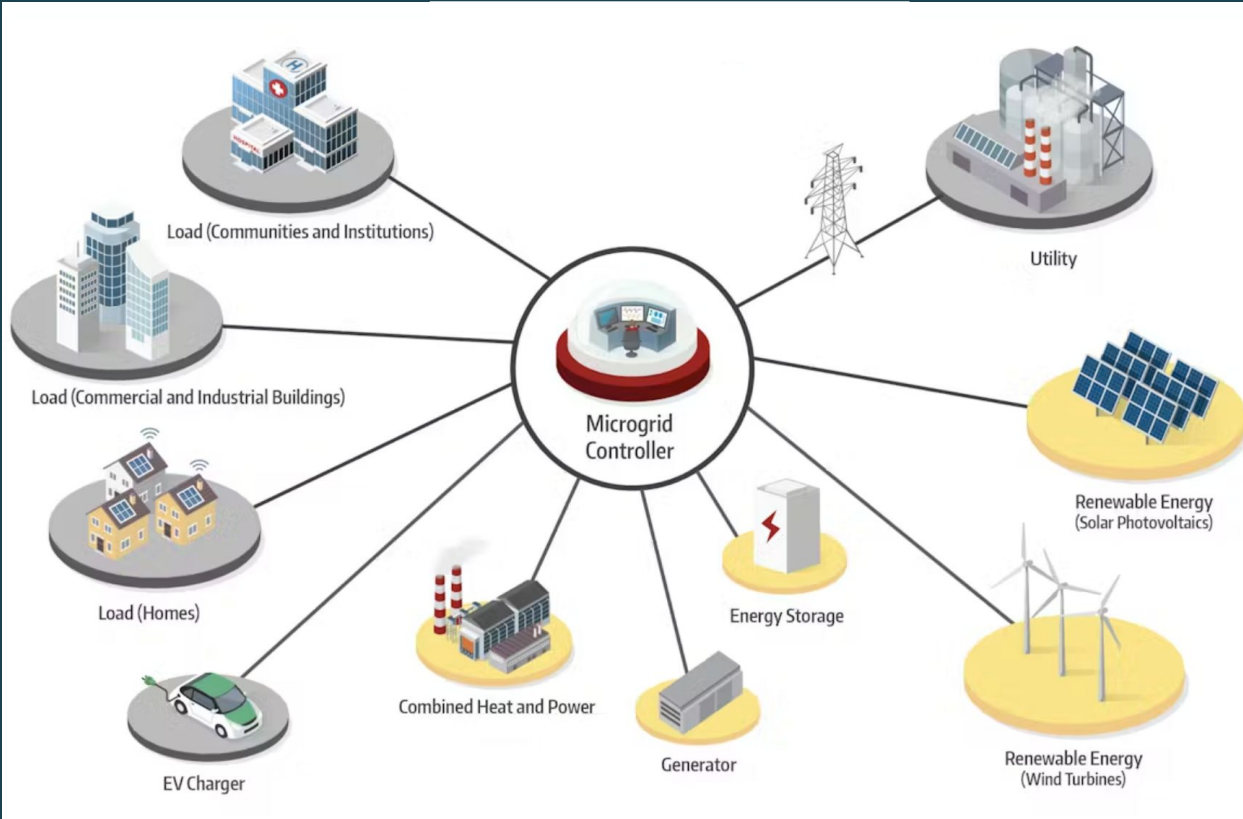


**NEW SUN ROAD** is a mission-driven, clean energy focused, Public Benefit Corporation based in the San Francisco Bay Area

**OUR MISSION** is to accelerate the deployment of renewable energy systems with technology, and to enable energy and access for remote communities



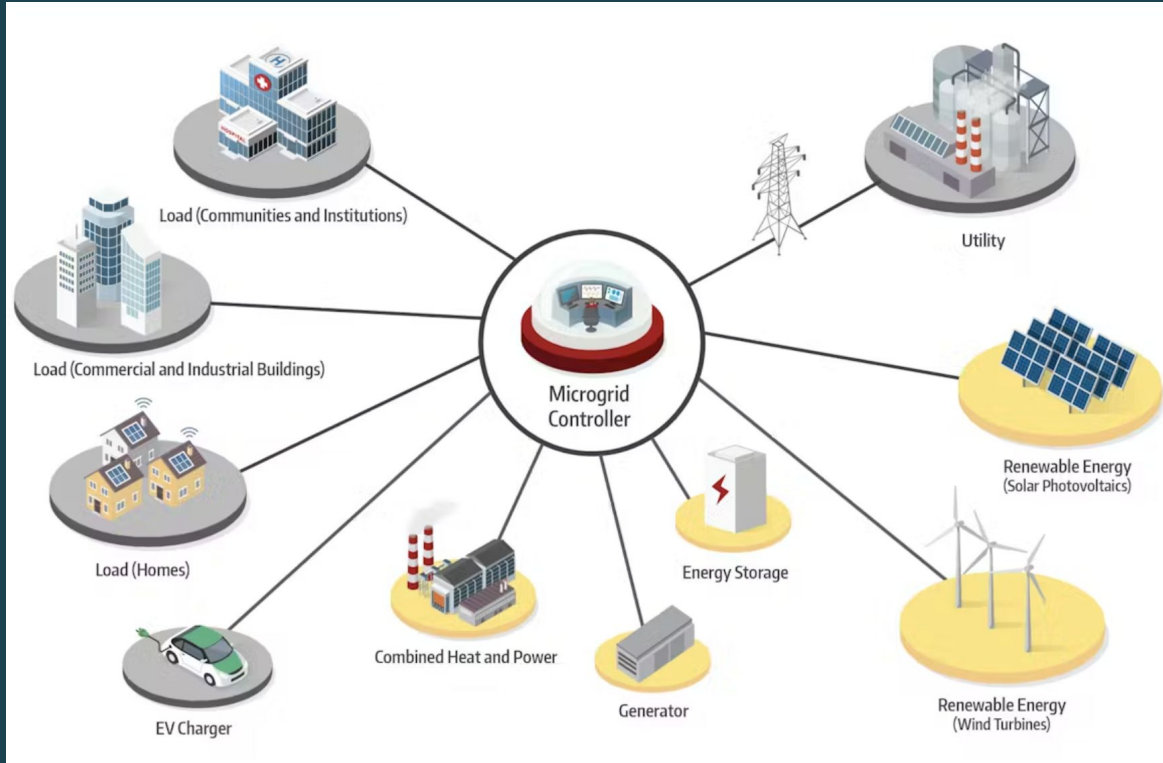
# What is a Microgrid?



- A. Solar + Storage
- B. A Virtual Power Plant (VPP)
- C. A self-sufficient energy system that serves a discrete area
- D. DERM

*Courtesy of Microgrid Knowledge*

# What is a Microgrid?



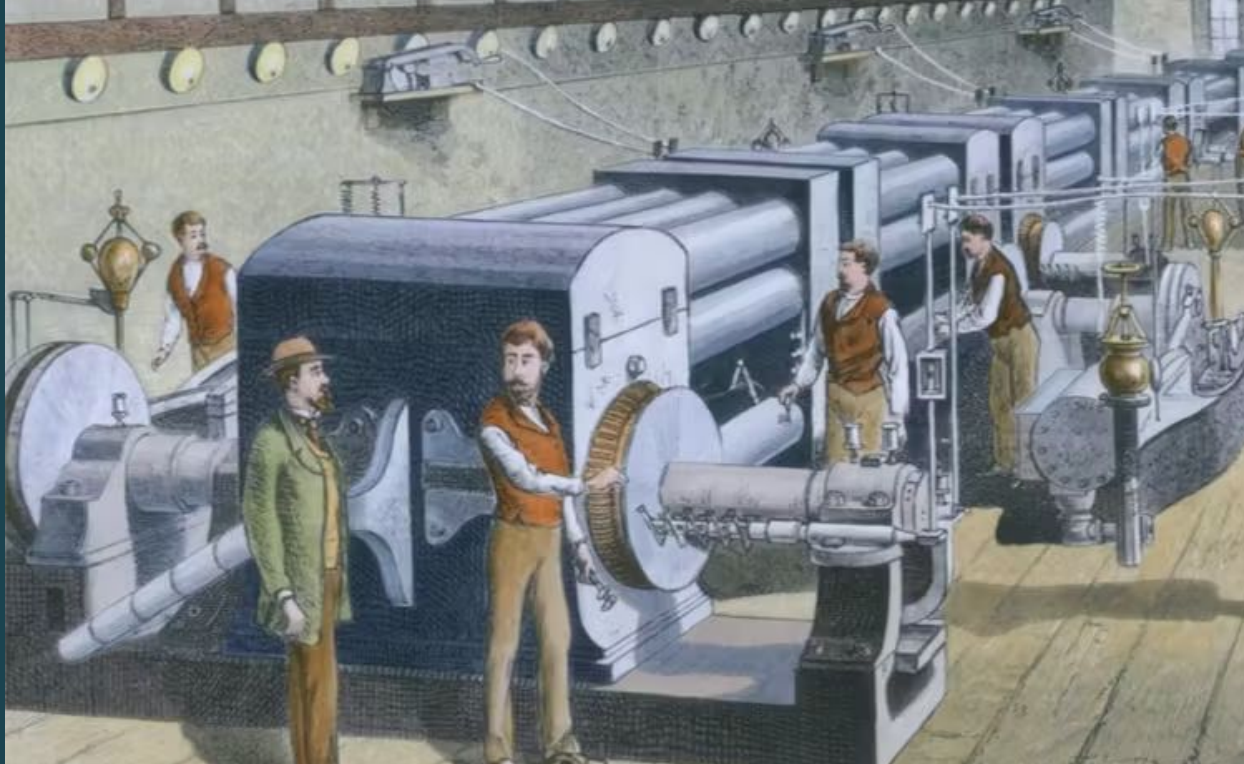
*Courtesy of Microgrid Knowledge*

A microgrid is a self-sufficient energy system that serves a discrete geographic footprint, such as a college campus, hospital or neighborhood.

Sometimes called:

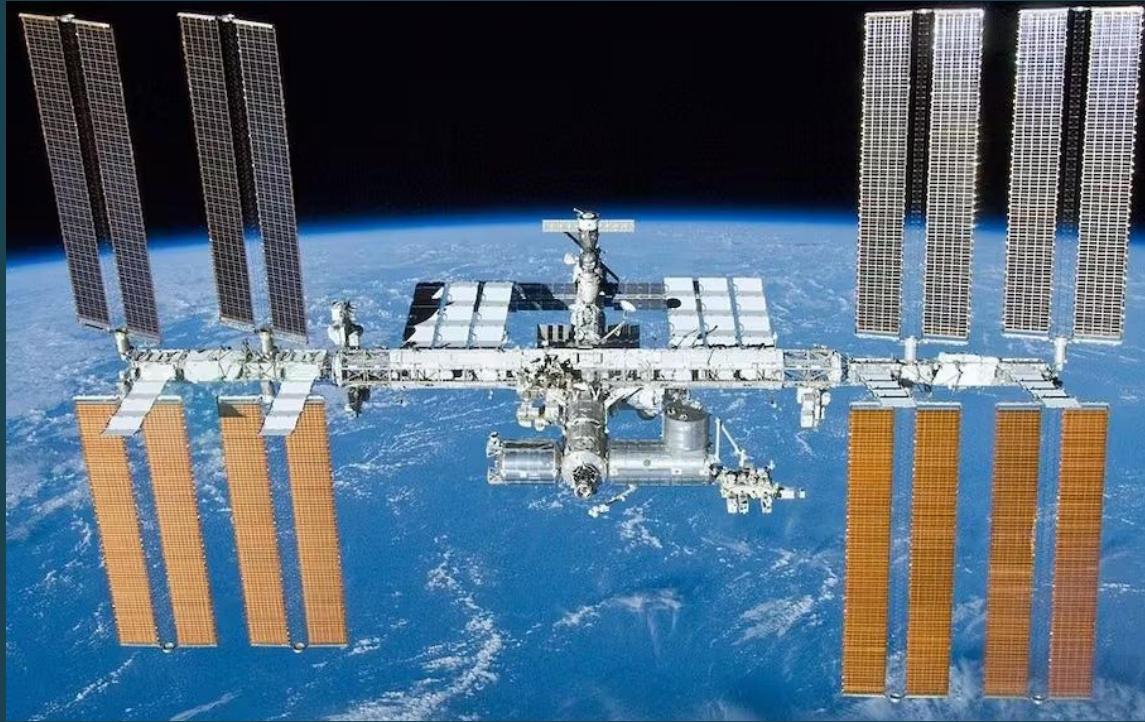
- Minigrid
- Nanogrid
- Stand alone power system
- Remote grid

# Microgrids are Not New



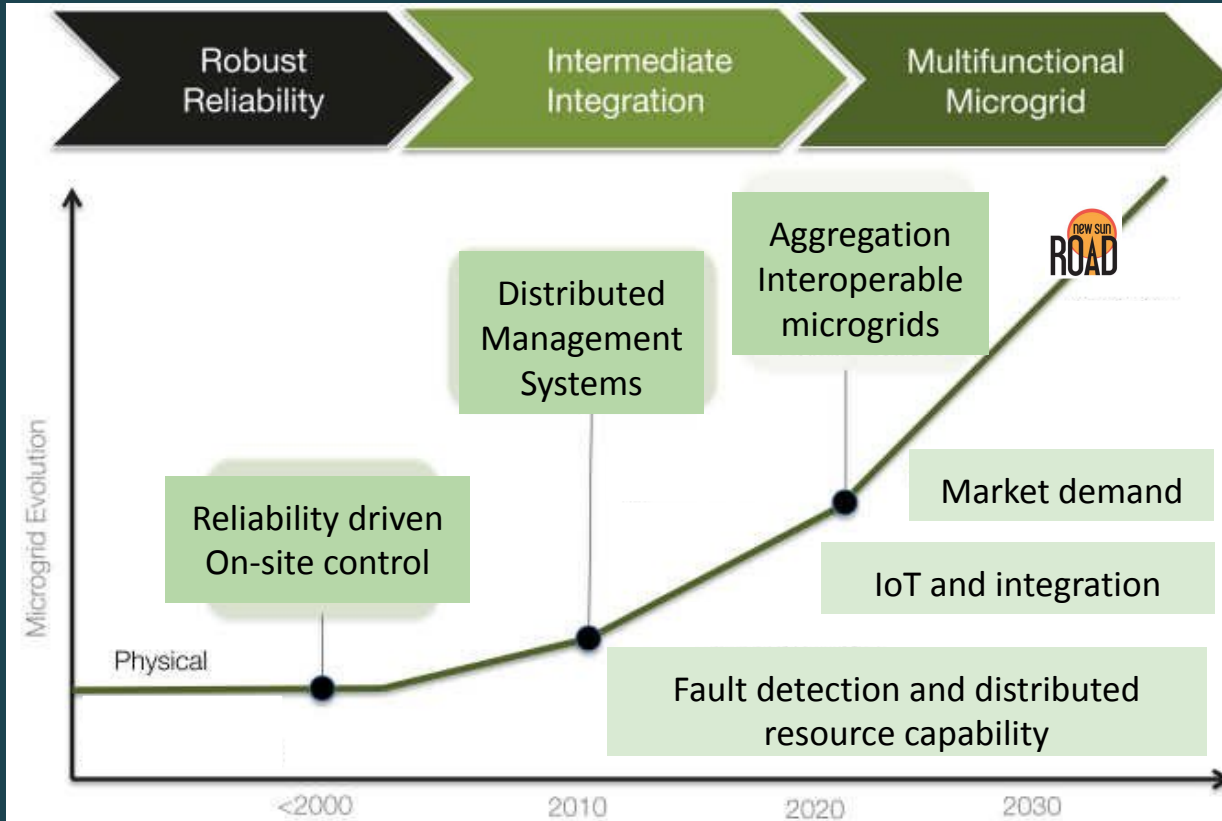
Thomas Edison's first power plant - a microgrid - was the 600kW Manhattan Pearl Street Station (1882). By 1886, the firm had installed 58 direct current microgrids.

# Microgrids are Flexible, Capable and Enabling



International Space Station's microgrid launched 1998 with 164 solar modules providing 248 kW of power with 38 Ni H batteries (to be replaced by Li ion).

# It's Time for Lots of Renewable Energy Microgrids



GTM Research 2014

## Critical Need

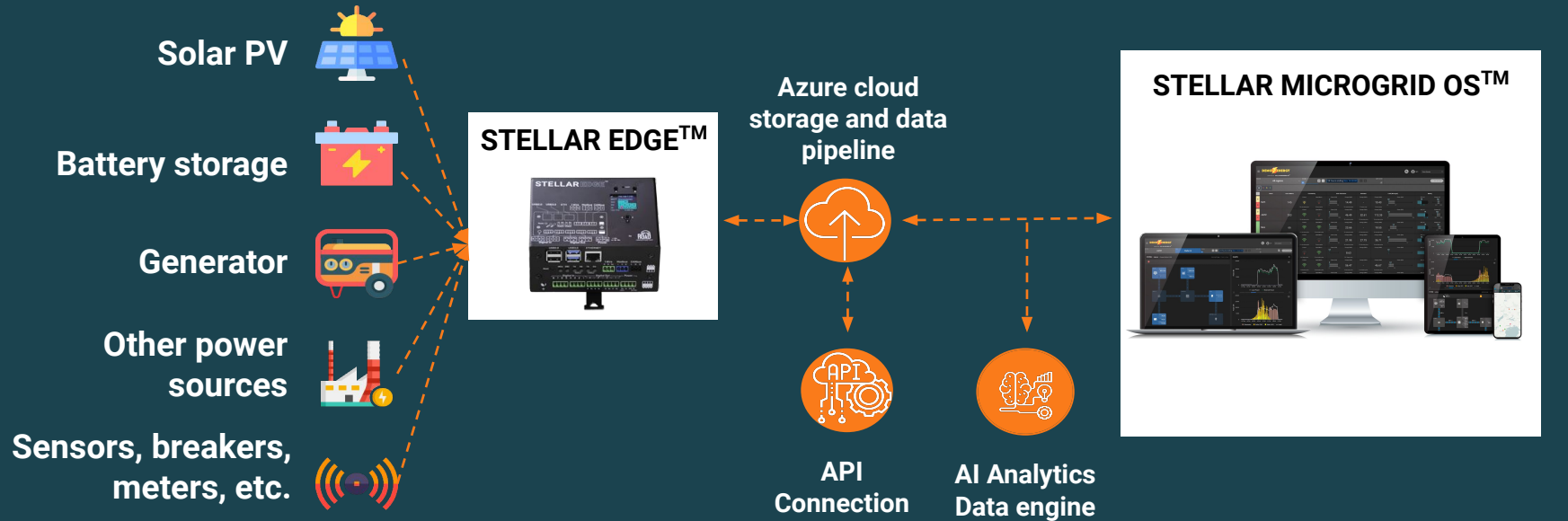
- Call for renewable power
- Climate related grid outages

## Applied Innovation

- PV and battery costs
- IoT integration
- Cloud computing

# IoT, Cloud Computing and AI - Microgrid Management Solution

Technology agnostic remote monitoring, control, and optimization



Portfolio Management



Site Level View



Analytics and Reporting



Automated Alerts



Incident Management







# Renewable Energy Microgrids to the Rescue

1. **Community water** - to pump well water when utility power is down
2. **Remote energy access** - power where the grid doesn't reach
3. **Local** - no transmission lines, reduce costs and wildfires
4. **Resilient energy** - on-grid or off-grid
5. **Flexible** - reliable power in an overloaded infrastructure
6. **Energy Sovereignty** - clean power and internet for indigenous communities

# 1. Resilient Communities



## Puerto Rico - 3 towns

Added batteries, controllers and internet to ensure reliable water pumping - on-grid/off-grid

- Partnered with Microsoft Airband, Blue Planet, Por los Nuestros, Red Verde
- Reliable power + internet



## 2. Remote Access



### East Africa > 120 microgrids

Solar, battery storage and  
back-up generators

- On-grid, off-grid and intermittent grid
- Fleet management



### 3. Reduce Costs and Wildfires



#### Briceburg, CA near Yosemite

Solar (36 kW), battery storage (69 kWh) and two backup propane generators - off-grid

- 90% renewable power, zero down-time.
- 4 systems currently managed by Stellar



## 4. Energy Resilience



### Sagehen Tahoe National Forest

Solar (20 kW), battery storage (68 kWh) and a backup propane generator (35 kW) - ongrid and off grid

- Avoided over \$2 million in capital and maintenance costs



# 5. Flexible Power



## Pallet Shelter San Jose, CA

2 off-grid PV + storage + propane generator microgrids for 25 casitas in the heart of San Jose

- Projected interconnection costs were > \$500k.



# 6. Energy Sovereignty



## Women-led Digital Community Centers Guatemalan Highlands

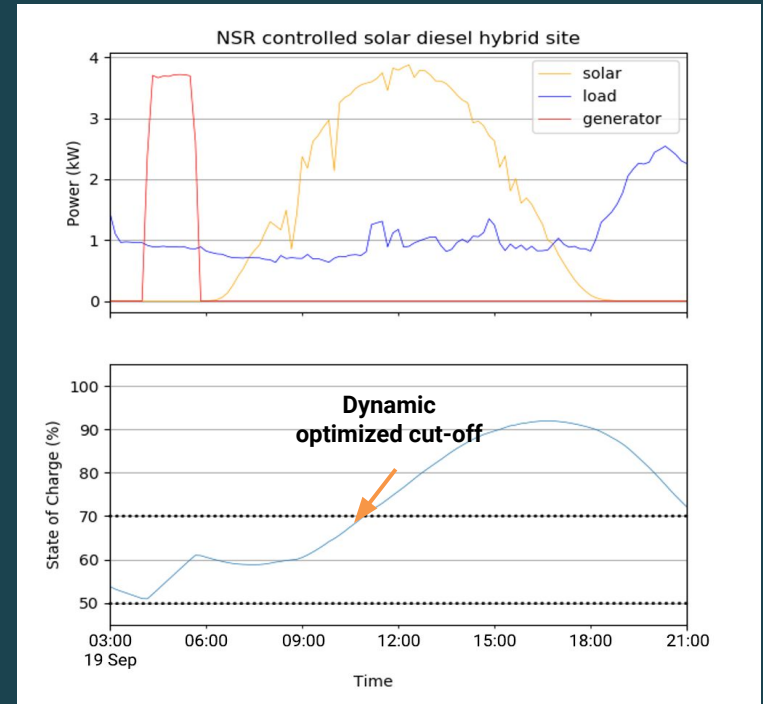
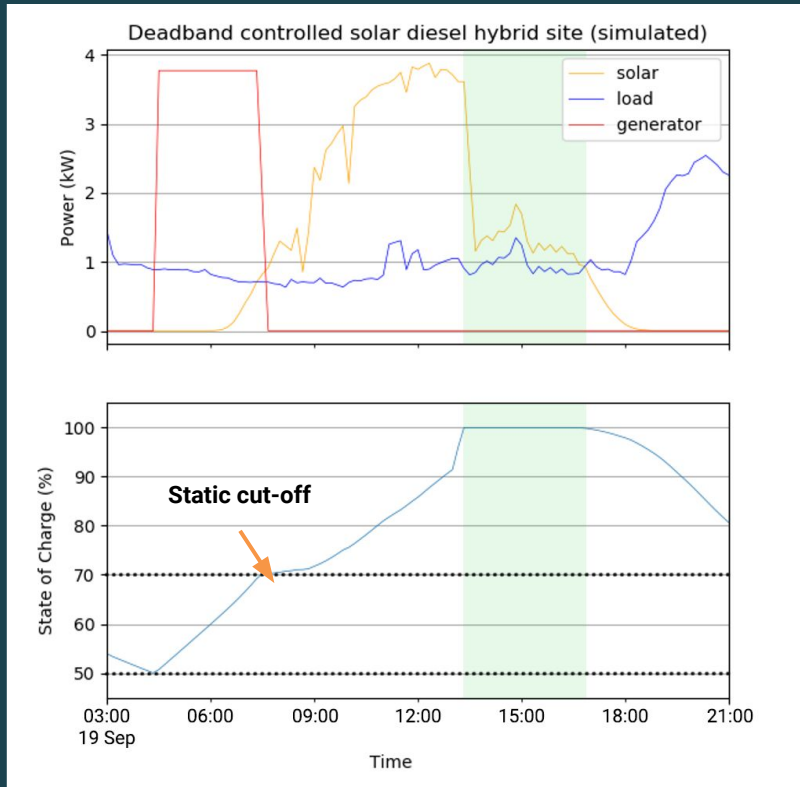
20 off-grid 3 kW solar powered community centers with internet and load management

- Digital skills training
- Services



# AI Optimization Maximizes Solar Power Usage

## Four month study on three hybrid microgrids using Stellar



- Increased solar power usage by > 10%
- Improved battery and generator lifetime



# Solar Power is the Heart of a Clean Energy Future And Microgrids Deliver the Solution



- Highly reliable
- Low maintenance
- Local
- Flexible
- Cost effective
- Scaling from a PV infrastructure
  - Financing
  - Project planning
  - Grid services



*Digital Community Center installed by New Sun Road in San Antonio IV, Alta Verapaz, Guatemala*



MICROGRID FLEET MANAGEMENT

THANK YOU!



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