Building the Foundation for Energy Resilient Communities:

Clean Energy Group's Resilient Power Funding Programs' 2022 Impact

November 14, 2023

Webinar Logistics

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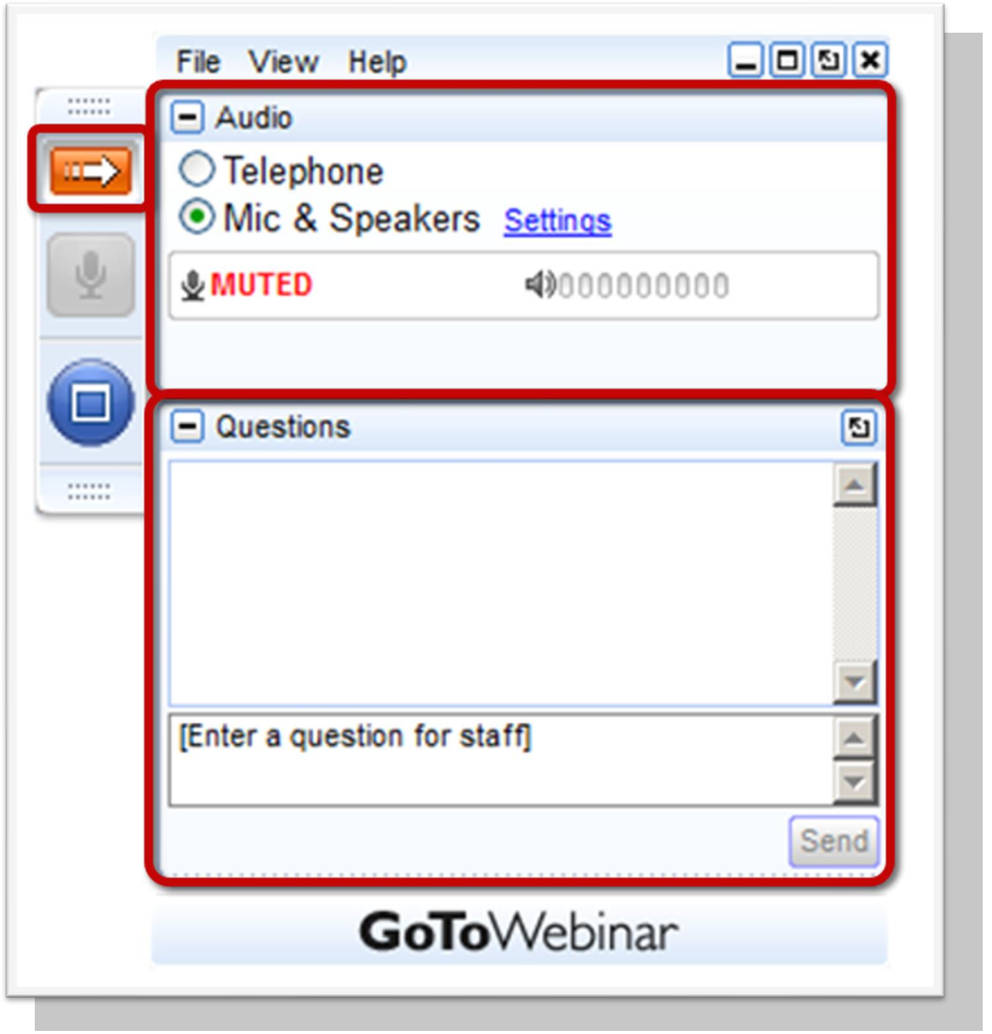

Clean Energy Group

Affordable, reliable, clean energy for all.

Climate Resilience and Community Health

Distributed Energy Access and Equity

Energy Storage and Flexible Demand

Fossil Fuel Replacement

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Resilient Power Project

Building the foundation for energy resilient communities.

USDN urban sustainability directors network

footprintproject.org™

AMERICAN MICROGRID SOLUTIONS

ELEVATE

GEMINI ENERGY SOLUTIONS

Rooftop solar installation in Dorchester, MA. Credit: Resonant Energy

www.resilient-power.org

Webinar Speakers

Building the Foundation for Energy Resilient Communities:
Clean Energy Group's Resilient Power Funding Programs' 2022 Impact

Tinice Williams
Executive Director, Feed the Second Line

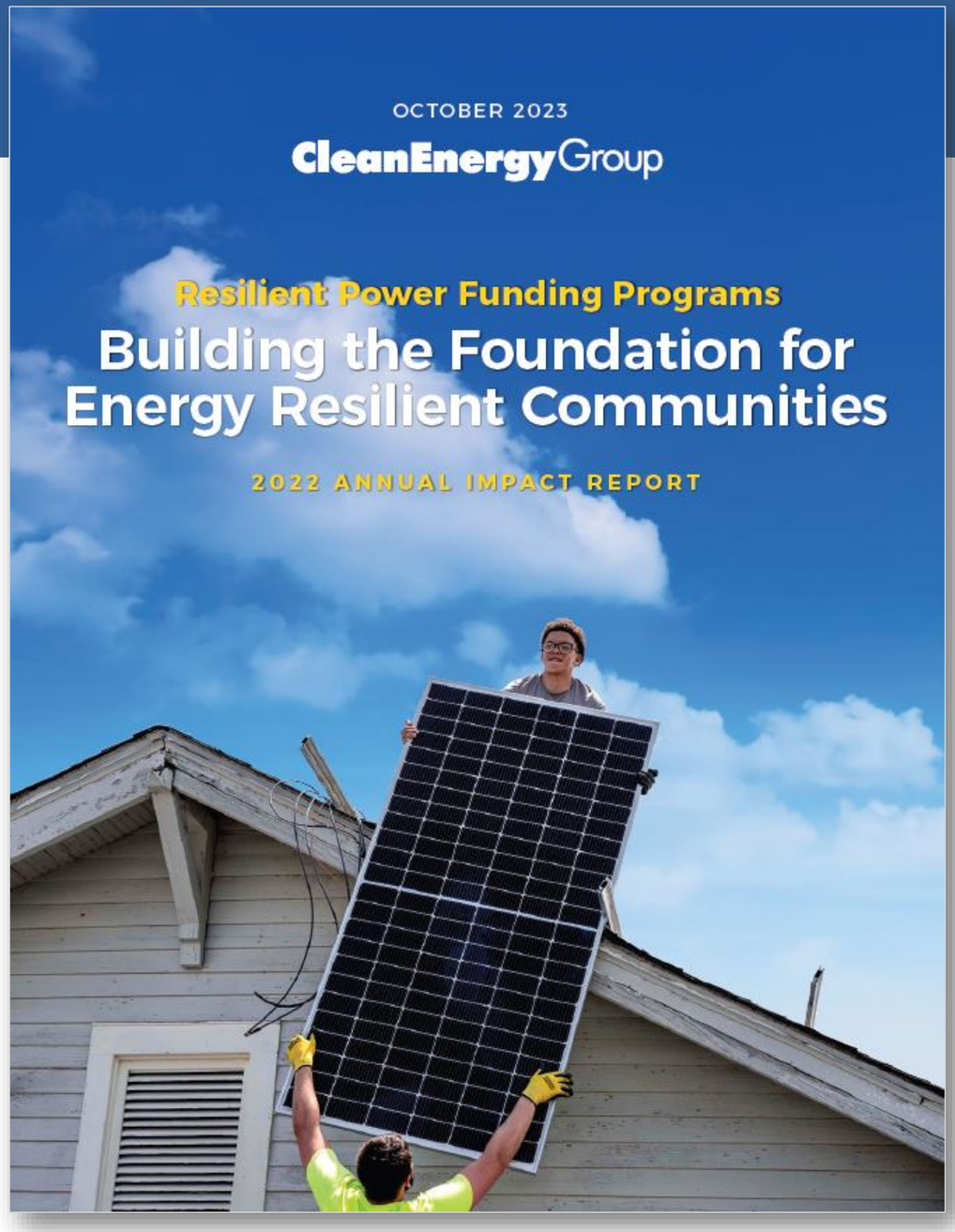
Amit Munshi
President and CEO, JPHB

Anthony Nicholson
Lead Scientist, JPHB

Craig Lewis
Executive Director, Clean Coalition

Anna Adamsson
Project Manager, Clean Energy Group

Abbe Ramanan
Project Director, Clean Energy Group



CleanEnergyGroup

Technical Assistance Fund and Resilient Power Leadership Initiative 2022 Impact Report

Anna Adamsson
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Abbe Ramanan
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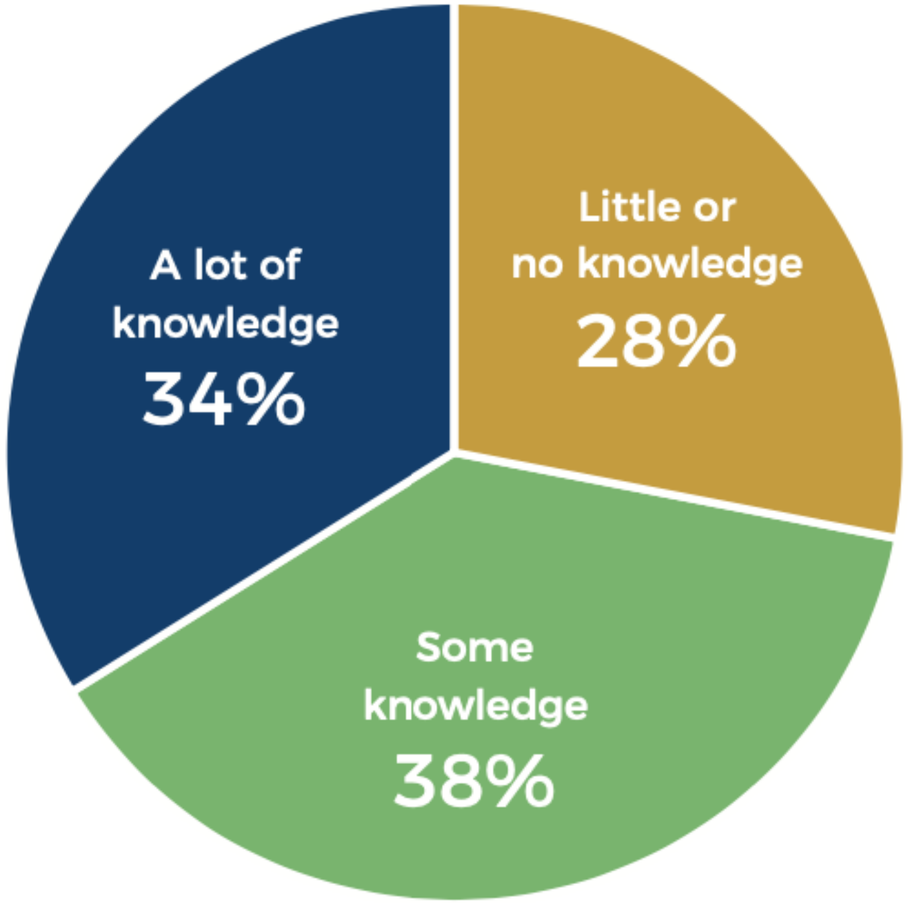
Read the report here:

www.cleanegroup.org/publication/2022-annual-impact-report

Technical Assistance Fund (TAF)

- Created in 2014 to fill a critical resource gap for community-serving institutions seeking to develop solar+storage
- Provides dedicated one-on-one support, plus targeted funding, to help organizations assess and understand their resilient power needs
- All projects must serve underrepresented communities; 50% of funding is reserved for BIPOC-led organizations
- Low-barrier to entry: applicants are not required to have extensive knowledge of solar+storage

Level of Existing Knowledge on Solar and Storage Technologies



Credit: CEG/David Gerratt

www.cleanegroup.org/initiatives/technical-assistance-fund

Resilient Power Leadership Initiative (RPLI)

- Created in 2017 to seed long-term, community-led programs advancing energy equity and environmental justice.
- Provides funding and capacity building to organizations to develop local resilient power awareness, training programs, and solar+storage implementation strategies.
- Since 2020, 100% of funds have gone towards BIPOC-led organizations.

Community Resiliency Hub opening. Credit: Queen Shabazz, UPAL

www.cleanegroup.org/initiatives/resilient-power-leadership-initiative

Resilient Power Project Impact: 2013 - 2022

$1.3 million in Grants Awarded

Over 100 Community Service Partners

255 Community Facilities

Resilient Power Project Impact: 2013 - 2022

$1.3 million in Grants Awarded

$200,000 Awarded in 2022

Over 100 Community Service Partners

Supported 23 communities across 11 states and Native Nations

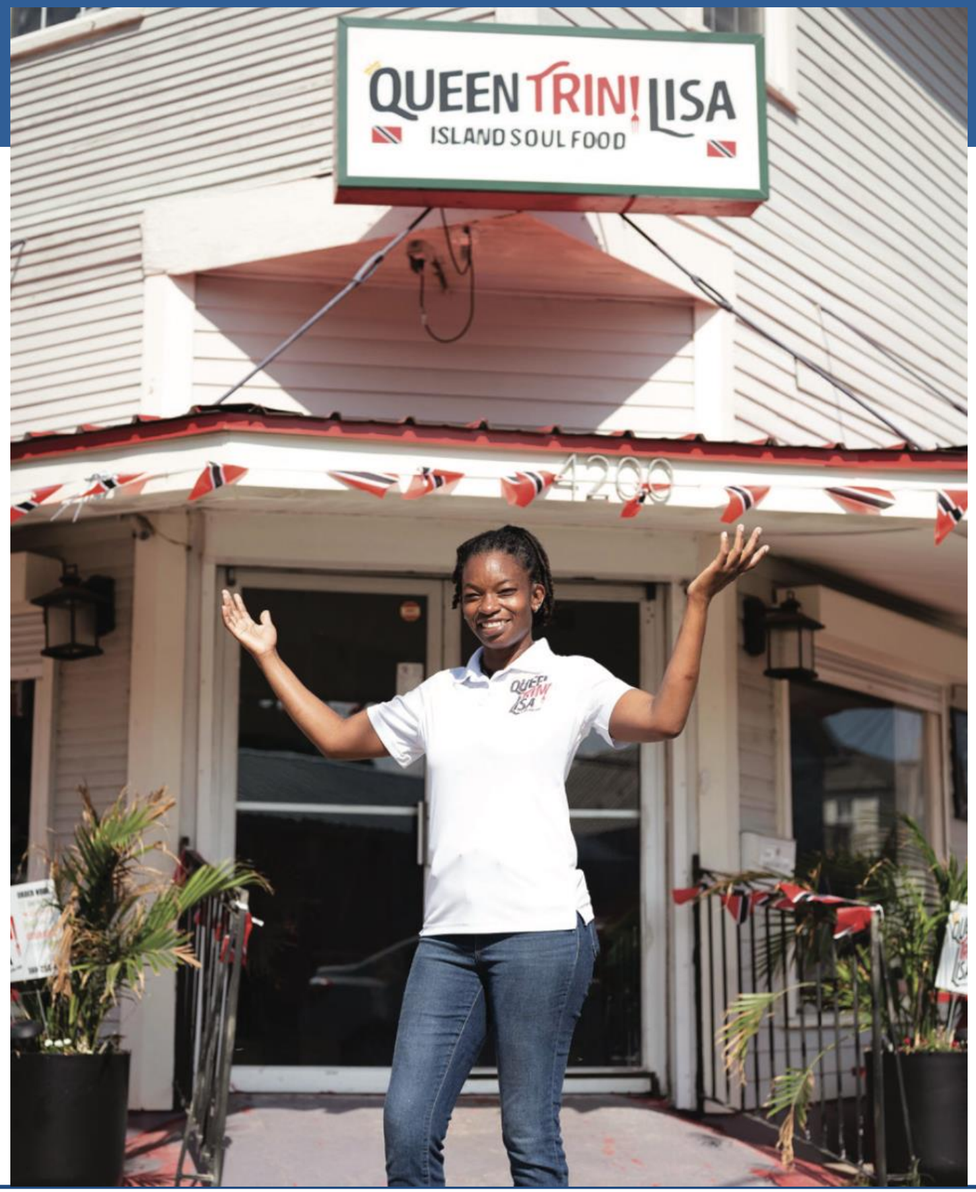
255 Community Facilities

Resilient Power Project Impact: 2022

www.cleanegroup.org

6 completed projects in 2022

- Vieques Community Microgrid (PR)
- Community Solar Resilience Hub (VA)
- Gleason YMCA (MA)
- Finch Cambridge affordable housing (MA)
- SOMA Studio and Family Apartments (CA)
- Union Square Apartments (MA)



Feed the Second Line Get Lit Stay Lit. Source: Katie Sikora

2022 Solar+Storage Trends

Mobile Solar+Storage

- Mobile solar+storage typically entails solar panels and a battery installed on a trailer or other vehicle, allowing the system to charge.
- **Gentilly Beehive Microgrid Project:** Microgrid charges mobile battery units that can be dispatched during emergencies. Solar trailers can be connected to microgrid or dispatched.
  - **Partners:** Footprint Project, Groundwork New Orleans, NET Gentilly Charter School
- **DignityMoves Project**: Solar+storage systems for temporary housing structures, designed for easy relocation every 3-5 years.
  - **Partners:** DignityMoves, Clean Coalition

Installing a solar panel "wing" on a solar trailer. Credit: Footprint Project.

Resilient Power for Public Health

- Solar+storage used to power emergency response systems as well as meet the needs of medically vulnerable individuals.
- Resilient power can be especially beneficial in affordable housing communities serving seniors and/or people living with disabilities.
- **Navajo Nation Project**: Solar+storage systems for two single-family homes with medically vulnerable residents living off-grid.
  - **Partners:** JPHB Solutions, Navajo Nation Mountain Chapter

TAF engineering partners with Navajo Nation residents, installing solar+storage on their home. Credit: JPHB Solutions

New and Continuing Partnerships

TAF Engineers

- CEG is committed to awarding at least 50% of TAF funds to BIPOC-led organizations. We have yet to meet that goal, but 2022 saw the highest percentage awarded yet (43%).
- One avenue we have identified for reaching communities we have not in the past is working with broader network of engineers.
- Engineers conduct the techno-economic solar+storage feasibility assessments that are part of the TAF and are invaluable partners in our work.
- **New Partners in 2022:** Gemini Energy Solutions, Clean Coalition

TAF Engineering Partners:

AMERICAN MICROGRID SOLUTIONS

Clean Coalition

CONVERGE STRATEGIES

CSW ENERGY

ELEVATE

footprintproject.org

GEMINI ENERGY SOLUTIONS

JPHB

muGrid Analytics

NEW ECOLOGY
Community-Based Sustainable Development

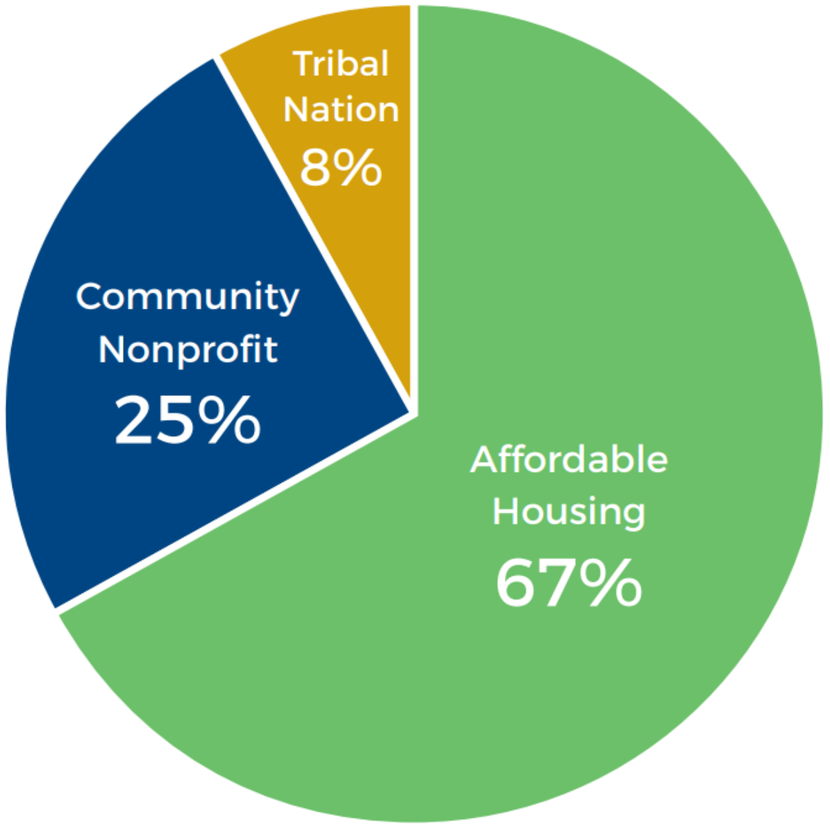
SÄZÄN GROUP

New and Continuing Partnerships

Expanding Affordable Housing Work

- Affordable housing has historically received at least 50% of TAF awards.
- Affordable housing received 67% of TAF awards in 2022.
- One driver: CEG launched our partnership with the Connecticut Green Bank.
- This has been expanded through a grant from the Robert Wood Johnson Foundation to provide health-focused solar+storage assessments for affordable housing providers serving medically vulnerable residents.

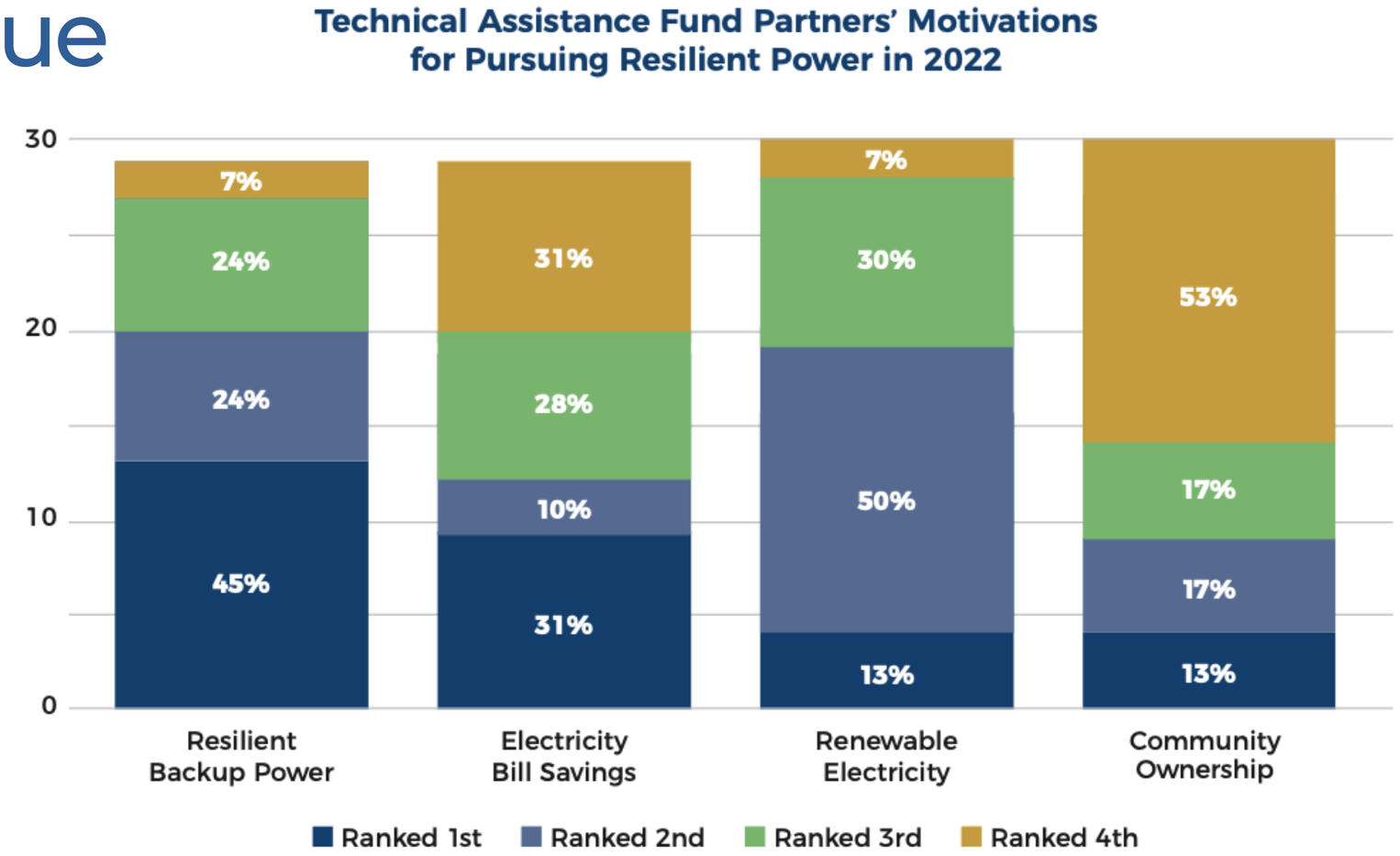
TAF Awards by Sector, 2022



Credit: CEG/David Gerratt

Why projects pursue solar+storage

- Almost half of TAF applicants cite 'resilient backup power' as their primary reason for exploring solar+storage
- Four TAF applicants cited 'community ownership' of electrical resources as a primary motivator



Credit: CEG/David Gerratt

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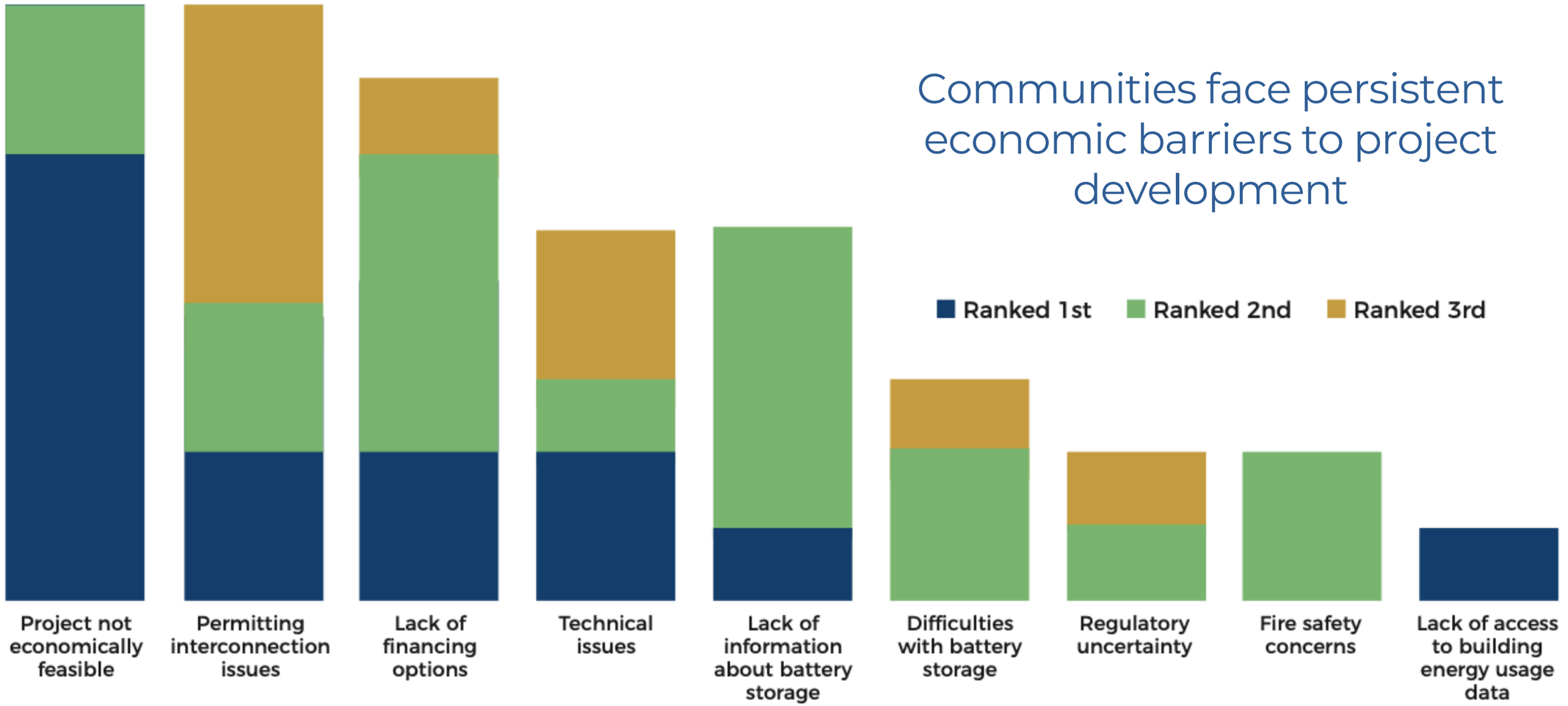
Top Three Barriers to Solar+Storage Project Development

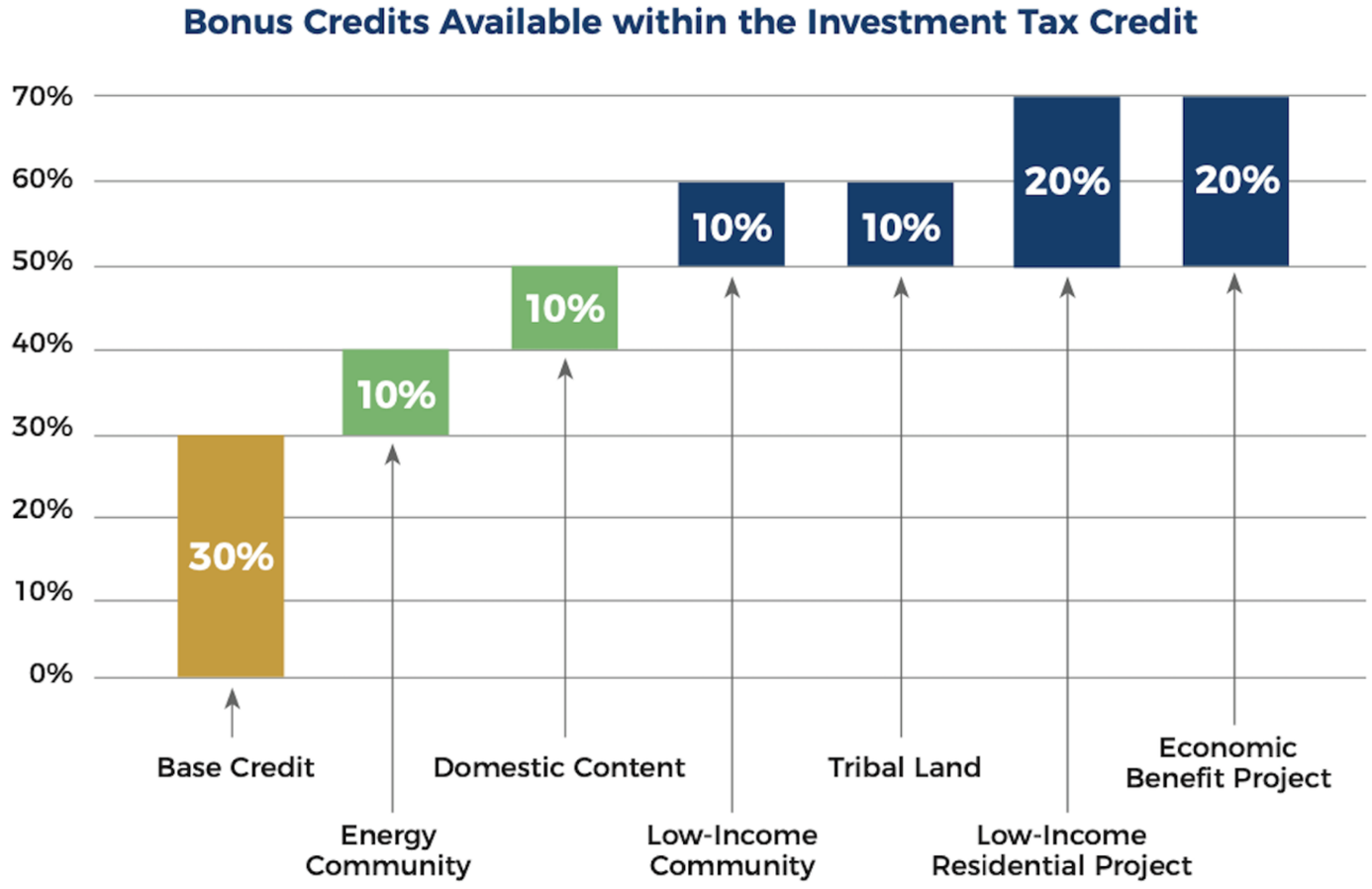


Communities face persistent economic barriers to project development

Credit: CEG/David Gerratt

Investment Tax Credit Improves Economics

- Solar+storage projects can receive back at least 30 percent and up to 70 percent of eligible project costs
- Of all TAF awardees over the past decade, over 60 percent could be eligible for either the energy community bonus credit and/or the low-income community bonus credit

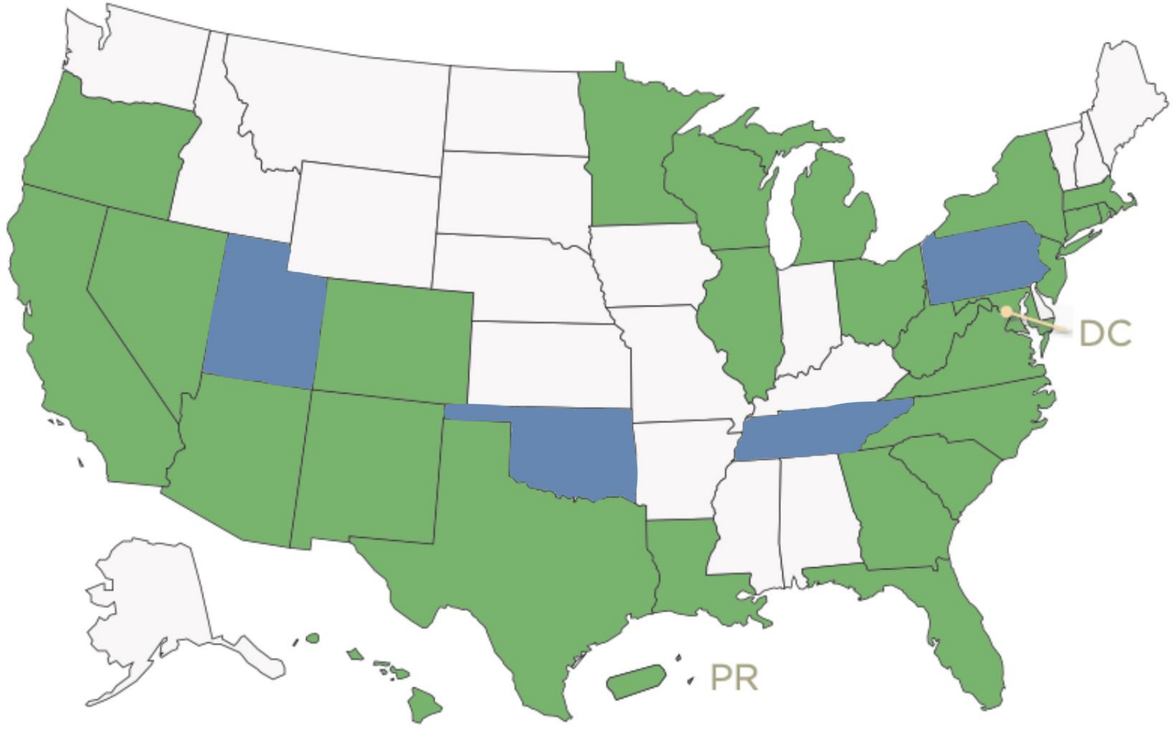


Credit: CEG/David Gerratt

2022 Impacts and Looking Forward

- 2022 projects have the potential to serve over 20,000 community members and 3,000 affordable housing residents

Subscribe to the Clean Energy Group newsletter to hear from our 2023 awardees and be first to know about 2023's year-in review impact report and trends analysis.



As of 2023, the TAF supported projects in **30 states**

Thank You!

Newsletters: cleanegroup.org/newsletters

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GET LIT STAY LIT

NEIGHBORHOOD RESTAURANTS AS HURRICANE RESILIENCY HUBS USING SOLAR + BATTERIES

Feed the SECOND LINE

AMERICAN MADE CHALLENGES

U.S. DEPARTMENT OF ENERGY

Feed the SECOND LINE

Our Mission:

- Building a stronger safety-net
- Job creation
- Healthy culture

For the culture creators of New Orleans

Feed the SECOND LINE

August 2021

We launched

....

GET LIT STAY LIT

The Aftermath of Hurricane IDA

The Governor called Ida the "strongest storm to hit Louisiana since 1856....."

The Aftermath of Hurricane IDA

the electrical grid was completely knocked out - and many neighborhoods were without power for 10 days...

In sweltering summer heat....

EMPOWERING NEIGHBORHOOD RESTAURANTS TO HELP THEIR COMMUNITY AFTER A HURRICANE

PROBLEM

AFTER A STORM

After a hurricane, the power is out. Citizens who did not evacuate are left to fend for themselves. Elders can die from heat and people go hungry.

WHAT PEOPLE NEED

The week after a hurricane citizens' top needs include:

- prepared meals, water
- Cellphone charging
- Cooling center
- neighborhood based-hubs

SOLUTION

STAY LIT

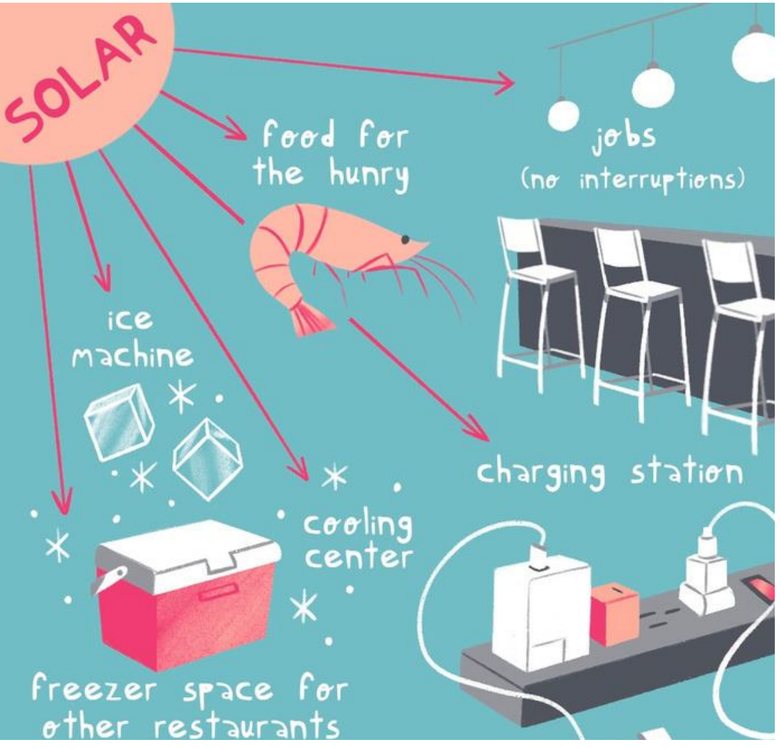
Outfitting neighborhood restaurants with solar panels and storage — transforms the local restaurant into a resilience hub for the immediate neighborhood.

RESILIENT RESTAURANTS

With solar & our partnership agreements, restaurants become cooling centers, food production centers (food is saved from waste) and cellphone charging stations.

Furthermore, restaurants save money on monthly bills, creating future, ever-green funding.

The Impact:



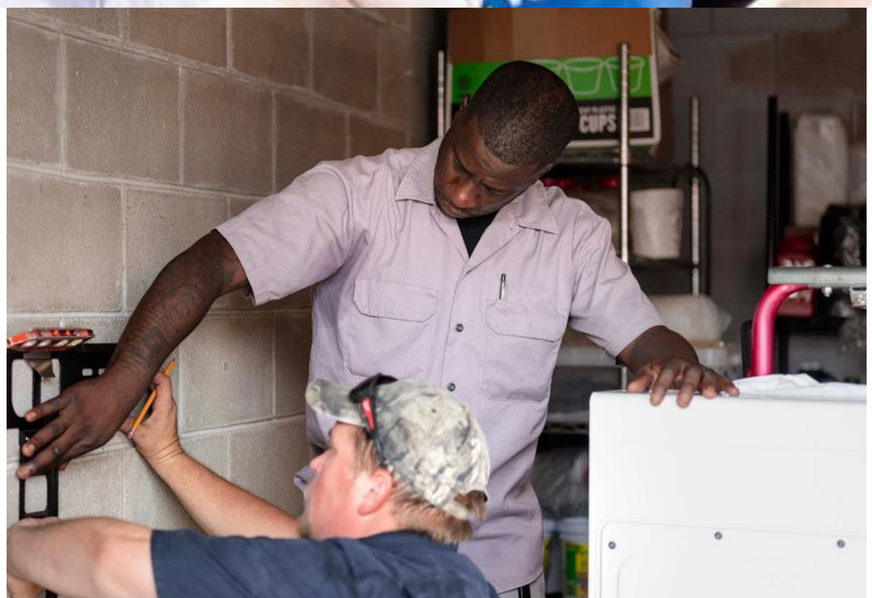
COMMUNITY

- engaged community networks by building micro-grids in three low-income neighborhoods, ensuring that vulnerable residents have access to essential needs after a storm
- established a sustainable and scalable program model
- Job training opportunities for
- solar Hired Staff from the Communities We Serve

RESTAURANT

- Reopen quickly
- Fewer job interruptions
- Energy savings able to support their community in time of need/becoming first responders

if we partner with cultural groups... we can hopefully create a job-training pipeline for our city....



JOBS FOR THE CULTURE

LOCAL PARTNERS

SOLAR ALTERNATIVES

Louisiana GREEN CORPS

GLASS HALF FULL NOLA


every neighborhood needs a micro-grid for the next hurricane....
What if neighborhood restaurants were the solution?

The Goal:

300

STAY LIT RESTAURANTS

=

A PATHWAY TO SELF-GENERATED EVERGREEN FUNDING +

JOB TRAINING

We have 4 completed-
296 more to go :)

LESS THAN A YEAR AFTER HURRICANE IDA, WE INSTALLED OUR FIRST STAY LIT:

QUEEN TRINI LISA IN MID-CITY

> This can be a little hub of support, and that's what I want to provide.

OUR Second STAY LIT:

AFRODISIAC NOLA-GENTILLY

> My wife and I have both experienced feeling helpless after a storm. Now we can make sure that our neighbors.

OUR Third STAY LIT:

FRITAI-TREME

> With "Get Lit, Stay Lit, I have the ausuurance of knowing that my people and my product will be safe during a storm or outage.
>
> Perishables stay cold, phones stay charged, and we can feed folks no matter the season without the impact of whats going on outside.

OUR Fourth STAY LIT:

GRACE AT THE GREEN LIGHT- UPTOWN

Resilient Power Community Leadership Initiative

- **Restaurant Recruitment**
- **Field Experience**
- **Hire a Grant Writing Team**

CleanEnergyGroup

Devastating power outages are a fact of life in Louisiana.

Restaurants can become the community's first responders.

LET'S EMPOWER THEM AS MICRO-GRIDS IN FUTURE HURRICANES

GETLIT STAY LIT

www.feedthesecondline.org

Energy Resiliency for Navajo Families

November 14, 2023

Dr. Amit H. Munshi
Dr. Anthony P. Nicholson

Proud member of -

National Small Business Association
Leadership Council Member

US-MAC
Manufacturing of Advanced Cadmium Telluride

https://www.usa-cdte.org/

Our Core Team

Dr. Amit H. Munshi
Technology Development, Project Management, Procurement, Corporate Outreach, and Resource Management.

12 years experience in solar technology development, project planning and execution.

Anthony Nicholson
Development and Technology Assessment/ Computational Modeling Lead

Atomistic modeling, CFD and FEA simulations, Solar+Storage integration

William Nichols
Finance and IT Security Lead

Financial Modeling and Analysis lead, Information Technology Security

Kevan Cameron
Chief Engineering and Plant Manager. Vacuum systems and thin film technology expert.

Three decades of high-tech equipment engineering, thin film PV fabrication, and vacuum systems. Navy veteran with 10 years managing the Space Simulation Laboratory at Lockheed Martin Corporation.

Top technical talent from First Solar and Toledo Solar now starting JPHB

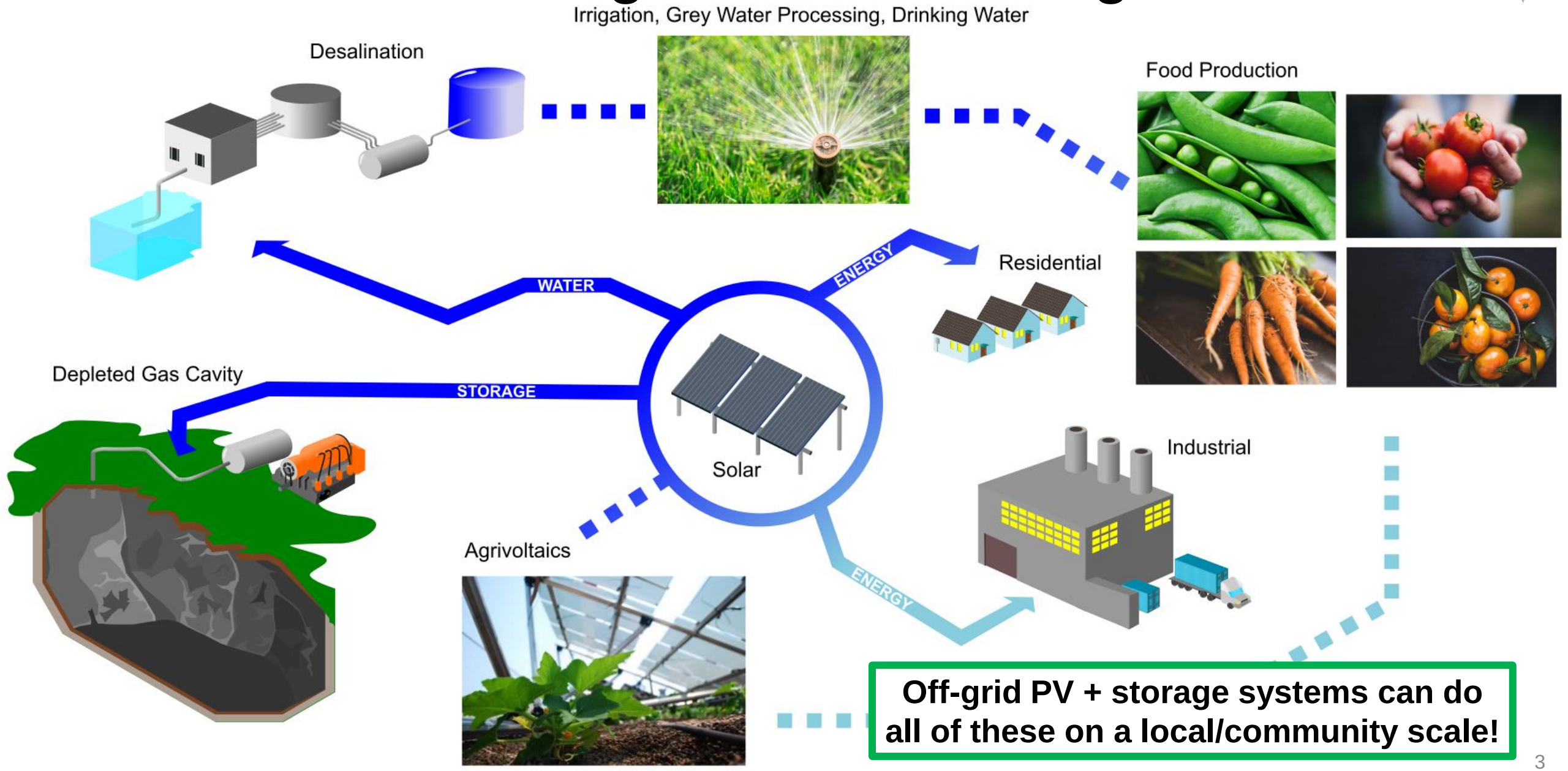
Advisory Board -

Prof. W.S. Sampath
Solar cell technology expert
Technology development advisor

Jay Munshi
Columbia Business School alumnus
Risk analysis advisor

Doug Schatz
Founder, Advanced Energy
Business and Product Development

Advantages of PV + Storage



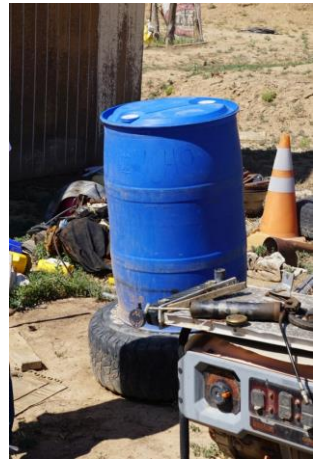
Off-grid PV + storage systems can do all of these on a local/community scale!

Potential Impacts by Off-Grid PV + Storage

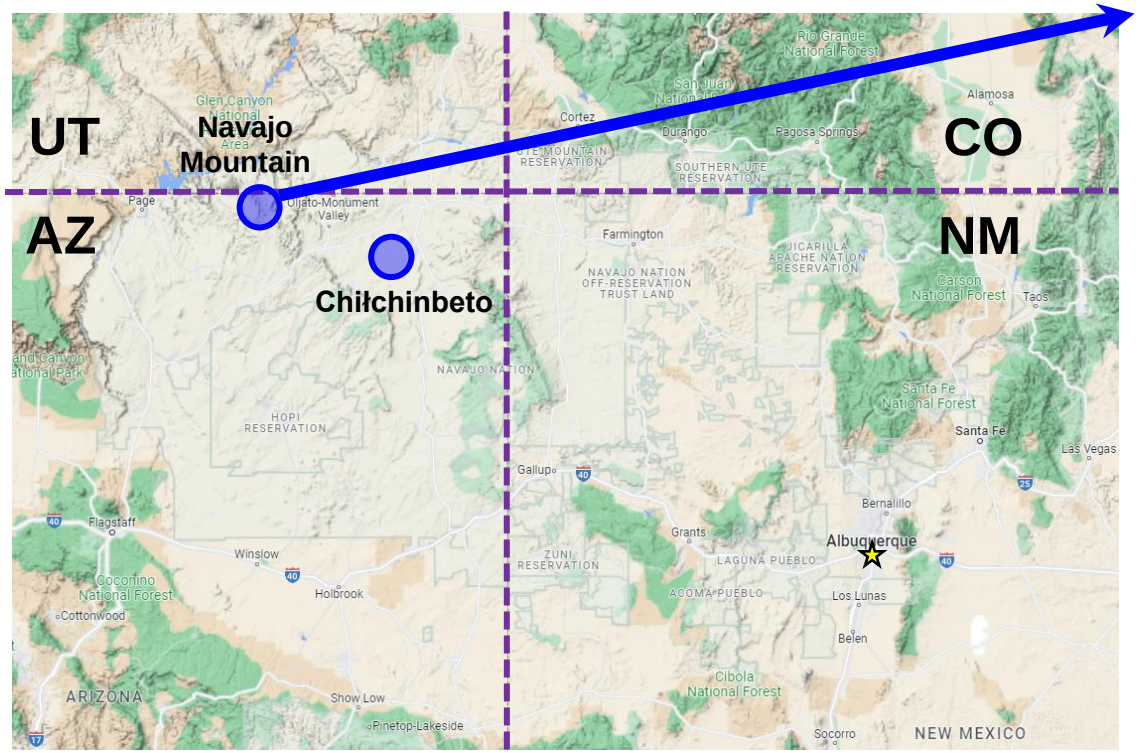
Self-Sustainable Energy

Workforce Development

Resource Accessibility



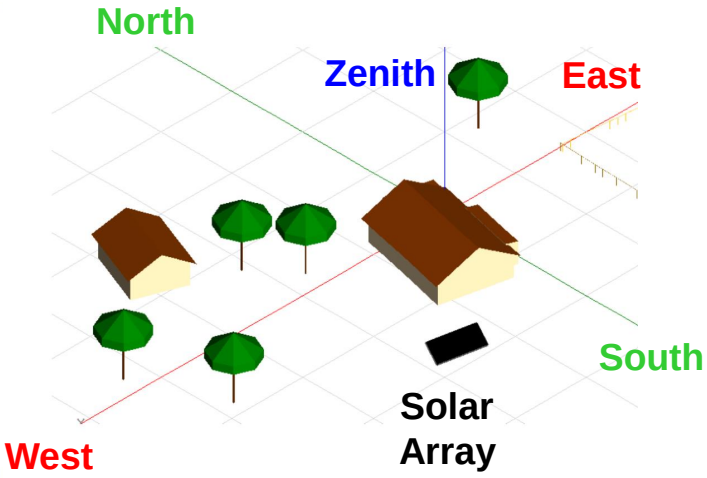
Assessments for Off-Grid PV + Storage Feasibility



Homestead Location

(Google Earth Satellite Image)

Simulated Scene



Estimated Consumer Energy Needs

Appliance	Number	Power per Appl. (W)	Usage (hr/day)	Energy (Wh/day)
Lamps (LED)	8	10	12	960
Computer/Mobile	1	75	7	525
Electric Cooker	2	1000	2	4000
Fridge/Freezer	1	250	24	6000
Fan	3	45	12	1620
Television (42")	1	120	3	360
	Total	**2660**	**Total**	**13465**

Objective: Identify the needs of each family homestead prior to implementing a solution

Assessments for Off-Grid PV + Storage Feasibility

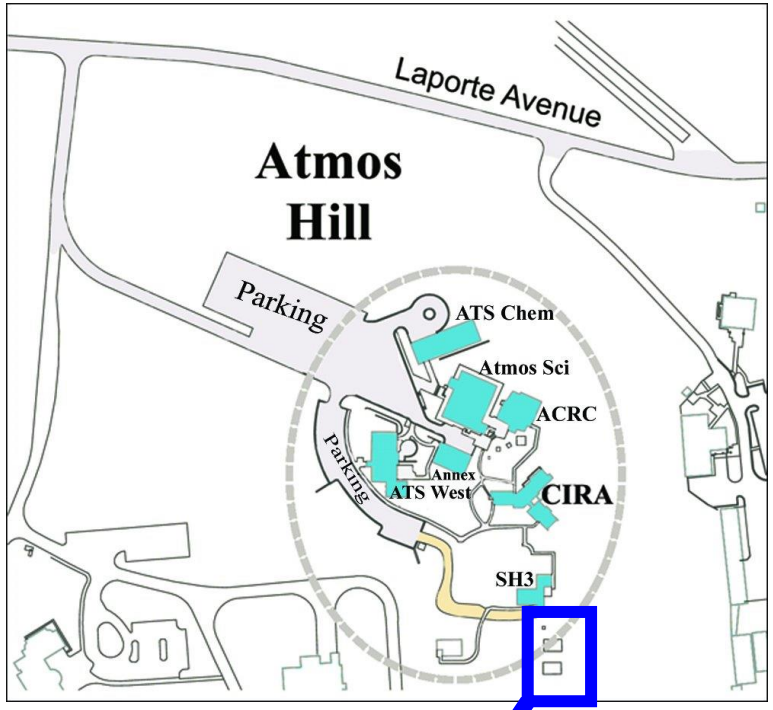
Donations for Expanding Homestead Locations

15 modules gifted by GRID Alternatives

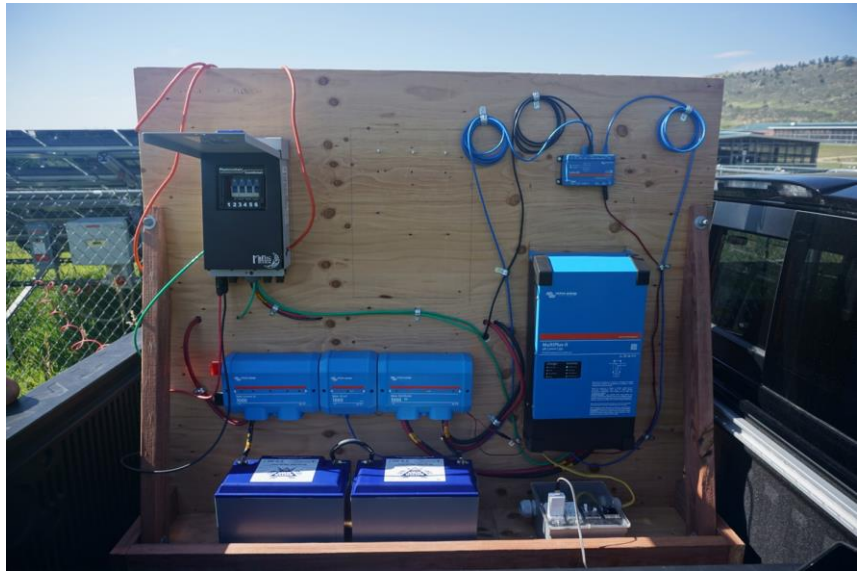
Approved donation by FSLR for 20+ modules

Potential for donation/discount on racking/mounting structures

Implementation of Off-Grid PV + Storage Prototype

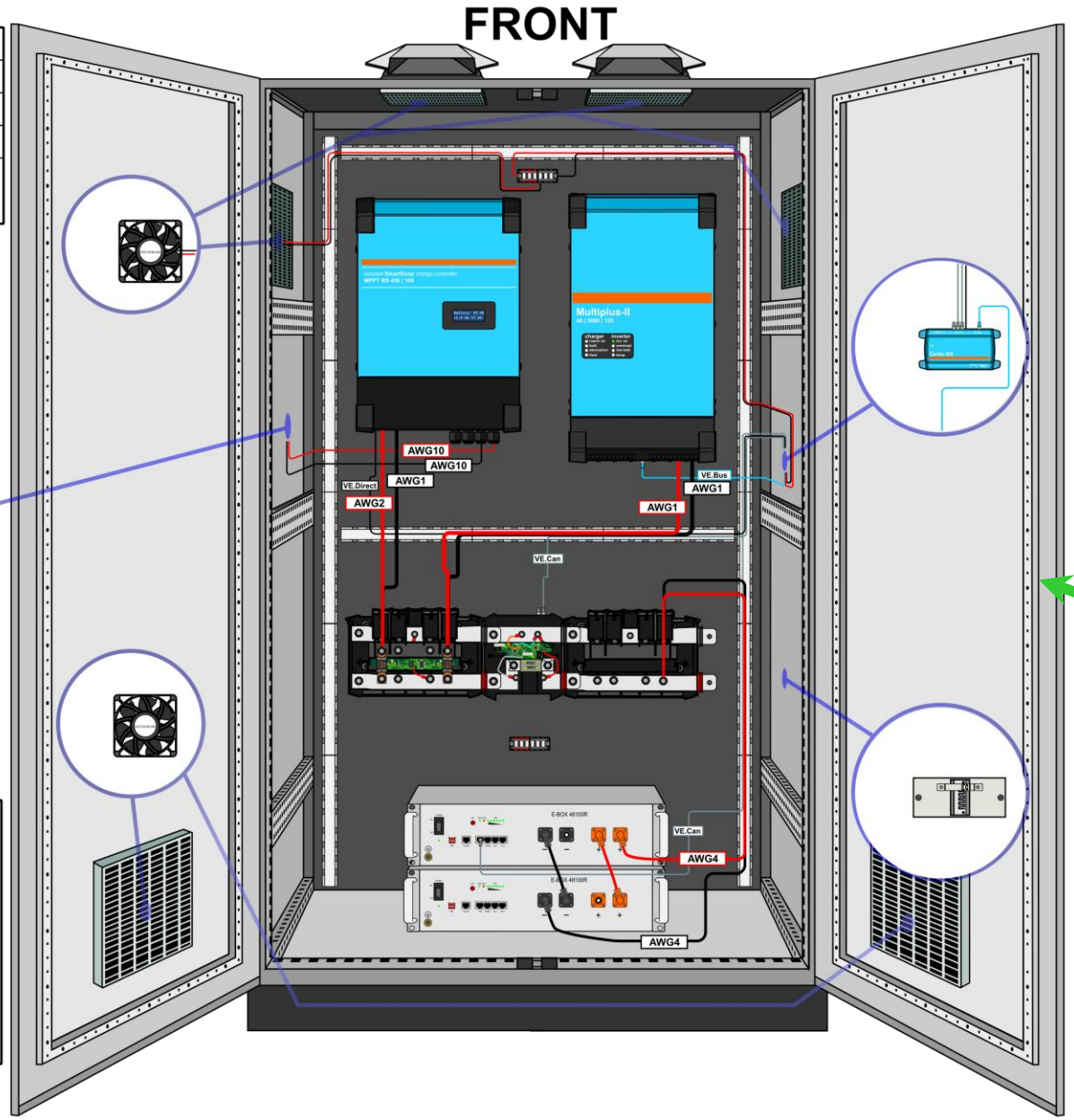


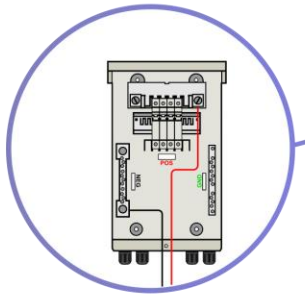
Implementation of Off-Grid PV + Storage Prototype

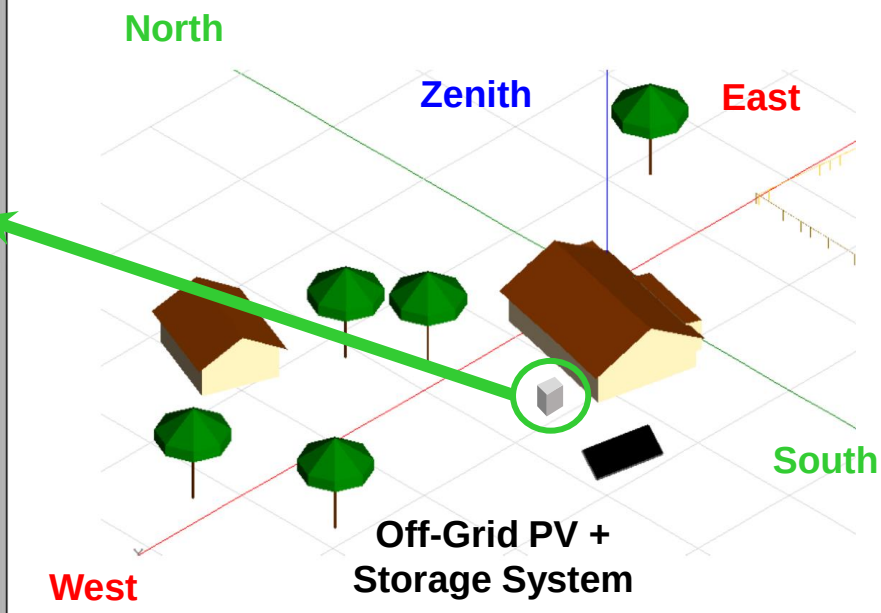


Final Design of Off-Grid PV + Storage System

Title: Outdoor Final Design (Wiring)	
Drawn By: APN	**Date:** 2023/09/07
Checked By:	**Units:** Millimeters
Scale: (approx.) 1 to 10	**DWG NO.** PV-01.14
Material: Powder-coated aluminum	







Notes:
- MPPT and M+2 require 4 in. clearance around top and bottom perimeters
- Conduit raceways not shown for clarity (three conductors max. for each)
- Wires and solar array not shown for clarity
- Pytes batteries set on server rack bars and connected in parallel only
- Metal cabinet contains vent caps on top to prevent water ingress while providing ventilation for 48V DC fans

Thank You! Questions?

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Interested in JPHB? Find more information at https://jphb.us/#/

This material is based upon work supported by the National Science Foundation MPS-Ascend Postdoctoral Research Fellowship under Grant No. 2138081.

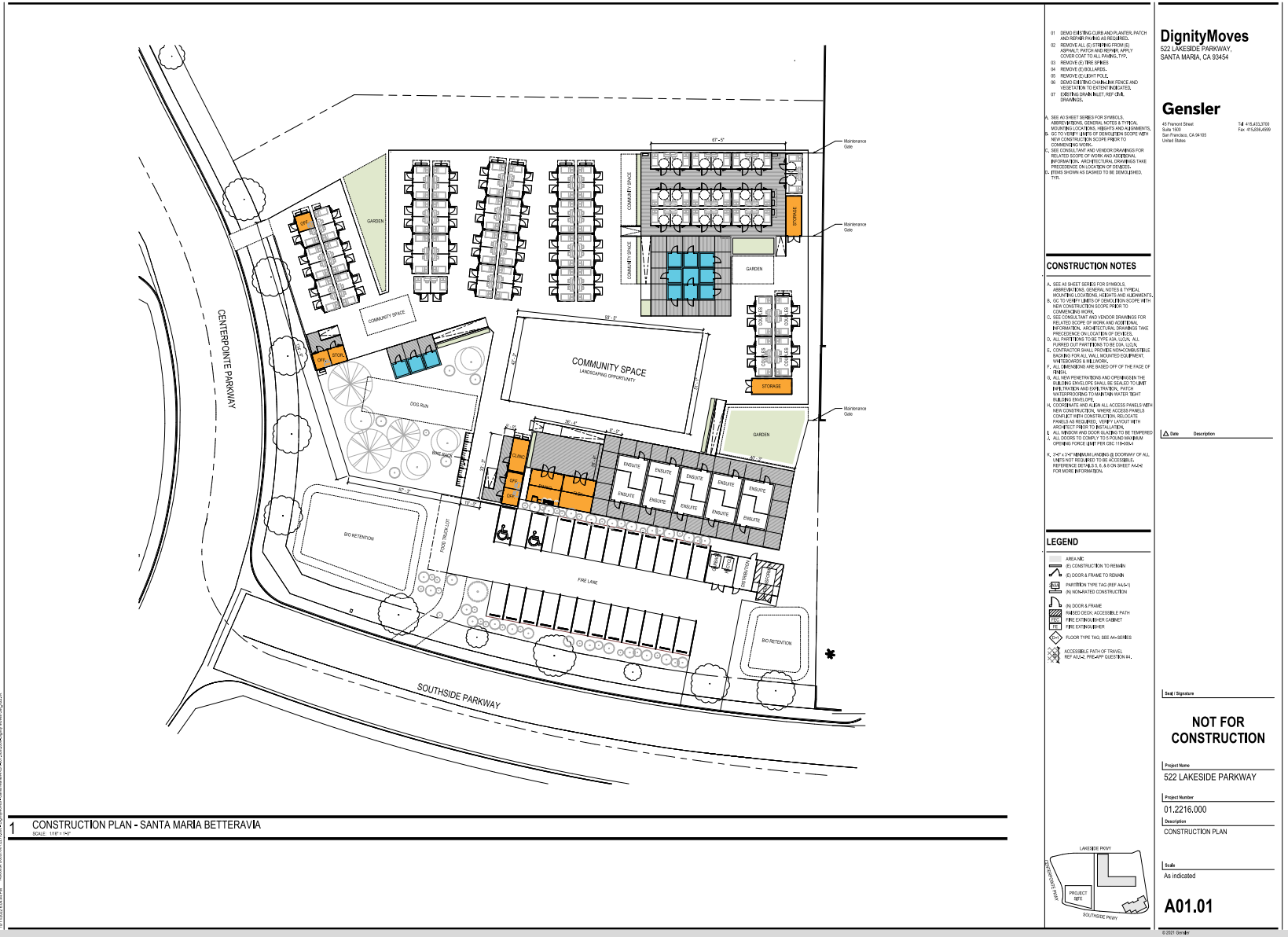
Clean Coalition

DignityMoves Santa Maria

Solar Microgrid Feasibility Study

Craig Lewis
Executive Director
650-796-2353 mobile
craig@clean-coalition.org

DignityMoves Santa Maria – site plan



1 CONSTRUCTION PLAN - SANTA MARIA BETTERAVIA
SCALE: 1/16" = 1'-0"

DignityMoves Santa Maria – example units

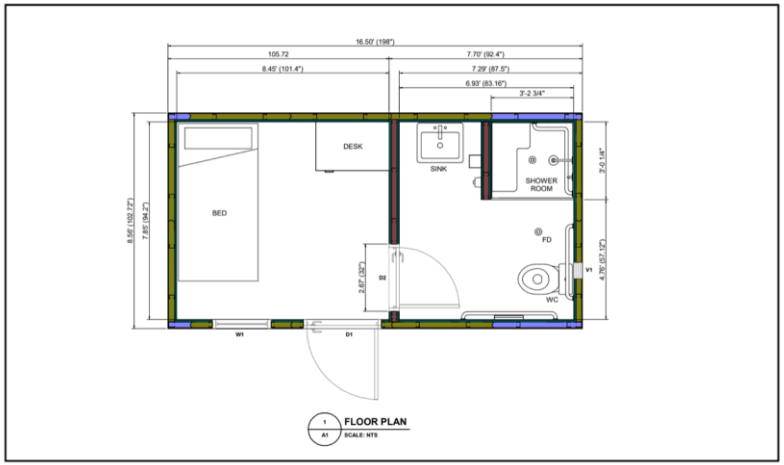
Temporary “pop-up” housing unit examples for the Santa Maria site.

BOSS CUBEZ

Cube144 - 8.5’ x 17’ Two Room
MODEL # BCULT08517GN000

BOSS CUBEZ TEMPORARY
SINGLES ADA EN SUITE

TECHNICAL SUPPLIES & SERVICES CO., LLC

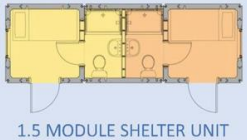


LIFEARK HOUSING TYPES

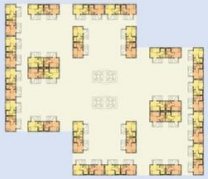
LIFEARK

1.5 MODULE 100 SF SHELTER FOR FAMILY

- 3 X 1 DOUBLE FAMILY SHELTER UNIT
- PRIVATE LOCKABLE BEDROOM UNIT
- PRIVATE BATHROOM
- LIGHTING AND POWER OUTLET
- AIR CONDITIONER/ HEATER
- FIRE SPRINKLER
- COMMUNITY CLUSTERING



1.5 MODULE SHELTER UNIT



48 UNIT COMMUNITY CLUSTER

Clean Coalition scope

Optimize the DER mix to achieve the following outcomes:

1. Serve all energy needs for a 100% electric community design until the electricity utility (PG&E) can establish service.
2. Achieve net zero energy.
3. Maintain Tier 1 (critical) loads during grid outages of any duration.
4. Support Tier 2 (priority) loads for the majority of time and Tier 3 (discretionary) loads for significant percentages of time.
5. Preempt the use of diesel and any other fossil fuels.
6. Standardize the Solar Microgrid components for ongoing use via Solar Microgrid kits for modular units.
7. Maximize economic benefits.

Solar Microgrid Methodology steps

Clean Coalition

Step 1

Load Profiles

- Baseline: recent annual loads.
- Master: adds future expected loads, e.g. EV charging.
- Critical: loads required to be maintained during outages.

Industry Tools:
- Clean Coalition: load analysis calculators.
- UtilityAPI: 15-minute load intervals.

Step 2

Resource Scenarios

- Optimal solar, storage, and other potential onsite resources.
- Sizing and combinations to achieve the required critical load and economic outcomes.

Industry Tools:
- Helioscope: solar siting.
- Energy Toolbase: resource sizing.

Step 3

Site Layouts

- Specific locations & sizing for solar, storage, and any other viable resources.
- Location of key electrical assets e.g. panels, etc.
- Energy usage profiles including load profiles.

Industry Tools:
- Clean Coalition: site layout tool.

Step 4

Economic Analysis

- Costs and financing options covering each viable resource scenario.
- Added resilience value.

Industry Tools:
- Energy Toolbase: economic analysis.
- Clean Coalition: resilience calculator (e.g. avoided diesel).

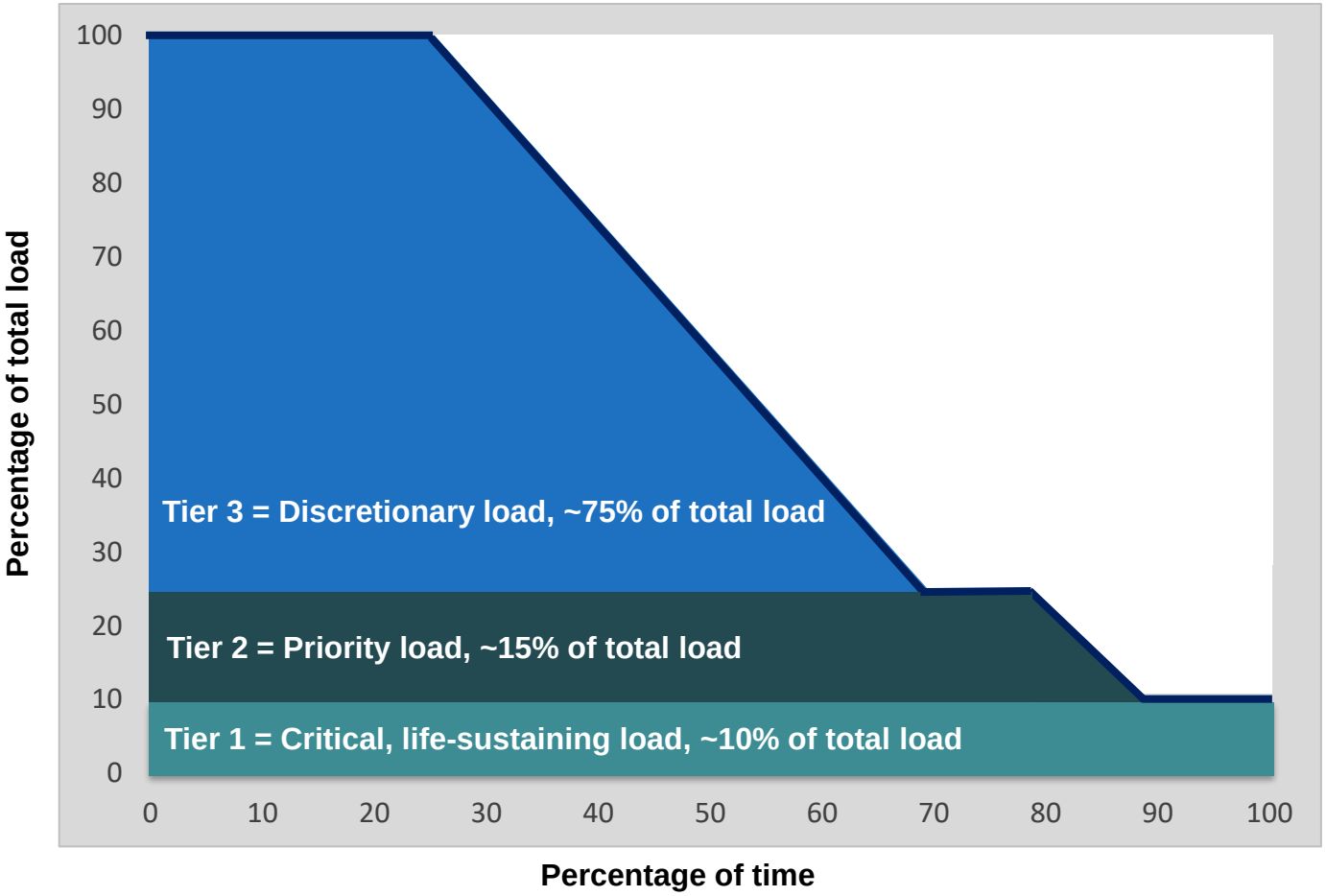
Step 5

Reporting & Recommendations

- Project Review Meetings.
- Reports and Presentations.
- Recommended options & next steps.

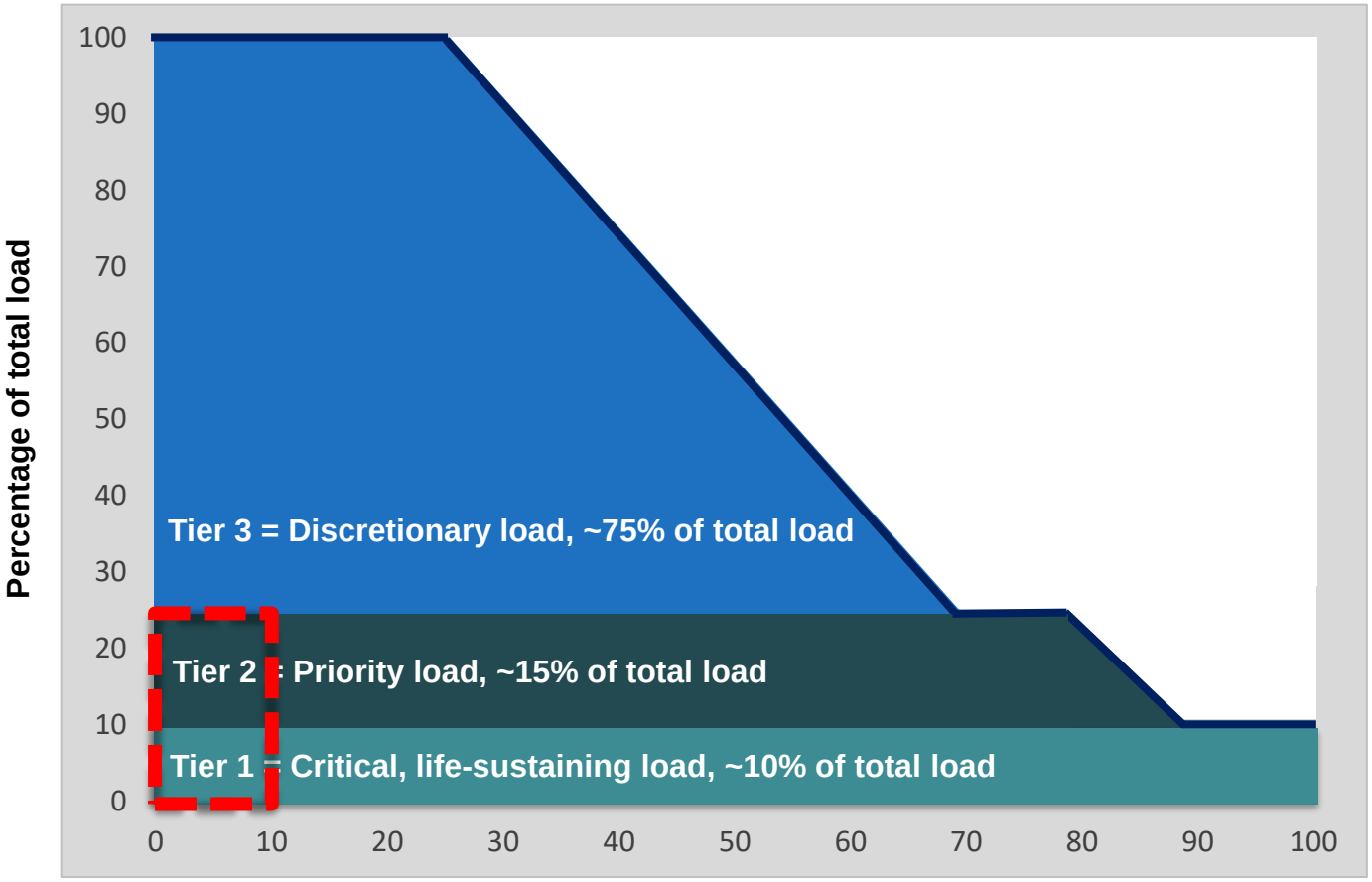
Load Profiles

Typical load tier resilience from Solar Microgrids



Percentage of time online for Tier 1, 2, and 3 loads for a Solar Microgrid designed for the University of California Santa Barbara (UCSB) with enough solar to achieve net zero and 200 kWh of energy storage per 100 kW solar.

Diesel generators are designed for limited resilience



A typical diesel generator is configured to maintain 25% of the normal load for two days. If diesel fuel cannot be resupplied within two days, these loads go off – hardly a solution for increasingly necessary long-term resilience. In California, Solar Microgrids provide a vastly superior trifecta of economic, environmental, and resilience benefits.

Load tiering based on plans & modifications

Clean Coalition

Electrical Panels and Loads				Watts (VA)	Percentage of Total Load	Percentage of T1 Load	Tier 1	Tier 2	Tier 3
MSB			Food SVC Module FS-1		29,952	5.25%		X		
			Food SVC Module FS-2		27,248	4.78%			X	
			Food SVC Module FS-3	Refrigerator Microwave (Prep -CTR RH) Microwave (Prep - CTR LH) Conven Outlet (Prep - LH) General LTS & Vent Fan Conven Outlet (Flex - Rear wall) Campus Lighting (exerior) Conven Outlet (exterior) Microwave (Prep - LH) Air Conditioning (x2) Conven Outlet (IT RM - LH wall) Conven Outlet (IT RM - Entry & RH) Conven Outlet (IT RM - Server LWR) Conven Outlet (IT RM - Server UPR) Conven Outlet (IT RM - Rear Wall) Microwave (Prep Area - RH)	12,272	2.15%	18.8%	X		
			Module Laundry		24,274	4.26%				X
			Storage - North		2,080	0.36%				X
			Community Bldg PNL		7,904	1.39%	12.1%	X		
			Module 24/TS-1L - Bathrooms		6,448	1.13%	9.9%	X		
			Module 24/TS-1R - Bathrooms		6,448	1.13%				
			Module Restroom		5,616	0.98%	8.6%	X		
	CDP1	Falcon PNL A	Intake/Security Lights		84	0.01%	0.1%	x		
			Exterior Lights		138	0.02%	0.2%	x		
			Intake Reception Room		360	0.06%	0.6%	x		
			Security Rec		360	0.06%	0.6%	X		
			Packaged Terminal Air Conditioner (PTAC)		2,304	0.40%			x	
		Falcon PNL B (North Support Services)	Offices/Staff Break Lights		147	0.03%				x
			Exterior Lights (3 brkrs)		345	0.06%	0.5%	x		
			Flex (multipurpose) Office Reception (3 brkrs)		2,160	0.38%				x
			Staff Break Reception		540	0.09%			x	
			Nurse Medical Reception		720	0.13%			x	
			Packaged Terminal Air Conditioner (PTAC)		9,216	1.62%				x
			Offices Lights		84	0.01%			x	
			Offices/Nurse/Medical Lights		147	0.03%	0.2%	x		
			IWH - 1 (2 units)		12,480	2.19%			X	
			Medical Fridge		1,200	0.21%	1.8%	x		
			Refrigerator		1,200	0.21%			X	
			Disposal		1,200	0.21%				x
			Coffee Maker		1,200	0.21%				x
			Microwave		1,200	0.21%			x	
		Falcon PNL C (South Support Services)	Offices/Meeting Lights		147	0.03%			x	
			Exterior Lights		483	0.08%	0.7%		x	
			Flex (multipurpose) Office Reception		2,160	0.38%				x
			Meeting Reception Room		1,440	0.25%				x
			Lounge Reception (Family room for managing families)		1,080	0.19%			x	
			Microwave		1,200	0.21%				x
			Coffee Maker		1,200	0.21%				x
			IWH-1		6,240	1.09%			X	
			Disposal		864	0.15%				x
			Office Lights		84	0.01%			x	
			Lounge /Offices/Meeting Lights		273	0.05%			x	
			Packaged Terminal Air Conditioner (PTAC)		11,520	2.02%				x
	RDP1		Module Panel - Single Family Unit 1, 7		35,360	6.20%				X
			Module Panel - Two Family Unit 2, 3, 4, 5, 6		95,470	16.74%				X
			Electrical Vehicle Charging Station - 1, 2		13,312	2.33%				X
			Reception - Main Service Area		180	0.03%	0.3%	X		
			Storage South		8,320	1.46%				X
			Parking Lot Lights		237	0.04%	0.4%	X		
	DP2		4 Bed Unit 1,2,3,4,5,6,7,8,9,10,11		116,688	20.46%				X
	DP3		4 Bed Unit 12,13,14,15,16,17,18,19,20,21,22		116,688	20.46%				X

Legend

X: Clean Coalition choice based on prior experience

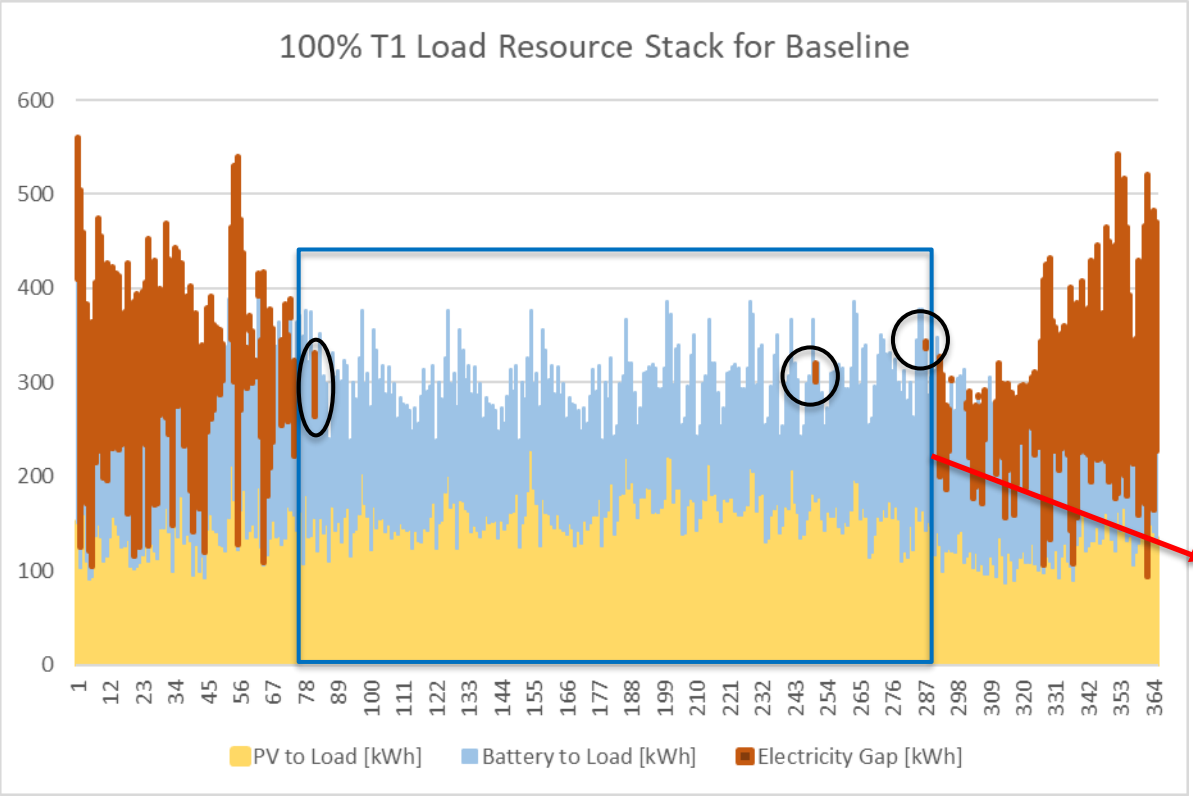
x: DignityMoves original choice

Resource Scenarios and Site Layout

DignityMoves SM – Battery sizing (2 BESS) with solar on Boss Cubez units

Clean Coalition

DignityMoves Santa Maria - On-Grid HomeGrid Battery Energy Storage Sizing, System Cost, and Resilience							
		Recommended Battery System Size		Battery System Cost		Indefinite Resilience	
Baseline Load Profile Peak Demand (kW)	Solar System Size (kW)	Standard Option Battery Power Capacity (kW)	Standard Option Battery Energy Capacity (kWh)	Total Battery Energy Storage System Cost	Battery Energy Storage System Cost per kWh	Total Percentage of Load Kept Online Indefinitely (Year 1)	Total Percentage of Load Kept Online Indefinitely (Year 15 - before replacement)
41	86.4	150	307	$269,717	$878	40.0%	35.0%



The total annual energy gap is 22,159 kWh. When on-grid, this energy gap is supplied by the grid. When off-grid, this energy gap would require 1,773 gallons of diesel fuel for 1 year – see diesel generator details in next slide.

For mid-March through October, solar and storage should be enough to cover 100% of the site's electrical load, except for the following three days:

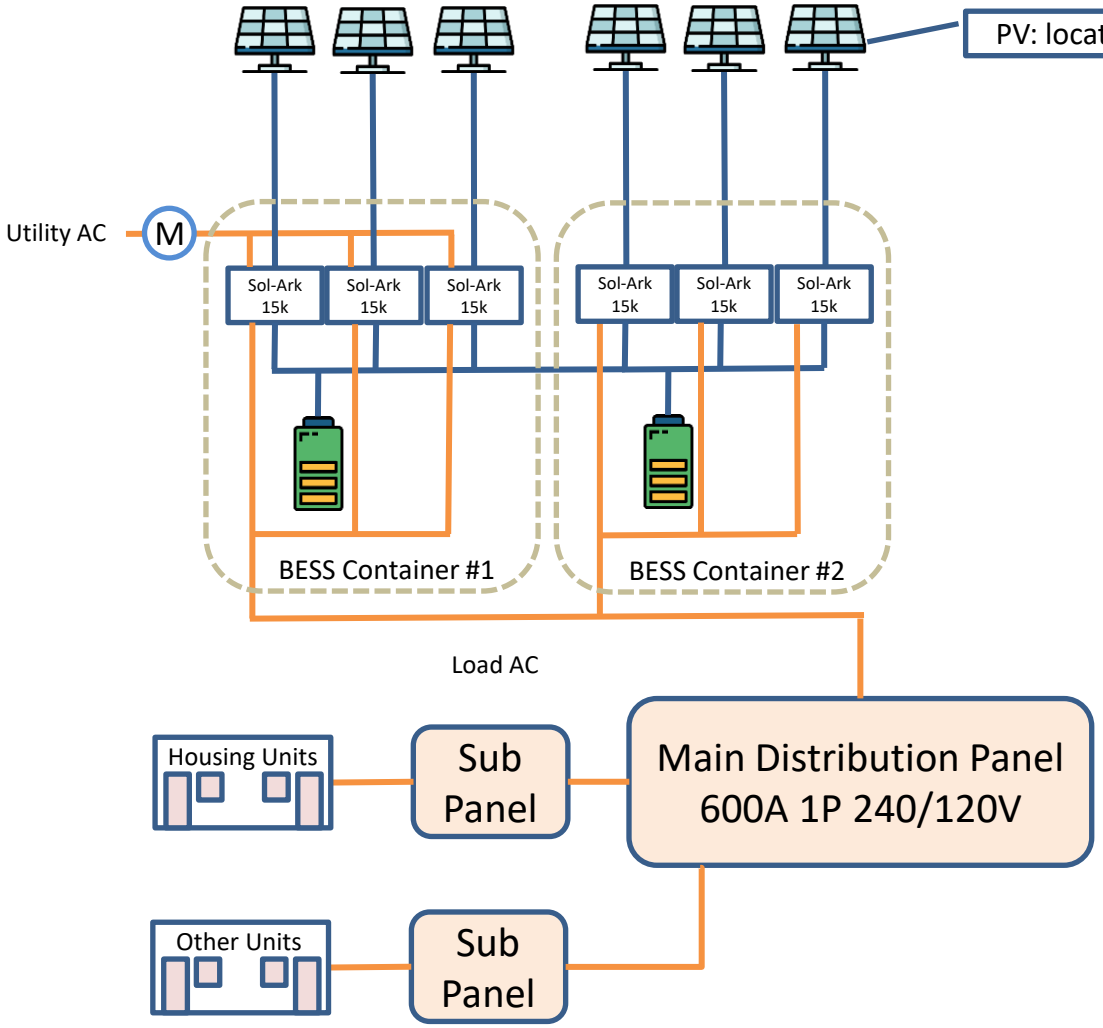
- Date – 22 March (67 kWh)
- Date – 7 September (20 kWh)
- Date – 14 October (8 kWh)

DignityMoves SM – example solar layout with 86 kWdc (114% NZE) via 216 (400W) solar panels

Clean Coalition

DignityMoves Santa Maria - Boss Cubez Total Solar Siting Potential					
Solar Siting by Location	Baseline Annual Load (kWh)	Solar System Size (kWdc)	Number of 400W Qcells Panels	Annual Solar Generation (kWh)	Solar Siting Potential as a Percentage of Net Zero
(29) Cube 144 - 2 rooms each for residences & offices	Not Calculated	46	116	74,702	61%
(16) Cube 170 - 2 rooms each for couples/ADA residences	Not Calculated	32	80	51,519	42%
(2) Cube 288 - 1 room each for dining & flex	Not Calculated	6	16	10,304	8%
(1) Cube 144 - 1 room for clinic	Not Calculated	2	4	2,576	2%
Total	121,899	86	216	139,100	114%

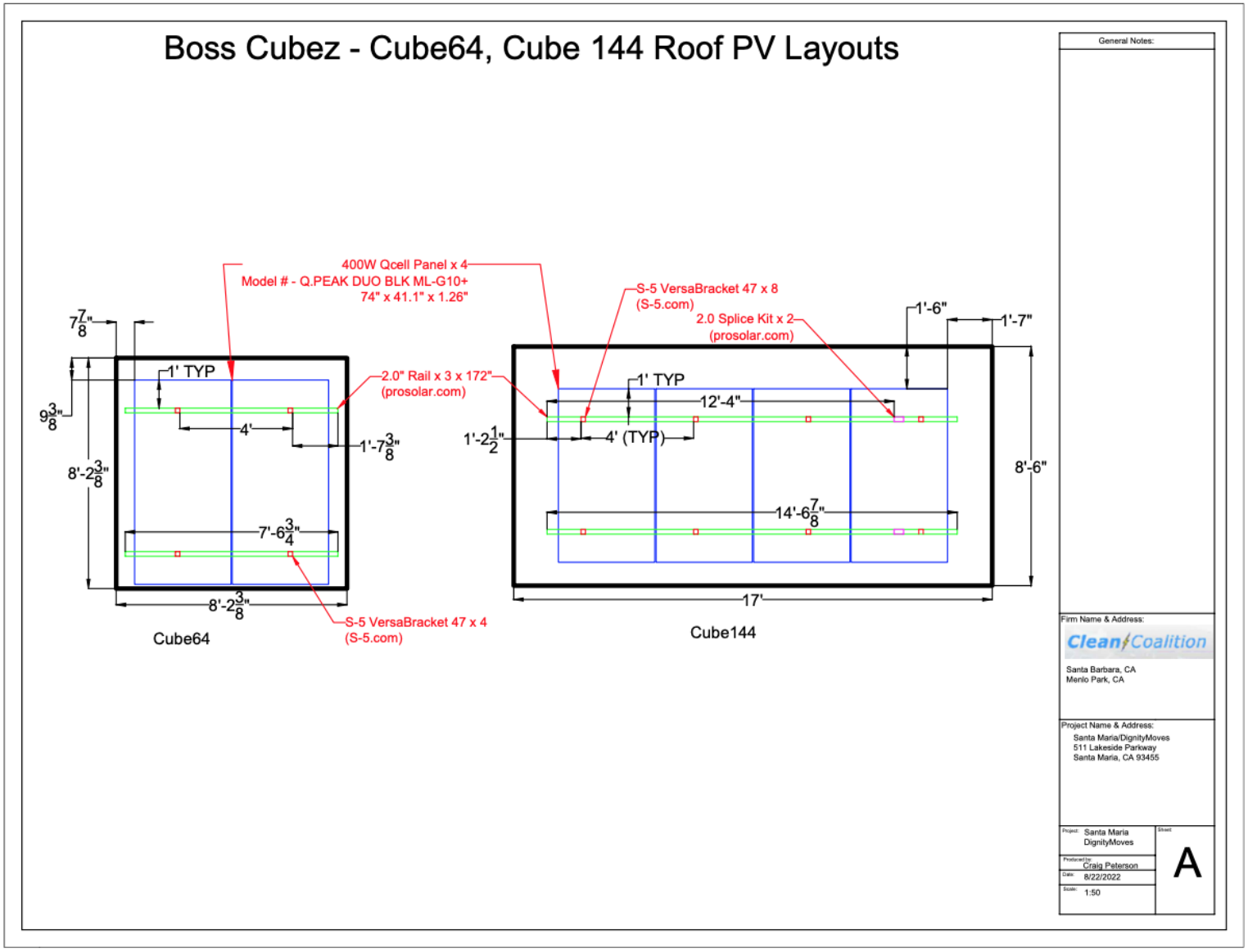
DignityMoves SM – System diagram



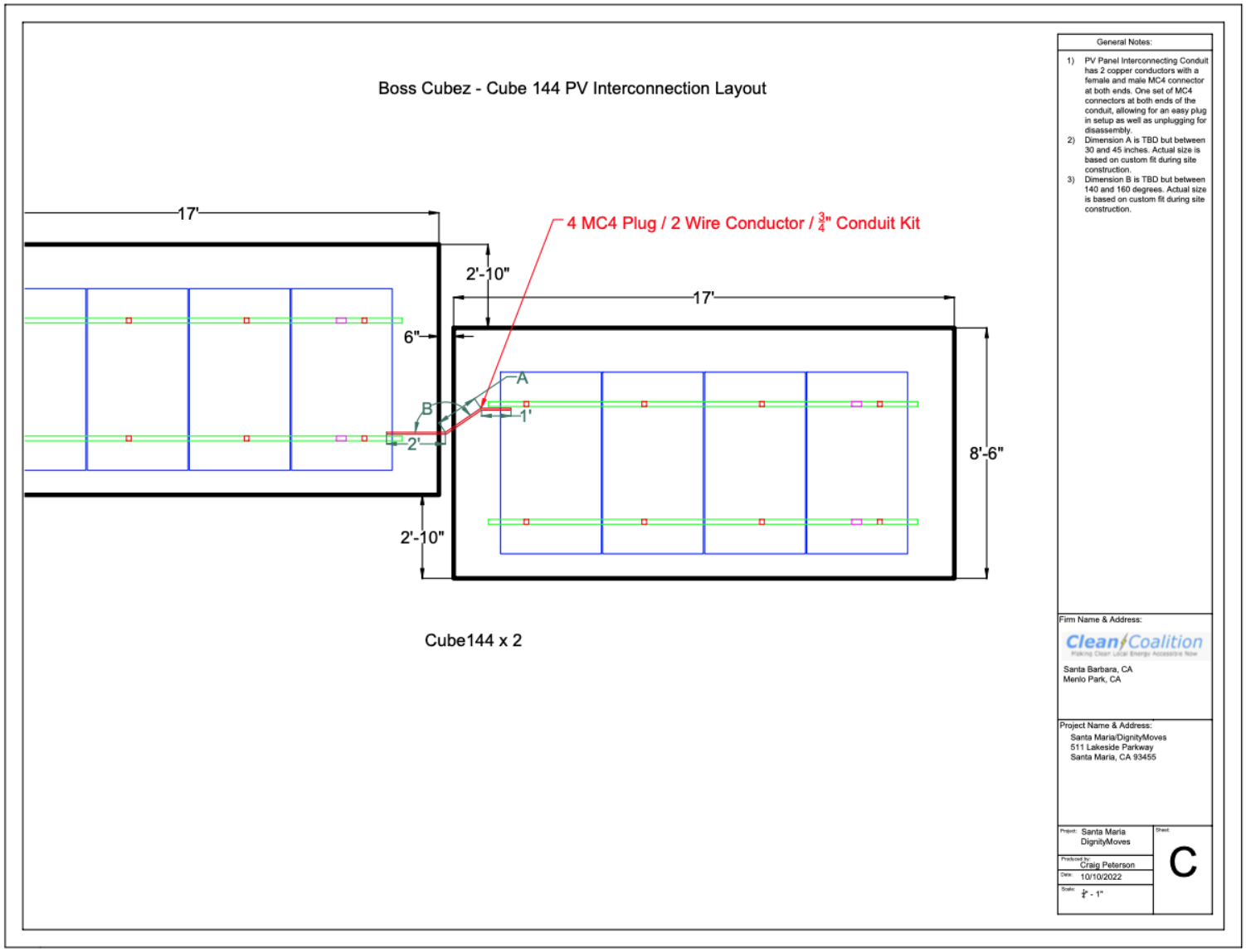
Notes:

- For On-Grid operations, 2 HomeGrid BESS containers are required.
- For Off-Grid operations, option for either a diesel generator combined with the 2 HomeGrid BESS containers (following slides), or 4 HomeGrid BESS containers (backup slides).

DignityMoves SM – solar layout



DignityMoves SM – solar layout



DignityMoves SM – diesel generator sizing and cost – Off-Grid only

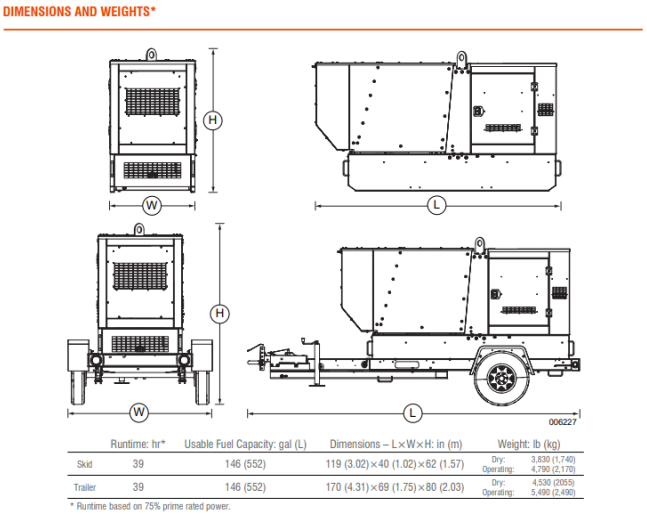
Clean Coalition

DignityMoves Santa Maria - Diesel Sizing and Resilience						
Annual Load (kWh)	Total 1-Year Energy Gap (kWh)	Diesel Required for 1-Year Energy Gap (gallons)	Max Daily Fuel Needed (gallons)	Average Daily Fuel Needed (gallons)	Diesel Genset Size (kW)	Genset Tank Capacity (gallons)
121,899	22,159	1,773	34	13	60	146

Diesel Generator Estimated System Cost & O&M - 60 kW / 146 gallons		
Company	Diesel Generator Scope of Work	Costs
Diesel Generator Supplier	Generator and Fuel Tank - Total Equipment Cost	$55,514
Diesel Generator Supplier	Tax and Shipping	$4,608
Diesel Generator Supplier	Generator Maintenance ($/Year)	$2,600
Diesel Generator Supplier	Fuel Cost ($/Year) for energy gap of 22,159 kWh	$11,523
	Total	$74,245

* NOTE: the diesel fuel cost covers a maximum of 1 year, as the projected energy gap for that timeframe.

Diesel Generator dimensions with trailer: 14.2 x 5.8 x 6.7 ft.



Economic Analysis

DignityMoves SM – Breakdown of PV and battery system costs (2 BESS)

DignityMoves Santa Maria - Off-Grid System Costs		
Solar System Size - 86.4 kWdc		
Company	**Solar Scope of Work**	**Costs**
Sun Pacific Solar Electric	Solar Panels and Installation	$238,000
	Solar Cost per Wdc	$2.75
Battery Energy Storage System - 150 kW / 307.2 kWh		
Company	**Battery Scope of Work**	**Costs**
HomeGrid	Shipping	$2,709
HomeGrid	Batteries	$133,168
HomeGrid	Containers with 3 Sol-Ark Inverters	$71,840
Sun Pacific Solar Electric	Permitting	$3,000
Sun Pacific Solar Electric	Site Prep	$25,000
Sun Pacific Solar Electric	Battery Installation	$4,000
Sun Pacific Solar Electric	Schneider Smart Main Service Board	$30,000
	Total	$269,717
	Battery Energy Storage System Cost Per kWh	$878
	Grand Total	$507,717

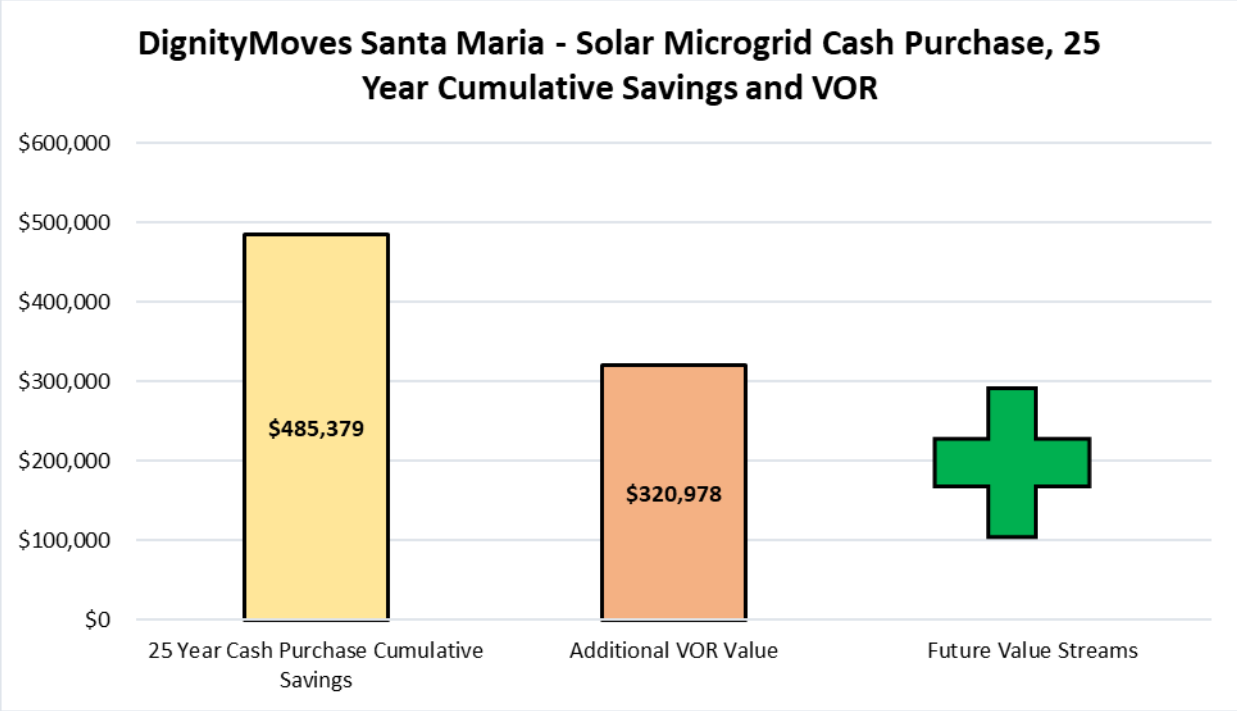
DignityMoves Santa Maria - Annual System Operations and Maintenance (O&M)		
Company	**O&M Scope of Work**	**Costs**
Sun Pacific Solar Electric	Battery Remote Review and Testing	$5,000
Sun Pacific Solar Electric	Solar Panel Cleaning	$1,800
	Total	$6,800
	Cost Per Wdc	$0.0787

DignityMoves SM – 25 Year Solar Microgrid cash purchase key economic details (2 BESS)

Clean Coalition

DignityMoves Santa Maria - 25 Year Cash Purchase Economic Details								
Facility	Annual Electricity Bill Cost (Pre-Solar Microgrid)	Solar Microgrid Cash Purchase - 25 Year Costs and Savings						Value of Resilience
		Capital Expenditure (Capex)	Operational Expenditure (Opex)	Incentives	Net Total Project Cost	Cumulative Utility Bill Savings	Net Cumulative Savings	25 Year Value
Santa Maria	$35,215	($507,317)	($424,676)	$253,659	($678,334)	$1,163,713	**$485,379**	$320,978

- Uses the scenario of 68.4 kW of solar and 150 kW / 307 kWh of energy storage
- Cash purchase economics use a 3% annual utility escalator, 30% ITC Direct Pay with a 20% low-income community & economic benefit project adders.

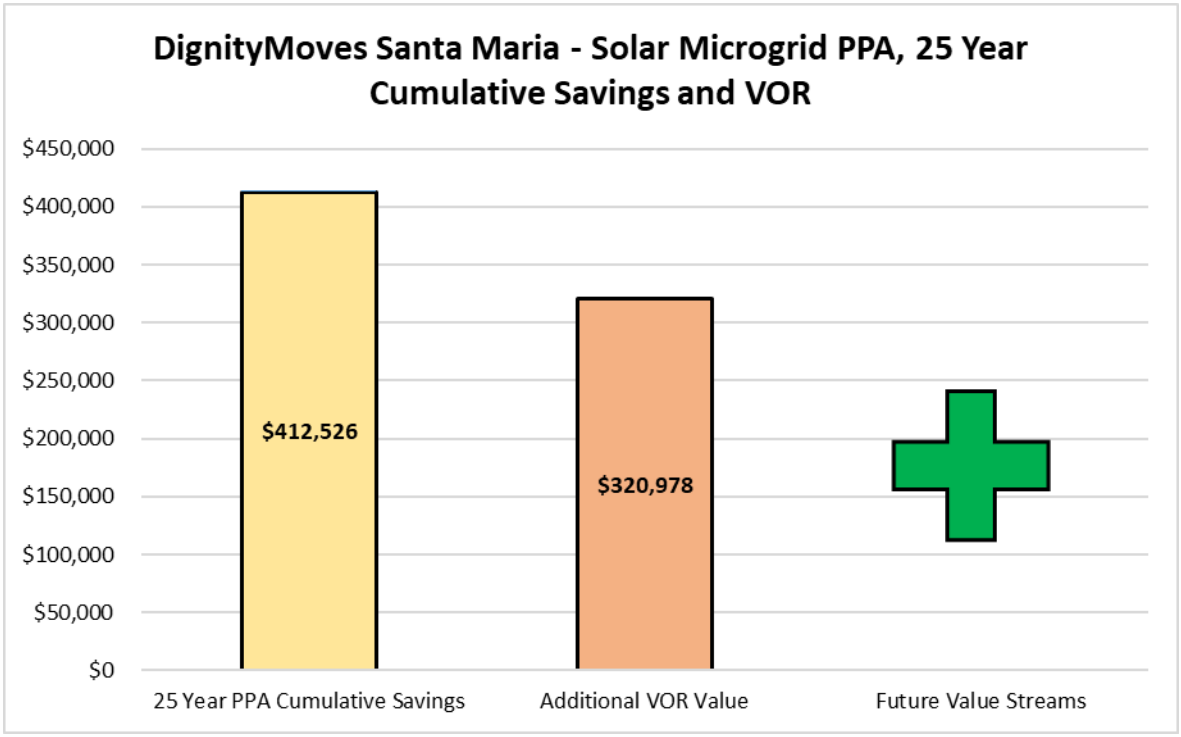


DignityMoves SM – 25 Year fixed PPA key economic details (2 BESS)

Clean Coalition

DignityMoves Santa Maria - 25 Year PPA Economic Details							
Facility	Annual Electricity Bill Cost (Pre-Solar Microgrid)	Solar Microgrid 23¢/kWh PPA - 25 Year Costs and Savings					Value of Resilience
		Average Monthly PPA Payment	25 Year Total PPA Payments	Cumulative Utility Bill Savings	Net Cumulative Savings	Year 1 Savings	25 Year Value
Santa Maria	$35,215	($2,504)	($751,187)	$1,163,713	**$412,526**	**$2,339**	$320,978

- Uses the scenario of 68.4 kW of solar, and 150 kW / 307 kWh of energy storage.

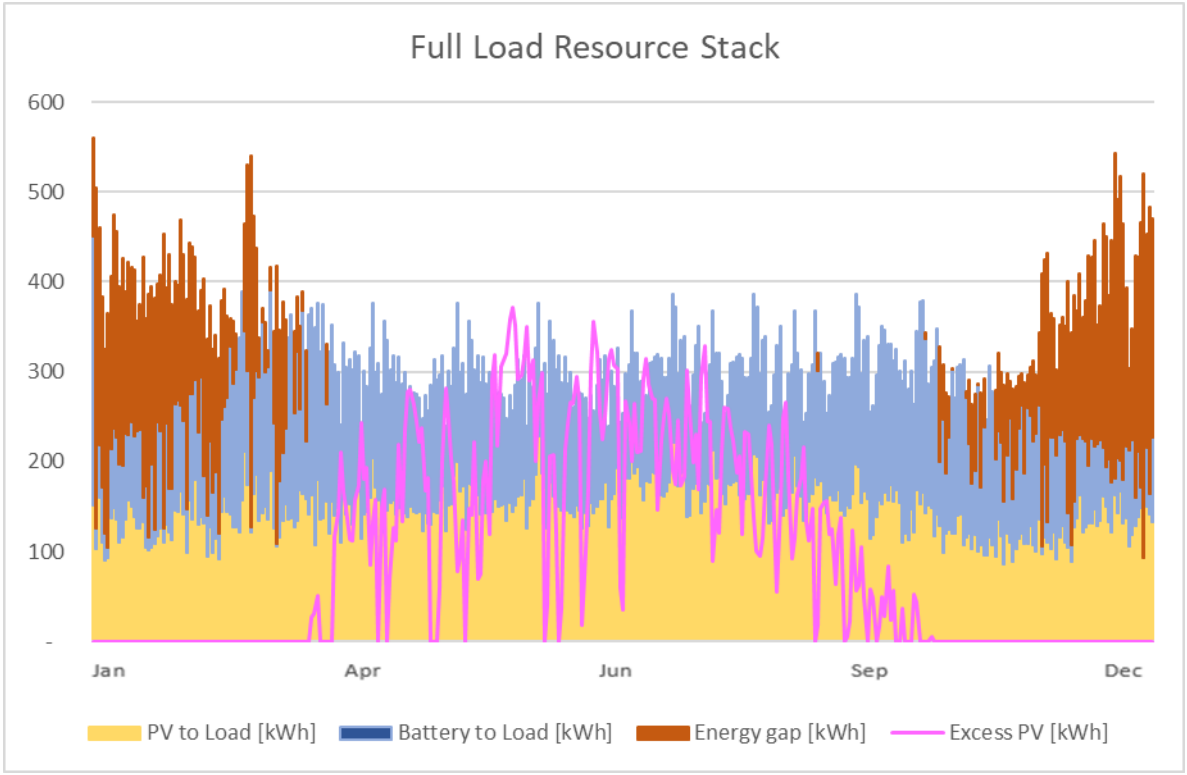


Additional Resource Scenarios

DignityMoves SM – Battery sizing (2 BESS) with solar on Boss Cubez units – Excess solar

Clean Coalition

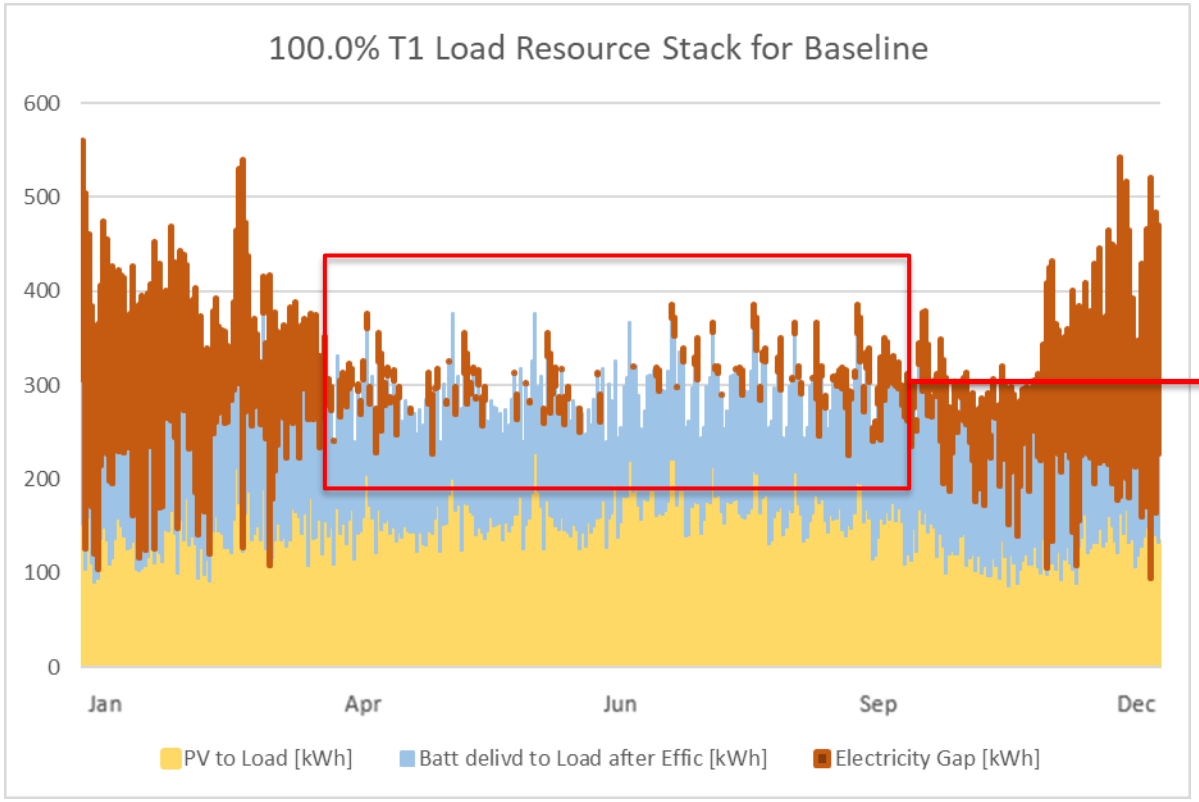
DignityMoves Santa Maria - On-Grid HomeGrid Battery Energy Storage Sizing, System Cost, and Resilience							
		Recommended Battery System Size		Battery System Cost		Indefinite Resilience	
Baseline Load Profile Peak Demand (kW)	Solar System Size (kW)	Standard Option Battery Power Capacity (kW)	Standard Option Battery Energy Capacity (kWh)	Total Battery Energy Storage System Cost	Battery Energy Storage System Cost per kWh	Total Percentage of Load Kept Online Indefinitely (Year 1)	Total Percentage of Load Kept Online Indefinitely (Year 15 - before replacement)
41	86.4	150	307	$269,717	$878	40.0%	35.0%



DignityMoves SM – Battery sizing for on-grid (1 BESS) with solar on Boss Cubez units

Clean Coalition

DignityMoves Santa Maria - On-Grid HomeGrid Battery Energy Storage Sizing, System Cost, and Resilience							
		Recommended Battery System Size		Battery System Cost		Indefinite Resilience	
Baseline Load Profile Peak Demand (kW)	Solar System Size (kW)	Standard Option Battery Power Capacity (kW)	Standard Option Battery Energy Capacity (kWh)	Total Battery Energy Storage System Cost	Battery Energy Storage System Cost per kWh	Total Percentage of Load Kept Online Indefinitely (Year 1)	Total Percentage of Load Kept Online Indefinitely (Year 15 - before replacement)
41	86.4	75	154	$167,213	$1,089	28.0%	23.0%



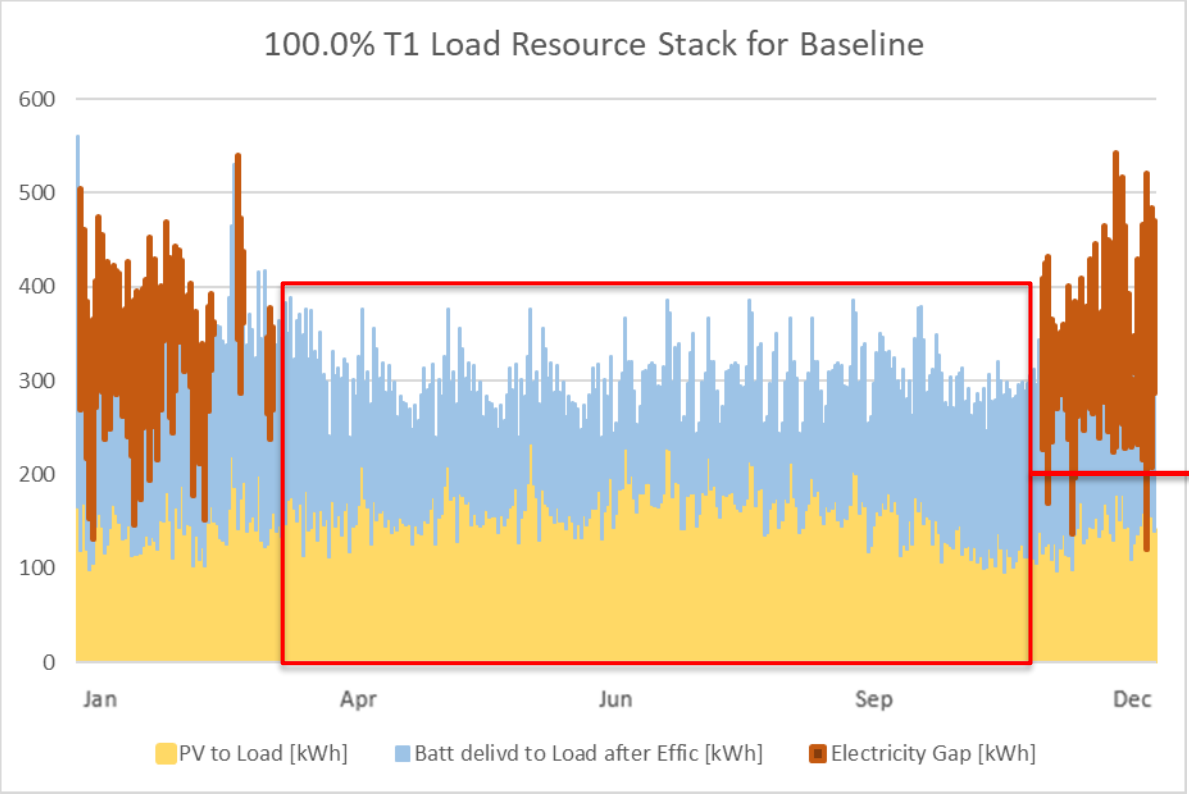
For the months from April to September, there is an electricity shortfall of 2,311 kWh.

The total annual energy shortfall is 27,045 kWh.

DignityMoves SM – Battery sizing for off-grid (4 BESS) with solar on Boss Cubez and LifeArk units

Clean Coalition

DignityMoves Santa Maria - Off-Grid HomeGrid Battery Energy Storage Sizing, System Cost, and Resilience with Boss Cubz and LifeArk Units							
		Recommended Battery System Size		Battery System Cost		Indefinite Resilience	
Baseline Load Profile Peak Demand (kW)	Solar System Size (kW)	Standard Option Battery Power Capacity (kW)	Standard Option Battery Energy Capacity (kWh)	Total Battery Energy Storage System Cost	Battery Energy Storage System Cost per kWh	Total Percentage of Load Kept Online Indefinitely (Year 1)	Total Percentage of Load Kept Online Indefinitely (Year 15 - before replacement)
41	110.4	300	614	$474,724	$773	56.0%	54.0%



For the months from March to November, solar and storage should be enough to cover 100% of the site's electrical load.

The total annual energy shortfall is 13,362 kWh.