SOLAR PV FOR RESILIENCE

OPPORTUNITIES AND BARRIERS TO ADOPTION IN SOUTHEAST FLORIDA

SOUTHEAST FLORIDA REGIONAL CLIMATE CHANGE COMPACT

Webinar

01 JULY 2025

CONVERGE STRATEGIES

SOLAR UNITED NEIGHBORS

Agenda

01 SOLAR FOR RESILIENCE FRAMEWORK

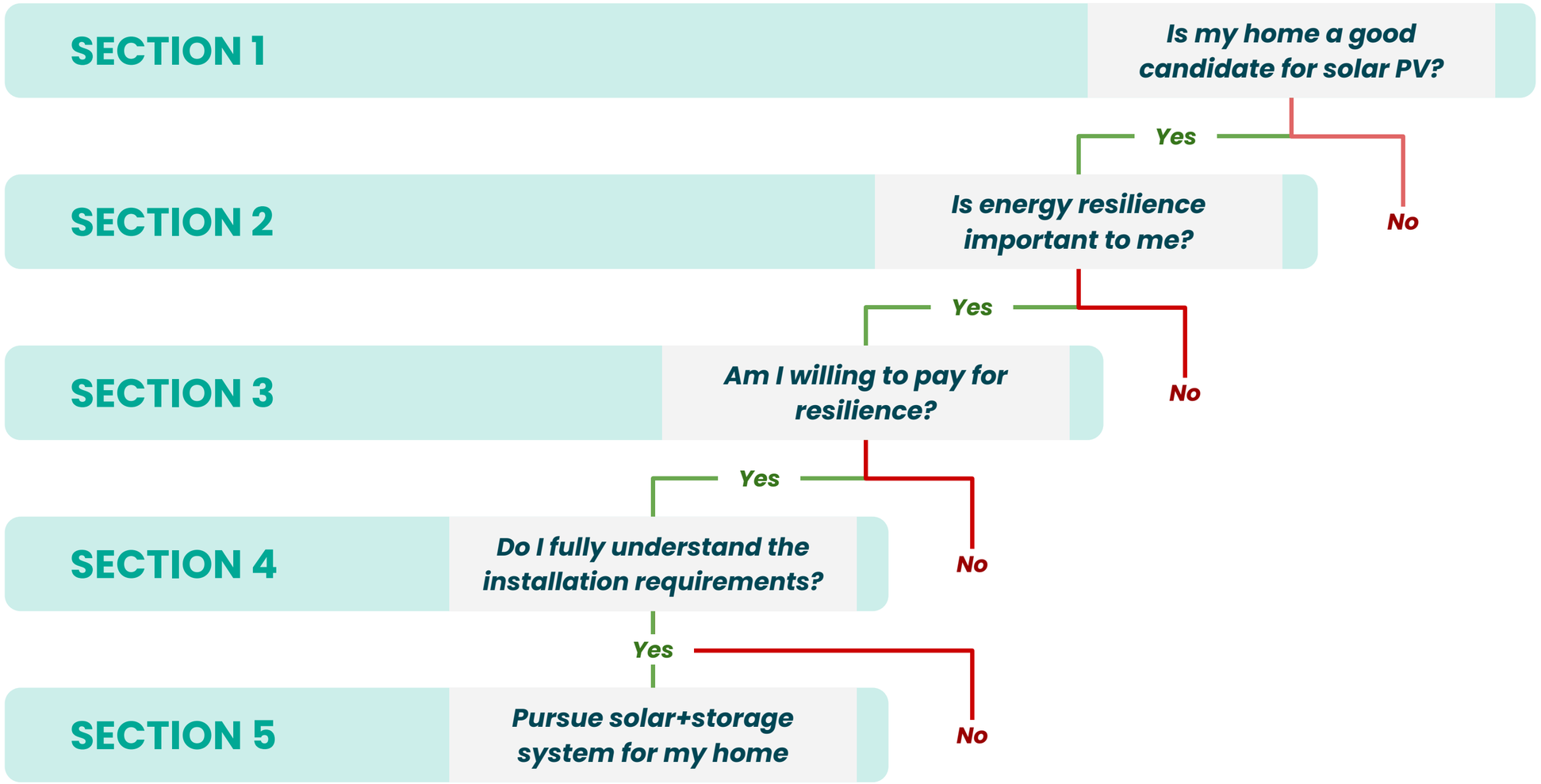
02 CASE STUDIES AND RESOURCES

03 FACILITATED Q&A

01

SOLAR FOR RESILIENCE FRAMEWORK

Solar PV for Resilience Framework



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QUESTION 1. ***IS MY HOME A GOOD CANDIDATE FOR SOLAR PV?***

What Makes a Home "Solar Ready"?

	SOLAR IRRADIANCE	SPACE AVAILABILITY	ROOF CONDITION	ELECTRICAL SYSTEM
Key Question	*Does my home receive sunlight or is it obscured by trees and/or buildings?*	*Does my roof have enough space to accommodate solar PV panels?*	*Is my rooftop in good enough condition to accommodate panels*	*Is my home's electrical system equipped to handle a resilient PV system?*
Criteria	Roof slope, roof orientation, and shading	Square footage necessary for solar PV production	Roof age and material	Dedicated critical panel or easily isolated circuits
General Tip	South and East-facing work best in Florida	Need about 200 sq. ft. of unobstructed roof space	Roofs should be <10 years from replacement	Need ≥200 amp main panel

Other Considerations

Energy efficiency must be considered. A more energy efficient home may result in a smaller solar PV system, and thus less upfront costs.

Implementing solar ready measures during construction can reduce costs by 60% compared to adding after construction. (Source: NREL)

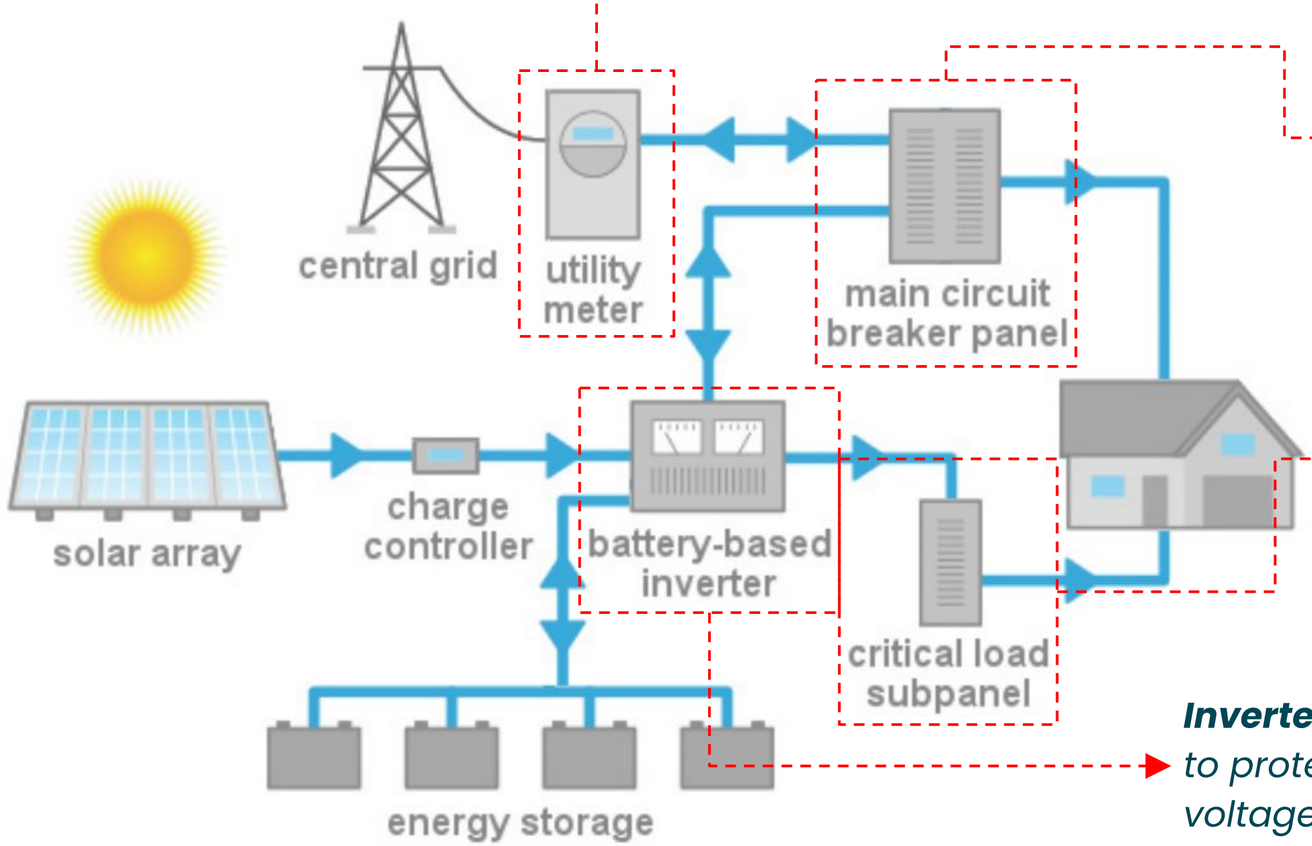
Roofing Material Considerations: Different Roof Types Require Different Flashing/Sealing

Roof Material	Consideration
Tile/Metal	Usually functional for a lifetime and may just need inspection before installation.
Copper/Lead	Seek an installer with specific experience with these material types for proper flashing and sealing.
Shingles*	All installers should be familiar with flashing and sealing on shingled roofs. Shingle roofs should be less than 10 years old.
Flat/Low Pitch Roof	No penetration required for solar install.

** Typically functional for 20 years in Florida.*

Electrical Upgrade Considerations

*Utility company will replace existing meter with a **bidirectional meter**.*



*Service panel will be upgraded to **200 amp or more**. (Breaker may require upgrades if problems with fuses exist.)*

*Automatic or manual switch and **separate subpanel for islanding** from the grid in the event of a disruption.*

***Inverter** will be installed to protect home from voltage fluctuations.*

Image Source: *Solar+Storage 101: An Introductory Guide to Resilient Power Systems*, Clean Energy Group.

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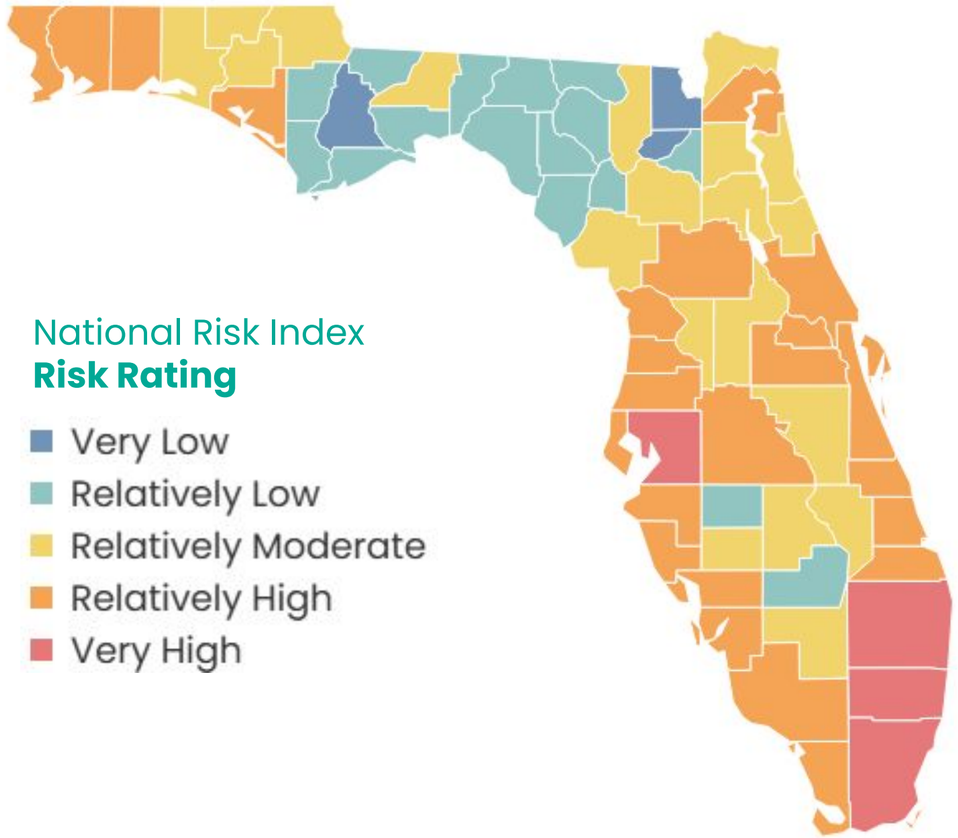
QUESTION 2.

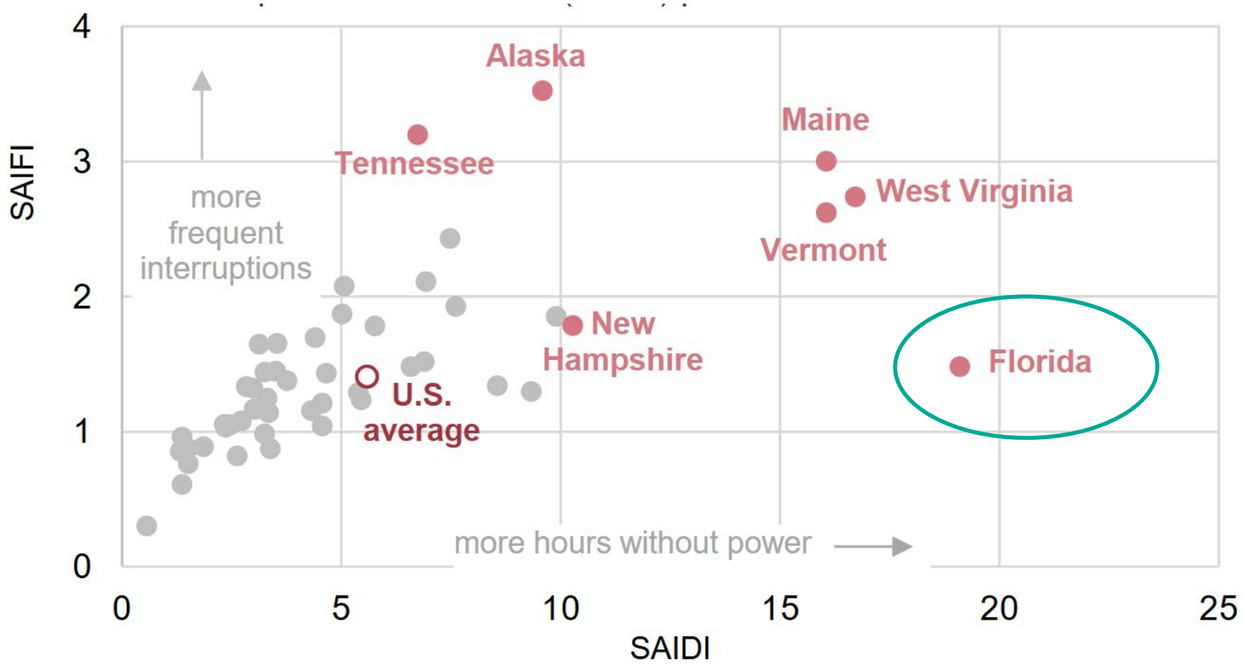
IS ENERGY RESILIENCE IMPORTANT TO ME?

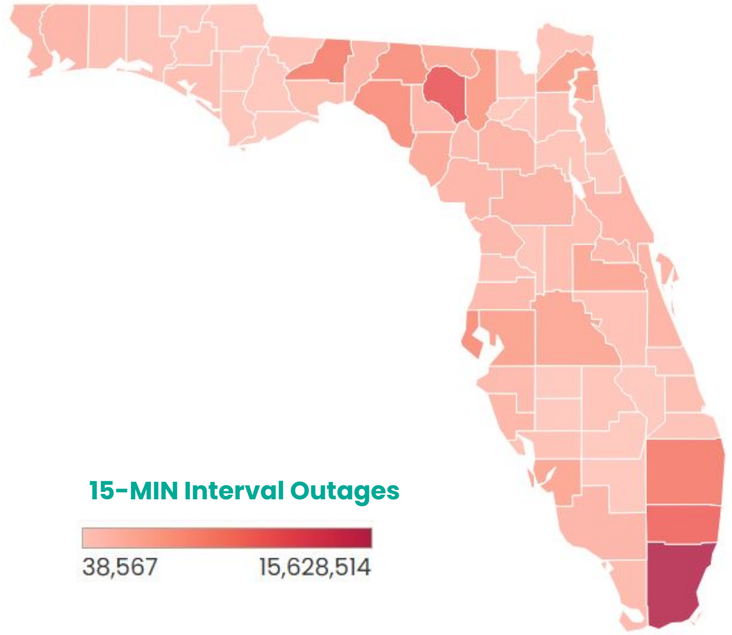
Southeast Florida Is Vulnerable to Extreme Weather Events Such As Hurricanes



Source: Adapted from National Risk Index, Federal Emergency Management Agency (FEMA)

Extreme Weather Strains the Grid and Leads to Longer Duration Power Outages





Source: Energy Information Administration, U.S. Department of Energy (2022)

Source: Adapted from EAGLE-I, U.S. Department of Energy (2023)

A Relatively Small Solar + Storage System Is Capable of Providing Backup Power for Days

> *A small solar PV system with 10 kWh of storage can fully meet basic backup power needs* over a 3-day outage in virtually all U.S. counties and in any month of the year.*

*Includes refrigeration, lighting during evening hours, well pump, and basic plug loads.

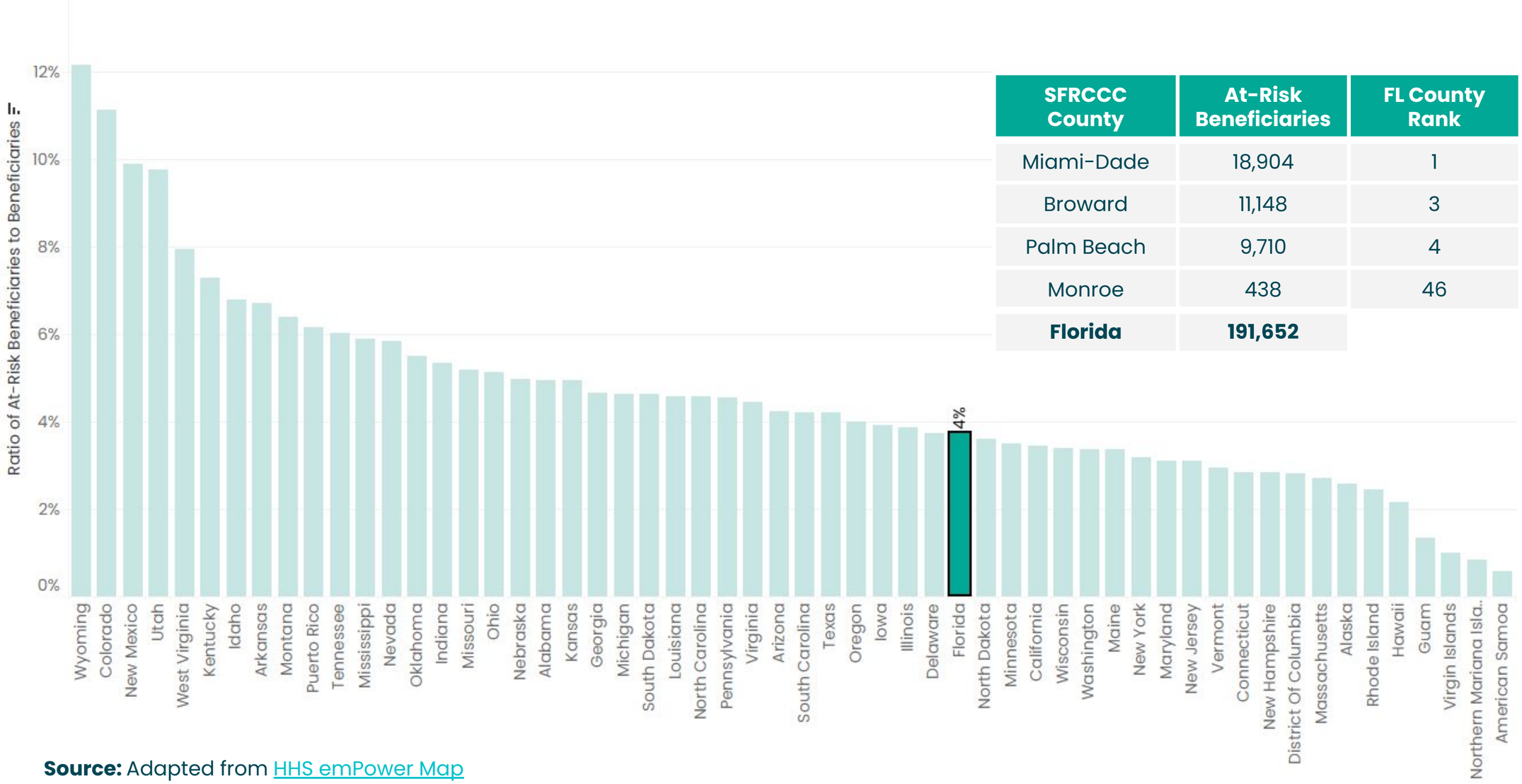
Source: *Evaluating the Capabilities of Behind-the-Meter Solar-plus-Storage for Providing Backup Power during Long-Duration Power Interruptions*, Lawrence Berkeley National Laboratory (2022)

Solar+Storage Can Mitigate Costs Commonly Associated with Power Outages

Item	Cost per Outage
Food Loss	$50-500
New refrigerator	$500-$,1000
Staying at a home vs. a hotel	$500+
Keeping a sump pump running vs. basement flooding	$5,000
Home medical equipment working vs. a hospital visit	$10,000+
Fish tank pump working and pet fish happy	Priceless
Total (Worst Case Scenario) Cost	**>$16,000**

Source: Solar United Neighbors

Solar+Storage Can Support Individuals That Rely on Electricity-Dependent Medical Devices



SFRCCC County	At-Risk Beneficiaries	FL County Rank
Miami-Dade	18,904	1
Broward	11,148	3
Palm Beach	9,710	4
Monroe	438	46
Florida	**191,652**	

Source: Adapted from HHS emPower Map

Benefits of Resilient Solar vs. Fossil Fuel Backup Generators

SOLAR + STORAGE	FOSSIL FUEL GENERATOR
	
Participates in electricity market	Only runs during power outages
Eligible for tax credits, other incentives	Ineligible for tax credits, limited incentives
Quiet	Noisy
Dependent on the sun (i.e., sustainable)	Dependent on fossil fuels (i.e., diesel or natural gas)
Limited lifetime maintenance	Routine maintenance and testing

Source: Solar United Neighbors

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QUESTION 3.

AM I WILLING TO PAY FOR RESILIENCE?

Solar PV Costs Range from ~$6K-$20K *After Incentives* But Result In Long-Term Savings

SAMPLE SOLAR PV CASH PURCHASE IN FLORIDA	4 kW System	8 kW System	12 kW System
Avg. Florida Solar Co-Op Pricing ($2.49/W)	$9,960	$19,920	$29,880
30% Federal ITC	-$2,988	-$5,976	-$8,964
Net Cost	**$6,972**	**$13,944**	**$20,916**
Est. 1-year electricity savings	$889	$1,777	$2,666
Est. 10-year electricity savings (cumulative)	$9,506	$19,012	$28,518
Est. lifetime electricity savings (25 years)	$26,680	$53,361	$80,041
Net Profit	**$19,708**	**$39,417**	**$59,125**

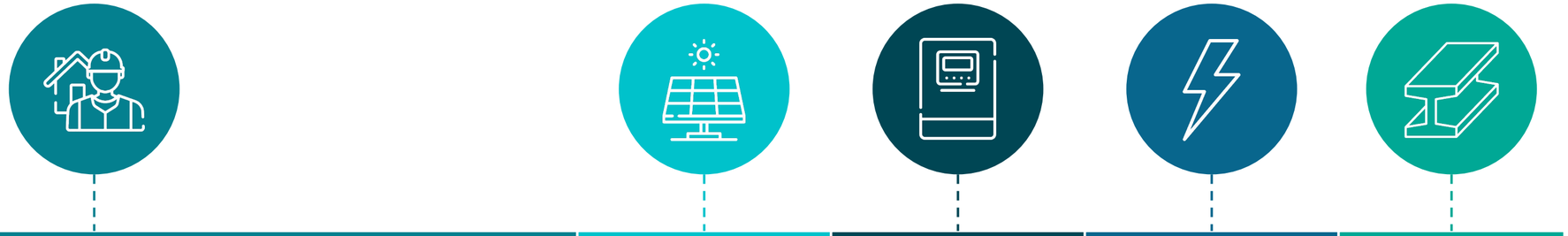
Source: Solar United Neighbors

Batteries Are Expensive; Popular Batteries Range from 6K-$16K *Before Incentives*

Battery Manufacturer	Battery Size	Battery Cost
LG Chem RESU 10H	9.8 kWh	$5,250
Tesla Powerwall 2.0	13.5 kWh	$6,700 + $1,100 for supporting hardware
Pika Energy Harbor	10.1 kWh	$13,500
Panasonic EverVolt	11.4 kWh	$15,880
Sonnen Eco	10 kWh	$16,750

Source: Build with Rise

“Soft Costs” and Battery Costs Represent the Lion’s Share of Installation Costs

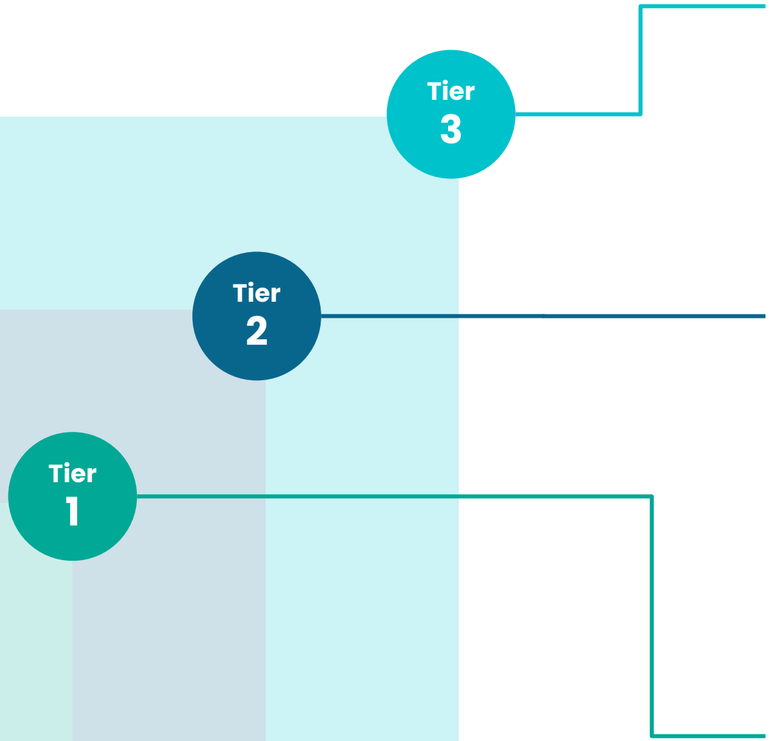


Soft Costs 54%	PV Modules 12%	Inverter 12%	EBOS 12%	SBOS 9%
Soft costs include costs incurred by the installers to install the system onsite (i.e., fieldwork) and offsite (i.e., officework). Does not include other costs, such as the costs of additional electrical work (e.g., new meter, electrical panel upgrade), financing, and additional roofing services (e.g., new roof). These costs may result in a higher upfront cost.	The cost to the installer of photovoltaic modules	The cost to the installer of equipment for converting direct current (dc) to alternating current (ac)	The cost to the installer of electrical balance of system components	The cost to the installer of structural balance of system components

Source (Costs): *U.S. Solar Photovoltaic System and Energy Storage Cost Benchmarks, With Minimum Sustainable Price Analysis: Q1 2023*, National Renewable Energy Laboratory (2023)

Source (Definitions): Solar Photovoltaic System Cost Benchmarks, U.S. Department of Energy

Defining and Articulating Your "Critical Load" Can Decrease the System Size—and Costs



Whole-Home Load (100%)

Includes all loads in the home: plug loads, water heating, space heating, refrigeration, and air-conditioning. *Most resilient solar PV systems are not configured for the whole-home load.*

Full Critical Load (>50%)

Includes the limited critical loads plus heating and cooling loads. *Heating and cooling needs will be determined by geographic conditions.*

Limited Critical Load (<50%)

Includes refrigeration, lighting during evening hours, well pump, and basic plug loads for survivability (e.g., medical devices). *A small solar PV system with 10 kWh of storage "can fully meet basic backup power needs over a 3-day outage in virtually all U.S. counties and in any month of the year." (Source: LBNL)*

Source: *Evaluating the Capabilities of Behind-the-Meter Solar-plus-Storage for Providing Backup Power during Long-Duration Power Interruptions*, Lawrence Berkeley National Laboratory (2022)

Defining and Articulating Your Critical Load In Action

TIER 1. LIMITED CRITICAL LOAD - EXAMPLE	
Solar PV Capacity	6 kW
Solar PV Cost	$16,500
Battery Capacity	13.5 kWh*
Battery Cost	$11,500
Total Cost	$28,000
Loads Included	Refrigerator, microwaves, some lights and plugs, small window AC unit
Loads *Not* Included	Stove, clothing dryer, electric water heater

** Provides ~1 day of power when the sun is not shining; battery recharged daily when sun is shining.*

Southeast Floridians Have Limited Funding and Financing Options—Especially for Storage

Financial Mechanism	Sector	Type	Solar PV	Storage	LMI Incentive or Carve-Out
Federal Investment Tax Credit (ITC)	National	Tax Credit	✔	✔	✔
Net Metering	Utility	Bill Credit	✔	X	X
Energy Edge Rebate (Boynton Beach)	Local Gov.	Rebate	✔	X	X
Solar Energy Loan Fund	National	Loan	✔	X	✔
Florida Solar for All Grant	State	Grant	✔	X	✔
Credit Unions (e.g., Climate First Bank, Self-Help Credit Union)	National	Loan	✔	X	X

See https://solarunitedneighbors.org/resources/financing-your-new-solar-panels/.

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QUESTION 4.

DO I FULLY UNDERSTAND INSTALLATION REQUIREMENTS FOR SOLAR+STORAGE?

Vendor Challenges: Solar PV Marketplace Can Be Predatory

- Shop local.
- Lean on the experts (e.g., SUN, FlaSEIA, SEIA)
- Know about Rule 61G4-12.011, F.A.C.
- Check FL Department of Business and Professional Regulation
- Check vendor reviews.
- Only buy cookies at the door.

Permitting Challenges: There Are Many Utility and Building Code Requirements

Challenge	Requirement	Homeowner Barrier
Ability to Island from the Grid	Utility Interconnection Agreement	Most interconnection agreements do not allow islanding without additional equipment (battery storage/ancillary equipment)
Ability to Island from the Grid	Florida Building Code: Certificate of Occupancy	FBC requires water and electric hook-up to obtain a COO. Could be re-checked after major remodels.
Fire Safety for Energy Storage Systems	Florida Building Code R328.4	Specifies that storage can only be installed in detached garages, attached garages *separated from the dwelling unit*, or outdoors or on exterior walls located >3 ft. from doors and windows. *Some AHJs require more.*
Flood-Proofing Energy Storage Systems	Florida Building Code F2702.1.8	Specifies that storage must be elevated >3 ft. off the floor and located >10 ft. away from any windows to ensure the system is isolated from water entrance points.

Insurance Challenges: Solar+Storage Systems May Require Additional Insurance Coverage

Challenge	Requirement	Homeowner Barrier
Increased Risks Associated with Hurricanes	Special Endorsements	Homes may require an additional “endorsement” for hurricane coverage. Panels are seen as a fixed asset and usually covered under Coverage A.
Increased Risks Associated with Batteries	Special Endorsements	Batteries—and generators—sometimes trigger special endorsements and carry more risk. (*Solar PV is deemed a non-risk by the insurance industry.*)
Increased Risks Associated with Larger Systems	Liability Insurance	Larger solar PV systems (>10kW AC) require liability insurance. This should be a simple umbrella policy and not cost more than $100/year. This is a utility interconnection requirement that even the Florida PSC has spoken out against it.

Insurance Challenges

- Panels are seen as a fixed asset and usually covered under Coverage A.
- Increased home value = increased coverage
- May require additional “endorsement” for hurricane coverage.
- Batteries, and generators, sometimes also trigger special endorsements and carry more risk.
- Solar is deemed a non-risk by the insurance industry.

- Larger systems, over 10kW AC require liability insurance.
- This should be a simple umbrella policy and not cost more than $100/year.
- This is a utility interconnection requirement–even the FL PSC has spoken out against it.
- “Tier 2 insurance”

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CASE STUDIES AND RESOURCES

– Daniel, Miami, FL

> During Hurricane Irma, our house was without power for 14 or 15 days. And I didn't have water without electricity either. I decided that never again am I going to depend on a company for my whole livelihood.

Weathering the Storm: Lessons Learned from Hurricane Ian

Jackson Family

Estero, FL

- "[Hurricane Ian] was the longest 24 hours in our lives."
- Lost cell service, internet, water
- Kept entire house running without interruption for 50 hours

Jones Family

Estero, FL

- Used 12 kWh battery in the Mitsubishi Outlander PHEV and SMA Secure Power Supply
- Watch their story here

Miller Family

Ft. Myers, FL

- Sheltered additional family members, who had lost water service – despite having solar PV, but no battery backup
- Did not need to curtail power usage once during 6-day outage

Resilient Power Creates Hubs of Hope

Key Resources: Guides and Tools

Resource Name	Organization	Use Case
GUIDES		
Go Solar Guide	Solar United Neighbors	Solar PV vendor selection
Battery Storage Guide	Solar United Neighbors	Battery storage technical overview
SolSmart Program Guides	SolSmart	Permitting, inspection, planning, and zoning
Solar+Storage Project Checklist	Clean Energy Group	Solar+storage project development criteria
TOOLS		
SolarAPP+	SolarAPP+	Permitting automation
PVWatts	NREL	Solar PV energy production estimation
Project Sunroof	Google	Solar PV energy production estimation
Clear Sky Tampa Bay	TBRPC	Solar+Storage resilience-based siting toolkit