CleanEnergy States Alliance

Plug-in Solar:

What States Need to Know

February 11, 2026

www.cesa.org

Webinar Logistics

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The Chat function is also disabled for attendees.

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Automated **captions** are available 

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Celebrating 20 Years of State Leadership

Clean Energy States Alliance

The Clean Energy States Alliance (CESA) is a national, nonprofit coalition of public agencies and organizations working together to advance clean energy.

CESA members—mostly state agencies—include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.

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Webinar Speakers

Ben Paulos
Clean Energy States Alliance

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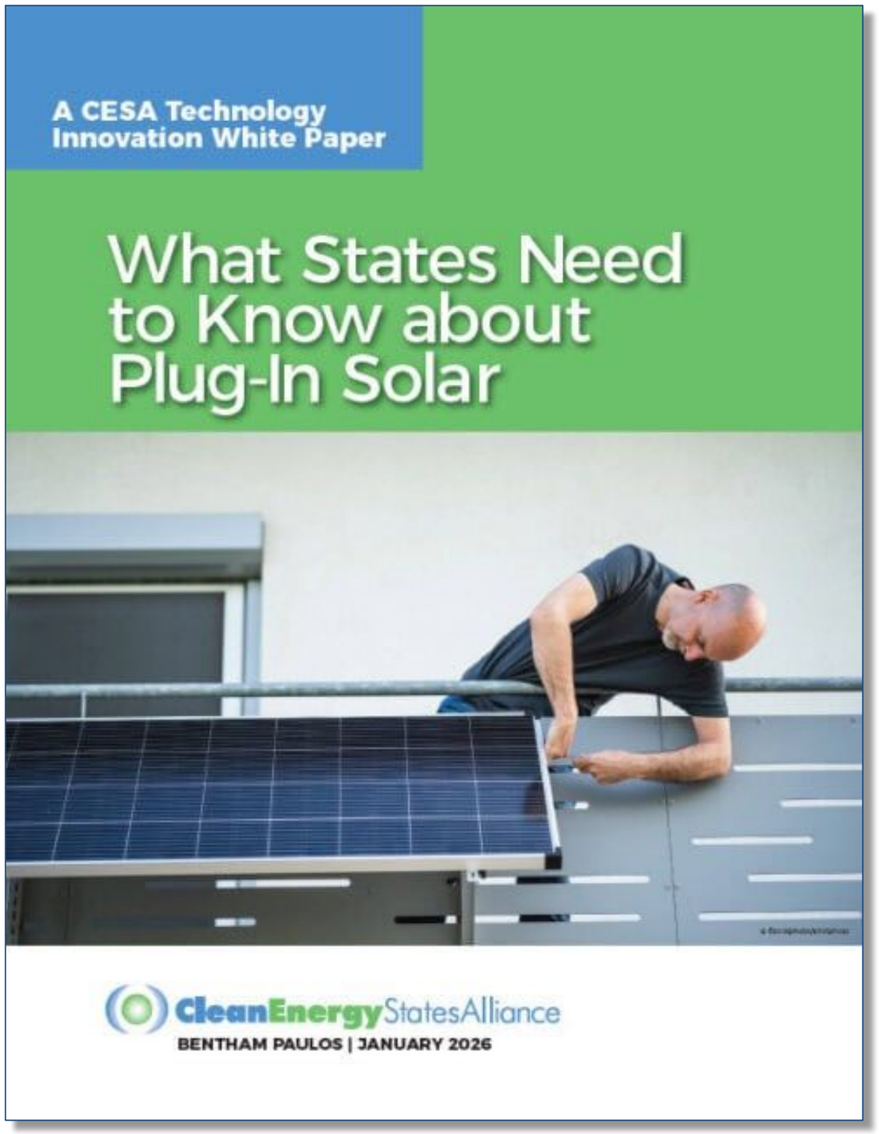
Moderator

What States Need to Know About Plug-In Solar

January 2026

Bentham Paulos, CESA

CleanEnergy States Alliance



https://www.cesa.org/resource-library/resource/plug-in-solar/

Relevant Resources

- **Lessons Learned from Puerto Rico's First Virtual Power Plant**
- **Directory of State Low- and Moderate-Income Clean Energy Programs**
- **"How to Make Solar for All a Reality": Summary of Opportunities for Funders and Allies**
- **Meaningful Household Savings: Best Practices for Achieving Equitable Solar Development**
- **A Directory of Solar Consumer Education Resources**
- Solar Equity Digest
  - This monthly newsletter includes news and resources from around the country on bringing the benefits of solar electricity to low- and moderate-income communities.

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Overview

- What and why
- Global and US status
- Safety issues
- Regulatory issues
- Economics
- Market dynamics
- My field research
- Pathways, roles for states

What and Why?

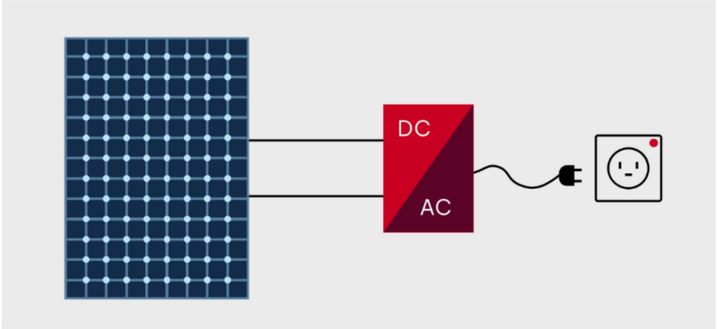
What

- Small systems, 120v output, plugged into existing AC outlets
- Installed by customer (DIY)
- No or few permit and interconnection requirements
- Marketed as a consumer appliance

Why

- Reduce cost of solar, especially soft costs
- Increase participation
- Cut household bills
- Generate clean power

Figure 1: The basic plug-in solar concept



Global and US Status

Europe

- Regulatory system established
- Marketers are active
- Germany: 1 million registered, maybe ~4 million installed

US

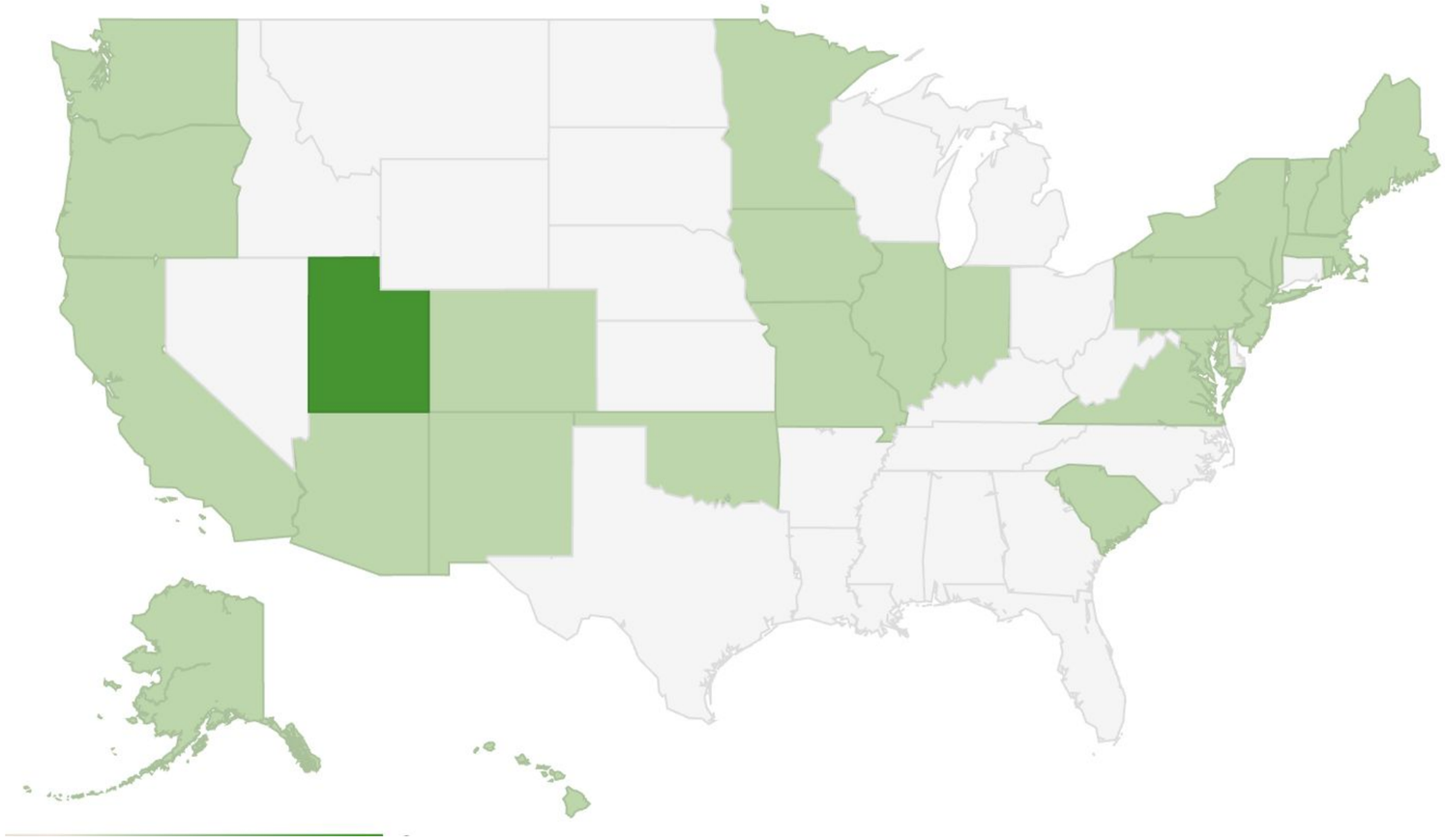
- Legal status not clear
- DIY community
- Growing advocacy movement and legislative interest

Bills bills bills

One state law passed

25 introduced in 2026

VA and VT making progress



Source: https://www.brightsaver.org/publicly-filed-states

Safety Issues

UL testing and certification just launched in January for “system,” not just components. Not an official standard, but done quickly to create “pathway to market.” UL is open to input.

Three key issues:

1) Touch safety
2) Circuit overload
3) Ground fault protection

Anti-islanding already covered in inverter standards

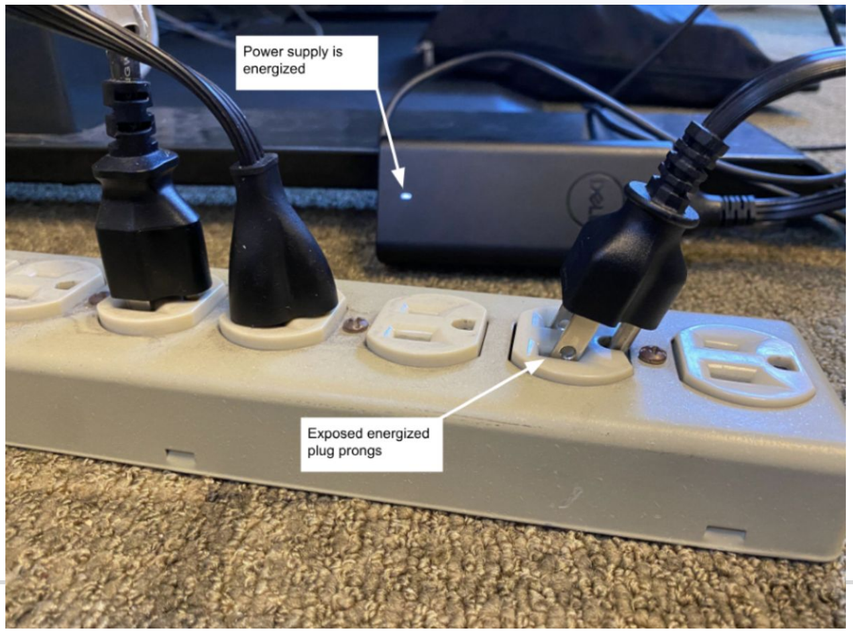
Touch safety

Panels can generate in sun, when plug is exposed to touch.

Standard US 3-prong plug has poor touch safety.

EU plug is better, so are solar cables

UL would like a special plug and receptacle with better touch safety



Circuit overload

Home circuit may be 15-30 Amps

Generator can be greater than that, causing overload

Circuit breaker prevents overload, but may be masked by activity on circuit

Technical fixes, or careful siting on home circuits

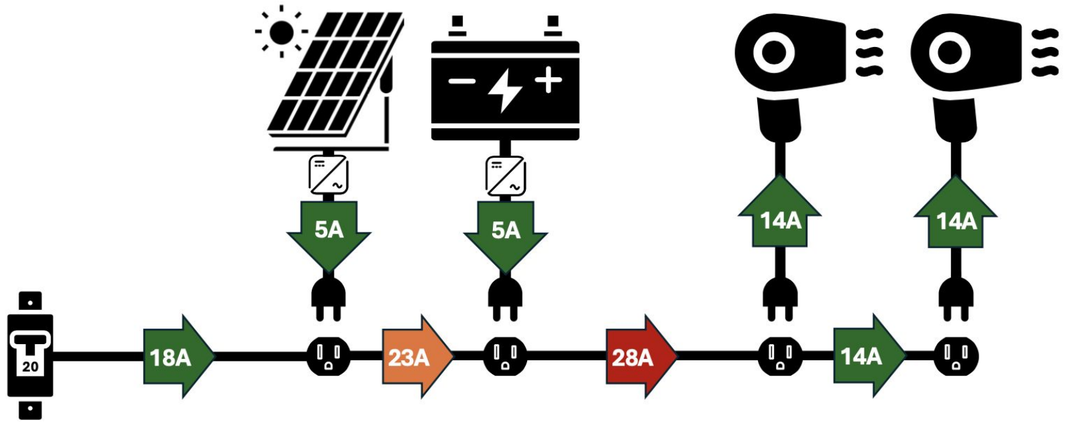


Figure 6. An illustration of the breaker masking problem. Here, the breaker does not trip despite there being 28 A on a section of the 20 A circuit.

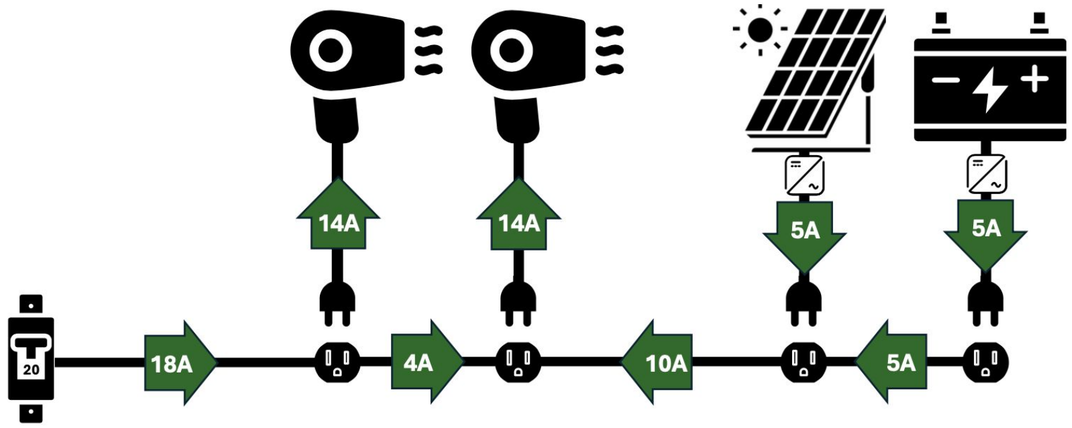


Figure 7. Plug-in DERs at the end of a branch could be acceptable, but this requires precise knowledge of the circuit.

Circuit overload

UL wants a dedicated and unique receptacle and plug.

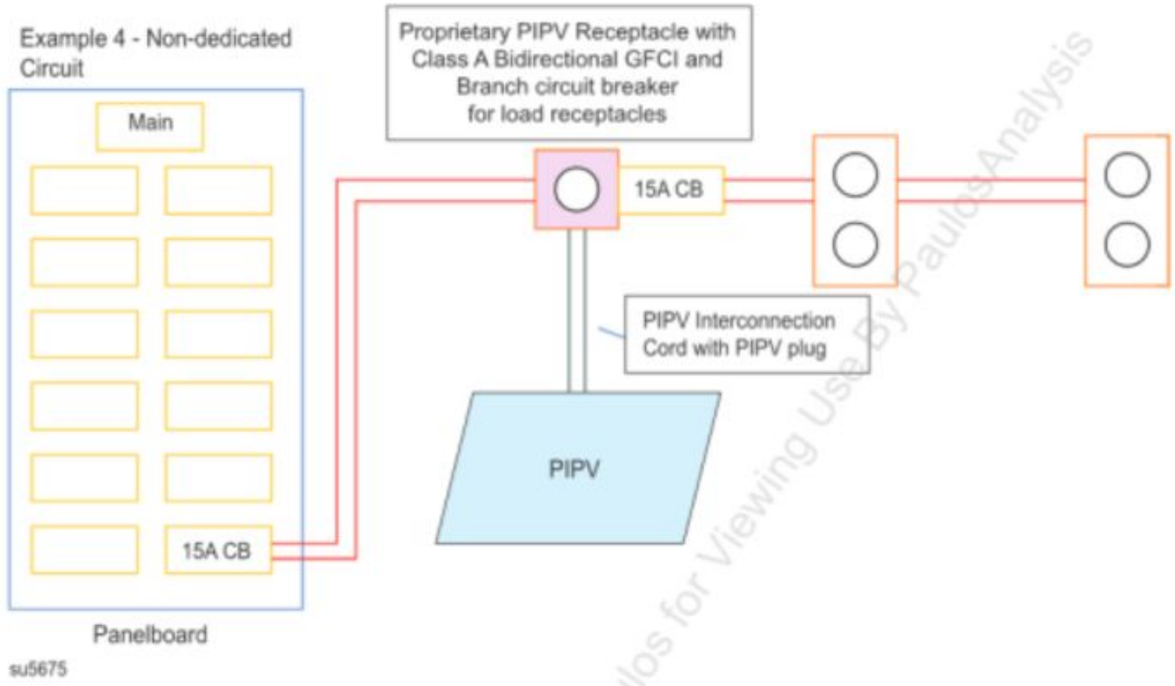
Receptacle would have bidirectional GFCI and in-line circuit breaker

Not currently made.

Likely requires and electrician.

Figure B.4

Non-dedicated Circuit Example 4 – 400 W PIPV backfed retrofit 12 AWG 20 A with bidirectional GFCI PIPV receptacle in place of first receptacle and a branch-circuit overcurrent protective device to prevent overcurrent on the branch circuit



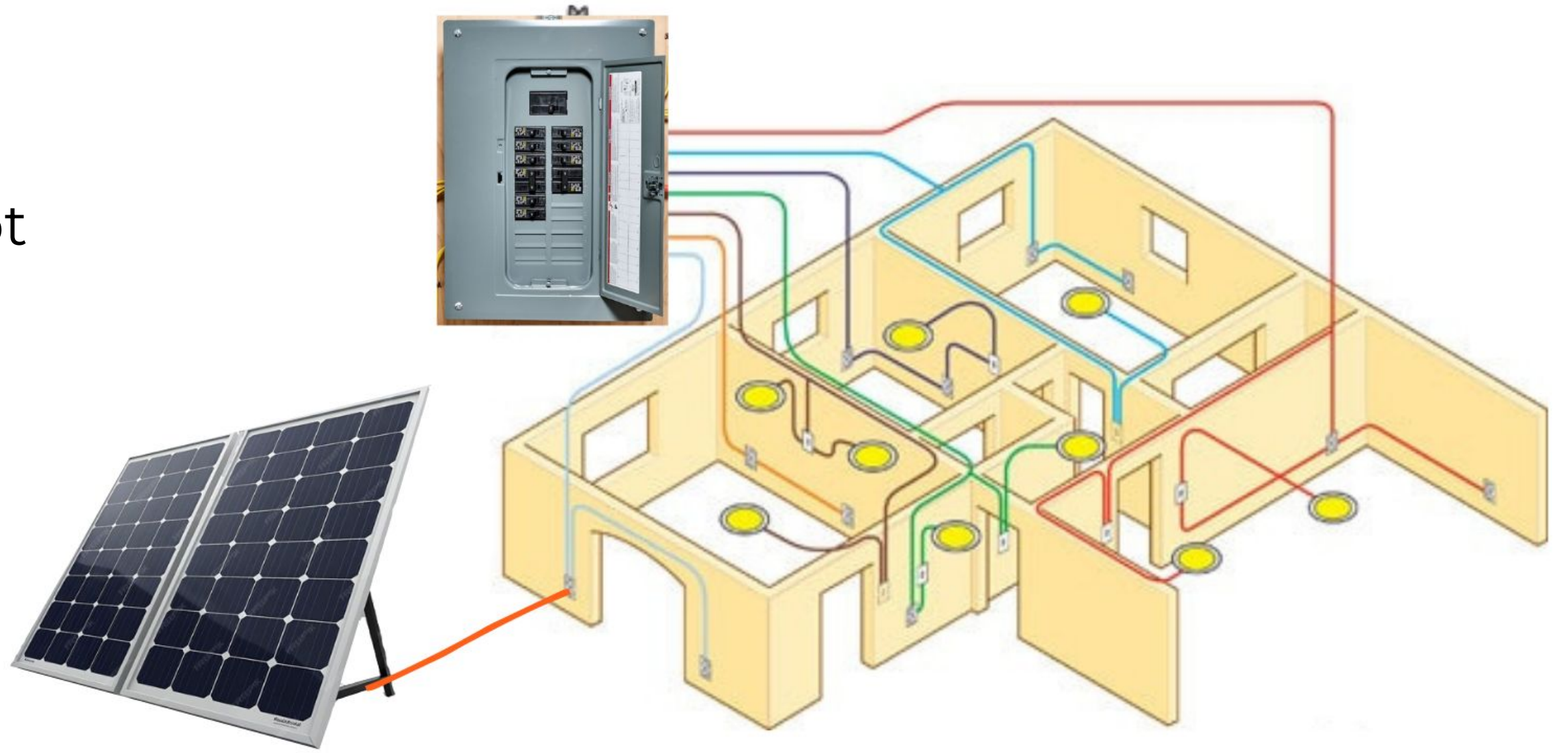
NOTE: The bidirectional GFCI PIPV receptacle protects all downstream receptacles from ground-faults and overcurrent when it is in the first receptacle location.

Circuit location

Location in home can prevent overloads

But homeowner may not know their circuits

Education or electrician needed



Ground fault protection

Ground fault circuit interruption (GFCI) plugs protect against faults

But are designed to be one-way: load → circuit

UL wants two-way GFCI certified and tested

Could also be built in to inverter

Regulatory Issues

Local permitting

- As an appliance, not typically covered by building codes or National Electrical Code (NEC)
- But will local authorities want to regulate it anyway?

Grid interconnection

- Key issue is **exports**: sending power to the grid
- Utah exempts systems from net metering
- Europe limits size and requests registration

Economics

Solar costs reduced or avoided

- Sales and marketing (customer acquisition)
- Local permitting and inspection
- Interconnection
- Labor

Penalties

- Suboptimal performance
- Risk: safety, consumer protection

Gateway drug?

Policy impact on economics

Key issue is treatment of exports

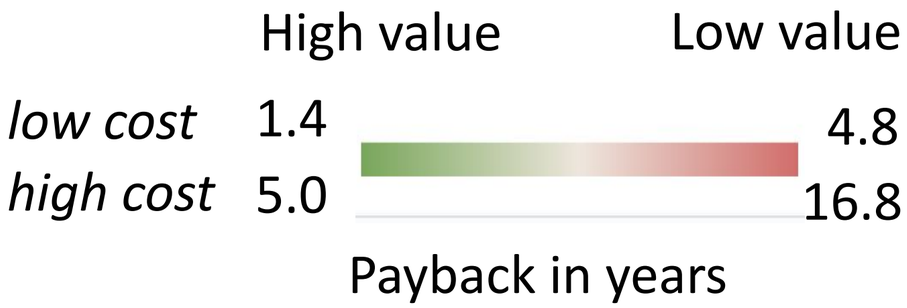
- Utah exempted from NEM, which means no value for exports
- Coverage by NEM or NBT requires utility involvement
- If no NEM, then full value captured only with self-consumption

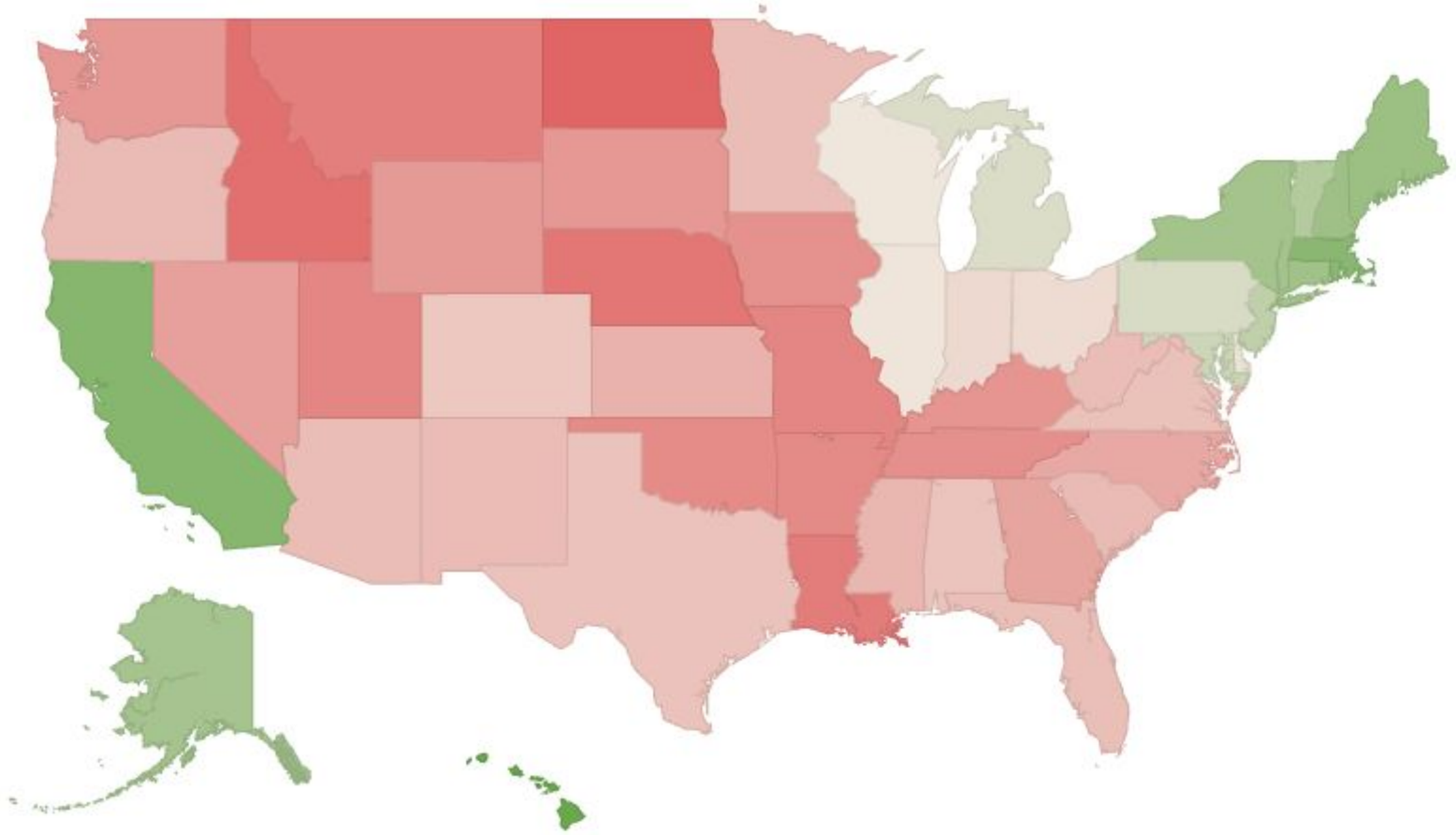
If regulation requires electrician, permits, etc, the value proposition erodes

Simple payback, high and low cases

Generation worth $100-500 per year

Value is a function of retail rates, installation cost, performance





Current market

Not many 120v AC inverters (yet)

Lack of local retailers but shipping rigid & large panels is expensive

- Option is foldable or flexible panels

Growing interest in small batteries: backup power, portable for camping.

- They have built-in inverters, good for non-NEM customers
- Create off-grid options in your home

Drawing from vibrant RV industry

Market evolution

A consumer product: manufacturers will create kits, retailers will emerge to manage sales and distribution

- First may be solar installers, then retailers

Consumer education is critical: how to install systems safely

Market penetration

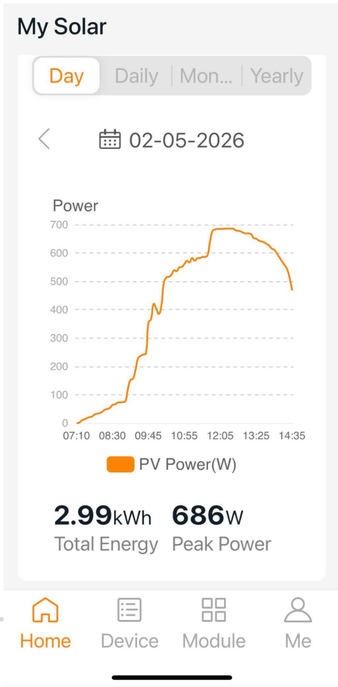
- Existing NEM customers (“expansion kit”)
- Then high users with large bills
- Then apartment dwellers

My field research

First helped a friend install Brightsaver kit, $1.75/W

Then added to my existing 1.7 kW system

- Tried to replicate the German Ikea price
  - used panels, new 120V AC output inverter, DIY mount
- Got to 75¢/W
- Plugged in to garage GFCI outlet



My field research

Lessons learned

A Saturday Dad project.

Buying a kit eliminates the hardest part (amps and volts!).

Some knowledge required.

Few inverters, limited retail

Pathway to Realization

1 **Set Policies**
- Net metering & interconnection
- Subsidies?

2 **Define Regulation**
- Safety certification and testing
- Exempt from permitting?

3 **Make markets**
- Consumer protection
- Consumer education

Roles for States

Safety
- Influence and require UL standards,
- Building codes?

Education and training
- SEO materials or requirements on marketers
- Workshops and videos (YouTube University)

Consumer protection
- Register sellers?
- Disclosure

Policy
- Integrate with low-income energy programs
- Deal with HOA rules
- Subsidies?

Market making
- Promotional campaigns?
- Group procurement?
- Outreach to landlords, affordable housing

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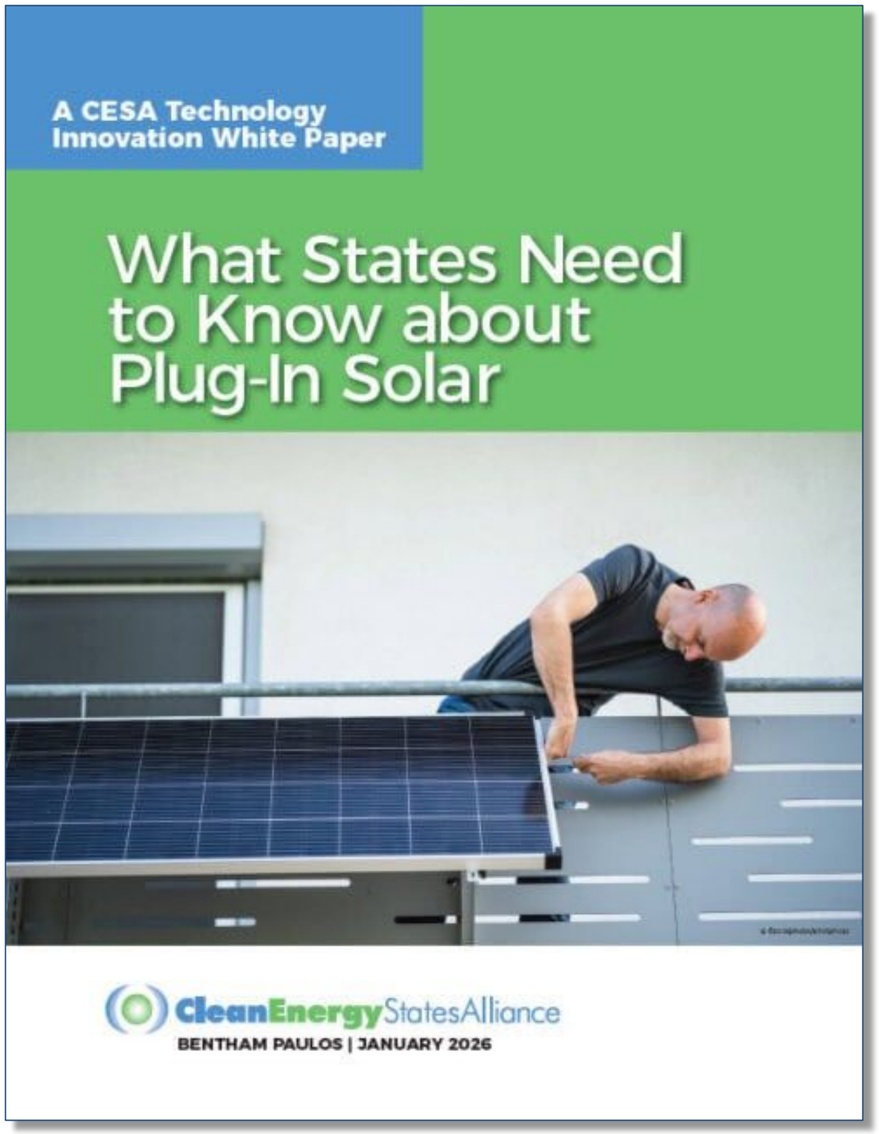

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Thank You

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Upcoming Webinars

The High Cost of AI: How Data Centers are Reshaping Pennsylvania's Energy Landscape

Wednesday, February 25, 2026 @ 1:00 PM - 2:00 PM ET

Pennsylvania has long been a powerful energy exporter, but that legacy has often come at a steep environmental cost.A new report, "The High Cost of AI: How Data Centers Are Reshaping Pennsylvania's Energy Landscape," details the impacts of rising energy demand from data centers in Pennsylvania and explains how the current trajectory will increase fossil fuel energy generation, raise energy costs, and worsen local air quality.

In this webinar, contributing report authors and experts from Clean Energy Group (CEG), Clean Air Council (CAC), and Physicians for Social Responsibility Pennsylvania (PSR PA) will delve into how data center-driven energy demand is driving up utility bills while jeopardizing climate and environmental progress for Pennsylvania. Speakers will also address strategies to combat harms from irresponsible data center proposals at the regulatory, state, and local levels.