# WIDRC MEETING 10/17/25

# REMOVING BARRIERS TO DUAL LUG TAP KIT INTERCONNECTIONS

A safe and cost effective interconnection method for larger residential solar installations

MIDWEST SOLAR POWER LLC
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# ABOUT US

- Local solar installer
- Focus on quality and safety
- Environmental concerns motivate us
- Want quality, safe, timely, and affordable solar
- Solar benefits everyone!

Note: Midwest Solar Power does not speak for every solar installer

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# AGENDA

- Background
- Interconnections and Design Constraints
- Tap Kits vs Termination Cabinets
- Equipment Lists and Service Rules
- What can be done

**Utilities should allow field installed dual lug tap connectors**

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# What is an Interconnection?

- **Interconnection -** The process by which a solar system is integrated into a home electrical system and by extension to the electric grid .

- **Point of Interconnection** - The single, physical connection location within the home electric system that the interconnection takes place.

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# Residential Solar Interconnection Methods

- **Two main types of interconnections for residential systems**

<u>Load Side</u>

- Load Side of the service disconnect
- Easier, Faster, Cheaper
- No outage required*
- Electrically Limited
  - Smaller Solar Systems

<u>Line Side</u>

- Line Side of the service disconnect
- Harder, Longer, More Expensive
- Outage required
- Less Electrically Limited
  - Larger Solar Systems

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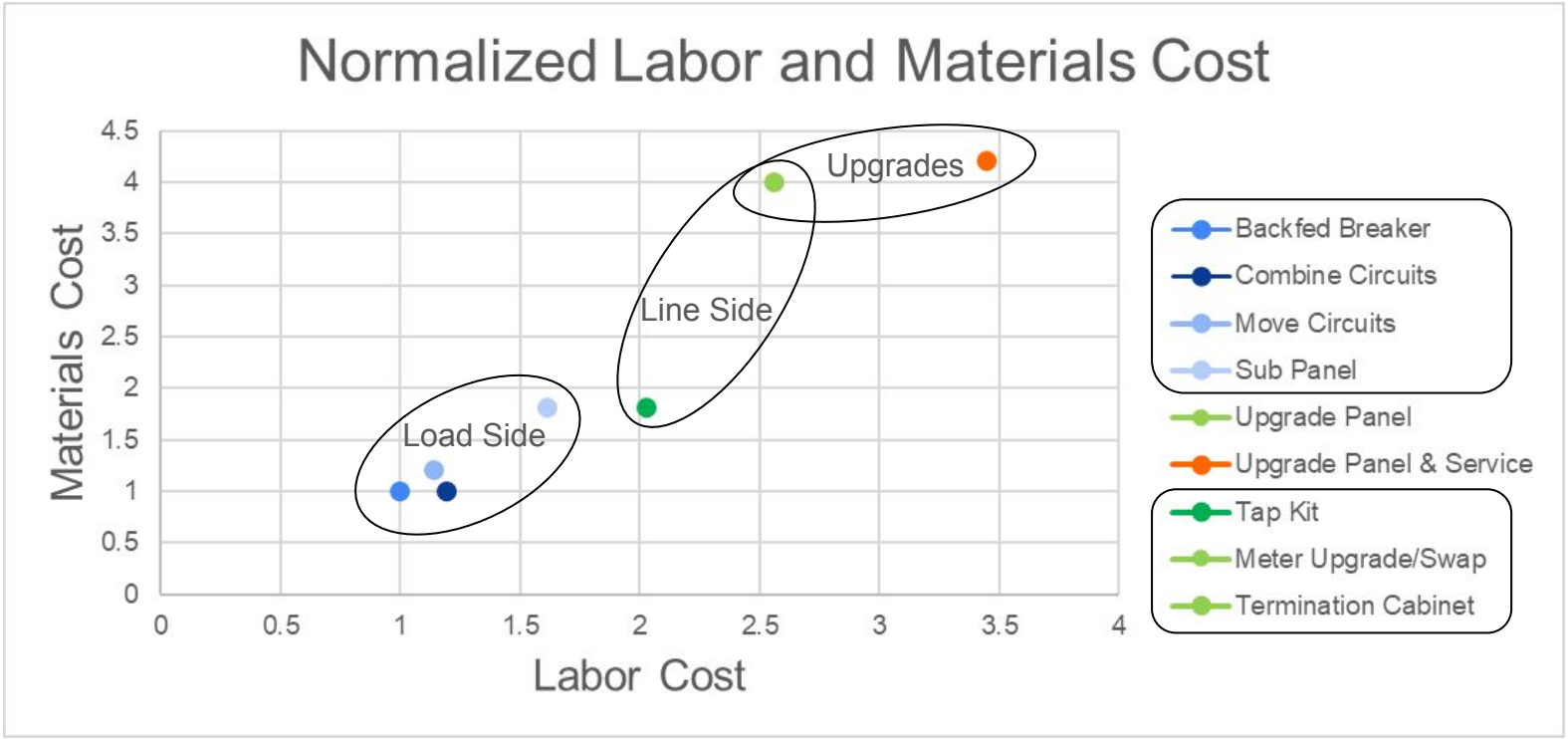
**Load Side = Smaller Systems**
**Line Side = Bigger Systems**

# Residential Solar Interconnection Methods




*Costs are illustrative only all pricing is project specific

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**Good Design = Most affordable interconnection allowed that meets the customers needs**

# Load Side: 120% Rule

- NEC 705.12(B)(2)(b)
- Solar Breaker + Main Breaker = 120% of busbar ampacity or less

Common Examples

- **100 Amp Bus + 100 Amp Main** = 20 Amp Solar = ~4.5 kW DC = ~3.8kW AC = ~5,500 kWh
- **125 Amp Bus + 100 Amp Main** = 50 Amp Solar = ~11.3kW DC = ~9.5kW AC = ~13,750 kWh
- **200 Amp Bus + 200 Amp Main** = 40 Amp Solar = ~9.0 kW DC = ~7.6kW AC = ~11,000 kWh
- **225 Amp Bus + 200 Amp Main** = 70 Amp Solar = ~15.8kW DC = ~13.3kW AC = ~19,000 kWh

Most Common

*Sites with poor solar access need more solar to produce the same kWh

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**What if you need more solar than you can get with a Load Side connection?**

# Line Side Connections

- Not limited by the 120% rule = bigger systems
- New Design Limitations:
  - Category 1 vs Category 2
  - Net Metering Thresholds: 20kW or 100kW

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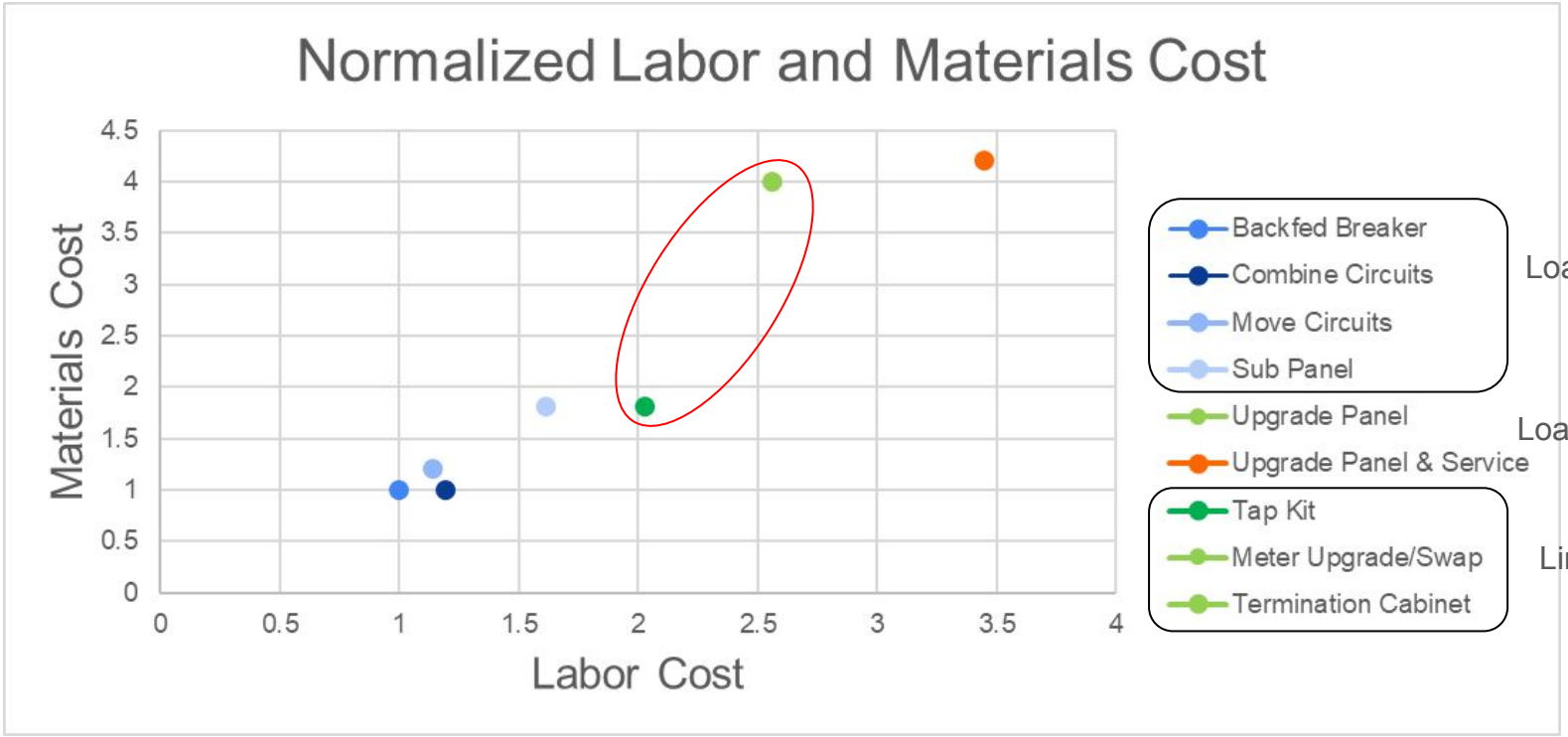
**Line Side interconnections are perfect for residential systems 7.6 - 20 kW AC**

# Residential Solar Interconnection Methods




**Tap Kits are an affordable and safe method of Line Side connection**

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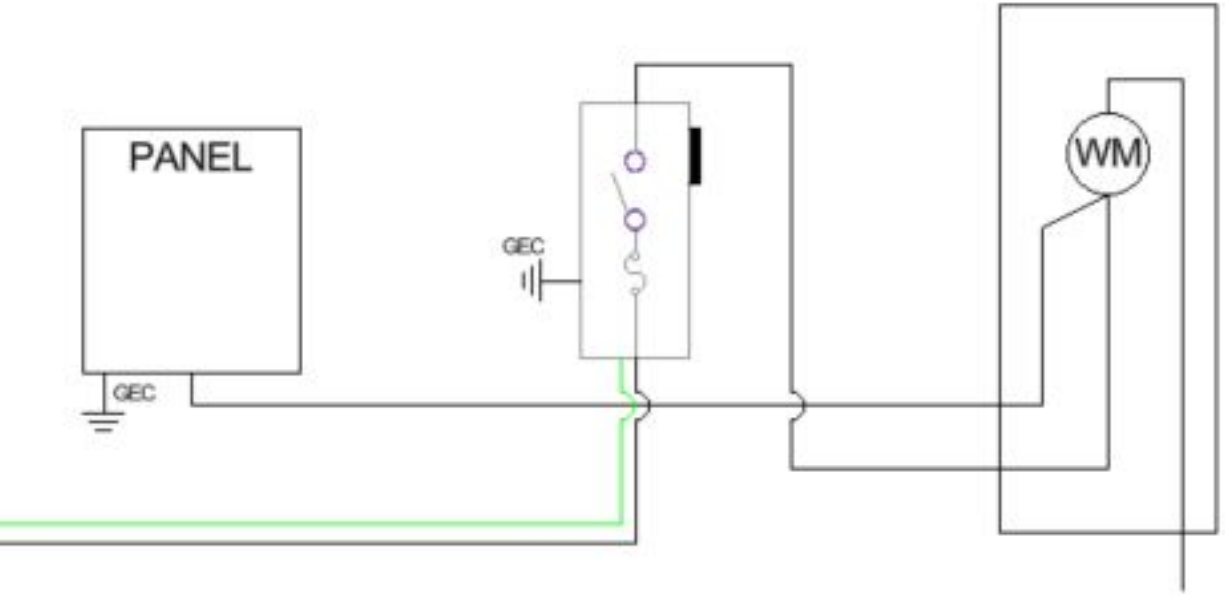
# Line Side Interconnection Methods

Tap Kits




**Dual Lug Tap Kits are easy and straightforward!**

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# Line Side Interconnection Methods

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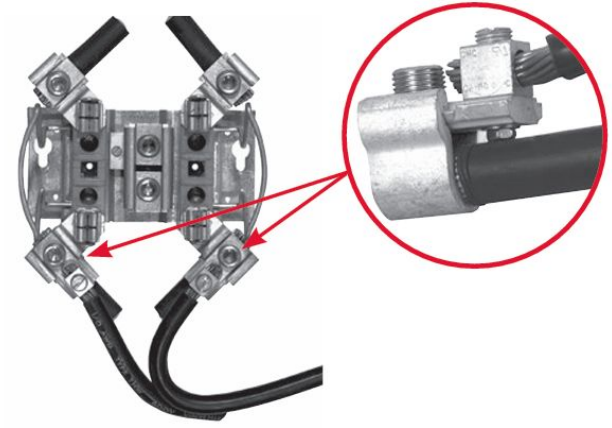
**Dual Lug Tap Kits are easy and straightforward!**

# Line Side Interconnection Methods

**Tap Connectors (3 per set)**



Replaces the load or line side slide-in nut assembly on Milbank 200 Amps sockets. Allows for a 100 Amps tap location in addition to the #6-350 kcmil load-side connector.

**K5022** includes safety barrier extensions for applications over 300 VAC. Three lugs per kit.

| |
|---|
| **K4977-INT** - Internal Hex |
| **K4977-EXT** - External Hex |
| **K5022-INT** - Internal Hex (set of 4 w/ barrier) |

- Milbank K4977-INT
  - Catalog
  - Datasheet

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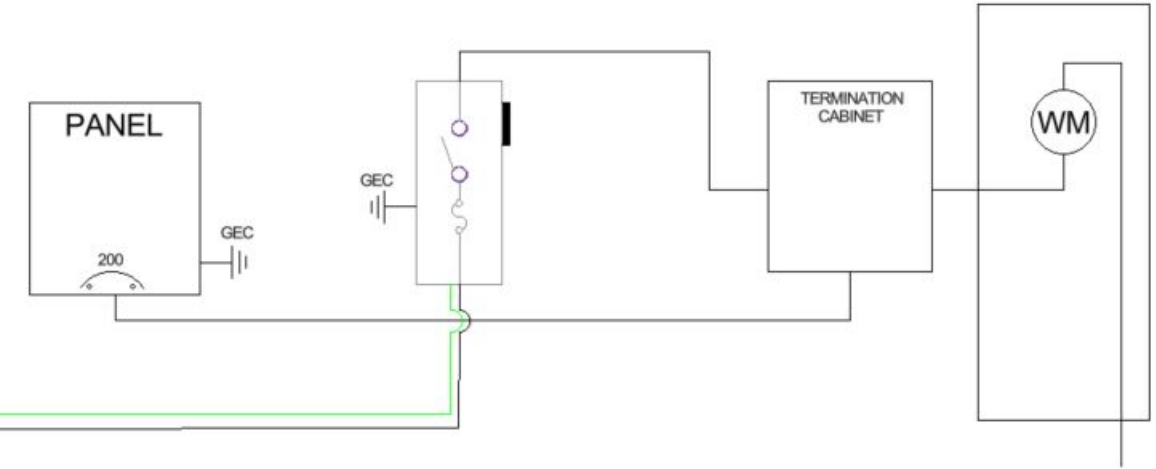
**Dual Lug Tap Kits are easy and straightforward!**

# Line Side Interconnection Methods

## Termination Cabinets




**Termination Cabinets are a lot of work!**

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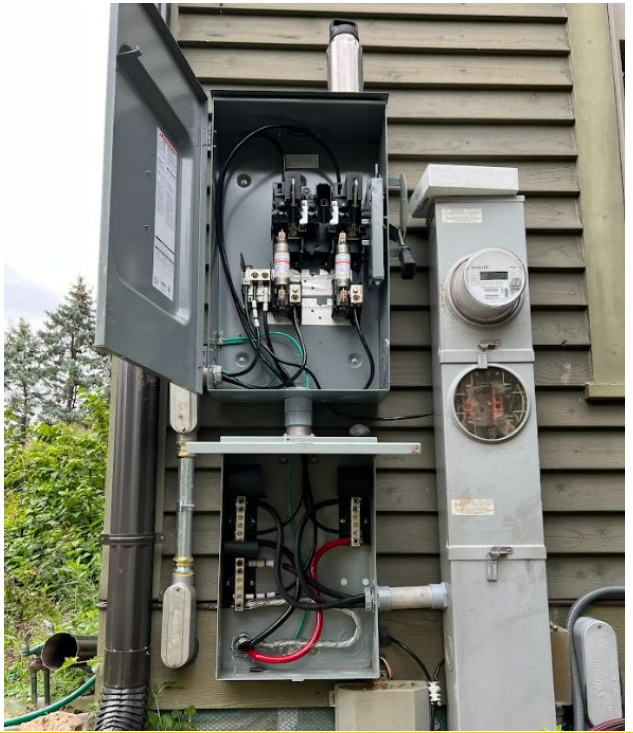
# Line Side Interconnection Methods

Termination Cabinets



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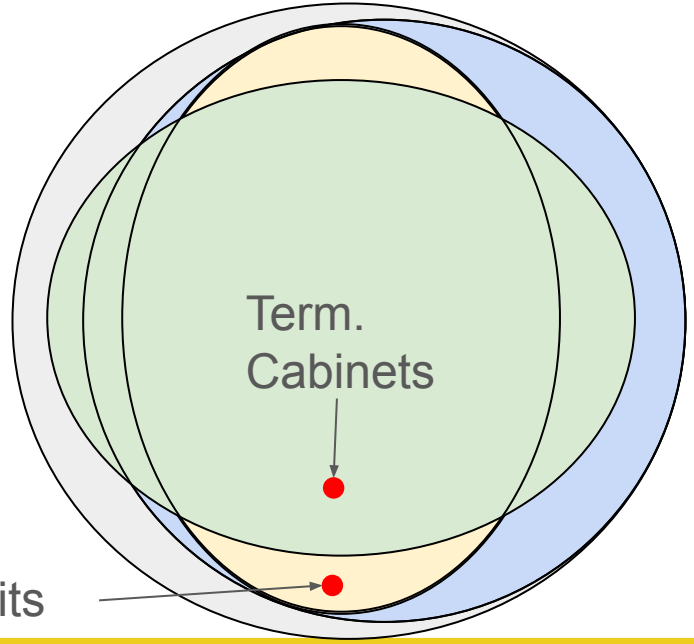
**Termination Cabinets are a lot of work!**

# Authority: Overlapping Jurisdictions

- Good Design = Most affordable interconnection **allowed** that meets customer's needs
- Who decides what is allowed?
  - NEC: NFPA 70
  - State of WI
  - Municipalities/Inspectors
  - Utilities
    - Electric Service Rules
    - Approved Equipment Lists

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**Tap Kits are not allowed by every utility but they should be**

# Equipment List Example

- Some utilities approve meters with factory installed dual lugs
  - U1797-O-K3L-K2L
- However they may not approve field installing the lugs
  - U3358-O-KK + K4977-INT

- All field installed connections must be inspected before being re-energized

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**Field installing the dual lugs does not change the safety**

# Service Rules Example

**510. POINT OF INTERCONNECTION**

**A.** Preferred Methods

1. DG connected via properly sized sub-breaker downstream from the main in-service panel
2. Meter socket with Main (See ESE e-manual E102 and E106)
3. Meter socket with factory installed dual lugs, 320A (See ESE e-manual E106B)
4. Terminated on available factory installed lugs on load side in metering transformer cabinet

**B.** Permitted when connecting DG on the line side of customer's service entrance overcurrent protective device (Breaker/Fuse) Refer to drawing 514 and 521.

1. Terminated on available factory installed lugs in properly sized UL Listed NEMA 3R sealable bussed gutter, termination box, or other UL Li installed outside.

**C.** Not Permitted when connecting DG on the line side of cu protective device (Breaker/Fuse).

1. Splices
2. Split bolts
3. Tap connectors
4. Insulation piercing connectors
5. Installing more cables than lugs are designed to handle

| Manufacturer | Use | Catalog Number | Bypass | Mount | SCCR | Notes |
|---|---|---|---|---|---|---|
| **E106B. Commercial/Residential with Dual Lug Sockets - 250V Max** | | | | | | |
| **120/240V \| 1PH \| 4-Terminal \| 300 Amp** | | | | | | |
| **Milbank** | | | | | | |
| | **UG** | U1797-O-K3L-K2L-ALT | Lever | WALL | 10kA | |
| | **UG** | U3000-O-K3L-K2L-ALT | Lever | WALL | 10kA | |
| **120/208V \| 3PH \| 7-Terminal \| 300 Amp** | | | | | | |
| **Siemens/Talon** | | | | | | |
| | **OH/UG** | 48707-82 | Lever | WALL | 10kA | |
| **E106C. Communications Meter Disconnet Combo** | | | | | | |
| **120/240V \| 1PH \| 4-Terminal \| 60 Amp** | | | | | | |
| **Milbank** | | | | | | |
| | **OH/UG** | U6419KK | Horn | WALL | 10kA | |

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**These are the types of restrictions we are requesting be revised**

# Spas and Hot Tubs

- Other electrical equipment has historically used this interconnection - even in utility territories where it is now disallowed for solar
  - Hot Tubs
  - Spas
  - Service to detached garage

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**This is frustrating for solar installers**

# What Can Utilities Do?

- Update Electric Service Rules and Equipment Lists to:
  - Remove comments that prevent installation of field installed dual lug taps such as K4977-INT
  - Add comments that explicitly allow for field installed dual lug taps such as K4977-INT
  - Update approved equipment lists to specifically note that accessories such as K4977-INT that facilitate Dual Lug interconnections are allowed

# What Can WIDRC Do?

- Solicit feedback on barriers to allowing dual lug tap kit interconnections
- Work as a group to overcome barriers
- Solicit input on other barriers and costs for solar and battery installation:
  - Additional interconnection concerns
  - Local Ordinances
  - Permit fee increases
  - Export Limiting Software

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**Let's work together to make solar more affordable!**

# Conclusion

- Dual Lug Tap Connectors:
  - Safe
  - Do not harm utility infrastructure or interests
  - Keep costs down for solar customers
  - Reduce material waste
  - Minimize outage time

- Let’s work together to keep costs down and improve installation experiences for solar customers

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**Let’s work together to make solar more affordable!**