

Interconnection Issues Surrounding “Plug-N-Play” Balcony Solar

Presentation for the Wisconsin Distributed Resources Collaborative
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Ken Walz, Madison Area Technical College



Balcony Solar in Berlin, Germany

Patio, Lawn & Garden › Generators & Portable Power › Solar & Wind Power › Solar Panels



Plug and Play Solar Panel Power with 800-Watt Solar Panels and 800-Watt Inverter; Simply Plug into Wall

Visit the PLUGGEDSOLAR Store

4.4 ⭐⭐⭐⭐⭐ (6) | Search this page

\$1,395⁰⁰

Price history

Or \$63⁹⁰ /mo (36 mo). Select from 3 plans

Thank you for being a Prime member. Get \$250 off: Pay \$1,145.00 ~~\$1,395.00~~ upon approval for Prime Visa.

Brand	PLUGGEDSOLAR
Material	Monocrystalline Silicon
Product Dimensions	16"L x 16"W x 4"H
Item Weight	5 Pounds
Efficiency	High Efficiency

About this item

- Simply Put the Solar Panel in the Sun & Plug the Electric Cord to Your Wall.
- Estimated Electricity Generation average 1500kWh per year.
- Estimated to save average 20% to 40% of electric bills for average home.
- 4PCS of 200 Watt Solar Panels (total 800Watt), Micro-Inverter with 50ft Cord
- Qualifies for 30% Federal Tax Credit



Click to see full view



Issues?

1. Are the outlets rated to take this? In Europe they are 240V, and accordingly lower current for the same amount of power. But in the US people likely are backfeeding a 120V outlet, so that would be twice the amount of current for a given amount of sun and given panel size.
2. What if people buy a system from Europe designed for a 240V outlet, and then use a traveler outlet adapter to plug that into a US 120V outlet?
3. Are the breakers in the AC panel rated for backfeeding? If you do a solar installation, the installer will install a dedicated solar breaker for backfeeding. But if someone is just plugging panels into the wall, they are backfeeding whatever breaker supplies that outlet. That breaker could be 50+ years old, and may not be rated for backfeeding.
4. Furthermore, the branch circuit in the wall is now being fed by TWO power sources – the Grid AND Solar. That means the current on those branch circuit wires could be LARGER than would be possible from just the Grid supply. The wires in the walls were not sized for this, and it might exceed their ampacity.
5. If the wire is extending from the balcony through a door or window to an outlet inside, how are the wires run? Are the conductors protected from damage, or is the wire just being sandwiched inside the gap of a sliding door or window?

More Issues

6. Home/Condo owner is operating an interconnected system, but has no legal agreement with utility to do so
7. Systems installed by home/condo owner may not even be known about for the utility, so they have no idea that this is out there on their grid. - a risk for lineman servicing that area.
8. No emergency disconnect for the system, so there is no way for a utility or fire department to shut this off.
9. Homeowner probably has not informed their insurance company of the installation. So the install likely is not covered, and might invalidate their insurance policy.
10. If insurance policy is invalidated, how does that impact a home or condo owner's mortgage?
11. Risk of a lightning strike hitting the panels on the balcony, and then sending energy back into the home/condo/apartment and frying circuits - maybe frying those of neighboring units in an apartment complex.
12. Are these products UL listed?
13. If the system is installed by an apartment dweller, what is their liability for potential damage to the residence/building. And what is the building owner's recourse to collect for possible damages?
14. Do landlord's need to add language to their lease to address balcony solar?

Some Key thoughts:

- Absent any legal restrictions, increasing numbers of apartment dwelling consumers will install these as the prices of equipment keeps dropping.
- Likely few (if any) of these people will contact an electrician, inspector, or utility to inform them of what they are doing. Much less inform their landlord or homeowners association or insurance agency.
- At some point, one or more of these systems will fail. And then, you just hope that the impact is not too severe, and that nobody gets hurt. But a single apartment suffering a solar induced electrical fire - even if it is minor - is going to be a black eye for the industry.
- At some point, it is going to become clear that there is a need to regulate these products. It would be good if that happened <before> anything bad happens.

Utah homes can now harness plug-in solar power

By Oliver Townsend Apr 9, 2025



Original image from: <https://cleantechnica.com/2025/04/09/power-to-the-people-plug-in-solar-now-legal-in-utah-homes/>



H.B. 340 Solar Power Amendments

(13) "Portable solar generation device" means a moveable photovoltaic generation device that:

- (a) has a maximum power output of not more than 1,200 watts;
- (b) is designed to be connected to a building's electrical system through a standard 120-volt alternating current outlet;
- (c) is intended primarily to offset part of the customer's electricity consumption;
- (d) meets the standards of the most recent version of the National Electrical Code; and
- (e) is certified by Underwriters Laboratories or an equivalent nationally recognized testing laboratory.

Part 6. Portable Solar Generation Device

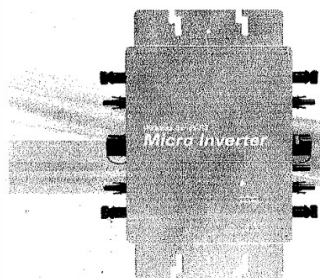
54-15-601. Portable solar generation device -- Exemptions -- Requirements.

- (1) A portable solar generation device that meets the requirements of this part:
 - (a) is exempt from:
 - (i) the interconnection requirements described in Section 54-15-106; and
 - (ii) requirements to enter into an interconnection agreement under Section 54-15-103;
 - and
 - (b) is not subject to the net metering program requirements under this chapter.
- (2) A portable solar generation device shall include a device or feature that prevents the system from energizing the building's electrical system during a power outage.
- (3) An electrical corporation:
 - (a) may not require a customer using a portable solar generation device to:
 - (i) obtain the electrical corporation's approval before installing or using the system;
 - (ii) pay any fee or charge related to the system; or
 - (iii) install any additional controls or equipment beyond what is integrated into the system; and
 - (b) is not liable for any damage or injury caused by a portable solar generation device.

Section 3. Effective Date.

This bill takes effect on May 7, 2025.

MICRO INVERTER



WVC-1600(Life)

USER MANUAL

..... Green Energy Expert

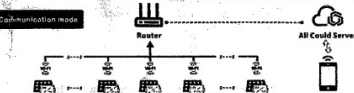
IoT Monitoring Platform

Smart mobile "core" life

- CO-2 induced environmental analysis
- Daily and total energy generation in kWh
- Actual DC input voltage, current and power
- Actual AC output voltage, current and power
- Inverter temperature
- Historical (daily, weekly, monthly) power curve
- Power losses due to inverter induced stress
- Optional limitation of power output
- Online switch for the inverter start stop
- Online switch for the inverter start stop



App Store Google Play



- ① CO-2 induced environmental analysis
- ② Daily and total energy generation in kWh
- ③ Actual DC input voltage, current and power
- ④ Actual AC output voltage, current and power
- ⑤ Inverter temperature
- ⑥ Optional limitation of power output
- ⑦ Online switch for the inverter start stop
- ⑧ Historical (daily, weekly, monthly) power curve

Micro inverter Use Manual(Life)

model	WVC-1600
Recommend use panels	4*500Watt
Output voltage mode	120/230V Auto switch
PV Open circuit voltage	33-60VDC
Operating voltage range	22-60V
Starting voltage range	22-60V
short-circuit current	4*12A
Maximum working current	4*16A
Output parameters	
Output peak power	@120V 1600Watt
Rated output power	@230V 1600Watt
Output current	1550Watt 6.5A
AC voltage range	11.3A 180-265VAC
AC frequency range	48-51Hz/58-61Hz
Power factor	48-51Hz/58-61Hz >95%
Number of branch connection	>95%
Output efficiency	3PCS (Single) 6PCS (Single)
Static MPPT efficiency	@120V 99.5%
Max output efficiency	@230V 99.5%
Loss of power at night	95%
Total current harmonics	<0.5W
Appearance and technical features	<5%
Temperature range	-20°C to +50°C
Size (L*W*H)	370mm*300mm*41.6mm
Net amount	3.0kg
Waterproof grade	IP65 IEMA38
Heat dissipation mode	Self-cooling
Communication mode	Wi-Fi
Power transmission mode	Reverse transmission, Load priority
monitoring system	APP
Electromagnetic Detection	EN61000-6-1:2007 EN61000-6-3:2007+AL:2011+AC:2012
Power Grid standard	EN50549-1, EN 50549-2, NBR 16149:2013, UL1741
Power grid detection	IEC/EN 62109-1, IEC/EN 62109-2, IEC 62116, IEEE 1547
Certificate	CE, CEC
Packing weight	
Specifications	Each (Packing) 4.0KG
weight	Box (4PCS) 15.5KG
	410*170*140mm
	430*405*380mm

Detailed



System diagram



With W wire connection (Single phase 120/230V)



No W wire connection (Single phase 120V)



Note: You can purchase a professionally customized AC bus with a T-type connector. Use this AC bus as the AC bus for each branch. Connect it hand in hand to form a modular micro-inverter branch wiring system.

LED indicator function of micro inverter

1. Red light keeps on - The equipment enters the preparatory working state.
2. Red light flashes - The device enters the different work status.
3. Blue light flashes quickly - MPPT maximum power point search status.
4. Blue light keeps on - MPPT maximum power point locked status.
5. Blue light turns to red light for a long time - Abnormal protection, or frequency protection, or fault, or software shutdown.
6. Blue light turns to red light for a long time - Abnormal protection, or frequency protection, or fault, or software shutdown.

Normal working indicator flashing process

Connect the micro-inverter correctly to the AC and DC terminals and then power on. The red light keeps on for 2-3 seconds - Blue light flashes for 20 seconds - The blue light flashes quickly MPPT maximum power point search - The blue light keeps on, MPPT lock.

RCT

SHENZHEN RCT Testing Technology Co., Ltd.

Declaration of Conformity

Applicant name & address : Dongguan kaideng Energy Technology Co., Ltd.
4 th floor, Fuyuan business building, no. 1, Lane 13, xin'an maiyuan Road, Chang 'an town, Dongguan City

Manufacturer name & address : Dongguan kaideng Energy Technology Co., Ltd.
4 th floor, Fuyuan business building, no. 1, Lane 13, xin'an maiyuan Road, Chang 'an town, Dongguan City

License holder: Dongguan kaideng Energy Technology Co., Ltd.
Address: 4 th floor, Fuyuan business building, no. 1, Lane 13, xin'an maiyuan Road, Chang 'an town, Dongguan City

Product : Micro Inverter

Model/Type reference : WVC-295, WVC-300, WVC-350, WVC-600, WVC-700, WVC-1200, WVC-1400, WVC-1600, WVC-2000, WVC-2400, WVC-2800

Trade mark : KGD

Order No. / Report No. : RCT20200824002S

Test Standards	EN 50549-1: 2019
	EN 50549-2: 2019

This Declaration is for the exclusive use of RCT's Client and is provided pursuant to the agreement between RCT and its Client. The observations and test results referenced from this Declaration are relevant only to the sample tested. This Declaration by itself does not imply that the material, product, or service is or has ever been under a RCT certification program.

Note: This Declaration is part of the full test report(s) and should be read in conjunction with it.

CE



Christy Chen

lab manager

Date: Aug.24, 2020

Report Seal

Note this is CE listed for European Union. It is NOT UL listed.

A CESA Technology
Innovation White Paper

What States Need to Know about Plug-In Solar



 **CleanEnergy**StatesAlliance
BENTHAM PAULOS | JANUARY 2026

<https://www.cesa.org/wp-content/uploads/Plug-In-Solar.pdf>

What questions should state legislators and state energy agencies consider?

- ☐ What should the maximum size of plug-in systems be?
- ☐ Should energy exports to the grid be allowed? Should there be a size limit for exporting systems?
- ☐ How should plug-in systems relate to net metering or net billing? Should energy exports be compensated, and at what level?
- ☐ Are current product safety standards sufficient?
- ☐ Under what circumstances, if any, should building or electrical permits be required and installations inspected?
- ☐ Is it necessary for utilities or local/state officials to register systems?
- ☐ How should officials encourage or regulate market development? Should vendors be registered or pre-approved? What scrutiny is required to ensure vendors are selling safe and effective products?
- ☐ Are incentives desirable, such as rebates or production payments, perhaps to broaden access to this technology for low-income households?
- ☐ How can plug-in solar be incorporated into existing low-income solar programs?
- ☐ Should batteries be encouraged or required?
- ☐ What should officials do for consumer protection and to encourage safe installations and fair sales practices? What information should manufacturers and distributors be required to provide regarding installation, connection, operation, or utility savings claims?
- ☐ In what circumstances should the use of an electrician be required?
- ☐ Is it worthwhile to include plug-in solar + battery systems in VPP or demand response programs?

Additional reading

- [*Safety Considerations for Plug-In Photovoltaic \(PIPV\) Systems*](#), UL Solutions, December 12, 2025.
- [*Plug-In Solar Bills Are in the Works in New Hampshire and Vermont*](#), Sarah Shemkus, Canary Media, September 23, 2025.
- [*Why Balcony Solar Panels Haven't Taken Off in the US*](#), Akielly Hu, Wired, May 3, 2025.
- [*Balcony Solar Comes to California*](#), John Fitzgerald Weaver, PV Magazine, April 25, 2025.
- [*Barriers to Balcony Solar and Plug-In Distributed Energy Resources in the United States*](#), Daniel L. Gerber, Achim Ginsberg-Klemmt, Lyn Stoler, Jordan Shackelford and Alan Meier, *Energies*, April 20, 2025.
- [*Utah H.B. 340 Solar Power Amendments*](#), Utah Legislature, March 25, 2025.
- [*Plug-In Solar PV: Solar for All - A Deep-Dive on a Fast-Emerging PV Segment*](#), Solar Power Europe, March 2025.