

INTERCONNECTION
REFORM TO
ACCELERATE
RESIDENTIAL
SOLAR & STORAGE

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NJ BPU Grid Modernization, Interconnection Process
Stakeholder Meeting 2 Submission
11/16/2021



Residential Storage Interconnection Reform – Essential for Grid Modernization



Problem

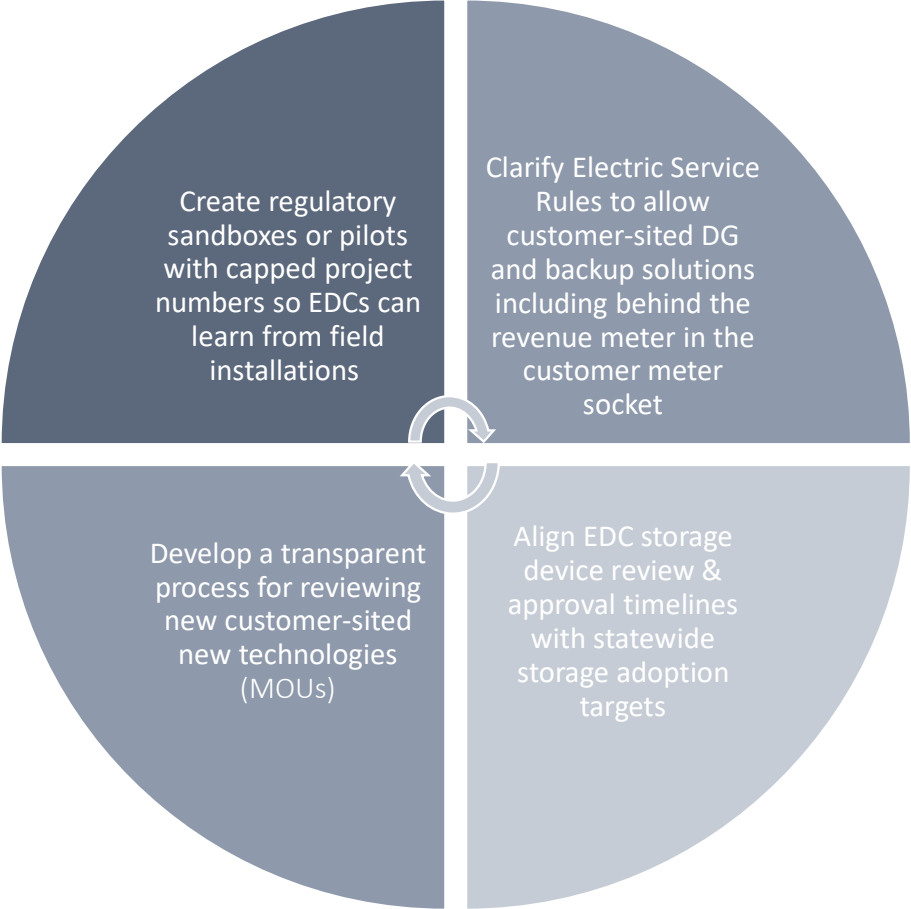
- A future of high residential solar penetration requires battery storage
- Solar + Storage installations can be costly and complex
- Interconnection and electric service rules are slow to evolve

Solution

- Develop a transparent pathway for distributed generation interconnection solutions to go through EDC technical, field, and legal review and approval
- Tesla Backup Switch reduces cost and install times for residential storage: an adapter that locates between customer meter socket and EDC revenue meter, it reduces storage install times by 10X and reduces project costs
 - Compliant with National Electric Code
 - Certified to UL 414, UL 2735, UL 916, UL 1741 PCS
 - Approved by utilities in other states

Pathways for Success to Allow New Customer-Sited Technologies

EDC Interconnection Reform Actions



Appendix

Problem: PV-Storage Home Installations are Complex

- Whole-home backup requires extensive re-wiring of the home
 - Either re-wiring the service disconnect and main panel grounding
 - Or re-wiring each individual home load circuit
- Multiple additional boxes are added to the customer's wall.
- Dozens of wire terminations are required
- Resulting installation is costly
- Resulting installation can be confusing for emergency personnel/contractors/EDC employees



Solution: Isolation Adapters on Customer Meter Can/Panel

Tesla Backup Switch

- Less intrusive for customer & more streamlined installs on diverse property sizes and configurations
- Improved aesthetics & customer experience
- Easier to install on more premises, 10X faster installs = less stress on available labor, easier logistics, improved install safety
- Less material and labor costs passed to customer (e.g. realized in \$500 TSLA credit for customers using Backup Switch)
- No EDC maintenance requirements (any issue at the site, simply pull it out)

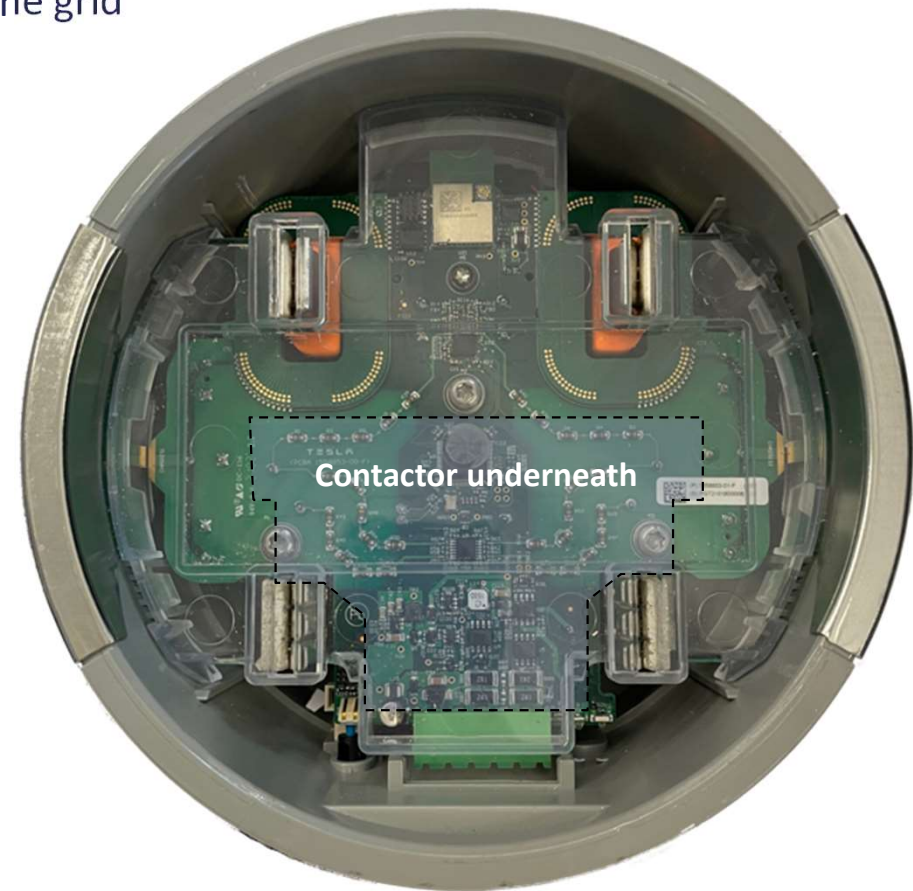


Tesla Backup Switch

Meter collar device/adaptor to safely island the home from the grid

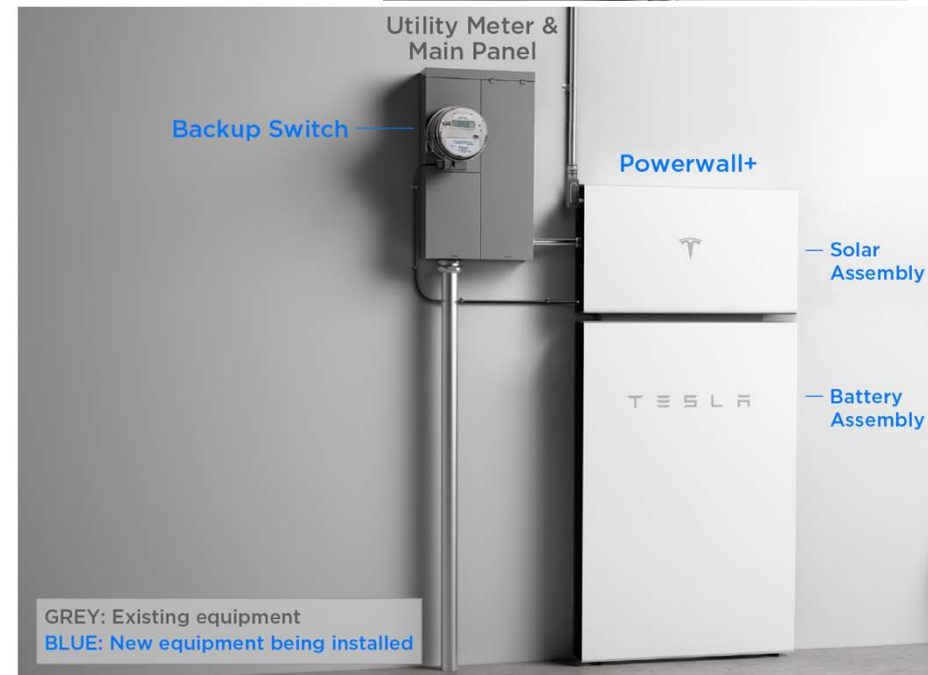
- The biggest single-change potential for customer cost savings
- **Not** a means for electrically connecting a generation source
- **Not** a line side tap
- The Backup Switch contains:
 - A latching relay to disconnect the home from the grid so that it can be backed up safely
 - Sensing equipment so that we can safely operate the relay and backup power sources
 - Intelligence and communication to ensure safe operation
- Certified under the same **UL 414 standard** as the **meter socket**.
 - Additional certification: UL 2735, UL 916, UL 1741 PCS

Production Sample



Enabling Low-Cost Isolation for Backup

- Safe whole-home backup from a battery energy storage system requires an integrated, automated means of disconnecting the home from the grid.
- Today's hardware requires 8-10 hours on site for installation
- The ANSI type 2S meter socket is a standard interface available in customer homes which allows a simple, safe alternative to rewiring the home
 - Governed by existing safety standards
- Backup Switch is an example of a clean energy DG solution that takes less than 1 hour by installing at the customer meter panel
 - <https://www.tesla.com/support/energy/powerwall/learn/tesla-backup-switch>

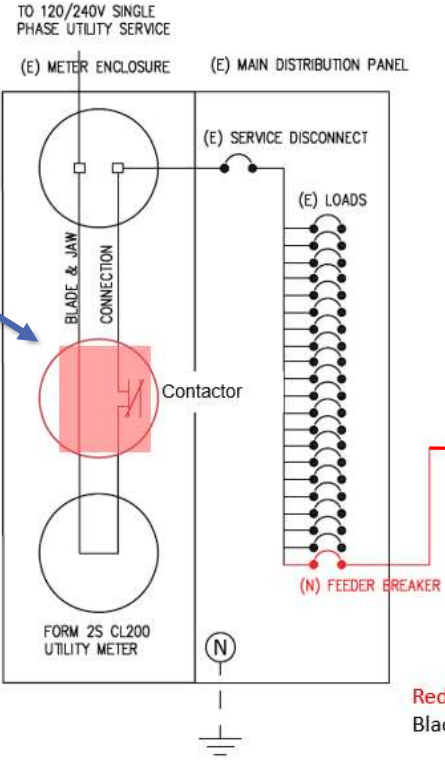


Tesla Backup Switch – Located Between Customer Meter Socket and Utility Meter

Residential PV-Storage installation with no load relocation



Backup Switch



Red (N): New Tesla installed Equipment
Black (E): Existing Equipment

Backup Switch Specifications

PERFORMANCE SPECIFICATIONS

Continuous Load Rating	200A, 120/240V Split phase
Short Circuit Current Rating	10 kA with any breaker ¹ 22 kA with minimum 22 kA breaker ¹
Communication	CAN
Product Compatibility	Powerwall 2 with Backup Gateway 2, Powerwall+
Expected Service Life	21 years
Warranty	10 years

¹ See section 27.12.4 in UL 414.

COMPLIANCE INFORMATION

Safety Standards	USA: UL 414, UL 2735, UL 916 CA Prop 65
Emissions	FCC, ICES

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-40°C to 50°C (-40°F to 122°F)
Storage Temperature	-40°C to 85°C (-40°F to 185°F)
Enclosure Rating	NEMA 3R

MECHANICAL SPECIFICATIONS

Dimensions	176 mm x 205 mm x 74 mm (6.9 in x 8.1 in x 2.9 in)
Weight	2.8 lbs
Meter and Socket Compatibility	ANSI Type 2S, ringless or ring type
External Service Interface	Contactator manual override ² Reset button
Conduit Compatibility	1/2-inch NPT

² Manually overrides the contactor position during a service event.

Regulatory Sandboxes – Support Accelerated EDC Learning from Field Installations

OPINION

Now is the time for regulatory sandboxes in energy and utilities

Published Oct. 22, 2021

By Brien J. Sheahan



Brian Tucker/Utility Dive

The following is a contributed article by Brien J. Sheahan, former Chairman and CEO of the Illinois Commerce Commission, and former chairman of the National Association of Regulatory Utility Commissioners' Presidential Task Force on Innovation.

"Energy-specific sandboxes must be carefully and thoughtfully designed, and ... there are good arguments for ... target[ing] the energy industry, particularly the power sector. The energy system is transforming toward a largely distributed and renewables-based future that will require an updated regulatory framework. Trialing some targeted policy changes now, at limited scale, will help ensure that the rules governing the system keep pace with the energy transformation."

[Guidehouse](#)

Clarify Electric Service Rules to Allow Tested Customer-Sited Adapters & Backup Solutions

3.11 Meter Attachments

No attachments by the customer or the customer's agent are permitted to Company-owned meters, meter circuits, or ancillary meter devices. This includes grounds attached to meter sockets from the telephone or CATV companies.

The following are considered **un-authorized** connections when not made, installed, or performed by a FirstEnergy employee or an authorized representative of FirstEnergy:

- Any adapter placed between the revenue meter and meter socket.
- Attachments or connections to the potential or current circuits of transformer rated revenue meters.
- Any connection inside the meter socket.

The Company will supply, upon request by a customer, kWh and/or kvarh pulses from a Company-owned meter for demand control purposes. A cost will be assessed to the customer in accordance with specific Company charges for this connection.

Source: JCP&L Customer Guide for Electric Service (NJ) – October 2018 at pp. 11

<https://www.firstenergycorp.com/content/dam/customer/service%20requests/files/Customer-Guide-for-Electric-Service-NJ.pdf>

Develop a transparent process for reviewing new customer-sited new technologies

Proposed General Terms based on other pilots

- Clear installation parameters - who installs, removes devices, duration of removal, commitment to comply with utility rules
- Develop communications process between utility staff and vendor/customer agents
- Stipulate necessary training documentation, in-person demos for personnel
- Clarify grey areas in electrical service rules – what is an extension of the customer-owned meter socket, what is utility property or process requiring permission?
- Provide assurances about the term of a pilot, demonstration, cap on customers enrolled in a program

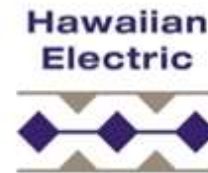
Customer-sited Switches and Adapters present the biggest single-change potential for residential DG customer cost savings

Tesla Backup Switch	Tesla's solar and storage installation for residential homes; installs under an hour and allows for safe disconnects and whole-home backup with the battery when the grid is in an outage
Simple ConnectDER	A meter panel adapter that reduces install time under an hour, allows resident to quickly "swap in" additional self-generation components on the home as they are introduced to the market, installed nationwide
Smart ConnectDER	The Smart ConnectDER™ goes beyond Simple ConnectDER by including onboard metering, communications, and controls. For utilities, it unlocks alternative tariff models and grid management capabilities like load unmasking. This meter collar operates in parallel with the utility's grid and can be factory-configured to terminate DER field wiring to either the load side or line side of the utility meter. For homeowners and installers, it comes with all the same benefits of the Simple ConnectDER – lower cost and fewer boxes and wires on the side of your house.
EZ-Connect	UL Listed, 200-amp manual transfer switch automatic disconnect for solar when the grid goes into an outage, allows transfer load to your back-up device, being developed for use nationwide.
SolarLink	During a power outage, PV systems shut down to prevent dangerous back-feeding of the utility lines. If these systems did not shut down, solar panels could energize the utility lines, creating an extremely dangerous situation for line-workers. SolarLink avoids this issue by automatically disconnecting from the utility grid when utility power is lost. It will be made available in a meter panel/socket based adapter and surface mount.
Green Meter Adapter	Used in California PG&E, the GMA is an alternative for solar and solar-storage installations to upgrading an electric panel and service to save time and additional cost; installed in meter panel .
RMA – Renewable Meter Adapter	The device simplifies the interconnection process, allowing customers to bypass electric service panel upgrades that are often required to support rooftop solar systems. This allows customers to eliminate the hassle and cost of associated construction to walls, stucco and landscaping, which can cost upwards of \$10,000, as well as related delays and additional permitting requirements. Since becoming available in 2015, more than 6,500 SDG&E customers have saved nearly \$8 million in solar installation costs by using the Renewable Meter Adapter.
Generlink	UL-listed, socket-mounted transfer switch that provides a safe and convenient way to connect portable generator power to the home; installed behind utility revenue meter, the GenerLink delivers generator power directly to customer breaker box, eliminating the hassle of running power cords through the home.

Backup switch approvals by these utilities allow Tesla to pass on \$500 savings per customer (PV-Solar):



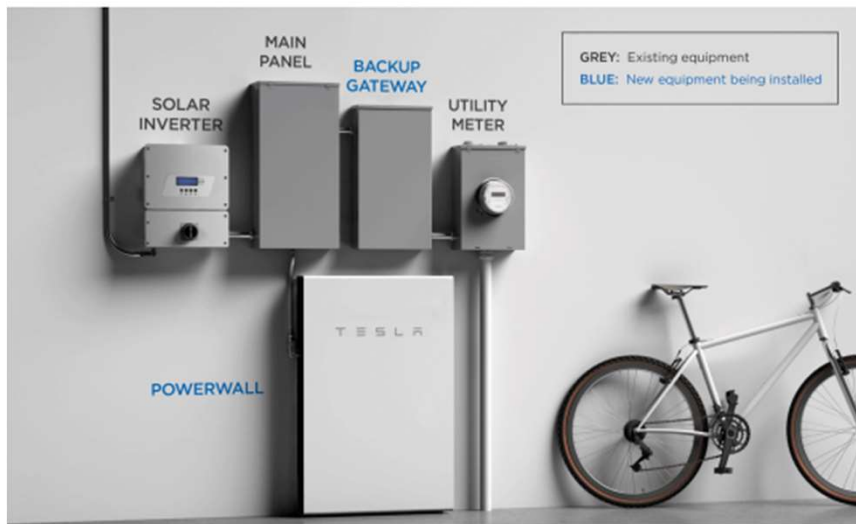
Adoption discussions underway in these utility service areas:



SMART HOMES AT EASTON PARK
DRIVEN BY UTILITY TECHNOLOGY APPROVALS



SMART HOMES AT EASTON PARK DRIVEN BY UTILITY TECHNOLOGY APPROVALS



Old Way



New Way

SMART HOMES AT EASTON PARK PROJECT MILESTONES & ENABLERS

- 06/09/2021
 - First *Powerwall* + Install in Utility service territory
- 09/30/2021
 - TSLA *Backup Switch* Approval + Install Guidelines Issued by Utility - available at [https://bluebonnet.coop/Bluebonnet/media/pdf/Reports%20and%20Forms/\(MS-507T\)-Renewable-Interconnection-Less-Than-50kW-At-Meter-With-Tesla-Disconnect-Collar-Backup-Switch.pdf](https://bluebonnet.coop/Bluebonnet/media/pdf/Reports%20and%20Forms/(MS-507T)-Renewable-Interconnection-Less-Than-50kW-At-Meter-With-Tesla-Disconnect-Collar-Backup-Switch.pdf)
 - TSLA immediately begins providing \$500 Point-of-Sale Discount for all PV+ Powerwall Purchases in Utility Service Area
- 10/14/2021
 - First 9 Solar Roofs Installed in Easton Park new homes
- 10/18/2021
 - First TSLA Backup Switch & Powerwall + Installs in Easton Park