PPL Electric Utilities

Interconnection Meeting Workshop - May 1, 2024

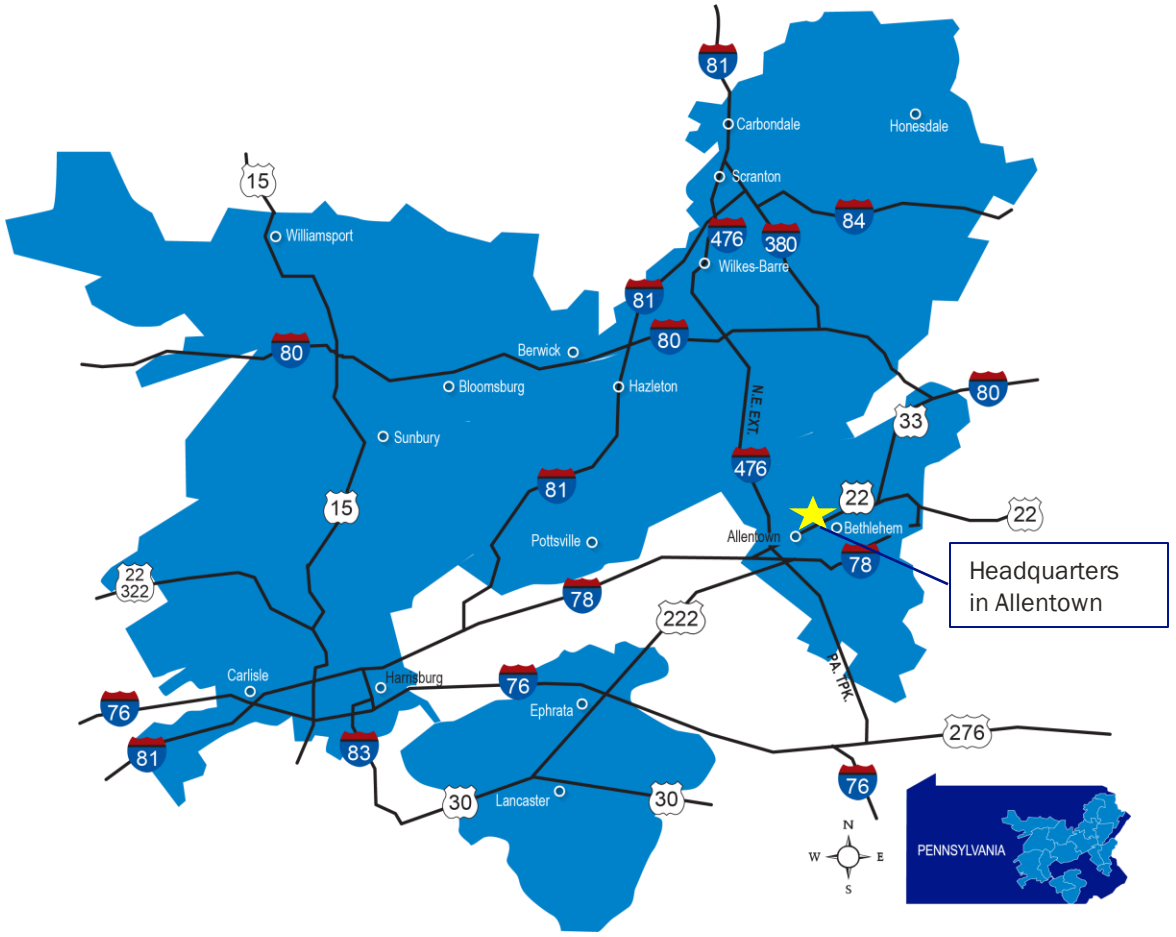
Business Use

Agenda

- **Introductions** – Preston Walker (5 min.)
- **PPL Electric Utilities Background** – Carol Obando-Derstine (5 min.)
- **Setting up the Application Process (Portal vs. Manual, Invoicing, Holds, etc.)** – Jonelle McKinnon (15 min.)
- **DER Pre-Application & Interconnection Process** – Leonard Nwankwo & Angie Wood (15 min.)
- **Mid-Workshop Break and Brief Q&A** (5 min.)
- **Regulatory Review** – George Beam (10 min.)
- **Web Resources** – Jonelle McKinnon & Denis Pancoast (10 min.)
- **Next Steps and Future Topics** – Preston Walker, Leonard Nwankwo & George Beam (5 min.)
- **Interconnection Process Q&A** (20 min.)

PPL Electric Utilities Background - A Powerful Network

Superior operations drive significant value for customers



1.5M
Customers served

29
Counties

50K+
Miles of transmission and distribution powerlines

1,700+
Dedicated employees

Data as of Dec. 31, 2023

We are Focused on Driving Sustainable Value

Guided by an enduring corporate mission and compelling strategy.

Mission

Provide safe, affordable, reliable, sustainable energy to our customers and competitive, long-term returns to shareowners.

Strategy

Create the Utilities of the Future

Enhance **reliability and resiliency** of our electric networks through **strategic investments**

Advance a **clean energy transition** while preserving **affordability and reliability** for our customers

Drive **operational efficiency** across PPL to **deliver long-term value** for our customers and shareowners

Strategy supports customer value, a clean energy transition and economic development

Our Strategic Investments are Delivering Value for Customers

Advancing grid innovation and automation and hardening the grid to improve reliability and resiliency while maintaining affordability.

Driving reliability, safety and efficiency

- Grid Hardening investments across distribution and transmission systems
- Replacing aging equipment with stronger poles, wires
- Building new substations and upgrading existing ones

Implementing grid automation and innovation

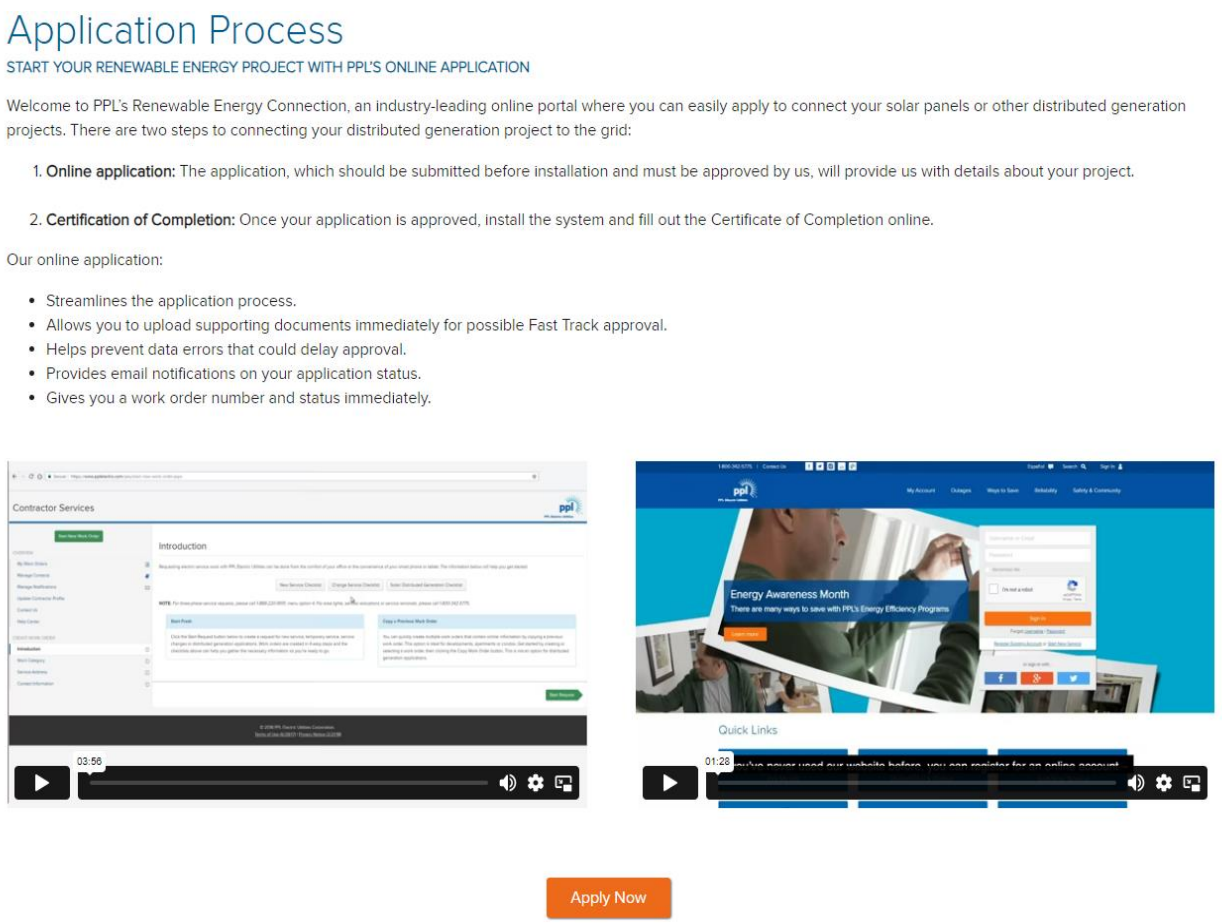
- Deploying non-wires and grid enhancing technology to increase capacity and reliability
- Meeting demand for distributed energy resources

Application Process: Portal versus Manual

PPL Electric will only require the customers to utilize the manual application process when new service is required.

All existing service customers can utilize the online application process.

You will find helpful resources on our website that will guide you how to complete the online and manual application, such as videos and links: Application Process and DER Interconnection Application Guide .

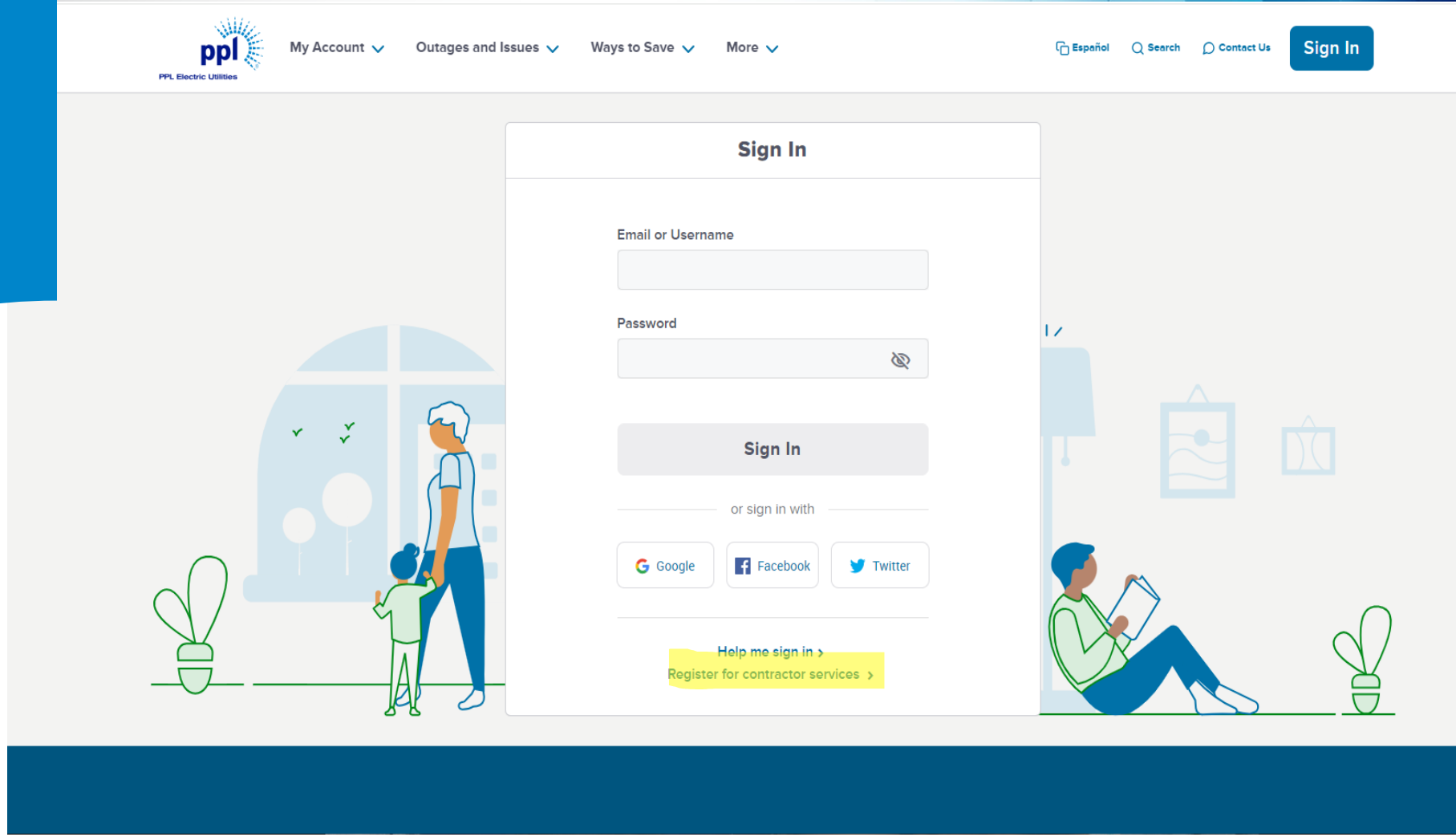


Customer Access versus developer Access

It is common for developers to complete the online application for their customers, and, if doing so, the developers will need to register for a contractor account access. Once completed, the developers can submit the online application on behalf of their customers.

If a customer is completing the online application, they will have to register for portal access and then can complete the online application process.

[PPL-Selfserve-Online-Application]



DER Interconnection Application Guide for Required Documentation

Information about the required documents for both the online application process and manual application process can be found on our website:

[DER-Interconnection-Application-Guide]

Please note that the manual application process will be lengthier, but you will receive additional assistance with an application overview and corrections that are provided from our DER interconnection coordinator. This is not available through the online application process.

DER Interconnection Application Guide

		How to Apply		Additional Requirements			Applications ≥ 500kW[1]			New Service
		Online Web Portal	Manual Submittal to DERapplications@pplweb.com	One-Line Diagram	Equipment Data Sheets	Site Plan	Customer Ownership Attestation	Net Energy Metering Rider	Parasitic Load Estimate	New Service Application
PPL Customers Applying for Solar/Renewables	**10 KW and under** (Level 1)	✓		✓	✓	✓				
	10 kW - 499kW (Level 2, 3, 4) ***Existing Service***	✓		✓	✓	✓	See note 2 below	See note 2 below		
	10 kW - 499kW (Level 2, 3, 4) ***New Service***		✓	✓	✓	✓	See note 2 below	See note 2 below		✓
	500kW+ (Level 2, 3, 4) ***Existing Service***	✓		✓	✓	✓	✓	✓	✓	
	500kW+ (Level 2, 3, 4) ***New Service***		✓	✓	✓	✓	✓	✓	✓	✓
	Pre-Application		✓							

Work Order Creation and Invoicing for the Application Process

Online application Work Order Creation and Invoice Process:

The DG work orders are created once the online application is submitted. At that time, you will receive an email with the work order number and the invoice addressed to the chosen party for payment. We recommend you keep this email for your records as you will need the work order number(s) for correspondence with PPL Electric about your project(s). A physical copy of the invoice will be mailed to the recipient(s) as well. Upon receipt of the invoice, payment is due within **30 calendar days**.

Manual Application Work Order Creation and Invoice Process:

After all necessary documents have been collected as part of the manual application process, an email with all these documents attached will be sent to the Business Accounts Service team (BAS team) for work order creation. Once the DG work order and new service work order have been created, our DER interconnection coordinator will create an invoice and send it to the chosen party for payment as expeditiously as possible, and this time will vary. An electronic copy will be emailed, and a physical copy mailed to the recipient(s). Upon receipt of the invoice, payment is due within **30 calendar days**.

The electronic copy will be attached with your **Application Approval email**. This email will contain the work order numbers for your project (s), and we recommend you keep these emails for your records. You will need the work order numbers for correspondence with PPL Electric about your project(s).

*Payment methods and instructions will be provided with all invoices. Current payment options available are ACH, Wire and Checks. Once payment has been received and posted, your project will drop into the queue for Planning and Engineering review.

DER Pre-application Process

Optional interconnection site analysis

PPL Electric Utilities

1 When evaluating a large solar project, you may want to start by requesting a pre-application to receive a preliminary evaluation of your service needs, a timeline associated with any improvements or upgrades to PPL Electric Utilities electric system and any applicable costs you may be responsible for. This can help you decide whether to move forward with the project. There is a base fee of $750.

2 Submit the completed pre-application form to DERapplications@pplweb.com

3 You will receive a pre-application work order number and a $750 invoice from us.

4 Once the invoice is paid, our engineers will review the application. The DER coordinator will provide the completed pre-application analysis. This will include details on the feasibility and estimated cost of your project.

5 If you decide to move forward with your project, you will need to complete an interconnection application for a more extensive and detailed analysis of your project.

DER Pre-application

Customer Details – *To be Completed by Customer/Contractor*

Customer/Contractor Name	Bill Smith
Service Address	333 New Solar Rd
Applicant's Contact Number	610-xxx-xxxx
Contact Name for Invoice	Bill Smith
Contact Address for Invoice	333 New Solar Rd
Contact Email Address for Invoice	solarstar@gmail.com
PPL Grid Number or Latitude/Longitude	64823S47832
Existing PPL Electric Customer	New
PPL Electric Bill Account Number (Existing Only)	
Customer's Service Voltage	12.47kV (3 phase)
Approximate In-Service Date	10/15/2026
Existing DER Size, if applicable (kW)	None
Proposed DER Size 1 (kW)	500kW
(Optional) Proposed DER Size 2 (kW)	3000kW
Proposed Energy Source	Solar
Date Submitted	4/1/2024
Additional Comments	

The DER Pre-Application fee is a non-refundable fee in the amount of $750 and must be paid in full prior to the pre-application's review. The DER Pre-Application fee is not applied to the interconnection application fee, upgrade fees, equipment charges, or any additional PPL charges required prior to the installation of the DER.

Interconnection Pre-Application Results – *To be Completed by PPL Electric*

Substation Name	
Substation Voltage	12.47kV
PPL Electric Feeder (XXXXX)	
Customer Service Voltage	12.47kV
Distance from Substation to end of 3-phase (circuit miles)	3.68
Distance from 3-phase line (miles)	0.00
Pending/Current Applications in Queue (qty)	1

Proposed DER Size 1 (kW)	500
Distribution Line Upgrades	No
Distribution Substation Upgrades	No
Point of Contact Recloser Requirement	Yes
PPL Upgrades Leadtime for DER Size 1**	40-44 weeks
PPL Upgrades Cost Range for DER Size 1**	$85,000

Proposed DER Size 2 (kW)	3,000
Distribution Line Upgrades	Yes
Distribution Substation Upgrades	Yes
Point of Contact Recloser Requirement	Yes
PPL Upgrades Leadtime for DER Size 2**	52-65 weeks
PPL Upgrades Cost Range for DER Size 2**	$1,560,000

Engineer Comments	If the queued application cancels their project, this pre-app estimate would increase by approximately $300,000.

- High-level desktop review of current grid conditions.
- Two sizes included in the review.
- Does not reserve an interconnection queue position.

[DER Pre-app Link]

Business Use

DER Application Lifecycle

- Once all necessary supporting documentation has been submitted and the application fee has been paid, the project will go to engineering for review and entered into the interconnection queue.
- Planning engineering review.
- DER PM will release results to developer in an Interconnection Impact Review (IIR) letter; along with an invoice for 25% of the order of magnitude cost called out in the IIR.
- Developer pays invoice and signs Notice of Customer Intent (NoCI) within 45 calendar days.
- Project goes to detail engineering.
- Customer pays remaining 75% of project cost after detailed engineering is complete.
- Project is scheduled for construction once long lead materials have been received.
- Once PPL construction is complete and customer's inspection has been submitted, Permission to Operate (PTO) will be issued.
- A final invoice may be required to true-up costs after construction is complete.

Regulatory Review Process Overview

- If your kW nameplate in this application is sized at 500kW or greater, there are regulatory documents required for PPL Electric to prepare a Net Metering recommendation to the PA PUC.
  - And, if this is your first submission, submit **ONE application,** which you can later use as a template.
  - Also, if it is a new service, submit a manual DER application in **ONE** submittal to Jonelle only.
- And there are other considerations that benefit you and PPL Electric Utilities
  - In all cases. It is important to note that any documents that are incomplete or inaccurate will be returned and will delay your project.
  - There is no need to rush. Regulatory reviews are not initiated until ALL documents are received.
  - Links are provided at the end of this presentation.
- Finally, please note that multiple or piecemeal submissions become unmanageable and will delay your project, which may require a new application along with the appropriate fee.
  - Information on the following pages are included in your project "Welcome" Package via email.
  - As such, there is no need to take notes.

Regulatory Review - Site Plan, One Line Diagram, and PLE

You can find this information online at the following web resource:

PUC-Requirements

Appendix A: (Site Plan/One-Line Diagram) - include acronym, i.e. SP/OLD

- Provide the overall property layout/street access including nearest cross street in each direction, identify:
  - Location of the service transformer and DER AC disconnect device.
  - Location of generation (both existing and new), inverters, Battery Energy Storage System (BESS), EV charger, etc.

- Energy sources described on the above Site Plan document. In addition, identify the
  - Customer/utility meter and load centers, if applicable.
  - Disconnect switch and note if it is lockable with a visible break when required.
  - Connection to other customer's electrical system.
  - Behind the Meter Transformation sizing kVa.

Appendix B: Parasitic Load Estimate (PLE)

- In a Word document, using the applicant's letterhead, provide the annual parasitic Load (kWh) estimate with the calculation and assumptions for that DER system site. It may include but is not limited to:
  - Customer step-up transformer losses
  - Data Acquisition System
  - Single axis solar tracking system estimate
  - Surveillance cameras energy use estimate.
  - Recloser Cabinet
  - Inverter System night-time drain
  - LED lights on a motion detection sensor

Regulatory Review – ICA, IA, and NEMR

You can find this information online at the following web resource:

PUC-Requirements

- Appendix C: Interconnection Application (ICA)/Interconnection Agreement (IA)
  - Customers with existing services submit through the DG portal.
  - Customers with new services submit manually through the DER Interconnections Coordinator at DERApplications@pplweb.com .
- Appendix D: Net Energy Metering Rider (NEMR)
  - This document is required for ALL applications. Please complete all 3 pages.
  - However, if one or more dependent accounts are listed, provide the following:
    - A tax parcel map showing the distance between the host and dependent account(s).
    - Evidence that the host has **site control** (owns or leases and operates) of the dependent account/assets.
    - Understand how the how credits are applied in setting up one or more dependent accounts.
- Customer Attestation (CA):
  - The following documentation is required reference material to back up a CA:
    - It is not part of the PUC Filing packet.
    - For customer-owned systems, evidence of ownership.
    - For third-party owned systems, a letter on the customer's letterhead regarding contract/agreement.
    - An Operating Agreement and/or Power Service Agreement between developer and customer.

Web Resources

. Getting Started
. Net Metering
. Checklist for DER
. Point of Interconnection
. REMSI
. PUC Requirements
. Additional Resources

This is the main PPL Electric DER webpage, which contains links to several helpful resources including the approved Smart Inverter list and our FAQs page. This web resource will help you navigate through the DER process at PPL Electric.

Getting-Started

For further assistance and access to our DER General Info web resources, you can use the link below:

DER-Interconnection General-Info

Distributed Energy Resource (DER) Management Pilot Program Information

Looking to connect renewable energy, like solar, to our grid? You've come to the right place. Technical details pertaining to PPL's DER Management Pilot Program can be found via the links below.

Getting Started

We want to make it easy for you to understand safety regulations and to apply to connect renewable energy projects to the grid.

- DER Management Device Installation >
- REMSI Sketches and Diagrams >
- DER Management - Tariff Rule 12 >
- Smart Inverter Website >
- Approved Smart Inverter List >
- Frequently Asked Questions >
- DER Interconnection General Info >

What is DER Management?

We have a tradition of encouraging the development of Distributed Energy Resources (DER), like solar, to provide the energy our customers need now and in the future. PPL is supporting Pennsylvania's vision of renewable energy growth to address climate and sustainability objectives, while continuing to provide safe and reliable service to our

Net Metering, Net Meter Rider and DER Checklist

PPL Electric also provides plenty of information about our Net Meter Program, requirements to qualify for enrollment, the necessary documentation and a checklist that can assist any customer or developer in completing the interconnection application process.

Additionally, you will find the level of application review and application fee you can anticipate for your project.

[Net-Metered-Distributed-Energy]

Net-Metered Distributed Energy

REQUIREMENTS, TIMELINE AND CHECKLISTS TO CONNECT TO THE PPL ELECTRIC UTILITIES POWER GRID

When you're installing solar panels, CHP, biomass, or another type of distributed energy resource (DER), PPL Electric Utilities is here to help you connect to the power grid. We recommend applying at least 6 months before interconnection service is needed.

For installations under 25 kilowatts, you'll hear from PPL within 3-4 weeks of submitting a completed application. For all other systems, additional engineering reviews and field visits may be required. In addition, for systems 500 kW or larger, PPL must submit a net-metering recommendation to the Public Utility Commission. Please see the following page for more information on what is required for that recommendation. For all DER projects, please see the full process outlined below.

Application

Application Submission – Applications with existing services should be submitted online at Contractor Services. When applying, you'll need the following documents:

- one-line diagram including communications and existing distribution facilities
- site plan (including geographic features)
- equipment data sheet
- For systems 500kW or larger, read more additional documentation requirements.

The level of review and the application fee will depend on the type and size of the proposed DER. Please refer to the table below for a breakdown of the different levels and associated application fees:

Levels	Brief Description	Base Fee	Per kW Fee
1	Certified inverter-based installations of 10kW or less.	$100	None
2	Certified inverter-based installations greater than 10kW but 2000kW or less.	$200	$1.50/kW
3	Non-inverter-based installations of any size. Certified inverter-based installations larger than 2000kW.	$350	$2/kW
4	Installations that do not qualify for Levels I and II and do not export power.	$350	$2/kW

Download Brochure

Be sure to double-check your application for accuracy. Once submitted, technical details cannot be modified or altered by PPL. Should you require a change in system sizing, equipment used, etc., you will need to cancel your existing application, submit a new application, and pay any associated fees.

For questions regarding your application and new services, please contact the following: Systems of 25 kW or less, email EUsolar@pplweb.com.

Systems over 25 kW, email DERapplications@pplweb.com.

Net Metering, Net Meter Rider and DER Checklist

For further information about the rate schedules that qualify for net metering, and/or virtual meter aggregation, please feel free to visit the following PPL webpage:

[Net-Metering-and-Virtual-Net-Metering]

A complete copy of net metering for Renewable Customer-Generators and copies of the Net Energy Meter Rider and Virtual Meter Application are available for download on this page.

Net Metering & Virtual Net Metering

Net metering measures the difference between the electricity delivered to the customer and the electricity exported by customers' distributed energy resource (DER) systems, which include rooftop solar panels. If a customer exports more energy to the grid than what PPL Electric delivers to that customer, the difference is reflected in the customer's kilowatt-hour (kWh) bank on their bill. This kWh bank can be used to compensate customers monthly through virtual metering aggregation.

For DER customers to qualify for net metering, they must meet the following criteria:

- Must be connected to the distribution system (12kV or lower).
- Eligible Rate Schedules:
  - Rate Schedule RS is limited to 50kW nameplate generation.
  - Rate Schedules GS-1, GS-3 and LP-4 are limited to 3000 kW.

For more details about net-metering, please refer to our tariff: **Net Metering for Renewable Customer-Generators**

What is virtual meter aggregation?

Virtual metering aggregation is the aggregation of meter readings and billing for multiple meters for a host and dependent account.

Below is the list of eligibility criteria:

- The host accounts and dependent accounts must be held by the same individual or legal entity (including parent company) receiving retail electric service from the same company.
- The virtual meter aggregation (VMA) shall be limited to meters located on properties owned/leased by the same customer-generator within two (2) miles of the boundaries of the customer-generator's property. Additionally, the host and dependent sites must be operated by the same customer-generator.
- The virtual meter aggregation shall only be available for properties located within the company's service territory.
- Both the host account and dependent accounts must use provider of last resort (POLR) to receive the full benefit of virtual metering. If either account uses an alternate supplier, you will not receive credit for transmission/generation portion of your bill.

Virtual Metering Example

Host Account generates 1,200 kWh in excess of usage. This would be evenly divided between the three accounts, 400 kWh for each account. Please note: we can only transfer the total amount of the credit if the satellite accounts used this amount or more. If one of those satellite accounts uses less than this amount, we can only transfer the credit for the amount used for that month and the excess balance would be transferred back to the banked balance on the host account to be used the following month.

Net Metering, Net Meter Rider and DER Checklist

PPL Electric has provided an online checklist for distributed energy resources to help our customers and their developers navigate the DER interconnection process as efficiently as possible. This online copy and a downloadable pamphlet can be found on the following PPL webpage:

[Net-Metered-Distributed-Energy]

This checklist will assist you through the application process, planning and engineering review process, scheduling and construction Process, and the completion of your project.

Checklist for Distributed Energy Resources

Application

- [ ] Review the interconnection requirements for electric service at pplelectric.com/remsi. Ensure your design matches the requirements in the appropriate sketch and shows both electrical and communications layouts.
- [ ] Choose an inverter certified to UL 1741 Supplement B. Only approved inverters may be used. For more information, see pplelectric.com/inverters.
- [ ] Submit any battery installations for approval.
- [ ] To qualify for net metering, the generation must be used to offset your own existing usage.
- [ ] Submit your application, one-line diagram (electrical and communications), site plan, equipment data sheet, and electronically sign your Interconnection Agreemen at pplelectric.com/renewable.
- [ ] Call PPL if the customer does not have a social security number or tax ID on file.
- [ ] Pay the application and any other fees related to your installation.
- [ ] Check your customer rate; only residential (RS), small business (GS1 and GS3) and large power (LP4) rates qualify.
- [ ] Be aware that systems over 50 kilowatts require customers to be on a non-residential rate.
- [ ] If any changes are made to a submitted application (equipment, nameplate, etc.,), then the existing application will be canceled and a new application along with application fee will need to be submitted.

Design

- [ ] Place the A/C disconnect switch directly next to and in sight of the PPL meter. See pplelectric.com/remsi for more details.
- [ ] Use approved termination and metering compartments listed at pplelectric.com/remsi. Transformer cabinets may not be used as junction points or termination cabinets.
- [ ] Pay any up-front costs to upgrade PPL equipment such as transformers and upgrading lines. Payments must be made before the job can be scheduled.

Scheduling

- [ ] If PPL equipment changes are needed, all customer responsibilities including customer payment and signed right-of-way agreement, if needed, must be met before your job can be scheduled.

Construction

- [ ] Call 811 at least 3 business days before you dig.
- [ ] Clear all obstructions at the service connection locations.
- [ ] Ensure all switchgears/meter box are installed and inspected.
- [ ] Submit your certificate of completion (COC).

Rules for Electric Meter & Service Installations (REMSI)

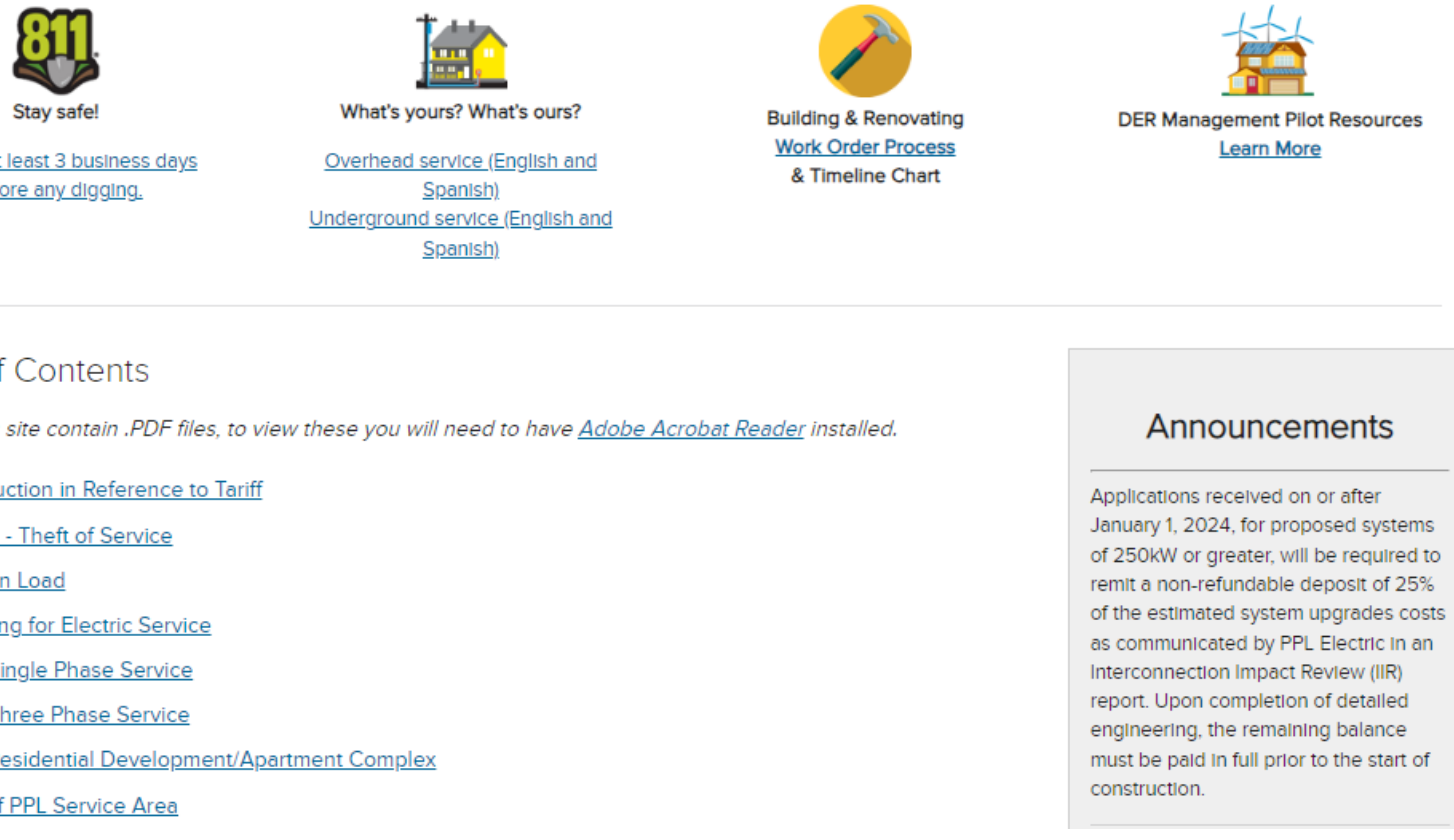
PPL Electric has also developed a series of web resources completely focused on providing the rules and regulations for interconnecting a renewable energy system to PPL infrastructure.

Additionally, you will find the most recent updates from PPL Electric about program changes on this page as well. You can find all this information and links to other resourceful webpages through the following link below:

REMSI-and-Announcements

One-Line Display-Standards

DER-Sketch-Tables



Rules for Electric Meter & Service Installations (REMSI)

INFORMATION FOR CUSTOMERS AND CONTRACTORS

Stay safe!

Call 811 at least 3 business days before any digging.

What's yours? What's ours?

Overhead service (English and Spanish)
Underground service (English and Spanish)

Building & Renovating
Work Order Process
& Timeline Chart

DER Management Pilot Resources
Learn More

Table of Contents

Parts of this site contain .PDF files, to view these you will need to have Adobe Acrobat Reader installed.

1. Introduction in Reference to Tariff
2. Notice - Theft of Service
3. Foreign Load
4. Applying for Electric Service
   - Single Phase Service
   - Three Phase Service
   - Residential Development/Apartment Complex
5. Map of PPL Service Area

Announcements

Applications received on or after January 1, 2024, for proposed systems of 250kW or greater, will be required to remit a non-refundable deposit of 25% of the estimated system upgrades costs as communicated by PPL Electric in an Interconnection Impact Review (IIR) report. Upon completion of detailed engineering, the remaining balance must be paid in full prior to the start of construction.

Additional Links to Web Resources

Below you will find links to other helpful web resources provided by PPL Electric:

- Billing-and-Usage
- Customer-Owned-Generation
- Rule-28-REMSI
- List-of-Rules-REMSI
- Tarrif-Rule-12
- Frequently-Asked-Questions
- Price-To-Compare-and-Shopping
- Smart-Inverters-and-DER-Requirements