SOLAR PANEL INTERCONNECTION

Fayetteville Public Works Commission

PWC
Fayetteville's
HOMETOWN UTILITY

Solar (Photovoltaic) Interconnection Overview & Pre-Submittal Checklist

Fayetteville Public Works Commission
Fayetteville, North Carolina

The purpose of the Solar Panel Interconnection Packet is to outline the process for customers looking to install solar panels. By defining ownership and sharing detailed steps, it will minimize the number of required revisions, expedite the application and review process, and facilitate installation.

This packet includes the following:

- **Pre-Submittal Checklist**: a list of required documents to be submitted to Fayetteville Public Works Commission (PWC) when applying to install and operate a residential or commercial solar photovoltaic (PV) system ("Generating Facility").
- **Photovoltaic Interconnection Criteria:** installation and system criteria required to maintain power quality and meet PWC safety requirements.
- **Photovoltaic Interconnection Customer Responsibilities**: a step-by-step guide of the process, from application to interconnection, that includes both customer and PWC obligations.
- **One-Line Diagram examples**
- **Solar Panel Interconnection Application**

PWC offers two options for PV installations:

- Inverter-Based Photovoltaic Generating Facility 10 kW or less
  - Billed on Renewable Energy Buyback Rider (REBB)*
  - Requires one bi-directional meter
- Inverter-Based Photovoltaic Generating Facility greater than 10 kW and not more than 20 kW
  - Billed on Buy All Sell All (BASA) rate schedule*
  - Requires two separate meters

**Information on the PWC rates can be found at www.faypwc.com.*

In addition to PWC and city requirements, customers seeking to install an electrical Generating Facility are required to apply for and receive either a Certificate of Public Convenience and Necessity (CPCN) *OR* a Report of Proposed Construction (RPC) from the North Carolina Utilities Commission (NCUC) prior to entering into a contract with PWC; the flow chart provided in this packet can help determine which document is necessary.

City requirements can be found on the fayettevillenc.gov website.

The accepted and approved Solar Panel Interconnection Packet is for the originating customer only. Future owner/operators must submit a new Solar Panel Interconnection Packet to PWC.

The following documents are required for submission prior to installation:

☐ Signed Photovoltaic Interconnection Customer Responsibilities

☐ Completed and signed Solar Panel Interconnection Application

- Application fee of $200 (Check or Money Order made payable to Fayetteville PWC) *OR*

- Transfer of Ownership processing fee of $50 (Check or Money Order made payable to Fayetteville PWC) *(applicable only to new owner/operators for homes/businesses with existing and previously approved PV systems)*

☐ Prefilled Standard Interconnection Agreement

☐ Wiring Diagram showing:

- Phases, neutral and ground
- Equipment
- Fusing
- Points of connection
- Disconnects - DC and AC
- Array wiring
- Equipment grounding
- Meter base labeling
- Physical arrangement of metering and disconnect distance in feet between the isolation switch (PV A/C disconnect) and customer meter**.** The disconnect must be lockable, heavy duty, fused, and sized per the NEC

☐ Electrical details of the equipment including:

- Manufacturer's installation instructions for PV modules and inverters, including specific models to be used on the project
- Specification sheets for PV modules
- Documentation that Photovoltaic Inverter/Isolation System meet the requirements listed in Photovoltaic Criteria

☐ Property Owner's Property Deed

☐ Property Owner's Insurance Certificate (PWC must be named as an additional insured)

☐ NCUC Documentation

- Certificate of Public Convenience and Necessity *OR*
- Report of Proposed Construction

The customer is also responsible for the submission of the Certificate of Completion after installation and inspection of the Generating Facility.

Throughout the application process, customers are responsible for providing any additional information required to complete interconnection in accordance with the guidelines and specifications set forth in the Solar Panel Interconnection Packet documents and PWC's Service Regulations and Charges.

Required documentation listed on the Pre-Submittal Checklist, processing fee payments, and the Certificate of Completion can be submitted electronically to solar@faypwc.com and/or via mail to:

Fayetteville PWC
ATTN: Rooftop Solar/Customer Programs
P.O. Box 1089
Fayetteville, NC, 28302

If you have questions, please contact PWC Customer Programs at 910-223-4950 or solar@faypwc.com.

Photovoltaic Interconnection Criteria
Fayetteville Public Works Commission
Fayetteville, North Carolina

Fayetteville Public Works Commission (PWC) supports the development of renewable resources for generation of electric power. To maintain current levels of safety and power quality for the general public, electric system employees, and customers, certain criteria must be applied to all alternative sources of electric power.

- All PV installations and PV systems ("Generating Facilities") greater than 10 kW must be connected to PWC's electric system through a separate meter with only the Generating Facility connected to the source side of the interconnection meter. Refer to installation illustrations and one-line diagram examples included with this packet.

- All Generating Facilities must comply with the following standards:
    - IEEE 929 – Recommended Practice for Utility Interface of Photovoltaic (PV) Systems, latest published edition
    - IEEE 1547 – Standard for Interconnecting Distributed Resources with Electric Power Systems, latest published edition
    - IEEE 1547.1 –2005 Standard Conformance Test Procedures for Interconnection Distributed Energy Resources with Electric Power Systems
    - IEEE P1547.3 Draft: Guide for Monitoring, Information Exchange, and Control of Distributed Resources Interconnected with Electric Power Systems
    - UL 1741 – Inverters, Converters and Controllers for use in Independent Power Systems, latest published edition
    - NFPA 70 – National Electrical Code, latest published edition
        - Specific compliance with Article 690 and Article 705 is required.

- All Generating Facilities shall have a service disconnect for the Generating Facility that is visible and accessible from the customer's meter. The disconnect shall be always fully accessible to and operable by PWC personnel. The disconnect shall include provisions for locking in the open position, shall be heavy duty, fused,and sized per the NEC. The disconnect shall be labeled in accordance with NEC 705.10.

- All Generating Facilities shall operate within the range of 0.90 lead to 0.90 lag power factor.

- All Generating Facilities shall be inspected and approved by the local authority having jurisdiction (AHJ) and are subject to review and testing by PWC prior to connection and at subsequent times of their choosing.

- All interconnected Generating Facilities shall be non-islanding. Any Generating Facility found to produce voltage when disconnected from the electric distribution system will be disconnected without notice and will remain disconnected until the Generating Facility is brought into compliance with specified standards.

- Generating Facilities with storage are prohibited from injecting stored energy into PWC's electric grid. Integrated energy storage must be configured to prohibit the export of power. Generating Facilities found injecting stored energy will be disconnected without notice and will

remain disconnected until it can be demonstrated that the energy storage has been reconfigured to restrict the flow of power to the grid.

- Generating Facilities shall not interfere with the power quality of any customer of PWC's distribution system. Generating Facilities found to interfere with utility industry-accepted power quality standards will be disconnected from the system.

- PWC will design and install reasonable and practical system modifications to the electric distribution system to allow the interconnection of Generating Facilities which would otherwise interfere with power quality delivered to other connections. Customers looking to install or who own Generating Facilities are responsible for the cost of any facilities constructed and/or installed by PWC necessary to accommodate the interconnection and safe operation of the Generating Facility These costs will be added under "Extra Facilities Charges" as part of a Utility Purchase Agreement (UPA).

- Customers looking to install or who own Generating Facilities are responsible for obtaining and retaining general liability insurance and providing certificates demonstrating effective coverage that meet PWC Interconnection requirements. PWC must be named as additional insured.

- Generating Facilities larger than 20 kW maximum output capacity will require special review, additional testing, and special interconnection facilities.

Photovoltaic Interconnection Customer Responsibilities

Fayetteville Public Works Commission

Fayetteville, North Carolina

1. Customer is responsible for completing and submitting all required documents listed in the Pre-submittal Checklist.
2. Within 10 business days of receiving documents:
    a. PWC will acknowledge the receipt of the customer's submission with an email confirmation.
    b. PWC will review the customer's submission to verify all required documents from the Pre-Submittal Checklist were included, all required forms are completed and signed, and all fee payments have been received.
        i. If customer submission includes all necessary documents, completed forms, and required payments, PWC will advise the customer the submission is complete.
        ii. If customer submission is incomplete, PWC will notify the customer and identify any missing requirements.
3. PWC will verify Generating Facility equipment can be interconnected safely and reliably and approve the application.
    a. In some circumstances, the customer may be required to perform system modifications, either at the request of PWC or the request of the inspector.
    b. Any recommended modifications may require revisions to be run by inspections and PWC will require a copy of any revised plans.
4. Once approved, a PWC representative will sign the approved Solar Panel Interconnection Application and return to the customer. PWC will send the Standard Interconnection Agreement to the customer for signature.
5. The customer can proceed with installation of the Generating Facility once they receive the approved Solar Panel Interconnection Application.
    a. Any Generating Facility installations that begin prior to receiving the approved Application from PWC are still subject to final review from PWC and may not be approved for interconnection.
6. The customer will arrange for inspection of the completed Generating Facility installation by the local electrical wiring inspector, or other authority having jurisdiction.
    a. When completed, the individual who completed the inspection will sign the Certificate of Completion.
    b. If the Generating Facility was installed by an electrical contractor, the contractor will also fill out the Certificate of Completion.
7. The customer is responsible for returning the Certificate of Completion to PWC.
8. PWC will acknowledge the receipt of the Certificate of Completion with an email confirmation.
9. PWC may choose to inspect the Generating Facility for compliance via witness test after the Certificate of Completion is received.
    a. If PWC chooses to inspect, the witness test must be completed within 15 business days of the receipt of the Certificate of Completion.
    b. If PWC does not inspect within 15 business days or it is decided by mutual agreement of the Parties, the witness test is deemed to be waived.

c. The customer is prohibited from operating (interconnecting) until the witness test has been performed or waived.

10. PWC will perform the witness test.
    a. If the witness test is satisfactory or waived, interconnection will be authorized.
    b. If the witness test is unsatisfactory:
        i. PWC reserves the right to disconnect the Generating Facility.
        ii. PWC will provide information to the customer with details why the project was not approved.
        iii. PWC will advise the customer of any steps required to achieve compliance.
11. After the Standard Interconnection Agreement is fully signed and the witness test is satisfactory, PWC will notify the customer in writing that interconnection has been authorized.
12. After Generating Facility completion, PWC may require the installation of additional PWC-owned interconnection facilities if the Generating Facility, despite compliance with the interconnection standards, causes safety, reliability, or power quality problems. The customer is responsible for the cost of any facilities constructed and/or installed by PWC. These costs will be added under as "Extra Facilities Charges," as part of a Utility Purchase Agreement (UPA).
13. In the event of change to ownership, the customer will communicate to any new owner/operator that they are required to complete the Solar Panel Application, submit all required paperwork, and sign the Standard Interconnection Agreement, or provide evidence that the Generating Facility has been removed or disabled to prevent future interconnection. The original customer will remain responsible and liable for the Generating Facility until the new owner/operator completes the application process.

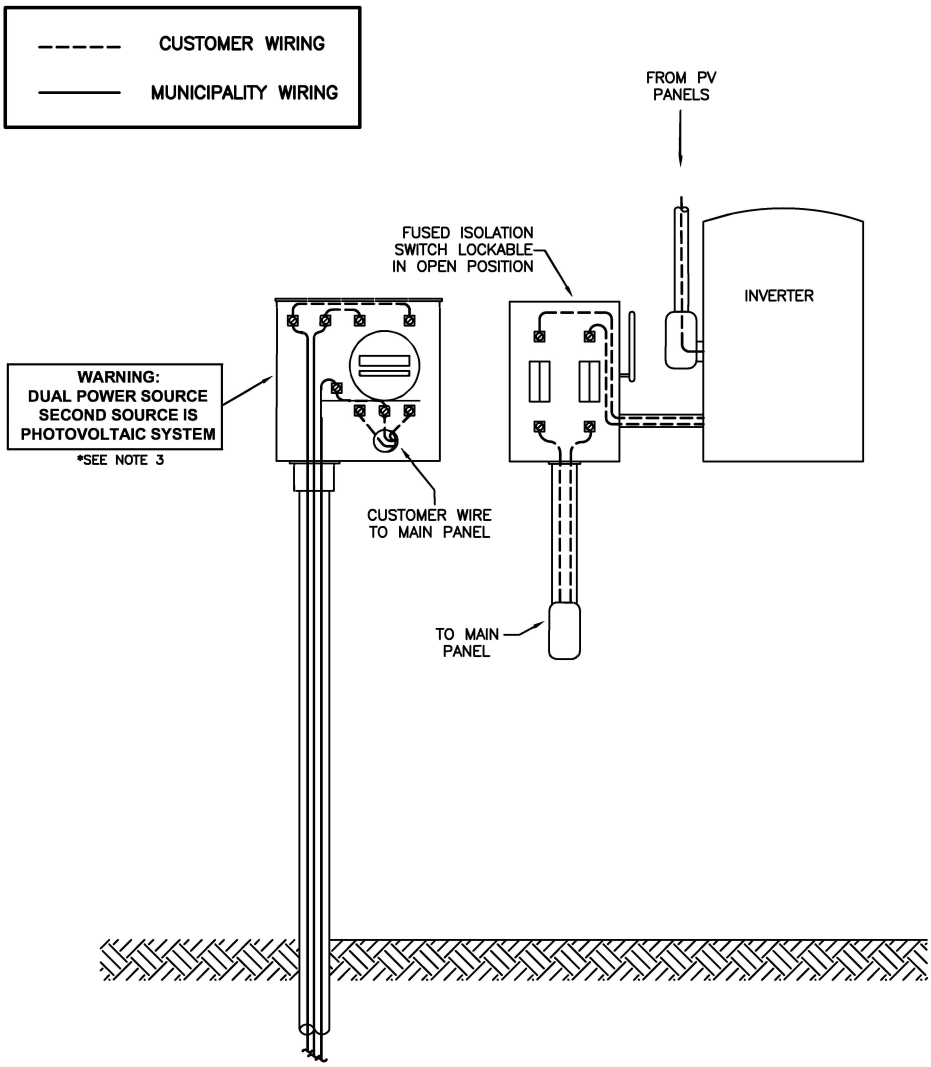
I certify I have read all the information provided in the Solar Panel Interconnection Packet and reference documents and understand the required steps and respective responsibilities outlined within. I agree to submit the necessary completed documentation and processing fee payment to PWC and acknowledge any missing/incomplete forms or failure to submit payment in a timely manner will result in delayed Application approval and Generating Facility interconnection. If I have any questions, I understand I can contact PWC for assistance.

Signature: _____

Applicant Name: _____ Date: _____

FOR PWC USE ONLY			
Application Received:	Date:	By:	
Customer Notified:	Date:	By:	
Application Reviewed:	Date:	By:	Approved: □ Yes □ No
Applicant Notified:	Date:	By:	Customer Verified Receipt: □ Yes □ No

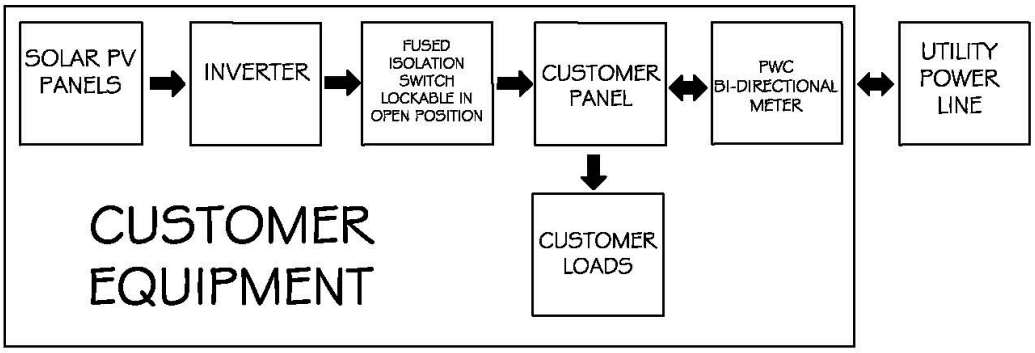
One-Line Diagram Examples



NOTES:

1. NEUTRAL AND GROUND WIRING NOT SHOWN
2. SEE DWG. ESS–28 FOR POWER FLOW EXAMPLE.
3. A PERMANENT WARNING LABEL SHALL BE AFFIXED TO THE METER BASE WITH THE MARKINGS AS SHOWN IN DRAWING OR EQUIVALENT.

			Electric Service Standards RENEWABLE ENERGY INTERCONNECTION INSTALLATION BI-DIRECTIONAL METERING RISER DIAGRAM FOR PV SYSTEMS LESS THAN OR EQUAL TO 10 KW				PUBLIC WORKS COMMISSION Fayetteville, North Carolina
1	1/9/23	RLW	DWN. BY: RLW	CK'D BY: JEC	APPR. BY: RDP	SCALE: NONE	DATE: 8/11/22	DRAWING NO. ESS-27
REV.	DATE	BY					



REV.	DATE	BY
1	1/9/23	RLW

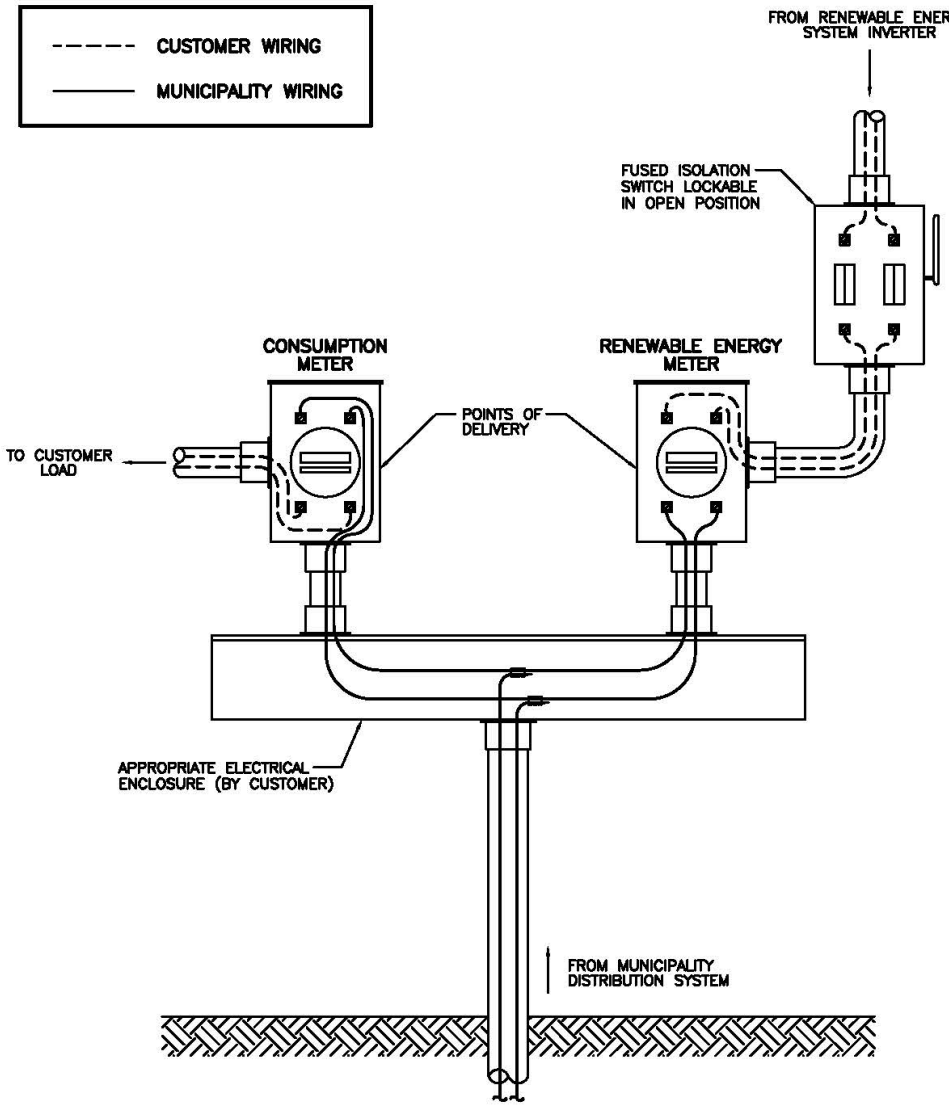
Electric Service Standards

POWER FLOW FOR BI-DIRECTIONAL METERING PV INSTALLATIONS LESS THAN 10 KW

DWN. BY: RLW	CK'D BY: JEC	APPR. BY: RDP	SCALE: NONE	DATE: 8/11/22

PUBLIC WORKS COMMISSION
Fayetteville, North Carolina

DRAWING NO.
ESS-28



NOTES:

1. NEUTRAL AND GROUND WIRING NOT SHOWN.
2. CONSUMPTION METER AND RENEWABLE ENERGY METER SHALL HAVE A NAMEPLATE ATTACHED AS SHOWN ON ESS-25.
3. SEE DWG. ESS-24 FOR WIRING DIAGRAM.

REV.	DATE	BY
2	08/15/22	RLW
1	06/19/17	JLL

Electric Service Standards

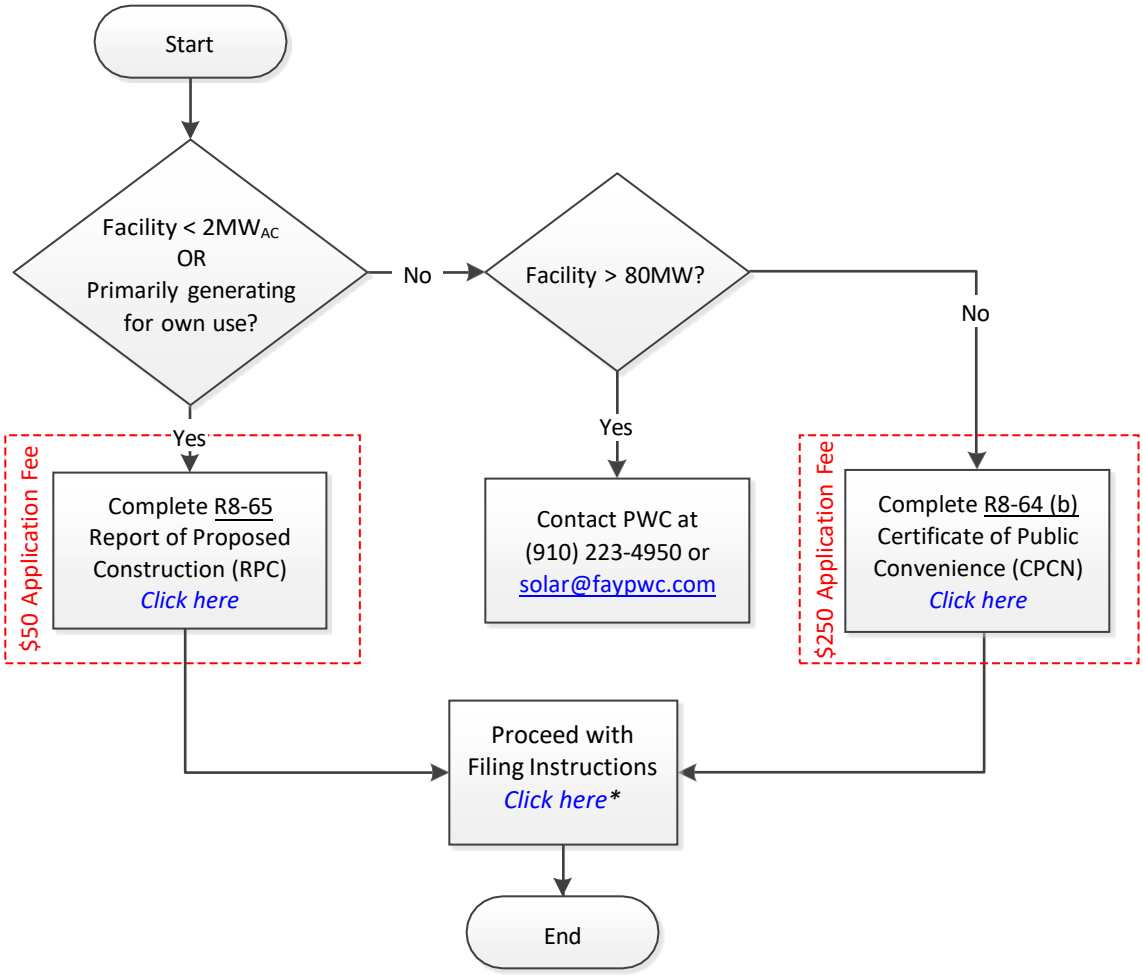
RENEWABLE ENERGY INTERCONNECTION INSTALLATION-BUY ALL SELL ALL METERING FOR PV SYSTEMS GREATER THAN 10 KW

DWN. BY: WJJ	CK'D BY: WRW3	APPR. BY: WRW3	SCALE: NONE	DATE: 05/18/09

PUBLIC WORKS COMMISSION
Fayetteville, North Carolina

DRAWING NO. ESS-23

Flow Chart for NCUC Documentation



*** Electronic Filing** is recommended for all NCUC documents (*Click here* for information on e-filing)

Updated 3/29/2019, NC Utilities Commission Electric Division

Fayetteville Public Works Commission

Solar Panel Interconnection Application

Phone: 910-223-3950

Fax: 910-484-1349

Application Date: _____

Property Owner Name: _____ Phone: _____

Project Address: _____ Suite: _____

City: _____ , NC Zip: _____

Project Contact Person: _____ Email: _____

Proposed Use: ☐ Residential ☐ Commerical

Account Number: _____ Existing Meter Number: _____

☐ Insurance Certificate

☐ $200 Application Processing Fee (Check or Money Order)

☐ $50 Transfer of Ownership Processing Fee (Check or Money Order)

Checks can be mailed to: Fayetteville PWC
ATTN: Rooftop Solar/Customer Programs
P.O. Box 1089
Fayetteville, NC, 28302

Metering Type: ☐ ≥10kW REBB ☐ ≤10kW/≥20kW BASA

Inverter Manufacturer: _____ Model: _____

Nameplate Rating: _____ kW _____ kVA _____ AC Volts ☐ Single Phase

System Design Capacity: _____ kW _____ kVA _____ AC Volts ☐ Three Phase

PV Manufacturer: _____ Model: _____

Quantity of Panels: _____ ☐ Single Phase

Nameplate Rating: _____ kW _____ kVA _____ AC Volts ☐ Three Phase

Is the equipment UL 1741 Listed? ☐ Yes ☐ No If YES, attach manufacturer's cut-sheet.

Battery Manufacturer: _____ Model: _____

Battery Capacity: _____ kW

Estimated Installation Date: _____ Estimated In-Service Date: _____

List the components of the PV Generating Facility equipment package that are currently certified:

	Equipment Entity		Certifying Entity
1.	_____	1.	_____
2.	_____	2.	_____
3.	_____	3.	_____
4.	_____	4.	_____
5.	_____	5.	_____

I hereby certify that I have the authority to make the necessary application, that all information in this Application is correct, and that all work will comply with Fayetteville Public Works Commission Solar Panel Interconnection Application requirements and all other applicable State and Local laws, ordinances, and regulations or private building restrictions, if any, which the deed may impose. I understand that this application will not be reviewed until the Processing Fee has been received by PWC.

I agree to abide by the Terms and Conditions for Interconnecting an Inverter-Based Photovoltaic Generating Facility < 10 kW for a bilateral meter (REBB) or a Generating Facility >10 kW and < 20 kW for two meters (BASA). After PWC inspection, the meter will be changed or installed within five (5) business days. This Generating Facility will not operate in parallel until I receive communication from PWC stating that the meter has been changed or installed. I understand that injecting stored energy into PWC's electric grid is prohibited. Integrated battery storage must be configured to prevent the export of power.

Approval for this work is listed and shown on the attached plans. Any changes from approved plans will be brought to the attention of the Fayetteville Public Works Commission in a timely manner.

Applicant Name: _____ Signature: _____ Date: _____

FOR PWC USE ONLY

Application Received: Date: _____ By: _____

Application Reviewed: Date: _____ By: _____ Approved ☐ Yes ☐ No

Applicant Notified: Date: _____ By: _____