Creating A Clean, Affordable, and Resilient Energy Future For the Commonwealth

COMMONWEALTH OF MASSACHUSETTS

Charles D. Baker, Governor

Karyn E. Polito, Lt. Governor

Matthew A. Beaton, Secretary

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SMART Metering Requirements

October 11, 2019

Key Differences Between SREC II and SMART

- EDCs will own production meters and will be responsible for collecting data and reporting to NEPOOL GIS (no more PTS reporting requirements)
  - Owner of PV system responsible for paying for meter via the interconnection process
  - Installers must leave open socket for utility owned production meter when designing systems
- EDCs own all Renewable Energy Certificates (RECs) for the duration of the tariff term
  - Customer must sign a REC assignment form acknowledging the EDCs ownership of the RECs before enrolling in tariff

SMART Program Participant Meter Costs

- SMART Production Meter(s)
  - ➢ Paid for during interconnection application
    - Process may be slightly different for early stage program applicants that already went through the interconnection process before the start of the program
  - ➢ Total meter costs paid for by interconnecting customer
  - ➢ May be multiple meters if paired with energy storage depending on configuration
  - ➢ Metering requirements will vary by utility

SMART Program Specific Metering Wiring Diagrams

October 2019

Interconnection Process

Remaining the Same

- Requests for meters are made to the DG Interconnections team
- Eversource will install and support all Revenue and Production meters
- Eversource will provide a PTO upon successful connection

Changes for the SMART Program

- Requirement page (4) was split in two and the IC responsibility to turn on the disconnect switch when the PTO is issued was outlined and highlighted.
- DG will ask for your SMART Application ID upfront
  - This requires the submittal of the SMART Application via the Web Portal prior to contacting the DG Interconnections team
- For Behind the Meter Installations (BTM)
  - Customer will be charged the cost of BTM Production Meter and installation fees upon submission of the SMART Application Fee via the Web Portal
    - Note: for larger, complex systems (additional charges still apply from ES engineering, i.e., CTs', PT's, etc.)
  - Will require customer-installed wiring, and installation of a second meter socket
    - Must be adequately accessible, proximate to existing utility revenue meter

Meter Configurations

Service Type		Project size	Meter Type
120/240V Single Phase	3 - wire	Under 60KW	Form 2S Bridge
120/208V Single Phase	3 - wire	Under 60KW	Form 12S Bridge
120/208V Three Phase	4-wire	Under 60KW	Form 16S Bridge
277/480V Three Phase	4-wire	Under 60KW	Form 16S Bridge
120/240V Single Phase	3 - wire	Over 60KW	Form 2S Interval
120/208V Single Phase	3 - wire	Over 60KW	Form 12S Interval
120/208V Three Phase	4-wire	Over 60 KW	Form 16S Interval
277/480V Three Phase	4-wire	Over 60KW	Form 16S Interval
IT Rated Single Phase (secondary CTs)		Over 320A	Form 4S Interval
IT Rated Three Phase (secondary CTs/PTs)		Over 320A	Form 9S Interval
IT Rated Single Phase (primary CTs)		Over 320A	Form 4S Interval
IT Rated Three Phase (primary CTs/PTs)		Over 320A	Form 9S Interval

General Meter Installation Guidelines

1. It this the responsibility of the Interconnecting Customer/Contractor (IC) to adhere to all applicable codes, standards and requirements including Eversource meter installation requirements as described in the Information and Requirements (I&R) publication, Eversource's Interconnection Tariff, the National Electrical Code (NEC), State and Municipal building requirements.
2. Eversource will install the meter for all services and, if required, Eversource will also provide all instrument transformers for any new IT-rated installation and make all secondary wiring connections to the meter.
3. During testing the system will be energized briefly. **Eversource Metering Personnel will leave the disconnect switch for the production meter in the condition we found it** (energized or not energized).
4. It is the responsibility of the IC to ensure all disconnecting devices are turned on upon receipt of the official final PTO approval.
5. See the appropriate I&R publication for either EMa or WMa for the IC responsibilities for procuring and installing the appropriate meter socket and any associated instrument transformer (IT) enclosure (if required).
6. Any primary metering, if required, will be coordinated with Eversource.
7. Each meter socket shall be marked with the unique identification such as a "SOLAR PRODUCTION" site for the location serviced prior to the start of any service work to ensure proper meter installation. If there are more than one meter, mark the appropriate SPA Key on the meter socket to identify one service from the other.

General Meter Installation Guidelines (con't)

7. The wiring diagrams within this document represent standard conceptual designs for commonly used service installations. Wiring configurations outside the norms shown within this document will require additional time for Eversource review and approval.
8. The IC is responsible for obtaining all approvals from the Authority Having Jurisdiction as soon as the work is completed.
9. Where the existing PCC meter is inside, the IC will upgrade their service connection to change it to an outside location.
10. All metering maintained by Eversource will be required to be accessible to Utility personnel at all times.
11. All self-contained meter sockets will be wired such as the top (line) side is toward the Utility feed and the bottom (Load) side is toward the solar generation and/or battery storage.
12. For any IT –rated services, all transformer polarity marks will be wired pointing toward the Utility feed.
13. Eversource reserves the right to amend this document from time to time as necessary.

Metering Diagrams

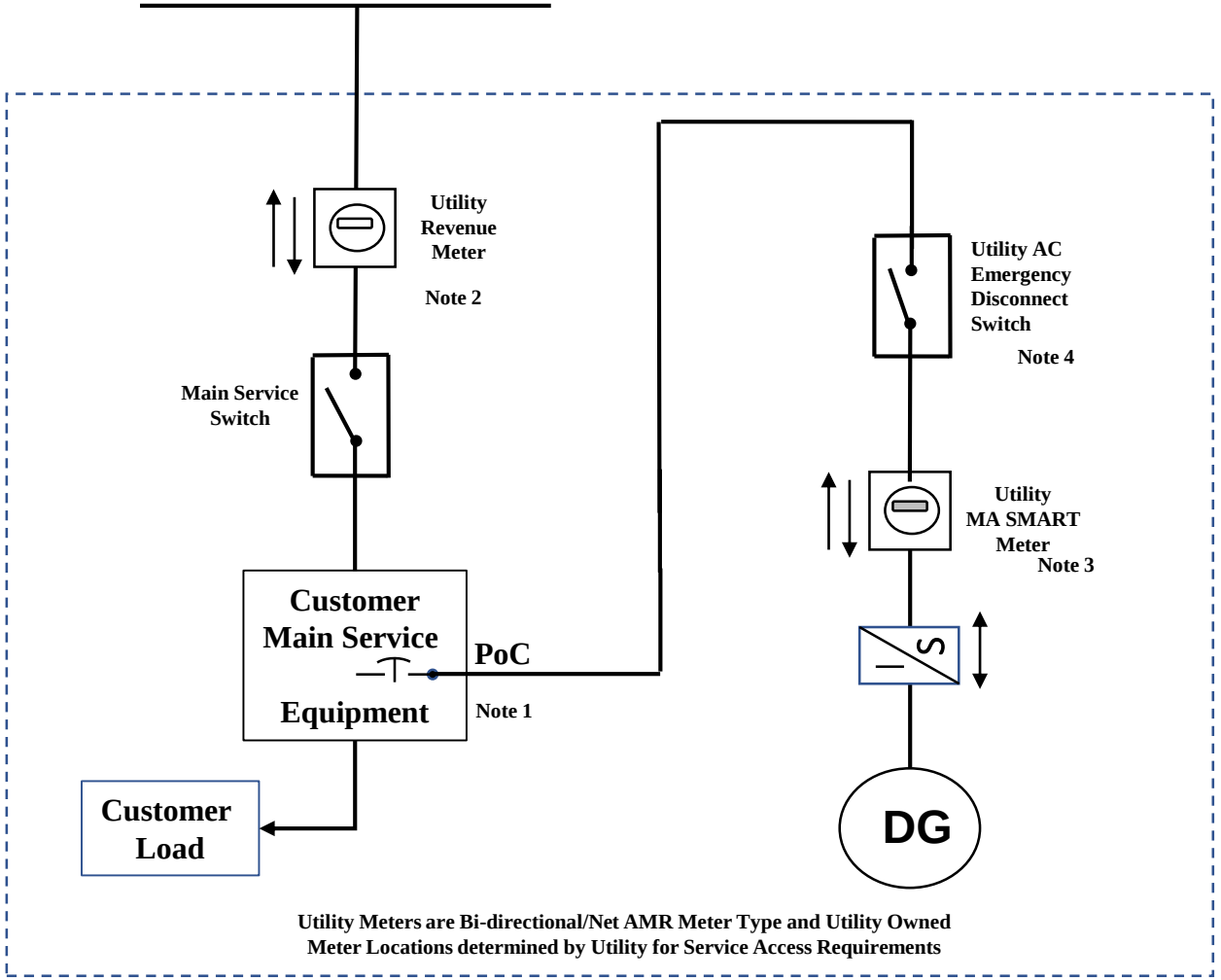
Metering Notes:

- **BTM: Behind the Meter installation option**
- **DER: Distributed Energy Resource**
- **DG: Distributed Generator/Solar Array**
- **ESS: Energy Storage System**
- **EPS: Electric Power System**
- **IC: Interconnecting Customer**
- **PCC: Point of Common Coupling**
- **PoC: Point of Connection**
- **PTO: Permission to Operate**
- **SPAKey: Smart Program Account number**

1a. BTM <60kW

Retail

Residential/Commercial DG Customer
Behind the Meter Ma SMART <60 kW
With No ESS System
UTILITY – AREA EPS



Utility Meters are Bi-directional/Net AMR Meter Type and Utility Owned
Meter Locations determined by Utility for Service Access Requirements

This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
*** All interconnection point are required to be placed behind the utility meter**
For behind the meter installations all interconnect points required to be located behind the utility revenue meter.
>>> No connections are to be made within the revenue meter socket or in utility transformer compartment. <<<

Note 2
*** Utility meters located inside customers facility, the interconnecting customer will be required to upgrade and have the meter relocated outside the customers facility near both the production meter and the utility disconnect switch.**

Note 3
*** Utility feed for the MA SMART meter, the socket is required to be wired top side utility, bottom side inverter.**
*** The utility AC emergency disconnect switch is required to be located on the ground level within vicinity of the utility revenue meter where our utility personal will have 24 / 7 access to it.**

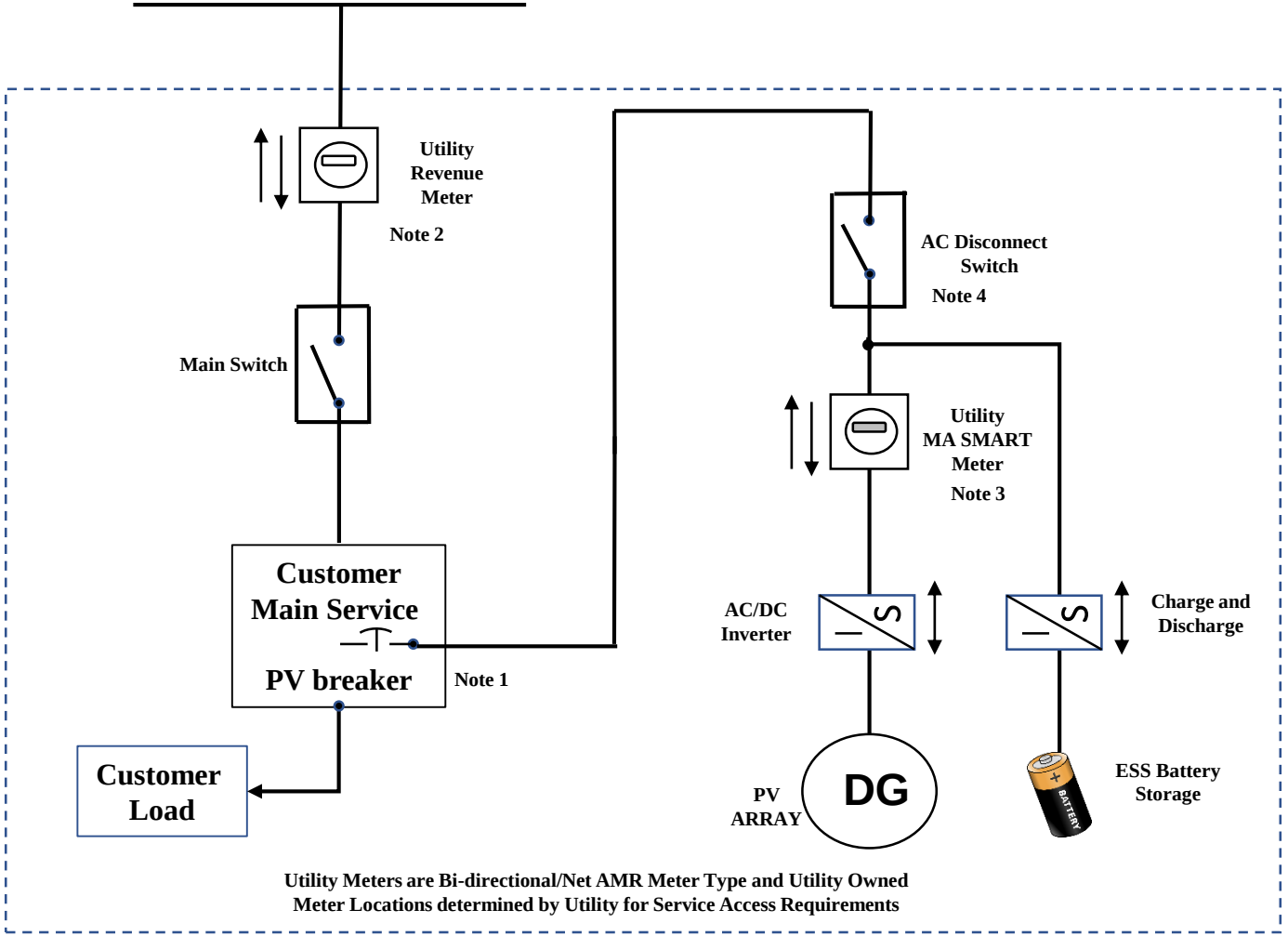
Note 4
*** The utility AC emergency disconnect switch is required to be located ahead of the SMART where utility personal will be able to isolate the metering circuit.**

Special Notes:
*** All meters and switches are required to be grouped unless interconnection contractor request and is granted a written variance.**

1b. BTM <60kW

Retail

Residential/Commercial DG Customer Behind the Meter Ma SMART <60 kW With AC coupled ESS System
UTILITY – AREA EPS



Utility Meters are Bi-directional/Net AMR Meter Type and Utility Owned Meter Locations determined by Utility for Service Access Requirements

This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
* All interconnection point are required to be placed behind the utility meter
For behind the meter installations all interconnect points required to be located behind the utility revenue meter.
>>> No connections are to be made within the revenue meter socket or in utility transformer compartment. <<<

Note 2
* Utility meters located inside customers facility, the interconnecting customer will be required to upgrade and have the meter relocated outside the customers facility near both the production meter and the utility disconnect switch.

Note 3
* Utility feed for the MA SMART meter, the socket is required to be wired top side utility, bottom side inverter.
* The utility AC emergency disconnect switch is required to be located on the ground level within vicinity of the utility revenue meter where our utility personal will have 24 / 7 access to it.

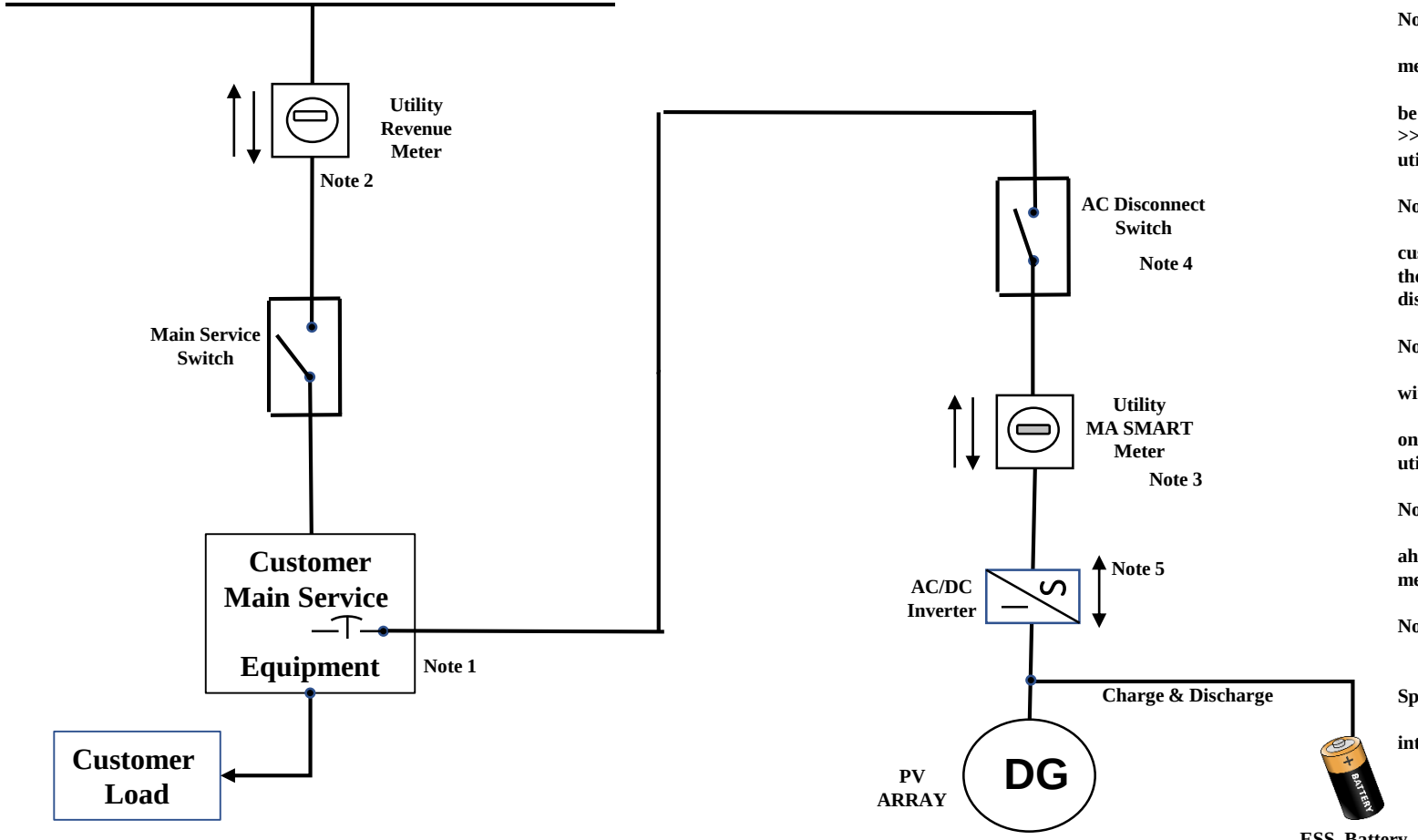
Note 4
* The utility AC emergency disconnect switch is required to be located ahead of the SMART where utility personal will be able to isolate the metering circuit.

Special Notes:
* All meters and switches are required to be grouped unless interconnection contractor request and is granted a written variance.

1c. BTM <60kW

Retail

Residential/Commercial DG Customer
Behind the Meter Ma SMART <60 kW
With DC coupled ESS System
UTILITY – AREA EPS



Utility Meters are Bi-directional/Net AMR Meter Type and Utility Owned Meter Locations determined by Utility for Service Access Requirements

This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
* All interconnection point are required to be placed behind the utility meter
* For behind the meter installations all interconnect points required to be located behind the utility revenue meter.
>>> No connections are to be made within the revenue meter socket or in utility transformer compartment. <<<

Note 2
* Utility meters located inside customers facility, the interconnecting customer will be required to upgrade and have the meter relocated outside the customers facility near both the production meter and the utility disconnect switch.

Note 3
* Utility feed for the MA SMART meter, the socket is required to be wired top side utility, bottom side inverter.
* The utility AC emergency disconnect switch is required to be located on the ground level within vicinity of the utility revenue meter where our utility personal will have 24 / 7 access to it.

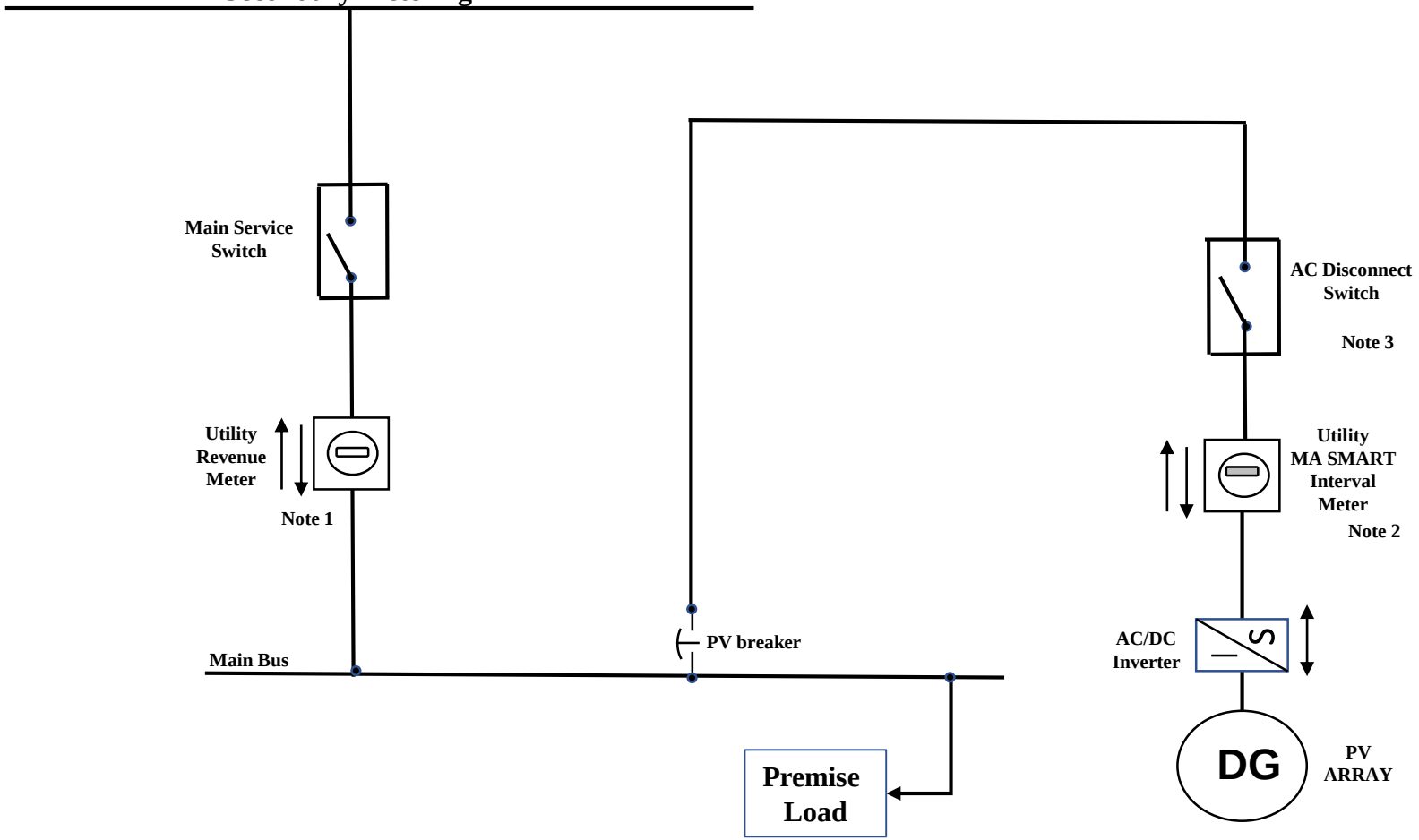
Note 4
* The utility AC emergency disconnect switch is required to be located ahead of the SMART where utility personal will be able to isolate the metering circuit.

Note 5
* Additional outputs of the inverter may need separate metering.

Special Notes:
* All meters and switches are required to be grouped unless interconnection contractor request and is granted a written variance.

2a. BTM >60kW to 500kW

AC Connection to Utility EPS 60kW – 500kW
Behind the Meter Ma SMART
Without ESS System
Utility Service Connection
3-Phase 4-Wire System
Secondary Metering



This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
* Utility Revenue Meter installed will be Bi-directional/NET/Recording meter and meet the requirements of both tariff and billing rate.

* Where Utility Meter is located inside, the interconnecting customer will upgrade the existing service and move the metering location outside with the Utility Ma SMART meter.

Note 2
* Must have a Cellular connection at Meter location.
* Meter will have bi-directional interval recording capabilities.
* Secondary metering CTs/VTs may be required.

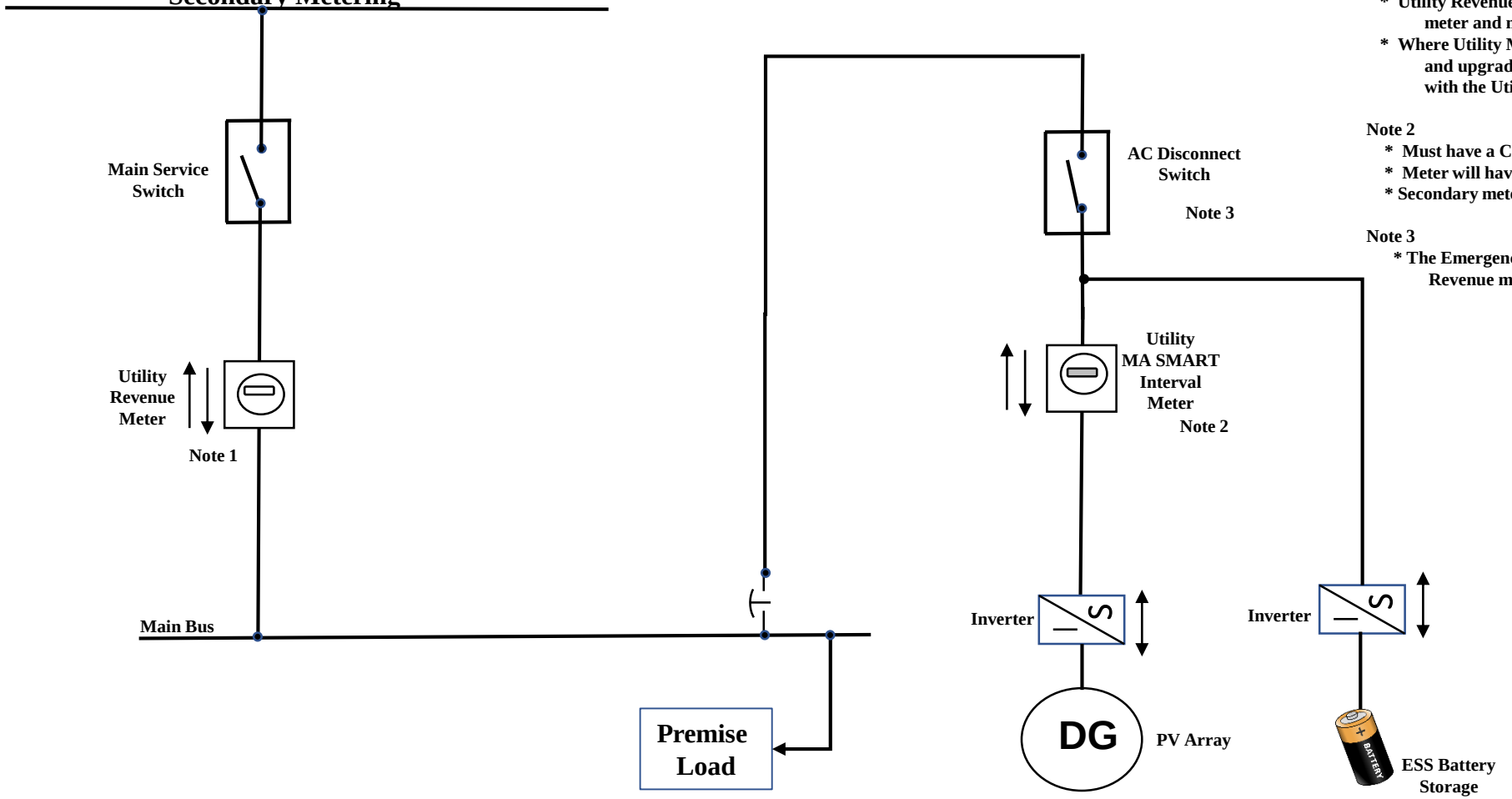
Note 3
* The Emergency shut off switch shall be within vicinity of the utility meter and accessible to Utility personnel.

Note 4
* Production meter current transformers polarity markings required to be pointed towards utility.

Special Notes:
* All meters and switches are required to be grouped unless interconnection contractor request and is granted a written variance.

2b. BTM >60kW to 500kW

AC Connection to Utility EPS 60kW – 500kW
Behind the Meter Ma SMART
With AC coupled ESS System
Utility Service Connection
3-Phase 4-Wire System
Secondary Metering



This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

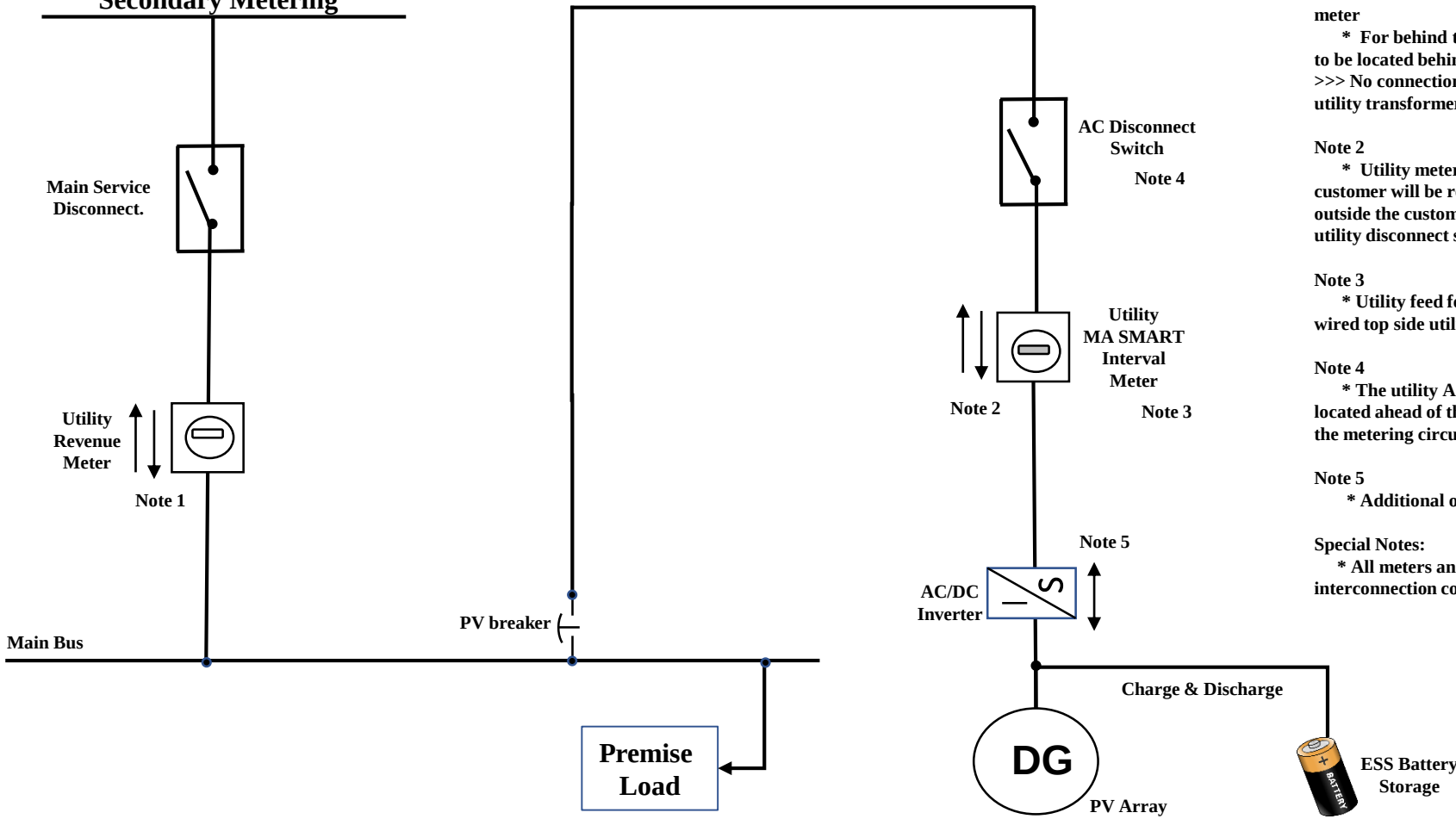
Note 1
* Utility Revenue Meter installed will be Bi-directional/NET/Recording meter and meet the requirements of both tariff and billing rate.
* Where Utility Meter is located inside, the interconnecting customer will and upgrade the existing service to move the metering location outside with the Utility Ma SMART meter.

Note 2
* Must have a Cellular connection at Meter location.
* Meter will have bi-directional interval recording capabilities.
* Secondary metering CTs/VTs may be required.

Note 3
* The Emergency shut off switch shall be located within the vicinity of the Revenue meter and fully accessible to Utility personnel.

2c. BTM >60kW to 500kW

AC Connection to Utility EPS 60kW – 500kW
Behind the Meter Ma SMART
With DC coupled ESS System
Utility Service Connection
3-Phase 4-Wire System
Secondary Metering



This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
* All interconnection point is required to be placed behind the utility meter
* For behind the meter installations all interconnect points required to be located behind the utility revenue meter.
>>> No connections are to be made within the revenue meter socket or in utility transformer compartment. <<<

Note 2
* Utility meters located inside customers facility, the interconnecting customer will be required to upgrade and have the meter relocated outside the customers facility near both the production meter and the utility disconnect switch.

Note 3
* Utility feed for the MA SMART meter, the socket is required to be wired top side utility, bottom side inverter.

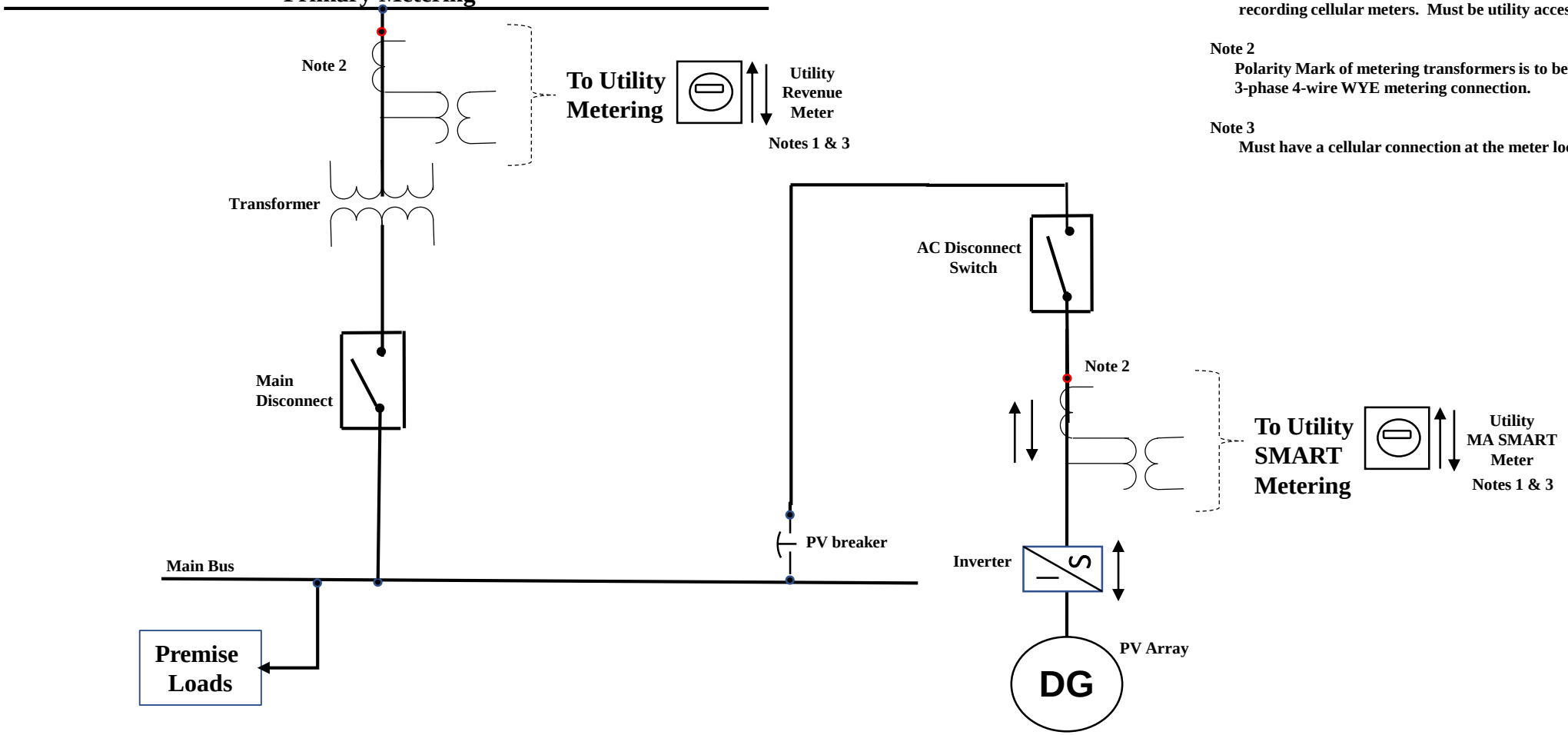
Note 4
* The utility AC emergency disconnect switch is required to be located ahead of the SMART where utility personal will be able to isolate the metering circuit.

Note 5
* Additional outputs of the inverter may need separate metering.

Special Notes:
* All meters and switches are required to be grouped unless interconnection contractor request and is granted a written variance.

3a. BTM >500kW

AC Connection to Utility EPS 500kW and Greater
Behind the Meter Ma SMART
With No ESS System
Utility Service Connection
3-Phase 4-Wire System
Primary Metering



This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
Utility Revenue & SMART Meters installed will be Bi-directional recording cellular meters. Must be utility accessible.

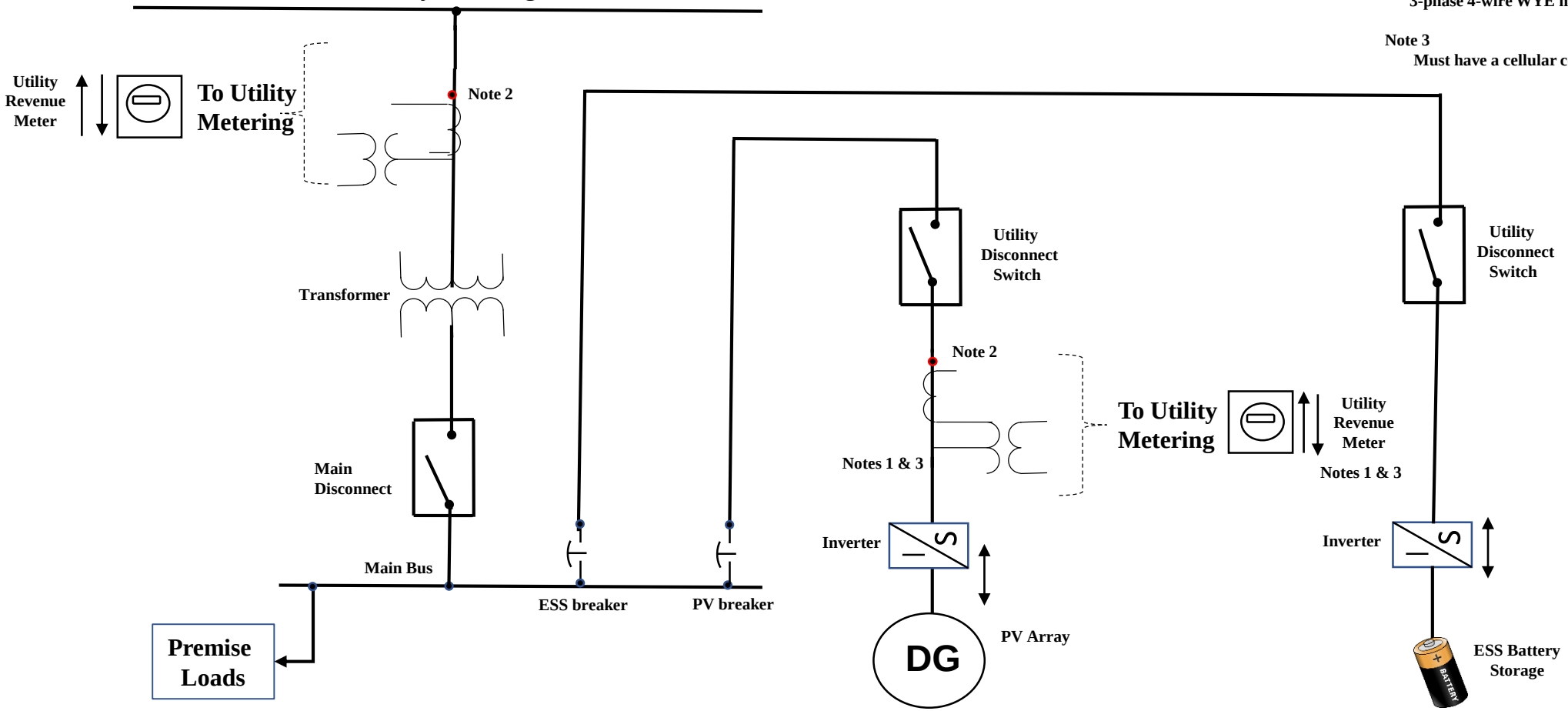
Note 2
Polarity Mark of metering transformers is to be toward the Utility feed. 3-phase 4-wire WYE metering connection.

Note 3
Must have a cellular connection at the meter location.

3b. BTM >500kW

This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

AC Connection to Utility EPS 500kW and Greater
Behind the Meter Ma SMART
With AC coupled ESS System
UTILITY SERVICE Connection
3-Phase 4-Wire System
Primary Metering



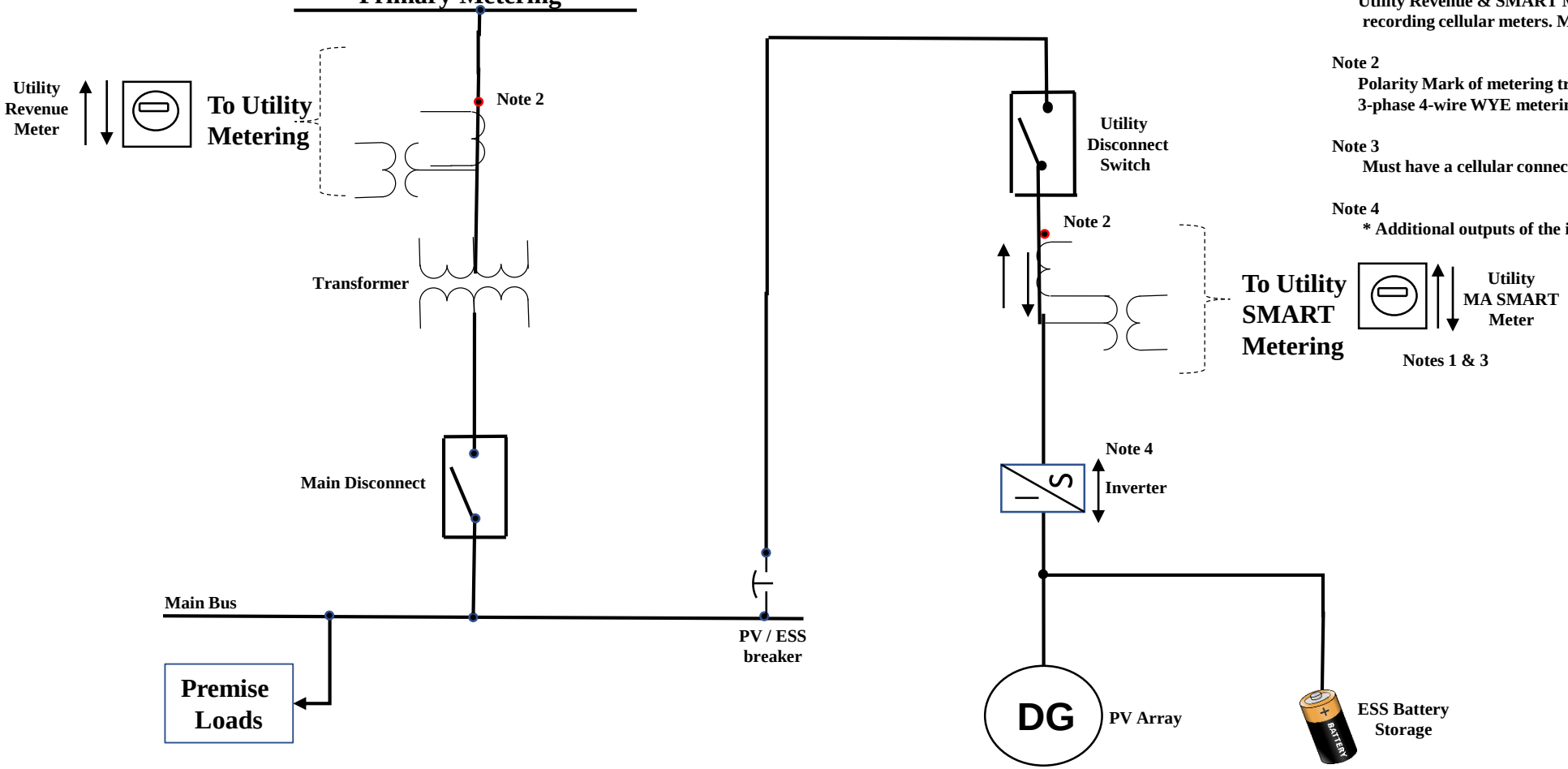
Note 1
Utility Revenue, SMART & ESS meters installed will be Bi-directional recording cellular meters. Must be accessible.

Note 2
Polarity Mark of metering transformers is to be toward the Utility feed. 3-phase 4-wire WYE metering connection.

Note 3
Must have a cellular connection at the meter location.

3c. BTM >500kW

AC Connection to Utility EPS 500kW and Greater
Behind the Meter Ma SMART
With DC coupled ESS System
UTILITY SERVICE Connection
3-Phase 4-Wire System
Primary Metering



This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
Utility Revenue & SMART Meters installed will be Bi-directional recording cellular meters. Must be accessible.

Note 2
Polarity Mark of metering transformers is to be toward the Utility feed. 3-phase 4-wire WYE metering connection.

Note 3
Must have a cellular connection at the meter location.

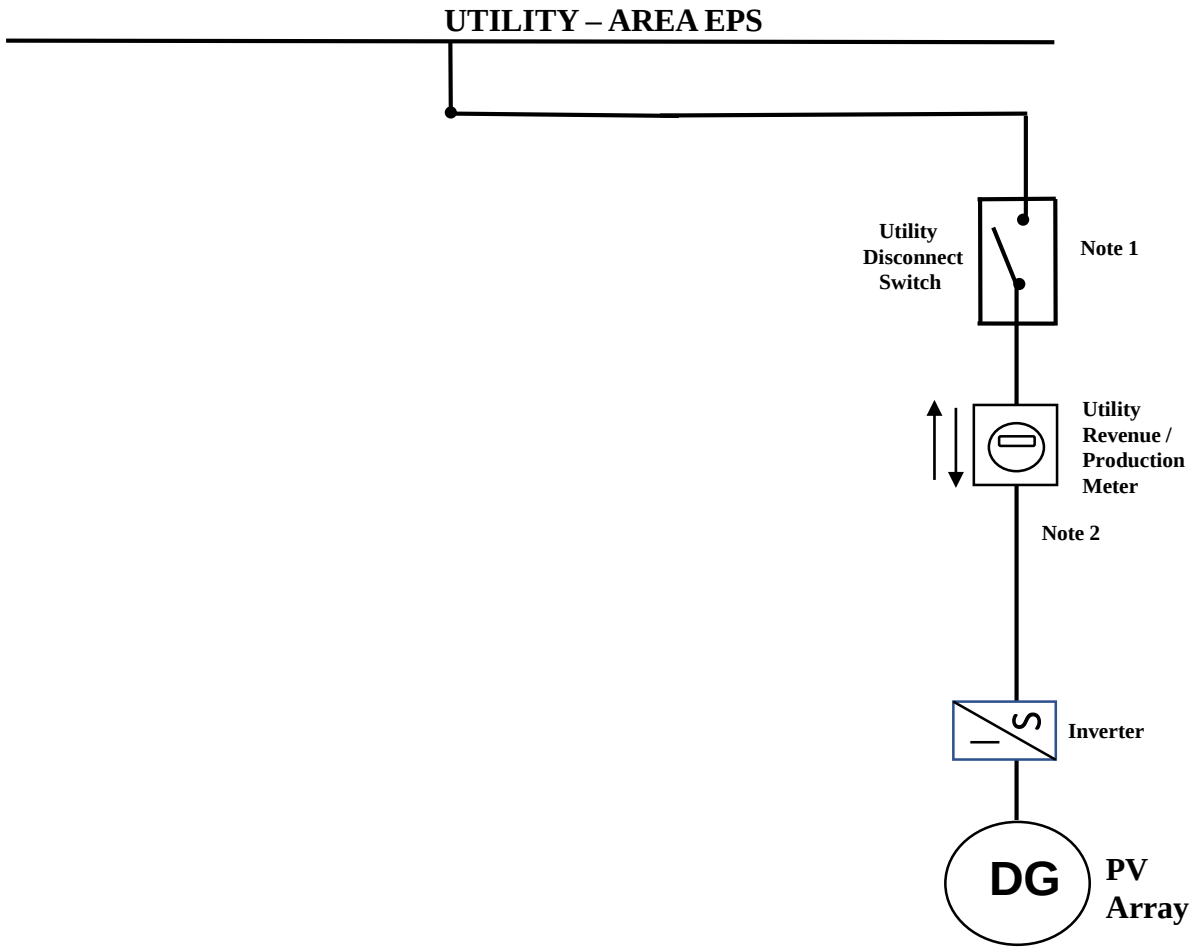
Note 4
* Additional outputs of the inverter may need separate metering.

Stand-Alone Wiring Diagrams

4a. Stand Alone <60kW

Retail

Residential/Commercial DG Customer
Stand Alone Ma SMART <60 kW
With No ESS System



This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
- * Following utility I & R book
- * All 277v/480 or instrument rated services required to be cold sequenced as shown in diagram.
- * The Emergency shut off switch shall be within the vicinity of the utility meter and accessible to Utility personnel.

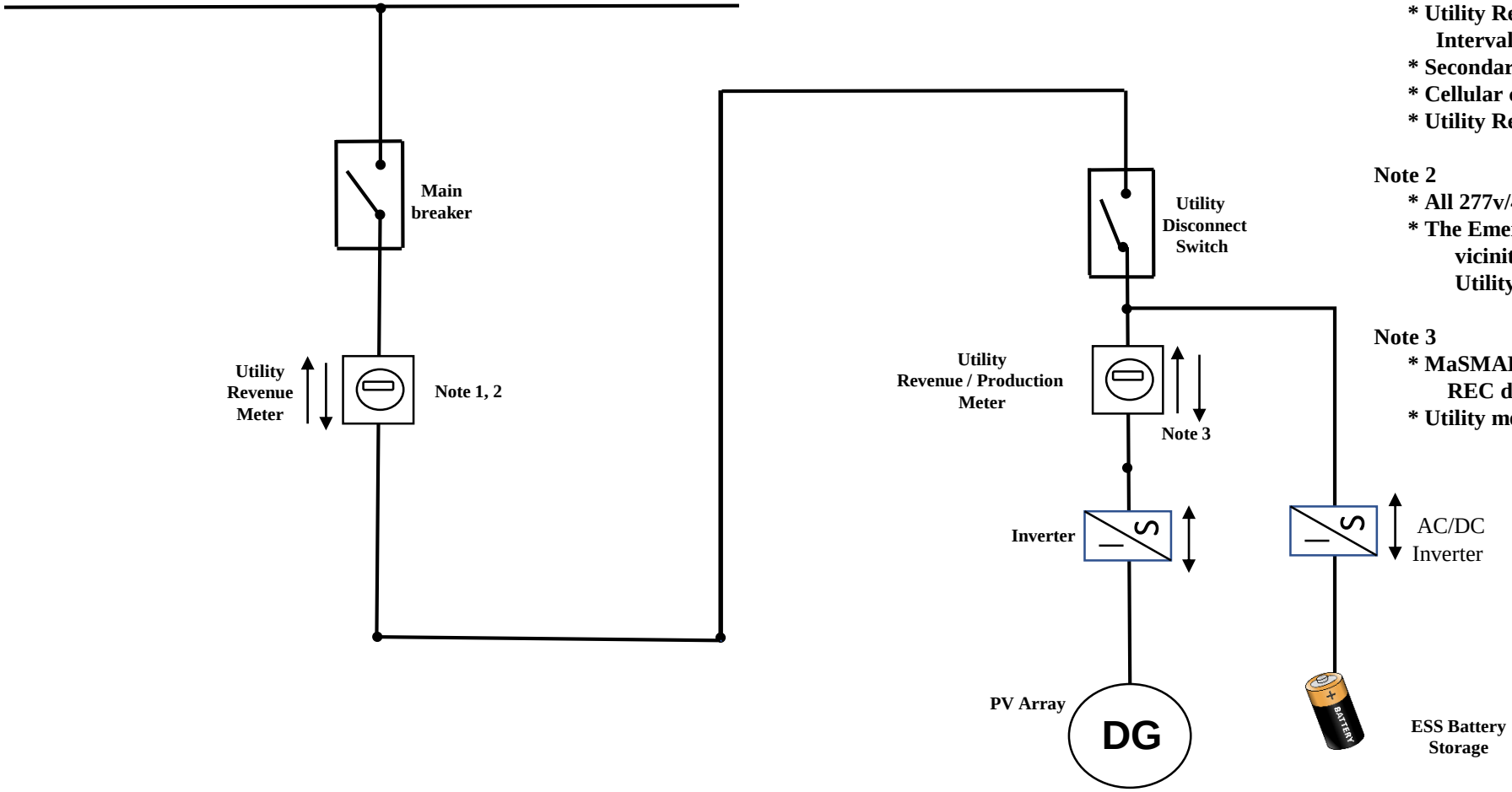
Note 2
- * MaSMART meter to be used for Utility Revenue and REC determination purposes.
- * Utility meter must be accessible to Utility personnel.

4b. Stand Alone <60kW

Retail

Residential/Commercial DG Customer
Stand Alone Ma SMART <60 kW
With AC coupled ESS System

UTILITY – AREA EPS



This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
- *** Utility Revenue Meter installed will be Bi-directional Interval Recording Cellular Meter**
- *** Secondary metering CTs/VTs may be required.**
- *** Cellular connection at the meter location is required.**
- *** Utility Revenue Meter must be accessible.**

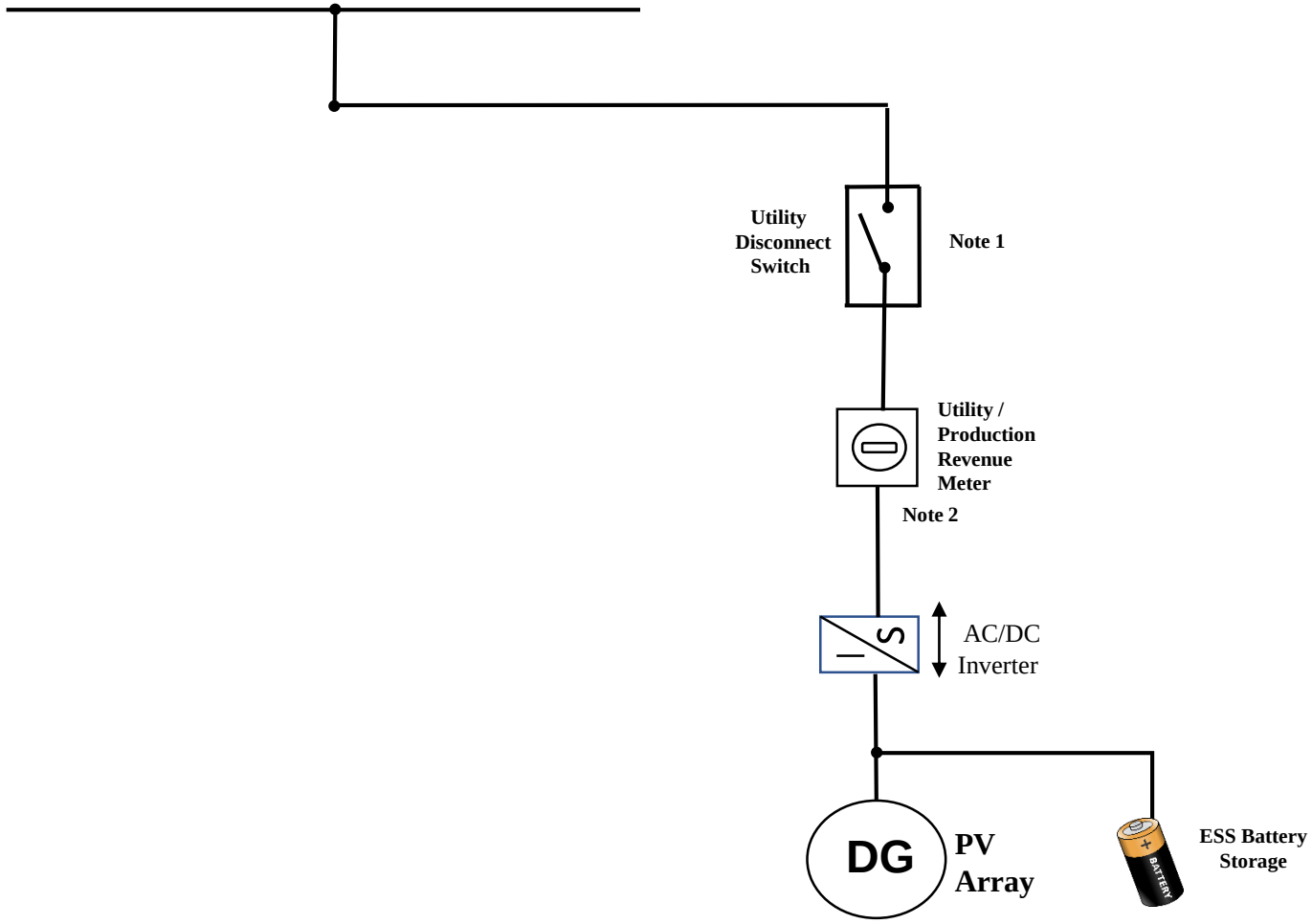
Note 2
- *** All 277v/480 services must be cold sequenced.**
- *** The Emergency shut off switch shall be within vicinity of the utility meter and accessible to Utility personnel.**

Note 3
- *** MaSMART meter to be used for Utility Revenue and REC determination purposes.**
- *** Utility meter must be accessible to Utility personnel.**

4c. Stand Alone <60kW

Retail **Residential/Commercial DG Customer**
Stand Alone Ma SMART <60 kW
With DC coupled ESS System

This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

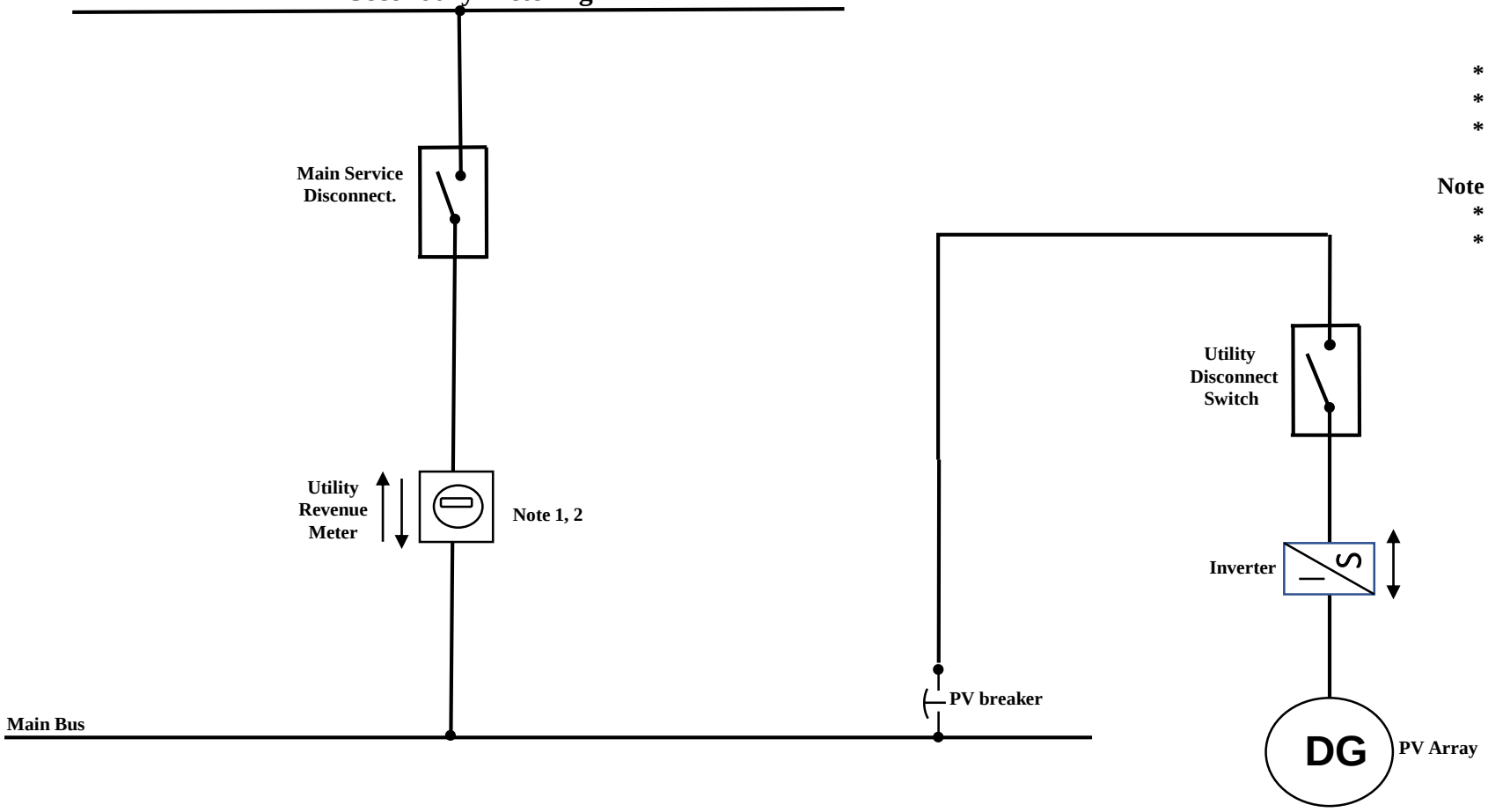


Note 1
* Following utility I & R book
* All 277v/480 or instrument rated services required to be cold sequenced as shown in diagram.
* The Emergency shut off switch shall be within the vicinity of the utility meter and accessible to Utility\ personnel.

Note 2
* MaSMART meter to be used for Utility Revenue and REC determination purposes.
* Utility meter must be accessible to Utility personnel.

5a. Stand Alone >60kW to 500kW

AC Connection to Utility EPS 60kW – 500kW
Stand Alone Ma SMART
Without ESS System
Utility Service Connection
3-Phase 4-Wire System
Secondary Metering



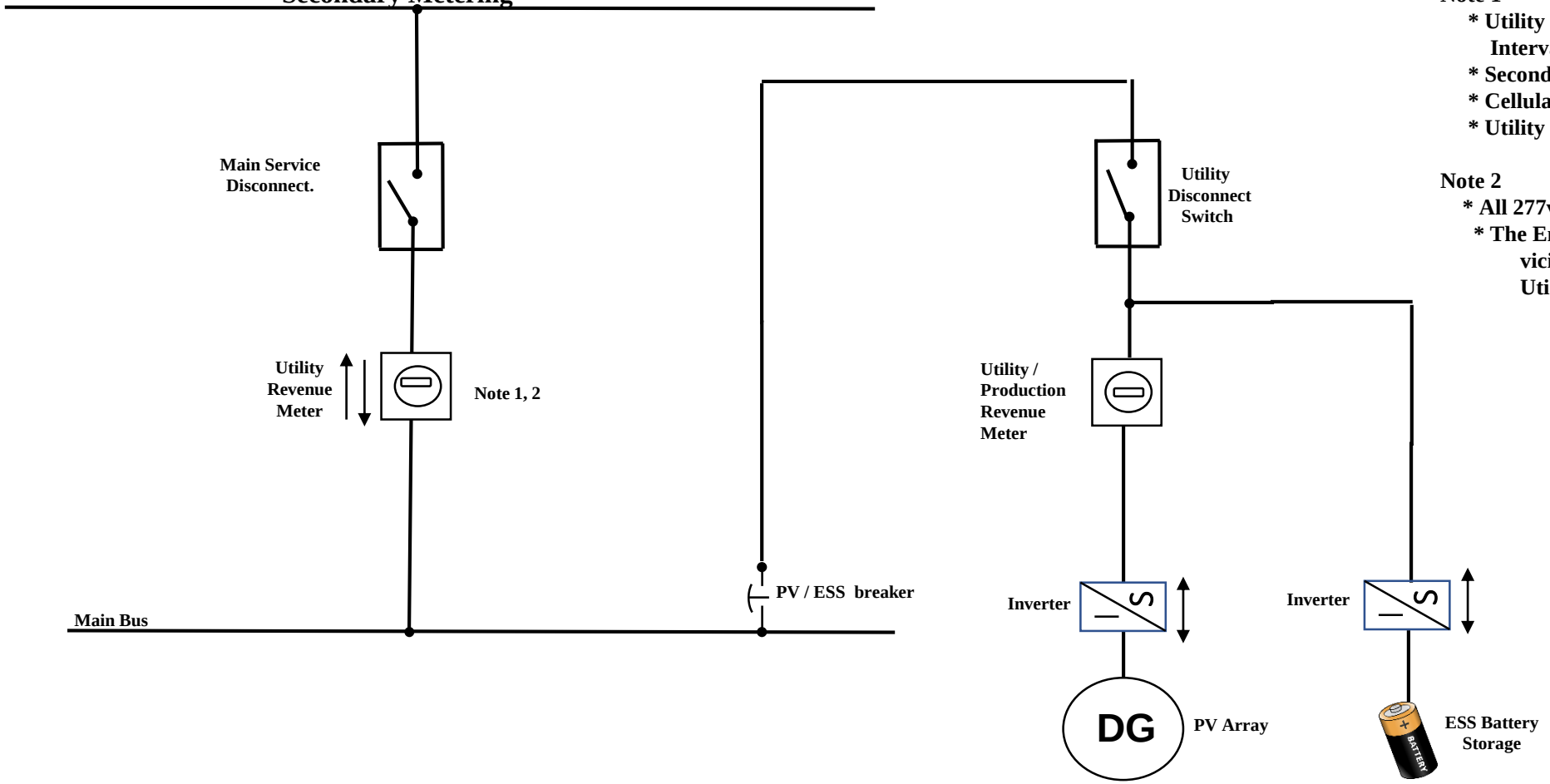
This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
- *** Utility Meter will be Bidirectional Interval Recording cellular meter to be used for Utility Revenue and REC determination purposes.**
- *** Secondary metering CTs/VTs may be required.**
- *** Cellular connection at the meter location is required.**
- *** Utility Revenue Meter must be accessible.**

Note 2
- *** All 277v/480 services must be cold sequenced.**
- *** The Emergency shut off switch shall be within vicinity of the utility meter and accessible to Utility personnel.**

5b. Stand Alone >60kW to 500kW

AC Connection to Utility EPS 60kW – 500kW
Stand Alone Ma SMART
With AC ESS System
Utility Service Connection
3-Phase 4-Wire System
Secondary Metering



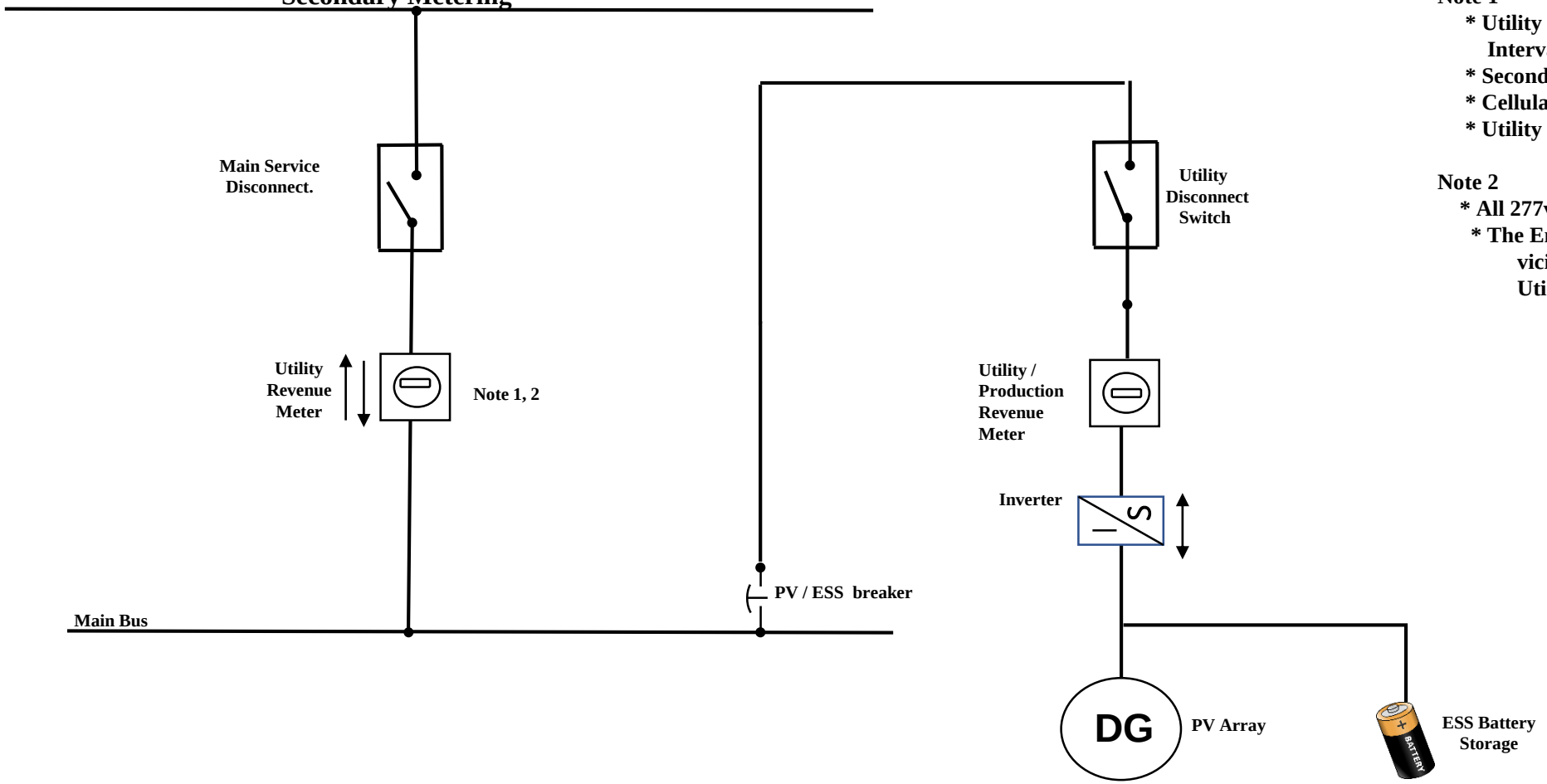
This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
* Utility Revenue Meter installed will be Bi-directional Interval Recording Cellular Meter
* Secondary metering CTs/VTs may be required.
* Cellular connection at the meter location is required.
* Utility Revenue Meter must be accessible.

Note 2
* All 277v/480 services must be cold sequenced.
* The Emergency shut off switch shall be within vicinity of the utility meter and accessible to Utility personnel.

5c. Stand Alone >60kW to 500kW

AC Connection to Utility EPS 60kW – 500kW
Stand Alone Ma SMART
With DC ESS System
Utility Service Connection
3-Phase 4-Wire System
Secondary Metering



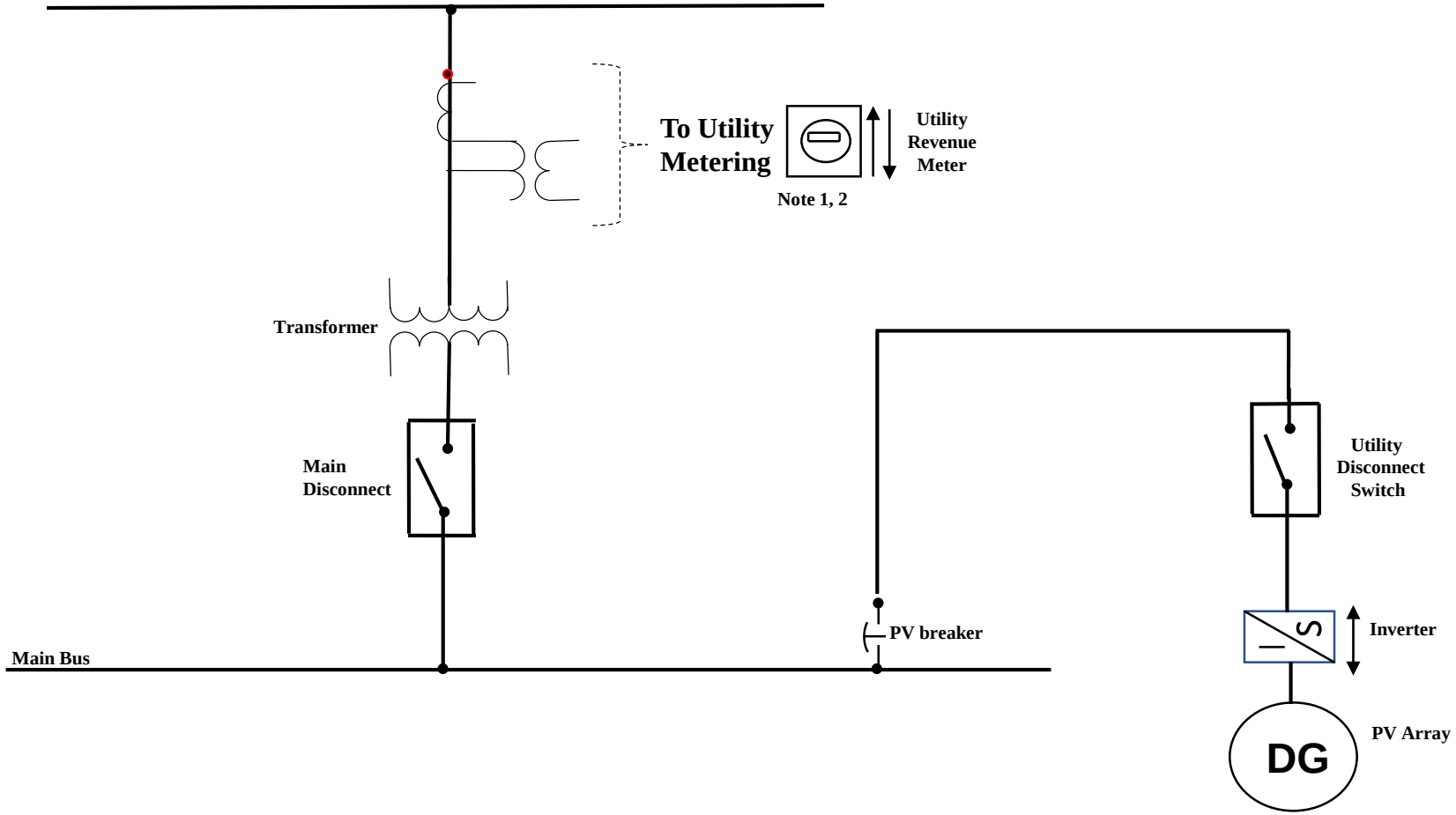
This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
* Utility Revenue Meter installed will be Bi-directional Interval Recording Cellular Meter
* Secondary metering CTs/VTs may be required.
* Cellular connection at the meter location is required.
* Utility Revenue Meter must be accessible.

Note 2
* All 277v/480 services must be cold sequenced.
* The Emergency shut off switch shall be within vicinity of the utility meter and accessible to Utility personnel.

6a. Stand Alone >500kW

AC Connection to Utility EPS 500kW and Greater
Stand Alone Ma SMART
With No ESS System
Utility Service Connection
3-Phase 4-Wire System
Primary Metering



This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1

- **Utility Revenue Meter installed will be Bi-directional Interval Recording cellular meter.**
- **Cellular connection at the meter location is required.**
- **Utility Revenue Meter must be accessible.**
- **Follow I&R metering requirements for Cold/Hot sequence metering**

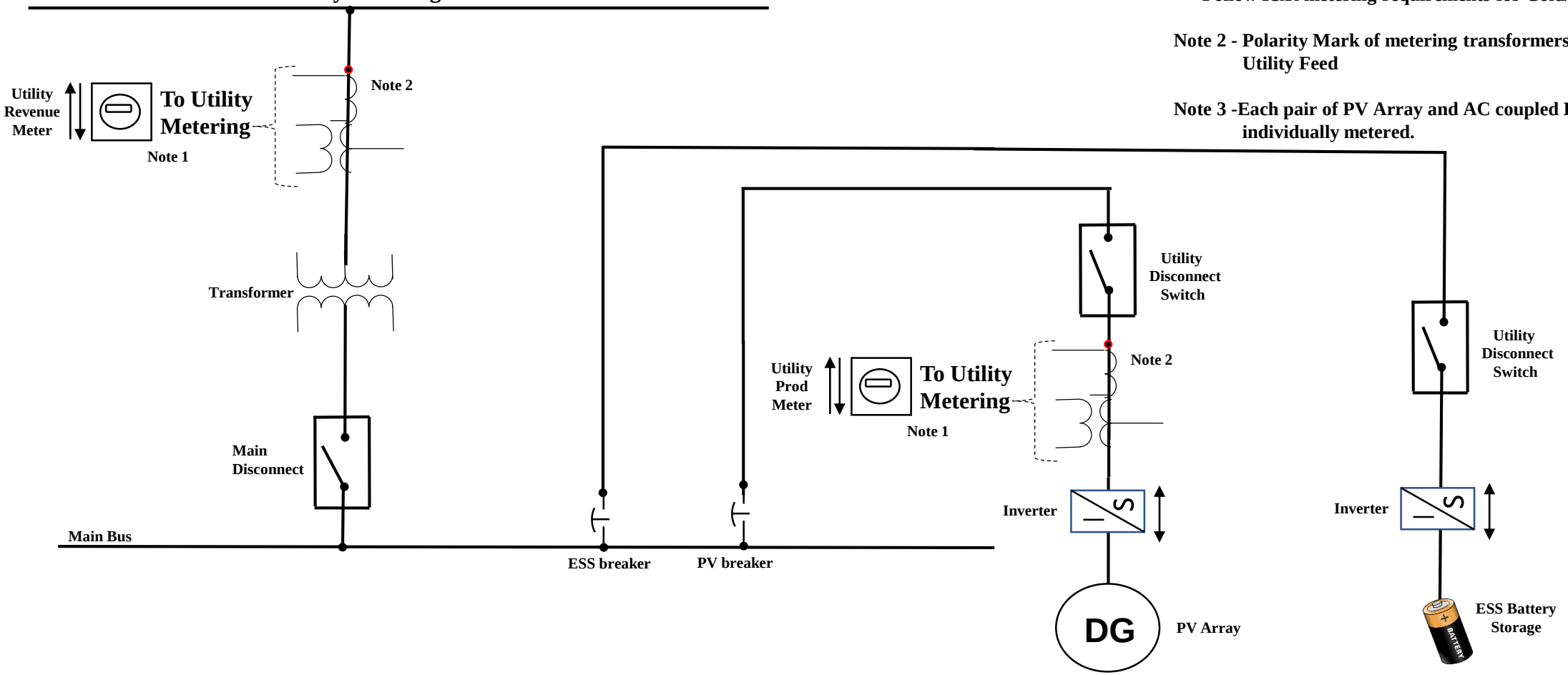
Note 2

Polarity Mark of metering transformers is to be toward the Utility Feed

6b. Stand Alone >500kW

This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

AC Connection to Utility EPS 500kW and Greater
Stand Alone Ma SMART
With AC ESS System
Utility Service Connection
3-Phase 4-Wire System
Primary Metering



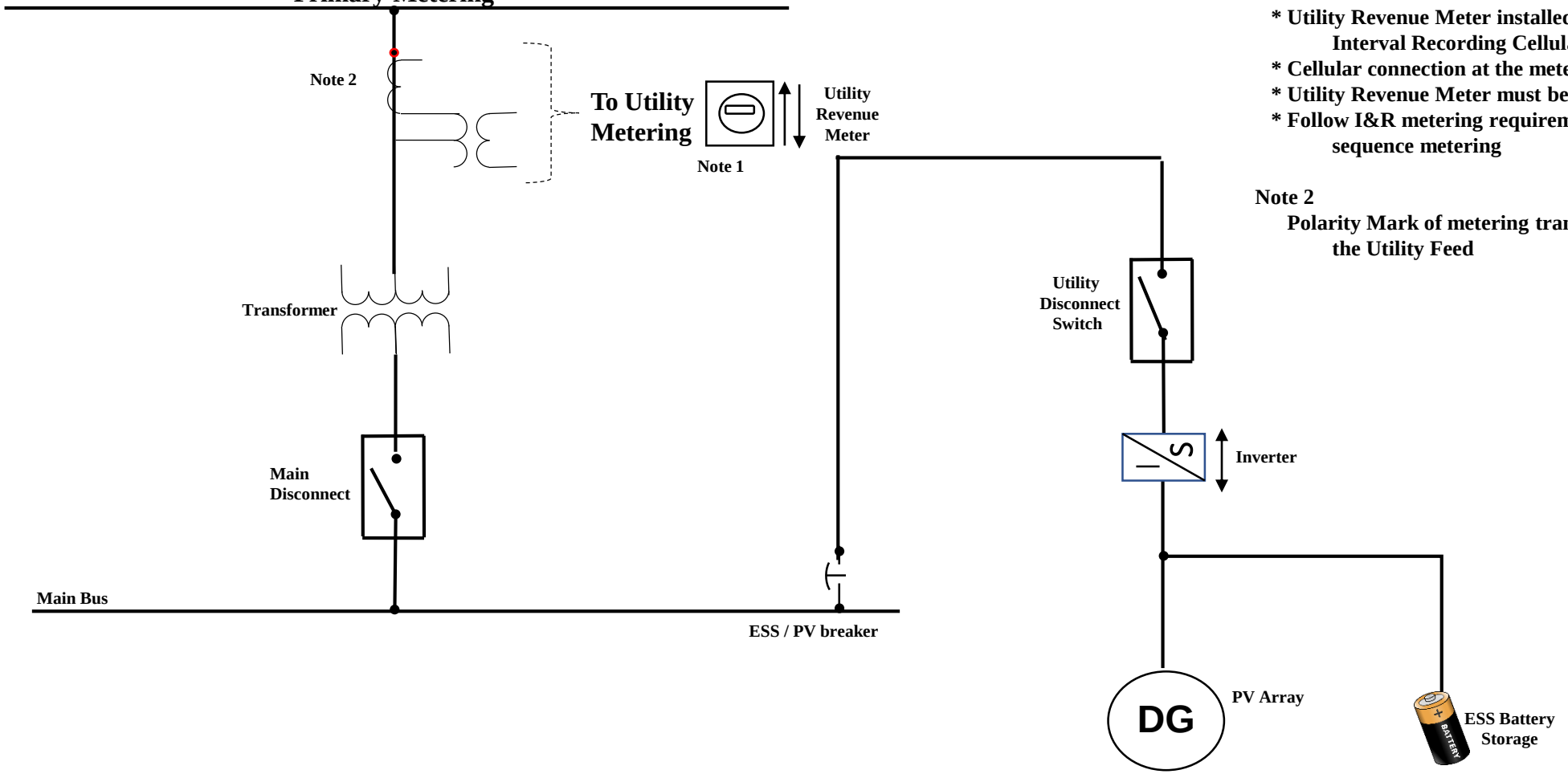
Note 1
* **Utility Revenue, SMART and ESS Meters will be Bi-directional Interval Recording Cellular meter. Cellular connection at the meter location is required. Utility Revenue Meter must be accessible.**
* **Follow I&R metering requirements for Cold/Hot sequence metering.**

Note 2 - Polarity Mark of metering transformers is to be toward the Utility Feed

Note 3 -Each pair of PV Array and AC coupled ESS System will be individually metered.

6c. Stand Alone >500kW

AC Connection to Utility EPS 500kW and Greater
Stand Alone Ma SMART
With DC ESS System
Utility Service Connection
3-Phase 4-Wire System
Primary Metering



This diagram is representative of a standard design. Please contact Eversource for approval, if a different configuration is needed.

Note 1
* Utility Revenue Meter installed will be Bi-directional Interval Recording Cellular meter.
* Cellular connection at the meter location is required.
* Utility Revenue Meter must be accessible.
* Follow I&R metering requirements for Cold/Hot sequence metering

Note 2
Polarity Mark of metering transformers is to be toward the Utility Feed

Summary of changes from previous edition

Change	Slide	Description
1.	1B	Customer connection of AC coupled ESS moved in front of the Production meter
2.	2B	Customer connection of AC coupled ESS moved in front of the Production meter
3.	3B	Removed Production meter from ESS system
4.	4A	Removed the “existing” service – not appropriate for a standalone scenario
5.	4B	Customer connection of AC coupled ESS moved in front of the Production meter
6.	4C	Removed the “existing” service – not appropriate for a standalone scenario
7.	5B	Meter added to measure just the solar output
8.	6B	Meter added to measure just the solar output

Agenda

- **The Interconnection Process** – What's changing, what won't
- **Timeline**
- **Roles of the Parties** – DOER, EDC, SPA interactions with program participants and the parties
- **National Grid/Utilities Metering Drafts**

Things staying the same:

- EDC specific processes and tools for making, monitoring interconnection requests
- Interconnection timelines
- EDC teams supporting the interconnection process

The MA SMART / SPA incentive application process is designed to complement the EDC interconnection process, not replace it

Things that will change:

- Additional applicant-paid metering charges
- In behind the meter situations, need for a second, utility installed meter for measuring system output behind the retail meter
  - Will require customer-installed wiring, installation of a second meter socket
  - Must be adequately accessible, proximate to existing utility revenue meter

Who you gonna call?

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Issue type	Primary point of contact
General MA SMART Program questions	CLEAResult
Program / adder eligibility questions	DOER Massachusetts Department of Energy Resources
Incentive application status / process questions	CLEAResult
Interconnection application status / process questions	EVERSOURCE nationalgrid Unitil energy for life
Incentive rate calculation questions	CLEAResult
Incentive payment questions	EVERSOURCE nationalgrid Unitil energy for life

Key Distinction

Behind-the-Meter	Standalone
	
System that serves on-site load other than parasitic or station load utilized to operate the unit	System that serves no associated on-site load other than parasitic or station load utilized to operate the unit

Behind the meter systems will be compensated differently than standalone systems

Billing Review DRAFT

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DETAIL OF CURRENT CHARGES

Delivery Services

Service Period	No. of Days	Current Reading		Previous Readin	Total Usage
Jul 7 - Aug 5	29	1200		500	700

METER NUMBER 99999999	**NEXT SCHEDULED READ DATE ON OR ABOUT Aug 8**			
SERVICE PERIOD Jun 6 - Jul 7	**NUMBER OF DAYS IN PERIOD 29**			
RATE Residential Regular R-1				
Customer Charge				10
Dist Chg	0.06236	x	700 kWh	43.65
Transition Charge	0.02084	x	700 kWh	14.59
Transmission Charge	0.0005	x	700 kWh	0.35
Energy Efficiency Chg	0.03056	x	700 kWh	21.39
Renewable Energy Chg	0.00054	x	700 kWh	0.38
	Total Delivery Services			**$85.86**

Supply Services

SUPPLIER National Grid

Energy Charge	0.12673	x	700 kWh	88.71
		Total Supply Services		**$88.71**

MA SMART Incentive Program

Service Perio	No. of Days	Current Reac		Previous Rea	Total Usage
Jul 7 - Aug 5	29	46005		44805	1200 kWh

METER NUMBER 99999999	**NEXT SCHEDULED READ DATE ON OR ABOUT Aug 8**			
SERVICE PERIOD Jun 6 - Jul 7	**NUMBER OF DAYS IN PERIOD 31**			
RATE Small C&I G-1				

SMART Compensation Payment

Total Compensation(Incl. QF pmt.)	$0.28	x	1200kwh	$ 336.00
		Total SMART Payment		**$336.00**

NOTES SMART SOLAR DWGS

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Residential/Commercial DG Customer
SMART SOLAR Metering Notes

DER: Distributed Energy Resource
DG: Distributed Generator (a subset of DER)
EPS: Electric Power System
IC: Interconnection Customer
PCC: Point of Common Coupling
PoC: Point of Connection
Wh: Watthour Meter (may include demand quantities of Watts and VA)

NOTES:

1. All Interval metering requires telemetry.
2. Grouped meter location and installation shall be according to National Grid's jurisdiction applicable service and tariff requirements. See ESB 750 and ESB 756 Appendix C for the MA service jurisdiction (https://www.nationalgridus.com/ProNet/Technical-Resources/Electric-Specifications).
   - IC installs meter socket trough grouped at service location accessible for National Grid's AMR meters (net type for load + DER and bi-directional for MA SMART DER).
   - < 60 kW applications are watthour type revenue meters and > 60 kW are interval type.
   - All kWh measured through the MA SMART meter is compensated through the MA SMART incentive rate.
3. Generator disconnect installed according to NEC and National Grid's MDPU Interconnection Tariff.
4. Inverters shall be UL 1741 or UL 1741 SA certified for parallel operation with the utility (area EPS).
5. Where existing PCC meter is inside, the IC will upgrade their service connection to change it to outside location grouped with MA SMART Solar meter.
6. Bypass meter sockets required in accordance to ESB 750 table 7.2-1.
7. Certified Inverter-based DER Interconnections <25kW may not be required to have an additional disconnecting means in accordance with ESB 756 Appendix C.
8. The following drawings are conceptual only. It is the responsibility of the customer to adhere to all applicable codes, standards and requirements.
9. For systems 25 kW and below a disconnecting or isolation means shall be required to be located between the Company meter installation and the DER device to allow for Company testing of the meter socket prior to meter installation.(1) This device may be located based on customer preference, although where this device is not accessible to the Company (2), this may cause delay with associated meter installation and testing.
10. Line side Disconnect in addition to the load side disconnect required for 480/277 Volt installations.
11. All Interval Meters will require telemetry
12. Ganged metering sockets are not allowed in this program.
13. PV and ESS will be wired to the load side of the Meter Socket.

BTM < 60 kW

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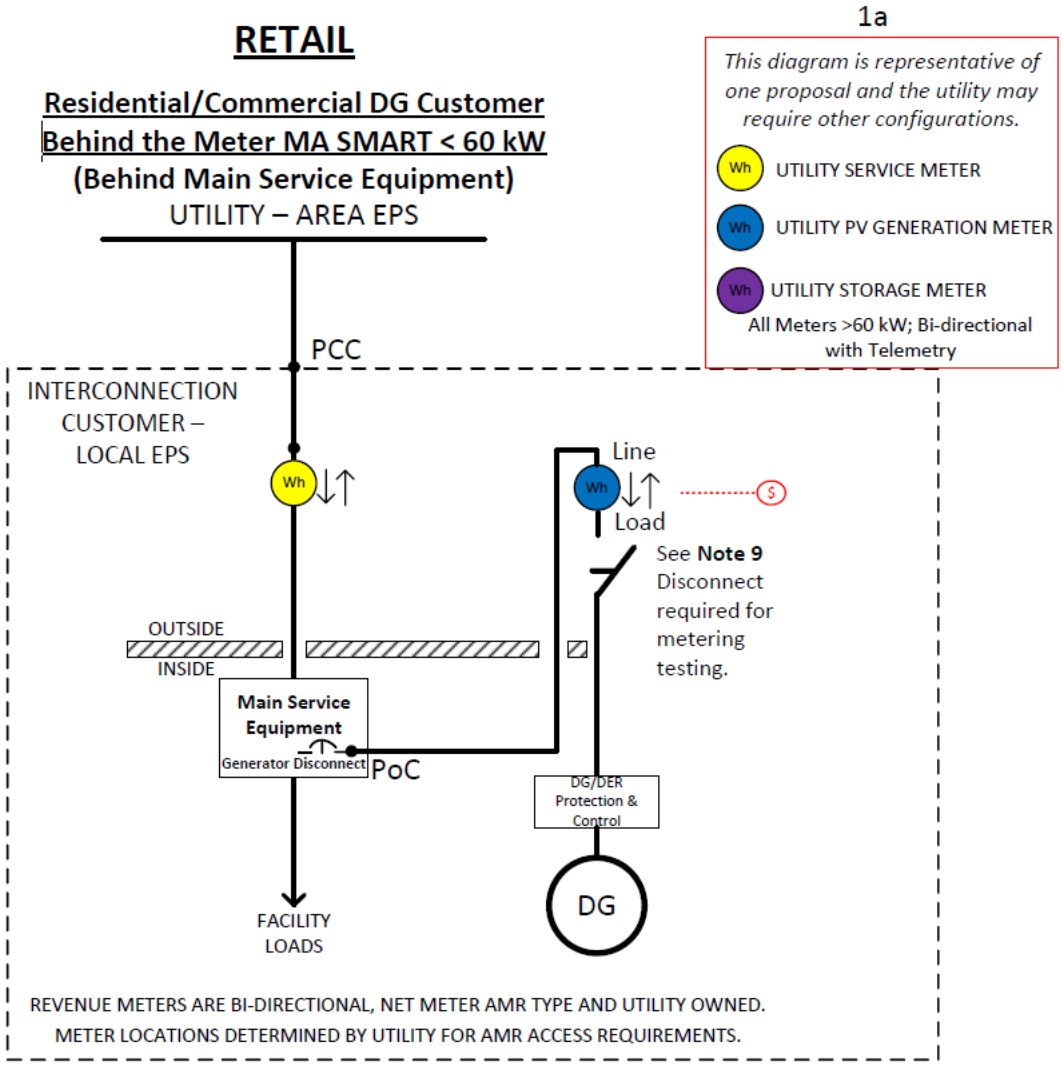
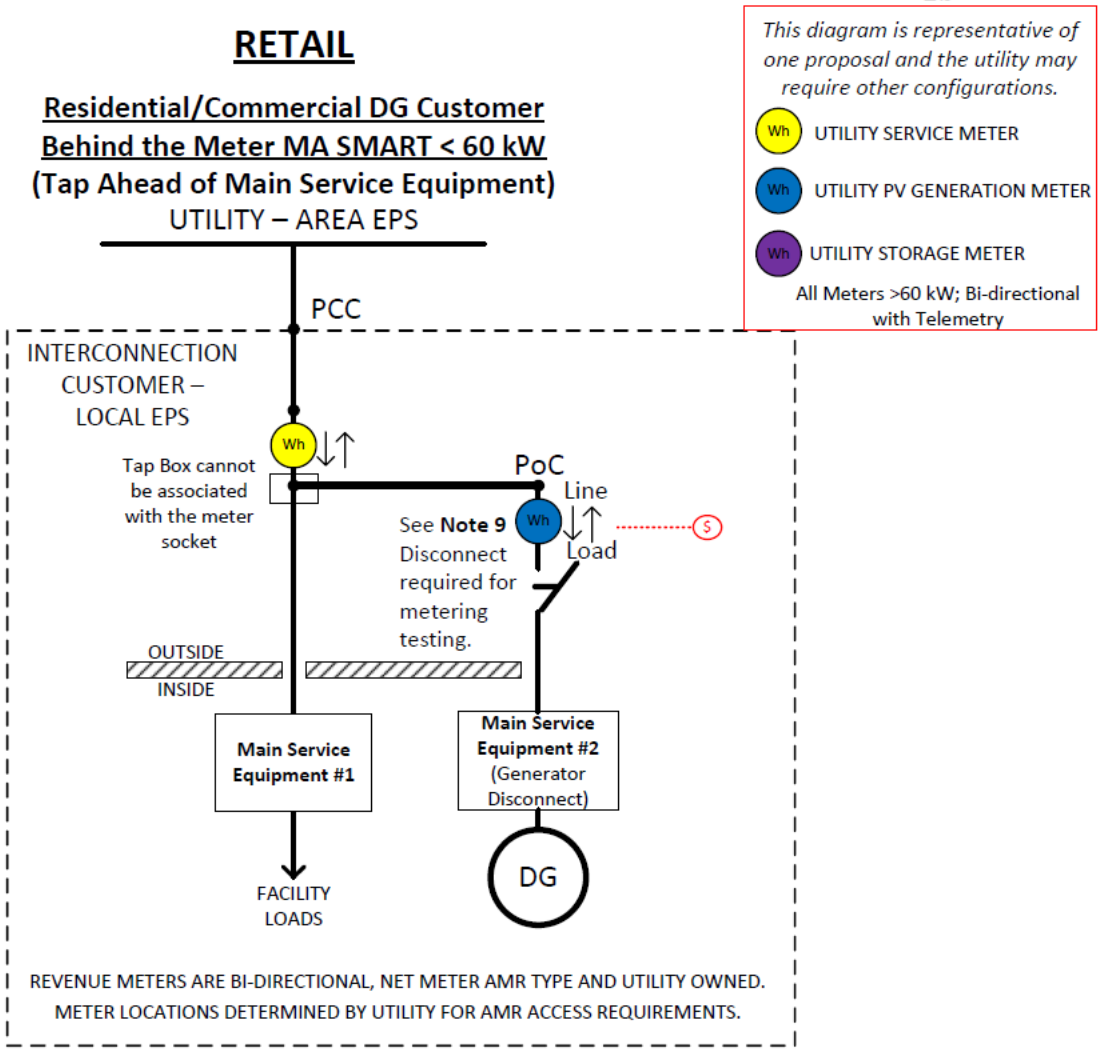


BTM < 60 kW

nationalgrid

1b



BTM < 60 kW

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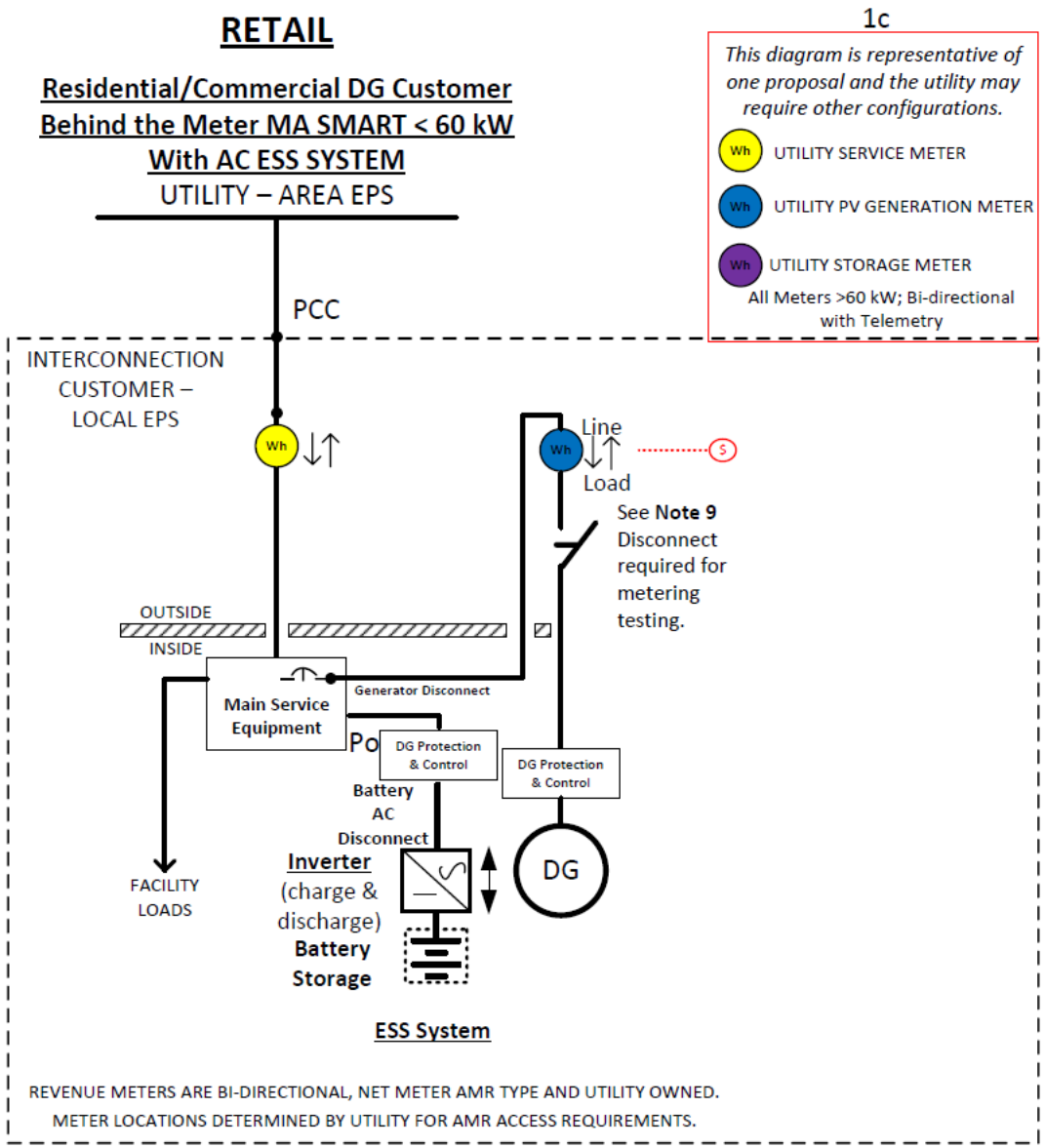

BTM < 60 kW

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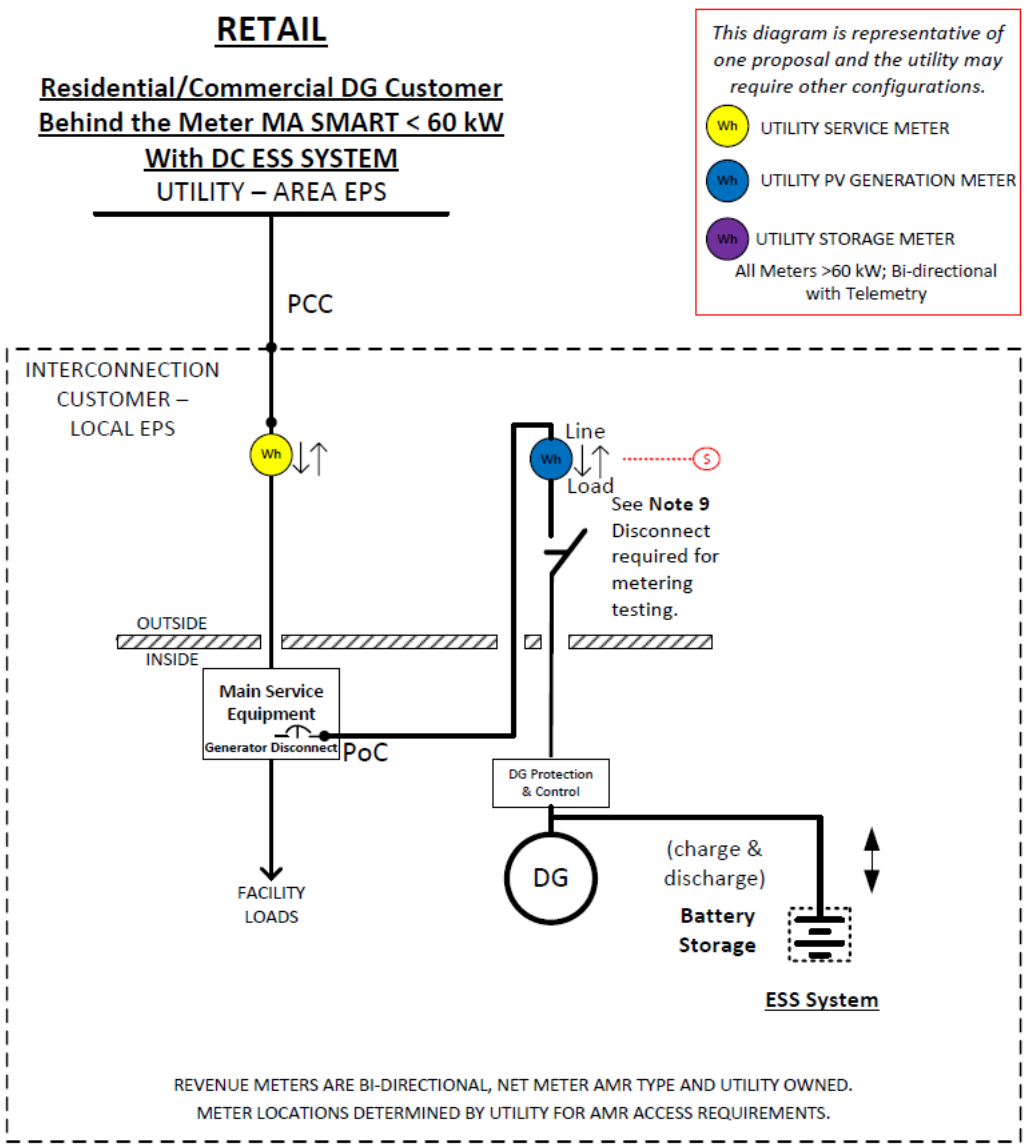
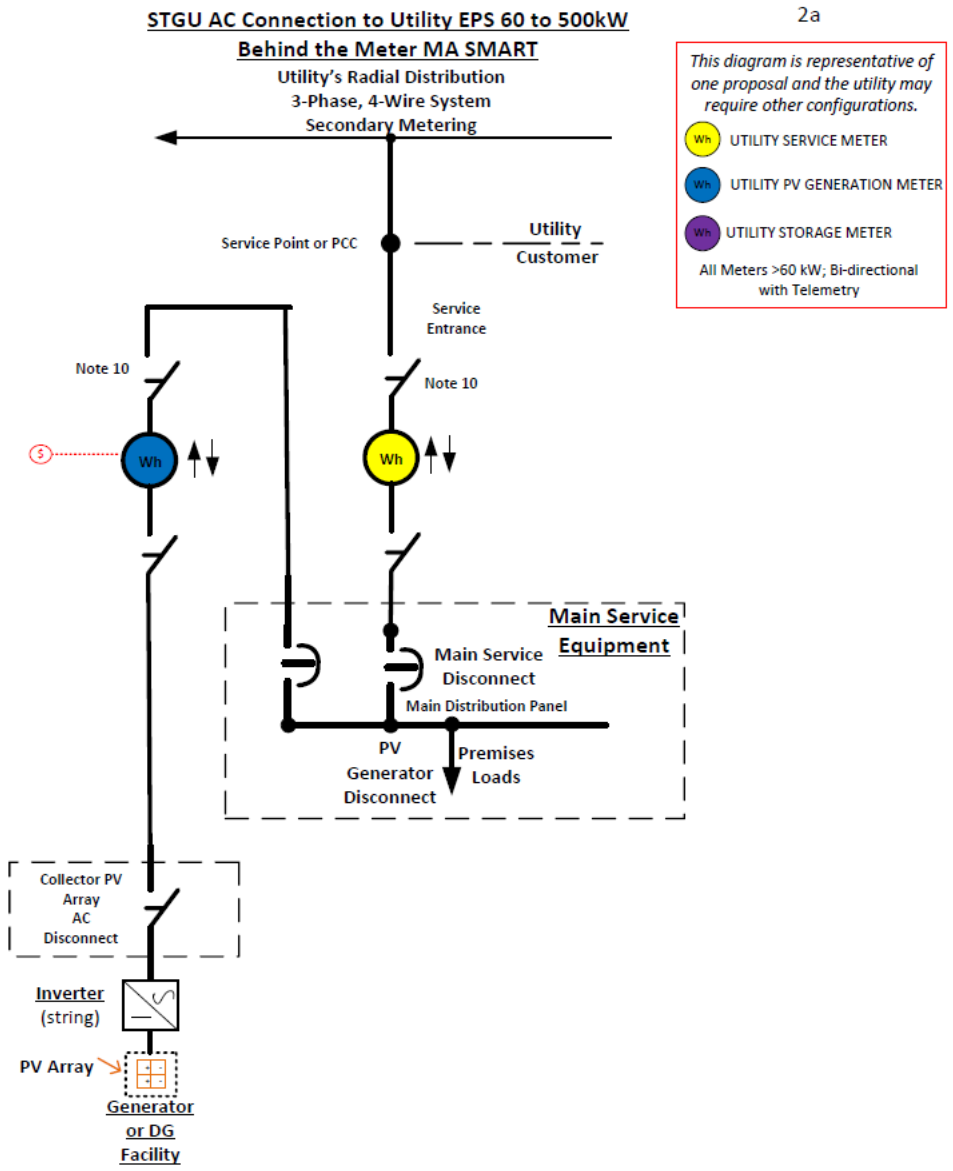


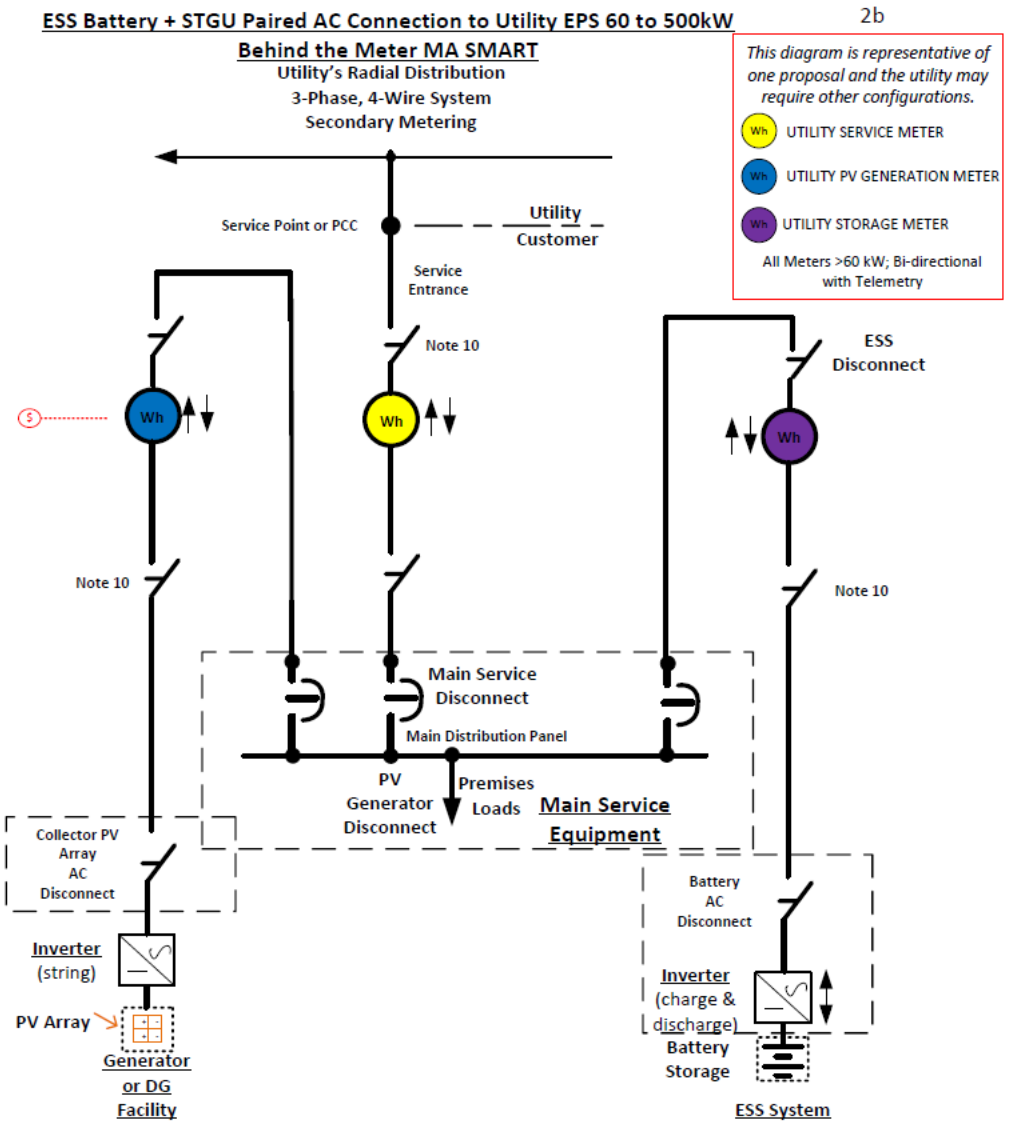
BTM >60 kW to 500 kW

nationalgrid



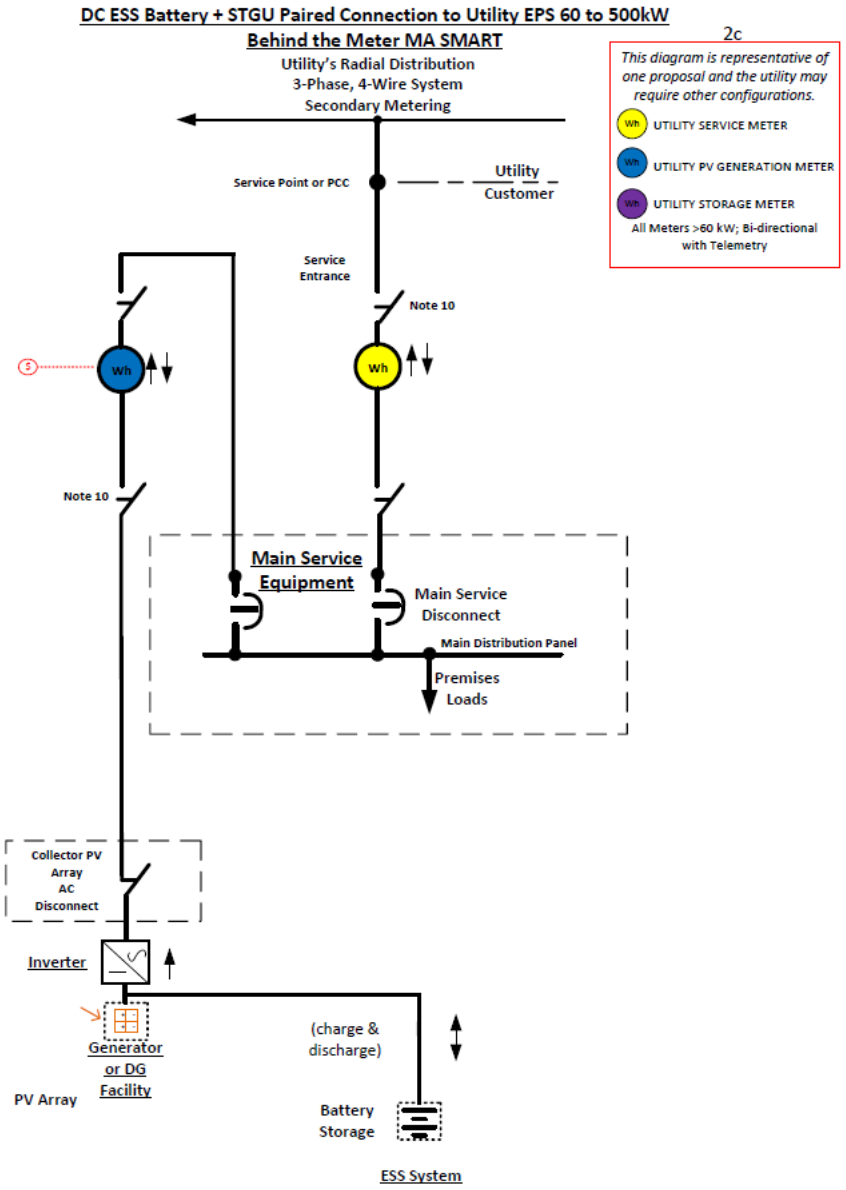
BTM >60 kW to 500 kW

nationalgrid



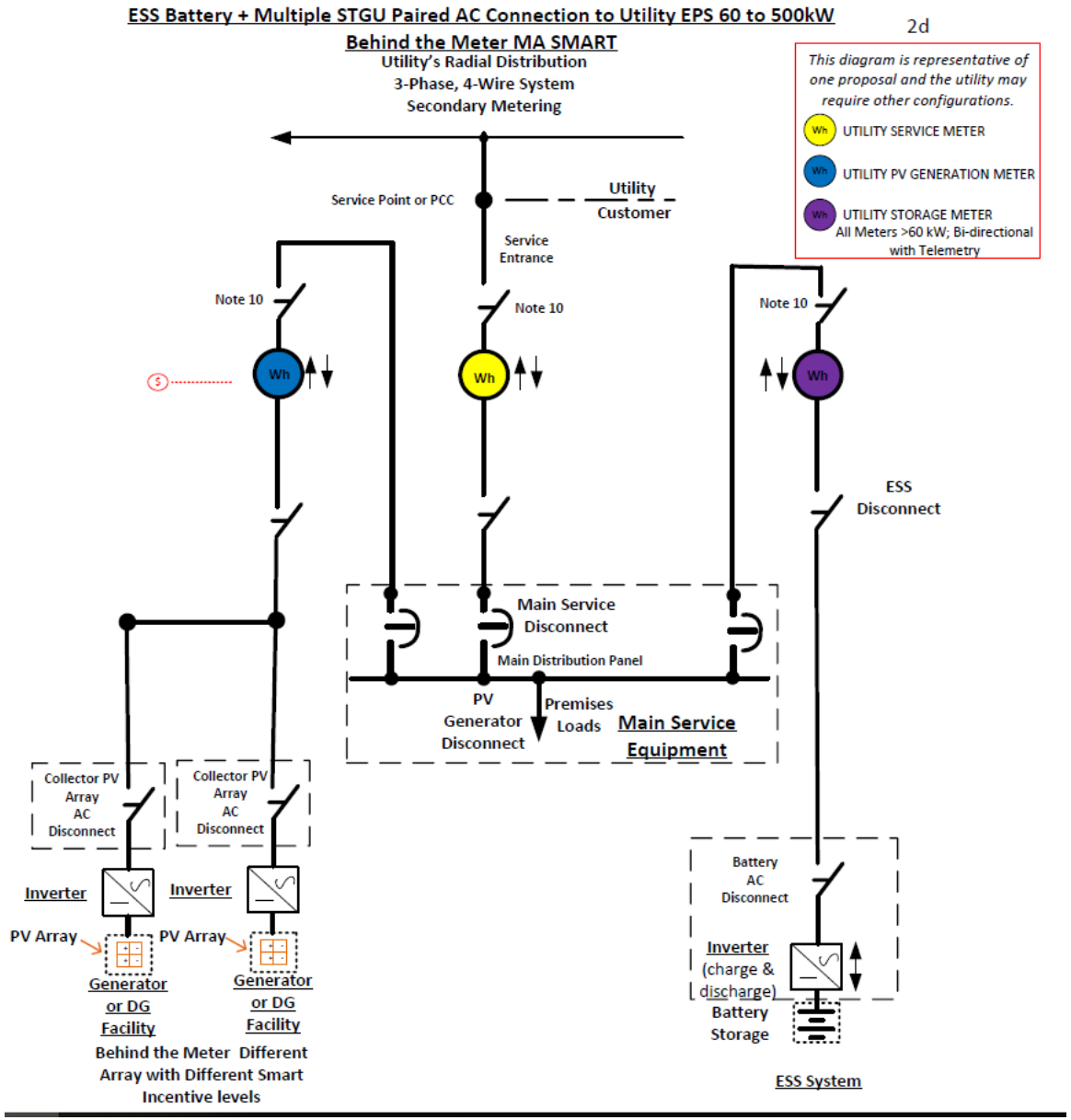
BTM >60 kW to 500 kW

nationalgrid



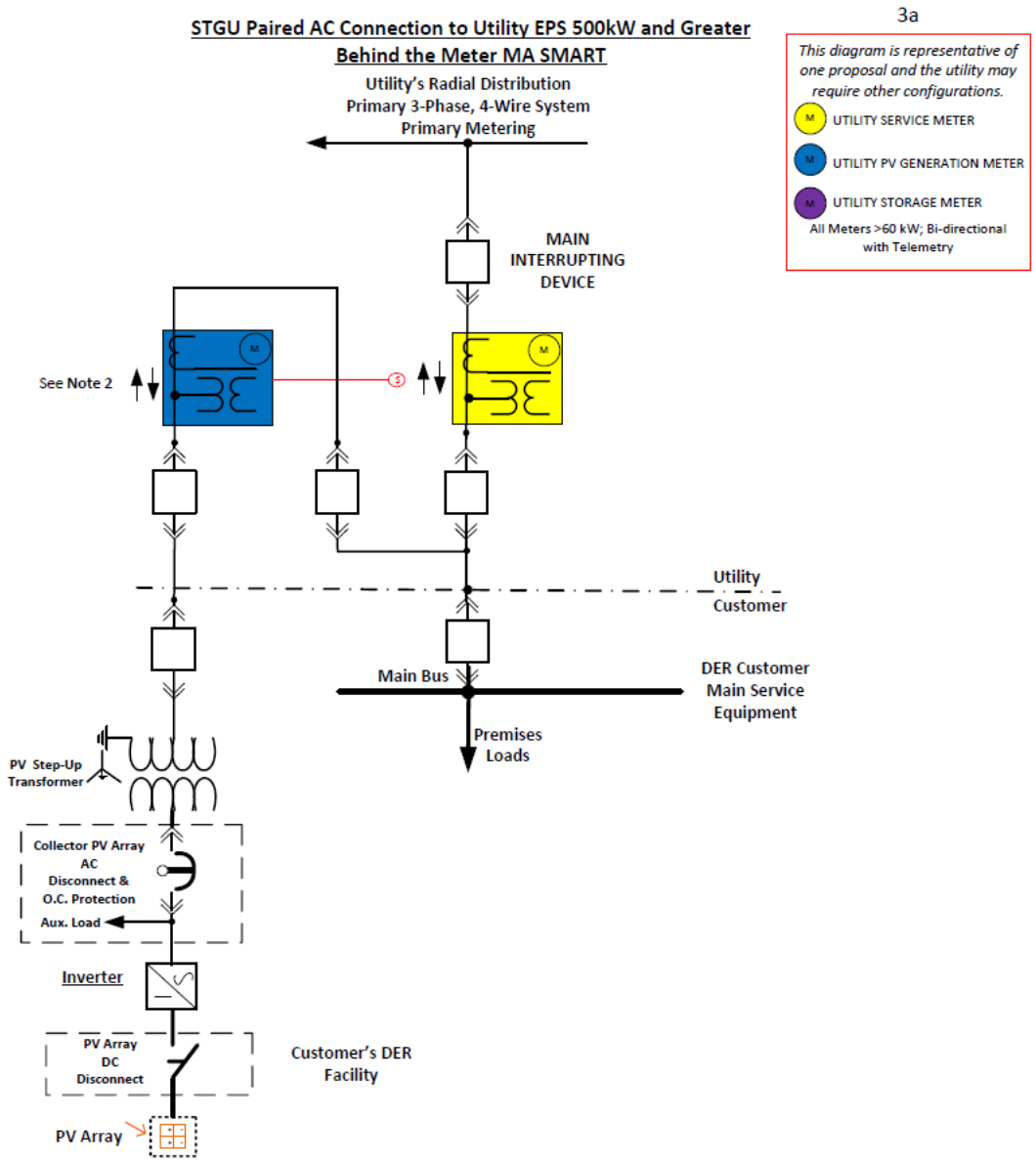
BTM >60 kW to 500 kW

nationalgrid



BTM > 500 KW

nationalgrid



BTM > 500 KW

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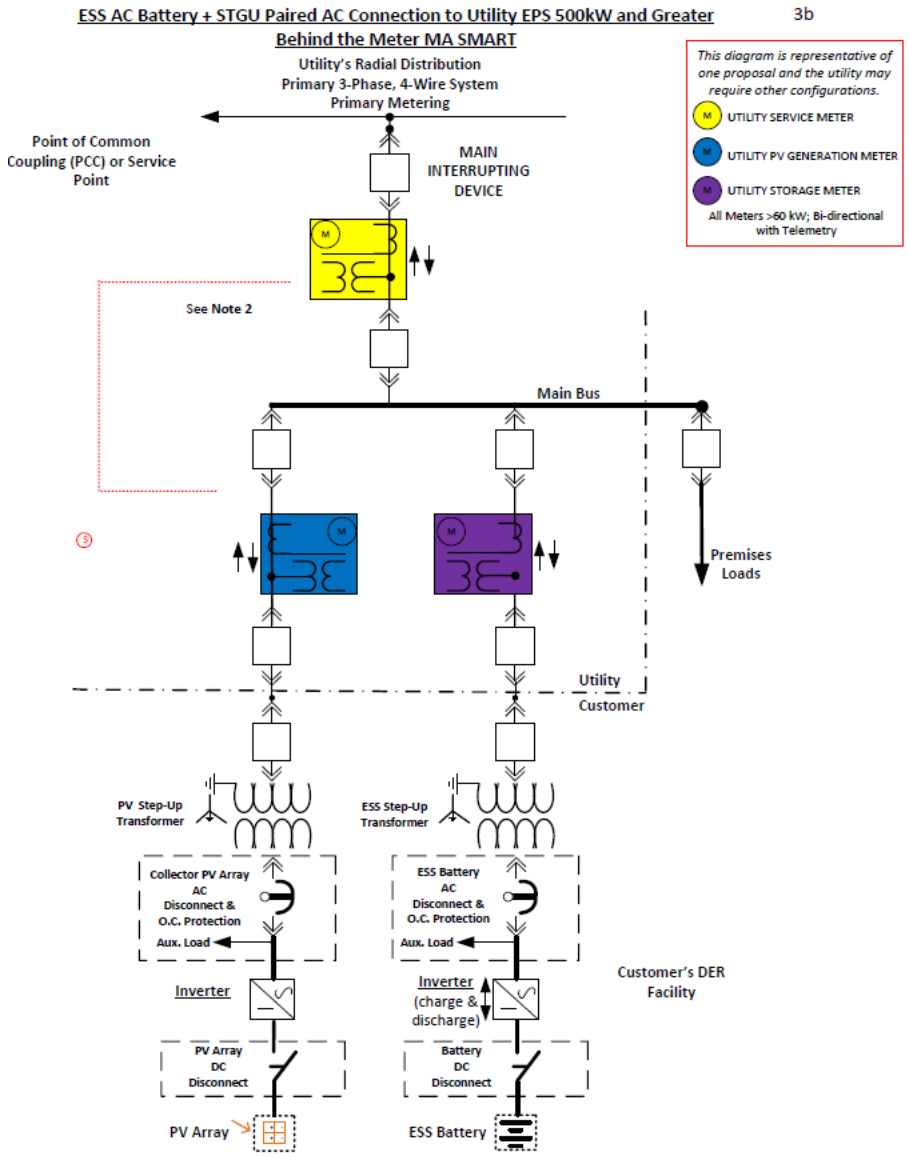

BTM > 500 KW

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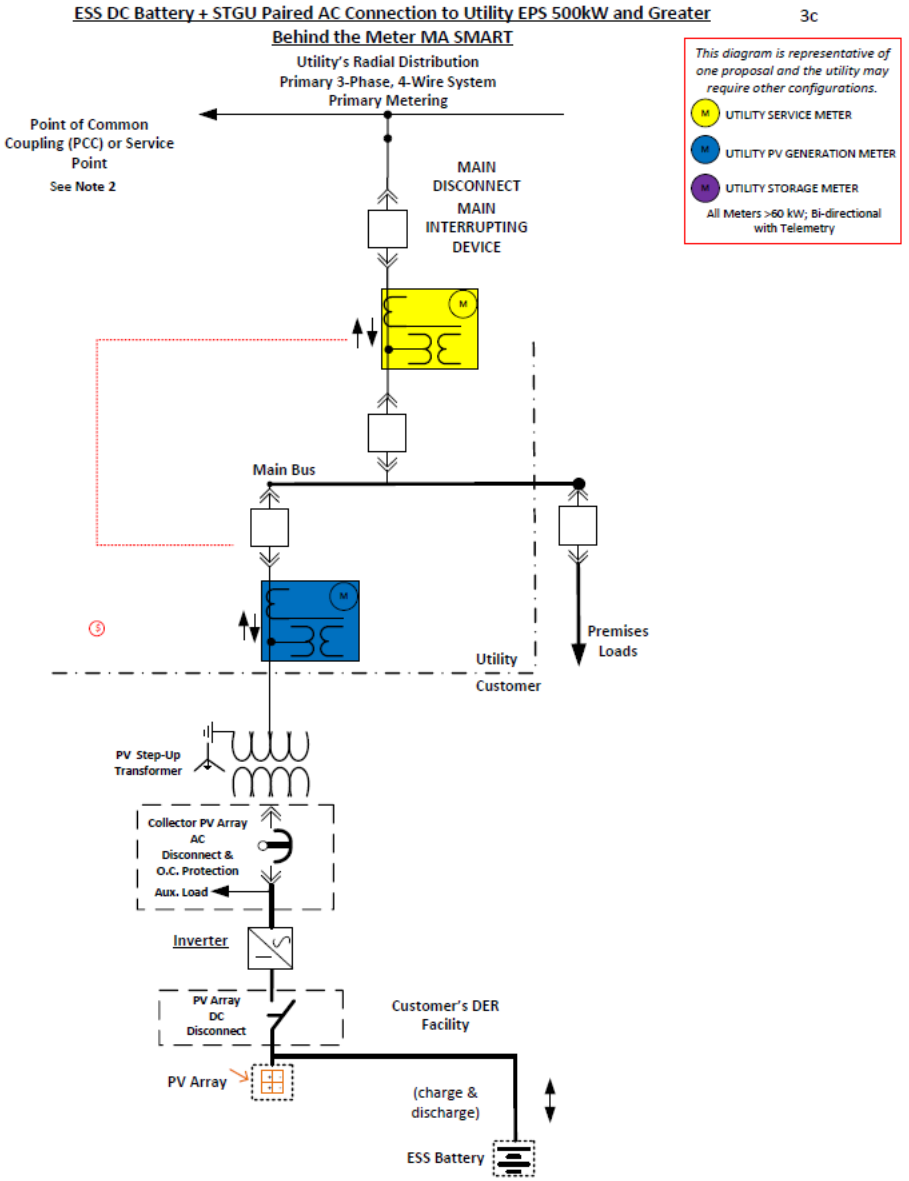
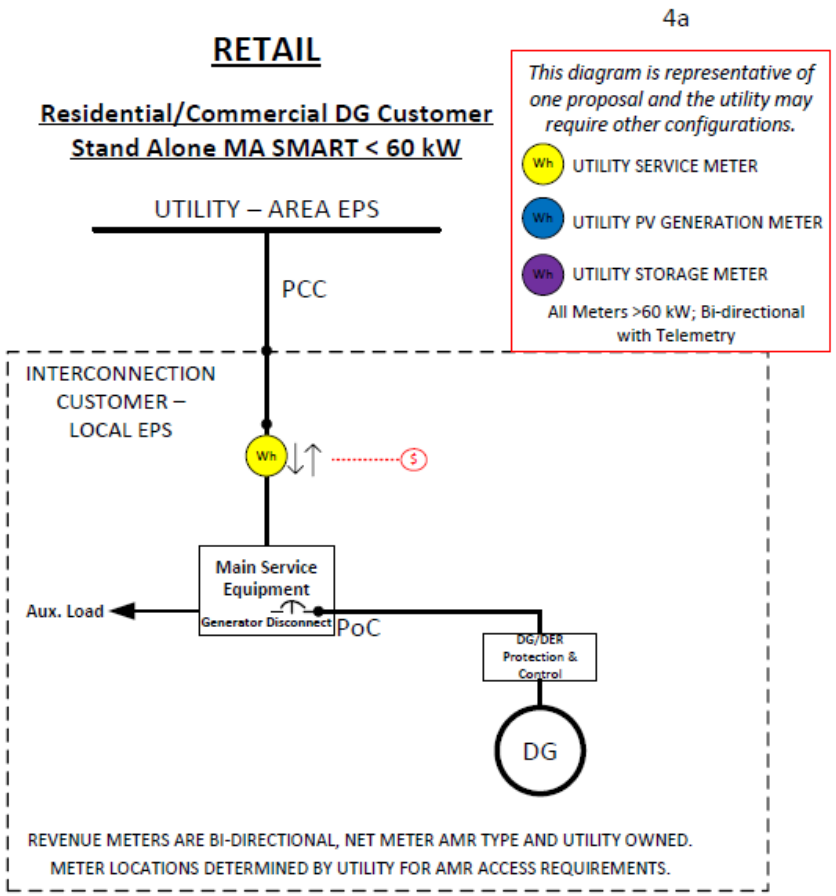
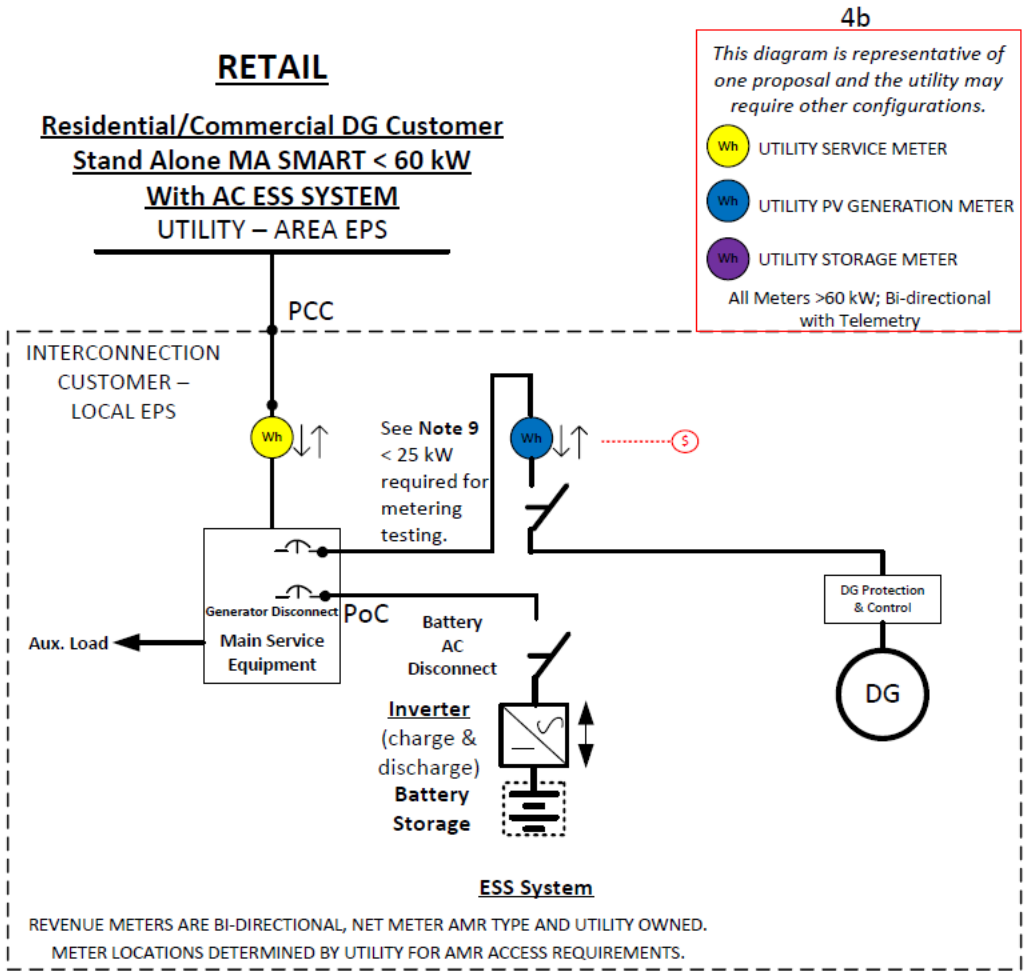


Stand Alone < 60 kW

nationalgrid

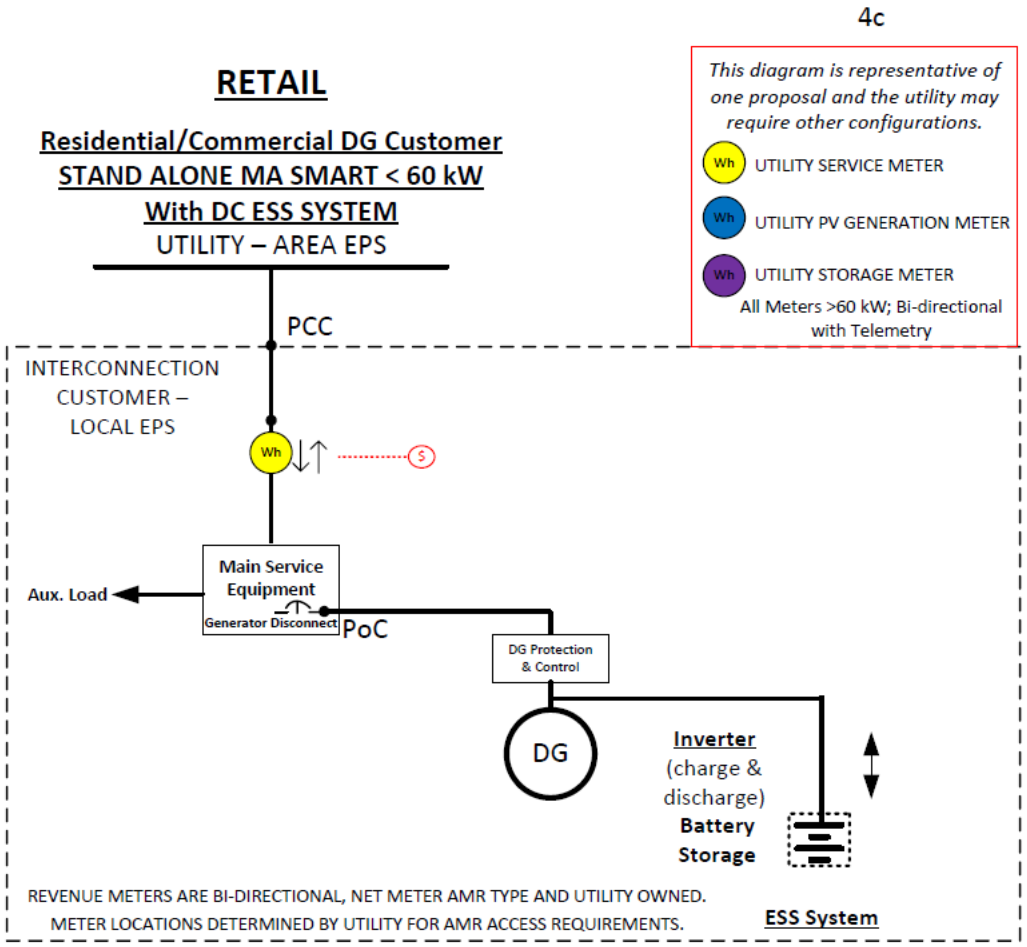


Stand Alone < 60 kW



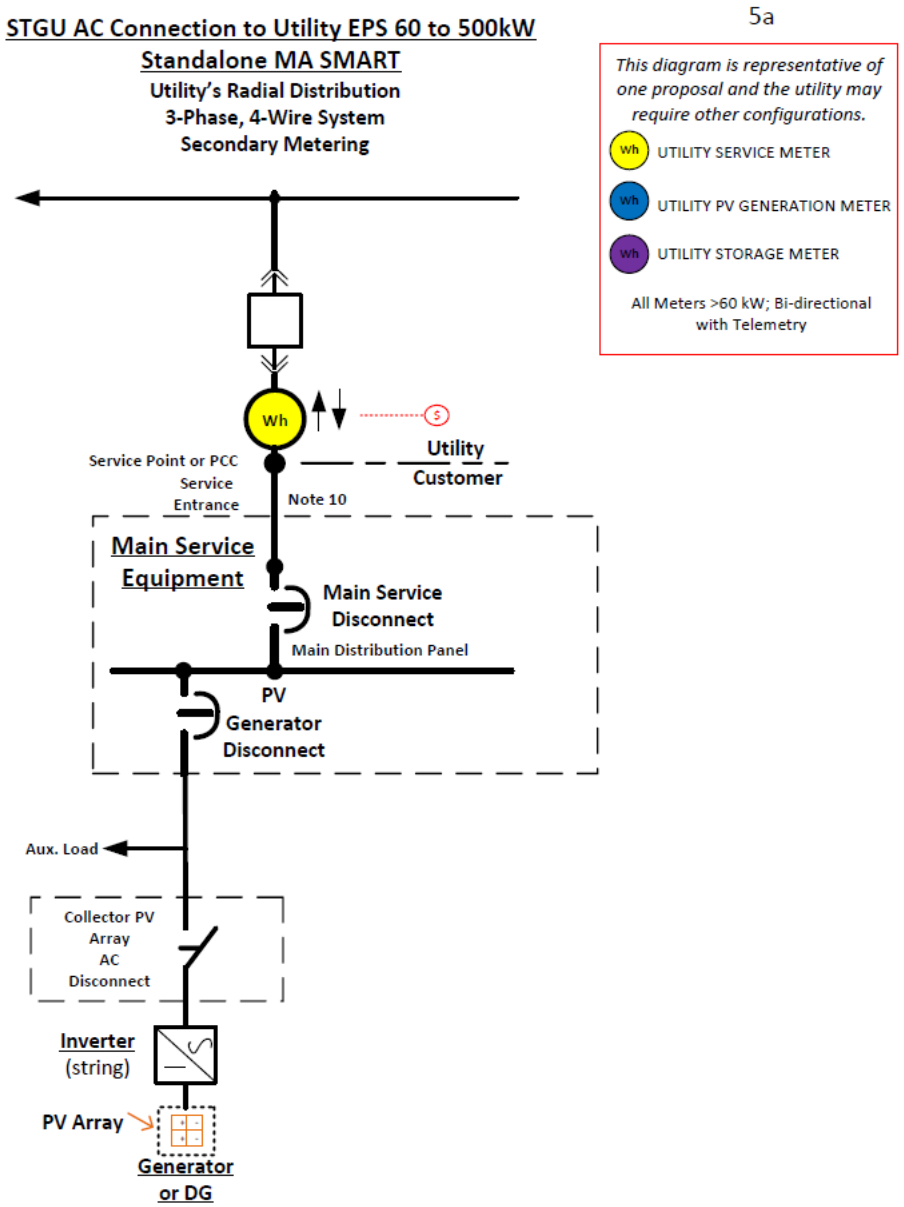
Stand Alone < 60 kW

nationalgrid



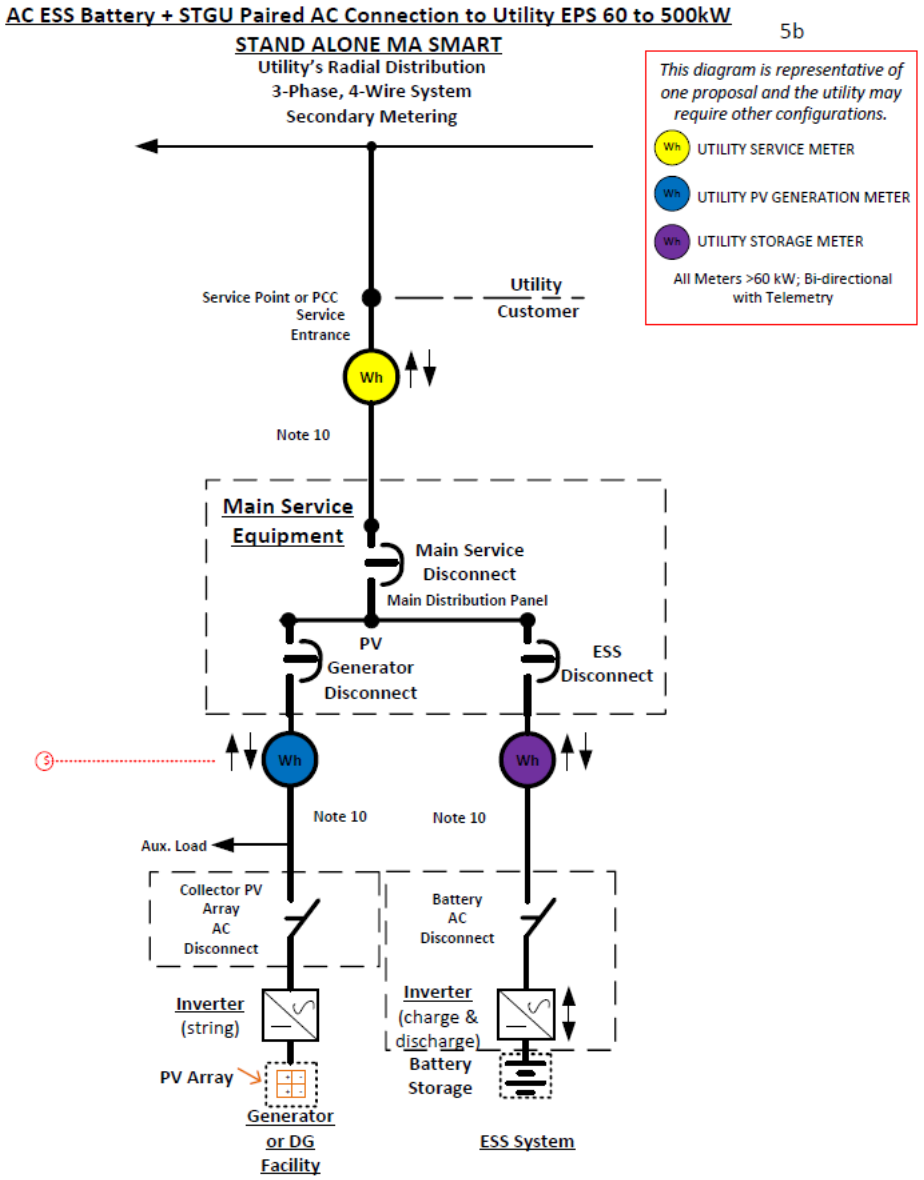
Stand Alone > 60 kW to < 500 kW

nationalgrid



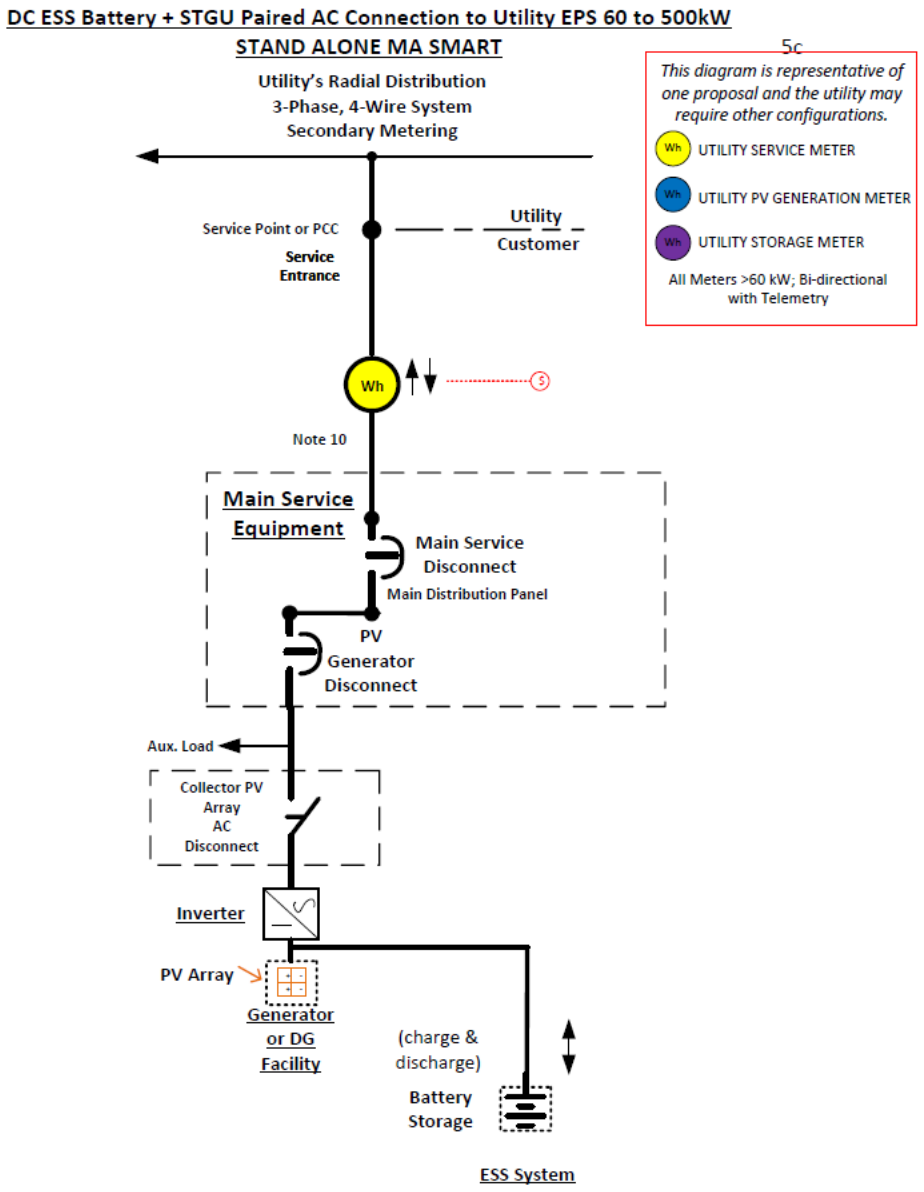
Stand Alone > 60 kW to < 500 kW

nationalgrid



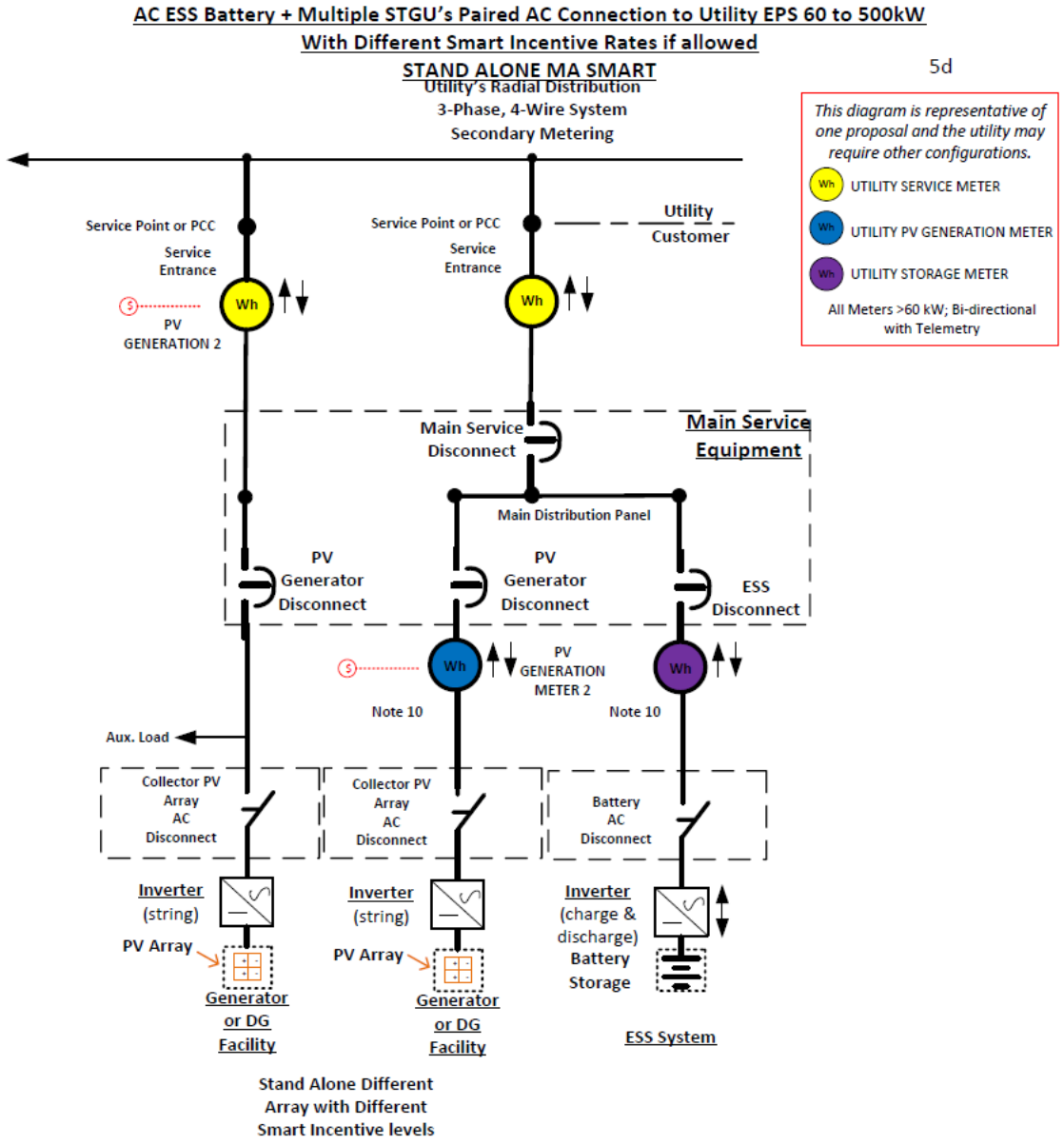
Stand Alone > 60 kW to < 500 kW

nationalgrid



Stand Alone > 60 kW to < 500 kW

nationalgrid



Stand Alone > 500 kW

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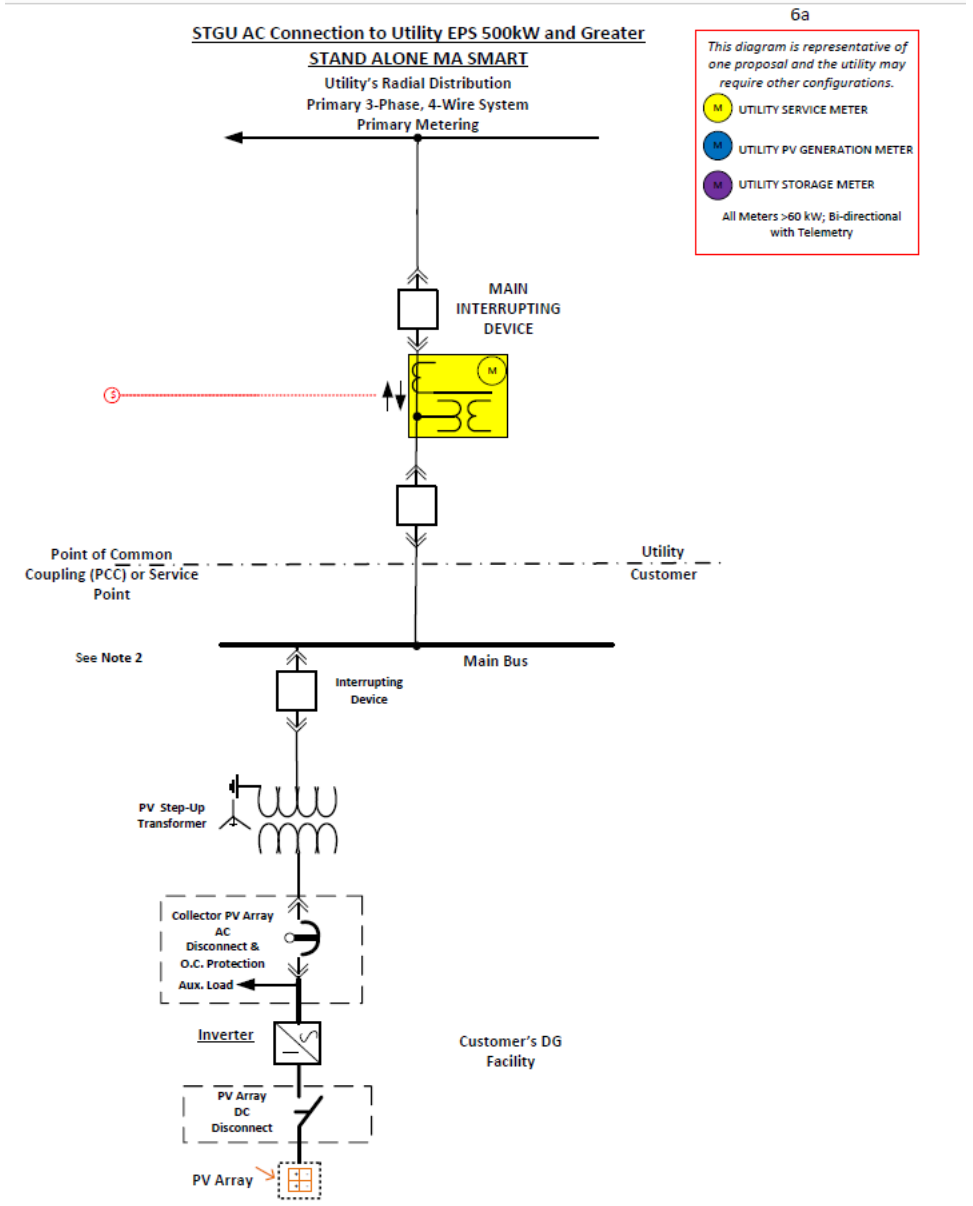

Stand Alone > 500 kW

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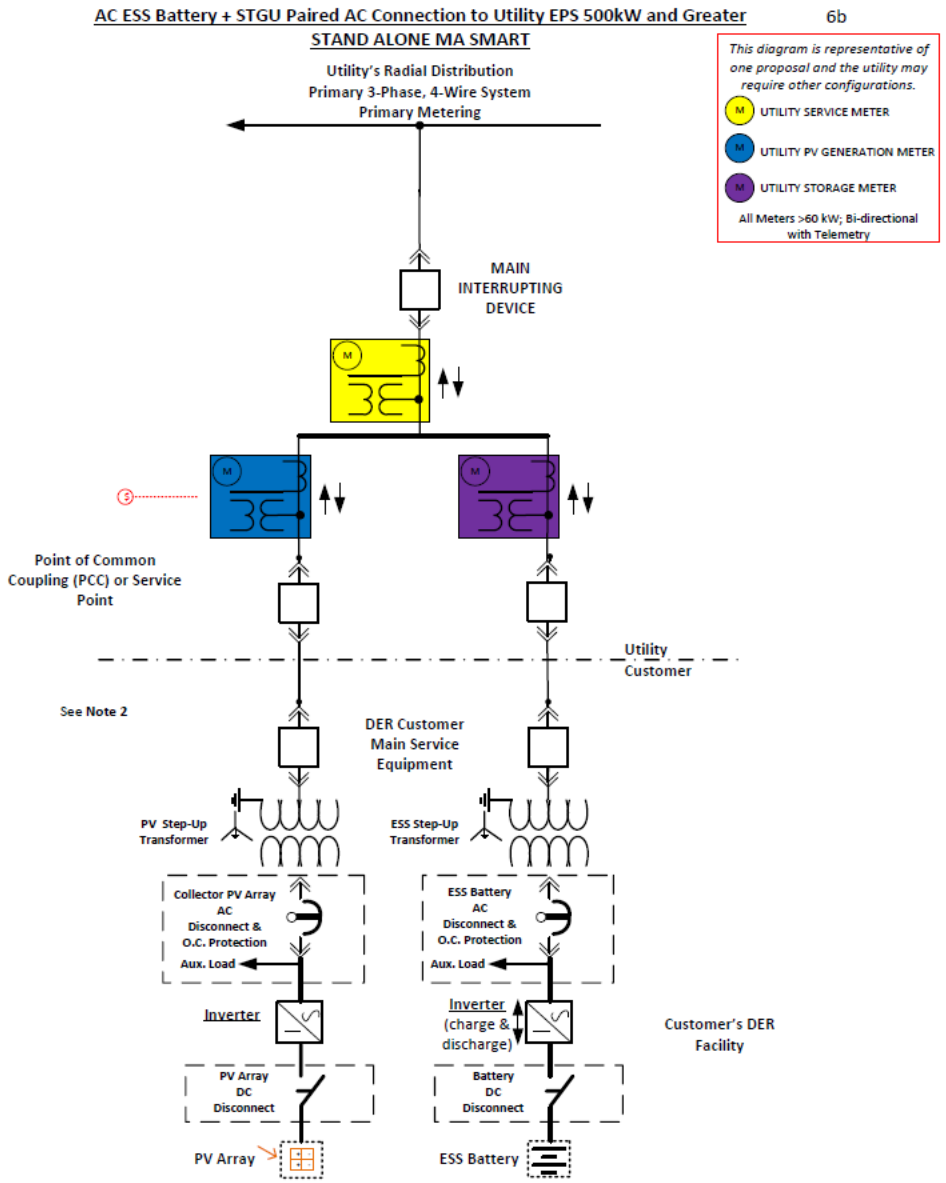

Stand Alone > 500 kW

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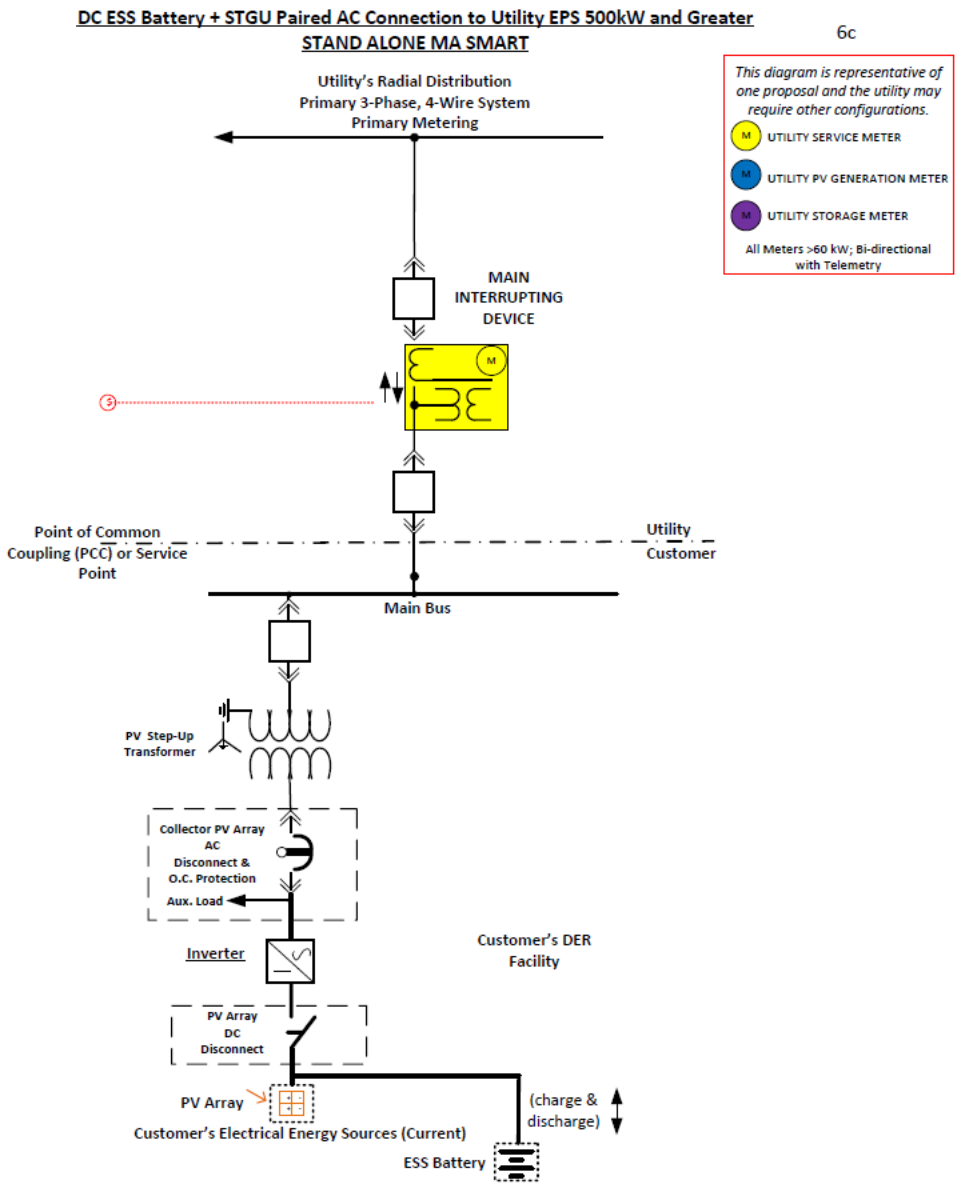


Contact Info

- Gerald (Jed) Ferris
- Smart Solar Program Manager
- National Grid
- 401 784-7364 Work
- 401 450-9417 Cell
- Gerald.Ferris@nationalgrid.com
- 245 South Main Street, Hopedale, MA.

- https://www.mass.gov/solar-massachusetts-renewable-target-smart

Unitil

MA ELECTRIC OPERATIONS

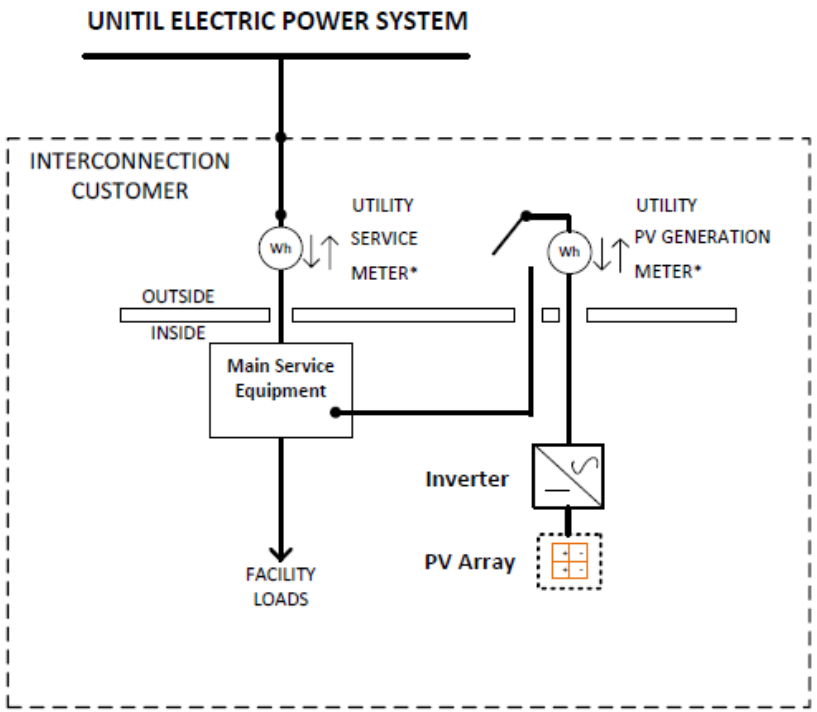
Solar Massachusetts Renewable Target ("SMART") Program
Metering Configurations

The drawings included in this document are guidelines for metering configurations related to the MA-SMART program. The guidelines depict typical metering configurations with the understanding that all system designs will be reviewed and inspected by Unitil personnel prior to approval. Consideration for meter configurations include:

1. Revenue and generation meters will be Unitil owned, bi-directional, watt-hour meters.
2. Inverter outputs will be wired to the bottom of the Utility PV Generation and Utility Storage meter sockets.
3. Unitil owned meters will be installed, removed, and changed by authorized Unitil personnel or approved contractors.
4. Meter location and installation shall be according to Unitil's jurisdiction applicable service and tariff requirements.
5. Utility Service, Utility PV Generation and Utility Storage meters will be located in close proximity of each other. Any exceptions will require prior approval from Unitil.
6. Unless located in an approved electrical utility room, existing revenue meter that are located inside, will require the service connection be upgraded so both the revenue and production meter are located outside.
7. Meter sockets up to 400 amps will be provided by the customer.
8. Meter installations rated greater than 400 amps will require transformer rated metering.
9. Meters connected to services or generation with AC ratings > 60 kW, will capable of recording interval readings and will require telemetering be available.
10. Generator disconnect switch is to be installed in accordance with NEC and Unitil's interconnection requirements.

Behind the Meter Solar

This diagram is representative of a typical system design. All system configurations must be approved by Unitil.

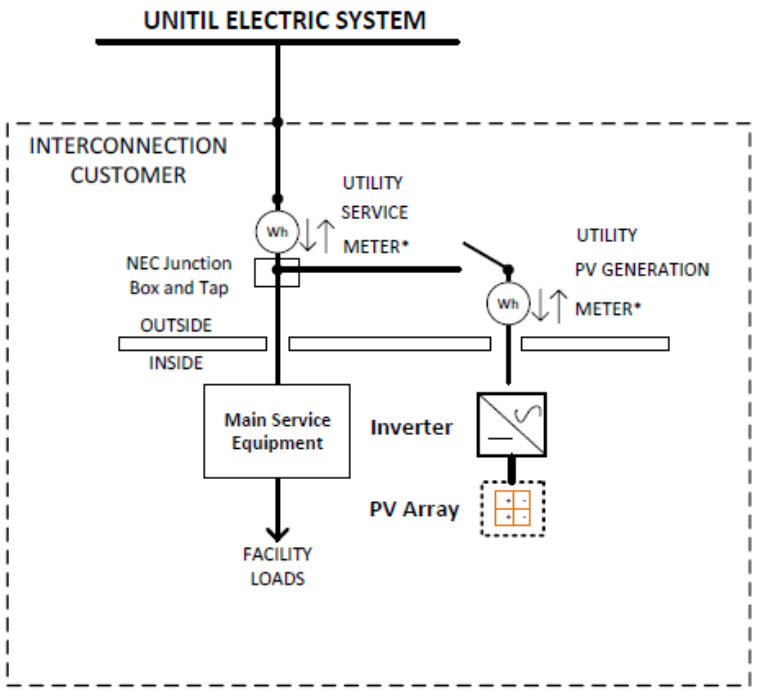


* Transformer rated metering is require for ratings > 400 amps

Unitil
MA ELECTRIC OPERATIONS

Behind the Meter Solar Alternative Connection

This diagram is representative of a typical system design. All system configurations must be approved by Unitil.

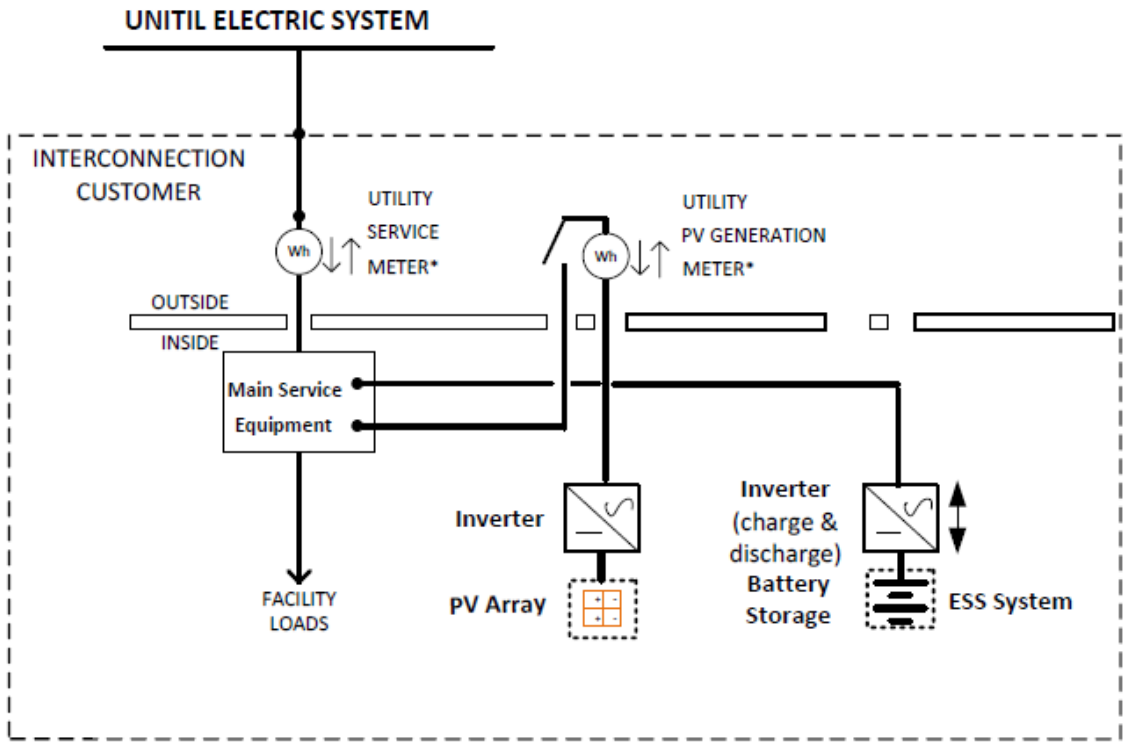


* Transformer rated metering is require for ratings > 400 amps

Unitil
MA ELECTRIC OPERATIONS

Behind the Meter Solar AC Coupled with Storage <= 60 kW

This diagram is representative of a typical system design. All system configurations must be approved by Unitil.

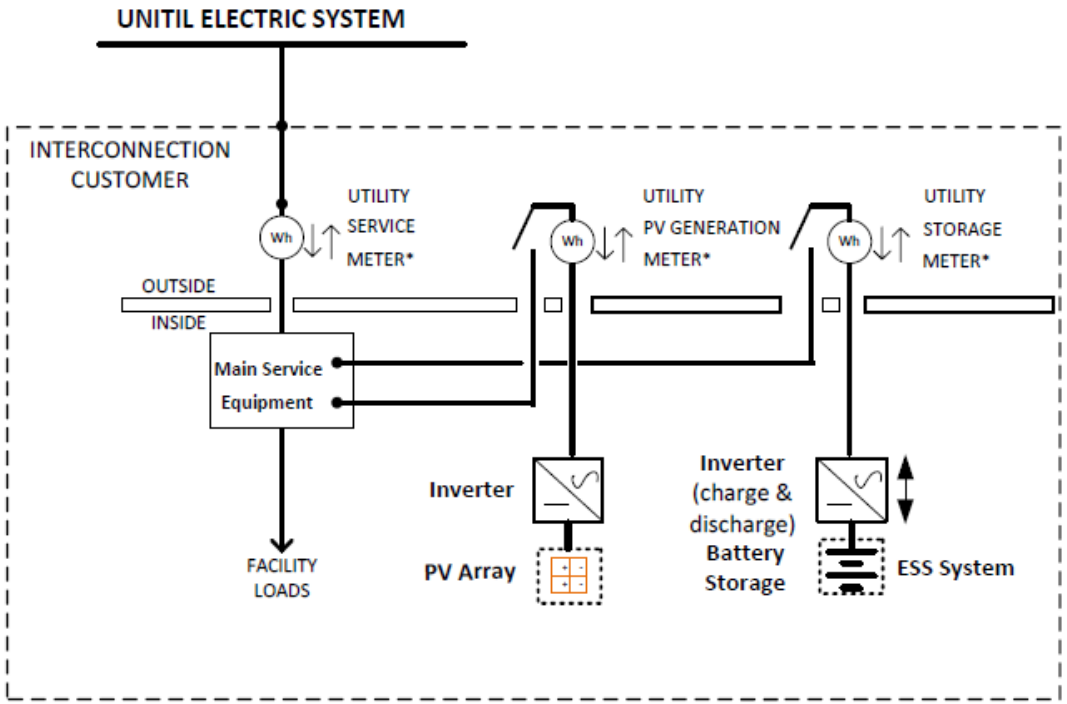


* Transformer rated metering is require for ratings > 400 amps

Unitil
MA ELECTRIC OPERATIONS

Behind the Meter Solar AC Coupled with Storage <= 60 kW w/storage registered with ISO NE

This diagram is representative of a typical system design. All system configurations must be approved by Unitil.

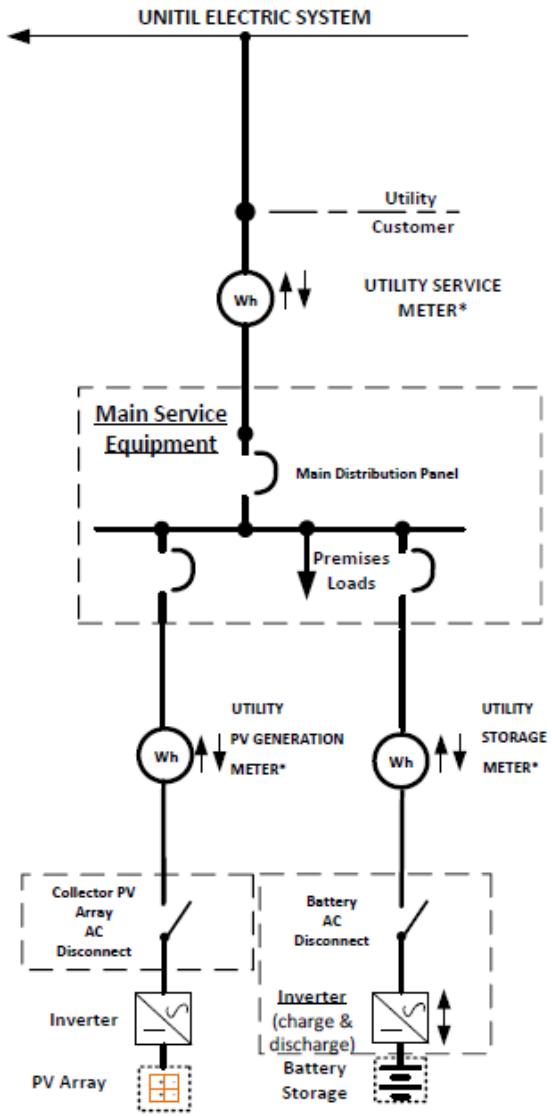


* Transformer rated metering is require for ratings > 400 amps

Unitil
MA ELECTRIC OPERATIONS

Behind the Meter Solar > 60kW AC Coupled with Storage > 60kW

This diagram is representative of a typical system design. All system configurations must be approved by Unitil.

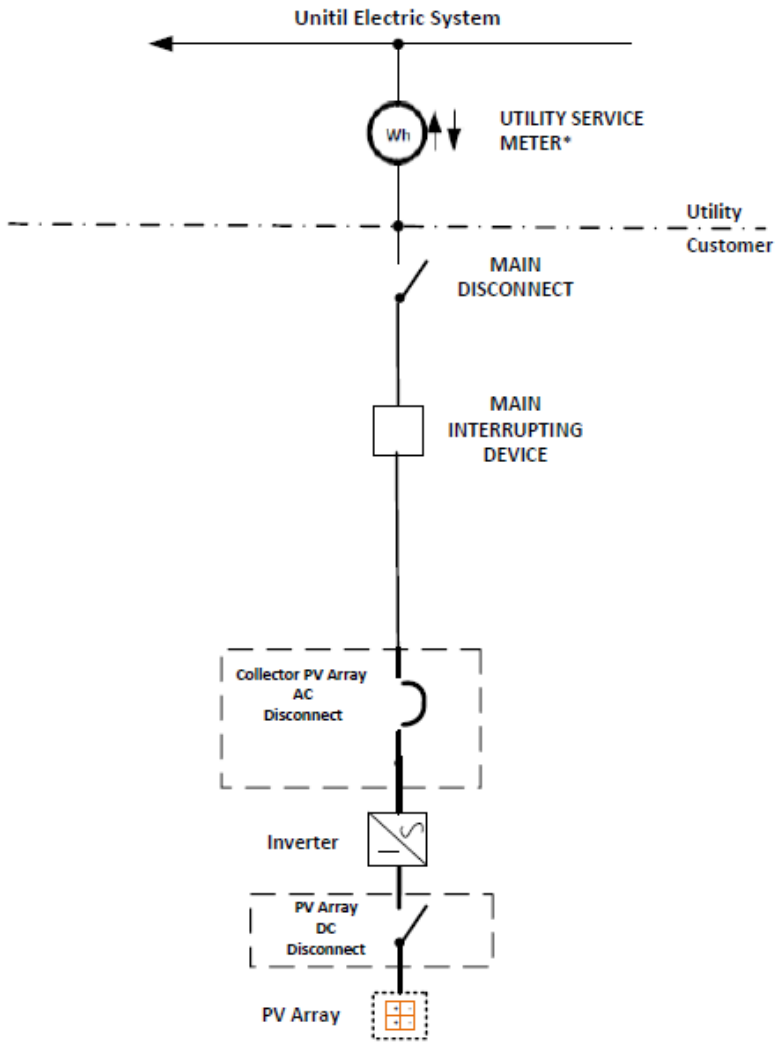


* Telemetered, interval meter - transformer rated metering is require for ratings > 400 amps

Unitil
MA ELECTRIC OPERATIONS

Stand Alone Solar

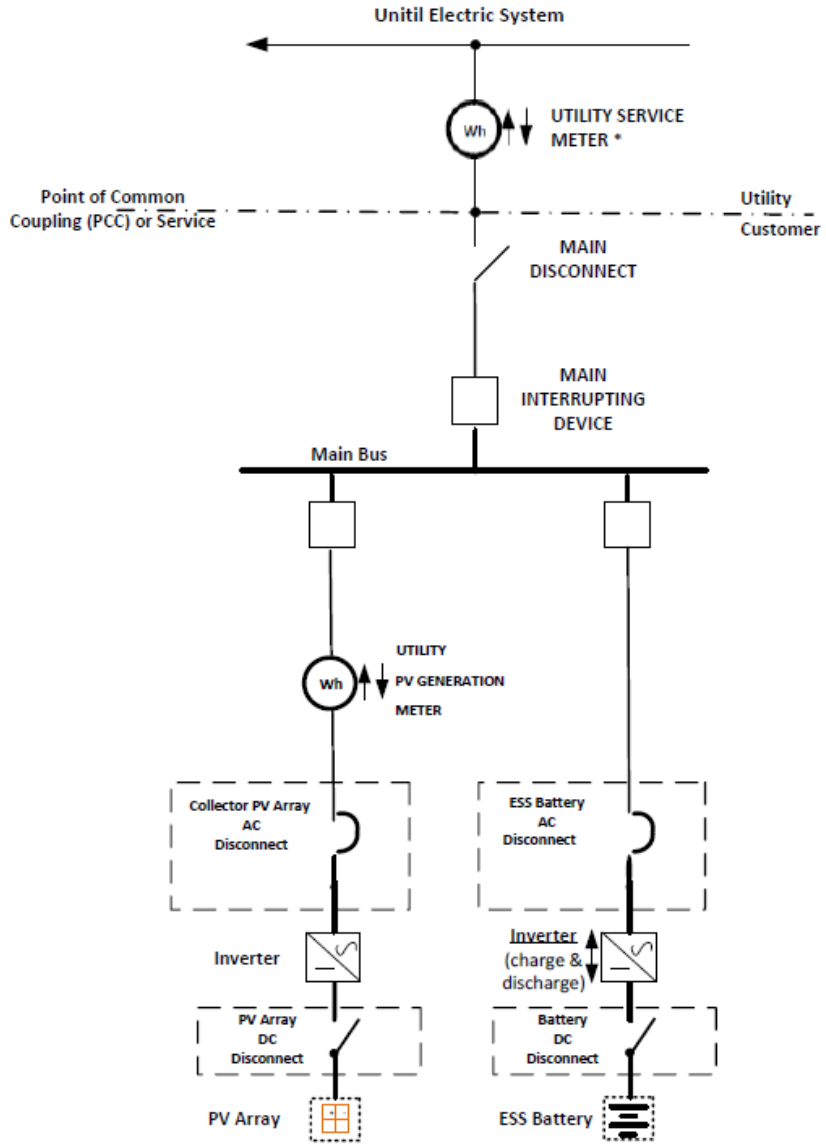
This diagram is representative of a typical system design. All system configurations must be approved by Unitil.



* Transformer rated metering is require for ratings > 400 amps

Stand Alone Solar AC Coupled with Storage <= 60kW

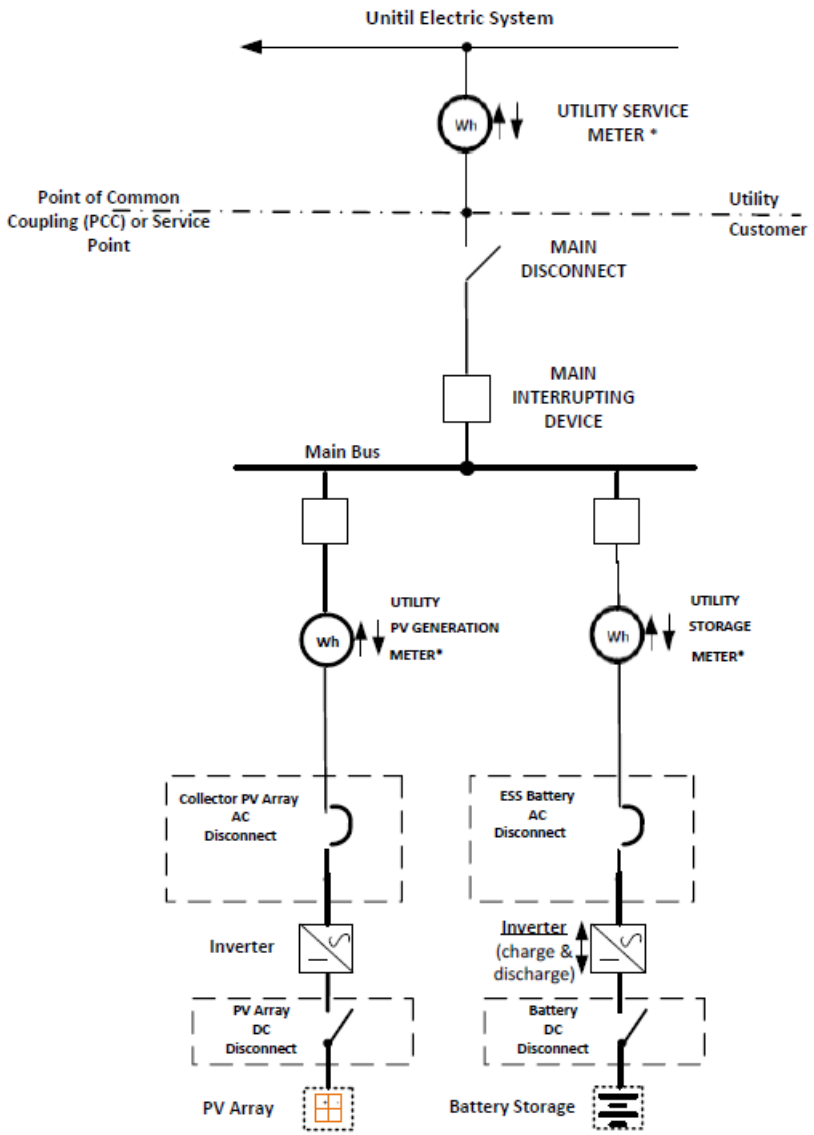
This diagram is representative of a typical system design. All system configurations must be approved by Unitil.



* Transformer rated metering is require for ratings > 400 amps

Stand Alone Solar AC Coupled with Storage > 60kW

This diagram is representative of a typical system design. All system configurations must be approved by Unitil.



* Transformer rated metering is require for ratings > 400 amps