PV code and Policy: Renewable Energy (RE) Systems and the National Electrical Code (NEC)—Critical changes in 2019

With Christopher LaForge, CMT

NEC Changes for Renewable Energy Systems

Christopher LaForge

IREC Certified Master Trainer

NABCEP Certified Photovoltaic Installation Professional

31 years Operating Great Northern Solar

27 years Training with MREA and other organizations

Emeritu

The changes in the NEC for renewable energy and energy storage systems in 2019 require important and dramatic changes in RE system design. These changes will affect PV and other renewable energy systems design and require significant adjustments to how we approach systems. This session will review the changes for 2019 and present options for making designs compliant with these unusual developments in the 2017 code. Understanding these changes will be vital for all contractors and designers in the renewable energy and energy storage field.

The 2017 NEC Changes for Renewable Energy (RE) Systems represent a major overhaul of the NEC with regard to solar and other RE systems.

This seminar will cover the changes and provide background for why the changes were made and their effects on solar installations – We will highlight the specific changes effective January 1, 2019 first. We will follow with a presentation of the wide range of changes made in 2017.

Your participation is invited throughout the seminar… questions during the presentation are welcome and there will be a brief Q&A period at the end of each session…

• 690.12 Rapid Shutdown Dramatically increased the detail in 690.12 and included requirements for Rapid Shutdown within the array. Detailed marking requirements are added to 690.56(C)

Before January 1 2019 there were several 2017 NEC Rapid Shutdown Options

1. String inverter located within 1 foot of the array with rapid shut down certification.
2. Micro-inverters were certified as rapid shut down devices.
3. Rapid shutdown combiner boxes within 1 foot of the array perimeter.
4. Building-Integrated PV array with no exposed metal or wiring and installed more than 8’ from grounded metal

After January 1, 2019 voltages within the array shall be less than 80 Volts DC –

Using one of 3 methods:

690.12(B)(2) lists three methods of controlling conductors within the array: using listed rapid-shutdown PV arrays [690.12(B)(2)(1)]; limiting conductors to 80 Vdc or less within 30 seconds (module-level shutdown through MLPE) [690.12(B)(2)(2)]; or employing PV arrays with no exposed wiring or conductive metal parts [690.12(B)(2)(3)]

Listed Building-Integrated PV arrays with no exposed metal or wiring and installed more than 8’ from grounded metal are acceptable without MLPE.

690.12

Several Significant Changes :

Greatly increased detail of rapid shutdown switch including location and signs

Required equipment to be Certified and Listed for rapid shutdown 690.12 (D)

690.12 (C)
The rapid shutdown initiation device(s) shall consist of at least one of the following:

- (1)Service disconnecting means
- (2) PV system disconnecting means
- (3) Readily accessible switch that plainly indicates whether it is in the “off” or “on” position

Informational Note: One example of why an initiation device that complies with 690.12(C)(3) would be used is where a PV system is connected to an optional standby system that remains energized upon loss of utility voltage.

690.12 (D)

• Equipment that performs the rapid shutdown functions, other than initiation devices such as listed disconnect switches, circuit breakers, or control switches, shall be listed and labeled, and identified for providing rapid shutdown protection.

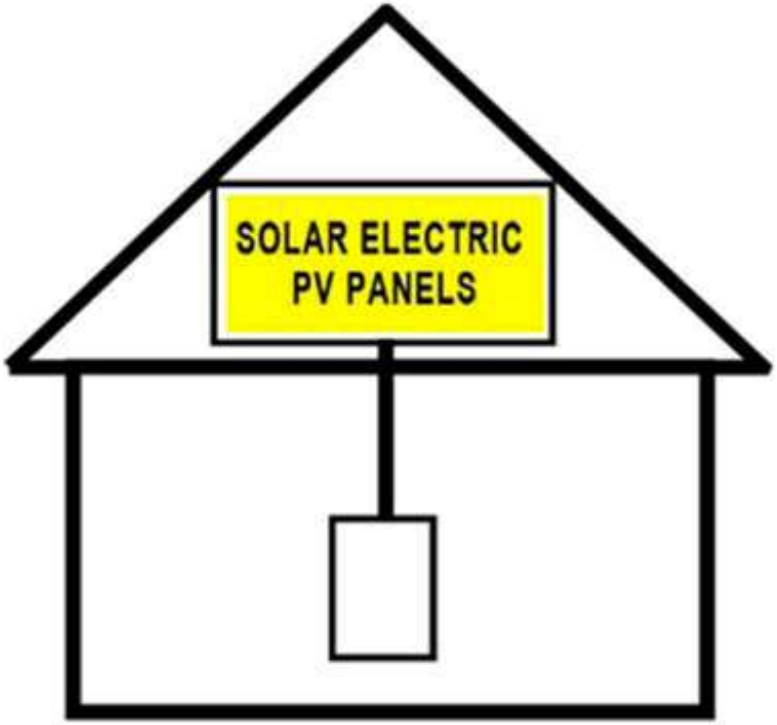
Informational Note: Inverter input circuit conductors can remain energized for up to 5 minutes with inverters not listed for rapid shutdown.

Sineage:

690.56 (C)
Buildings with Rapid Shutdown
For PV systems that shutdown the array and conductors leaving the array
Signage next slide

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

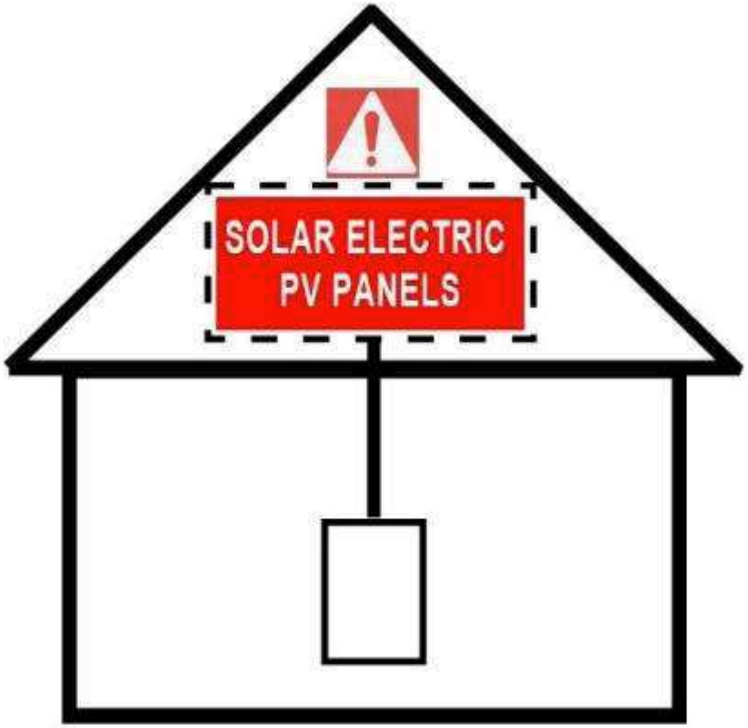
TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY



690.56 (C)
Buildings with Rapid Shutdown
For PV systems that only shutdown conductors leaving the array
Signage next slide

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION, TO SHUTDOWN CONDUCTORS OUTSIDE THE ARRAY. CONDUCTORS WITHIN ARRAY REMAIN ENERGIZED IN SUNLIGHT

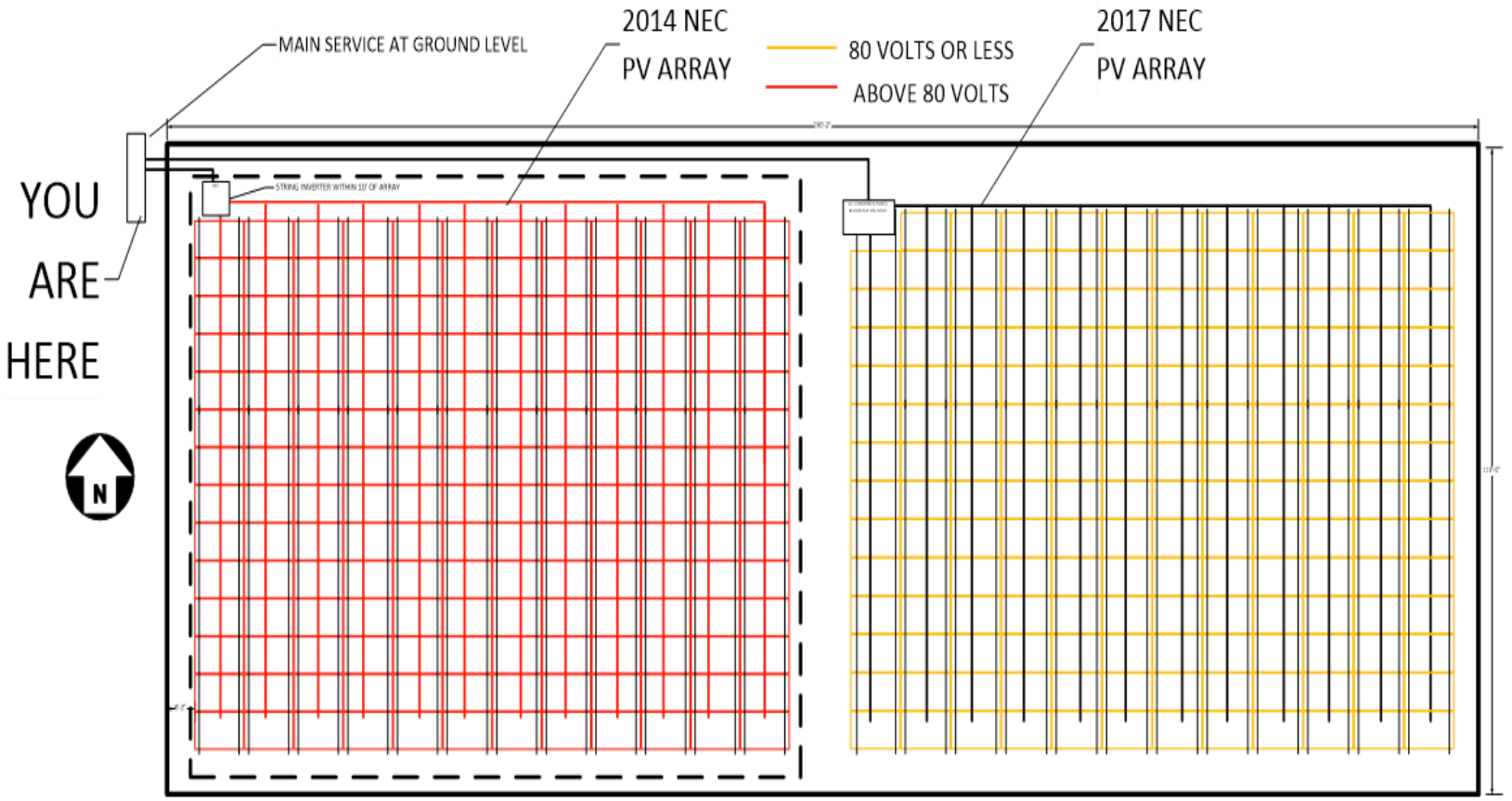


690.56 (C)
Buildings with Rapid Shutdown
For buildings with both types of PV systems

New Signage Requirement

SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN

AREAS WITHIN DOTTED LINES REMAIN ENERGIZED IN SUNLIGHT WHEN RAPID SHUTDOWN SWITCH IS IN "OFF" POSITION



690.56 (C) Buildings with
Rapid Shutdown
A rapid shutdown switch shall have a label located on or no more than 3 ft.
from the switch that includes the following wording:

RAPID SHUTDOWN SWITCH
FOR SOLAR PV
SYSTEM

Rapid Shutdown has received a great deal of attention in the years since 2017 and will be at the top of the list for compliance in inspections coming after January 1 2019.

Module Level Power Electronics (MPLE) are continuing to be developed to achieve the needed reduction of voltage within the array to less than 80 VDC.

Within the whole of the NEC
5 New Articles

- Article 425- Fixed Resistance and Electrode Industrial Process Heating Equipment
- Article 691 – Large Scale PV Electric Supply Stations.
- Article 706 – Energy Storage Systems (ESS)
- Article 710 – Stand Alone Systems (from 690.10)
- Article 712 Direct Current Microgrids

Article 691

- This article covers the the installation of large scale PV electric supply stations operated for the sole purpose of providing electric supply to a system operated by a regulated utility for the transfer of electric energy with a generating capacity of no less than 5,000kw (generating stations, substations, associated generator, storage battery, transformers, and switchgear areas)

Article 706- ESS

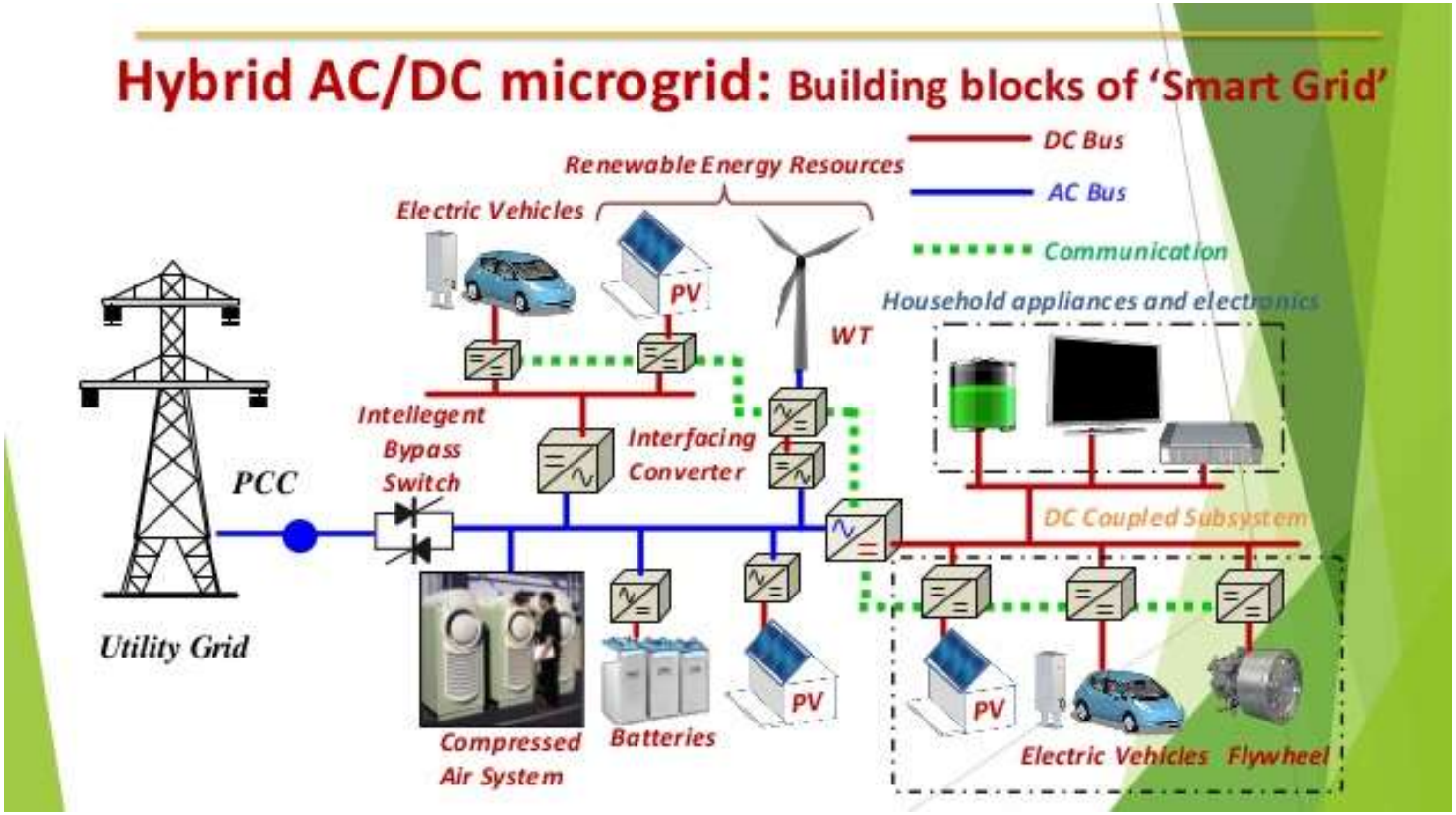
• This article applies to all permanently installed energy storage systems (ESS) operating at over 50 volts ac or 60 volts dc that maybe stand-alone or interactive with other electric power production sources.

Article 710- Stand Alone Systems

- This article covers electric power production sources operating in standalone mode.

Article 712 – DC Microgrids

• This article applies to direct current microgrids, which is a power distribution system consisting of more than one interconnected dc power sources, supplying dc/dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter



Specific to 2017 NEC Article 690

- Whole article was reduced from 11,000 words to about 8,000 words.
- Rapid shutdown increased from 133 words to over 1100 words.
- Dc loads, stand-alone systems (ac loads), and battery storage systems have historically been considered part of Article 690.

- With the advent of a whole new articles on energy storage systems [Article 706], stand-alone systems [Article 710], microgrids [new Part IV of Article 705], and dc microgrids [Article 712]all these sections were removed from 690.

SECTION 2017 NEC CHANGE

- 690.1 Scope Remove Large-Scale PV systems from 690
- 690.1 Figures Revised figures to clarify the end point of a PV system
- 690.2 New and revised definitions
- DC-to DC Circuits, PV System DC Circuit, Generating Capacity,
- Inverter Input/Output Circuit, Functional Grounded PV System

690.2 -Inverter Input/Output Circuit,
Functional Grounded PV System

- Functional Grounded PV System.
- A PV system that has an electrical reference to ground that is not solidly grounded.
- Informational Note: The reference A functional grounded PV system is often connected to ground is often through a fuse, circuit breaker, resistance device, non-isolated grounded ac circuit, or electronic means that is part of a listed ground-fault protection system. Conductors in these systems that are normally at ground potential may have voltage to ground during fault conditions.

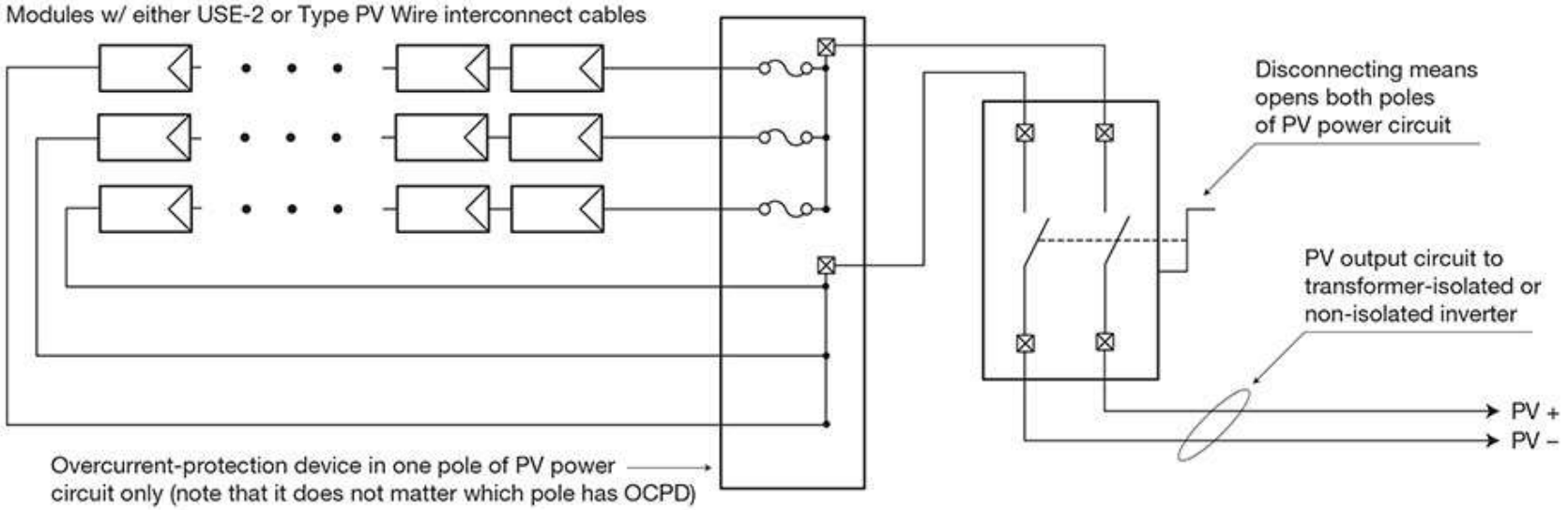
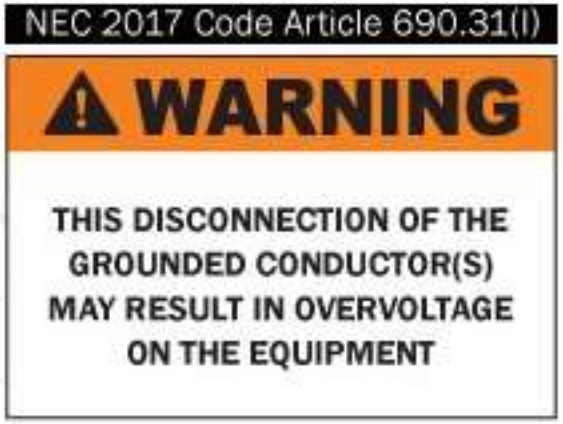


Figure 3 The line drawing illustrates the new design standards for functional grounded PV systems. *NEC 2017* allows for both USE-2 and PV Wire single-conductor cable, regardless of inverter topology. It requires that disconnecting means open both poles of the array, even though overcurrent protection is required in one side only.



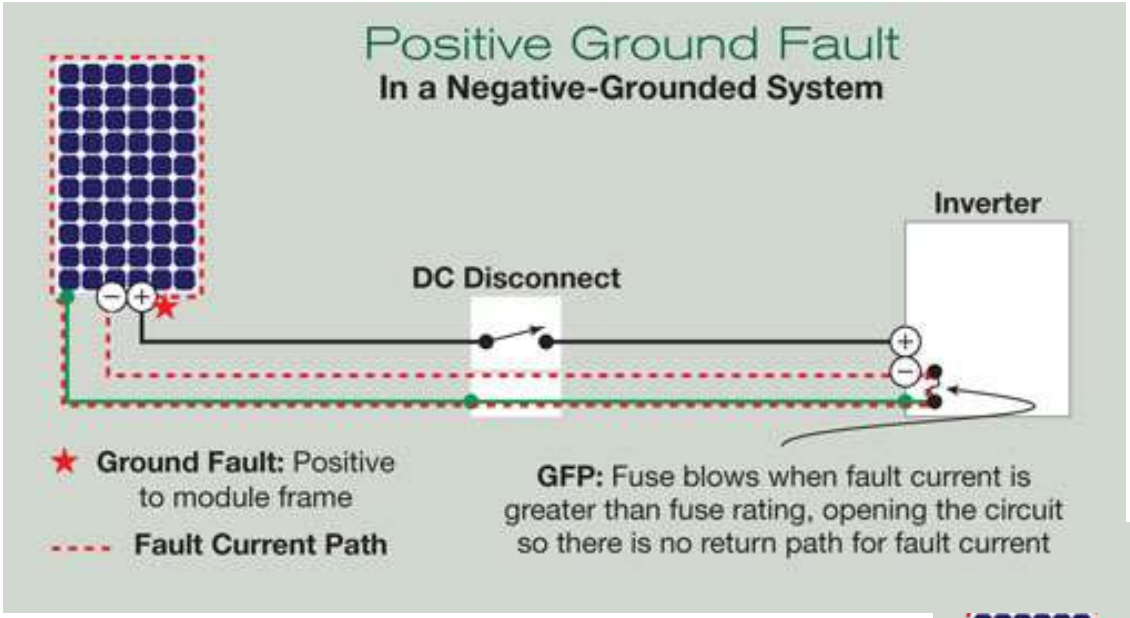
Design Changes Related to Functional
Grounded PV System Definition

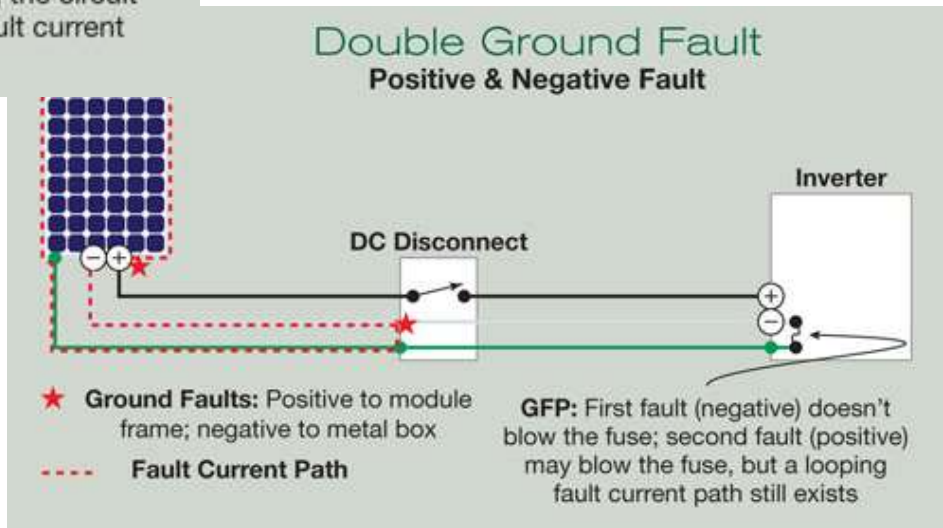
- The requirements for the dc side of a PV system have been unified. Functionally grounded or ungrounded systems have same requirements.
- • 1) only one overcurrent device required per circuit (previously only allowed on grounded systems) [690.9(C)];
- 2) disconnecting means in both dc legs to disconnect equipment or a dc PV system (previous requirement for ungrounded PV systems) [690.15];
- 3) single-conductor cable in PV array can be either USE-2 or PV Wire (previously PV Wire required on modules and home runs for ungrounded PV systems)[690.31(C)(1)];
- 4) ground-fault detection details covered by listed
- equipment (much of detail removed from NEC) [690.41(B)].

SECTION 2017 NEC CHANGE

• 690.4(D)- Clarify that multiple PV systems are allowed on a single building, not just multiple inverters.

• 690.5 and 690.35(C) Moved to 690.41(B) to consolidate grounding and ground fault protection issues.





- 690.7 Maximum Voltage- Reorganized and added voltage calculation method for larger PV systems. Section 690.7(A) allows for a simulation to be performed to calculate the maximum PV source and output circuit voltage.

When an engineer uses a simulation for current, the calculated value may not be less than 70% of the value as determined by the traditional approach (1.25 x Isc).

The benefit of simulating voltage and current is that it enables much more accurate calculations. Array ampacity, for example, is based on continuous load, defined in Article 100 as “the maximum current expected to continue for 3 hours or more.” Computer modeling can accurately simulate this maximum 3hour current value for a specific PV array based on its location and orientation. By comparison, the traditional method of calculating PV circuit currents significantly oversizes conductors, especially given recent improvements in shortcircuit protection. The new calculation method will reduce conductor and conduit costs, which make up an increasing percentage of the overall costs in large PV systems.

SECTION 2017 NEC CHANGE

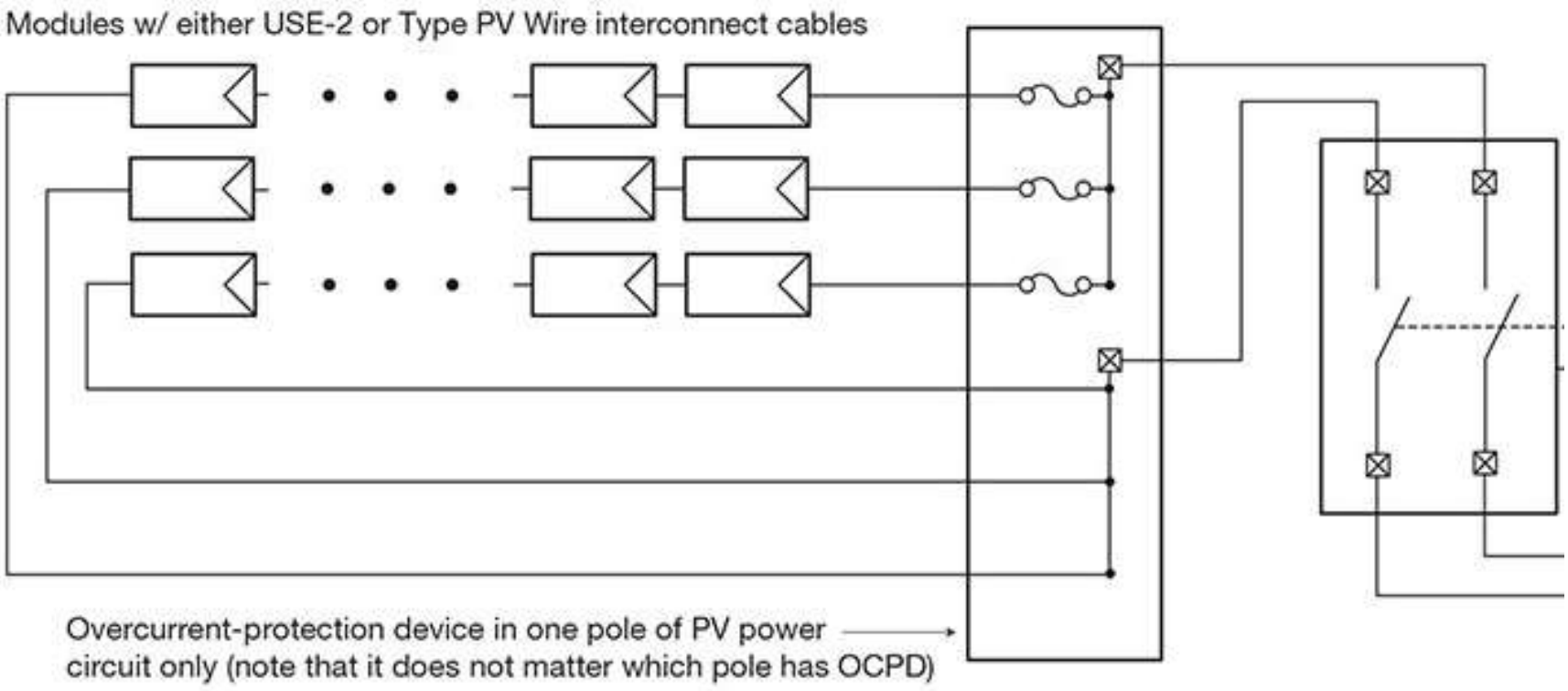
- 690.8 Circuit Sizing and Current
- Revised to cover dc-to-dc converter circuits and allowed for additional calculation of PV circuit currents.
- Section 690.8(A) allows a simulation to be performed to calculate the maximum source and output circuit current
- [690.8(A)(1)(b)]. The calculated current is not permitted to be less than 70% of standard old-school calculation of 1.25 x Isc [690.8(A)(1)(a)].

690.8(b) Conductor Ampacity

- Larger of 125% of current calculated in 690.8(A) before adjustment or correction or current determined in 690.8(A) after adjustment and correction Where protected by a listed adjustable electronic overcurrent protective device as per 690.9(B)(3), not less than the current in 690.8(B)(3)
- (3) The rating or setting of the adjustable electronic overcurrent protective device installed in accordance with 240.6

SECTION 2017 NEC CHANGE

• 690.9 Overcurrent Protection Revised to cover all PV systems, including ungrounded systems. Only requires one overcurrent device per circuit.



690.9 (B)

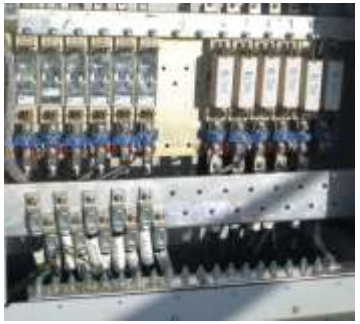
• Overcurrent devices, where required, shall be rated in accordance with one of the following:

• (1) Not less than 125 percent of the maximum currents calculated in 690.8(A).

• (2) Circuits containing an assembly, together with its overcurrent device(s), that is listed for continuous operation at 100 percent of its rating shall be permitted to be used at 100 percent of its rating.

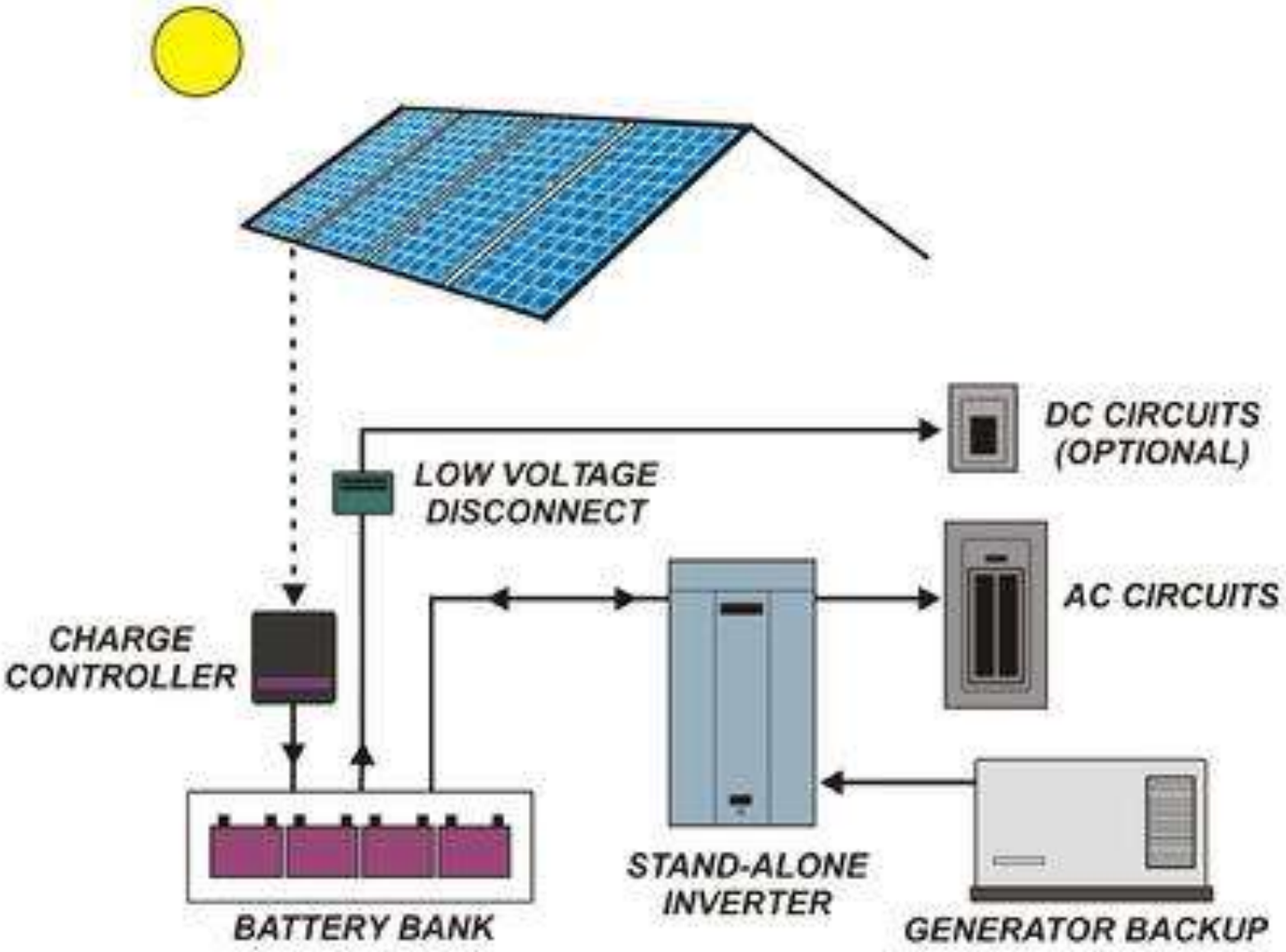
• (3) Adjustable electronic overcurrent protective devices rated or set in accordance with 240.6.

Informational Note: Some electronic overcurrent protective devices prevent backfeed current.



SECTION 2017 NEC CHANGE

• 690.10 Stand-Alone Systems Moved to new Article 710



• 690.11 Arc-Fault Detection Revised to exempt PV output circuits on ground-mounted systems from arc fault protection when using specific wiring methods

SECTION 2017 NEC CHANGE

- 690.13 PV System Disconnecting Means
- Clarified that there are only two types of disconnects in PV systems:

(1) The PV System Disconnecting Means [690.13] and

(2) The disconnects for equipment [690.15] conductors on the dc side of the PV system.

690.15

- 690.15 Disconnection of Equipment
- Removed all of 690.16, 690.17, and 690.18 and placed the necessary requirements in 690.13 and 690.15. Introduce “Isolating Devices” to 690.

Disconnects must disconnect both positive and negative.

SECTION 2017 NEC CHANGE

- 690.31 Wiring Methods Reorganized and revised 690.31 to include all wiring methods, including ungrounded systems, into a single set of requirements.
- 690.31(B)(1) Identification - No white wire allowed on the dc side of a PV system for anything except rare solidly grounded PV systems.

690.31(C)(1) Single- Conductor Cable – Type USE-2 and PV Wire are permitted for grounded and ungrounded PV Systems

This allows for retro-fitting legacy systems with non-isolated (transformerless) inverters when replacement is necessary – such as during the Hartley Nature Center retro-fit project…

690.31 (D)

- (D) Multiconductor Cable.
- Jacketed multiconductor cable assemblies listed and identified for the application shall be permitted in outdoor locations. The cable shall be secured at intervals not exceeding 1.8 m (6 ft.)

690.41 and 690.42 System Grounding and Point of System Grounding

- Concept of functional grounded PV systems introduced to 690. Most PV systems installed now and in the last 15 years are functionally grounded. All PV systems require ground fault protection unless solidly grounded (rare).

690.47
Grounding Electrode System

- Completely reorganized and simplified. Structures supporting PV systems must have a grounding electrode system.
- Equipment grounding conductor must be connected to the local grounding electrode system.
- Additional array electrodes are optional

690.53
Marking DC PV Power Source

• Simplified by removing “Rated maximum power-point current and Rated maximum power-point voltage” from the list on the sign.

Part VII
Connection to Other Sources

- Replaced with a simple reference to Article 705.

Part VIII
Storage Batteries

- Replaced with a reference to new Article 706. The remaining element is the requirements for Self- Regulated PV Charge Control.

Parts IX and X

(Over 1000V and EV Charging)

- Removed as they are adequately covered elsewhere in 690 and the rest of the NEC.

Article 705 Major Changes

705.2 Microgrid System

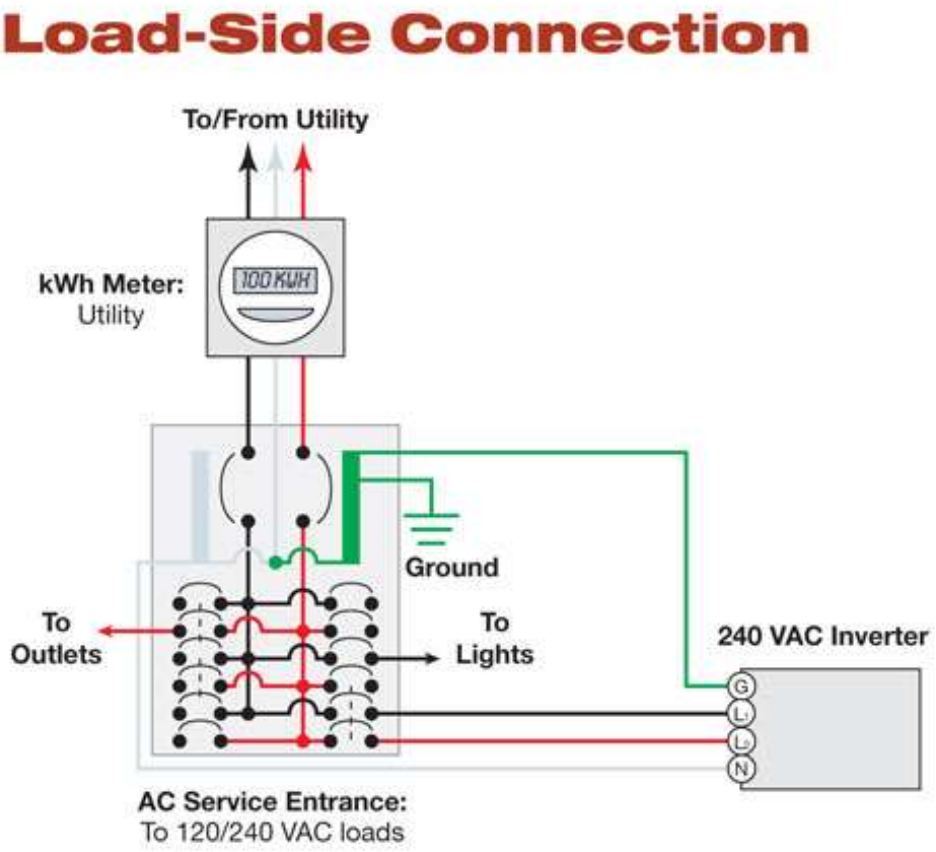
- New Microgrid definition and
- New Part IV, Microgrid Systems.

705.12 Point of Connection

- Simplified whole section to cover just supply-side and load-side interconnections of electric power sources.

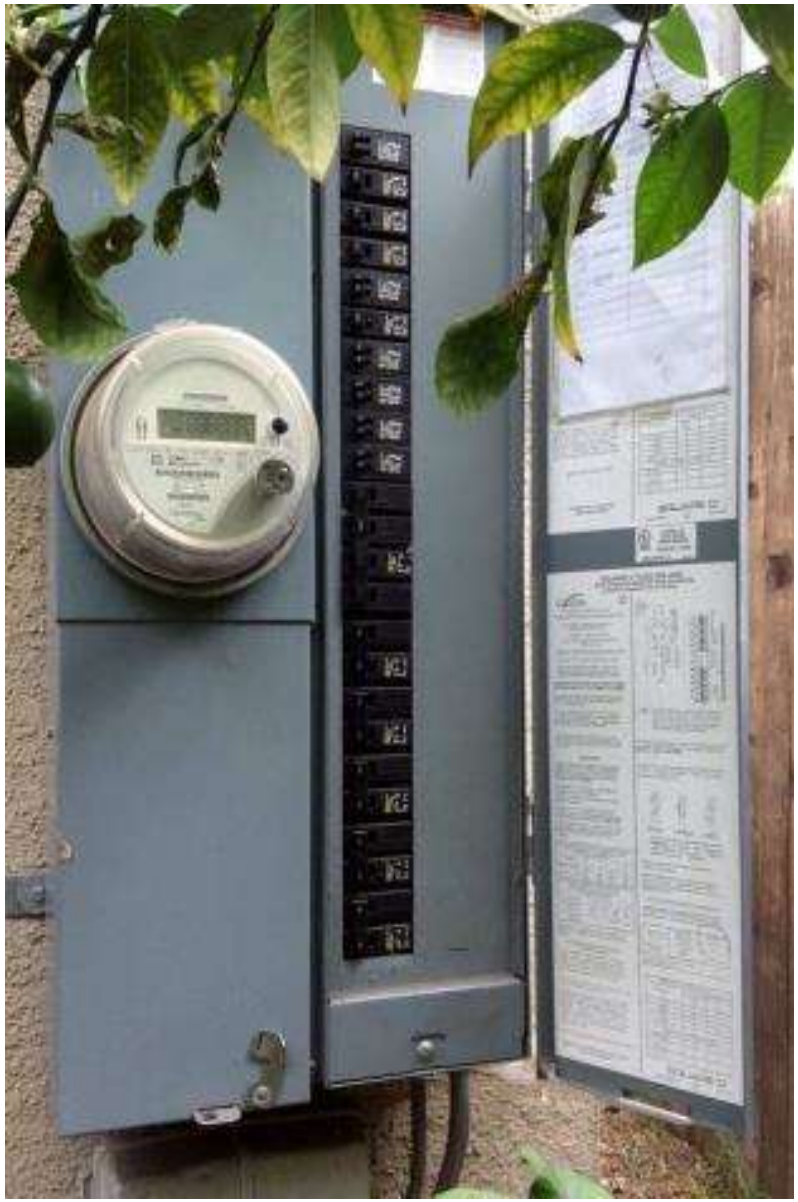
705.12(B) Load Side

- Allows for interconnection of more than one inverter on load side.



705.12(B)(2)(3)(d)

• Allows center-fed panels in dwellings to apply the 120% rule with power source connection at either end of the panelboard.



705.12(B)(2)(3)(d)

• A connection at either end, but not both ends, of a center-fed panelboard in dwellings shall be permitted where the sum of 125 percent of the power source(s) output circuit current and the rating of the overcurrent device protecting the buss-bar does not exceed 120 percent of the current rating of the buss-bar

Old 705.12(D)(6)

• Requirement for arc-fault detection on small ac circuits is removed.

New 705.23 Interactive System Disconnecting Means

- New section to match the changes in Article 690 related to PV System Disconnecting Means.

And Now as promised!
A summary of the new Minnesota Interconnection Standards !!

with Laura Hannah of

Fresh Energy

and David Shaffer of

MN Statewide Interconnection Standards Update

David Shaffer, Executive Director

dshaffer@mnseia.org, https://www.mnseia.org/

Minnesota Solar Energy Industries Association

MnSEIA

MNSEIA'S MISSION is to grow solar energy industries as part of Minnesota's clean energy transition by delivering strong public policy, education, job creation and sustainable industry development.

Commission Order

January 24, 2017

- The Commission hereby delegates authority to the Executive Secretary to issue Notice(s), set schedules, and designate comment periods for the scope outlined in paragraphs 2 – 3 below. The Executive Secretary will, in cooperation with the Department of Commerce, convene a work group of appropriate size and composition, and may select a facilitator, to **develop the record more fully.**
- **The Commission will transition the Minnesota Interconnection Process to one based on the FERC SGIP and SGIA**. The Executive Secretary will set schedules and take comments. It is anticipated that the Commission will consider the record and comments within 18 months of this order, to replace Attachments 1, 3, 4, and 5 to its 2004 Interconnection Standards in this Docket. The Executive Secretary will **use the Joint Movants' May 12, 2016 filing, generally, as the starting point for comments.**
- In the longer-term (nine to twenty-two months), the Executive Secretary will set schedules and take comments on updating the Minnesota interconnection technical standards. It is anticipated that the Commission will consider the record and comments within 24 months of this Order, to replace Attachment 2 to the Commission's 2004 Interconnection Standards. **This stage of work would incorporate newly revised national technical standards, and other issues identified as areas in need of updating.**
- The Commission hereby designates Commissioner Matthew Schuerger as lead commissioner pursuant to Minn. Stat. § 216A.03, Subd. 9, with authority to **help develop the record necessary for resolution of the issues, and to develop recommendations to the Commission in this docket.**

Minnesota Interconnection Update

Phase I

Interconnection Process, Applications, Agreements

(8/13/18 Order)

Phase II

Technical Requirements consistent with newly revised IEEE 1547 (Published April 6, 2018)

(ongoing)

Phase III?

- Compensation?

- Rate Design?

- Incentive for the utility?

Phase I	Phase II
3 initial documents (FERC SGIP/SGIA, Joint Movants' Red-line of FERC; Dakota Electric Red-line of MN existing stds)	1 initial document (Regulated Utilities' Technical Interconnection and Interoperability Requirements Proposal)
15 organizations (engineers, regulatory staff, lawyers, advocates)	9 organizations (engineers, technical experts)
5 full day In Person meetings – 1 year	8 half day web meetings – 7 months; 3 full day In Person mtgs
Draft staff recommendations (4 rounds of comments)	Edits as we go (~2 rounds of comments)

Workgroup Topics & Timeline

2017	PHASE I In-Person Topics
June 2	Pre-app report; Application requirements; Queue type & process; Material Modification Definition; Fast Track; Site Control
July 28	Definitions; Transmission Provider's role; Engineering screens; Study process; process timelines/extensions; dispute resolution
Sept 15	Insurance; Disconnect Switch; metering; Commissioning/inspection, testing, authorization; Design, procure, install, construct facilities/upgrades; advanced inverters
Nov 3	Interconnection Agreement; process for updating; Transition issues; any outstanding issues
Dec 1	Webinar for feedback on some of the draft staff recommendations and descriptions of outstanding issues

2018	PHASE II Web Meeting Topics
March 23	Scope/Overview; Inventory of Definitions to Discuss
April 13	Performance Categories; Response in Normal and Abnormal Conditions; MISO Bulk Power System
May 18	Reactive Power and Voltage/Power Control Performance; Protection Requirements
June 8	Energy Storage; Non-export; Inadvertent export; Limited export
Aug 24	Interoperability (Monitor and Control Criteria); Metering; Cyber security
Sept 14	Test and Verification; Witness Test Protocol
Sept 21	Full Day In Person to Revisit and Reconcile Edits
Oct 3	References; Definitions; 1-line diagram requirements; Agreements

2019 Timeline

•January 9

Briefing Papers posted for 1/17 Agenda Meeting re: Movant's Request on Att. 6

Oral Argument Schedule forthcoming

•January 14

18-713 Minnesota Power Tariff Initial Comments due

*13-1015 Xcel Solar*Rewards Red-line edits Comments due*

•January 17

Agenda meeting re: Movants' Request on Att. 6

Oral argument will be taken.

•January 24

18-713 Minnesota Power Tariff Reply due

•January 31

18-711 Dakota Electric Assn. Tariff Initial Comments due

PUC will issue a notice of extension/variance with this deadline

•February 4

18-712 Otter Tail Power Tariff Initial Comments due

18-714 Xcel Energy Tariff Initial Comments due

13-867 Xcel CSG tariff Initial comments due

•February 11

18-711 Dakota Electric Assn Tariff Reply due

PUC will issue a notice of extension/variance with this deadline

•February 14

18-712 Otter Tail Power Tariff Reply due

•February 22

18-714 Xcel Energy Tariff Reply due

13-867 Xcel CSG tariff Reply due

Tent. Late Feb – Late Mar

Agenda Meetings on Utility Tariffs

We anticipate addressing DEA, OTP, and MP in Late Feb/Early March; and Xcel later in March to leave time for Order and implementation prior to effective date.

•*April*

Phase II TSG Writing Subgroup Recommendations due

•June 17

Effective Date of MN DIP and MN DIA

Some Interconnection Process Changes

Pre-Application Report	• Allows Interconnection Customer more detail about a specific location before submitting an application
Queue	• Assigns capacity and organizes interconnection application requests for transparency and efficiency
Simplified Process	• Expedites and streamlines interconnection process for smaller projects; incorporates Uniform Statewide Contract where appropriate.
Fast Track Process	• Expedited review option for projects under 1 MW and some projects under 5 MW
Updated Engineering Screens	• Initial review screens for Simplified and Fast Track based on FERC SGIP updated with input from DGWG, NREL, & EPRI

Interconnection Process Changes Cont'd

DER Modifications	• Clarifies what constitutes a major modification, identifies when new application is required (including for existing DER.)
Timelines	• Establishes timeframes for utility & customer. Option to withdraw an application for failure to meet deadline or request extension.
Electronic Submission	• Allows customer to submit applications & materials electronically. Enables electronic signatures and payment at utility discretion.
Application Agent	• Allows customer to identify someone to coordinate with the utility on details of the application/interconnection process.
Updates Fees & Study Deposits	• Establishes application fee caps based on DER capacity and type of review. Requires study deposits in advance.
Other improvements	• Recognize Distributed Energy Resources, including storage, which parallel with utility grid. Clarifies DER capacity is in AC not DC.

Interconnection Process Next Steps: Phase I

- MN PUC will issue notices seeking comment on the utility tariffs. We anticipate incorporating the outstanding issues identified in the 8/13/18 Order in the approval of utility tariffs.
- Cooperative and Municipal Utilities "shall adopt a distributed generation tariff that addresses the issues included in the order" within 90 days of the issuance of the order. The MN PUC does not receive copies of nor review and approve these tariffs.

Thank you,

MnSEIA

Mn SEIA

Questions?

I move Mn solar forward

MN DIP & DIA

Minnesota's new interconnection standards

Fresh Energy

First, it is called the DIP or MN DIP.

State of Minnesota Distributed energy resources Interconnection Process

And, the DIA.

Minnesota Distributed energy resource Interconnection Agreement

Effective for all new applications submitted

June 17, 2019 and after.

Applications submitted prior to that date will be grandfathered in under the existing standard and proceed to PTO without interruption.

Two goals for today's presentation:

- Persuade you to read the standard
- Explain the process tracks

Be proactive!

Nobody is responsible for training you on the new standard or holding your hand (particularly not the utilities). You run a business. You have employees that interact daily with the process. You have new deadlines to meet and fees to pay. You have customers that rely on your expertise.

These are the new rules of the game. You need to know them.

Example - new forms:

Is equipment certified (i.e. UL 1741 Listed)? ☐ Yes (Certification is a Simplified Process requirement)

Use Exhibit [A] to list components of the Distributed Energy Resource equipment package that are currently certified, if applicable.

Installed DER System Cost (before incentives):_____

Estimated Installation Date: _____

Interconnection Customer Signature [This Section must be completed by the Customer]

The simpler Uniform Statewide Contract replaces the longer Interconnection Agreement (MN DIA) if the conditions of MN DIP 1.1.5 are met. A qualifying customer signing a Uniform Statewide Contract may elect to be additionally provided the MN DIA. Request a MN DIA?: No ☐ Yes ☐

Disclaimer: The Area EPS Operator shall notify the Interconnection Customer with an opportunity to request a timeline extension (See MN DIP Section 1.8.2 and 5.2.2.) Failure by the Interconnection Customer to meet or request an extension for a timeline outlined in the MN DIP could result in a withdrawn queue position and the need to re-apply. INITIAL: _____

I designate the individual or company listed as my Application Agent to serve as my agent for the purpose of coordinating with the Area EPS Operator on my behalf throughout the interconnection process (see MN DIP 1.3.2.) INITIAL:_____

Example – new path to dispute resolution:

10.6. If a resolution is not reached in the thirty (30) Business Days from the date of the notice described in section 10.3, the Parties may 1) if mutually agreed, continue negotiations for up to an additional twenty (20) Business Days; or 2) either Party may request the Commission's Consumer Affairs Office provide mediation in an attempt to resolve the dispute within twenty (20) Business Days with the opportunity to extend this timeline upon mutual agreement. Alternatively, both Parties by mutual agreement may request mediation from an outside third-party mediator with costs to be shared equally between the Parties.

10.7. If the results of the mediation are not accepted by one or more Parties and there is still disagreement, the dispute shall proceed to the Commission's Formal Complaint process as described in Minn. Rules 7829.1700-1900 unless mutually agreed to continue with informal dispute resolution.

10.8. At any time, either Party may file a complaint before the Commission pursuant to Minn. Stat. §216B.164, if applicable, and Commission rules outlined in Minn. Rules Ch. 7829.

Example - new meetings and required information:

17.0 Data to be provided by the Interconnection Customer with the Facilities Study Agreement

17.1. The Interconnection Customer shall be available to meet on site with the Area EPS Operator within 5 Business Days of signing the Facilities Study Agreement. The personnel furnished by the Interconnection Customer for this site meeting shall bring detailed information on the site layout. The Area EPS Operator may request the Interconnection Customer physically places stakes at the location of the major components.[14]

17.2. The Interconnection Customer shall furnish a final site plan detailing the location of major equipment at the time this agreement is returned. The Point of Common Coupling (PCC) and Point of DER Connection (PoC) shall be clearly marked. The site plan shall depict any nearby roads and be labeled with the road name. Accurate dimensions shall be included on the site plan. The proper emergency (911) address, corresponding to the site, shall be labeled on the site plan.

Example - new timelines:

2.2.2 Within ten (10) Business Days of receipt of the Simplified Process Application, the Area EPS Operator shall acknowledge to the Interconnection Customer receipt of the Simplified Application, evaluate the Simplified Process Application for completeness, and notify the Interconnection Customer whether the Simplified Process Application is or is not complete, and, if not, identify what material is missing. The Area EPS Operator shall to the best of its ability identify all missing material and other errors or omissions at this time. The Interconnection Customer shall submit any additional material within five (5) Business Days of the Area EPS Operator's notice. The Area EPS Operator shall have an additional five (5) Business Days to review the additional material and notify the Interconnection Customer that the Simplified Process Application is complete.

Example – new process tracks:

Section 3. Fast Track Process

3.1 Applicability

3.1.1 The Fast Track Process is available to an Interconnection Customer proposing to interconnect a DER with the Area EPS Operator's Distribution System if the DER capacity does not exceed the size limits identified in this Section, including the table below and does not qualify for the Section 2 Simplified Process. Fast Track eligibility does not imply or indicate that a DER will pass the Fast Track Initial Review Screens in 3.2.1 or the Supplemental Review screens in 3.4 below.

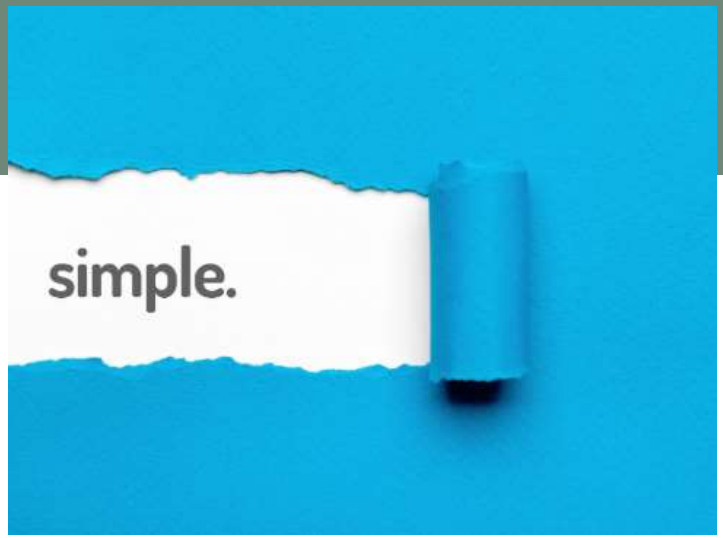
Fast Track eligibility for DERs is determined based upon the generator type, the size of the generator, voltage of the line, and the location of and the type of line at the Point of Common Coupling. All synchronous and induction machines must be no larger than 2 MW to be eligible for Fast Track Process consideration. The Fast Track Process size limits are included in the table below.

Read the ~150 page MN DIP and DIA.

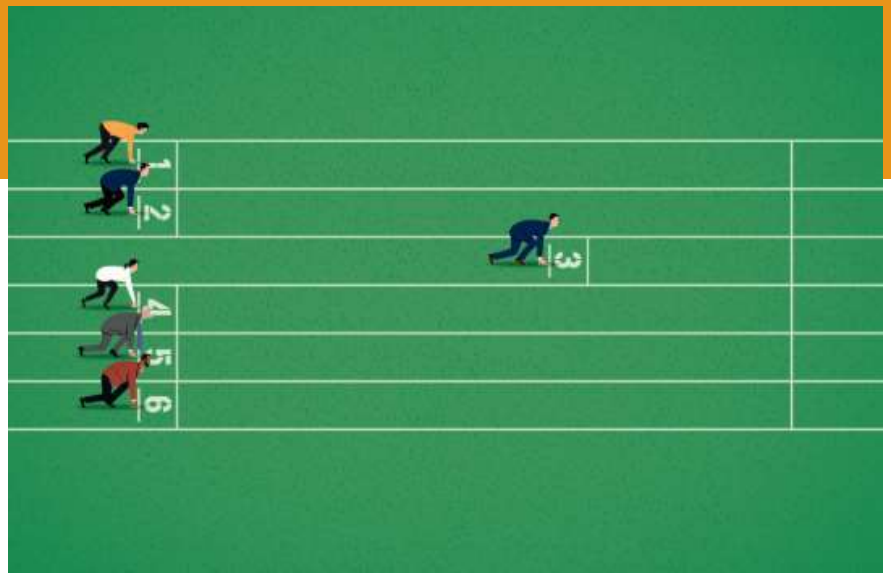
Two goals for today's presentation:

- Persuade you to read the standard
- Explain the process tracks

Simplified Process Track:



- Section 2 of MNDIP
- For “inverter-based DERs with a DER Capacity of 20 kWac or less” ….
- … that pass the initial screens!
- Simplified Application Form + and exhibit for storage
- Streamlined process but, unfortunately, not expedited
- Incorporates the Statewide Uniform Contract (DIA optional)



Fast Track:

- Section 3 of MNDIP
- For qualifying DERs (see table) up to 5MW … that also pass all screens
- Expedited review without full study!
- Full Application Form and Interconnection Agreement

Full Study Track:

- Section 4 of MN DIP
- For DERs not qualifying for Fast Track and/or that fail screens
- Up to 10MW
- Full Application Form and Interconnection Agreement

Get involved!

Questions?

Laura Hannah

Senior Policy Associate
hannah@fresh-energy.org
651.726.7579

Fresh Energy

Questions?

Thank you for your interest in renewable energy and creating a rational future…

GREAT NORTHERN SOLAR

IREC
Interstate Renewable Energy Council
CERTIFIED MASTER TRAINER™