



Oregon

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*Oregon Solar Energy Code Committee
September 10, 2009
Meeting Summary*

****NOTE:** *The following is a summary of the committee's discussion.*

To review the meeting in its entirety, the archived video of the meeting is available on the committee's Web site at the following link: <http://www.bcd.oregon.gov/committees/10sec.html>

Members Present: Doug Aljets, Electrical and Elevator Board and Solar Installer for NW Current Energy, LLC
Brian Crise, International Brotherhood of Electrical Workers (IBEW), Local 48
Jerry Henderson, Independent Contractor for Department Of Energy (DOE) and Energy Trust of Oregon (ETO)
Robert Lane, Three Phase Electric
Dave Mumford, Lear Electric
Robin Rabirotff, Oregon Solar Energy Industries Association (OSEIA) and EC Company
Len Ralston, Solar Installer for Dynalectric
Robert Rice, Oregon Building Officials Association (OBOA) and Josephine County Building, Official
Marcus Reed, State Fire Marshal
Jaimes Valdez, City of Portland – BPS/BDS

Members Absent: Nathan Philips, National Electrical Contractors Association (NECA)

Guests Present: Dan Petrin, Frahler Electric
Greg Creal, Central Electrical Training Center
Bruce Leiby, All City Electric
Alan Hichenbottom, Tanner Creek Energy
Jennifer Weddle, Energy Trust New Homes
Craig Stewart, Tanner Creek Energy
Johnathan Balkema, Oregon Home Builders Association
Andrew Koyaanisqatsi, Solar Energy Solutions

Staff Present: Patrick Allen, Interim Administrator
Chris Huntington, Policy and Technical Services Manager
Dennis Clements, Electrical Program Chief
Jim Denno, Policy Analyst
Gabrielle Schiffer, Sustainability Coordinator
John Powell, Facilitator
Shauna Parker, Rules Coordinator

Staff Present: Dana Fischer, Building Code Para-Technical
Michael Morter, Regional Program Services Manager

The meeting was called to order by John Powell at 9:05 a.m.

Introductions

John Powell, Facilitator, welcomed the committee and guests to the committee meeting. He introduced Patrick Allen, Interim Administrator.

Patrick Allen, Interim Administrator, thanked the committee for their time and expertise they will share during the committee process.

Chris Huntington, Policy and Technical Services Manager, welcomed everyone and asked them to introduce themselves. He then explained that all of the meetings are open to the public and will be video streamed live over the web. He also went over the goals and outcomes for the committee's, and the process that will be followed. The committee is going to be developing the nation's first Statewide Solar Energy Code, the Oregon Solar Energy Code (OSEC). The goal is to create consistency through a clear and concise code for photovoltaic (PV) installations. The code will address only about 80% of the solar installations. It will not address solar hot water or building intergraded systems. It is also outside the scope of the committee to address other agencies tax incentives, though of course we are interested in aligning the code to address incentives for solar installations.

Manager Huntington explained once the committee completes their work, the model code document will go to the appropriate board for review, comment and recommendation. Once a board has taken action to approve, not approve or modify the committee's recommendations, the model code document will go to a public hearing. If any additional suggestions come out of the public hearing, the committee may be reconvened to reconsider those items.

Manager Huntington also stated that it is important that each meeting have a quorum, to give credibility to the committee's work and so that items can be approved and moved forward. John Powell's role will be as facilitator and he will assist the committee in making decisions on items to be tabled for further discussion, and where appropriate suggest a decision be made so the committee can move onto the next agenda item. Mr. Huntington briefly discussed the anticipated timeline for discussing items. The committee will be entertaining proposals throughout the process, however, if a proposal deals with a topic that is not covered on the agenda it will be discussed at a later time. It is important that proper notice of a topic be given so that interested parties can be at the discussion.

Mr. Powell asked that Dennis Clements, Chief Electrical Inspector, discuss past adoption processes and how the [matrix](#) will work for this committee. Dennis Clements explained that the matrix will be used to track individual code sections reviewed by the committee and will show whether an item was approved, not approved, modified or tabled for further discussion.

Mr. Powell explained that the code's name may change to avoid confusion with the Oregon Electrical Specialty Code, as they currently have similar acronyms of OESC versus OSEC. He further clarified that the committee does not have authority to change what is currently in Oregon Revised Statute (ORS) but does have the ability to possibly change Oregon Administrative Rule (OAR), although the division's goal is to keep changes to the OAR's to a minimum.

Manager Huntington briefly reminded the committee and public attendees that the committee meetings are open to the public and the division encourages public comment. He stated that anyone wanting to speak will need to come up to the testimony table and state their name so their comment(s) are recorded for the record.

Mr. Powell also conveyed that the committee's purpose is not to interpret existing code, or current jurisdiction issues, but that some discussions may help provide a better understanding of what is currently in the code. He also asked that committee members remember the main focus is on fire and life safety issues.

Mr. Clements explained to the committee that ORS 479.730 simply gives the division statutory authority to adopt a code through the adoption process. He further explained that on the matrix, the reference column lists the ORS relating to the code section for that particular line item.

Mr. Powell explained that the electrical definitions are found in Chapter 2 and that the committee will be discussing those at a later meeting. He further explained that there are some language differences between what the different codes, OAR's and ORS's state, and those differences will need to be discussed.

Chapter 4: Electrical Requirements

I General

Section 690.1 Scope

Mr. Powell reviewed the language in this section with the committee. He stated that the only difference between the OSEC and the National Electrical Code (NEC) scope is that there is a reference in the NEC to a picture of a photovoltaic system which is not included in this section. Only electrical systems will be discussed at this time.

Robert Rice asked how the model document will be numbered in the final version, noting that the current document shows some NEC numbering but in other places show no numbering. Manager Huntington replied that the numbering will be determined once the model code document is completed.

Mr. Powell stated that the division is aware that the 2011 National Code is currently being discussed and this committee is fortunate to have Brian Crise as a member because he is also a member of the National Code Committee. Items that could be pertinent to this code adoption process may be brought in for discussion. It depends on the progress of the National Code Committee.

The committee had no comments on this section and agreed to the proposed language.

Section 690.3 Other Codes

Mr. Powell reviewed the language in this section with the committee. He explained that the second paragraph *“The installation of conduits or other raceway systems shall comply with the appropriate requirements of the Oregon Electrical Specialty Code. Raceways and conduit systems shall be installed with special attention to ambient temperature, expansion characteristics of the conduit or raceway system and any required ambient temperature adjustment from Table 310.15(B)(2)(c)”* is new language, which was added as an important reminder that fires can occur on buildings where the ambient temperature has not been taken into consideration.

Mr. Rice suggested that the “exception” in this section be a requirement, not an exception. Mr. Powell stated that it is listed in the NEC as an exception, but if the committee agrees it should be a requirement, that is an acceptable proposal. The committee agreed the “exception” should be a requirement.

The committee had no further comments and agreed to the language modifications.

Section 690.4 Installation

Mr. Powell reviewed the language in this section with the committee. He stated the language was taken from the NEC but that there may be modified language submitted at the national level for the 2011 code pertaining to subsections A through D and asked Mr. Crise to bring back to the committee, a document showing projected changes. *The committee tentatively agreed to the proposed language, but tabled the section until Mr. Crise can provide the committee with modified language submitted at the national level.*

Section 690.5 Ground Fault Protection

Mr. Powell reviewed the language in this section with the committee, stating the language was taken from the NEC.

Jaimes Valdez asked for clarification on the second exception and how it could affect structures that are turned into dwellings. Mr. Powell replied that if you change a garage into a dwelling unit the wiring may need to be changed, because the original intent of the structure has changed. This scenario would be a code call for the local jurisdiction to make.

Mr. Rice asked that if the intent of this document is to be considered a “stand alone” document, should a reference be added, directing the reader to the electrical code where it states a change of occupancy is required. Mr. Powell replied that is a requirement in all codes, and as such, are found in statute and rule. Manager Huntington added that there are statutes and rules that trump what is in the code.

The committee had no further comments on this section and agreed to the proposed language.

Section 690.6 Alternating-Current (ac) Modules

Mr. Powell reviewed the language in this section with the committee. He suggested that for consistency the word “Article” in subsection A, be replaced with “OESC”. He also noted that in subsection E, the reference to 240.2(B)(2) which refers to the OESC is new

The committee agreed to the proposed and modified changes in this section.

Motion to approve as modified Chapter 4: Electrical Requirements, I General.

Motion carried unanimously.

Break

II Circuit Requirements

Section 690.7 Maximum Voltage

(Mr. Powell has requested at future committee meetings, the NEC be projected on the wall so it can be available for review if needed).

Mr. Powell reviewed the language in this section with the committee. He stated that other than two new references to the OSEC, the language is written as found in the NEC.

Mr. Powell suggested that in the last sentence of subsection A, the word “*listed*” be removed and replaced with the word “*certified*” and that a reference to *OESC 110.3(b)* be added.

Mr. Creal asked in reference to OESC Table 690.7, whether the committee would discuss using an estimated ambient temperature more suited for the city of Salem and surrounding areas. Mr. Powell commented that Mr. Creal’s suggestion would be considered a code change proposal and should be submitted in writing to the division. The proposal could then be presented to the committee for their review. Mr. Crise stated that a fine print note has been accepted at national level, which is using a suggested “extreme annual mean minimum design dry bulb temperature” from the ASHRAE Handbook. This gives the user a data point where you can go to collect nationally recognized data, to use as a baseline.

The committee discussed subsection C, and whether or not to delete the second part of the section, “*PV dc circuits in buildings are permanently connected using wiring systems recognized by this Code. Requirements for protecting unqualified persons from contact with these circuits are included in OSEC 690.7(B) and (D). Unqualified persons are not likely to service equipment in these circuits due to its complexity. A significant difference exists between the rated open-circuit voltage and the operating voltage in PV dc circuits. For the PV system to perform its intended function, rated dc open-circuit voltages of up to 600 volts may be present*”. Mr. Powell stated the language is taken from the NEC handbook and is explanatory language. He commented that he does not believe explanatory language should be included in the code. *After continued discussion, the committee agreed the language should be deleted.*

The committee agreed to delete the second part of the FPN, “*Where dc circuitry over 150 volts to ground is present in one- and two-family dwellings, additional protection for unqualified persons may be needed. Protection may be in the form of conduit, a closed cabinet, or an enclosure that requires the use of tools to open it and that permits entry only by qualified persons*”, as it is also explanatory language found in the NEC Handbook.

Mr. Rice commented that some of the language references the “adopted” OESC, and voiced his concern that if the OSEC is adopted on April 1, 2010 and the OESC goes through its normal code change process of adoption in 2011 language may change in the 2011 OESC and not be reflected in the 2010 OSEC. Mr.

Powell clarified that the 2010 OSEC will only be adopted for one year, then if needed it will be revised to reflect changes in the 2011 OESC.

Section 690.8 Circuit Sizing and Current

Mr. Powell reviewed the language in this section with the committee, stating the language in subsections A through D was taken from the NEC, but that subsection E is new language.

Mr. Powell explained that the intent of subsection E is to clarify the need for “de-rating conductors (DC)”. Committee members suggested that “DC” be added in the heading of subsection E, as an indicator that “DC’s” are current-carrying. Mr. Powell also suggested that “Oregon Electrical Specialty Code” be added as after each table reference. Mr. Crise suggested “source and” be added in front of “output circuits” in the first sentence.

The committee agreed to the proposed and modified language changes in this section.

Section 690.9 Overcurrent Protection

Mr. Powell reviewed the language in this section with the committee, stating the language was taken from the NEC. *The committee voiced no objections to the proposed language.*

690.10 Stand-Alone Systems

Mr. Powell reviewed the language in this section with the committee, stating the language was taken from the NEC. *The committee voiced no objections to the proposed language.*

Motion to approve as modified Chapter 4: Electrical Requirements II Circuit Requirements.
Motion carried unanimously.

III Disconnecting Means

Section 690.13 All Conductors

Mr. Powell reviewed the language in this section with the committee, stating the language was taken from the NEC, except the added reference to the OSEC in the exception.

(A) Fire Fighting Disconnect

Mr. Powell stated the language in subsection A is new, and then reviewed it with the committee. Mr. Crise commented that there was an effort at the national code level to add language requiring a “disconnect” to be located on the roof of structures making it accessible to fire fighters, so once it is shut off, the electrical current would deaden the output circuit on down to the inverter. The idea was rejected at the national level due to high estimated costs.

Dave Mumford commented that it makes sense to have one location for disconnects instead of several sites that fire fighters would have to locate.

Mr. Powell commented that fire fighters typically fight a fire from the roof down, and asked committee members if the suggestion to locate a “disconnect” on top of a roof, would be the best place for it’s location. Marcus Reed replied that since a fire department would be shutting off domestic power to a structure, a “disconnect” should be located next to electrical boxes for easy shutoff and so they are accessible in one location.

Mr. Powell suggested this section be tabled until further input can be gathered from the fire community and asked the committee members to think of appropriate language that could be used. The committee voiced no objection.

Mr. Creal commented that the word “string” is not defined in code and should be defined if it is used in this section. *Since the committee agreed to table this section, Mr. Powell agreed to discuss defining the word “string” in Chapter 2, Definitions when the section is discussed at a later meeting. The committee voiced not objection.*

(B) Utility Disconnect

Mr. Powell reviewed the language in this section with the committee. He stated the language is new and was suggested at the request of Utility Departments. The utility linemen are concerned about PV systems supplying power to the grid during a power outage and also concerned that though inverters should shut down during a power outage, equipment failure, internet purchasing and counterfeit Nationally Recognized Testing Laboratories (NRTL) listing is a concern.

Mr. Powell suggested that in the second sentence, the word “solar” should be replaced with “PV”. *No change to the language was made at this time.*

The discussion continued with suggestions from committee members and public guests, on where utility disconnects should be placed, who should have access to them, whether they are locked or not, and the best way to avoid a potential safety hazard.

Robin Rabirotff suggested that if the language “utility disconnect” is going to be used, then the language needs to be clarified in regards to the location adjacent to the point of the inverter. He stated the inverter in not necessarily adjacent to where it is back feeding into the utility service equipment and may not satisfy the requirements of the Utility Department.

Mr. Crise asked that this section be tabled. The committee voiced no objection.

Section 690.14 Additional Provisions

Mr. Powell reviewed the language in this section with the committee. He stated that the second sentence in subsection A “*A disconnecting means rated in accordance with OSEC 690.17 may be used, but it is not required to be marked as suitable for use as service equipment*”, is new language and was added to help make the section more user friendly. Mr. Rabirotff, stated he is concerned that the new language may be setting “precedent language”, if anyone delves into an interpretation of what the systems are. *Robert Lane suggested the language be deleted. The committee agreed.*

Mr. Powell continued reviewing the section, stating the language in subsections B through D, was taken from the NEC, except for the references to the OSEC.

Mr. Powell stated that although subsection (C)(5) has been taken directly from the NEC, he suggested it be tabled for further discussion because he believes it will be impacted by the discussion on tabled item 690.13 (A) Fire Fighting Disconnect. The committee voiced no objection.

Section 690.15 Disconnection of Photovoltaic Equipment

Mr. Powell explained that the language in this section is from the NEC, except for the added reference to the OSEC. *The committee voiced no objections to the proposed language.*

Section 690.16 Fuses

Mr. Powell explained that the language in this section is from the NEC. *The committee voiced no objections to the proposed language.*

Section 690.17 Switch or Circuit Breaker

Mr. Powell explained that the language in this section is from the NEC, except for the reference to the OSEC. *The committee voiced no objections to the proposed language.*

Section 690.18 Installation and Service of an Array

Mr. Powell explained that the language in this section is from the NEC. *The committee voiced no objections to the proposed language.*

Motion to approve as amended: Chapter 4 Electrical Requirements; III Disconnecting Means except for tabled sections (A) Fire Fighting Disconnect, (B) Utility Disconnect and Section 690.14 Additional Provisions (C5).

Motion carried unanimously.

IV Wiring Methods

Section 690.31 Methods Permitted

Mr. Powell reviewed the language in this section with the committee. He noted there are no changes to the language in subsections A, C, D and E, compared to how the language is listed in the NEC, except for where a reference to either the OSEC or OESC have been added.

(B) Single-Conductor Cable and (F) Flexible, Fine-Stranded Cables

Mr. Powell stated that in subsections B and D the words “*listed and labeled*” need to be changed to “*certified*”, because it is statutory language and that he will make the change where needed throughout the rest of the document.

Mr. Rabirotff asked if in subsection F, there should be language listed for equipment and how to ensure the listed and approved connectors are being applied to the cables in a proper manner. Mr. Powell replied that the language in section 110.14 deals with equipment and the equipment being used for the appropriate terminations and also includes reference to section 110 (3)(b), which requires the use of manufacturer's specifications.

The committee voiced no objections to the proposed language.

Section 690.32 Component Interconnections

Mr. Powell reviewed the language in this section with the committee and noted there were no changes from how the language is listed in the NEC. *The committee voiced no objections to the proposed language.*

Section 690.33 Connectors

Mr. Powell reviewed the language in this section with the committee and noted there were no changes from how the language is listed in the NEC for subsection A through E.

Mr. Clements commented about the “note” in subsection E, which refers to a Chief Electrical Inspector Notice for a product that was on the shelf when the 2008 OESC became effective. The note allows the use of the product for a period of time, which is until the notice has expired. Mr. Powell stated and Mr. Rice agreed that the note does not belong in the code. *The committee voiced no objection to the proposed language, including the deletion of the “note” in subsection E.*

Section 690.34 Access to Boxes

Mr. Powell reviewed the language in this section with the committee. *The committee voiced no objections to the proposed language.*

Section 690.35 Underground Photovoltaic Power Systems

Mr. Powell reviewed the language in this section with the committee, noting the reference to the OSEC. *The committee voiced no objections to the proposed language.*

Motion to approve as amended Chapter 4 Electrical Requirements IV Wiring Methods.
Motion carried unanimously.

The committee concluded their discussion.

Manager Huntington summarized the meeting by asking committee members to way in on any issues they feel need to be discussed. He reminded the committee that the meetings provide an opportunity for them to share and discuss their concerns, ideas and expertise. He explained that Building Codes staff will work on a model code document that shows changes denoting the language that has been deleted with ~~striketrough~~ marks and new language that has been added with **bold and underlined** marks which will help during the review process. He asked that if there were any questions or comments on the process that the committee feel free to contact the division.

Adjourn

The committee meeting adjourned at 4:00 p.m.