

**BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON**

**UM 2111**

In the Matter of

PUBLIC UTILITY COMMISSION OF  
OREGON,

Investigation Into Interconnection Process  
and Policies.

**JOINT UTILITIES' COMMENTS ON  
INCORPORATION OF UPDATED  
IEEE STANDARDS**

**I. INTRODUCTION**

1           In accordance with Staff’s “Summary of September 28 Meeting,” filed on October 7, 2022,  
2           and “Summary of October 25 Meeting,” filed on October 31, 2022, Portland General Electric  
3           Company (PGE), PacifiCorp dba Pacific Power (PacifiCorp), and Idaho Power Company (Idaho  
4           Power) (together, the Joint Utilities) provide the following comments regarding incorporating the  
5           updated IEEE 1547 standards into the Public Utility Commission of Oregon’s (Commission) rules,  
6           policies, and practices.<sup>1</sup> Staff and stakeholders participated in three workshops to discuss this issue  
7           on August 31, 2022, September 28, 2022, and October 25, 2022. Staff structured these workshops  
8           around the Interstate Renewable Energy Council’s (IREC) matrix entitled, “IEEE 1547 Adoption:  
9           Decision Options Matrix” (IEEE Matrix), which IREC circulated on September 15, 2022. The  
10          IEEE Matrix presents decision options (DOs) for stakeholders’ consideration, with the items  
11          classified as near-, mid-, and long-term.

12          The Joint Utilities support the goal of incorporating updated IEEE 1547 standards into the  
13          Commission’s rules and the utilities’ practices, and appreciate IREC’s identification of issues to  
14          consider and the discussion in the workshops. In these comments, the Joint Utilities provide their

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<sup>1</sup> Docket UM 2111, Order No. 22-126, App. A at 12 (Apr. 22, 2022) (listing issues to be addressed in initial phase of the docket).

1 recommendations regarding efficiently completing the IEEE 1547 workstream and also respond  
2 to Staff’s questions regarding the near- and mid-term items that have been discussed at the  
3 workshops to-date.

## II. INCORPORATING UPDATED IEEE 1547 STANDARDS INTO RULES

4 At the first workshop for the IEEE 1547 workgroup, Staff directed stakeholders to move  
5 the process forward, prioritize quick-win policies, and seek to have actionable items at the six-  
6 month mark.<sup>2</sup> With this direction in mind, the Joint Utilities recommend that stakeholders begin  
7 to consider specific updates to the language of the Commission’s current net metering and small  
8 generator interconnection rules, Oregon Administrative Rules (OAR) Chapter 860, Divisions 39  
9 and 82, respectively. The current net metering rules specifically define “IEEE Standards” as the  
10 2003 edition of Standard 1547,<sup>3</sup> and also reference the 2003 edition in the definition of “Area  
11 Network.”<sup>4</sup> The current small generator interconnection rules specifically define “IEEE 1547” to  
12 mean the 2003 edition and “IEEE 1547.1” to mean the 2005 edition.<sup>5</sup>

13 While the existing rules specify that IEEE 1547-2003 is the technical standard, they do not  
14 include the specific default settings to be selected within the IEEE Standards and do not reach the

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<sup>2</sup> Staff’s Presentation for Aug. 31, 2022 Workshop, Slides 2-3 of 46 (Aug. 30, 2022).

<sup>3</sup> OAR 860-039-0005(3)(k) (“IEEE standards’ means the standards published in the 2003 edition of the Institute of Electrical and Electronics Engineers (IEEE) Standard 1547, entitled ‘Interconnecting Distributed Resources with Electric Power Systems,’ approved by the IEEE SA Standards Board on June 12, 2003, and in the 2005 edition of the IEEE Standard 1547.1, entitled ‘IEEE Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems,’ approved by the IEEE SA Standards Board on June 9, 2005.”).

<sup>4</sup> OAR 860-039-0005(3)(c) (“Area network’ means a type of electric distribution system served by multiple transformers interconnected in an electrical network circuit in order to provide high reliability of service. This term has the same meaning as the term ‘secondary grid network’ as defined in IEEE standard 1547 Section 4.1.4 (published July 2003).”).

<sup>5</sup> OAR 860-082-0015(11) (“IEEE 1547’ means the standards published in the 2003 edition of the Institute of Electrical and Electronics Engineers (IEEE) Standard 1547, titled ‘Interconnecting Distributed Resources with Electric Power Systems’ and approved by the IEEE SA Standards Board on June 12, 2003.”); OAR 860-082-0015(12) (“IEEE 1547.1’ means the standards published in the 2005 edition of the IEEE Standard 1547.1, titled ‘Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems’ and approved by the IEEE SA Standards Board on June 9, 2005.”).

1 level of detail included in IREC’s IEEE Matrix. The Joint Utilities generally believe that the level  
2 of detail in the current rules is appropriate and that it would not be appropriate to memorialize in  
3 rules most of the issues discussed in the workshops to-date. In addition to being very technical,  
4 many of the issues may vary between utilities, across a utility’s system, or with different generator  
5 sizes and types. For example, settings that are appropriate for a feeder with a peak load of 100 kW  
6 may not be sufficiently protective for a feeder with a peak load of 10 MW. Similarly, different  
7 requirements may apply to a small, residential net metering customer and an 8-MW qualifying  
8 facility (QF). System requirements may also change over time, for example if the system  
9 configuration changes or the penetration of Distributed Energy Resources (DERs) increases.  
10 Moreover, in the Joint Utilities’ experience, most of the issues discussed at the workshops have  
11 not been contentious and are not issues that have caused disputes in Oregon. For all of these  
12 reasons, the workgroup should not attempt to codify in rules the level of detail contained in IREC’s  
13 IEEE Matrix.

14           Instead, the Joint Utilities recommend that stakeholders focus their efforts at the remaining  
15 workshops on reaching consensus regarding targeted updates to the existing rules. Doing so will  
16 require stakeholders to discuss whether the rules’ references to IEEE 1547-2003 could simply be  
17 updated, or whether additional changes to the rules are necessary to implement updated IEEE 1547  
18 standards. The Joint Utilities would also like to discuss their proposal that the rules simply  
19 reference the most recent version of IEEE 1547, rather than referencing a specific version of IEEE  
20 1547, such as IEEE 1547-2018. In January 2023, work will begin on the successor to IEEE 1547-  
21 2018, meaning that IEEE 1547-2018 will likely be superseded soon after the Commission adopts  
22 updated rules. Thus, including a generic reference to the latest version of IEEE 1547 would avoid  
23 the need for the Commission to regularly re-open these rules, conserving Commission and

1 stakeholder resources. The upcoming and future editions of IEEE 1547 further support  
2 maintaining the level of detail in the current rules as more technical detail may need to be revised  
3 based upon future editions of IEEE 1547.

4 After the rules have been updated, then each utility can make appropriate changes to its  
5 interconnection handbooks and procedures to incorporate the updated IEEE 1547 standards. The  
6 Joint Utilities view IREC's IEEE Matrix as an informative reference document that will assist the  
7 utilities in determining what potential issues they should consider addressing as they implement  
8 the updated IEEE 1547 standards through appropriate updates to their interconnection policies and  
9 handbooks. The workshop discussions with IREC and among stakeholders helped inform the Joint  
10 Utilities regarding best practices and the experiences of other states.

11 At the last workshop, there was a suggestion that the Commission could regularly review  
12 the utilities' handbooks. However, these are not the types of documents that the Commission  
13 typically reviews and requiring the Commission to undertake such new reviews could potentially  
14 require additional resources, time, and expense. Rather, consistent with current practice in  
15 interconnection policies and other areas, the Commission should simply direct the utilities to  
16 implement the updated IEEE 1547 standard(s). By moving forward to focus on revisions to the  
17 rules, and not initiating a review process for utility handbooks, Staff and stakeholders can ensure  
18 that this workgroup process concludes by the six-month mark so that all involved can shift their  
19 resources to resolving the important topics in the other phase one subgroup and in phases two  
20 through four of this docket.

### III. NEAR-TERM ITEMS

1 IREC identifies the near-term items as “actions needed as first steps in the adoption  
2 process” of IEEE 1547-2018.<sup>6</sup> The Joint Utilities generally agree that the default selections made  
3 by IREC in the IEEE Matrix for DOs 1 through 7 represent best practices that the utilities would  
4 seek to implement in most situations.<sup>7</sup> During the September 28<sup>th</sup> workshop, there was significant  
5 discussion of options for voltage regulation modes by reactive power (DO 8), and it does not  
6 appear that the Joint Utilities and IREC have reached consensus regarding this issue. The Joint  
7 Utilities provide the following feedback on both the specifics of the selected defaults and the  
8 appropriate location for incorporation of each default.

#### 9 A. DOs 1 through 10

##### 10 1. DO 1 – Adoption Timeline

11 Under DO 1, IREC selected both “Comply with IEEE 1547-2018 beginning ~April 1<sup>st</sup>,  
12 2023 or a later date” (DO 1a-2) and “Comply with IEEE 1547-2018 when the equipment is readily  
13 available (TBD by Commission action)” (DO 1a-3).<sup>8</sup> In its September 28, 2022 workshop  
14 memorandum, Staff proposed a compliance date of July 1, 2023, and noted that, “should  
15 equipment not be available the Commission could order a new date for compliance. [Staff] can  
16 reassess closer to the end of 2022.”<sup>9</sup>

17 The Joint Utilities agree with Staff’s position—a compliance date of mid-2023 seems  
18 appropriate, but Staff and stakeholders should reassess at the end of this year. At this time, only a

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<sup>6</sup> IEEE Matrix at 1.

<sup>7</sup> See IEEE Matrix at 1-3.

<sup>8</sup> IEEE Matrix at 1.

<sup>9</sup> Staff’s Workshop Summary of September 28 Meeting at 1 (Oct. 12, 2022).

1 handful of states have incorporated IEEE 1547-2018 standards because of the relatively recent  
2 adoption of the standards and the fact that the associated technology is not readily available.

3 The Commission’s rules will need to make clear when the requirement to comply with  
4 updated IEEE 1547 standards takes effect, but stakeholders may need to craft rule language that  
5 provides flexibility regarding the implementation date to address potential issues with equipment  
6 availability and installation.

7 2. DO 2 - Abnormal operating performance category

8 The Joint Utilities do not object to the selection of DO 2-1, “IEEE 1547-2018 Category III  
9 Ride-Through capabilities must be supported for inverter-based DER. Rotating DER must meet  
10 Category I Ride-Through capabilities, at minimum.”<sup>10</sup> The majority of inverters that are used by  
11 DERs have these capabilities, so this default is not expected to create market issues. The Joint  
12 Utilities agree that this default DO is generally consistent with utility best practices, however this  
13 level of detail should not be placed in rules and is best addressed in utility handbooks and policies.

14 3. DO 3 - Normal operating performance category

15 IREC selected, and the Joint Utilities agree with the requirement that, “Inverter-based DER  
16 shall meet reactive power requirements of 1547-2018 Category B. Rotating DER must meet  
17 Category A and may meet Category B” (DO 3-1).<sup>11</sup> To the Joint Utilities’ knowledge, rotating  
18 machines generally are not capable of meeting Category B, so an allowance for that requirement  
19 is appropriate. The Joint Utilities agree that this default DO is generally consistent with utility  
20 best practices, however this level of detail should not be placed in rules and is best addressed in  
21 utility handbooks and policies.

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<sup>10</sup> IEEE Matrix at 2.

<sup>11</sup> IEEE Matrix at 2.

1           4.       DO 4 - Alternative performance category

2           IREC’s IEEE Matrix notes that if a technology cannot meet the specified Abnormal or  
3 Normal Operating Performance Category, “a defined process may be useful for determining that  
4 the technology can safely interconnect without unduly impacting grid support requirements.”<sup>12</sup>  
5 However, under the alternative performance category, IREC selected the option to leave the  
6 alternative performance process undefined (DO 4-2). The Joint Utilities agree with this option.  
7 Because the number of DERs that would be unable to safely connect under the abnormal/normal  
8 operating performance categories (discussed in DO 2 and DO 3, respectively) will be minimal, the  
9 equipment to which the “alternative performance category” would apply is likely quite limited.

10           5.       DO 5 - Voltage trip settings & ranges

11           IREC selected, and the Joint Utilities agree with, the option to align the voltage trip settings  
12 and ranges with the defaults of IEEE 1547-2018 (DO 5-1). While the Joint Utilities agree that this  
13 default DO is generally consistent with best practices, this level of detail should not be placed in  
14 rules and is best addressed in utility handbooks or policies.

15           6.       DO 6 - Frequency trip settings & ranges

16           IREC selected, and the Joint Utilities agree with, the option to align the frequency trip  
17 settings and ranges with the defaults of IEEE 1547-2018 (DO 6-1). While the Joint Utilities agree  
18 that this default DO is generally consistent with best practices, this level of detail should not be  
19 placed in rules and is best addressed in utility handbooks or policies.

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<sup>12</sup> IEEE Matrix at 2.

1           7.       DO 7 - Frequency droop settings

2           IREC selected, and the Joint Utilities agree with, the option to align the frequency droop  
3 settings with the defaults of IEEE 1547-2018 (DO 7-1). While the Joint Utilities agree that this  
4 default DO is generally consistent with best practices, this level of detail should not be placed in  
5 rules and is best addressed in utility handbooks or policies.

6           8.       DO 8 - Voltage regulation modes by reactive power

7           Within the voltage regulation modes by reactive power DO, IREC recommends DOs 8a-2,  
8 “utilize volt-var without autonomously adjusting Vref” and 8a-3, “utilize volt-var with  
9 autonomously adjusting Vref.” The Joint Utilities agree that requiring that DERs participate in  
10 voltage regulation is a best practice that the Joint Utilities will implement as incorporation of the  
11 IEEE 1547-2018 standards move forward. However, the Joint Utilities wish to reserve the  
12 discretion to select what/how the DER participates in the voltage regulation, rather than to establish  
13 a highly specified, standardized process. Therefore, as discussed at both the September 28 and  
14 October 25 workshops, the Joint Utilities are concerned about the DOs IREC recommends, and  
15 instead strongly support “DO 8c-2: Leave process for selecting settings on site-by-site undefined.”

16           The Joint Utilities are concerned that predetermining this function in rule and standardizing  
17 it across all systems is problematic for two reasons. First, the voltage regulation requirements will  
18 likely differ based on project size, the specific location, the generator type, and other attributes of  
19 the project. Therefore, it is difficult to set size thresholds or other clear criteria in advance. In  
20 many cases, especially for larger projects, the Joint Utilities will need to study the project to  
21 determine the appropriate requirements.

22           Second, the requirements that best protect the system will likely change over time as both  
23 technology and the system changes. Any requirement the Joint Utilities apply would be consistent



1 with the latest version of IEEE 1547, thus generators that meet the IEEE 1547 requirements will  
2 be able to meet the utility's voltage regulation requirements. For example, for smaller projects,  
3 the Joint Utilities can likely include information about system requirements in the Electric Power  
4 Research Institute, Inc. (EPRI) database, or other adopted venue for publishing preferred settings.  
5 Proceeding with DO 8c-2 provides the utility the latitude to determine what is appropriate for the  
6 system; gives the utility more control over the design of the system, which is of particular concern  
7 with legacy systems interacting with new interconnections; and allows the utility the flexibility to  
8 keep the system in a state of readiness.

9 With respect to IREC's election of DO 8a-2, the Joint Utilities agree that the use of voltage  
10 regulation with non-autonomously adjusting voltage reference (DO 8a-2) is appropriate for some  
11 projects, but they do not recommend specifying the use of this specific technology in rules. At  
12 this time, the Joint Utilities are not confident that a concise set of parameters could be established  
13 that would consistently lead to the specified use of non-autonomously adjustment voltage  
14 regulation. The variability in project size, location, and equipment does not lend itself to  
15 specifying, without study, the specific technology for voltage regulation. Simply specifying in  
16 rules that the latest version of IEEE 1547 standards must be met is a sufficient level of detail to  
17 ensure that voltage regulation is implemented.

18 Additionally, the Joint Utilities strongly oppose the selection of DO 8a-3, autonomously  
19 adjusting voltage reference. The Joint Utilities are unaware of any utility implementing  
20 autonomously adjusting voltage reference. The earlier version of IEEE standards did not have the  
21 autonomously adjustable function. Because this is a newly added option, the industry is not seeing  
22 utilities implement this option.

1           9.       DO 9 - Voltage regulation modes by active power

2           IREC selected the option to consider statewide activation of volt-watt function with default  
3 settings from IEEE 1547-2018 (DO 9-1). This default setting is interrelated with DO 8 and will  
4 be required only for Category B systems. While the Joint Utilities can support this approach in  
5 certain circumstances, it is not the preferred method. Therefore, the Joint Utilities request the  
6 flexibility to select which method of regulation to use as determined on a case-by-case review.  
7 Because this selection is interrelated to DO 8, this level of detail should not be placed in rules and  
8 is best addressed in utility handbooks.

9           10.       DO 10 – Interconnection Rule

10          IREC’s IEEE Matrix notes that the interconnection rule should be updated to clarify which  
11 version of the standard applies and when it takes effect, and that “the implementation date is made  
12 clear either within the rule or by Commission order.”<sup>13</sup> The Joint Utilities agree that the rules  
13 should be updated to clarify that the latest IEEE standard applies, in accordance with DO 10a-1  
14 (change 1547 date and title in standards references). See Section II of these comments.  
15 Additionally, the Joint Utilities agree and that specifying a compliance date is appropriate, but  
16 Staff and stakeholders should reassess at the end of the year, in accordance with DO 10b-2 (leave  
17 timeline for adoption open dependent on, e.g., Commission order (in line with DO 1a-3)). See  
18 Section III A.a of these comments.

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<sup>13</sup> IEEE Matrix at 3.

#### IV. MID-TERM ITEMS

1 IREC identifies the mid-term items as “actions that should, for the most part, be taken  
2 before the implementation date.”<sup>14</sup> The Joint Utilities respond to each of the DOs identified by  
3 IREC and to Staff’s requests for additional clarification.

##### 4 A. Reference Point of Applicability (RPA)

5 The updated IEEE 1547-2018 defines the point of interconnection as the RPA, which  
6 establishes “what physical location the requirements of the standard need to be met for testing,  
7 evaluation, and commissioning.”<sup>15</sup> The RPA location can be at the “Point of Common Coupling  
8 (PCC), Point of DER Connection (PoC), a point between PCC and PoC, or there could be multiple  
9 RPAs for different DER units.”<sup>16</sup> There are three points of discussion for the RPA DO: updating  
10 the existing rules to incorporate this new definition; allowing applicants to designate their preferred  
11 RPA; and the process for the utility to review the applicant-designated RPA.

##### 12 1. Incorporation of RPA into Rules

13 The Commission’s current net metering and small generator interconnection rules do not  
14 allow for the applicant to select a point of interconnection from multiple possible locations.  
15 Currently, the small generator interconnection rules refer to the “Point of Interconnection” as the  
16 PCC, as that term is used in IEEE 1547-2003-1.0,<sup>17</sup> and the net metering rules define the

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<sup>14</sup> IEEE Matrix at 1.

<sup>15</sup> BATTRIES, Toolkit and Guidance for the Interconnection of Energy Storage and Solar-Plus-Storage at 119-120 (Mar. 2022).

<sup>16</sup> BATTRIES, Toolkit and Guidance for the Interconnection of Energy Storage and Solar-Plus-Storage at 120 (citing IEEE 1547-2018).

<sup>17</sup> OAR 860-082-0015(26) (“‘Point of interconnection’ means the point where a small generator facility is electrically connected to a public utility’s transmission or distribution system. This term has the same meaning as ‘point of common coupling’ as defined in IEEE 1547, section 3.1.13. This term *does not have the same meaning* as ‘point of common coupling’ as defined in OAR 860-039-0005(3)(p) [net metering rules].”) (emphasis added).

1 interconnection point only as the point of common coupling, which is defined differently than the  
2 definition of “PCC” in the small generator interconnection rules.<sup>18</sup>

3 The Joint Utilities recommend that the existing rules be updated to align with IEEE 1547-  
4 2018. Specifically, the definition of RPA should be added to the small generator interconnection  
5 rules and net metering rules, and the references to the point of interconnection and PCC throughout  
6 the existing rules should be updated to reflect the optionality of connection points available under  
7 the RPA.

8 2. Selection of RPA by Applicant

9 IREC proposes that the utilities adopt a process by which the RPA is noted in the initial  
10 application forms.<sup>19</sup> As proposed by IREC, the application form would request that the applicant  
11 select the proposed RPA from a specified list, which would allow for the discussion of the RPA  
12 during initial review processes and during scoping meetings.<sup>20</sup>

13 The Joint Utilities do not oppose allowing the interconnection applicant to designate the  
14 RPA on the initial application, which will allow the utility to review and approve the proposed  
15 RPA at the same time the utility reviews the application for completeness and compliance with the  
16 applicable rules and requirements. However, the Joint Utilities do not believe it is necessary or  
17 appropriate to incorporate this requirement into rules, as the current application format is not  
18 dictated by rules.

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<sup>18</sup> OAR 860-039-0005(q) (“Point of common coupling’ means the point beyond the customer-generator’s meter where the customer-generator facility connects with the electric distribution system.”).

<sup>19</sup> IEEE Matrix at 4.

<sup>20</sup> Staff’s Presentation for Oct. 25, 2022 Workshop, Slide 18 of 77 (Oct. 21, 2022).

1           3.       Review Process

2           IREC proposes a review process for the applicant-designated RPA that occurs concurrently  
3 (but in parallel to) the review of the remainder of the interconnection application.<sup>21</sup> Under IREC’s  
4 proposal, during the initial 15-day screening of the application, the RPA will be reviewed by the  
5 utility and within “3 days of completeness review”, the utility must notify the customer if it does  
6 not agree with the proposed RPA.<sup>22</sup> After notification, the applicant has three days to resubmit the  
7 corrected RPA, and then the utility has four days to review the revised RPA.<sup>23</sup> If the utility agrees  
8 with the proposed RPA, the notification of this approval tracks along the same timeline with the  
9 concurrent review of the full application.<sup>24</sup>

10           The Joint Utilities oppose IREC’s proposed review process for three reasons. First, the  
11 Joint Utilities do not support adopting a separate process for review of the RPA. This will create  
12 two separate timelines for review, which could cause confusion and be burdensome for the utility.  
13 The RPA is just one aspect of the full review of the application, and thus it is appropriately  
14 considered during the overall application-review process, and not in isolation. Second, the  
15 proposed timeline is expedited in comparison to the timeline for review allowed by rule.<sup>25</sup> The  
16 Joint Utilities are sometimes challenged with meeting timelines as currently written; expediting  
17 review will be burdensome and likely to be problematic as the number of interconnection

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<sup>21</sup> Staff’s Presentation for Oct. 25, 2022 Workshop, Slide 20 of 77.

<sup>22</sup> Staff’s Presentation for Oct. 25, 2022 Workshop, Slide 20 of 77.

<sup>23</sup> Staff’s Presentation for Oct. 25, 2022 Workshop, Slide 20 of 77.

<sup>24</sup> Staff’s Presentation for Oct. 25, 2022 Workshop, Slide 19 of 77.

<sup>25</sup> See e.g., OAR 860-082-0045(3) (“In addition to the timelines and requirements in OAR 860-082-0025, the public utility must provide written notice to the applicant stating whether the small generator facility meets the Tier 1 approval criteria no later than 15 business days from the date a Tier 1 interconnection application is deemed complete.”); OAR 860-039-0030(3) (“Within 10 business days after the public utility notifies a Level 1 applicant that the application is complete, the public utility must notify the applicant that . . .”).

1 customers will likely continue to increase. Last, the RPA will affect only a small subset of projects  
2 (*i.e.*, those with greater distances between the project and utility system).

3         The Joint Utilities agree that the RPA should be reviewed as part of the initial review  
4 process. Under the current review process, the point of interconnection is reviewed as part of the  
5 full initial application—this review would logically include the updated RPA. During the review  
6 process, if the utility determines that there is the need for modification to the interconnection, the  
7 applicant is notified once review is complete—not as a separate notification process from the  
8 remainder of the application, like the IREC-proposed RPA review process. During the response  
9 time, the applicant does not lose queue position while the applicant is notified. The utility’s  
10 timeline for review does not start until the applicant provides the corrected information.<sup>26</sup>

11 **B. Replacement Units**

12         This DO requests the utility to specify what technical requirements must be followed if and  
13 when equipment is replaced because it reached the end of its life or for other reasons. Currently,  
14 under the small generator interconnection rules, the interconnection customer may make a “minor  
15 modification” without submitting a new application to the utility.<sup>27</sup> A “minor modification” is one  
16 that involves changing of equipment and does not compromise safety or affect nameplate capacity  
17 and it not a modification that would have required the application to be reviewed under a different

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<sup>26</sup> See OAR 860-082-0025(7).

<sup>27</sup> OAR 860-082-0025 (“Applications to Interconnect a Small Generator Facility - (1) A person may not interconnect a small generator facility to a public utility’s transmission or distribution system without authorization from the public utility. . . .

(b) A person with an existing interconnected small generator facility who proposes to make any change to the facility, other than a minor equipment modification, must submit an application to the public utility.”).

1 tier, had it been included in the initial application.<sup>28</sup> If an existing interconnection customer makes  
2 any change other than a minor modification without the utility’s written authorization, the utility  
3 may temporarily disconnect the customer.<sup>29</sup>

4 The Joint Utilities believe that the process established by the current rules is sufficient to  
5 address replacement of equipment and to differentiate between instances of minor modifications—  
6 that do not require a new application—and material modifications that do require a new application  
7 and potentially a study by the utility. Under the current rules, like-for-like replacements are  
8 acceptable and the rules do not need modification in this area. For replacements that change the  
9 character of the facility, and thus are not minor modifications, the interconnection customer must  
10 submit a new application.<sup>30</sup> However, the current rules lack language addressing the DERs  
11 replacement of end-of-life equipment (absent the end of and reissuance of an interconnection  
12 agreement). Thus, the Joint Utilities propose additional language that specifies that replacement  
13 of end-of-life equipment must meet the latest version of IEEE 1547 at the time of replacement.  
14 This end-of-life requirement will ensure that moving forward, updated equipment, particularly  
15 inverters, are meeting the updated standards and capable of compatibility with updated technology  
16 over the course of the interconnection agreement or the DER’s life.

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<sup>28</sup> OAR 860-082-0015(20) (“Minor equipment modification’ means a change to a small generator facility or its associated interconnection equipment that:  
(a) Does not affect the application of the approval requirements in Tiers 1, 2, or 3;  
(b) Does not, in the interconnecting public utility’s reasonable opinion, have a material impact on the safety or reliability of the public utility’s transmission or distribution system or an affected system; and  
(c) Does not affect the nameplate capacity of a small generator facility.”).  
<sup>29</sup> OAR 860-082-0075(5).  
<sup>30</sup> OAR 860-082-0025(1)(b) (“This includes changes affecting the nameplate capacity of the existing interconnected small generator facility or the output capacity authorized in the agreement governing the terms of the interconnection.”).

1 **C. Interconnection Agreements**

2 IREC’s IEEE Matrix recommends that interconnection agreements (IAs) should reflect the  
3 “required functional settings and updating settings or equipment over time.”<sup>31</sup> The current IAs  
4 were adopted after the small generator interconnection rulemaking and the subsequent compliance  
5 filings made by the utilities.<sup>32</sup> The Joint Utilities believe adoption of these technical requirements  
6 could be accomplished via the appendix included with the standard IA, at least in the near term.  
7 Furthermore, there will be a need for many changes to the IAs depending on what the final rules  
8 reflect. For instance, if export limited capacity is used, the forms will need to reflect that change.  
9 The current IAs likely need to be modernized as well, given that they have been in effect for more  
10 than 10 years. It would be most logical and time-efficient to update the IAs later in this docket to  
11 modernize them and implement the decisions made in this docket.

12 **D. Enter Service Settings**

13 IREC proposes that non-default Enter Service settings are preferred for voltage and  
14 frequency ranges, delay time, and ramp rate. The Enter Service settings address three subset DOs  
15 – volt-watt curtailment, normal ramp rate, and nameplate ratings.

16 1. Volt-Watt Curtailment Process/Reporting

17 IREC’s IEEE Matrix recommends that because “volt-watt can have impact on the DER  
18 customer’s energy production” and because “[c]urtailment is based on utility voltage that the  
19 customer has no control over” that the utility should “[c]onsider a reporting process to understand

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<sup>31</sup> IEEE Matrix at 5.

<sup>32</sup> See *In re Rulemaking to Adopt Rules Related to Small Generator Interconnection*, Docket AR 521, Order No. 09-350 at 1 (Sept. 8, 2009) (“[T]he Commission also ordered that the subject utilities, Idaho Power Company (Idaho Power), Portland General Electric Company (PGE), and PacifiCorp, dba Pacific Power (Pacific Power), each submit draft small generator interconnection forms and agreements to the Commission Staff by July 15, 2009, with final versions being agreed upon by August 12, 2009.”).



1 if volt-watt curtailment becomes an issue for customers now or in the future.”<sup>33</sup> The Joint Utilities  
2 disagree with this recommendation for reporting for two reasons.

3 First, these events are infrequent and tend to be repeat occurrences with only a few  
4 interconnection customers. Internal processes exist to ensure that curtailment is not widespread  
5 and that issues at DERs with repeat curtailment issues are identified and addressed. While there  
6 is no specific annual reporting to the Commission on power quality issues, the Joint Utilities report  
7 voltage problems to their respective power quality groups, which address the curtailment issue.  
8 For example, at PGE, the current process for addressing curtailment involves the receipt of a  
9 customer complaint; the creation of a work order to establish verification modeling; the installation  
10 of a voltage monitor on the distribution system at the location, which is then left in place for ten  
11 days; the analysis of that data to evaluate the problem; and if voltage problems are present, a new  
12 work order is developed to perform the appropriate corrective action. Based on feedback from  
13 PGE’s power quality group, power quality complaints related to inverter functioning are rare—  
14 perhaps two or three complaints in the past decade. In each case, the monitoring did not identify  
15 voltage issues on the distribution system, the problem was customer-sited inverter related, either a  
16 malfunctioning inverter or incorrect installation.

17 Second, the level of data necessary to report curtailments requires adequate telemetry,  
18 which most interconnection customers currently do not have installed. Thus, this would be a costly  
19 requirement for all parties. The data acquisition and reporting of a minor issue would be  
20 burdensome to incorporate with little benefit. While the Joint Utilities have Advanced Metering  
21 Infrastructure (AMI) meters installed in Oregon, which could allow the utilities to track

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<sup>33</sup> IEEE Matrix at 5.

1 curtailments, the Joint Utilities may not have the bandwidth to retrieve *all* the necessary  
2 information. And while some larger facilities may have sufficient telemetry, the collection and  
3 analysis of this data will provide little benefit to understanding curtailment issues as compared  
4 with reviewing any issues in a more focused fashion when problems are identified. For example,  
5 where the AMI meters are installed, some meters have the ability to monitor voltage. It would be  
6 possible to develop a report to monitor the voltage at interconnections for voltage excursions.  
7 However, it would be a burdensome process to develop the reporting and verify its accuracy.  
8 Furthermore, if the customer is experiencing curtailment, the power quality team would be notified  
9 and a review process would commence to address this issue.

10 2. Normal Ramp Rate

11 Normal Ramp Rate is implemented when transitioning between output levels and is  
12 optional in IEEE 1547-2018. Currently, no Joint Utility specifies ramp rate in its interconnection  
13 documents, as it has been generally shown to not be needed to avoid flicker, and IEEE 1547-2018  
14 does not specify a default setting. Stating in rules that the interconnection applicant must comply  
15 with the latest version of IEEE 1547 is sufficient (should future updates of IEEE 1547 specify a  
16 default setting for normal ramp rate), and the Joint Utilities recommend that the specific selection  
17 of the setting be defined in the utility handbook or policies, if necessary.

18 3. Nameplate Ratings

19 IREC recommends that stakeholders “[c]onsider addressing nameplate ratings issues  
20 related to” volt-watt, the limit maximum active power function, and frequency droop  
21 implementation.<sup>34</sup> The Joint Utilities recommend that the workgroup not provide guidance on

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<sup>34</sup> Staff’s Presentation for Oct. 25, 2022 Workshop, Slide 42 of 77.

1 these issues nor adopt them in rules at this time. To the extent these issues are addressed, the  
2 workgroup should affirm that the utilities will have discretion to determine these issues on a case-  
3 by-case basis going forward. If in the future, when the Joint Utilities have more experience  
4 implementing these standards, disagreements consistently develop surrounding these issues, then  
5 it would appropriate to evaluate the need for the Commission to regulate these aspects of the  
6 standards in more detail.

7 **E. Utility Required Profile (URP)**

8 IREC proposes that the Joint Utilities finalize their URP with all default settings and  
9 consider posting that in the EPRI URP database.<sup>35</sup> The Joint Utilities are in general agreement  
10 with the idea of making their default settings available to potential applicants, either in a third-  
11 party database or on the utilities’ websites. However, it is presently unclear whether EPRI will be  
12 the industry standard location for the placement of this information. Currently, Idaho Power  
13 Company is the only utility that has uploaded its default settings to the EPRI database.

**V. CONCLUSION**

14 The Joint Utilities look forward to continuing to work with Staff and stakeholders to refine  
15 the selection and adoption of IEEE standards and answer any remaining questions. The Joint  
16 Utilities request that Staff or the Commission clarify whether, when, and how the proposed  
17 documents will be incorporated into the Commission’s existing rules.

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<sup>35</sup> IEEE Matrix at 4.

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