UM 2111

Incorporating updated standards: IEEE 1547-2018

11-17-2022

Oregon Public Utility Commission

Agenda

Item	Schedule	Time
Welcome		
Process Update	9:00	30 min
Joint Utilities discussion on issues in Decision Adoption Matrix	9:30	30 min
IREC Presentation: Mid- and Long-Term issues	10:00	90 min
Next Steps	11:30	30 min
Adjourn	12:00	

Oregon Public Utility Commission

Process Update

- Staff planning on opening a rule-making first-second quarter of 2023.
- Memo to open rulemaking(s) will address areas of
  - Consensus items
  - Competing proposals
- Question: Separate Rulemakings to address workstreams?
  - Incorporating updated standards: IEEE 1547-2018
  - Screens, Study Methods, and Modern Configurations
- Rulemaking to look at both SGIP and NEM rules
  - Oregon SGIP OAR 860-082
  - Oregon NEM OAR 860-039
- Rulemaking will be used to determine appropriate place for issue elements (i.e. Decision Matrix items)
  - Rules
  - Commission Order (Guidelines)
  - Utility Interconnection handbooks
- Currently scheduled workshops to be used for Rulemaking

Oregon Public Utility Commission

Joint Utilities

- Jordan Schoonover
  - Discussion of comments dated November 11

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Presentation

- IREC – Midhat Mafazy and Brian Lydic
  - Decision Adoption Matrix – Mid- and Long-Term issues

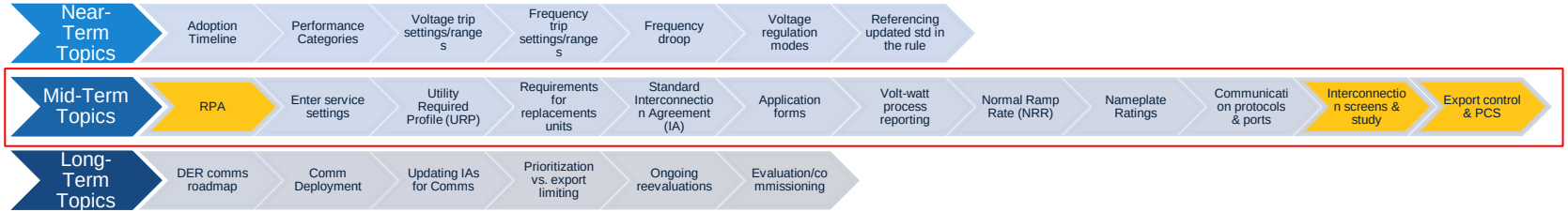
Oregon Public Utility Commission

UM 2111: Incorporating updated standards, IEEE 1547

Background/supporting slides for the Mid-Term Topics (9/28/22 – 10/25/22 – 11/17/22)

IREC

Agenda



Focus of today is on Mid-Term Topics.
Feel free to use the Matrix to follow along.
This slide deck is designed to complement the Matrix by providing background/visuals as needed.

Highlighted are items that can overlap with the other working group (process and screens)

IREC

Reference Point of Applicability (RPA)

Why RPA matters

- IEEE 1547-2018 defines RPA so that it is clear at what physical location the requirement of the std needs to be met for testing, evaluation, and commissioning

What are the possible RPA locations

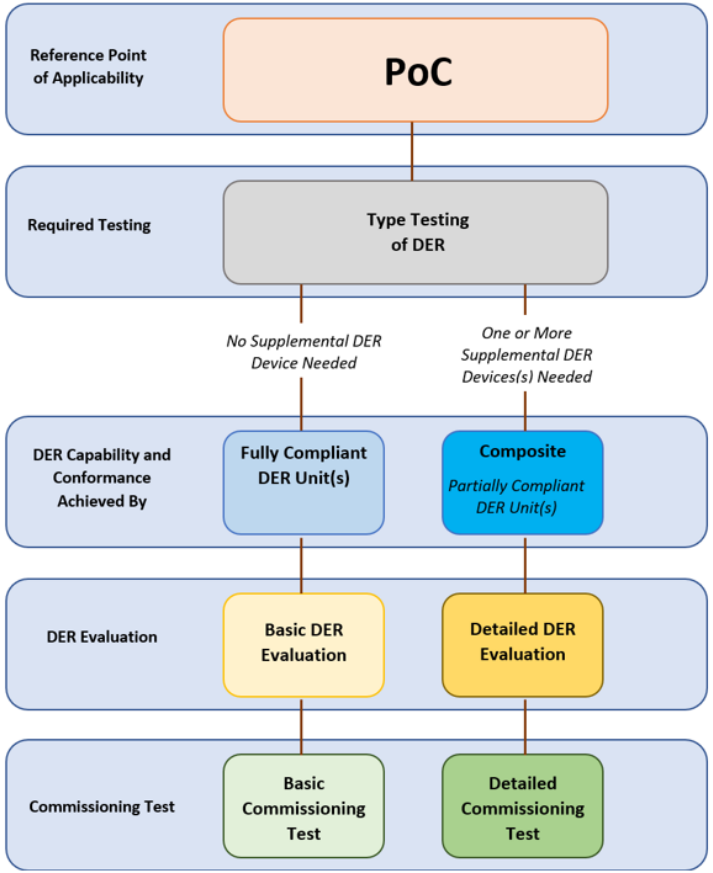
- PCC, PoC, A point between PCC and PoC, or Multiple RPAs for different DER units

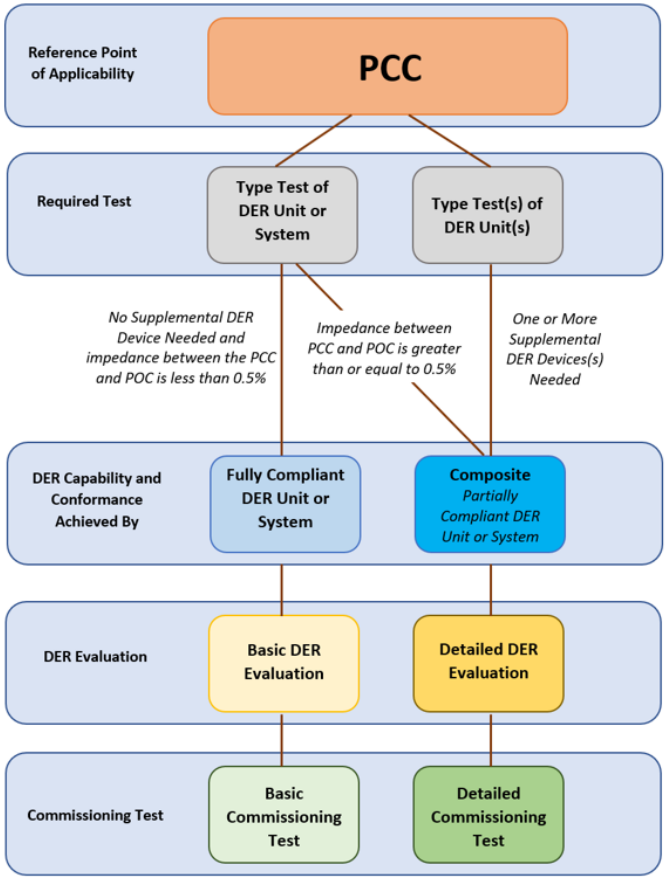
More on why this matters, some examples

- Where the PoC is designated at the RPA location–utility can rely on equipment certification
- Where the PCC is the RPA–a more detailed system assessment may be needed for commissioning

This designation is likely to affect DER units under 500kVA (or those with export controls limiting export to 500kVA). It is important for utility and applicant to agree on RPA location upfront

RPA – Evaluation and Commissioning





Figures 3 and 4 of MN TIIR (Test and Verification Required Steps)

RPA – Evaluation and Commissioning

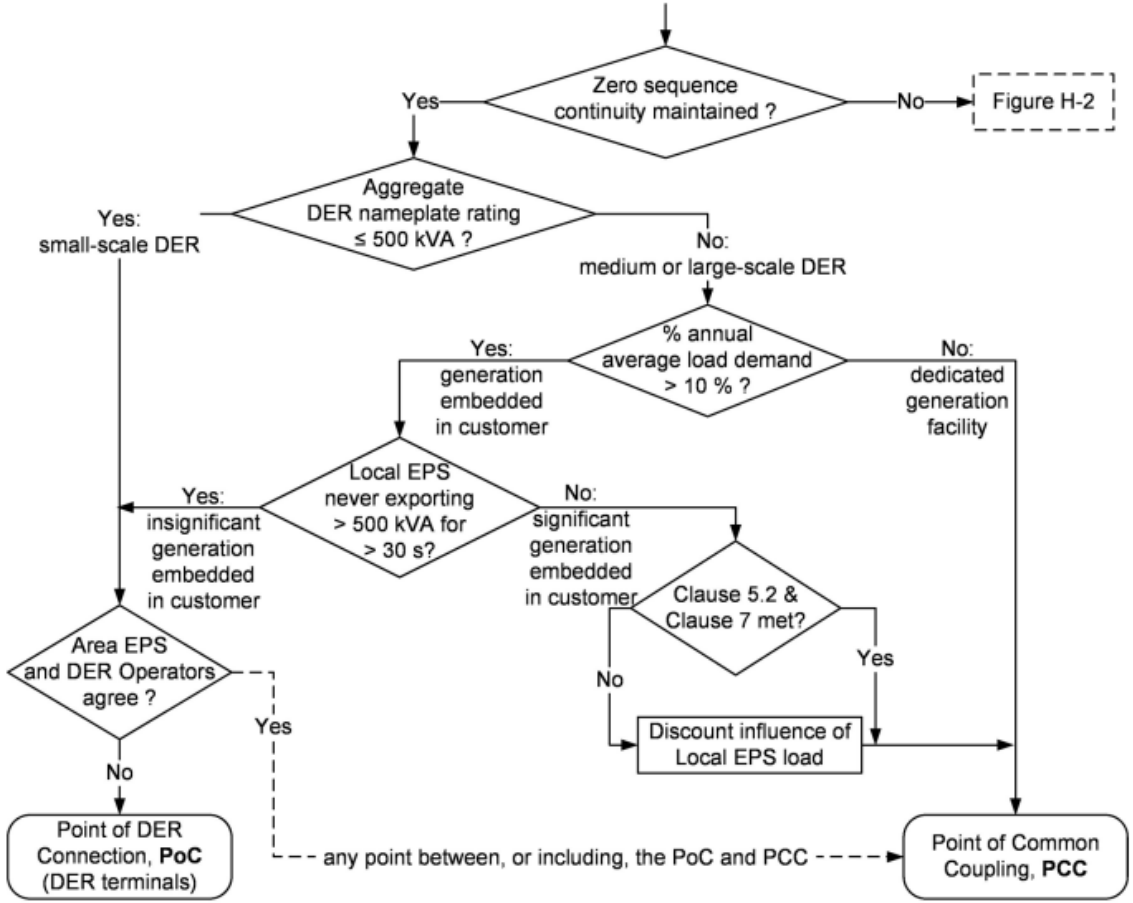


Figure H.1 of IEEE 1547-2018 (Decision tree for local EPS where zero sequence continuity maintained)

RPA – Evaluation and Commissioning

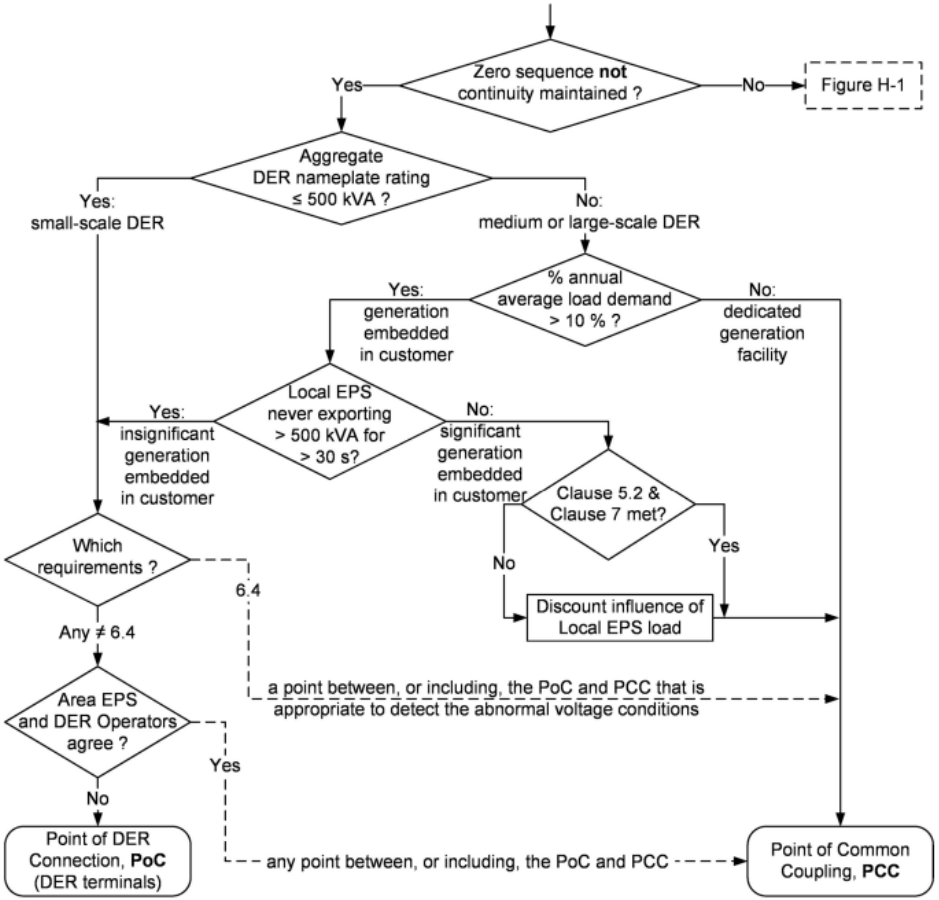


Figure H.1 of IEEE 1547-2018 (Decision tree for local EPS where zero sequence continuity is not maintained)

RPA Process – What Should Be Considered?

Process related improvements that allows for RPA designation by applicant

- RPA designation in Application Forms

Process related improvement that allows for RPA review/verification by utility

- Fast Track (initial reviews) – Intended to coincide with review timelines
- Impact Study (scoping meeting) – Involves discussion between parties

RPA Process – Application Form

RPA designation in Application forms by Applicant

Where is the desired RPA location? [Check one]

- ☐ *PoC*
- ☐ *PCC*
- ☐ *Another point between PoC and PCC (must be denoted in the one-line diagram)*
- ☐ *Different RPAs for different DER units (must be denoted in the one-line diagram)*

Is the RPA location the same as above for detection of abnormal voltage, faults and open-phase conditions?

- ☐ *Yes*
- ☐ *No (detection location must be denoted in the one-line diagram)*

Why does this DER fit the chosen RPA? [Check all that apply]

- ☐ *Zero-sequence continuity between PCC and PoC is maintained*
- ☐ *The DER aggregate Nameplate Rating is less than 500 kVA*
- ☐ *Annual average load demand is greater than 10% of the aggregate DER Nameplate Rating, and it is not capable of, or is prevented from, exporting more than 500 kVA for longer than 30 seconds.*

RPA process – What should be considered?

RPA review/verification by utility

2.2 Reference Point of Applicability Review

The following process will occur concurrently with the Initial Review process in section 2.3. Within five Business Days after the Distribution Provider[91] notifies the Interconnection Customer that the Interconnection Request is complete, the Distribution Provider shall review the Reference Point of Applicability denoted by the Interconnection Customer and determine if it is appropriate.

2.2.1 If it is determined that the Reference Point of Applicability is appropriate the Distribution Provider will notify the Interconnection Customer when it provides Initial Review results and proceed according to sections 2.3.2 to 2.3.4 below.

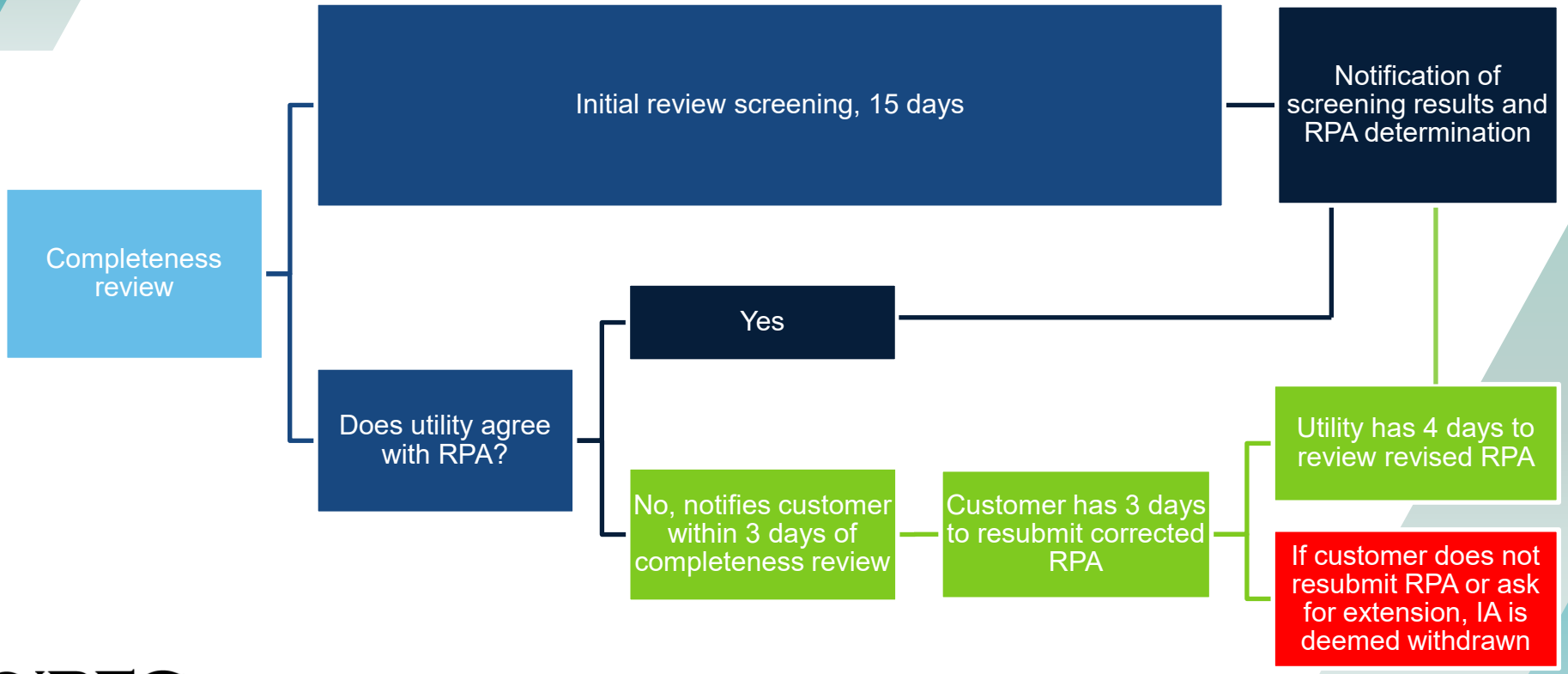
2.2.2 If the Distribution Provider determines the Reference Point of Applicability is inappropriate, the Distribution Provider will notify the Interconnection Customer in writing, including an explanation as to why it requires correction. The Interconnection Customer shall resubmit the Interconnection Request with the corrected Reference Point of Applicability within five Business Days. During this time the Distribution Provider will proceed with Initial Review in 2.3. The Distribution Provider shall review the revised Interconnection Request within five Business Days to determine if the revised Reference Point of Applicability has been appropriately denoted. If correct, the Distribution Provider will proceed according to sections 2.3.2 to 2.3.4. If the Interconnection Customer does not provide the appropriate Reference Point of Applicability or a request for an extension of time within the deadline, the Interconnection Request will be deemed withdrawn.

[Note: Initial Review is renumbered to 2.3]

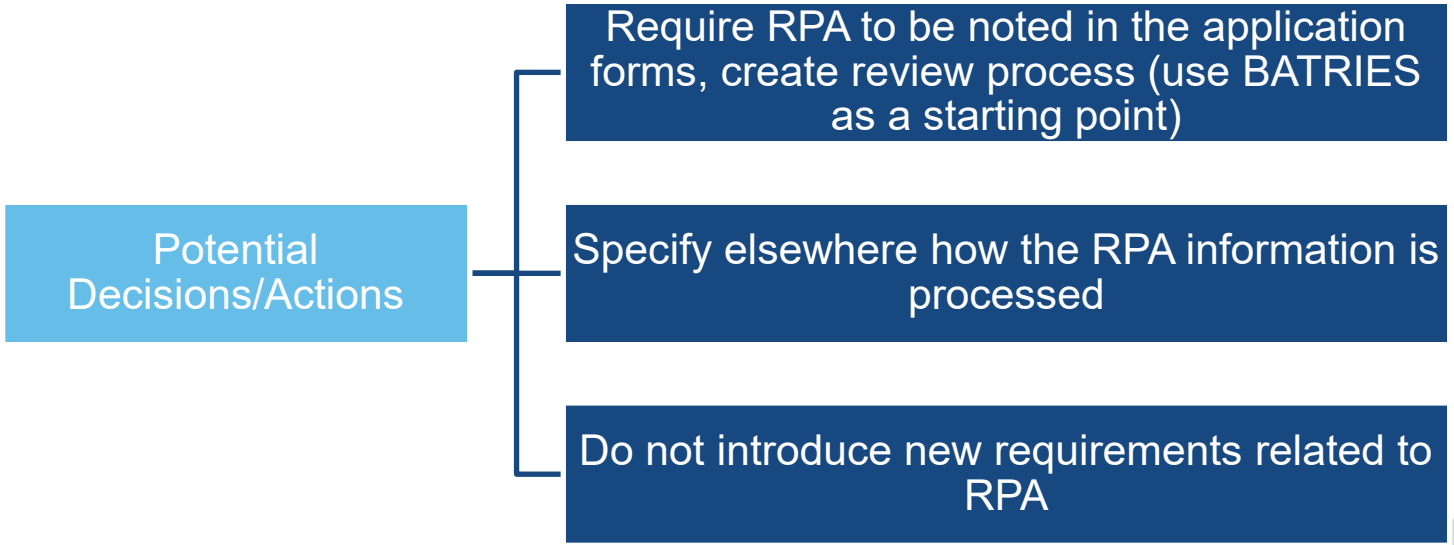
The purpose of the scoping meeting is to discuss the Interconnection Request, the Reference Point of Applicability, and review existing studies relevant to the Interconnection Request.

IREC

RPA Process – Proposed Utility Review in OR



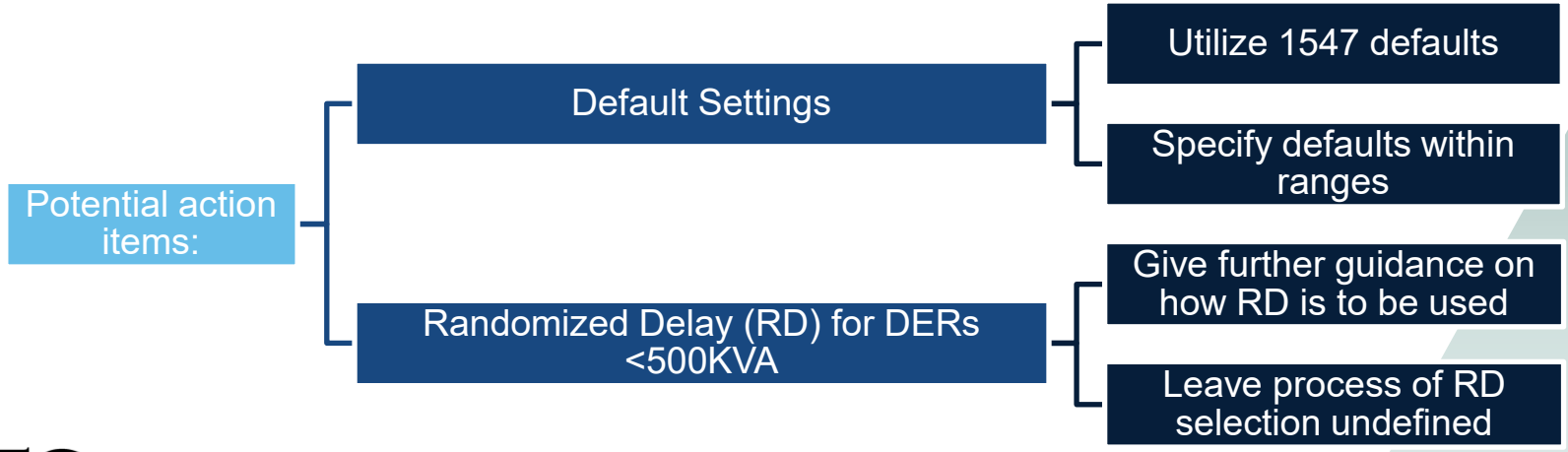
RPA Process – What Should Be Considered?



Enter Service Settings

What is allowed in the standard

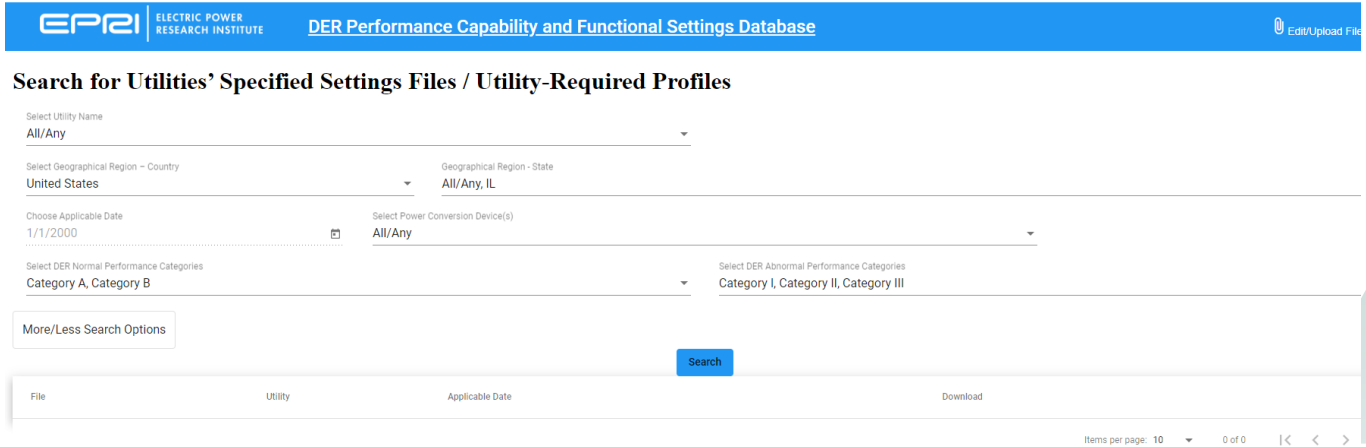
- Ramp rate can be adjusted over 1-1000 sec with default at 300 sec
- However, DERs <500kVA, individual DER units may use randomized time delay as an alternative to ramping



Utility Required Profile (URP)

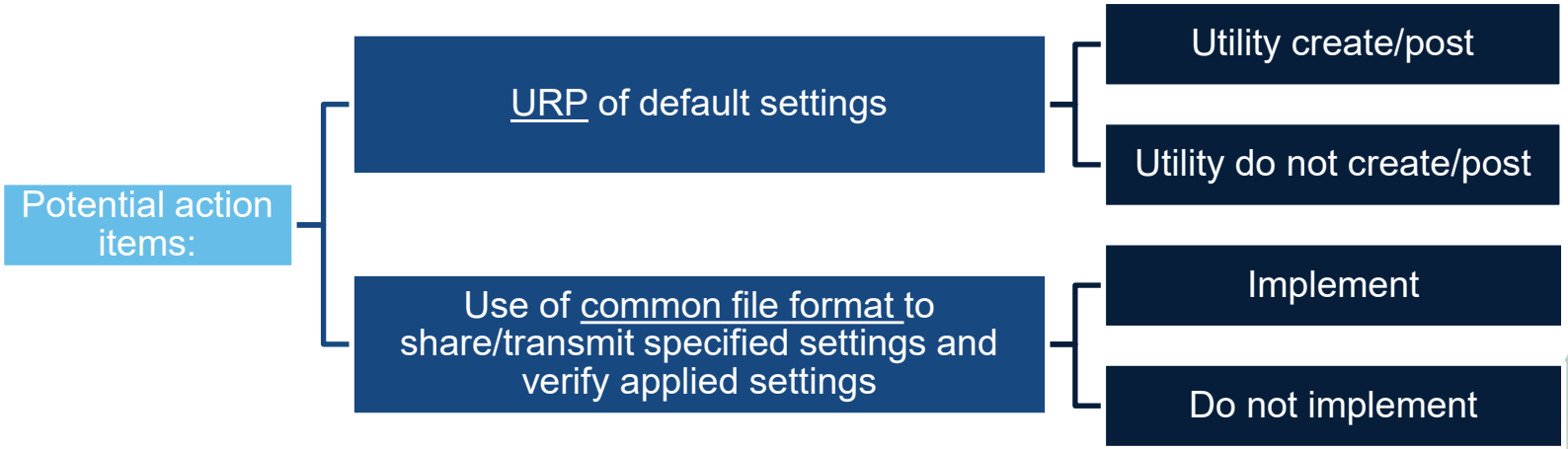
Communicating DER default settings:

- Finalize URP with all default settings and consider making that publicly available (post in the EPRI URP database)
- Implement the use of EPRI's Common File Format for DER settings Exchange and Storage



https://dersettings.epri.com/search

Utility Required Profile (URP)

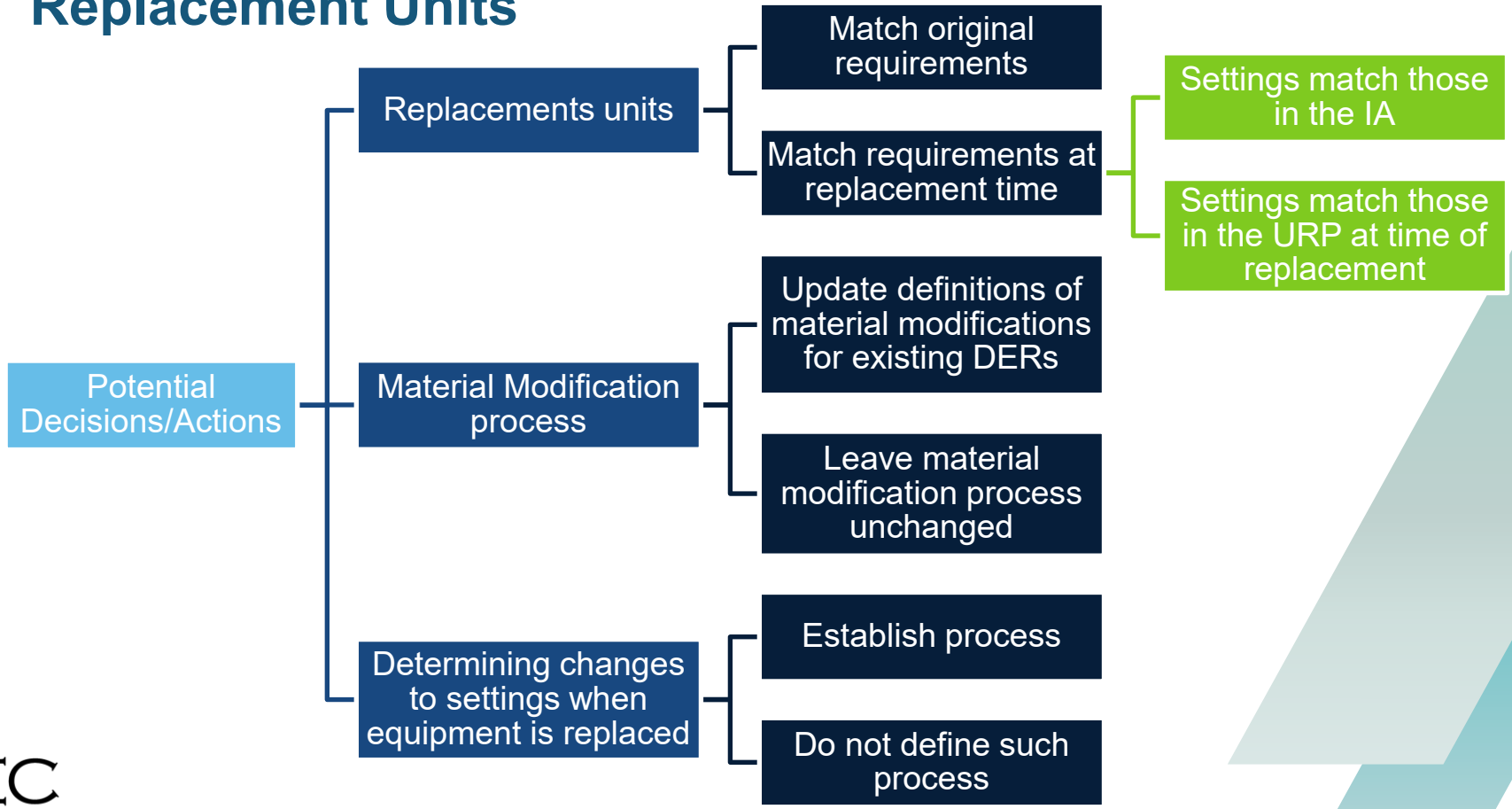


Replacement Units

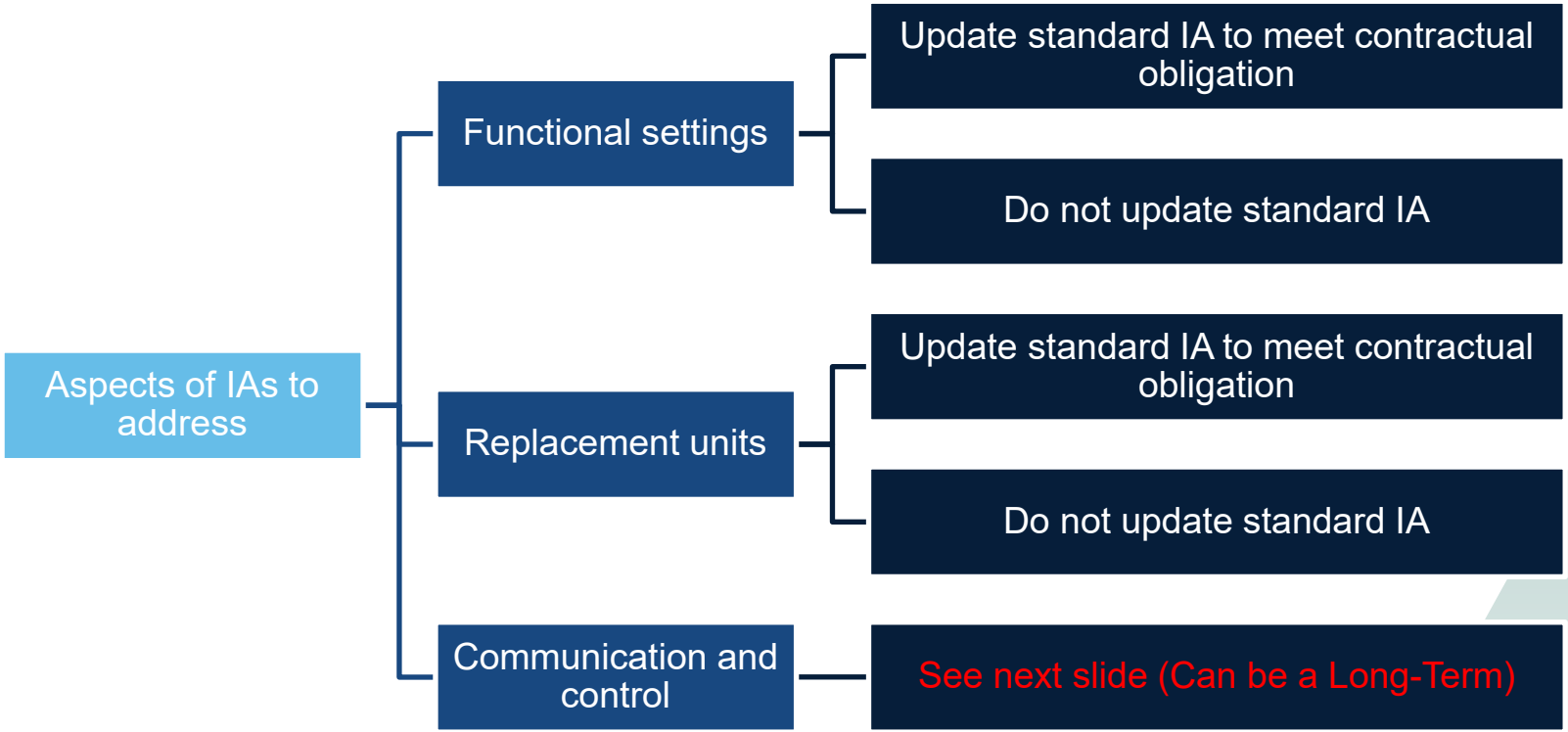
For end-of-life, define whether the most recent technical requirements, certifications and settings must be followed. However, make exceptions on like-for-like:

- If through warranty replacement, or
- If customer has spare parts on hand for future use

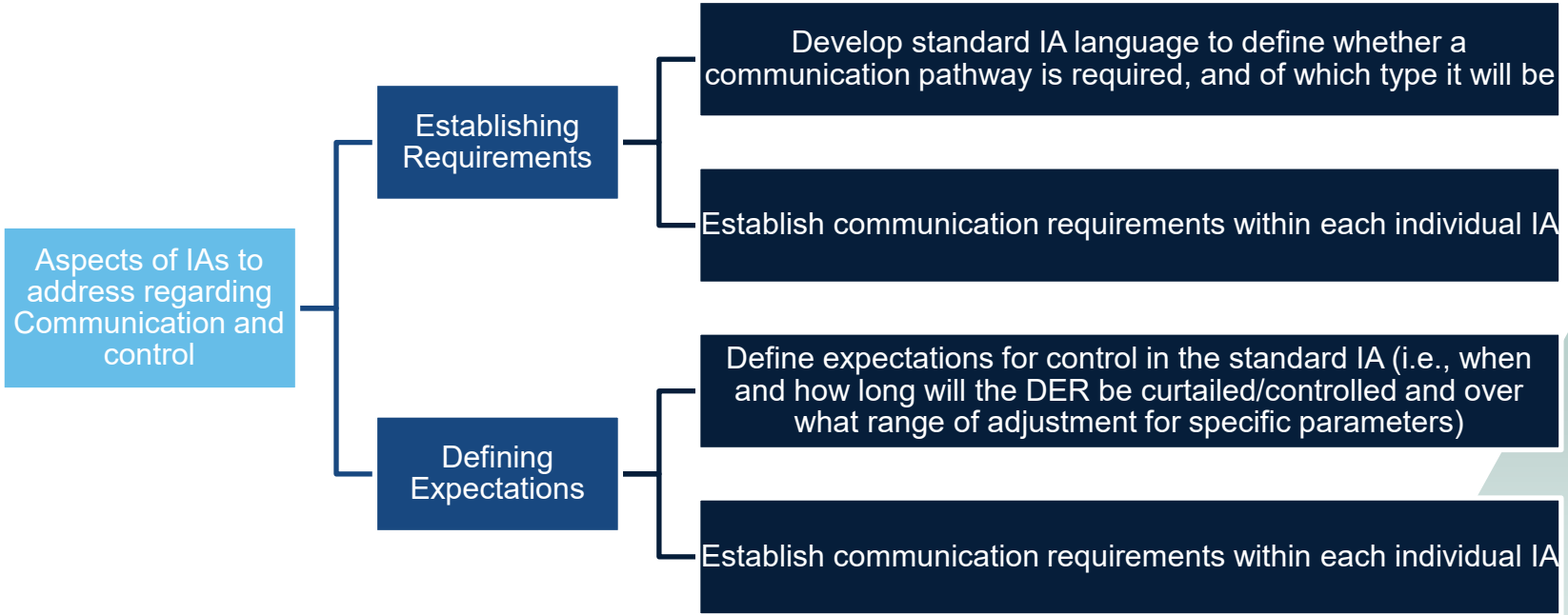
Replacement Units



Interconnection Agreements (IA)



Interconnection Agreements (IA) – Can be Long-Term



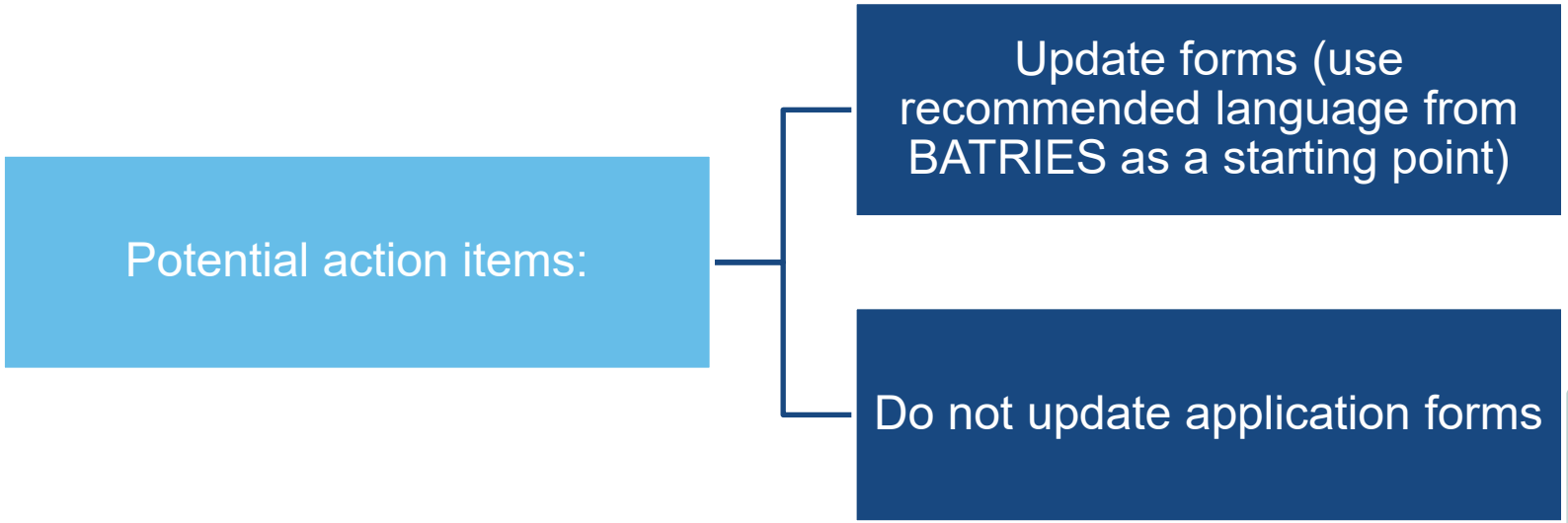
Application Forms

Forms (online portals) offer means to streamline applicant designation and utility review of information. The following items need updating:

- RPA selection
- Enter service randomized delay
- Volt-watt implementation
- Limit active maximum power function implementation
- Frequency droop implementation
- Intentional islanding
- Emergency backup systems
- DER communication capabilities
- Export/import limiting
- Power Control Systems (PCS)
- Inverter fault current

BATRIES addressed some of these, and provides recommended language

Application Forms



See sample recommended language from BATRIES in next slides

Application Forms

VIII. UL 1741 and PCS related: The project team recommends the application forms ask whether or not a PCS is included in the DER system design. Note the blank ___ section is a fill in response from the applicant.

Does the DER include a Power Control System? [yes / no]
(If yes, indicate the Power Control System equipment and connections on the one-line diagram)

What is the PCS maximum open loop response time? _____
What is the PCS average open loop response time? _____

When grid-connected, will the PCS employ any of the following? [Select all that apply]

- ☐ *Unrestricted mode*
- ☐ *Export only mode*
- ☐ *Import only mode*
- ☐ *No exchange mode*
- ☐ *Export limiting from all sources*
- ☐ *Export limiting from ESS*
- ☐ *Import limiting to ESS*

Application Forms

IX. IEEE 1547-2018 related: The project team recommends application forms use the language below to streamline the review of IEEE 1547-2018 capabilities (such as RPA designation, execution of mode of parameter changes, prioritization of DER response).

Where is the desired RPA location? [Check one]

- ☐ *PoC*
- ☐ *PCC*
- ☐ *Another point between PoC and PCC (must be denoted in the one-line diagram)*
- ☐ *Different RPAs for different DER units (must be denoted in the one-line diagram)*

Is the RPA location the same as above for detection of abnormal voltage, faults and open-phase conditions?

- ☐ *Yes*
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Why does this DER fit the chosen RPA? [Check all that apply]

- ☐ *Zero-sequence continuity between PCC and PoC is maintained*
- ☐ *The DER aggregate Nameplate Rating is less than 500 kVA*
- ☐ *Annual average load demand is greater than 10% of the aggregate DER Nameplate Rating, and it is not capable of, or is prevented from, exporting more than 500 kVA for longer than 30 seconds.*

Application Forms

Does the DER utilize export limiting for the Limit Maximum Active Power function (Yes/No)
Which equipment(s) achieves this functionality?
Is the equipment certified for export limiting (PCS, or "plant controller" via 1547.1 test 5.13)?

In addition to grid-connected mode, will the DER operate as an intentional local EPS island (also known as "microgrid" or "standby mode")?

When grid-connected, does the DER employ any of the following? [Select all that apply]

- ☐ *Scheduled Operation*
- ☐ *Export limiting or control*
  - ☐ *Does the export limiting method limit on the basis of kVA or kW?*
- ☐ *Import limiting or control*
  - ☐ *Does the import limiting method limit on the basis of kVA or kW?*
- ☐ *Active or reactive power functions not specified in IEEE 1547 (such as the Set Active Power function)*

IREC

Application Forms

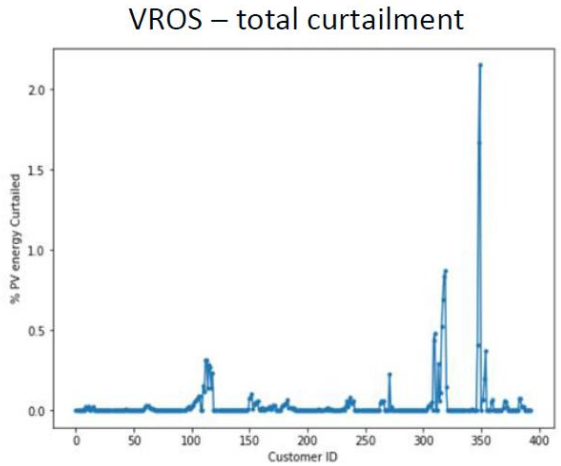
Is the DER, or part of the DER, designated as emergency, legally required, or critical facility backup power? [yes / no]
(If yes, denote the emergency generators and applicable portions of the DER in the submitted one-line diagram)

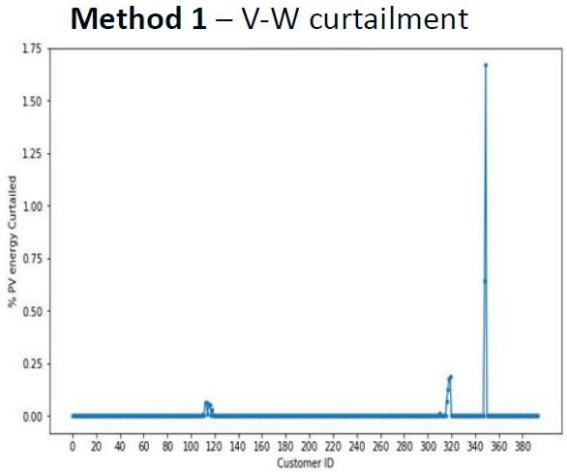
How is the voltage-active power function implemented? [Check one]

- ☐ *All DER units follow the same functional settings (same per-unit curve regardless of individual unit Nameplate Rating)*
- ☐ *Different DER units follow different functional settings (different per-unit curves for individual unit Nameplate Ratings)*
  - ☐ *Denote in one-line diagram the voltage-active power settings of each DER unit*
- ☐ *A plant controller or other supplemental DER device manages output of the entire system (one per-unit curve based on total system Nameplate Rating)*
  - ☐ *If selected, is the managing device certified for the voltage-active power function? [yes / no]*
- ☐ *Export limit is utilized (power control system manages export based on total system Nameplate Rating)*
  - ☐ *If selected, is the managing device certified for the voltage-active power function? [yes / no]*

Volt-Watt Curtailment

- Ensure complaint process handles DER complaints appropriately
- Consider reporting on how many voltage-based curtailment issues arise
- Consider metric based on voltage data to determine potential for curtailment





Credit: NREL

Volt-Watt Curtailment Reports

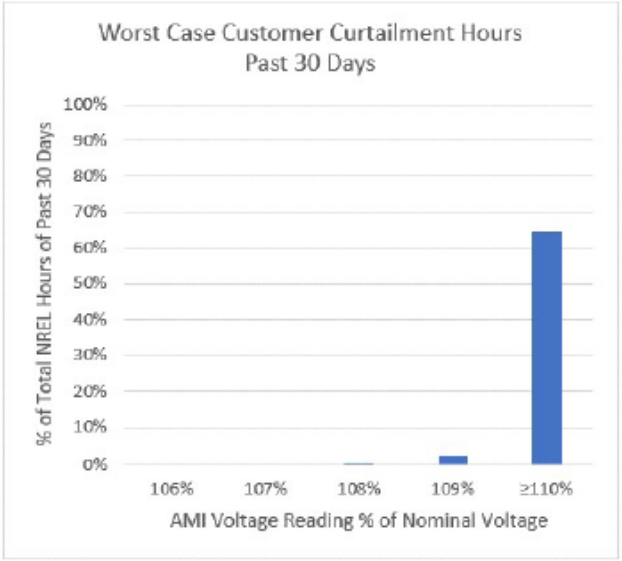
California Experience

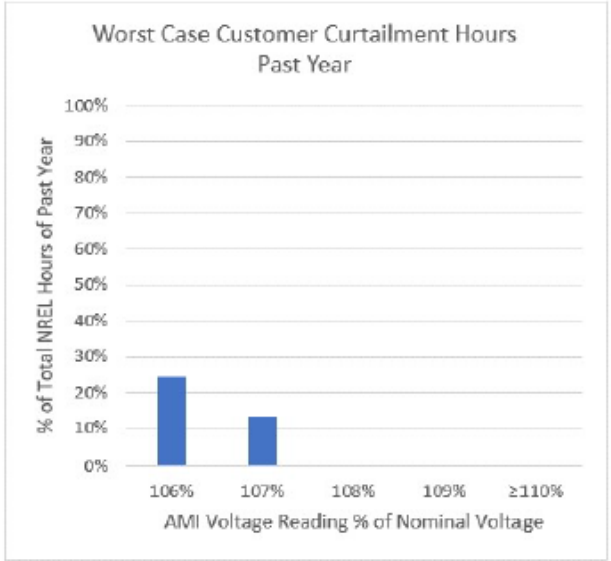
- California IOUs have been reporting on the power quality complaint process since February 2021
- For PV customers with volt-watt curtailment complaints, AMI data is used to note volt-watt triggering events
- Output potential is assumed to be 100% between 9am - 3pm
- Overview as well as amounts/corrective action categories per issue are included; worst-case customer voltages

Summary Results for Utility (or Pending) Mitigations		
NREL Method 1 Estimation of Curtailment %	# of Customers with 1 year Curtailment %	# of Customers with 1 month Curtailment %
≤ 2%	15	10
> 2% ≤ 4%	0	1
>4%	4	8
Total	19	19

Summary Results for Customer Issues		
NREL Method 1 Estimation of Curtailment %	# of Customers with 1 year Curtailment %	# of Customers with 1 month Curtailment %
≤ 2%	16	15
> 2% ≤ 4%	2	0
>4%	0	3
Total	18	18

Worst Case Customer (>5% Curtailment) Voltage Histograms





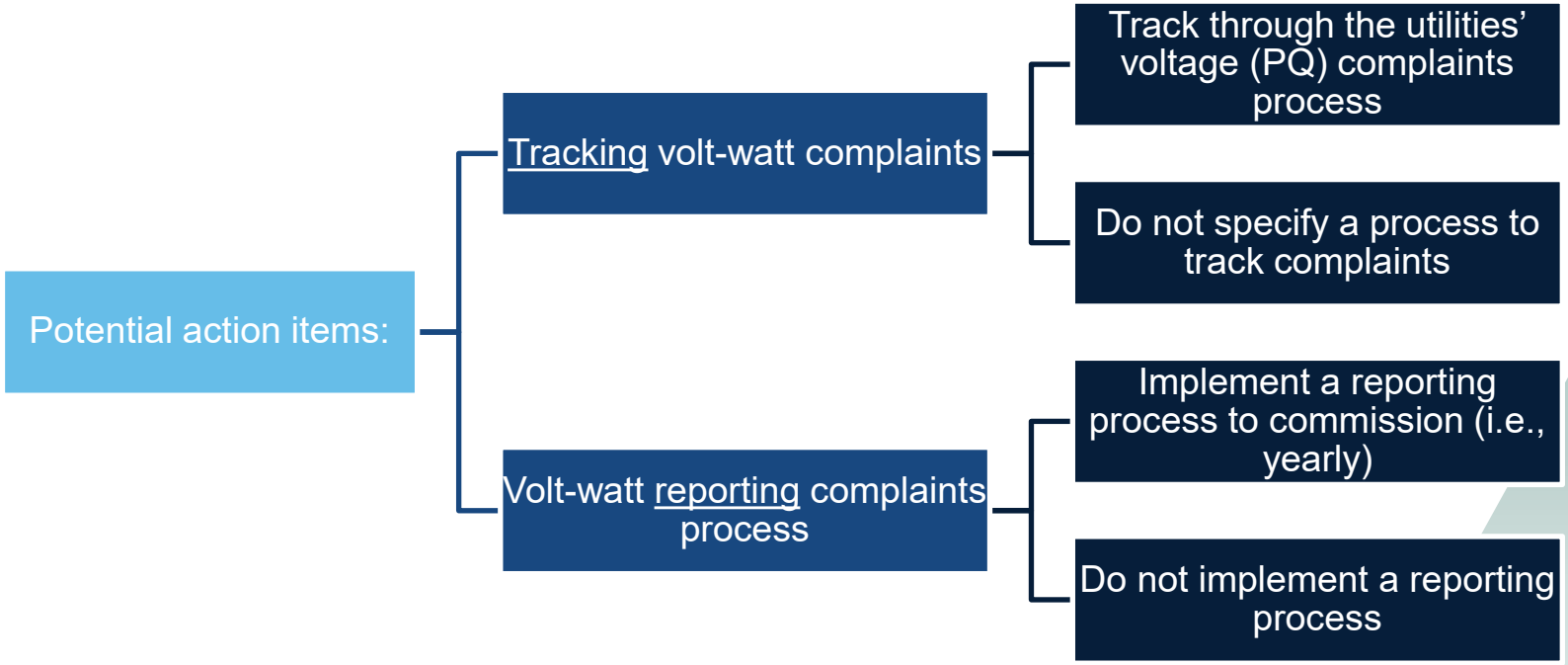
Per Customer Curtailment Calculations and Mitigations			
Customer ID	1 Year Curtailment %	1 Month Curtailment %	Mitigation
1	0.2%	0.0%	CUSTOMER ISSUE
2	3.8%	0.0%	CUSTOMER ISSUE
3	1.2%	7.4%	CUSTOMER ISSUE
4	0.0%	0.3%	CUSTOMER ISSUE
5	0.1%	0.1%	CUSTOMER ISSUE
6	0.8%	5.2%	CUSTOMER ISSUE
7	0.0%	0.1%	CUSTOMER ISSUE
8	0.8%	0.0%	CUSTOMER ISSUE
9	0.0%	0.1%	CUSTOMER ISSUE
10	0.0%	0.3%	CUSTOMER ISSUE
11	0.2%	0.0%	CUSTOMER ISSUE
12	0.4%	0.1%	CUSTOMER ISSUE
13	0.2%	0.0%	CUSTOMER ISSUE
14	0.1%	0.2%	CUSTOMER ISSUE
15	0.2%	0.4%	CUSTOMER ISSUE
16	2.1%	11.6%	CUSTOMER ISSUE
17	0.1%	0.0%	CUSTOMER ISSUE
18	0.0%	0.1%	CUSTOMER ISSUE
19	0.3%	1.0%	DIST - CHANGE SETTINGS
20	0.1%	0.0%	DIST - REPAIR EQUIPMENT
21	1.4%	8.6%	DIST - REPAIR EQUIPMENT
22	0.1%	1.4%	DIST - REPAIR EQUIPMENT
23	0.3%	0.0%	DIST - REPAIR EQUIPMENT
24	0.2%	0.0%	DIST - TREE TRIMMING
25	1.8%	2.2%	PENDING
26	0.1%	1.1%	PENDING
27	7.3%	21.3%	PENDING
28	0.4%	4.3%	SEC/SVC - REPAIR
29	1.6%	8.4%	SEC/SVC - REPAIR
30	0.1%	0.2%	SEC/SVC - REPAIR
31	0.2%	0.0%	SEC/SVC - REPAIR
32	5.8%	16.2%	SEC/SVC - REPLACE
33	0.1%	0.0%	SEC/SVC - REPLACE
34	0.4%	0.0%	SEC/SVC - REPLACE
35	0.4%	4.6%	SUB/TRANS - CHANGE SETTINGS
36	4.5%	22.1%	TX - REPLACE
37	5.8%	67.2%	TX - REPLACE

Volt-Watt Curtailment Reports

California Experience

- PG&E (largest IOU) reported only 9 customers with potential yearly curtailment >4%
- Worst yearly potential loss reported was 38.7% (failing distribution transformer)
- Next highest was 7.3%
- It appears true that volt-watt is unlikely to cause widespread curtailment, but individual customers can be highly impacted

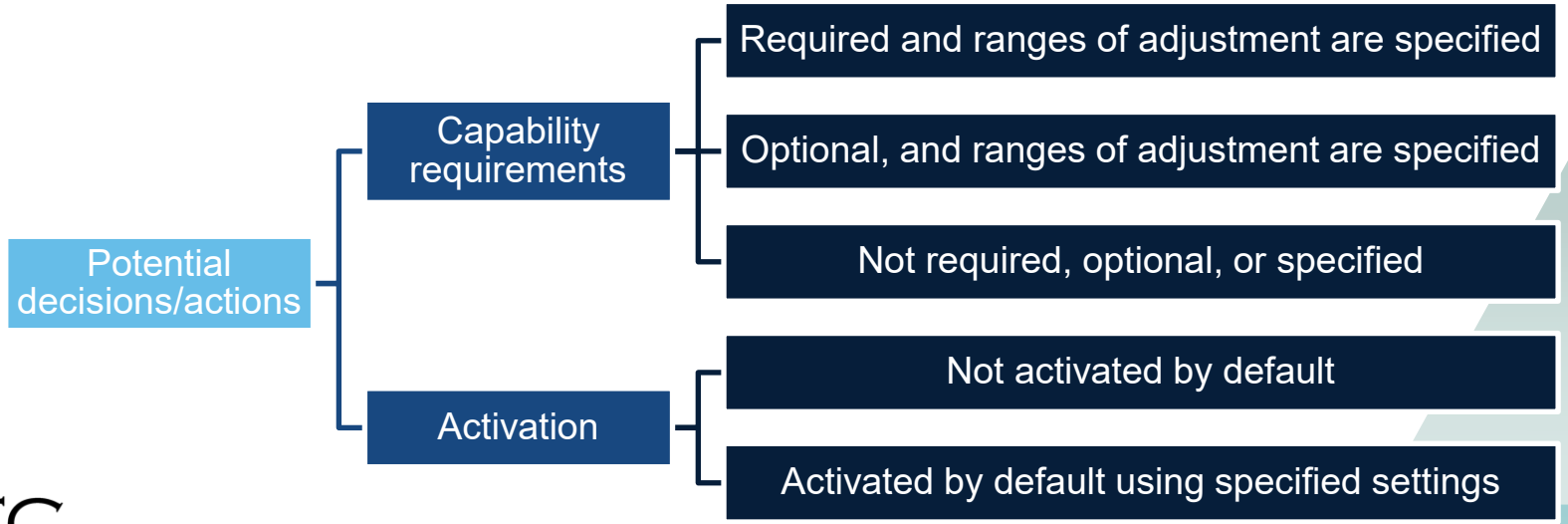
Volt-Watt Curtailment



Normal Ramp Rate (NRR)

NRR is used when transitioning between output levels:

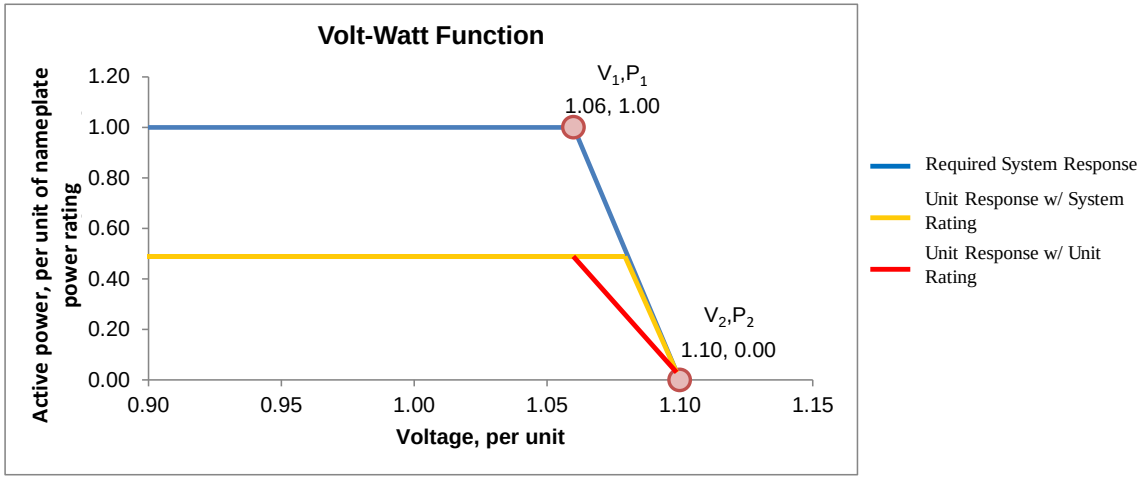
- Based on UL 1741 SA certification. Presently, testing only supports verification of ramp up (not ramp down)



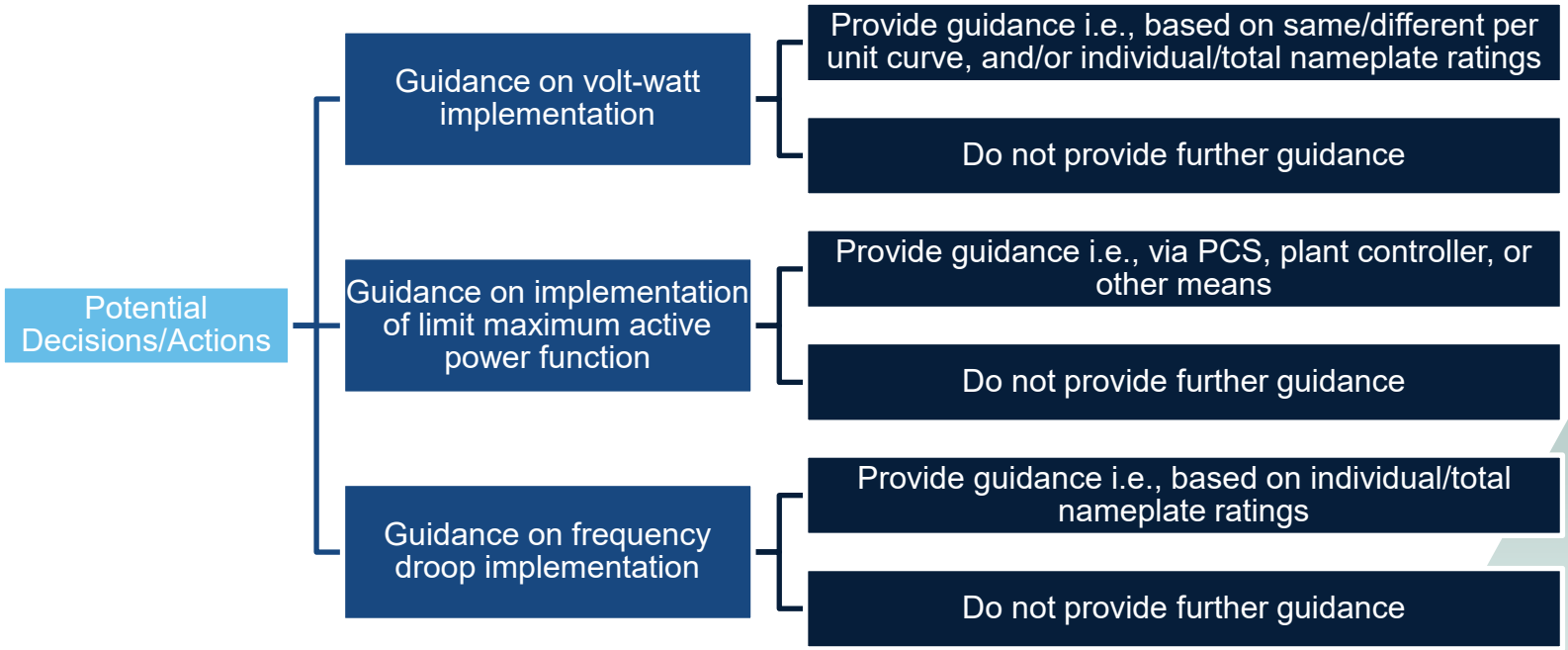
Nameplate Ratings

What to consider

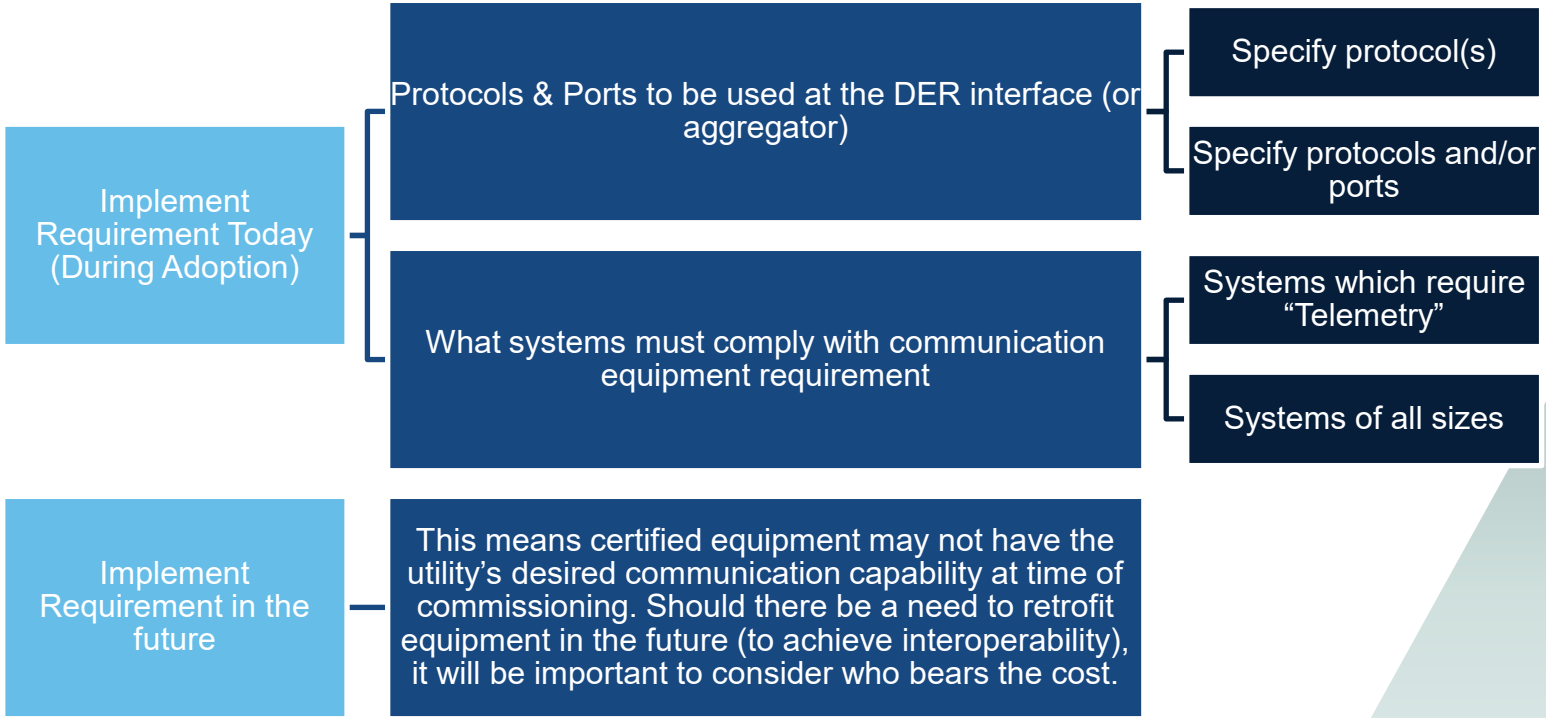
- Consider addressing nameplate ratings issues related to volt-watt, limit maximum active power, and frequency droop
- Interconnection application forms may need to allow applicants to describe how the functions are achieved



Nameplate Ratings



Communications – Protocols, Ports & Telemetry



Interconnection Screens/Study + Export Controls:

These are topics for the other WG but influenced by standard adoption. (Discuss as needed).

IREC

Secondary Transformer Screen

The existing Shared secondary Tx Screen says

"If the proposed DER is to be interconnected on a single-phase shared secondary, the aggregate Export Capacity on the shared secondary, including the proposed DER, shall not exceed"

- *Some states use "20 kW"*
- *Some states use "65 % of the transformer nameplate power rating"*

The existing screen may not reflect voltage regulation (i.e., volt-var settings) activated by the DER. Assuming voltage regulation settings is activated by default settings:

- What is the likelihood of overvoltage occurring?
- Should the screen stay conservative as is?
- Should there be alternate methods for screening with voltage regulation?

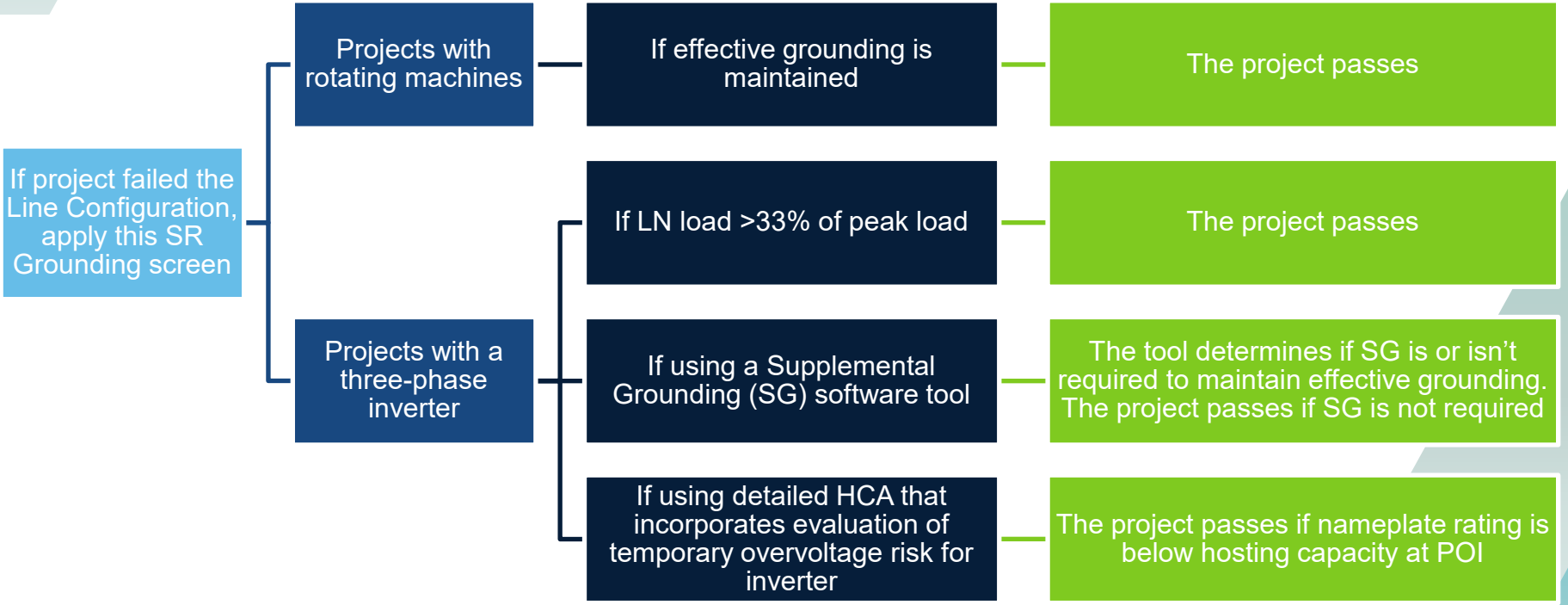
Line Configuration Screen (LCS)

- The existing LCS may not recognize the difference between inverters vs. rotating machines.
- Follow IEEE C62.92.6 guidelines and screen inverters and rotating machines distinctly.
- Consider using the revised table from BATRIES (next slide)

Line Configuration Screen (LCS)

Primary Distribution Line Type	Type of Interconnection to Primary Distribution Line	Result/Criteria
Three-phase, three-wire	*~~3 phase or single phase, phase-to-phase~~ If ungrounded on primary or any type on secondary*	*Pass screen*
Three-phase, four-wire	*~~Effectively grounded 3 phase or Single-phase, line-to-neutral~~ Single-phase line-to-neutral*	*Pass screen*
Three-phase, four-wire (for any line that has sections or mixed three-wire and four-wire)	*All others*	*Pass screen for inverter-based generation if aggregate generation rating is ≤ 100% feeder* minimum load, or ≤ 30% feeder* peak load (if minimum load data isn't available)* *Pass screen for rotating generation if aggregate generation rating ≤ 33% of feeder* minimum load, or ≤ 10% of feeder* peak load (if minimum load data isn't available)* *(*or line section)*

Grounding Review Within Supplemental Review (SR)



Export Control & PCS - Certification for export controls in IX process

- Export controls and PCS may be used for Some aspects of IEEE 1547 implementation: (RPA selection, volt-watt etc.), and may also be used for Tariff compliance
- Export controls can be considered part of the interconnection system
- Certification or compliance could be considered necessary in certain “fast track” or “simplified” processes
- Interconnection Rules may need to include specific technical and certification requirements for export controls and PCS
- More on this topic (including recommended language) is discussed in the other WG

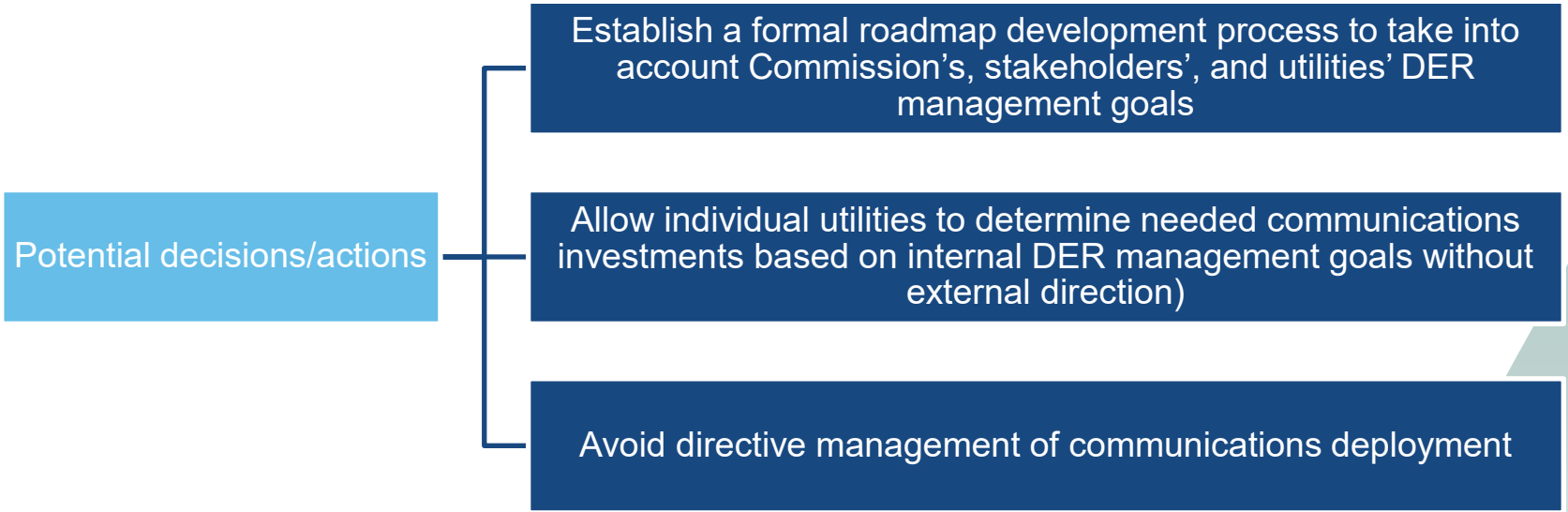
Long-Term Topics

DER Communications/controls roadmap

Identify strategy and goals for deploying comms over time – What to consider?

- Timeline for utilization of monitoring data, changes to autonomous function settings, scheduled function changes, and continuous direct control.
- Deployment for larger systems versus numerous small systems
- Utility communications infrastructure versus DER aggregator model.

DER Communications/controls roadmap



DER Communications Deployment

We are still in the early stages of communication deployment – What to consider?

- Is there a need to change the interconnection rule's "telemetry," "SCADA," or "monitoring" DER size threshold?
- What requirements apply to the DER site/equipment?
- What actions need to be taken to adopt a DER aggregator model?

DER Communications Deployment

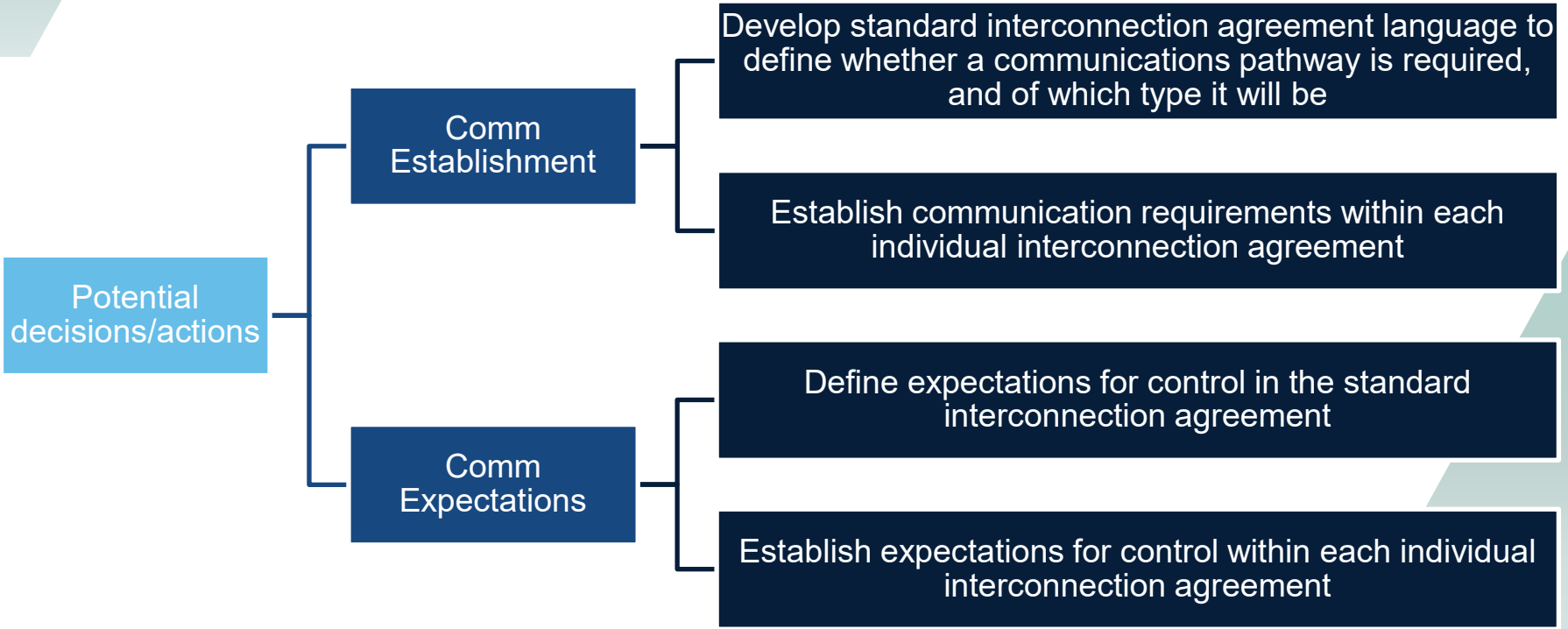
- If not done previously, specify protocols and ports to be used at the DER interface or aggregator
- Define equipment requirements for DER or aggregator, and whether or not those apply to systems below the “telemetry” size threshold
- Create or reference a guide for utilization of communications protocol(s) (e.g., California Common Smart Inverter Profile)
- Update “telemetry” requirements to change size threshold
- Update “telemetry” and/or other communication requirements to reference IEEE 1547 communications requirements
- Include certification/validation requirements for communications equipment (e.g., California Common Smart Inverter Profile)
- Define standard aggregator requirements and agreements

Interconnection Agreement (IA) for comms/control

IAs may need updating to reflect contractual obligations

- Control of the reactive power, volt-watt, limit maximum active power, permit service, and other functions can affect energy production/delivery and have financial repercussions on the affected DER
- These aspects should be memorialized in the IA
- A standardized IA can be developed to help establish expectations and limits while streamlining the interconnection process.

Interconnection Agreement (IA) for comms/control

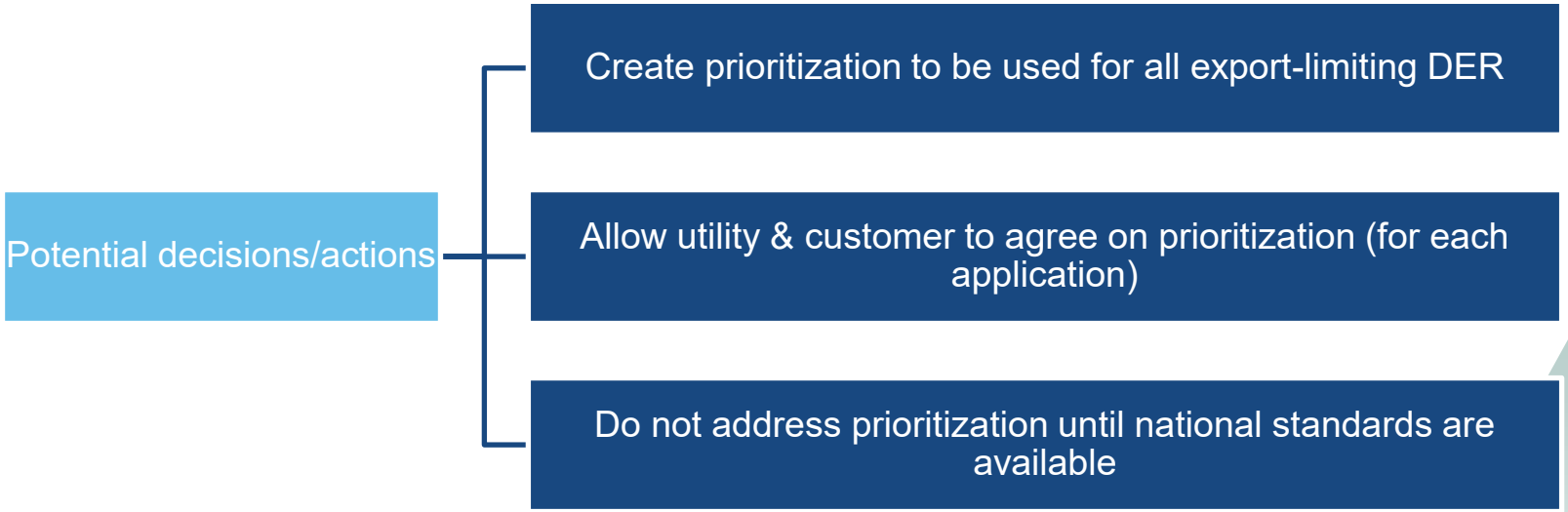


Prioritization vs. Export Limiting

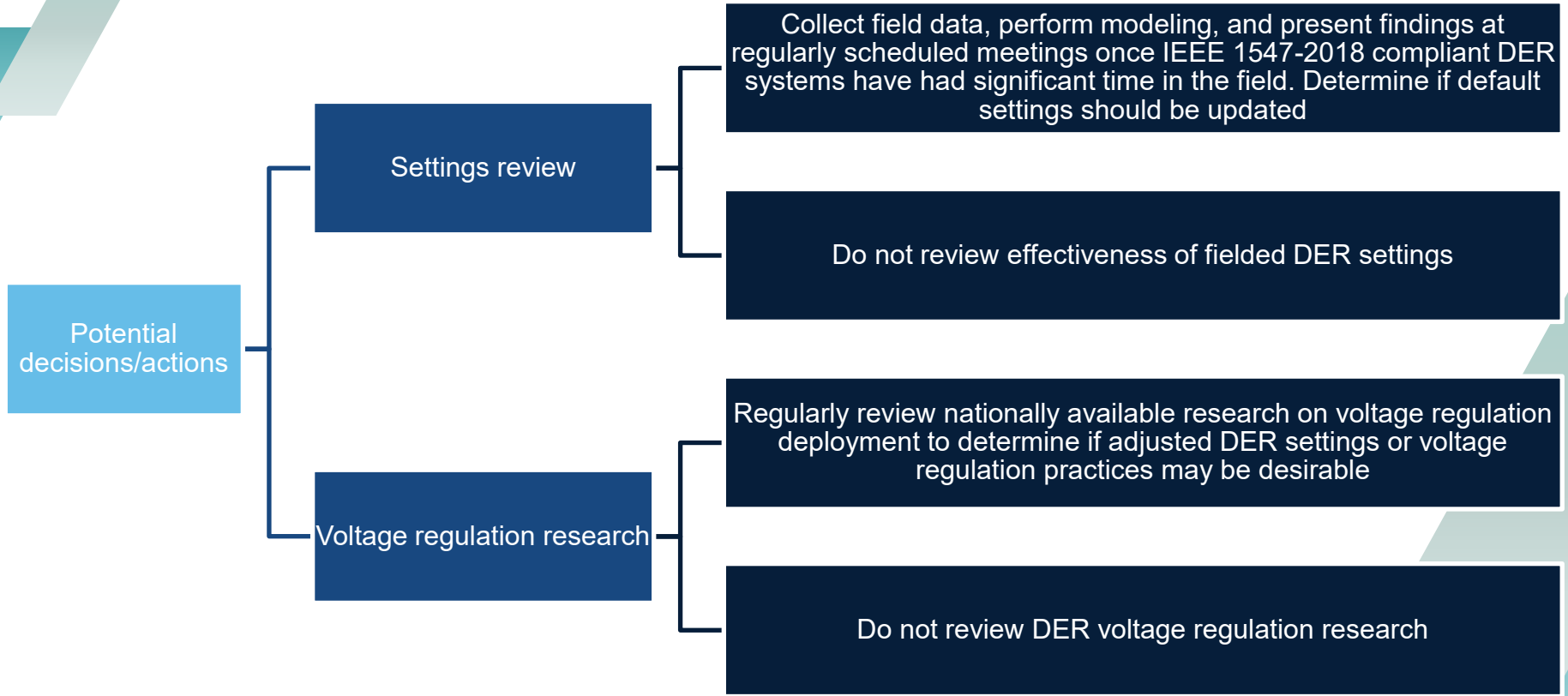
Export limits can potentially interfere with DER systems providing full grid support capability:

- Prioritization of DER responses with export limiting is not addressed in subclause 4.7 of IEEE 1547-2018
- Seek input from RTO when assigning priority of functions (IEEE P1547.2)

Prioritization vs. Export Limiting



Ongoing Reevaluation of Default Settings



Evaluation/Commissioning

- IEEE 1547-2018 and 1547.1-2020 contain expanded guidance on how evaluation of DER systems should be performed
- The different type tests, DER evaluations and commissioning tests are dependent on: RPA, fully vs. partial certification, and other factors
- Rules often do not explicitly require specific commissioning guidance (Rule vs. Utility handbooks)
- Consider updating rule and/or utility handbooks to address evaluation and commissioning

If you have any questions, contact:

Brian Lydic
Chief Regulatory Engineer | IREC
brian@irecusa.org

Midhat Mafazy
Regulatory Engineer | IREC
midhatm@irecusa.org

IREC

Next Steps

- Staff to provide meeting notes – with questions for stakeholders
- Circulate responses to **service list** by December 13
- Next workshop in this workstream on December 20 9am-noon
  - Discussion of any responses/proposal(s) received
  - Discussion of long-term issues
  - Discussion of process going forward

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Save the Date(s)

Workshop 4: Screens, Study Methods, and Modern Configurations

- Date: December 7
- Time: 9:00 AM – 12:00 PM
- Location: Zoom
  - **Link to Meeting**
  - Dial-In: 1-551 285 1373
  - Meeting ID: 161 631 5107
  - Passcode: 6623001161

Workshop 4: Incorporating Updated Standards

- Date: December 20
- Time: 9:00 AM – 12:00 PM
- Location: Zoom
  - **Link to Meeting**
  - Dial-In: 1-551 285 1373
  - Meeting ID: 161 631 5107
  - Passcode: 6623001161

*The November 8 workshop was canceled.

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Appendix – IREC Decision Matrix

An online of the IREC Decision Options Matrix for IEEE 1547-2018 Adoption as published October 12 may be found here on IREC's website.

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Appendix – Decision Matrix October 25 Slides

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Near-term Decisions
Adoption Timeline

What to consider?	Decision Option (DO) Description	Utilize?
Consider equipment availability, the use of UL 1741 SA certification in the interim (if needed), and whether naming a date certain is necessary before certified equipment is widely available. Compliance requirements are usually based on the interconnection application submission date. Some projects have long interconnection review and lead times and may not be installed long after the application date. A mechanism to require some of those projects with earlier application dates to be 1547-2018 compliant once installed could be beneficial for grid support. Installed MW with 1547-2018 compliance could be increased if compliance is based on installation date, but this may be challenging for developers from a planning perspective, as they may have to specify equipment that is not yet certified for 1547-2018. This issue may be mitigated if UL 1741 SA inverters are utilized, which can have similar features as those required by UL 1741 SB/1547-2018. Also consider how an interim adoption period will be implemented, allowing for 1547-2018 compliance before the deadline. Widely available UL 1741 SB certified equipment is expected on the market by around April 1, 2023. More information is available on IREC's research on equipment availability. [MTGS II]	**DO 1a-1:** Comply with IEEE 1547-2018 beginning [some date before April 1, 2023].	☐
	DO 1a-2: Comply with IEEE 1547-2018 beginning ~April 1st, 2023 or a later date.	☒
	DO 1a-3: Comply with IEEE 1547-2018 when the equipment is readily available (TBD by Commission action).	☐
	DO 1b-1: Base compliance date on application submission.	☒
	DO 1b-2: Base compliance date on installation (may be useful for larger projects with long lead times).	☐
	DO 1b-3: Differentiate compliance date mechanism between smaller and larger projects.	☐
	DO 1c-1: Allow interim compliance with IEEE 1547-2018 beginning immediately.	☐
	DO 1c-2: Define another interim compliance pathway.	☒

Do parties agree with that these are the consensus choices? If not, please provide alternative selections, with the reasoning behind the choice. Do parties have a date in mind that would work in DO 1a-2? Staff would propose July 1, 2023 – should equipment not be available the Commission could order a new date for compliance. We can reassess closer to the end of 2022.

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Near-term Decisions
Operating performance categories

	What to consider?	Decision Option (DO) Description	Utilize?
Abnormal	Consider input from transmission operators or regional reliability coordinator when assigning ride-through categories, plus local distribution utility protection practice. Since there can be conflict between distribution utility desires and bulk system reliability, 1547-2018 designates oversight of this selection to the Authority Governing Interconnection Requirements – often the Public Utilities Commission. [MTGS V.A]	**DO 2-1:** IEEE 1547-2018 Category III Ride-Through capabilities must be supported for inverter-based DER. Rotating DER must meet Category I Ride-Through capabilities, at minimum.	☒
		DO 2-2: IEEE 1547-2018 Category II Ride-Through capabilities must be supported by inverter-based DER, at minimum. Rotating DER must meet Category I Ride-Through capabilities, at minimum.	☐

Staff would like to know if there are any parties who object to the use of Category III Ride-Through Capabilities going forward, and to the underlying rationale for the objection..

	What to consider?	Decision Option (DO) Description	Utilize?
Normal	The selection of A or B will impact the use of voltage regulation controls. Some DER types cannot meet the full scale of reactive power support. Consider specifying category assignment based on technology type. [MTGS V.A]	**DO 3-1:** Inverter-based DER shall meet reactive power requirements of 1547-2018 Category B. Rotating DER must meet Category A and may meet Category B.	☒
		DO 3-2: All DER types (Inverter-based and rotating) shall meet reactive power requirements with 1547-2018 Category A.	☐

Staff would like to verify stakeholders do not oppose the requirement of inverter-based DERs meeting the more stringent Category B requirements.

Oregon Public Utility Commission

Near-term Decisions
Operating performance categories

	What to consider?	Decision Option (DO) Description	Utilize?
Voltage trip settings & ranges	Consider local distribution utility protection practices and make sure appropriate trip settings are selected. As desired, select default settings or settings within the adjustable range. Trip settings should not hinder ride-through capability required at the transmission level.	**DO 5-1:** Align default settings with 1547.	☒
		DO 5-2: Select other default settings within 1547 ranges of adjustment.	☐
Frequency trip settings & ranges	Ensure that the under/over frequency trip settings are coordinated between the utility and transmission operator. As desired, select default settings or settings within the adjustable range. Trip settings should not hinder ride-through capability required at the transmission level.	**DO 6-1:** Align default settings with 1547.	☒
		DO 6-2: Select other default settings within 1547 ranges of adjustment.	☐
Frequency droop Settings	This capability is required for all DERs (with some limitations on Category I types) during the under/over frequency conditions. Consider using default settings or adjust within ranges of allowable settings. Consider input from transmission operators or regional reliability coordinator. [MTGS V.A]	**DO 7-1:** Align default settings with 1547.	☒
		DO 7-2: Select other default settings within 1547 ranges of adjustment.	☐

Staff wanted to make sure stakeholders are in favor of using the default settings for the items above.

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Near-term Decisions
Voltage Regulation

Voltage regulation modes by reactive power

What to consider?	Decision Option (DO) Description	Utilize?
If desired, consider activating a non-unity power factor, volt-var, watt-var, or constant var function. See PNNL research on autonomously adjusting V_{ref}. Also, consider statewide (or similar) default settings for such mode. [MTGS V.B, VI]	DO 8a-1: Adjustable constant power factor is activated.	☐
	DO 8a-2: Utilize volt-var without autonomously adjusting Vref.	☒
	DO 8a-3: Utilize volt-var with autonomously adjusting Vref.	☐
	DO 8a-4: Watt-var is activated.	☐
	DO 8a-5: Constant var is activated.	☐
	DO 8b-1: Align default settings with 1547.	☒
	DO 8b-2: Select other default settings within 1547 ranges of adjustment.	☐
	DO 8c-1: Specify process for selecting settings on site-by-site basis.	☐
	DO 8c-2: Leave process for selecting settings on site-by-site undefined.	☐

Staff would like to hear more fully from stakeholders on recommendations for this issue. A better understanding of which options would work best, and why. Along with that, which decisions are unworkable, and why. Do the recommendations change based on resource size, location, composition of loads on feeders, or other factors?

Oregon Public Utility Commission

Near-term Decisions
Voltage Regulation

Voltage regulation modes by active power

What to consider?	Decision Option (DO) Description	Utilize?
If desired, consider statewide (or similar) activation of volt-watt function (with default setting). Notably, the utilization of volt-watt will require changes to the interconnection applications forms (online portals) to allow an applicant to specify how volt-watt is implemented. [MTGS V.B, VI]	**DO 9-1:** Volt-watt is activated with default 1547 settings.	☒
	DO 9-2: Volt-watt is activated with non-default settings.	☐
	DO 9-3: Volt-watt is not activated.	☐

Staff would like to hear from parties as too their choice for this issue, and the rationale.

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Near-term Decisions
Interconnection Rule

What to consider?	Decision Option (DO) Description	Utilize?
Update the interconnection rule to be inclusive of IEEE 1547-2018. To be clear which version of a standard applies and when it takes effect, it is recommended that standards be dated (and with edition number, if applicable), and that the implementation date is made clear either within the rule or by Commission order. In addition to implementing adoption of the standard within the rule, requirements or references to other standards that are now addressed by IEEE 1547 should be updated to be inclusive of 1547's requirements. Note that this latter issue is reflected in DO 10c, and no alternatives are offered.	**DO 10a-1:** Change 1547 date and title in standards references.	☒
	DO 10a-2: Leave 1547 standard reference undated.	☐
	DO 10b-1: Define timeline for adoption of new requirements in line with IEEE 1547-2018 per DO 1.	☒
	DO 10b-2: Leave timeline for adoption open dependent on, e.g., Commission order (in line with DO 1a-3).	☐
Update the interconnection rule to be inclusive of IEEE 1547-2018. To be clear which version of a standard applies and when it takes effect, it is recommended that standards be dated (and with edition number, if applicable), and that the implementation date is made clear either within the rule or by Commission order. In addition to implementing adoption of the standard within the rule, requirements or references to other standards that are now addressed by IEEE 1547 should be updated to be inclusive of 1547's requirements. Note that this latter issue is reflected in DO 10c, and no alternatives are offered.	**DO 10c-1:** Update applicable power quality or other references (such as IEEE 519 or IEEE 1453 in SGIP's Supplemental Review Voltage and Power Quality Screen) to IEEE 1547-2018.	☒

Issue will be considered more fully in the Screens workstream

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