UM 2111

Workshop

7-15-2022

Oregon Public Utility Commission

Agenda

Item	Schedule	Time
Welcome and objectives	9:00	15
Presentation	9:15	45
Breakout Sessions	10:00	60
Break	11:00	15
Report Out - Next Steps	11:15	45
Adjourn	12:00	

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Approach

- Purpose: “Staff will convene a kick-off meeting for the initial work group by June 30, 2022. This meeting will help identify subgroups and roles for participants. In addition to roles, approaches, roadmaps, will be developed for moving the issues forward to resolution.”

- Expectations – move process forward, everyone expected to work towards solutions
  - Identify positions, areas of agreement, areas for Commission resolution
  - Goal to have actionable items at the six- and twelve-month marks

- Phase 1 Topics (adopted by Commission)
  - Modernizing the screening and interconnection study practices;
  - Incorporating advanced inverters, storage, islanding, and other modern configurations;
  - Incorporating updated standards, such as IEEE 1547-2018; and
  - (If Stakeholder-led interest) Access to transparent data about utility standards, costs, and study assumptions.

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Kick-off meeting objectives

Create a roadmap for addressing Group 1 issues through working group(s)

- Identify subgroups
- Establish scope and objectives – identify six- and twelve-month deliverables
- Discuss starting proposals/proposal process
- Feasibility of a stakeholder-led process for "Data Transparency" (or other topic?)

Next steps

- Meeting logistics
  - Cadence – subgroups and all topics check-ins
  - Roles
  - Other questions
- Staff's next steps

Data transparency issues

- Update on Hosting Capacity Analysis
- Remaining priority issues?
- Today’s question – worth scoping as stakeholder-led?

Fyi…links to utility interconnection manuals:

[PGE]
[PacifiCorp]
[Idaho Power]

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Distribution System Planning Update

- Initial steps in DSP
  - Baseline data requirements
  - Creation of a map presenting areas where it is difficult to interconnect DERs without system upgrades
  - Cost and timeline estimates for conducting three options of HCA
- Maps evolved beyond minimal requirements, leveraging work done in OASIS postings in Docket No. UM 2000
  - PGE Distributed Generation Evaluation Map
  - Pacific Power Distribution System Planning Map
  - Idaho Power Oregon Generation-Limited Circuits

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Distribution System Planning Update

- From Order No. 22-083:

  As noted, Staff recommends that further discussion of HCA in DSP pause until the plan for the Docket No. UM 2111 is final. Staff recommends DSP stakeholders then consider continuing discussions of HCA. If there is bandwidth and interest, Staff will work with stakeholders on next steps that are coordinated with Docket No. UM 2111.

- Staff proposes a workshop in late-September
  - Goal is to inform DSP stakeholders' consideration of continuing discussions of HCA
  - Agenda topics:
    - Overview of HCA
    - Data and assumptions in current utility maps
    - Test-drive current utility maps to illustrate capabilities and limitations
- Following workshop Staff will: request stakeholder comment + work to develop straw-proposal for next-steps

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IREC: Model Rules & Processes

- Incorporating advanced inverters, storage, islanding, and other modern configurations
- Modernizing screening and interconnection study practices
- Incorporating updated standards such as IEEE 1547-2018.

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UM 2111 Group 1 Kickoff Workshop

Oregon Public Utility Commission – July 15, 2022

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INTERSTATE RENEWABLE ENERGY COUNCIL

Independent leadership. Trusted clean energy expertise.

Yochi Zakai
Attorney at Shute, Mihaly and Weinberger, LLP

Midhat Mafazy
IREC Regulatory Engineer

Goal: Introduce IREC's resources concerning the three group 1 topics

- Incorporating advanced inverters, storage, islanding, and other modern configurations
- Modernizing the screening and interconnection study practices
- Incorporating updated standards such as IEEE 1547-2018.

Order 22-126, Appendix A at 10.

Topic 1: Incorporating advanced inverters, storage, islanding, and other modern configurations

To download the Toolkit, go to:

energystorageinterconnection.org

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BATRIES Project: Barriers Addressed

Toolkit Chapter	Energy Storage Barrier Addressed in the Toolkit	Covering Today*
II	Updating Interconnection Procedures to Be Inclusive of Storage	☑
III	Requirements for Limited- and Non-Export Controls	☑
IV	Evaluation of Non-Export and Limited-Export Systems During the Screening or Study Process	☑
V	Defining How to Address Inadvertent Export	☑
VI	Improving Grid Transparency Through Hosting Capacity Analyses and Other Tools	
VII	Pathways to Allow for System Design Changes During Interconnection Review Processes to Mitigate the Need for Upgrades	
VIII	Incorporating Updated Interconnection Standards into Interconnection Procedures	☑
IX	Defining Rules and Procedures for the Evaluation of Fixed-Schedule DER Operation	

**See bonus slides section for key takeaways on chapters not covered today*

Chapter II: Updating Interconnection Procedures to be Inclusive of Storage

Challenge

Storage is typically not included in interconnection rules, and there is lack of clarity as to whether and how existing rules apply to storage systems.

Solution

- Define the term “ESS” and clearly state that the procedures apply to the interconnection of new standalone ESS
- Define and describe the requirements and use of Power Control Systems
- Include defined terms that describe the maximum amount of output that takes into account acceptable export control methods
- Include definitions of “operating schedule” and “operating profile”
- Related documents (applications, study agreements, etc.) should be updated

Chapter III: Requirements for Limited- and Non-Export Controls

Challenge

Interconnection rules may not include acceptable methods that can be used for controlling export of limited- and non-export systems

Solution

- Understanding acceptable export control methods that can mitigate or avoid grid impacts
- Recognizing export control methods within interconnection rules
- Enabling export control while supporting safety and reliability and increasing certainty for customers

Acceptable Export Control Methods		
	For Non-Exporting DER	For Limited-Export DER
a) Reverse Power Protection (Device 32R*)	Yes	
b) Minimum Power Protection (Device 32F*)	Yes	
c) Relative Distributed Energy Resource Rating	Yes	
d) Directional Power Protection (Device 32*)		Yes
e) Configured Power Rating		Yes
f) Limited Export Utilizing Certified Power Control Systems (PCS)	Yes	Yes
g) Limited Export Using Agreed-Upon Means	Yes	Yes

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Chapter IV: Evaluation of Non-Export and Limited-Export Systems During the Screening / Study Process

Challenge

Evaluating non- and limited-export systems based on unrealistic operating assumptions can lead to overestimated grid impacts

Solution

- Identifies screens in which Export Capacity is appropriate for impact assessment (instead of Nameplate Ratings)
- Proposes a new Inadvertent Export Screen

Chapter IV: Evaluation of Non-Export and Limited-Export Systems During the Screening / Study Process

Screens in which Export Capacity is appropriate to evaluate impacts

- Level 1 & Level 2 Eligibility Size
- Penetration Screens
- Shared Secondary Transformer Screen
- Inadvertent Export Screen (new)

Screens in which Nameplate Ratings can still be used

- Spot Network Screen
- Protection Screens (Max. Fault Current & Short Circuit Interrupting Capability)
- Single-phase Imbalance Screen
- Transient Stability Screen

Chapter V: Defining How to Address Inadvertent Export

Challenge

Lack of clarity regarding the impacts of inadvertent export

Lack of uniform specification for export control equipment response times

Solution

- EPRI conducted testing on the effect of inadvertent export:
  - Field testing of Power Control Systems
  - Simulations of rural and urban feeders
- This research informed the development of a new screen for inadvertent export.

Chapter V: Defining How to Address Inadvertent Export

Informed the development of a new Inadvertent Export Screen:

For interconnection of a proposed DER where the Nameplate Rating minus the Export Capacity is greater than 250 kW, the following inadvertent export screen is required. With a power change equal to the Nameplate Rating minus the Export Capacity, the change in voltage at the point on the medium voltage (primary) level nearest the PCC shall not exceed 3%. Voltage change will be estimated applying the following formula:

Formula	$\frac{(R_{SOURCE} \times \Delta \boldsymbol{P}) - (X_{SOURCE} \times \Delta \boldsymbol{Q})}{V^2}$

Where:

$\Delta \boldsymbol{P}$ = (DER apparent power Nameplate Rating – Export Capacity) × PF,

$\Delta \boldsymbol{Q}$ = (DER apparent power Nameplate Rating – Export Capacity) × $\sqrt{(\mathbf{1} - \boldsymbol{PF}^{\mathbf{2}})}$,

R_{SOURCE} is the grid resistance, X_{SOURCE} is the grid reactance,

V is the grid voltage, PF is the power factor

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Chapter VIII: Incorporating Updated Interconnection Standards Into Interconnection Procedures

Challenge

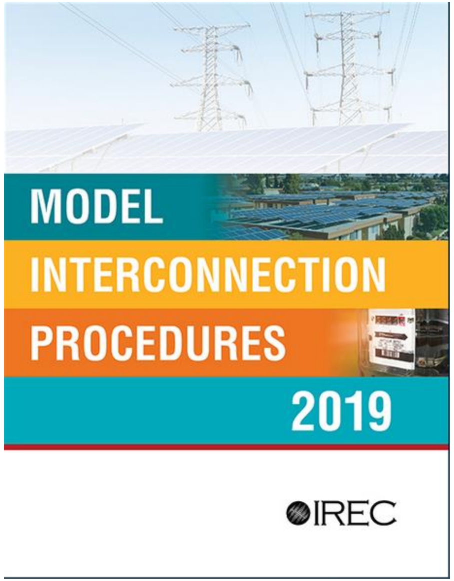
Many states have not yet incorporated updated technical standards into their interconnection procedures and technical requirements

Solution

- Understand which standards are relevant to ESS operation, and how to incorporate those standards and associated documents into interconnection procedures
- Recommendations complements IEEE 1547 series (including upcoming drafts), UL 1741 CRD, and IEEE C62.92.6

Topic 2: Modernizing screening and interconnection study practices

IREC Model Interconnection Procedures



https://irecusa.org/resources/irec-model-interconnection-procedures-2019/

- Oregon's Interconnection Procedures are based on the multi-level review system used in IREC's Model.
- Oregon's Interconnection Procedures do not include some innovations found in the 2019 IREC Model.
- The 2019 IREC Model is a few years old and does not include some recent innovations, such as those discussed earlier from the Toolkit or recently implemented in other leading states.

2019 Model Rules: Topics Addressed

Part	Interconnection Topic	Covering Today
II	Improving Grid Transparency Through Pre-Application Reports (more recently, Distribution System Data Portals, and Hosting Capacity Analyze)	
III.A	Level 1 Screening Criteria for Small Projects, a.k.a. Simplified Process	
III.B	Level 2 Screening Criteria, a.k.a Fast Track Process	☑
III.D	Supplemental Review	☑
III.F	Level 4 System Impact Study Process	
IV.A	Timelines	
Attach 8-9	Public Queue and Reporting Requirements	

Level 2 Screening Criteria, a.k.a Fast Track Process

Challenge

In Oregon's NEM and SGIP rules, the Level 2 size limit should allow the largest sized Project that could potentially pass the interconnection screens on the particular line size to use the Fast Track procedures.

Solution: Modernize the size limit to use an eligibility table.

Line Voltage	Export Capacity for Level 2 Eligibility	
	Regardless of location	On > 600 amp line and < 2.5 miles from substation
< 5 kV	< 1 MW	< 2 MW
5 kV – 14 kV	< 2 MW	< 3 MW
15 kV – 30 kV	< 3 MW	< 4 MW
31 kV – 69 kV	< 4 MW	< 5 MW

Penetration Screen Threshold

Challenge

Penetration screens are designed conservatively and typically the most failed screens.

Solution: Modernize the penetration screen threshold

- 15% of peak load threshold was designed over 20 years ago as a conservative estimation for 50% of minimum load because, for typical distribution circuits in the US, minimum load is approximately 30% of peak load. Back then, minimum load data was almost never available, and utilities were not familiar with DERs.
- Today, consider using 100% of minimum load when that data is available.
- In the medium term, consider requiring the collection of minimum load data, e.g., IL.
- In the long term, consider using a Commission-approved hosting capacity analysis instead of the penetration screen, e.g., CA.

Screening Criteria

Challenge

In Oregon's NEM & SGIP rules, Level 1 and Level 2 screening criteria do not reflect modern interconnection screening practices.

Solution

- Evaluate and consider modernizing the following screens, consistent with the Model Rules/Toolkit:
  - Network Screen
  - Shared Secondary Transformer Screen: use 65% of transformer nameplate
  - Line Configuration Screen (most recent version in the Toolkit, not Model Rules)
  - Is the fault current screen necessary for Level 1?
- Include or modernize timelines
- Allow system modifications & construction

Supplemental Review

Challenge

Projects that fail Level 1 & 2 should have the opportunity to interconnect without the time and expense of a System Impact Study.

Solution: Add a Supplemental Review Process

- allow the utility additional time to perform a more detailed analysis than is allowed by the short timeline in Fast Track,
- take significantly less time than the full study process,
- use standard screens, and
- use a fixed fee.

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Topic 3: Incorporating updated standards such as IEEE 1547-2018.

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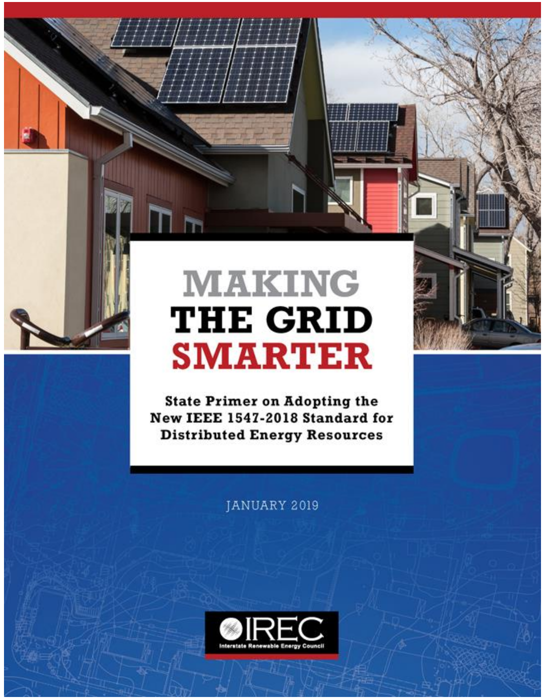
For a Deeper Dive into IEEE 1547-2018



Also available:

- NREL resources: https://www.nrel.gov/grid/ieee-standard-1547/
- BATRIES Toolkit Chapter VIII: https://energystorageinterconnection.org/viii-incorporating-updated-interconnection-standards-into-interconnection-procedures/

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Adopting IEEE 1547-2018

Key Considerations

- Determine timeline for implementation (examples in next slide)
- Where will the technical requirements reside?
- Choose categories
- Define default function and settings (or not)
- Voltage regulation impacts (volt-var, volt-watt)
- Process updates (mitigations, settings changes/selection)
- Interconnection Agreements
- Interconnection screens and study
- Communications (capability vs utilization, pathways, protocols)

Timeline to compliance

- **April 2018** — IEEE publishes 1547-2018
- **May 2020** — IEEE publishes 1547.1-2020
- **Aug 2020** — UL updates 1741 allowing start of DER testing and certification
- **Sept 2021** — NEW! UL 1741 SB revised to fill in 1547.1 gaps
- **2022-2023** — Tested and certified 1547-2018 compliant DER available on market

MD: January 1, 2022, …extending (looking at April 1, 2023)

HI: January 1, 2022, …extending (HECO proposing Oct 1, 2022)

MN: “such time the equipment is readily available”

CA: April 1st, 2023

NY: January 1, 2023 (date to be reassessed in September)

NM: Targeting around April 1, 2023 (not official)

Adopting IEEE 1547-2018

IREC's Decision Option Matrix (based on NM)

Key:

Suggested for TIR	Original color
Suggested for Rule	
Rule or TIR	
Other	

			Decisions To make	
	Issue	**What to consider?**	**Decision Option (DO) Description**	**Utilize?**
Near Term	Adoption Timeline	Consider equipment availability, the use of UL 1741 SA certification in the interim (if needed), and whether naming a date is necessary. 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.	**DO 1a-1:** Comply with IEEE 1547-2018 beginning [some date before ~April 1, 2023].	☐
			DO 1a-2: Comply with IEEE 1547-2018 beginning ~March 28, 2023 based on installation.	☒
			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 April 1, 2022.	☐
			DO 1c-2: Define another interim compliance pathway.	☐
	Abnormal Operating Performance Category	Consider input from transmission operators or regional reliability coordinator when assigning ride-through categories, plus local distribution utility protection practice.	**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.	☒
			DO 2-2: IEEE 1547-2018 Category II Ride-Through capabilities must be supported for inverter-based DER. Rotating DER must meet Category I Ride-Through capabilities.	☐
	Normal Operating Performance Category	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.	**DO 3-1:** Inverter-based DER shall meet reactive power requirements with 1547-2018 Category B. Rotating DER must meet Category A.	☒
			DO 3-2: All DER types (Inverter-based and rotating) shall meet reactive power requirements with 1547-2018 Category A.	☐

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Adopting IEEE 1547-2018

IREC's Decision Option Matrix (based on NM)

	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 UF and OF 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.[1] Consider using default settings or adjust within ranges of allowable settings. Consider input from transmission operators or regional reliability coordinator.	**DO 7-1:** Align default settings with 1547.	☐
			DO 7-2: Select other default settings within 1547 ranges of adjustment.	☐
	Voltage regulation modes by reactive power[2]	If desired, consider activating a non-unity power factor, volt-var, watt-var, or constant var function. Also, consider statewide (or similar) default settings for such mode.	**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[3] 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 undefined.	☐
	Voltage regulation modes by active power[4]	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.	**DO 9-1:** Volt-watt[5] 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.	☐

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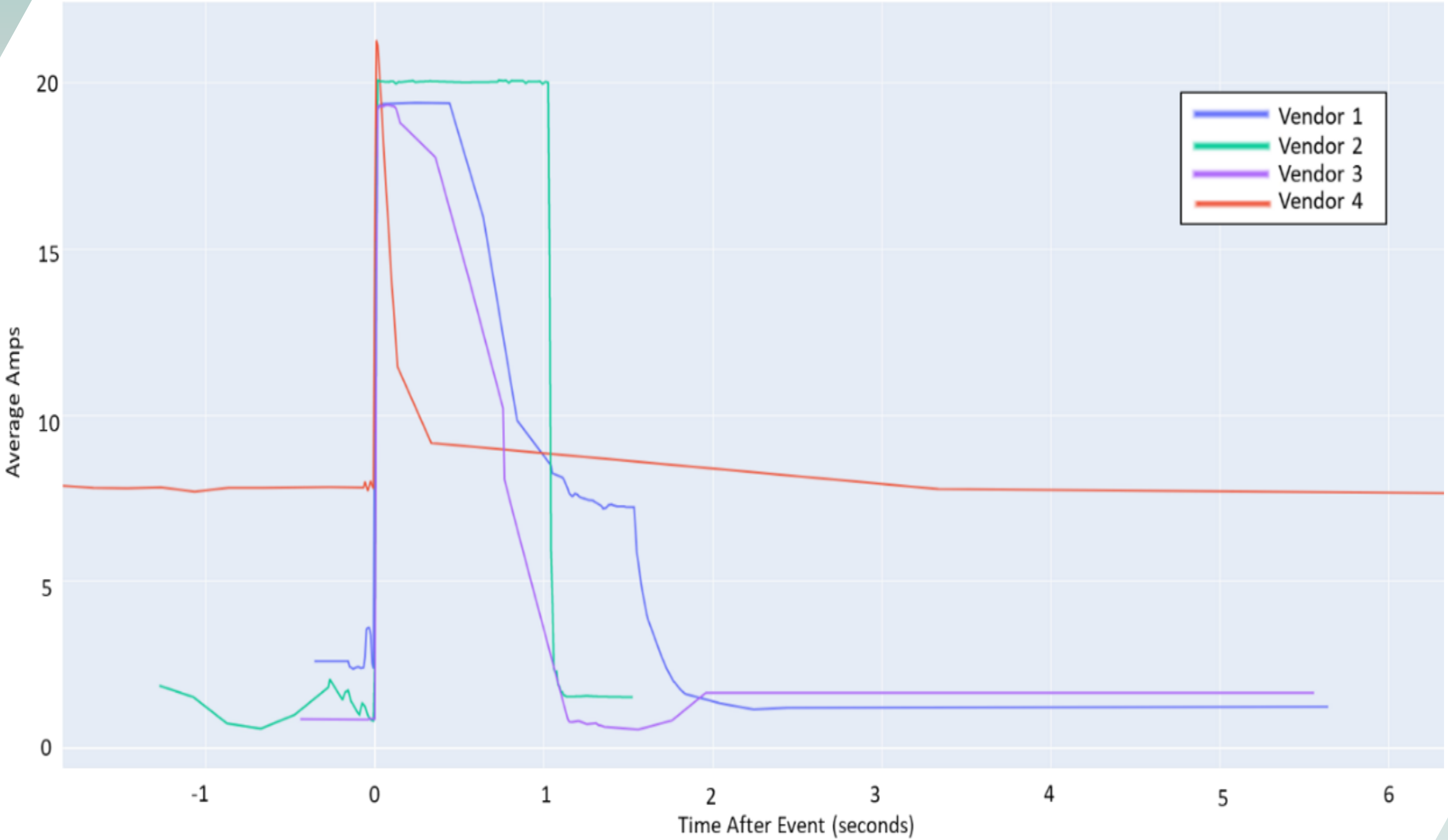
Bonus Slides

Chapter V: Comparison of OLRT among Four Tested PCS Devices



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Chapter V: Summary Details of Modeled Feeders

Modeled Feeder	Feeder Voltage	Feeder Load Range	Feeder Length	Feeder Voltage Regulation*	PV Capacity Limit**
Urban	12.47 kV (LL†) 7.2 kV (LG‡)	0.65 MW (min.) 3.2 MW (max.)	7.3 mi	Load tap changer (LTC) at substation, 1.1 Mvar switched-capacitor bank	2.9 MW
Rural	12.47 kV (LL) 7.2 kV (LG)	5.95 MW (min.) 11.17 MW (max.)	11.2 mi	LTC at substation, 3 fixed capacitors, 8 line voltage regulators (LVRs) (delay head end 30s, tail end 37s)	8.9 MW

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Chapter VI: Improving Grid Transparency Through Hosting Capacity Analyses and Other Tools

The Challenge: there tends to be a lack of information about the distribution grid and its constraints, which, if available, can inform where and how to interconnect storage.

Key Takeaways:

- Utilities should provide data on the state of the distribution system at the Point of Interconnection through pre-application reports and basic distribution system maps
- Hosting Capacity Analysis can serve as an informational tool to guide ESS design (e.g., customers could design their ESS systems to avoid contributing to grid constraints by limiting charging during existing net peak load hours). This requires regulators to take a number of considerations into account
- HCA can serve as a decision-making tool in the interconnection review process for ESS, such as by enabling ESS to be designed in ways that address specific grid constraints. HCAs would need to provide hourly information to provide this function

Chapter VII: Allowing System Design Changes to Mitigate the Need for Upgrades

Challenge

The interconnection review process is not designed to allow a customer to make project design changes to avoid system upgrades without forfeiting their place in the interconnection queue

Solution

Interconnection procedures should:

- Include requirements for providing more data on the reasons for a project fails screens
- Accommodate the type of project modifications than an ESS system could make to avoid the need for upgrades during the interconnection process

Chapter VII: Allowing System Design Changes to Mitigate the Need for Upgrades

Sample Penetration Screen Result:

Example: An Ideal 15% Screen Result For interconnection of a proposed DER to a radial distribution circuit, the aggregated Export Capacity, including the proposed DER, on the circuit shall not exceed 15% of the line section annual peak load as most recently measured. A line section is that portion of a Distribution Provider's electric system connected to a customer bounded by automatic sectionalizing devices or the end of the distribution line.		
Export Capacity of DER Application		kW
Export Capacity of Active DER on Feeder		kW
Export Capacity of DER ahead in Queue		kW
15% of Peak Load		kW
Aggregate Export Capacity, Including Proposed DER		kW
Export Capacity of DER, as % of Load		%
Passes Screen	No	

Sample Detailed Study Result:

Upgrade Required	Option 1 X MW	Option 2 X MW @ 99% PF	Option 3 0.8*X MW	Failures Addressed
3VO Installation	$ 600,000	$ 600,000	$ 0	Overvoltage Transmission System Fault
Load Tap Changer Bi-Directional Co-Generation Capability	$ 0	$ 0	$ 30,000	Substation Regulation for Reverse Power
Supervisory Control and Data Acquisition (SCADA) With Direct Transfer Trip	$ 120,000	$ 120,000	$ 120,000	Unintentional Islanding
Existing Utility Recloser Upgrade	$ 60,000	$ 60,000	$ 60,000	Unintentional Islanding
Upgrade Voltage Regulator Controls	$ 15,000	$ 0	$ 0	High Voltage
Total	$ 795,000	$ 780,000	$ 210,000	

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Chapter IX: Defining Rules and Processes for the Evaluation of Fixed-Schedule DER

The Challenge: interconnection procedures lack defined rules and processes for the evaluation of operating schedules.

Key Takeaways – Developing standards for scheduling energy storage operations:

- Standards should be developed that describe the scheduling of storage operations, especially time-specific import and export limitations
- Because standards take time to develop, regulators can create a sense of urgency and expectation for standards development, such as by convening working groups, developing their own interim testing protocols while national standards are being developed, or incorporating scheduling functionality into interconnection rules with implementation dates set based upon standard publication
- While standards are being developed, vendor attestations may provide utilities with some performance assurance

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Breakout group discussion

Break out group questions – for each topic in scope

1. Journal and share out (15 minutes)
   - What are the major problems/impediments to successful interconnections related to this topic?
   - What actions could be taken to improve the process?
2. Scope and objectives (30 min)
   - What issues will the group cover?
   - What will be accomplished in 6 months and 12 months, in terms of deliverables?
3. Logistics (15 min)
   - Are the subgroups required
   - Starting proposals/proposal process (key issues not covered by IREC model? Counter proposals available?)

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Report Out - Workplan Discussion

- Need for sub-groups?
- Meeting logistics/cadence?
- What can be accomplished by six-month check in – what process to get there?
- Logistics for working groups + volunteers to play particular roles in working group?
  - Notes
  - Agendas
  - Facilitation

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Report Out - Topics

- Modernizing the screening and interconnection study practices;
- Incorporating advanced inverters, storage, islanding, and other modern configuration;
- Incorporating updated standards, such as IEEE 1547-2018 standards; and
- Access to transparent data about utility standards, costs, and study assumptions per OSSIA's comments (Stakeholder-led).

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Next Steps

- Workshops to be scheduled for subgroups
- Stakeholders to work on solutions to identified issues
- Further discussion of potential solutions at future workshops

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Appendix

Topics

- Modernizing the screening and interconnection study practices;
- Incorporating advanced inverters, storage, islanding, and other modern configuration;
- Incorporating updated standards, such as IEEE 1547-2018 standards; and
- Access to transparent data about utility standards, costs, and study assumptions per OSSIA's comments (Stakeholder-led).

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Group 1: Focus on underlying methodologies and ensuring readiness for the types of projects being promoted by state policy (community, resiliency, flexible decarb) • Ensuring rules, policies, and practices for identification of upgrades account for modern technologies and industry best practices including, but not limited to: • Modernizing the screening and interconnection study practices • Incorporating updated standards such as IEEE 1547-2018 • Incorporating advanced inverters, storage, islanding, and other modern configurations • Modernizing and right-sizing the upgrade options considered when an upgrade is needed	**Group 2: Focused on cost allocation practices** **Assigning system upgrades between generators, including use of cluster studies** • Assigning system upgrades between generators and other system beneficiaries (utilities and customers), e.g., more clarity on "reasonable costs" to be borne by a generator • Assigning interconnection upgrades for QF's renewing contracts • Explore any additional improvements to rules and utility practices for identification of upgrades that account for modern technologies and industry best practices that weren't addressed in Group 1
Group 3: Focused on generator ability to manage costs **Generators' ability to perform studies and construct upgrades** • Ensuring there is an efficient, effective, and accessible dispute resolution process(es) for all generator types, and any other processes to ensure sufficient ability to verify and challenge interconnection studies and results • Limits on upgrade costs or deviation from cost estimates • Clarity on material changes, option to request multiple POIs and other configurations, downsizing, and aggregation (includes net metering) • Requirements for transparent communications, access to in-person meetings with engineers, professional engineer stamps, access to standards and assumptions, study inputs, baseline data, and price assumptions	**Group 4: Focused on efficient processes and predictability:** Interconnection process • Predictability and enforcement of timelines, responsiveness, and preventing congestion in the queue. Includes publishing interconnection application processing metrics. • Predictability, speed, and enforcement of construction timelines • Remedies for utility and generator violations of rules/processes, reasonable, non-discriminatory, good faith actions. Rule structure • Whether to adopt rules for 10 MW – 20 MW Oregon jurisdictional generators. • Whether to continue to have separate rules for NEM, SGIP and separate LGIP.

Approach

- Prioritization
  - **Root cause**: Issues that address the root causes of interconnection barriers, complaints, and disputes; Issues that reduce interconnection barriers across multiple state-jurisdictional generator types
  - **Customer and community benefits**: Issues that reduce barriers to projects that provide direct customer and community benefits, including resiliency-focused projects, small-scale projects, and community-based projects; issues that best position utilities to interconnect and help maximize the impact of incentives and grant opportunities.
  - **Decarbonization**: Issues that will help enable smarter, flexible resources that minimize the costs and maximize the benefits of decarbonization, e.g., fossil dispatch offset, grid services, T&D avoidance.

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Approach – Group 1 Issues

Distribution-level ~~"hosting capacity"~~ interconnection study and screening thresholds

Modernizing analytical methods and threshold levels; and

Reasonable technologies to mitigate impacts when thresholds are reached.

Advanced inverters

Incorporate IEEE 1547-2018 and policies needed to incorporate advanced inverters into existing interconnection rules and practices.

Storage and flexibility

Integrate storage, islanding, and other modern configurations more explicitly into interconnection rules, policies, and practices.

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Clarifications

Distribution-level ~~“hosting capacity”~~ interconnection study and screening thresholds

- What is overlap for HCA analysis between UM 2005 and UM 2111?
- What is included in “Modernizing the screening and interconnection study practices”?
- Is “modernizing and right-sizing the upgrade options considered when an upgrade is needed” intended to explore the possibility of undertaking larger than needed upgrades to make room for future interconnections? Or does Staff simply intend to reevaluate the current approach of designing upgrades to produce the minimum incremental capacity required to facilitate the specific interconnection?

Advanced inverters

- What does Staff plan to incorporate, “advanced inverters”? storage, islanding and other modern configurations” into?

Storage and flexibility

- What does Staff plan to incorporate, “storage, islanding and other modern configurations” into?

Oregon Public Utility Commission