# FERC Order No. 904 Compliance

*Elimination of Compensation for Reactive Power Capability within the Standard Power Factor Range*

Kory Haag

PRINCIPAL OPERATIONS ANALYST

# FERC Order No. 904 Compliance

**Proposed Effective Date: 12/31/9998**

- On October 17, 2024, the Federal Energy Regulatory Commission (FERC) issued Order No. 904 on Compensation for Reactive Power within the Standard Power Factor Range
- The ISO's comments on the preceding Notice of Inquiry (NOI) and Notice of Proposed Rulemaking (NOPR) supported maintaining its existing design based on economic principles, system benefits, rate transparency, and administrative simplicity
  - FERC denied ISO's arguments in its Final Rule
  - FERC acknowledged that its findings "represent a change in policy from prior Commission findings"
  - FERC stated that its Order strictly dealt with compensation within the standard power factor range and did not address compensation outside of that range P.167
- Following the February 2025 MC, the ISO considered the NYISO's most recent interpretation of the standard power factor range described in the Order
  - This review further informed the ISO on potential ambiguity in the Order and alternative interpretations of the term "standard power factor range" used within the Order

# FERC Order No. 904 Compliance

**Proposed Effective Date: 12/31/9998**

- In accordance with the Order, ISO's revised compliance filing will eliminate compensation for reactive power within the interconnection required minimum design standard power factor range of 0.95 leading to 0.95 lagging at continuous rated output, but will now continue to compensate for reactive power provided outside this range
  - Compliance filings are due by March 28, 2025
  - FERC allowed for an effective date up-to 90 days thereafter (by June 26, 2025)
  - The Order allows ISO/RTOs to request a later effective date to respect interplay between capacity, energy, and reactive power revenues
- This presentation provides an overview of the ISO's revised proposed compliance

# Overview of Revised Compliance Proposal

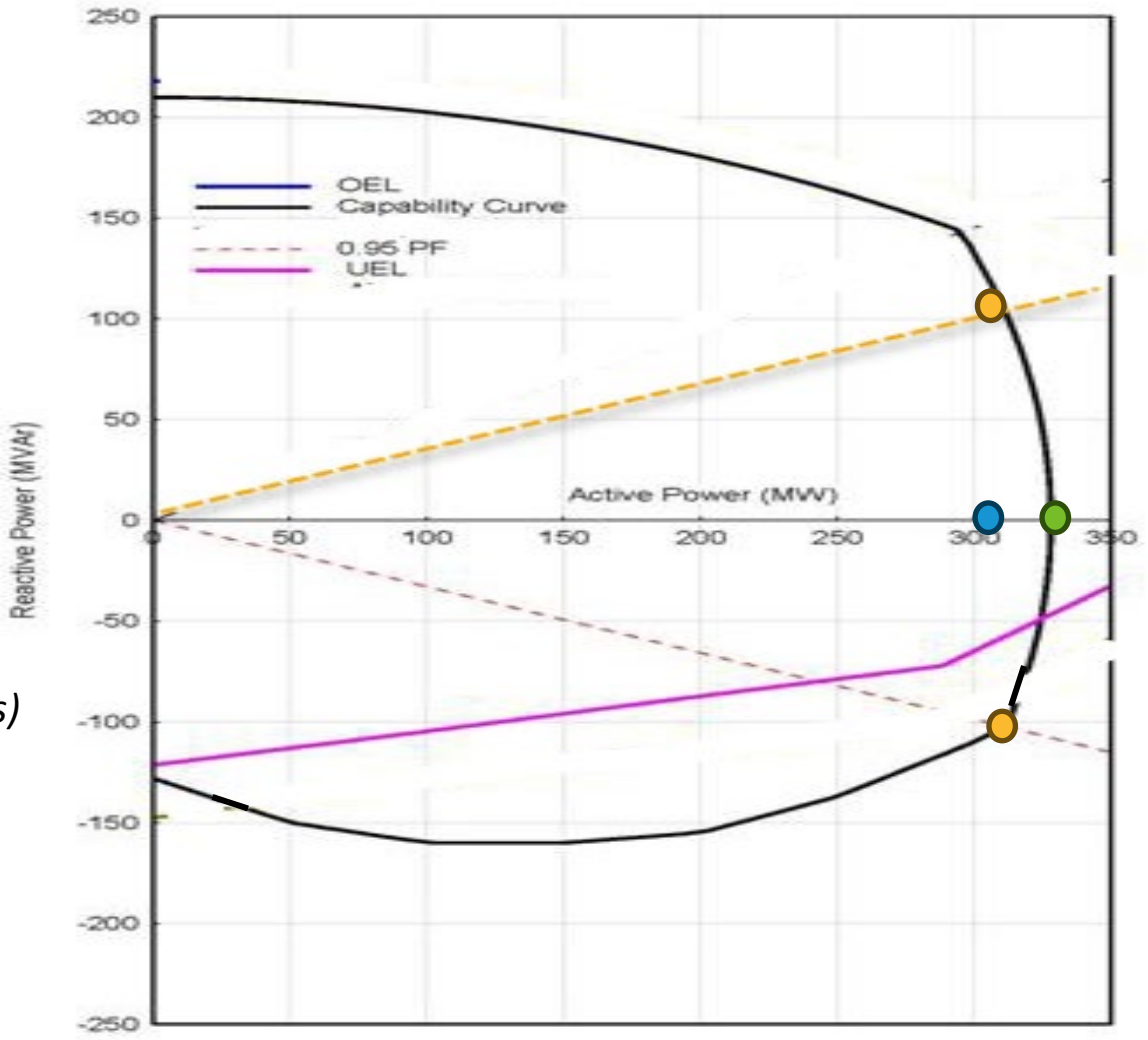
- The revised compliance proposal will eliminate VAR Capacity Cost (CC) credits to Qualified Reactive Resource (QRRs) within the power factor range of 0.95 leading to 0.95 lagging at continuous rated output, but will now continue to compensate for reactive power provided outside this range
  - Continuous rated output will be calculated as the maximum real power at which the resource could still theoretically produce 0.95/0.95 power factor
- The compliance proposal will alter the calculation of Qualified VARs to remove compensation within the 0.95 leading to 0.95 lagging power factor range
- Existing base rate of $2.19/kVAr-yr will remain in effect
- Existing Qualified Reactive Resource eligibility criteria will remain in effect

# Capacity Cost Credit Determination

- CC credits will be determined outside of the 0.95 leading to 0.95 lagging power factor range as follows:
  - Required leading and lagging reactive power requirement will be determined based upon nameplate capability and 0.95 power factor requirement
  - Leading and lagging capability at Summer Seasonal Claimed Capability (S-SCC) (or comparable point for resources without a S-SCC) will be based upon tested values
    - Leading capability will no longer be based upon testing at Economic Minimum (Economic Minimum test will remain in OP-23 for reliability)
    - An additional leading test will be required for QRRs at S-SCC to determine capability for CC credits
  - The difference between tested values and the required reactive power requirement will be compensated at the CC rate

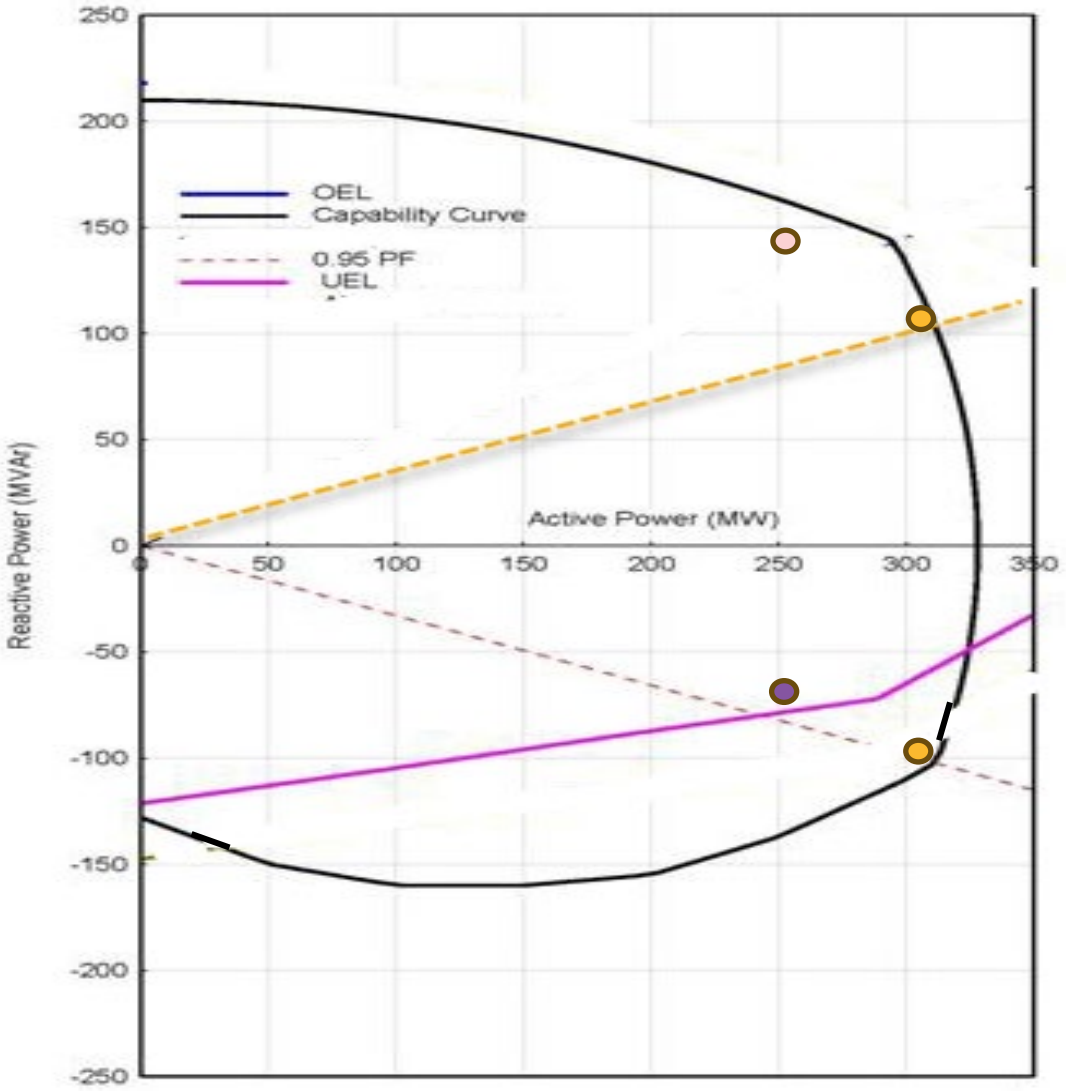
# Example Qualified VAR Calculation

- Nameplate capability
  = 325 MVA *(Green Dot)*
- Continuous rated output value
  = $S_{nameplate}$*0.95
  = 308.8 MW *(Blue Dot)*
- Required reactive capability
  = sqrt[$S^2$ - (0.95*$S_{nameplate}$)$^2$]
  = sqrt[$325^2$ - (0.95*325)$^2$]
  = 101.5 MVAr *(Orange Dots)*



# Example Qualified VAR Calculation (cont.)

- $Q_{lagtest}$
  = 150 MVAr *(Pink Dot)*
- $Q_{leadtest}$
  = 75 MVAr *(Purple Dot)*
- Total QVAR
  = $\max(0, Q_{lagtest} - Q_{lagrequired}) + \max(0, Q_{leadtest} - Q_{leadrequired})$
  = (max0,150 MVAr - 101.5 MVAr) + max(0,75 MVAr - 101.5 MVAr)
  = (48.5 MVAr) + (0 MVAr)
  = 48.5 MVAr outside of 0.95 leading/lagging
- Current QVAR
  = 225 MVAr
- Proposed QVAR
  = 48.5 MVAr



# Qualified Non-Generator Reactive Resources

- Qualified Non-Generator Reactive Resources that were required to be installed to facilitate the interconnection of another resource will be aggregated with the associated resource to determine the required reactive value at 0.95 leading and 0.95 lagging
  - *E.g.*, a wind plant that requires the installation of a synchronous condenser to interconnect
    - The wind plant and synchronous condenser capabilities will be combined to determine the required reactive capability
- Qualified Non-Generator Reactive Resources that were not installed to facilitate the interconnection of another resource and cannot produce or absorb real power will be compensated for the full tested capability of the resource
  - Non-Generator Reactive Resources that are receiving cost recovery under the PTF cost recovery mechanism remain ineligible for CC credits

# FOLLOW-UP FROM FEBRUARY MARKETS COMMITTEE MEETING

# Existing Compensation Outside of 0.95 Leading to 0.95 Lagging Power Factor Range

- **Question:**
  - What quantity of MVAr outside of the 0.95 leading to 0.95 lagging power factor range receive Schedule 2 VAR CC compensation?
- **ISO Response:**
  - Resources receiving Schedule 2 CC Compensation: 199/286 eligible (69.5%)
  - Total Schedule 2 Qualified Vars: 14,505 MVAr
  - Current yearly CC credits: ~$16M
  - Total MVAr capability outside of 0.95 leading to 0.95 lagging power factor at continuous rated output: 3,118 MVAr
  - Total percentage of MVAr currently receiving Schedule 2 CC compensation outside of 0.95 leading to 0.95 lagging power factor at continuous rated output: 21%
  - Assuming no change in resources, projected CC credits for capability outside 0.95 leading to 0.95 lagging: ~$3-4M

# Reduction of Reactive Capability within an Interconnection Agreement

- **Question:**
  - What is the process for a Market Participant to reduce the reactive capability of a resource?
- **ISO Response:**
  - To modify a resource's capability where a change to the design or operating characteristics of the facility may have significant adverse impact, the Market Participant must utilize the Material Modification Determination (MMD) process
  - If a reduction in reactive capability of a resource causes reliability concerns, that resource may be restricted in real power output (including restricting the unit from operating) until those reliability concerns have been addressed

# Overview of Compliance Redlines and Effective Date

- Revisions are proposed to OATT Schedule 2 to facilitate compensation outside of the 0.95 leading to 0.95 lagging power factor range at continuous rated output
  - Conforming changes to Schedule 2 VAR Business Procedure and OP-23 (Resource Auditing) will be proposed as part of the implementation effort
  - Related conforming changes to Section III.13 of Market Rule 1 and Section I.2.2 of the Tariff will no longer be necessary for the revised proposal
- Proposed compliance effective date is 12/31/9998
  - ISO will commence implementation efforts following FERC acceptance of the compliance proposal
    - Implementation effort is expected to take 6-12 months following FERC acceptance of the compliance proposal
  - ISO will submit a filing with the Commission specifying a precise effective date prior to implementation

# TRANSMISSION COMMITTEE TARIFF REDLINES

# Overview of Updated Schedule 2 Redlines

| Schedule 2 Section | Overview of Changes |
|---|---|
| Introduction | Specifies that resources will no longer be compensated for reactive power capability provided within the 0.95 leading to 0.95 lagging power factor range |
| Section IV.A.1 | Specifies that resources will continue to be compensated for reactive power capability provided outside of the 0.95 leading to 0.95 lagging power factor range |
| Section IV.A.12(a) | Specifies how the quantity of "Qualified VARs" is determined for a Qualified Reactive Resource |
| Section IV.A.12(b) | Specifies how the quantity of "Qualified VARs" is determined for a Qualified Generator Reactive Resource that has not tested or has a waiver |
| Section IV.A.12(c) | Specifies how the quantity of "Qualified VARs" is determined for a Qualified Non-Generator Reactive Resource that has not tested or has a waiver |
| Section IV.A.12(d) | Specifies how the quantity of "Qualified VARs" is determined for a Qualified Non-Generator Reactive Resource that was interconnected to support another resource |

# Overview of Updated Schedule 2 Redlines (cont.)

| Schedule 2 Section | Overview of Changes |
|---|---|
| Section V.1.a | Incorporates adjustment for required reactive capability at 0.95 lagging power factor in calculation of Current Net Aggregate Tested Lagging VARs |
| Section V.1.b | Incorporates adjustment for required reactive capability at 0.95 lagging power factor in calculation of Current Net Aggregate Non-Tested Lagging VARs |
| Section V.2.a | Incorporates adjustment for required reactive capability at 0.95 leading power factor in calculation of Current Net Aggregate Tested Leading VARs |
| Section V.2.b | Notes adjustment for required reactive capability at 0.95 leading power factor in calculation of Current Net Aggregate Non-Tested Leading VARs |
| Section V.5.b | Replaces Economic Min with Summer Seasonal Claimed Capability in calculation of Monthly Net Leading VAR for a Qualified Reactive Resource that has not tested |

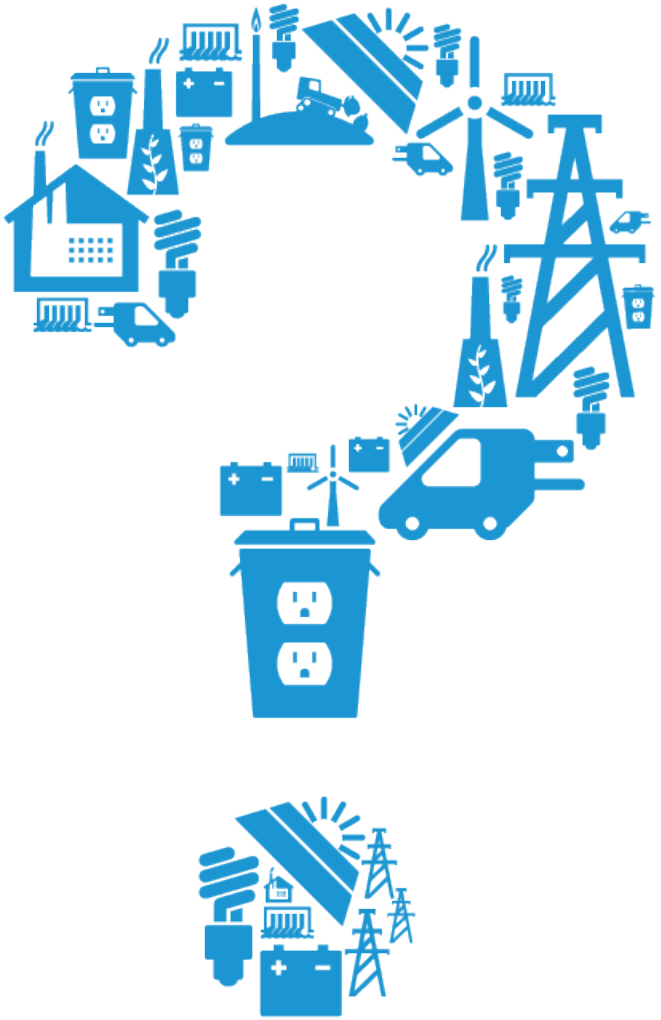
# Conclusion

- The ISO is proposing to:
  - Remove the Schedule 2 CC credits within the power factor range of 0.95 leading to 0.95 lagging
  - Continue compensation for capability outside the power factor range of 0.95 leading to 0.95 lagging
- Compliance filings are due March 28, 2025, and FERC allowed for an effective date up-to 90 days thereafter (by June 26, 2025)
  - However, the Order allows ISO/RTOs to request a later effective date to respect interplay between capacity, energy, and reactive power revenues
  - ISO will request a proposed effective date of "12/31/9998" to allow sufficient time to implement necessary modifications to procedures and software
    - ISO will submit a filing with the Commission specifying a precise effective date prior to implementation

# Stakeholder Schedule

| Stakeholder Committee and Date | Scheduled Project Milestone |
|---|---|
| **Transmission Committee<br>December 19, 2024** | Summary of compliance requirements and high-level compliance plan |
| **Transmission Committee<br>January 29, 2025** | Additional detail on compliance plan and initial review of proposed Tariff language |
| **Transmission Committee<br>February 27, 2025** | Review of revised Tariff language and vote |
| **Participants Committee<br>March 6, 2025** | Vote |

# Questions



# APPENDIX 1

*Background Provided at December TC*

# Current VAR Service Payments

- VAR Capacity Cost Compensation Program (CCCP)
  - Participating in the VAR CCCP as a Qualified Reactive Resource (QRR) is a voluntary election
  - Monthly credits to QRRs at VAR Capacity Cost (CC) rate for demonstrated lagging and leading capability at the Point of Interconnection (POI)
- Make-Whole Payments for Energy (Real Power)
  - As-needed credits to Reactive Resources dispatched by ISO to operate outside economic merit when required for voltage support
  - Three forms of make-whole credit:
    - Cost of Energy Produced (CEP) for energy production costs not recovered through energy revenue of resources committed for voltage support
    - Lost Opportunity Cost (LOC) for energy opportunity costs of resources dispatched out-of-merit relative to energy LMP for voltage support
    - Cost of Energy Consumed (CEC) for energy consumed by a reactive device when operated at zero real power output for voltage support

# Reactive Resources Provide Reactive Capability And System Voltage Support

- Regardless of QRR Status, Reactive Resources have obligations to:
  - Provide reactive capability to the full extent available
  - Maintain their voltage schedules designated by the ISO
  - When required by ISO, audit regularly to demonstrate reactive capability
  - Submit changes to reactive capability to ISO for study
- See *Appendix 2* for governing document references

# APPENDIX 2

*Governing Document References*

# Requirements for Provision and Auditing of Reactive Power

- NERC Standards:
  - MOD-025-2
  - MOD-032-1
  - VAR-002-4.1
- ISO Tariff
  - III.1.5.3 Reactive Capability Audits
  - OATT Schedules 22, 23, 25
- Planning Procedure
  - PP5-1 Section 2.1
- Operating Procedures
  - OP-12 Section IV.A.2 (and various others)
  - OP-23 Resource Auditing Section IV

# APPENDIX 3

*Example Reactive Capability Curve for Excess VAr Calculation*

# Example Reactive Capability Curve for Excess VAr Calculation