Provisional Interconnection Study Report for PI-2024-04

8/26/2024

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1.0 Executive Summary

The PI-2024-04 project is a Provisional Interconnection request for a 28 MW Combustion Turbine Facility with a Point of Interconnection (POI) at the Alamosa 115 kV substation. PI-2024-04 is the Provisional Interconnection request as associated with Generation Interconnection Request 5RSC-2024-19 in the 5RSC cluster.

The total cost of the transmission system improvements required for PI-2024-04 to qualify for Provisional Interconnection Service is estimated to be $3.296 million (Table 6).

The initial maximum permissible output of the PI-2024-04 Generating Facility is 28 MW. The maximum permissible output of the Generating Facility in the PLGIA[1] would be reviewed quarterly and updated, if there are changes to the system conditions assumed in this analysis, to determine the maximum permissible output.

Security: Based on 5RSC-2024-19 in the 5RSC selection of Energy Resource Interconnection Service (ERIS), the security associated with the Network Upgrades that might be identified at the conclusion of the 5RSC-2024-19 Large Generation Interconnection Procedure (LGIP) in the 5RSC cluster is $5 million.

The Interconnection Customer assumes all risk and liabilities with respect to changes between the PLGIA and the LGIA[2], including changes in output limits and Interconnection Facilities, Network Upgrades, Distribution Upgrades, and/or System Protection Facilities cost responsibility.

Note Provisional Interconnection Service in and of itself does not convey transmission service.

[1] **Provisional Large Generator Interconnection Agreement (PLGIA)** shall mean the interconnection agreement for Provisional Interconnection Service established between Transmission Provider and/or the Transmission Owner and the Interconnection Customer. The pro forma agreement is provided in Appendix 8 and takes the form of the Large Generator Interconnection Agreement, modified for provisional purposes.

[2] **Large Generator Interconnection Agreement (LGIA)** shall mean the form of interconnection agreement applicable to an Interconnection Request pertaining to a Large Generating Facility that is included in the Transmission Provider's Tariff.

2.0 Introduction

PI-2024-04 is the Provisional Interconnection Service[3] request for a 28 MW Combustion Turbine Generating Facility located in Alamosa County, Colorado.

- The POI of this project is the Alamosa 115 kV substation, an existing substation.
- The Commercial Operation Date (COD) to be studied for PI-2024-04 as noted on the Provisional Interconnection request for is May 31, 2027.

The geographical location of the transmission system near the POI is shown in Figure 1.

[3] **Provisional Interconnection Service** shall mean an Interconnection Service provided by Transmission Provider associated with interconnecting the Interconnection Customer's Generating Facility to Transmission Provider's Transmission System and enabling that Transmission System to receive electric energy and capacity from the Generating Facility at the Point of Interconnection, pursuant to the terms of the Provisional Large Generator Interconnection Agreement and, if applicable, the Tariff.

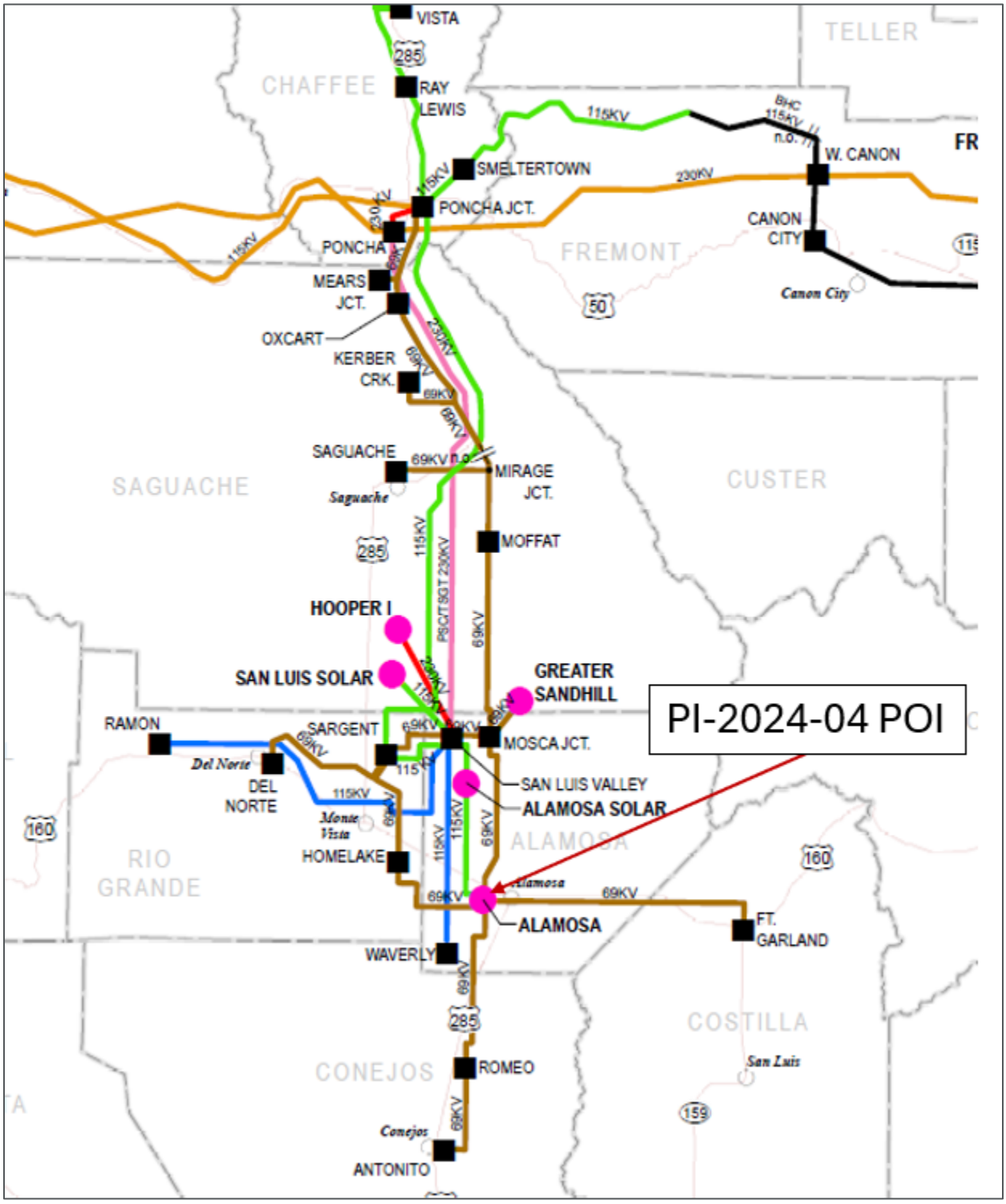


Figure 1: Point of Interconnection of PI-2024-04

3.0 Study Scope

The purpose of this study is to determine the impacts to the PSCo system and the Affected Systems from interconnecting PI-2024-04 for Provisional Interconnection Service. Consistent with the assumption in the study agreement, PI-2024-04 selected Energy Resource Interconnection Service (ERIS)[4].

The scope of this report includes voltage and reactive capability evaluation, steady state (thermal and voltage) analysis, transient stability analysis, short-circuit analysis, and cost estimates for Interconnection Facilities and Station Network Upgrades. The study also identifies the estimated Security[5] and Contingent Facilities associated with the Provisional Service.

3.1 Steady-State Criteria

The following Criteria are used for the reliability analysis of the PSCo system and Affected Systems:

P0—System Intact conditions:

Thermal Loading: <=100% of the normal facility rating

Voltage range: 0.95 to 1.05 per unit

P1 & P2-1—Single Contingencies:

Thermal Loading: <=100% Normal facility rating

Voltage range: 0.90 to 1.10 per unit

Voltage deviation: <=8% of pre-contingency voltage

P2 (except P2-1), P4, P5 & P7—Multiple Contingencies:

Thermal Loading: <=100% Emergency facility rating

Voltage range: 0.90 to 1.10 per unit

Voltage deviation: <=8% of pre-contingency voltage

[4] **Energy Resource Interconnection Service** shall mean an Interconnection Service that allows the Interconnection Customer to connect its Generating Facility to the Transmission Provider's Transmission system to be eligible to deliver the Generating Facility's electric output using the existing firm and non-firm capabilities of the Transmission Provider's Transmission System on an as available basis.

[5] **Security** estimates the risk associated with the Network Upgrades and Interconnection Facilities that could be identified in the corresponding LGIA.

3.2 Transient Stability Criteria

The transient voltage stability criteria are as follows:

a. Following fault clearing, the voltage shall recover to 80% of the pre-contingency voltage within 20 seconds of the initiating event for all P1 through P7 events for each applicable Bulk Electric System (BES) bus serving load.
b. Following fault clearing and voltage recovery above 80%, voltage at each applicable BES bus serving load shall neither dip below 70% of pre-contingency voltage for more than 30 cycles nor remain below 80% of pre-contingency voltage for more than two seconds, for all P1 through P7 events.
c. For Contingencies without a fault (P2.1 category event), voltage dips at each applicable BES bus serving load shall neither dip below 70% of pre-contingency voltage for more than 30 cycles nor remain below 80% of pre-contingency voltage for more than two seconds.

The transient angular stability criteria are as follows:

a. P1—No generating unit shall pull out of synchronism. A generator being disconnected from the system by fault clearing action or by a special Protection System is not considered an angular instability.
b. P2–P7—One or more generators may pull out of synchronism, provided the resulting apparent impedance swings shall not result in the tripping of any other generation facilities.
c. P1–P7—The relative rotor angle (power) oscillations are characterized by positive damping (i.e., amplitude reduction of successive peaks) > 5% within 30 seconds.

3.3 Breaker Duty Analysis Criteria

Fault Current after PI addition should not exceed 100% of the Breaker Duty rating. PSCo can only perform breaker duty analysis on the PSCo system. Before the PI goes in-service the Affected Systems may choose to perform a breaker duty analysis to identify breaker duty violations on their system.

3.4 Study Methodology

For PSCo and non-PSCo facilities, thermal violations attributed to the request include all new facility overloads with a thermal loading >100% and increased by 1% or more from the benchmark case overload post the Generator Interconnection Request (GIR) addition.

The voltage violations assigned to the request include new voltage violations which resulted in a further variation of 0.01 per unit.

Since the request is for Provisional Service, if thermal or voltage violations are seen, the maximum permissible Provisional Interconnection before violations is identified. For voltage violations caused by reactive power deficiency at the POI, voltage upgrades are identified.

The Provisional Interconnection request should meet the transient stability criteria stated in Section 3.2 If the addition of the GIR causes any violations, the maximum permissible Provisional Interconnection Service before violations is identified.

3.5 Contingency Analysis

The transmission system on which steady state contingency analysis is run includes the WECC designated areas 70 and 73.

The transient stability analysis is performed for the following worst-case contingencies shown in Table 1.

Table 1 – Transient Stability Contingencies

Ref. No.	Fault Location	Fault Category	Outage(s)	Clearing Time (Cycles)
1	Alamosa Terminal - Blanca Peak 115 kV Line	P1	Alamosa Terminal - Blanca Peak 115 kV Line	6
2	Alamosa Terminal - San Luis Valley 115 kV Line	P1	Alamosa Terminal - San Luis Valley 115 kV Line	6
3	Alamosa 115 kV Bus	P1	Alamosa Terminal 115/69 kV Transformer T4	6
4	Alamosa Terminal 115 kV - Blanca Peak 115 kV Line	P4	- Alamosa Terminal - Blanca Peak 115 kV Line - Alamosa CT2 Generation - Alamosa Terminal 115 kV Load P2 and P3	22

3.6 Study Area

The San Luis Valley (SLV) study area includes WECC designated zones 710. As described in Section 3.11 of the BPM, this study pocket is comprised of all generation within the SLV area with associated nameplate capacity, including:

- San Luis Solar (SLV 230 kV), 52 MW PV
- Iberdrola Solar (SLV 115 kV), 30 MW PV
- Cogentrix Solar (Blanca Peak 115 kV), 30 MW PV
- Greater Sandhills Solar (Mosca 69 kV), 19 MW PV
- Alamosa CTs, 37.3 MW

The study did not identify any impacts to Affected Systems.

4.0 Base Case Modeling Assumptions

The 2029HS2a WECC case released on May 3, 2023, was selected as the Starting Case. The Base Case was created from the Starting Case by including the following modeling changes.

- Shortgrass to Goose Creek uprate to 1439 MVA – ISD TBD
- Poncha – San Luis Valley 115 kV L9811 uprate to 239 MVA – ISD 8/20/2025.
- Daniels Park-Prairie-Greenwood Uprate L5707 to 956 MVA – ISD 6/1/2026.
- Leetsdale-Monroe-Elati line 5283 uprate to 956 MVA – ISD 5/31/2026.
- Uprate Lines 6935/6936 69 kV from Alamosa - Mosca - San Luis Valley to 800 A, 95 MVA – ISD 5/15/2026.
- Daniels Park-Prairie-Greenwood Uprate L5111 to 956 MVA – ISD 10/21/2026.
- Additional Harvest Mile to Smoky Hill 230 kV Line – ISD 5/14/2027.
- Leetsdale to University Line 9338 – ISD 9/9/2026.
- Tollgate Load Shift – ISD 7/7/2026.
- New Arapahoe T6 230/115 kV, 272/319 MVA – ISD 2/10/2027.
- Cherokee-Federal Heights-Broomfield L9558 Line rebuild – ISD 11/18/2026.
- MidwayPS 230/115 T1 Transformer Replacement with 280 MVA – ISD 10/7/2026.
- Leetsdale-Harrison L9955 Uprate to 1900 A – ISD 11/16/2027.
- Uprate Line 9255 115kV from Poncha Junction to Otero Tap 1200A 239 MVA – ISD 5/1/2028.
- Cherokee-Federal Heights-Semper Line 9055 rebuild – ISD 6/1/2029.
- Semper-Broomfield Line 9464 rebuild – ISD 6/1/2029.
- Add Smoky Hill 345/230 T6 Transformer – ISD 9/27/2028.
- San Luis Valley – Blanca Peak Line 9431 115kV uprate to 800A, 159 MVA – ISD 6/20/2028.
- Poncha – San Luis Valley 230 kV L3006 Uprate to 478 MVA – ISD 5/11/2029.
- New Line (second circuit) 115kV from Alamosa Terminal - San Luis Valley 1200 A 239MVA – ISD 6/15/2028.
- Cherokee-Lacombe 230 kV L5057 Uprate to 1900 A, 756 MVA – ISD 9/13/2029.
- Daniels Park 345/230 kV Transformer #4 – ISD 9/13/2029.
- Add Chambers T3 230/115 Transformer – ISD 9/13/2029.
- Capital-Denver Terminal L9007 Uprate to 1900 A – ISD 9/13/2029.
- Havana-Chambers 115 kV L9543 & L9544 Uprate - ISD 9/13/2029.
- New double circuit from Cherokee-Sandown-Chambers-Harvest Mile 230 kV – ISD 9/13/2029.
- Sandown 230/115 kV Transformer #1 Uprate to 560/756 MVA – ISD TBD.
- New Fort Lupton 230/115 kV, 273/319 MVA Transformer #4 – ISD TBD.
- New Allison to Chatfield 230 kV transmission line rated at 283 MVA – ISD TBD.

Additionally, the following segments of the Colorado Power Pathway (CPP) were included in the Base Case:

- Segment #1: Fort St. Vrain – Canal Crossing 345 kV Double Circuit
- Segment #2: Canal Crossing – Goose Creek 345 kV Double Circuit
- Segment #3: Goose Creek – May Valley 345 kV Double Circuit

The Base Case model includes the existing PSCo generation resources and all Affected Systems' existing resources.

While the higher-queued NRIS requests were dispatched at 100%, the higher-queued ERIS requests were modeled offline.

4.1 Benchmark Case Modeling

The Benchmark Case was created from the Base Case described in Section 4.0 by changing the study pocket generation dispatch to reflect heavy generation in the SLV study pocket. This was accomplished by adopting the stressed generation dispatch given in Table 2.

Table 2 – Generation Dispatch Used to Create the San Luis Valley Benchmark Case (MW is Gross Capacity)

Generator Bus No.	Name	kV	ID	Pgen (MW)	Pmax (MW)
70485	ALMSACT1	13.8	G1	17.28	19.20
70486	ALMSACT2	13.8	G2	16.29	18.10
70932	SLVS_IBRDRLA	34.5	S2	25.50	30.00
70933	ALAMOSA_PV	34.5	S3	25.50	30.00
70931	GSANDHIL_PV	34.5	S1	16.15	19.00
70935	SUNPOWER	34.5	S1	44.20	52.00
Total (MW)				**144.92**	**168.30**

4.2 Study Case Modeling

A Study Case was created from the Benchmark Case by turning on the PI-2024-04 generation. The additional 28 MW output from PI-2024-04 was balanced against PSCo generation outside of the SLV study pocket. As described in Section 3.11 of the BPM, this study pocket is comprised of all generation within the SLV area with associated nameplate capacity, including:

- San Luis Solar (SLV 230 kV), 52 MW PV
- Iberdrola Solar (SLV 115 kV), 30 MW PV
- Cogentrix Solar (Blanca Peak 115 kV), 30 MW PV
- Greater Sandhills Solar (Mosca 69 kV), 19 MW PV
- Alamosa CTs, 37.3 MW

4.3 Short-Circuit Modeling

The Integrated System Planning - OATT Department has requested Fault Studies for a Provisional Interconnection request. This request is for the Interconnection of a 28 MW Combustion Turbine Generating Facility (PI-2024-04) to the Alamosa 115 kV substation. The output will not exceed 28 MW at the POI.

This project will add one (1) GE LM2500 combustion turbine to the Alamosa Terminal 115 kV Substation with a COD of 5/31/2027. Generator 1 will be disconnected on 9/2025 and Generator 2 will be disconnected on 3/2026. PI-2024-5 at Alamosa Terminal will come online on 3/31/2026. One 115/13.8 kV main GSU transformer rated at 24/32/40 MVA will step the voltage up from the generator voltage to the POI voltage. The generation is directly connected to the Alamosa Terminal 115 kV switchyard.

All connected generating facilities were assumed capable of producing maximum fault current. As such, all generation was modeled at full capacity, whether NRIS or ERIS is requested. Generation is modeled as a separate generating resource in CAPE and included at full capacity in the short circuit study, regardless of any limitations to the output that would be imposed otherwise. The short circuit study assumes that Alamosa Generators 1 and 2 have been removed prior to the PI-2024-04 installation and that PI-2024-05 is online.

5.0 Provisional Interconnection Service Analysis

5.1 Voltage and Reactive Power Capability Evaluation

Per Section 4.1.1.1 of the BPM, the following voltage regulation and reactive power capability requirements are applicable to non-synchronous generators:

- Xcel Energy's OATT requires all non-synchronous generator Interconnection Customers to provide dynamic reactive power within the power factor range of 0.95 leading to 0.95 lagging at the high side of the generator substation. Furthermore, Xcel Energy requires every Generating Facility to have dynamic voltage control capability to assist in maintaining the POI voltage schedule specified by the Transmission Operator.
- It is the responsibility of the Interconnection Customer to determine the type (switched shunt capacitors and/or switched shunt reactors, etc.), the size (MVar), and the locations (on the Interconnection Customer's facility) of any additional static reactive power compensation needed within the generating plant in order to have adequate reactive capability to meet the +/- 0.95 power factor at the high side of the main step-up transformer.
- It is the responsibility of the Interconnection Customer to compensate their generation tie-line to ensure minimal reactive power flow under no load conditions.

Per Section 4.1.1.2 in the BPM, the following voltage regulation and reactive power capability requirements are applicable to synchronous generators:

- Xcel Energy's OATT requires all synchronous Generator Interconnection Customers to provide dynamic reactive power within the power factor range of 0.95 leading to 0.95 lagging at the POI.
- The reactive power analysis performed in this report is an indicator of the reactive power requirements at the POI and the capability of the generator to meet those requirements. The Interconnection Customer is required to demonstrate to the satisfaction of PSCo Transmission Operations prior to the commercial in-service date of the generating plant that it can safely and reliably operate within the required power factor and the regulating voltage of the POI.

Per Section 4.4.1 in the BPM, the following steps shall be followed to perform the reactive power capability evaluation for synchronous generators:

a. The reactive power evaluation of the Synchronous generators is done by dispatching the generator at Pmax and changing the POI voltage till Qmax and Qmin are reached.
b. This step is repeated for Pmin.
c. The POI voltage and power factor for the two evaluations are noted. If the POI power factor of 0.95 is reached and the POI voltage stays under the voltage guidance values noted (1-1.04 p.u. for the 230 kV system, 1-1.05 for the 345 kV system and 1-1.03 for 115 kV system), the GIR is considered to meet reactive power requirements. If not, additional dynamic reactive support would be identified.

All proposed reactive devices in customer provided models are switched favorably to provide appropriate reactive compensation in each test, therefore identified deficiencies are in addition to any proposed reactive compensation.

All summary tables representing GIRs' Voltage and Reactive Power Capability tests adhere to the following color formatting representing the different aspects of the tests:

- Values highlighted in red indicate a failed reactive power requirement.
- Voltages outside the following ranges are highlighted in yellow to provide additional information.
    - 1.00 – 1.03 for 115 kV system
    - 1.00 – 1.04 for 230 kV system
    - 1.00 – 1.05 for 345 kV system

The PI-2024-04 GIR is modeled as follows:

Combustion Turbine Generator: Pgen = 28.3 MW, Pmin = 8.0 MW, Qmax = 30.0 MVar, Qmin= -11.0 MVar

The summary for the Voltage and Reactive Power Capability Evaluation for PI-2024-04 is:

- The GIR is capable of meeting 0.95 lagging pf at the POI while maintaining an adequate POI bus voltage, at either operating point.
- The GIR is capable of meeting 0.95 leading pf at the POI while maintaining an adequate POI bus voltage, at either operating point.

The Voltage and Reactive Power Capability tests performed for PI-2024-04 are summarized in Table 3.

Table 3 – Reactive Power Capability Evaluation for PI-2024-04

Test	POI			
	P (MW)	Q (Mvar)	V (p.u.)	PF
Pmax - Lagging	28.00	25.90	1.015	0.731
Pmax - Leading	28.00	-13.80	1.021	0.898
Pmin - Lagging	8.00	25.10	1.030	0.277
Pmin - Leading	8.00	-11.60	1.020	0.568

5.2 Steady-State Analysis

Contingency analysis was performed on the SLV study pocket using the Study Case model.

- System Intact analysis showed no thermal or voltage violations attributed to PI-2024-04.
- Single Contingency analysis showed no thermal or voltage violations attributed to PI-2024-04.
- Multiple Contingency analysis showed no thermal or voltage violations attributed to PI-2024-04.

5.3 Transient Stability Results

The following results were obtained for the disturbances analysed:

- ✓ No machines lost synchronism with the system.
- ✓ No transient voltage drop violations were observed.
- ✓ Machine rotor angles displayed positive damping.

The results of the contingency analysis are shown in Table 4. The transient stability plots are shown in Appendix A in Section 10.0 of this report.

Table 4 – Transient Stability Analysis Results

Ref. No.	Fault Location	Fault Category	Outage(s)	Clearing Time (Cycles)	Post-Fault Voltage Recovery	Angular Stability
1	Flat Run	P0	-	-	Stable	Stable
2	Alamosa Terminal - Blanca Peak 115 kV Line	P1	Alamosa Terminal - Blanca Peak 115 kV Line	6	Stable	Stable
3	Alamosa Terminal - San Luis Valley 115 kV Line	P1	Alamosa Terminal - San Luis Valley 115 kV Line	6	Stable	Stable
4	Alamosa 115 kV Bus	P1	Alamosa Terminal 115/69 kV Transformer T4	6	Stable	Stable
5	Alamosa Terminal 115 kV - Blanca Peak 115 kV Line	P4	- Alamosa Terminal - Blanca Peak 115 kV Line - Alamosa CT2 Generation - PI-2024-04 Generation (CT3) - Alamosa Terminal 115 kV Load P2 and P3	22	Stable	Stable

5.4 Short-Circuit and Breaker Duty Analysis Results

The fault currents at the POI for three-phase and phase-to-ground faults can be found in Table 5 below, along with the Thevenin impedance at the POI. Both the base case and the case with the GIR added are shown.

Table 5 – Short-Circuit Parameters at PI-2024-04 POI (Alamosa 115 kV substation)

	Before the PI Addition with Generator 1 Removed and PI-2024-5 Online	After the PI Addition with Generators 1 & 2 Removed and PI-2024-5 Online
Three Phase		
Three Phase Current	3310A	3510 A
Positive Sequence Impedance	3.70595 + j23.3419 ohms	3.23501 + j21.8092 ohms
Negative Sequence Impedance	3.90182 + j23.1747 ohms	3.23597 + j21.8095 ohms
Zero Sequence Impedance	1.53263 + j11.5278 ohms	1.32537 + j10.3988 ohms
Phase-to-Ground		
Single Line to Ground Current	4230 A	4490 A
Positive Sequence Impedance	3.70595 + j23.3419 ohms	3.23501 + j21.8092 ohms
Negative Sequence Impedance	3.90182 + j23.1747 ohms	3.23597 + j21.8095 ohms
Zero Sequence Impedance	1.53263 + j11.5278 ohms	1.32537 + j10.3988 ohms

A breaker duty study on the PSCo transmission system did not identify any circuit breakers that became over-dutied due to the addition of PI-2024-04.

5.5 Affected Systems

The study did not identify any impacts to Affected Systems.

5.6 Summary of Provisional Interconnection Analysis

The maximum allowable output of the GIR without requiring any additional System Network Upgrades is 28 MW.

6.0 Cost Estimates

The total cost of the required Upgrades for PI-2024-04 to interconnect for Provisional Interconnection Service at the Alamosa 115 kV substation is estimated to be **$3.296 million**.

- **Cost of Transmission Provider's Interconnection Facilities (TPIF) is $3.296 million** (Table 6)
- **Cost of Station Network Upgrades is $0**
- **Cost of System Network Upgrades is $0**

The list of improvements required to accommodate the Provisional Interconnection of PI-2024-04 are given in Table 6.

Since the POI is a new substation, a CPCN would be required to accommodate the interconnection.

Table 6 – Transmission Provider's Interconnection Facilities

Element	Description	Cost Est. (Million)
PSCo's Alamosa Terminal 115 kV Substation	Interconnection of 5RSC-2024-19 (PI-2024-04) at the Alamosa Terminal 115 kV Substation. The new equipment includes: • (1) 115 kV single bay dead end structure • (1) 115 kV 3-phase arrester • (3) 115 kV disconnect switch • (3) 115 kV CCVT/PTs metering unit • Dual fiber communication equipment • Associated electrical equipment, bus, wiring and grounding • Associated foundations and structures • Associated transmission line communications, fiber, relaying and testing	$3.246
PSCo's Alamosa Terminal 115 kV Substation	Transmission line into substation from customer's dead-end structure on gen-tie. Single span, conductor, insulators, hardware and labor.	$0.050
Total Cost Estimate for Interconnection Customer-Funded, PSCo-Owned Interconnection Facilities		**$3.296**

PSCo has developed cost estimates for Interconnection Facilities and Network/Infrastructure Upgrades required for the interconnection of PI-2024-04 for Provisional Interconnection Service. The estimated costs provided in this report are based upon the following assumptions:

- The estimated costs are in 2024 dollars with escalation and contingencies applied.
- Allowances for Funds Used During Construction (AFUDC) is not included.
- The estimated costs include all applicable labor and overheads associated with the siting, engineering, design, and construction of these new PSCo facilities.
- The estimated costs do not include the cost for any Customer owned equipment and associated design and engineering.
- Labor is estimated for straight time only—no overtime included.
- PSCo (or its Contractor) will perform all construction, wiring, testing, and commissioning for PSCo owned and maintained facilities.

The customer requirements include:

- Customer will install two (2) redundant fiber optic circuits (one primary circuit with a redundant backup) into the Transmission Provider's substation as part of its interconnection facilities construction scope.
- Power Quality Metering (PQM) will be required on the Customer's generation tie-line terminating into the POI.
- The Customer will be required to design, procure, install, own, operate and maintain a Load Frequency/Automated Generation Control (LF/AGC) RTU at their Customer substation. PSCo will be provided with indications, readings, and data from the LF/AGC RTU.
- The Interconnection Customer will comply with the Interconnection Guidelines for Transmission Interconnected Producer-Owned Generation Greater Than 20 MW, as amended from time to time, and available at: XEL-POL-Transmission Interconnection Guideline Greater 20MW

6.1 Schedule

This section provides proposed milestones for the interconnection of PI-2024-04 to the Transmission Provider's Transmission System. The customer requested a back-feed date (In-

Service Date for Transmission Provider Interconnection Facilities and Station Network Upgrades required for interconnection) for the Provisional Interconnection of September 2025. This is not attainable by the Transmission Provider, based upon the current schedule developed for this interconnection request. The Transmission Provider proposes the milestones provided below in Table 8.

Table 7 – Proposed Milestones for PI-2024-04

Milestone	Responsible Party	Estimated Completion Date
LGIA Execution	Interconnection Customer and Transmission Provider	October 2024
In-Service Date for Transmission Provider Interconnection Facilities and Station Network Upgrades required for interconnection	Transmission Provider	January 29, 2027
In-Service Date & Energization of Interconnection Customer's Interconnection Facilities	Interconnection Customer	January 29, 2027
Initial Synchronization Date	Interconnection Customer	April 1, 2027
Begin trial operation & testing	Interconnection Customer and Transmission Provider	April 1, 2027
Commercial Operation Date	Interconnection Customer	May 31, 2027

Some schedule elements are outside of the Transmission Provider's control and could impact the overall schedule. The following schedule assumptions provide the basis for the schedule milestones:

- Construction permitting (if required) for new facilities will be completed within 12 months of LGIA execution.
- The Transmission Provider is currently experiencing continued increases to material lead times which could impact the schedule milestones. The schedule milestones are based upon material lead times known at this time.
- Availability of line outages to interconnect new facilities to the transmission system.

7.0 Summary of Provisional Interconnection Service Analysis

The total estimated cost of the PSCo transmission system improvements required for PI-2024-04 to qualify for Provisional Interconnection Service would be $3.296 million.

The initial maximum permissible output of PI-2024-04 Generating Facility is 28 MW. The maximum permissible output of the Generating Facility in the PLGIA would be reviewed quarterly and updated if there are changes to system conditions compared to the system conditions previously used to determine the maximum permissible output.

Security: Based on 5RSC-2024-19 in the 5RSC selection of Energy Resource Interconnection Service (ERIS), the security associated with the Network Upgrades that might be identified at the conclusion of the 5RSC-2024-19 Large Generation Interconnection Procedure (LGIP) in the 5RSC cluster is $5 million.

Note that Provisional Interconnection Service in and of itself does not convey transmission service.

8.0 Contingent Facilities

The Contingent Facilities identified for PI-2024-04 include the TPIF Upgrades identified in Table 6.

9.0 Preliminary One-Line Diagram and General Arrangement for PI-2024-04

Figure 2: Preliminary One-Line of PI-2024-04 at Alamosa 115 kV Substation

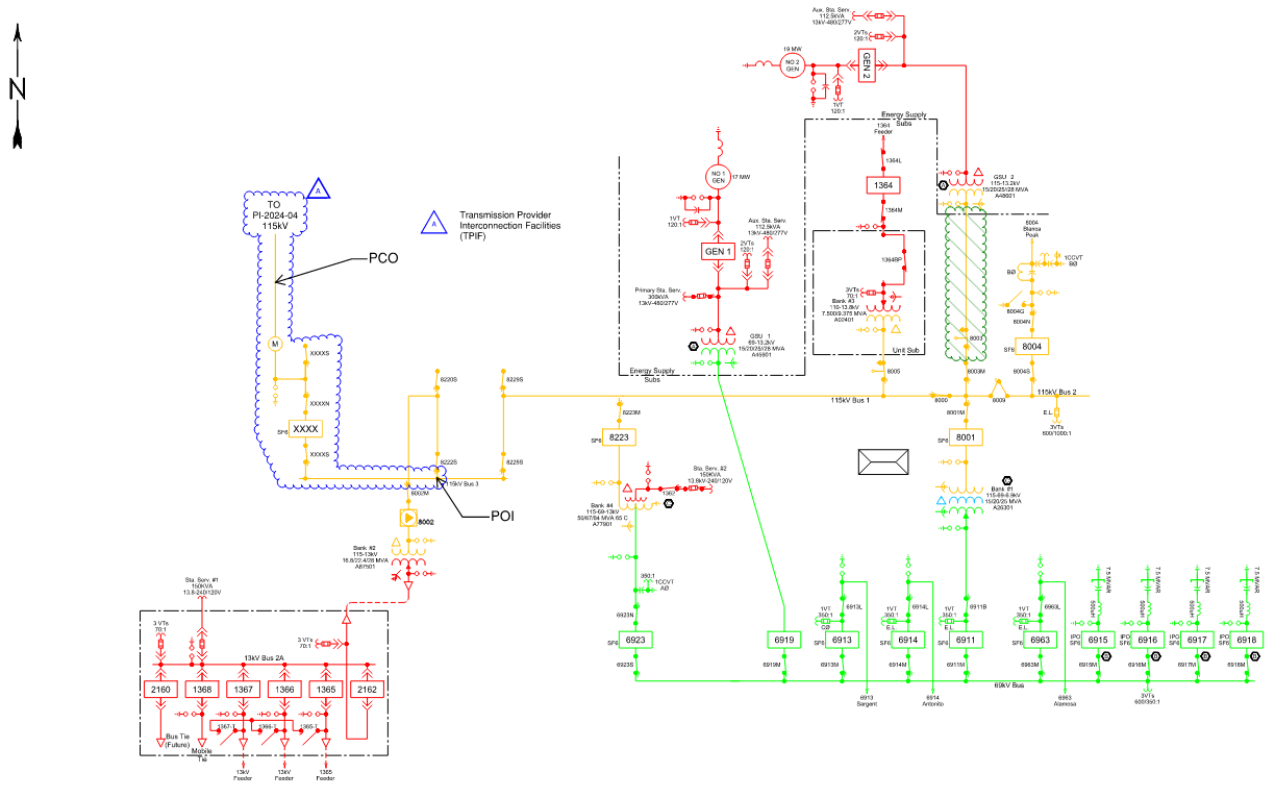
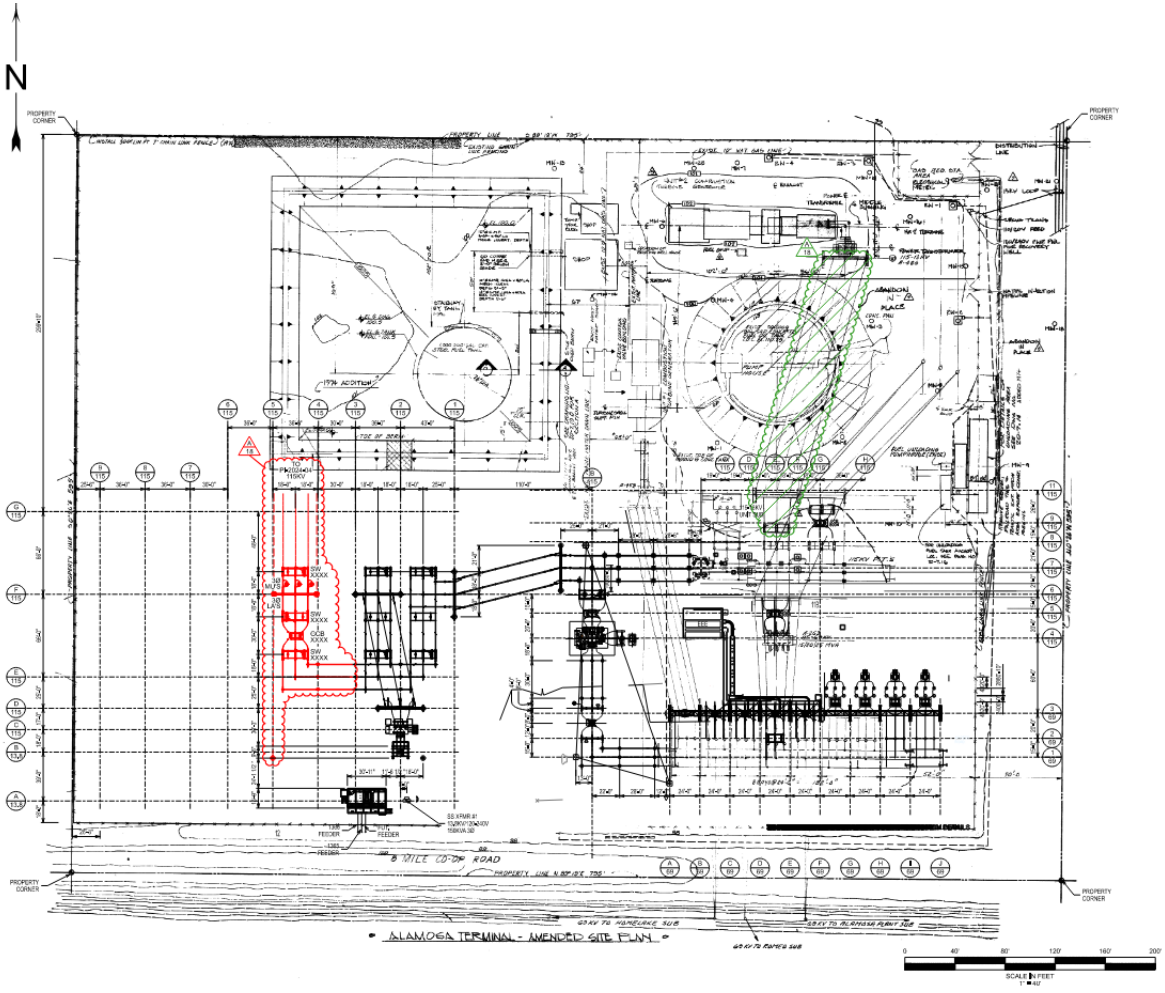


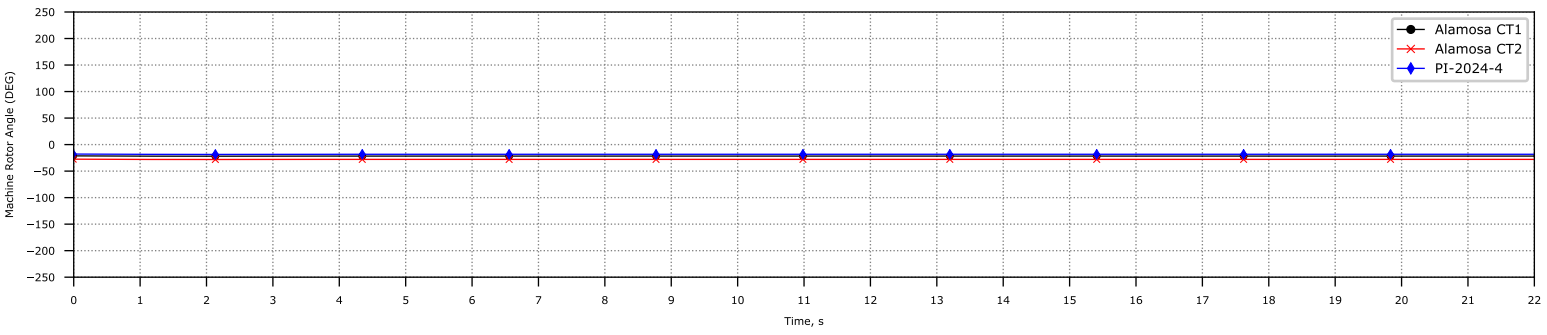
Figure 3: Preliminary General Arrangement for PI-2024-04 at Alamosa 115 kV Substation

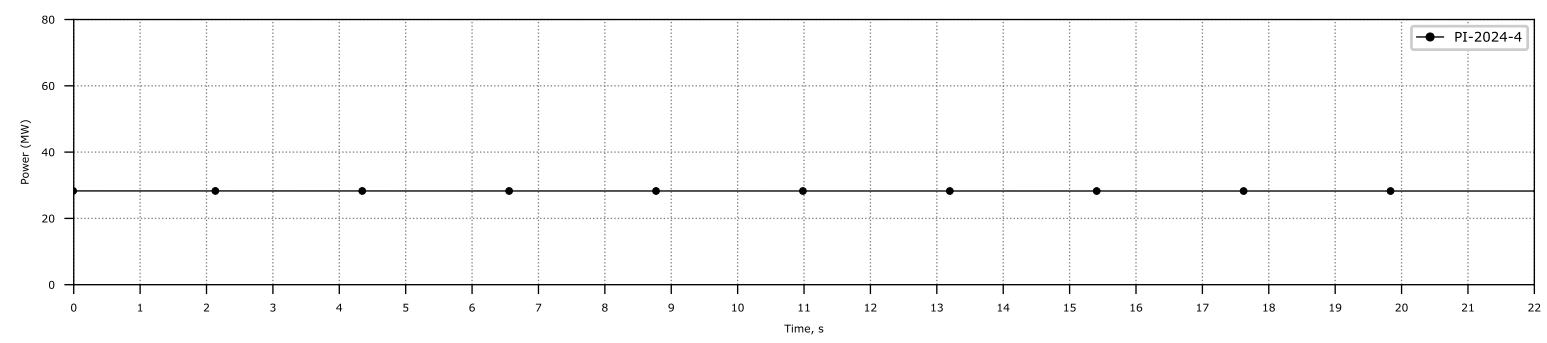


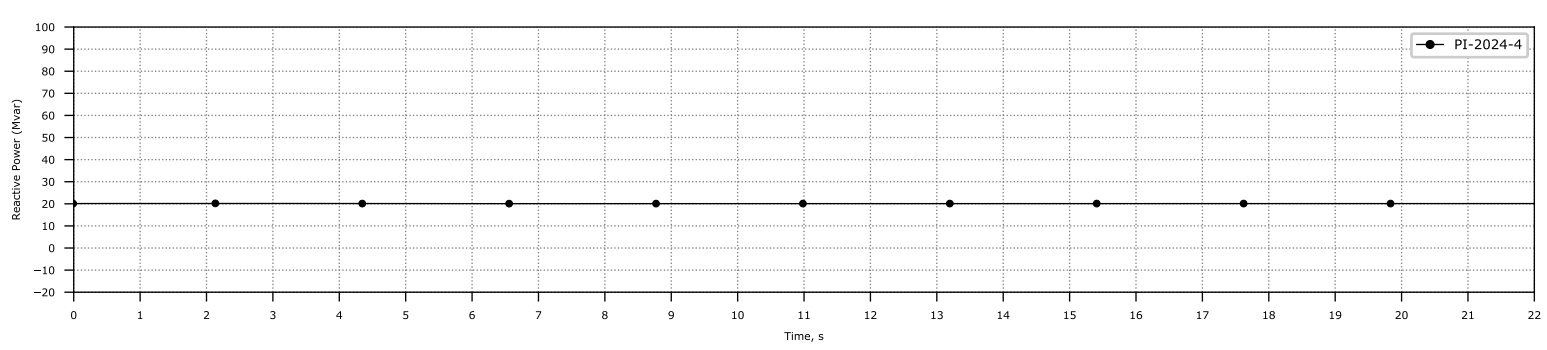
10.0 Appendices

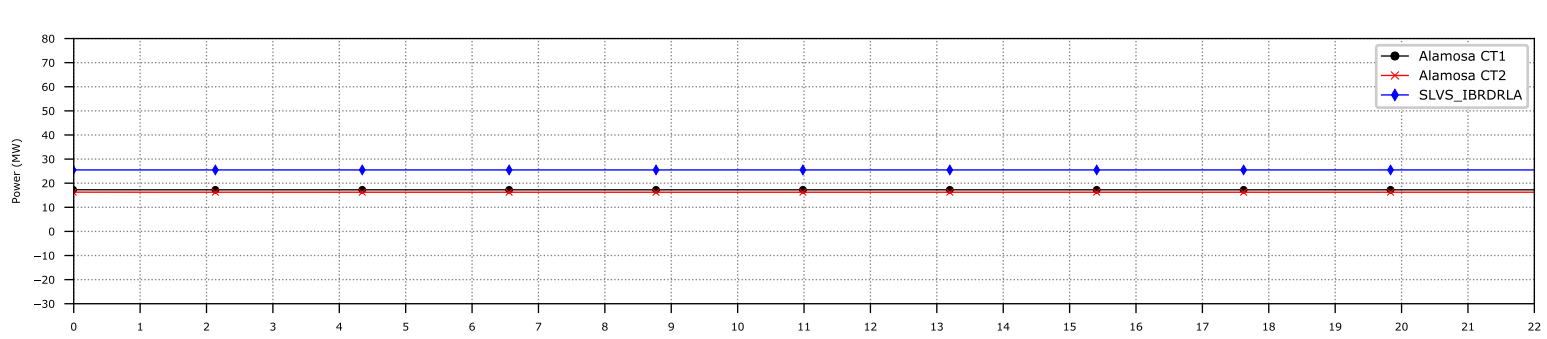
Appendix A: Transient Stability Plots	PI-2024-4_Transient Stability Plots.pdf

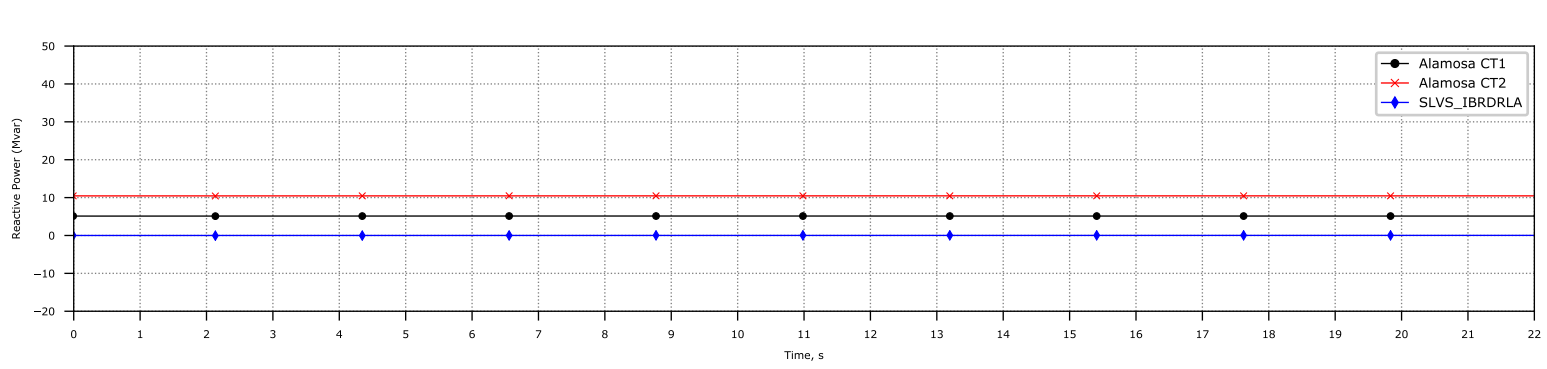
PI-2024-4_Study_SLV_flatrun

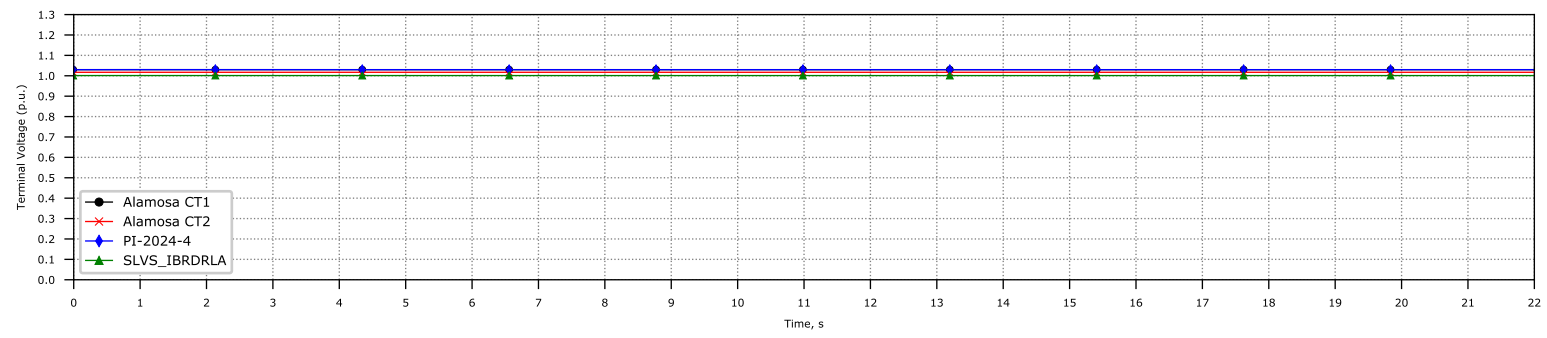


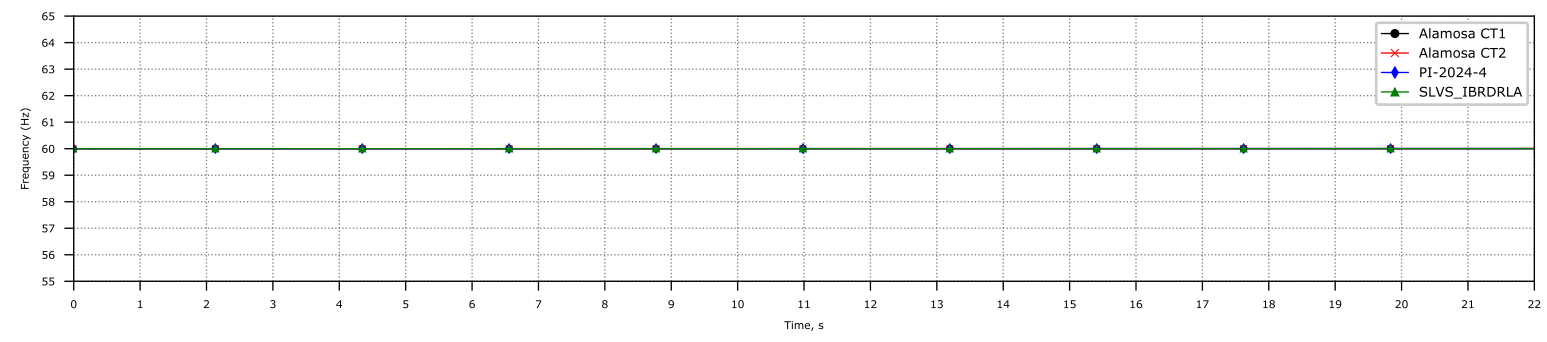


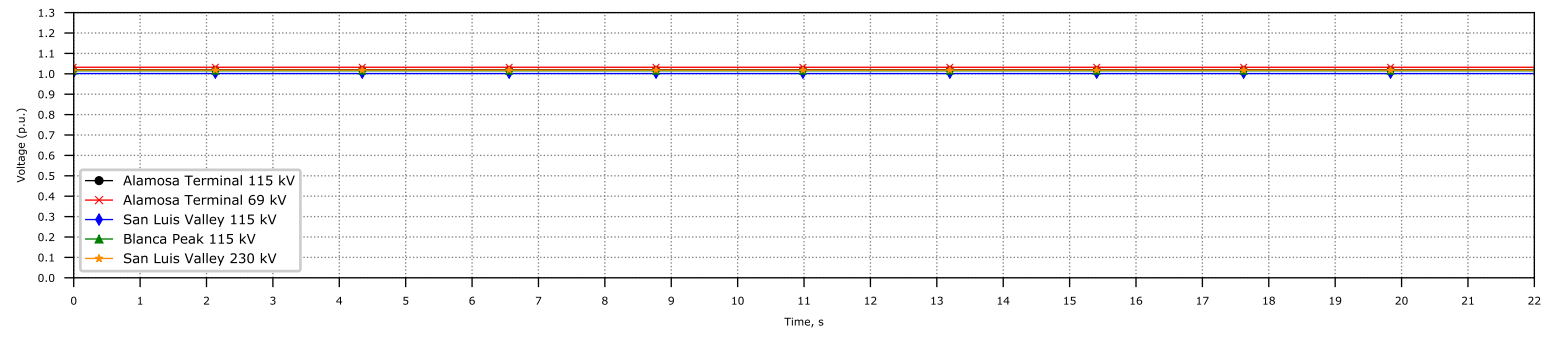




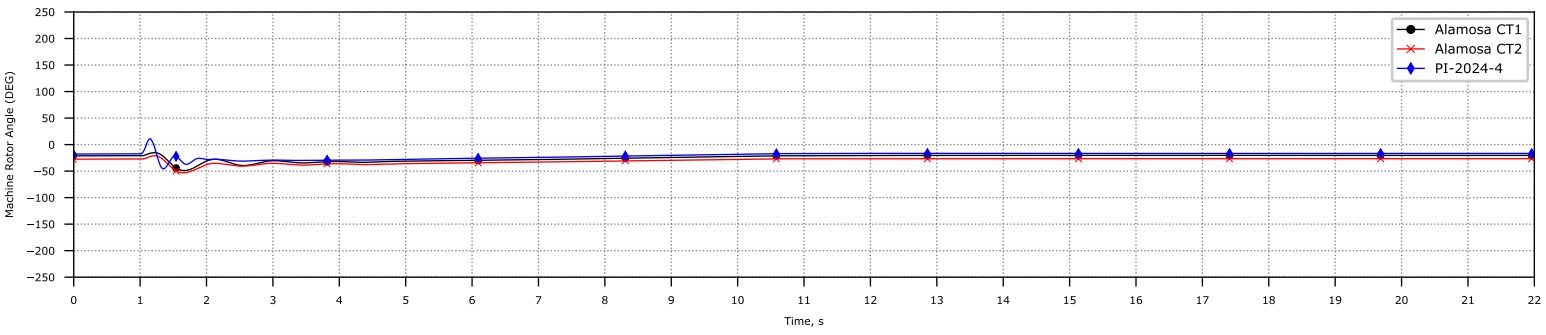


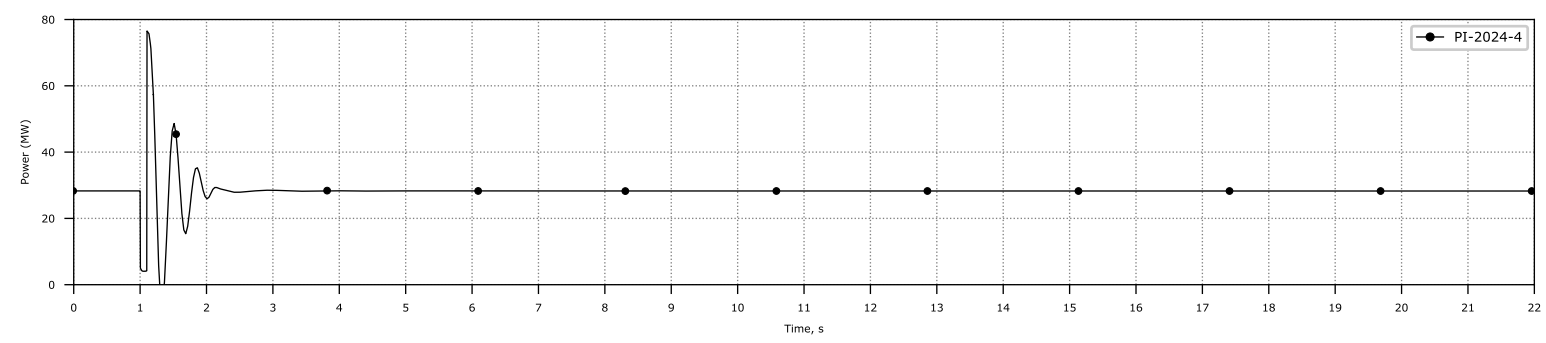


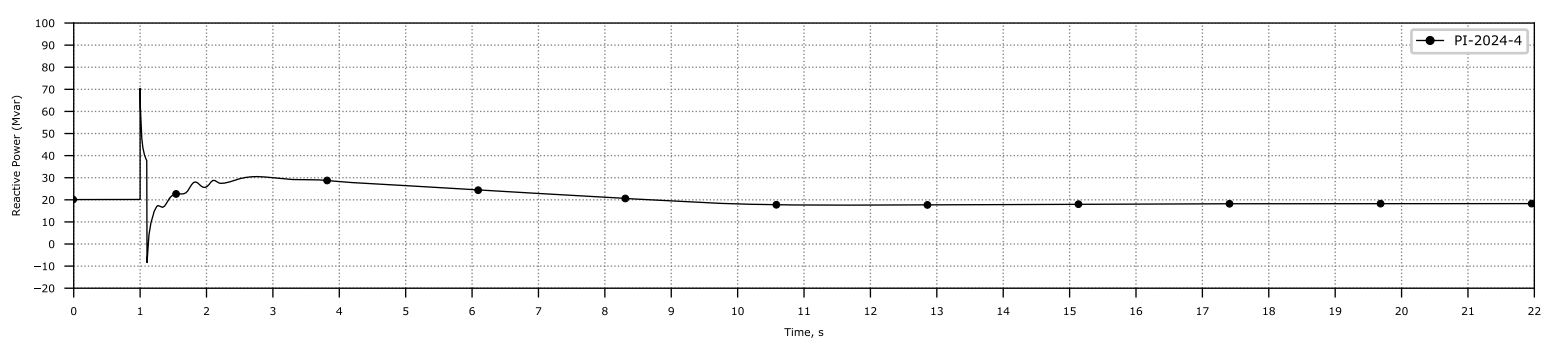


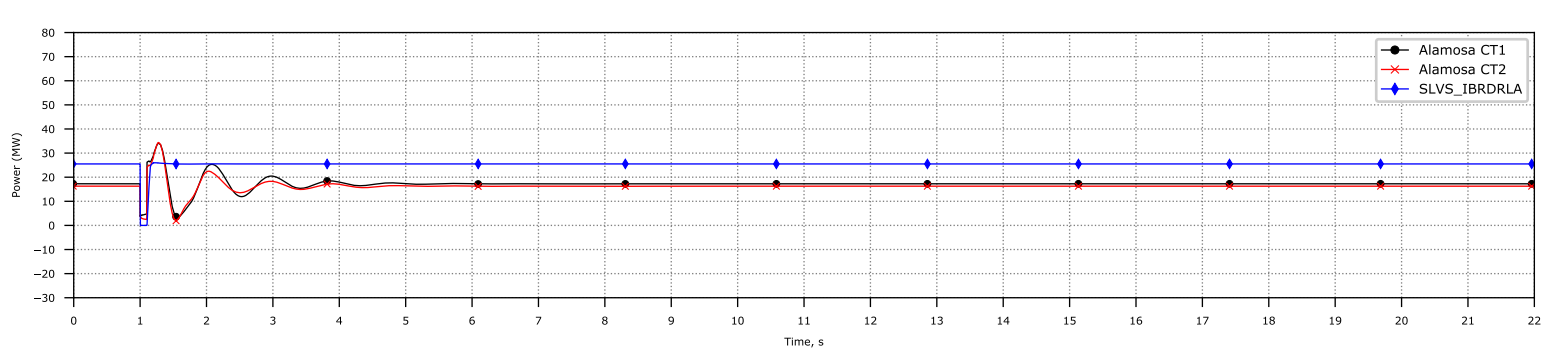


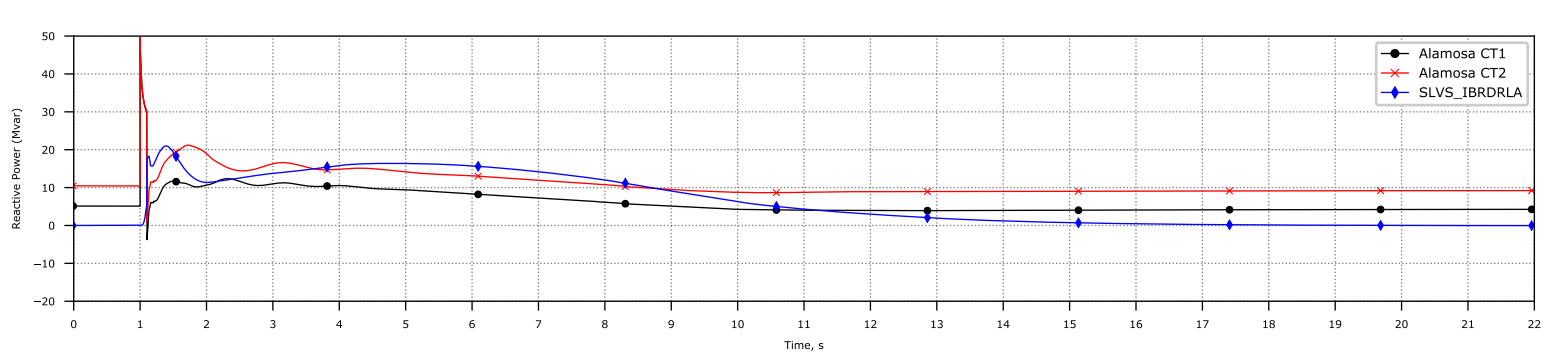
PI-2024-4_Study_SLV_Alamosa-Blanca-115kV

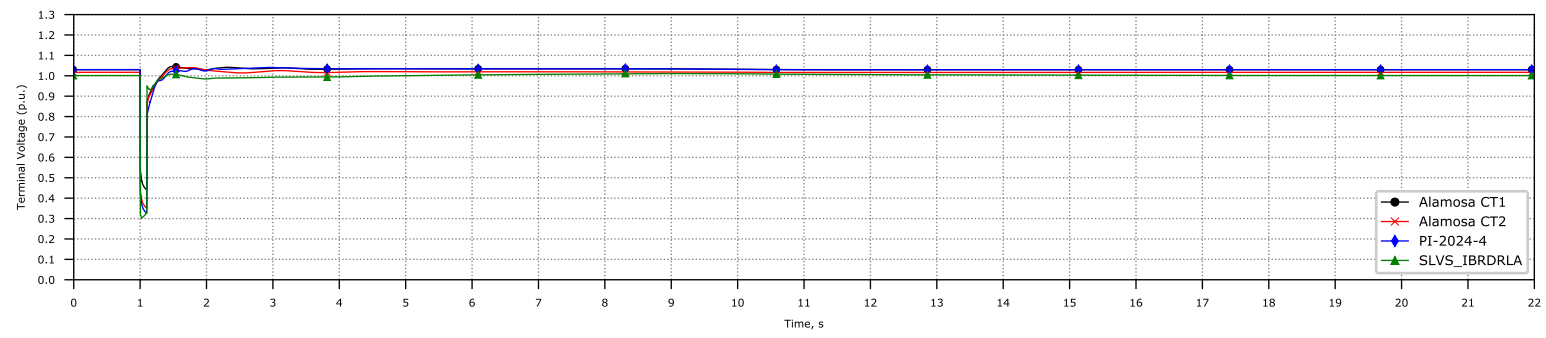


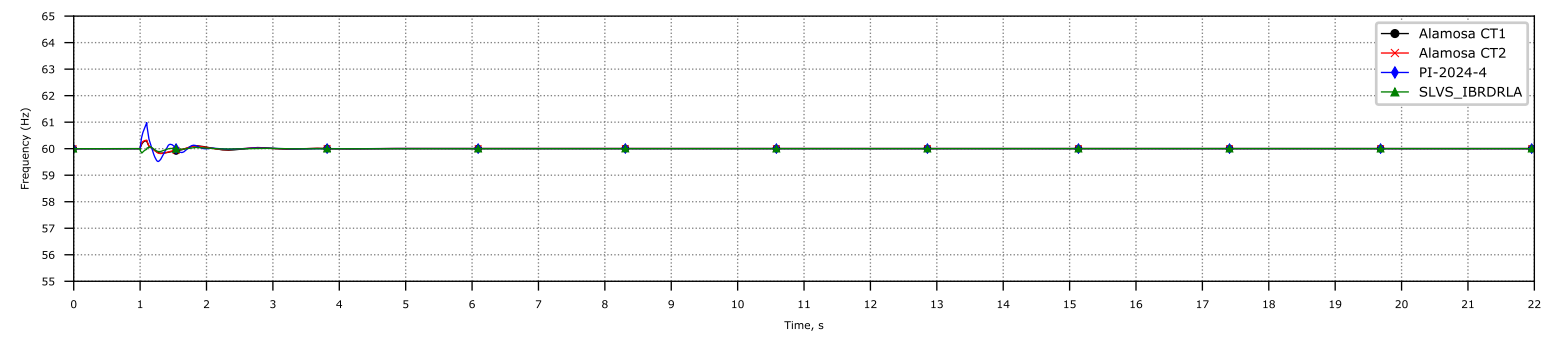


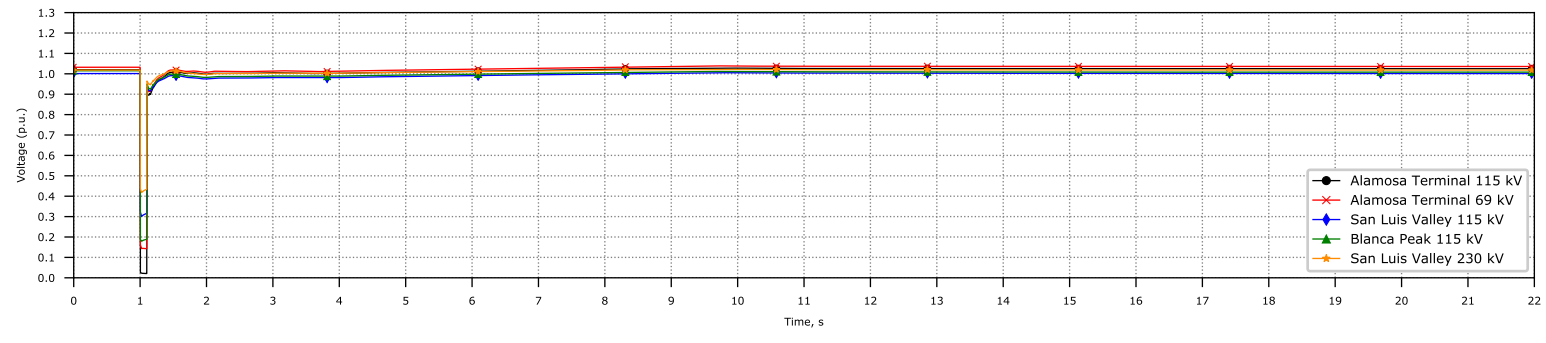




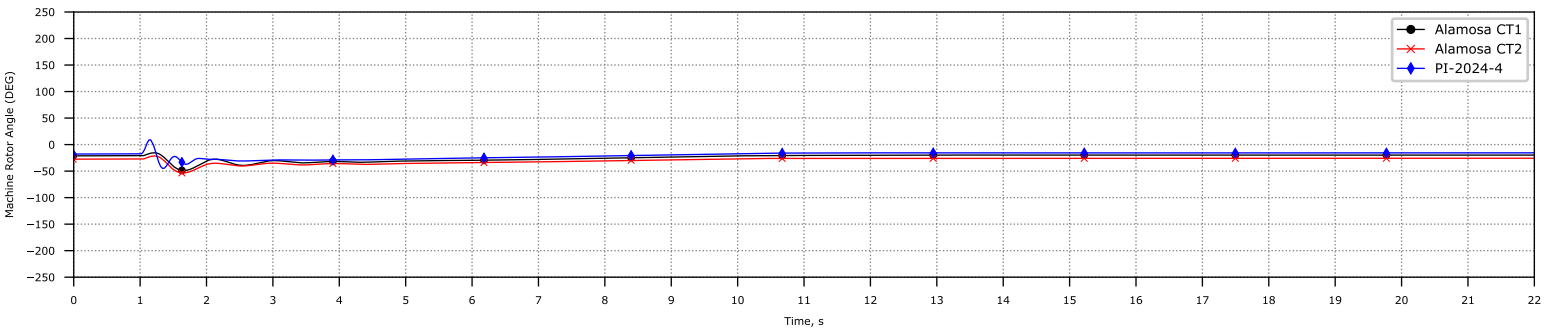


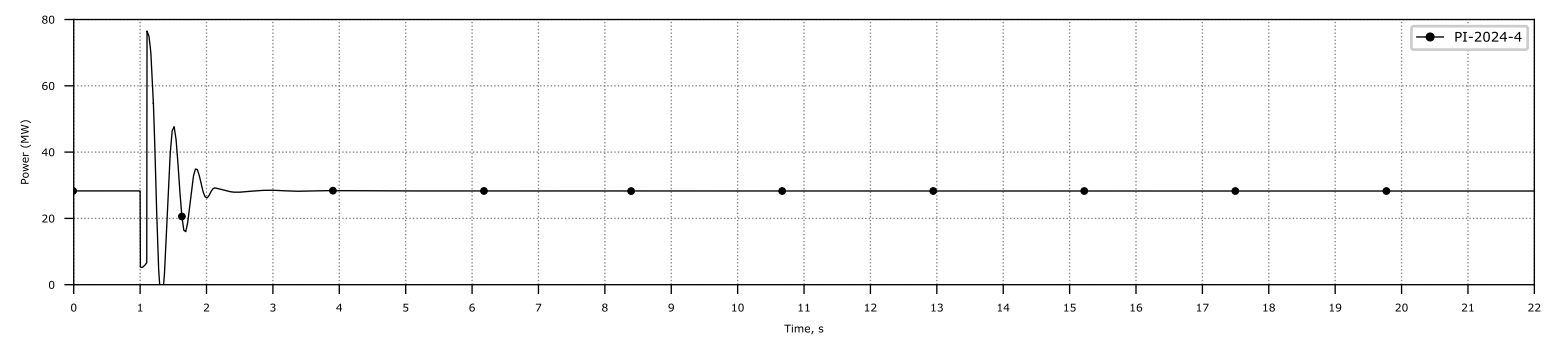


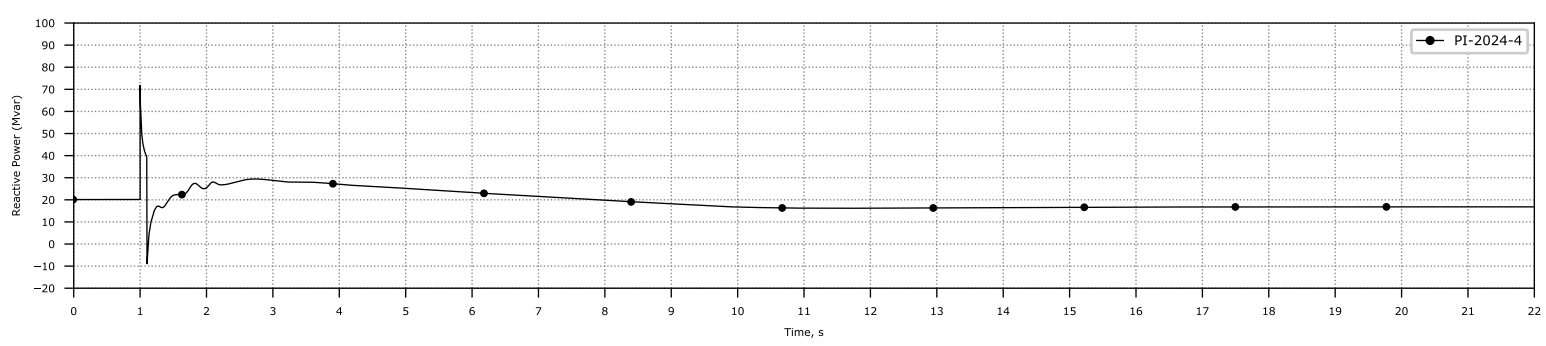


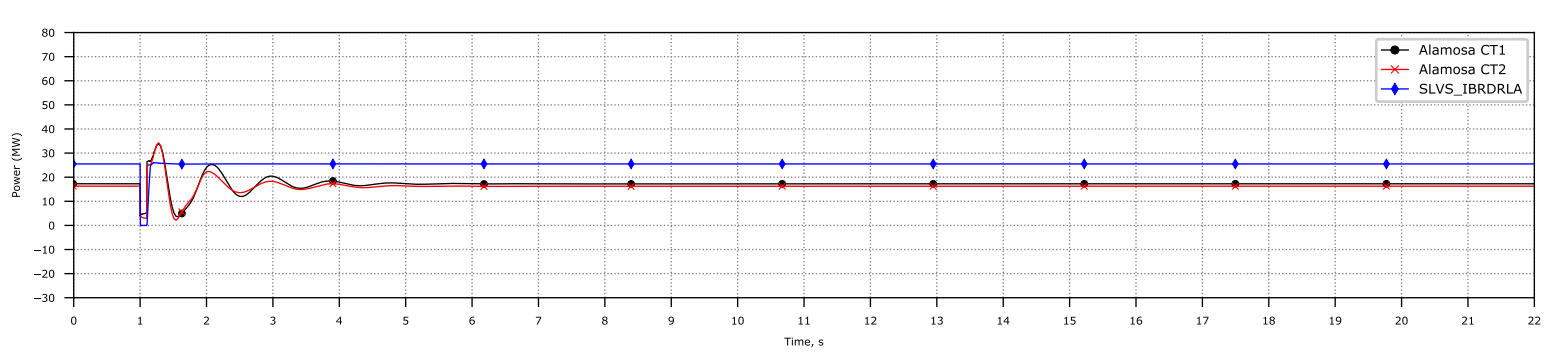


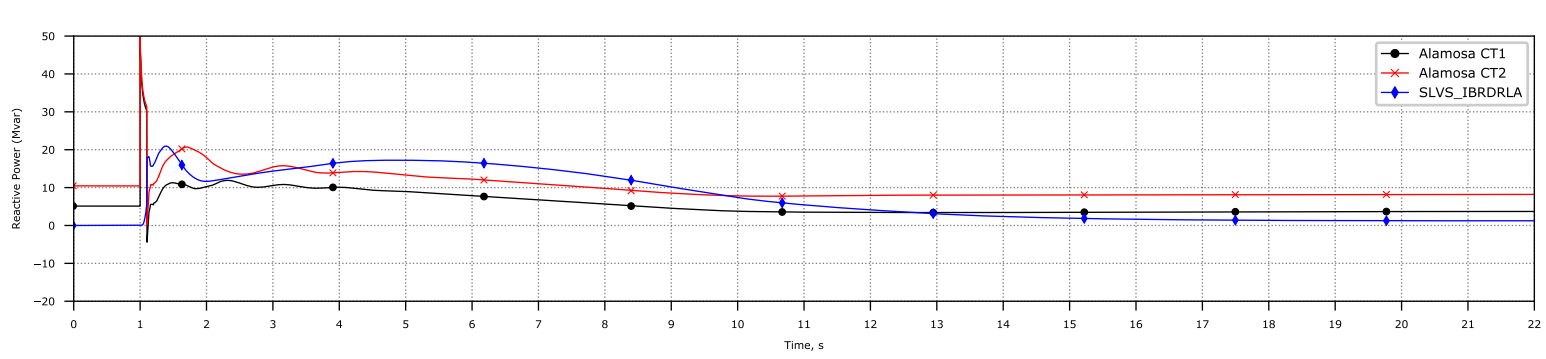
PI-2024-4_Study_SLV_Alamosa-SLV-115kV

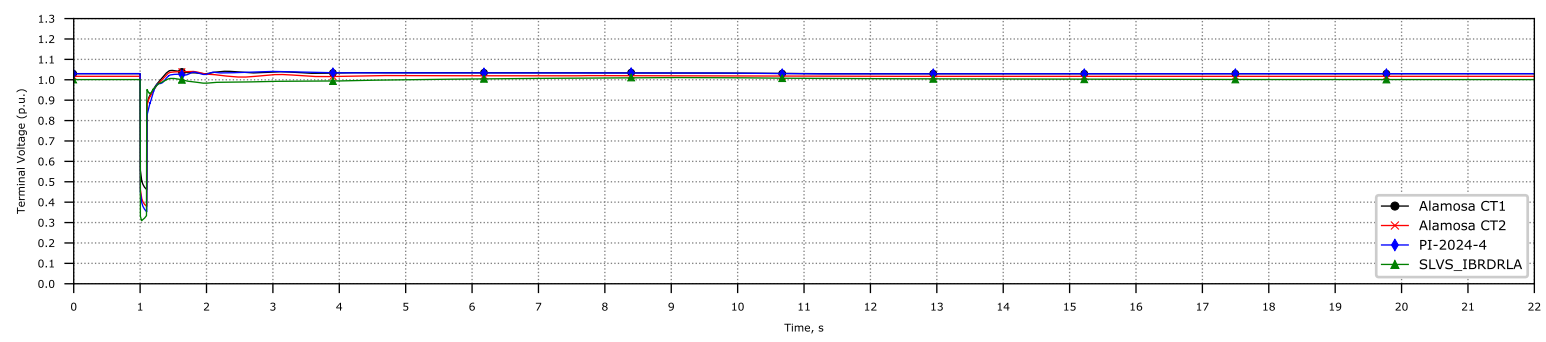


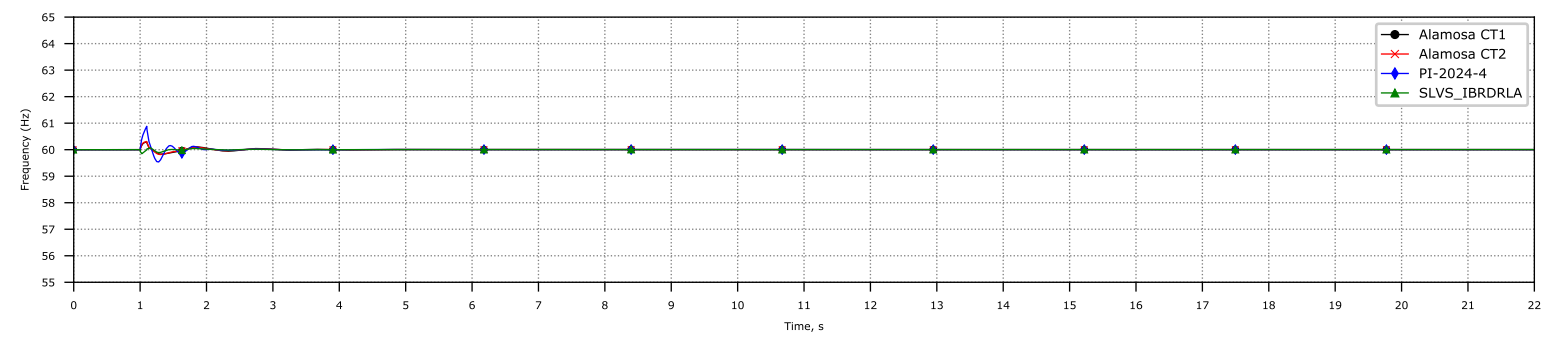


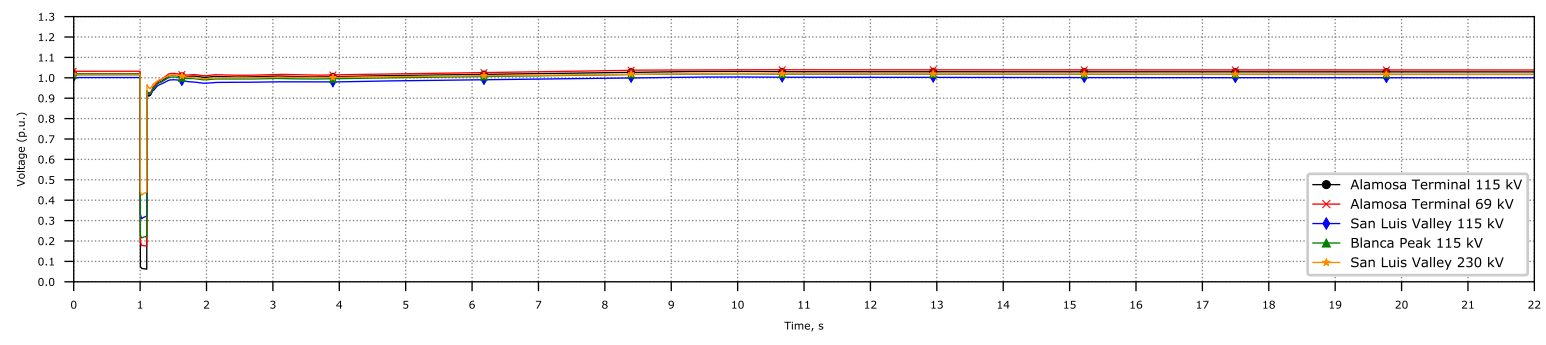




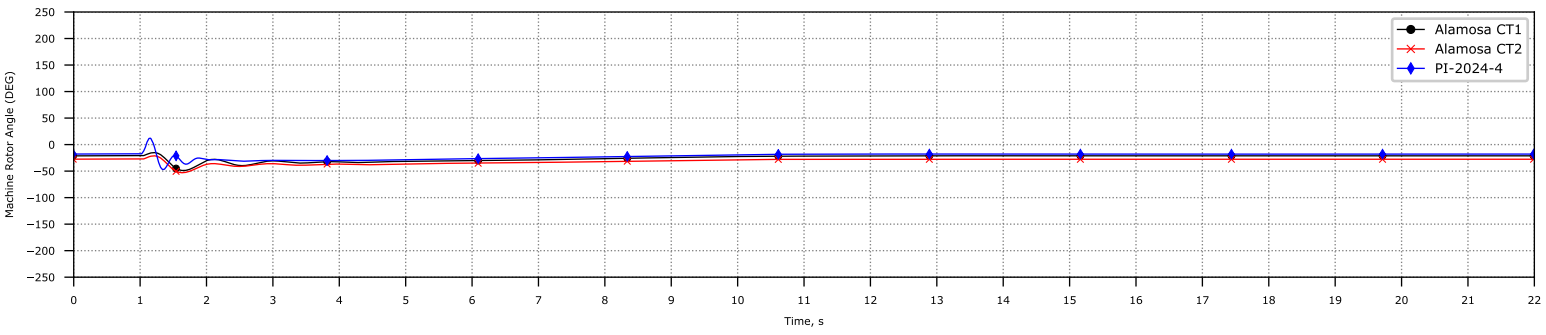


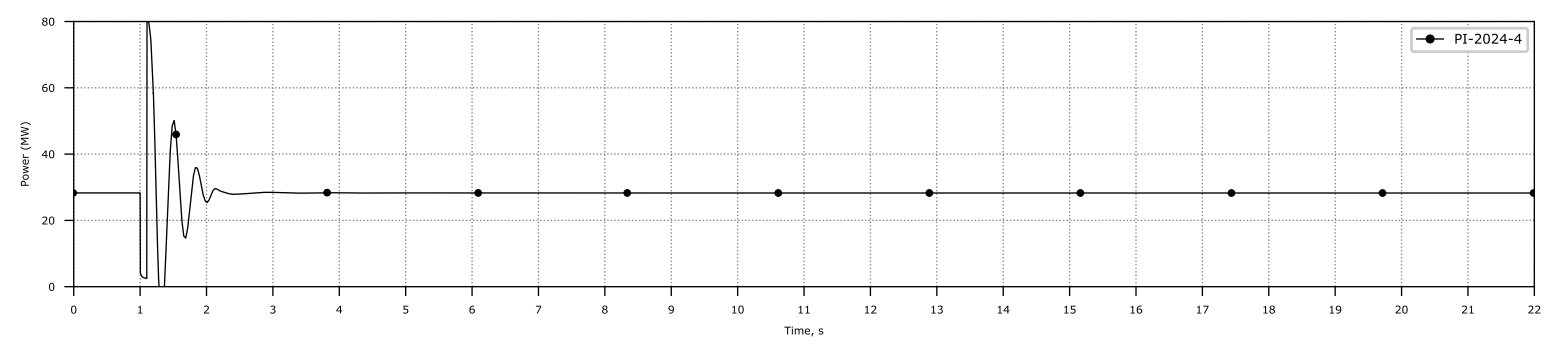


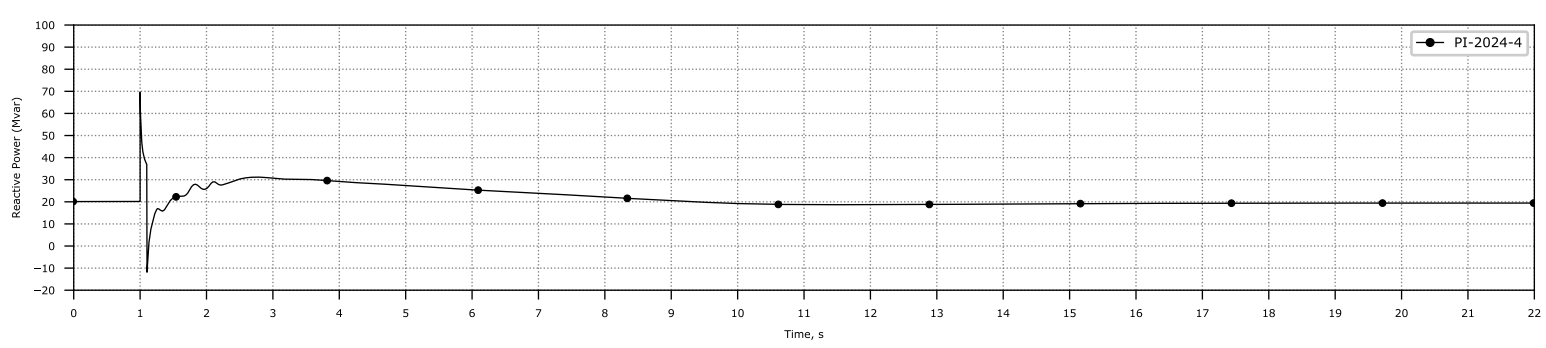


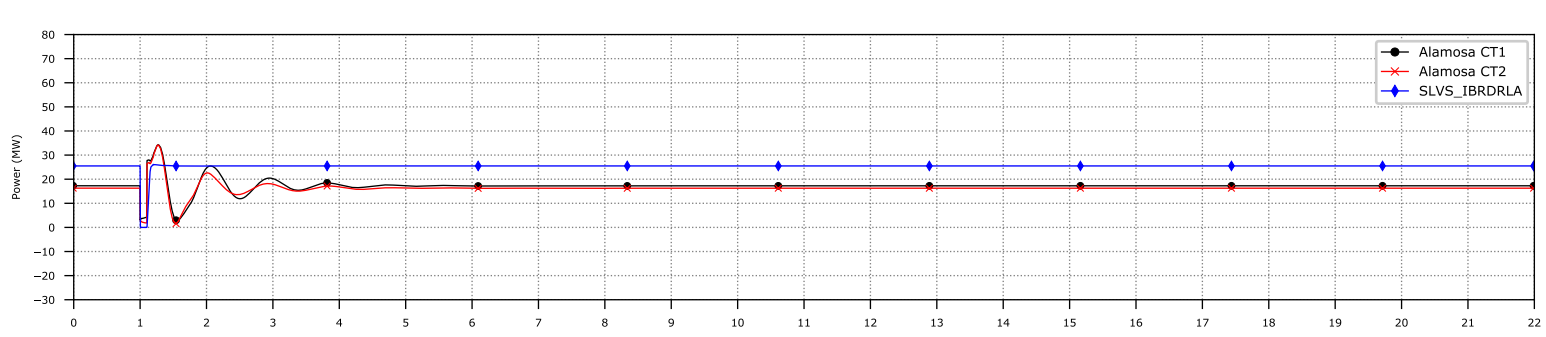


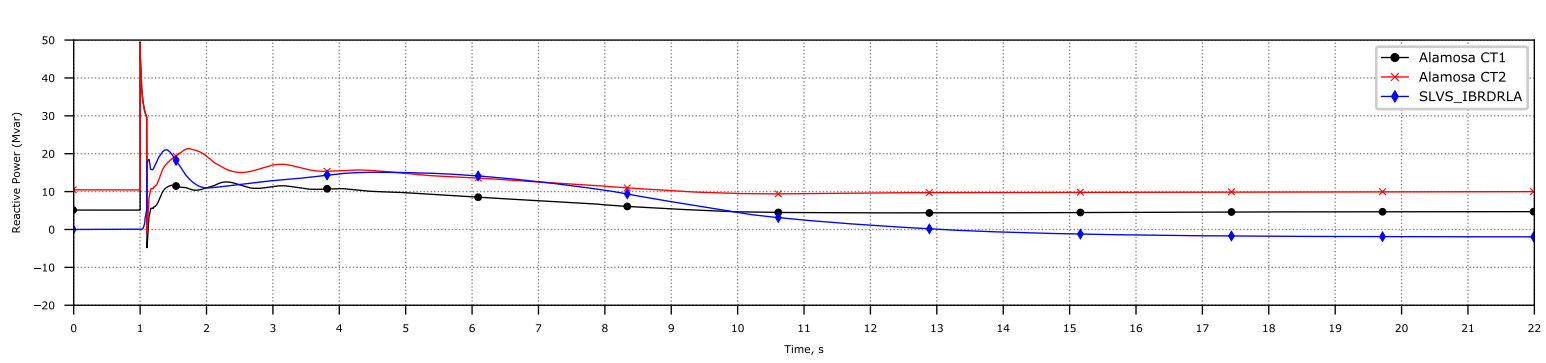
PI-2024-4_Study_SLV_Alamosa_115-69kV_Xfmr

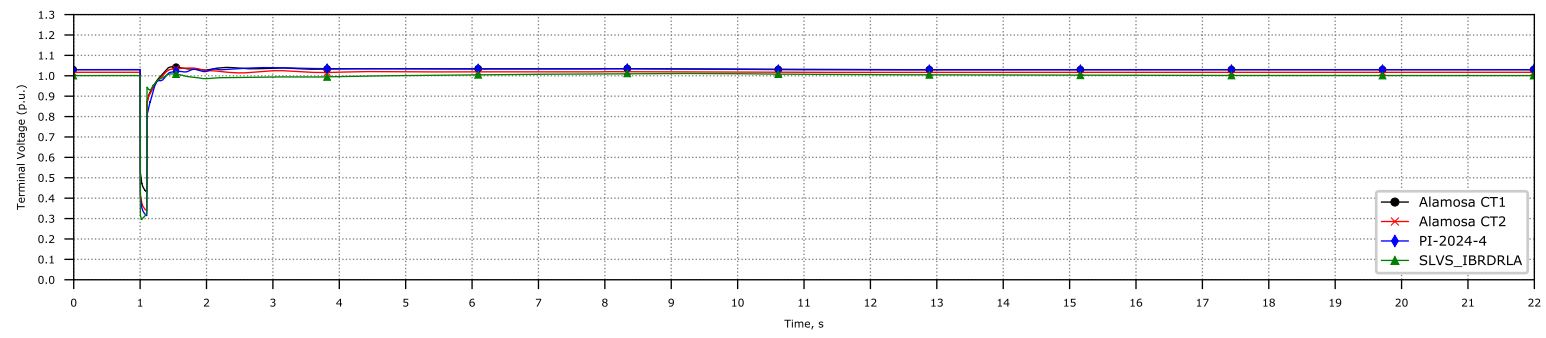


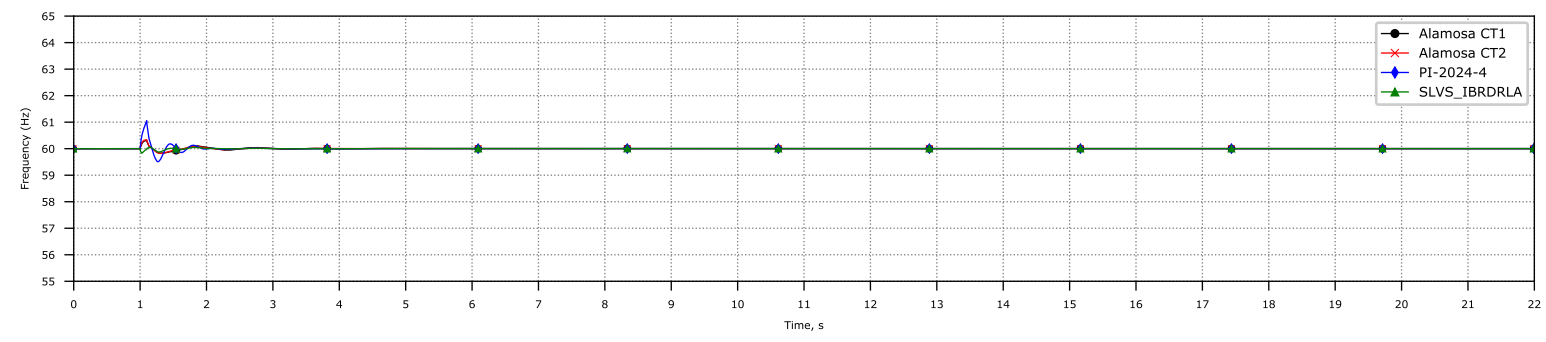


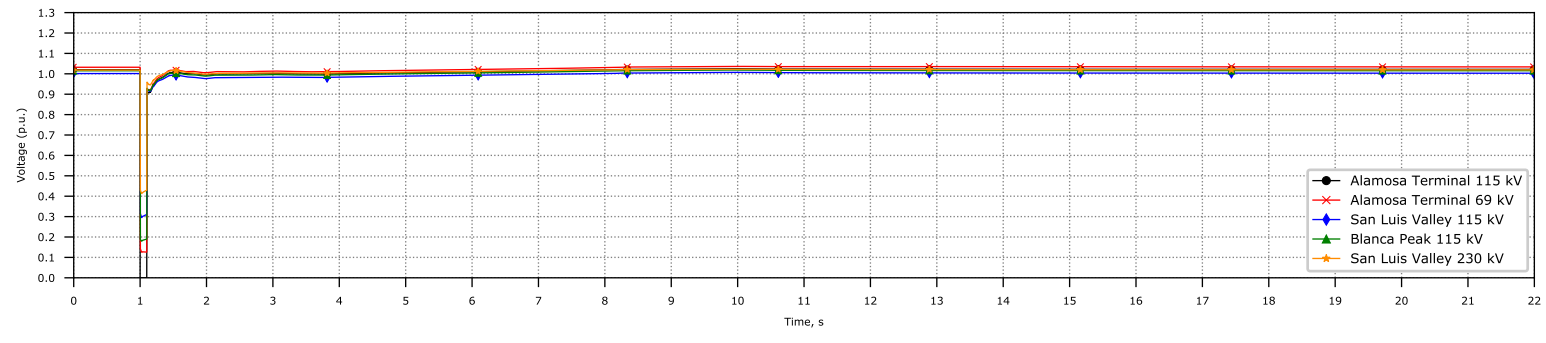












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