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Transmission Alternatives for California North Coast Offshore Wind
Volume 3: Transmission Analysis

This report was prepared by Ali Daneshpooy and Rahul Anilkumar of Quanta Technology, LLC and published by the Schatz Energy Research Center in March 2022.

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QUANTA TECHNOLOGY

BOEM Bureau of Ocean Energy Management

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The Schatz Energy Research Center at Cal Poly Humboldt advances clean and renewable energy. Our projects aim to reduce climate change and pollution while increasing energy access and resilience. Our work is collaborative and multidisciplinary, and we are grateful to the many partners who together make our efforts possible. Learn more about our work at schatzcenter.org

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REPORT

CA North Coast OSW Study Transmission Analysis

PREPARED FOR

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EXECUTIVE SUMMARY

Schatz Energy Research Center retained Quanta Technology to analyze and assess the electric transmission capacity in the Humboldt County area within California's North Coast region. Quanta Technology's analysis examines the area's ability to accommodate varying levels of offshore wind (OSW) energy interconnection to the electric grid. The analysis evaluated a range of interconnection capacity alternatives and associated costs of OSW development using a combination of power flow and economic studies. The studies include the following scenarios:

1. OSW farm development scenarios up to 500 MW of plant capacity, including high-level cost estimates using a System Impact Study approach per CAISO guidelines. In particular- 144 MW, 168 MW, 288 MW, and 480 MW OSW farm sizes.
2. OSW farm revenue analysis with and without battery storage to manage the timing of energy delivery.
3. Assessing the impact of three different load forecasts with peak demand ranging from 136 MW to 189 MW in the Humboldt area. The energy consumption ranges from 895 GWh/yr to 1174 GWh/yr.

The analysis determined the minimum transmission expansion that would be required to support the full deliverability of OSW energy at different capacities. Major findings include:

- The potential for energy-only OSW development in California's North Coast region is limited to 174 MW under the projected peak loading conditions for 2030 and existing transmission topology. An increase in load due to accelerated electrification or other factors could increase the OSW capacity that could be installed without upgrades to the transmission infrastructure to as much as 231 MW.
- The current transmission topology within the Humboldt area imposes operational limits under normal and emergency operating conditions. These restrictions include limited export capability between Humboldt and the rest of California's grid.
- The most critical constraints that need to be addressed before significant OSW can be accommodated into the region are the Humboldt to Bridgeville 115 kV and Humboldt to Trinity 115 kV transmission facilities.
- Under the existing system topology, only 30 MW of OSW capacity is fully deliverable without the need for upgrades.
- To support the full deliverability of OSW beyond 30 MW, transmission expansion is required to create new export channels between the region and the rest of the state.
  - The analysis estimated upgrades in the range of $168M to $238M to support the full deliverability of 144 MW of OSW.
  - The analysis estimated upgrades in the range of $329M to support the full deliverability of 288 MW of OSW.
  - The analysis estimated upgrades in the range of $591M to $1.12B to support the full deliverability of 480 MW of OSW.
  - OSW capacity larger than 480 MW requires major expansions, including upgrade transmission to 500 kV level while considering potential interactions with Path 66 and other PG&E bulk electric infrastructure.

- The economic studies evaluated the potential curtailment risk associated with OSW projects at the Humboldt substation. The project alternatives were evaluated as energy only under the existing system configuration.
  - The 144 MW OSW farm demonstrates 4.4% curtailment of production (MWh) over the year with total revenues of $37M, operating at a capacity factor of 50%.
  - The 168 MW OSW farm demonstrates a 6% curtailment of production (MWh) over the year with total revenues of $30M, operating at a capacity factor of 49.1%.
  - The 288 MW OSW farm demonstrates 36.5% curtailment of production (MWh) over the year with total revenues of $9M, operating at a capacity factor of 33%.
  - The increase in project size directly increases congestion and negative price signals that trigger curtailment, thereby lowering overall locational marginal prices (LMPs) and revenues.
  - The curtailment prices consider the impact of production tax credit values at $25/MWh, which is an assumption around the future value of these payments, consistent with CAISO models.
- The economic studies evaluated the potential curtailment risk associated with OSW and a co-located battery energy storage system (BESS) at the Humboldt Bay substation. The considered BESS was 15 MW, 60 MWh.
  - The BESS did not significantly reduce plant curtailments due to its relatively small size, but it helped increase plant revenues by participation in arbitrage and ancillary service markets.
  - The 144 MW OSW farm with a 15 MW, 60 MWh BESS demonstrates 4.4% curtailment of production (MWh) over the year with total revenues of $41M, operating at a capacity factor of 50%.
  - The 168 MW OSW farm with the same BESS demonstrates 5.6% curtailment of production (MWh) over the year with total revenues of $37M, operating at a capacity factor of 49.5%.
  - The revenue benefit provided by the BESS relative to the base case was notably larger for the 168 MW OSW farm than for the 144 MW OSW farm. This was true because the BESS solution minimizes the impact of congestion-driven curtailments by reducing the price suppression (negative LMPs) with increasing OSW plant sizes.
- The analysis considered alternative points of interconnection, including the Fairhaven Substation, which resulted in similar conclusions.
- The OSW plant production is also restricted by the dispatch and operation of the Humboldt Bay generating plant. Due to the resource adequacy contracts of the plant and their reliability must-run status, their output minimizes the available transmission capacity on the existing network. Their operation as the must-run units for reliability purposes influences the curtailment trends at the OSW sites.
- The overall studies identified the need for further transmission expansion to support the buildout of fully deliverable OSW energy to the rest of Northern California.

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1 INTRODUCTION

The Schatz Energy Research Center requested an assessment of the design and operation of the offshore wind (OSW) and transmission system expansion to minimize the costs of interconnection and network upgrades for the Humboldt area within California's North Coast region. Several alternatives and sensitivities were evaluated to determine the most feasible option. The analysis includes a system impact study (SIS) consistent with the California Independent System Operator (CAISO) methodology for the independent system operator (ISO) cluster queue process and large generator interconnection procedure. The study is amended with production cost simulations.

SISs typically identify the following:

- Transmission system impacts caused by the addition of a project
- Needed system reinforcements to mitigate the project's adverse impacts under various system conditions
- Required facilities and a nonbinding good faith estimate of the project's cost responsibility and the timeline for facility construction
- Potential reliability and deliverability constraints that limit project performance

Production simulation studies typically identify the following:

- Curtailment risks associated with the project
- Congestion trends in the vicinity of the project
- Interaction of the project with other must-run generation in the vicinity

Note that this transmission analysis report is part of a collaborative effort to assess the impact that transmission alternatives can have on the economic viability of modest scale (less than 500 MW) offshore wind development in the Humboldt Wind Energy Area. Supported by funding from the Bureau of Ocean Energy Management (BOEM), this collaboration is being led by the Schatz Energy Research Center (Schatz Center) at Cal Poly Humboldt. Partners include the National Renewable Energy Laboratory and Quanta Technology, LLC. The research is comprised of four tasks, each of which features a standalone report. Descriptions of the four tasks and the responsible parties are shown in Table 1-1.

Table 1-1. Description of the tasks and responsible parties

Task Description	Responsible Party
Task 1. Wind Resource Assessment	Schatz Energy Research Center
Task 2.1 Description of Transmission Alternatives	Schatz Energy Research Center
Task 2.2 Transmission Analysis	Quanta Technology, LLC
Task 2.3 Cost-Benefit Analysis	National Renewable Energy Laboratory

1.1 Humboldt Area

The Humboldt area is part of PG&E's service territory and is considered a single division in the PG&E's transmission planning study. This area is approximately 3,000 square miles in California's northwestern corner. Some of the cities PG&E serves in this area are Eureka, Arcata, Garberville, and Fortuna.

Humboldt's transmission system is comprised of 60 kV and 115 kV transmission facilities. Generators at the Humboldt Bay Power Plant and local qualifying facilities provide most of the electric supply to the Humboldt area, which is supplemented by transmission from the North Valley and North Coast areas.

The Humboldt Division is connected to the PG&E bulk transmission system via four transmission circuits that are approximately 80 to 100 miles long. These circuits consist of two 115 kV lines—one 60 kV line from Cottonwood Substation in the east and one 60 kV line from Mendocino Substation in the south.

The power import capability of the Humboldt transmission system is a function of the load within Humboldt and the amount of internal generation. California ISO's annual transmission plans have demonstrated that the existing system's import capability can adequately serve the projected load growth up to 10 years if the existing (or equivalent replacement) generation facilities remain in service. The major transmission paths[1] are illustrated in Figure 1-1 . Figure 1-2 provides an aerial view of the Humboldt area.

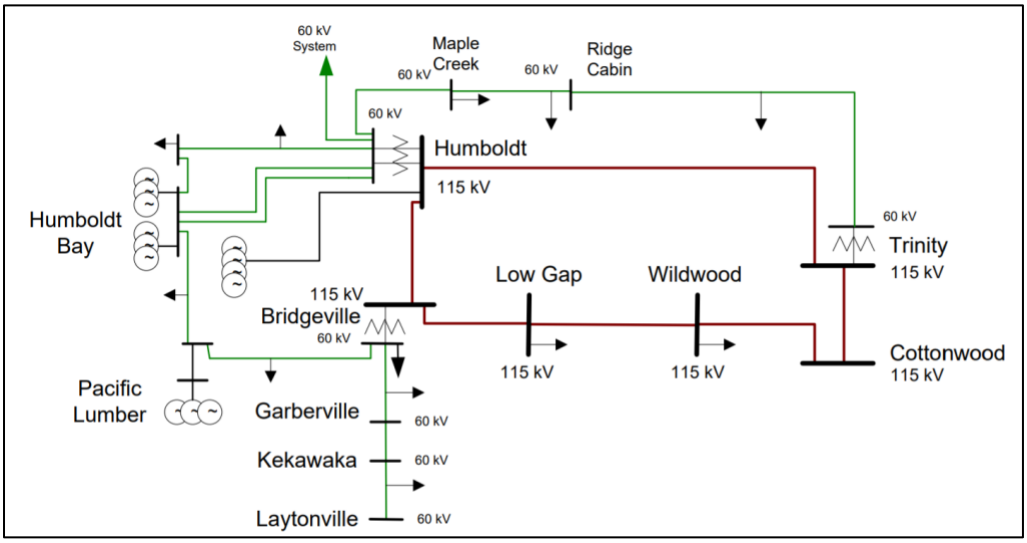

Figure 1-1. Humboldt Planning Division Transmission System[1]

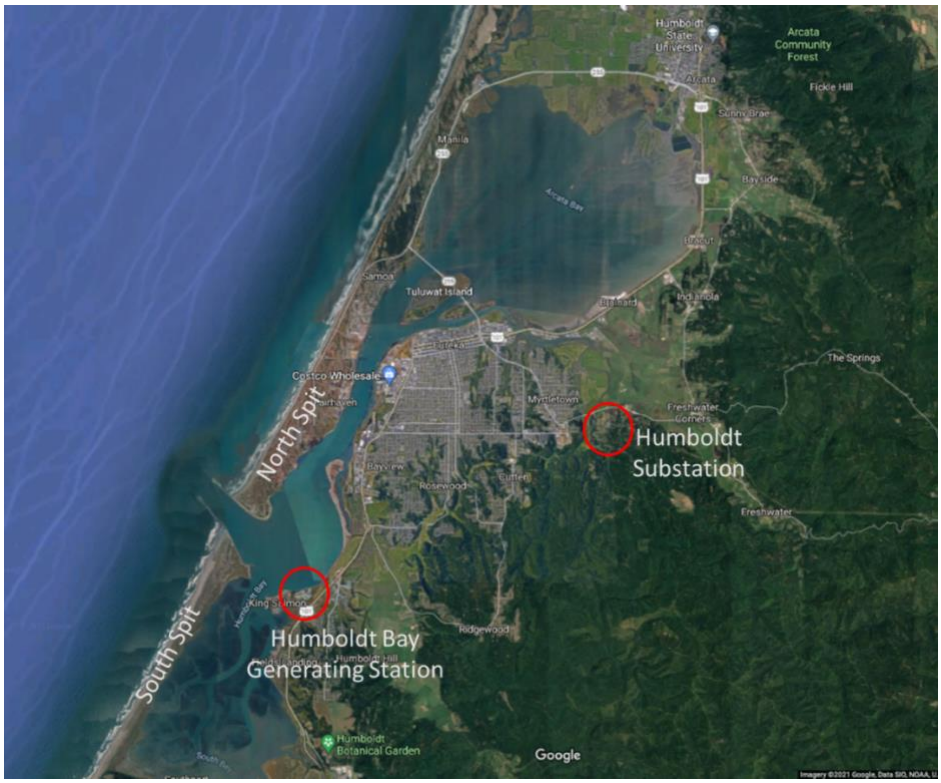

Figure 1-2. Humboldt Bay Region, with Major Substation Locations Indicated

[1] https://www.caiso.com/Documents/Presentation-Final2021and2025LCRHumboldtLocalArea.pdf

1.2 Project Overview

In this study, the interconnection of the OSW farm is evaluated for two potential locations, referenced as Option 1 and Option 2. Option 1 involves a submarine cable landing through the south spit and under the bay to the substation at the Humboldt Bay generating station (i.e., Humboldt Bay substation), as shown in Figure 1-3. The Humboldt Bay substation connects to the Humboldt substation via a 115 kV line. The Humboldt substation is the initiating point for 115 kV transmission lines running eastward toward Trinity, Cottonwood, and Bridgeville.

Figure 1-3. Map for Interconnection of the OSW Farm (Option 1); Transmission Line Routes Are Approximate

Option 2 involves a submarine cable landing on the north spit and transitioning to overhead transmission around Arcata Bay following an existing 60 kV right-of-way to connect to the Humboldt substation via a new 115 kV line shown as a red dashed line in Figure 1-4.

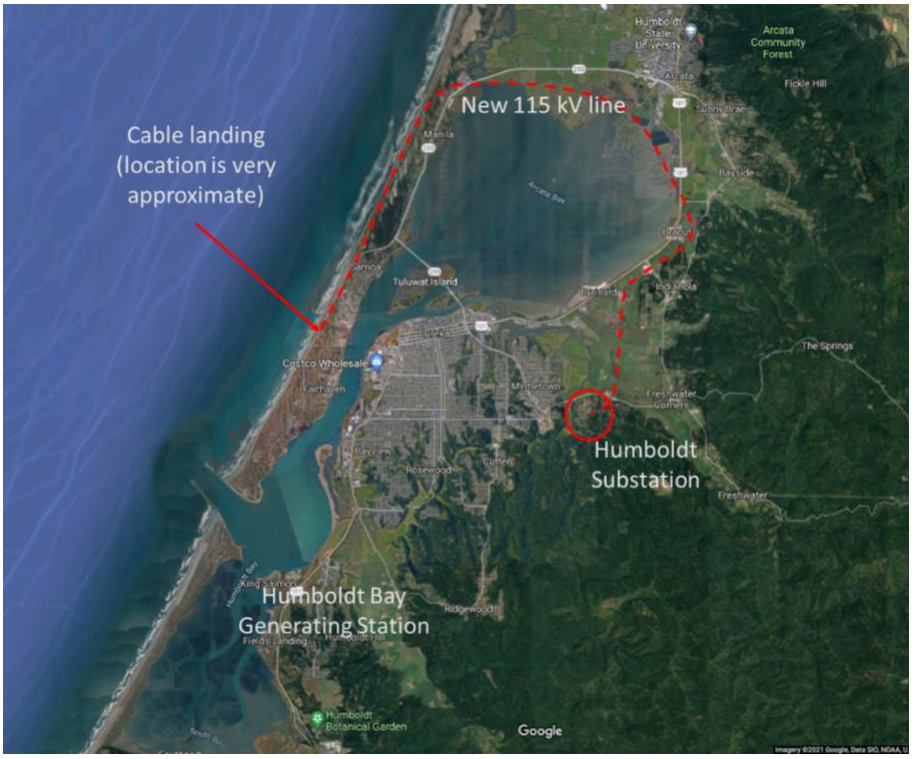

Figure 1-4. Overview Map for Interconnection of the OSW Farm (Option 2); Hypothetical Transmission Line Route Is Approximate

This study considered four OSW farm power alternative ratings ranging from 144 to 480 MW with the potential in-service year of 2030. These alternatives and study sensitivities are presented in Table 1-2.

Table 1-2. Different Alternatives and Sensitivities for the OSW Farm

OSW Nameplate	Storage	Projected Load (2030)	Point of Interconnection (Option)
144 MW	NA	RCEA Base Case Load	I
168 MW	NA	RCEA Base Case Load	I
288 MW	NA	RCEA Base Case Load	I
480 MW	NA	RCEA Base Case Load	I
168 MW	NA	RCEA Augmented Growth Load	I
144 MW	4 Hr, 15 MW	RCEA Base Case Load	I
168 MW	4 Hr, 15 MW	RCEA Base Case Load	I
144 MW	NA	RCEA Base Case Load	II

2 STUDY CRITERIA AND METHODOLOGY

2.1 Reliability Standards and Criteria

The SIS was conducted to ensure the CAISO-controlled grid complies with the North American Electric Reliability Corporation (NERC) reliability standards, Western Electricity Coordinating Council (WECC) regional criteria, and the CAISO planning standards.

2.1.1 NERC Reliability Standards

Quanta Technology analyzed the need for transmission upgrades and additions for the project following NERC reliability standards, which set forth criteria for system performance requirements that must be met under a varied but specific set of operating conditions. The following NERC reliability standards apply to CAISO, as a registered NERC planning authority, and the participating transmission owners, as transmission planners, and are the primary standards for the interconnection of new facilities and system performance:

- FAC-001: Facility Connection Requirements
- FAC-002: Coordination of Plans for New Facilities
- TPL-001-4: Transmission System Planning Performance Requirements

2.1.2 WECC Regional Criteria

WECC's System Performance TPL-001-WECC-CRT-2.22 Regional Criteria apply to CAISO as a planning authority and set forth additional requirements that must be met under a varied but specific set of operating conditions.

2.1.3 California ISO Planning Standards

California ISO's standards specify the grid planning criteria to be used when planning CAISO transmission facilities.[3] These standards cover the following:

- Specifics not covered in the NERC reliability standards and WECC regional criteria
- Interpretations of the NERC reliability standards and WECC regional criteria specific to the CAISO-controlled grid
- If specific criteria that are more stringent than the NERC standards or WECC regional criteria should be adopted

[2] https://www.wecc.biz/Reliability/TPL-001-WECC-CRT-2.2.pdf

[3] http://www.caiso.com/Documents/FinalISOPlanningStandards-April12015_v2.pdf

2.1.4 Contingencies

The system's performance with the addition of the project was evaluated under normal conditions (Category P0) and following the loss of single or multiple bulk electrical system elements as defined by the applicable reliability standards and criteria.

2.1.4.1 Single Contingency (Category P1)

The assessment considered all possible Category P1 contingencies based upon the following:

- Three-phase (3Φ) fault with loss of one generator (P1-1)[4]
- 3Φ fault with loss of one transmission circuit (P1-2)
- 3Φ fault with loss of one transformer (P1-3)
- 3Φ fault with loss of one shunt device (P1-4)
- Single line to ground (SLG) fault with loss of a single pole of a DC line (P1-5)

2.1.4.2 Single Contingency (Category P2)

The assessment considered selected possible Category P2 contingencies based upon the following:

- Opening a line section without a fault (P2-1)
- SLG fault with loss of one bus section (P2-2)
- SLG fault with loss of one breaker (internal fault) (non-Bus-tie Breaker) (P2-3)
- SLG fault with loss of one breaker (internal fault) (Bus-tie Breaker) (P2-4)

2.1.4.3 Multiple Contingencies (Category P3)

The assessment did not consider Category P3 contingencies. Category P3 contingencies have the initial condition of the loss of a generator unit followed by system adjustments and then a Category P1 event. Since system adjustments are allowed and include generator redispatch, the project generator being studied can be re-dispatched for any project generator-caused violations.

2.1.4.4 Multiple Contingencies (Category P4)

The assessment considered some Category P4 contingencies with the loss of multiple elements caused by a stuck breaker (non-bus-tie breaker for P4-1 through P4-5 and bus-tie breaker for P4-6) attempting to clear an SLG fault on one of the following:

- Generator (P4-1)
- Transmission circuit (P4-2)
- Transformer (P4-3)
- Shunt device (P4-4)
- Bus section (P4-5)
- Bus(es) associated with bus-tie breaker(s) (P4-6)

[4] Includes per CAISO Planning Standards, Loss of Combined Cycle Power Plant Module as a Single Generator Outage Standard.

2.1.4.5 Multiple Contingencies (Category P5)

The assessment considered selected possible Category P5 contingencies of delayed fault clearing due to the failure of a non-redundant relay protecting the faulted element to operate as designed:

- SLG fault with loss of one generator (P5-1)
- SLG fault with loss of one transmission circuit (P5-2)
- SLG fault with loss of one transformer (P5-3)
- SLG fault with loss of one shunt device (P5-4)
- SLG fault with loss of one bus section (P5-5)

2.1.4.6 Multiple Contingencies (Category P6)

The assessment did not consider Category P6 contingencies. Category P6 contingencies have the initial condition Category P1 event followed by System adjustments and then another Category P1 event. Since system adjustments are allowed and include generator redispatch, the Project generator being studied can be re-dispatched for any Project generator-caused violations.

2.1.4.7 Multiple Contingencies (Category P7)

The assessment considered all possible Category P7 contingencies for an SLG fault with the loss of a common structure. They are as follows:

- Any two adjacent circuits on a common structure (P7-1)[5]
- Loss of a bipolar DC line (P7-2)

2.2 Steady State Study Criteria

2.2.1 Normal Overloads

Normal overloads exceed 100% of normal facility rating under Category P0 conditions (no contingency). Normal overloads are identified in reliability study power flow analyses using Reliability Standard TPL-001-4. The loading of all transmission system facilities must be within their normal ratings for Category P0 conditions.

2.2.2 Emergency Overloads

Emergency overloads are those that exceed 100% of emergency ratings under Categories P1 through P7 conditions. Emergency overloads are identified in the reliability study power flow analyses using Reliability Standard TPL-001-4. The loading of all transmission system facilities must be within their emergency ratings for Categories P1 through P7 conditions.

[5] Excludes circuits that share a common structure or common right-of-way for 1 mile or less.

2.2.3 Voltage Criteria

All buses within the CAISO controlled grid that cannot meet the requirements in Table 2-1 will be further investigated. Exceptions to the voltage criteria in Table 2-1 granted by the CAISO will be observed in this study.

Table 2-1. Voltage Performance Criteria (Voltages are Relative to the Nominal Voltage of the System Studied)

Voltage Level	Normal Conditions (P0), Vmin (pu)	Normal Conditions (P0), Vmax (pu)	Contingency Conditions (P1 through P7), Vmin (pu)	Contingency Conditions (P1 through P7), Vmax (pu)	Voltage Deviation, P1 through P3	Voltage Deviation, P4 through P7
≤ 200 kV	0.95	1.05	0.90	1.1	≤8%	≤10%
≥ 200 kV	0.95	1.05	0.90	1.1	≤8%	≤10%
≥ 500 kV*	1.0	1.05	0.90	1.1	≤8%	≤10%

*Most of the 500 kV buses have specific requirements.

The maximum total voltage deviation for Standard TPL-001-4 category P3 is ≤ 5% measured from the voltage that exists after the initial condition (loss of generator unit followed by system adjustments), and therefore, considers only voltage deviation due to the second event.

2.3 Power Flow Study Assumptions

2.3.1 Reliability Analysis

In the reliability studies, the base cases are obtained from PG&E. They reflect peak/off-peak loading conditions for the years studied (through 2026) and will be updated to reflect study assumptions. To support the evaluation of OSW, long-term planning models (through 2030) will be used. These models are:

- 2030_HMBO_Summer Peak case
- 2030_ HMBO_Winter Peak case

A reliability study is performed using power flow analysis to evaluate the project's local impacts (the studies do not consider short circuit analysis). The Contingency analysis is performed using the applicable NERC category contingencies, and CAISO's recommended performance criteria are used for the study.

Table 2-2 provides a summary of the reliability model assumptions.

Table 2-2. Reliability Analysis: Base Case Model Assumptions

	Peak	Peak C[18]	Off-Peak Daytime	Off-Peak Night Time C
Years to Be Represented in Base Cases	2025	2025	2025	2025
Load Level	1-in-10[17]	1-in-10[17]	50% ~ 65% of Peak[20]	~40% of Peak
Solar Generation	Pmax	Pmax	85% of Pmax	0
Wind Generation	Pmax	50% ~ 65% of Pmax	Pmax	Pmax
Energy Storage Dispatch	Max Discharging[21]	Max Charging[22]	Max Discharging	Max Charging
Other Renewable	Pmax	Pmax	Pmax	Pmax
Thermal Generation	Pmax	As Needed to Balance Load	As Needed to Balance Load	As Needed to Balance Load
Hydro Generation	Based on Historical Data	Based on Historical Data	Based on Historical Data	Based on Historical Data
Import Levels	Historical Max Flows Adjusted to Accommodate Output from Renewable Generation as Needed	Historical Max Flows Adjusted to Accommodate Output from Renewable Generation as Needed	Historical Max Flows Adjusted to Accommodate Output from Renewable Generation as Needed	Historical Max Flows Adjusted to Accommodate Output from Renewable Generation as Needed

Under the energy-only deliverability status, the interconnection customer is responsible for reliability network upgrade costs but not deliverability network upgrade costs. The generating facility will be deemed to have a net qualifying capacity of zero, as defined in the CAISO Tariff. This status means the generator will not qualify for resource adequacy. While an energy-only interconnection can mitigate the need for system upgrades and associated costs, it also can hamper revenue opportunities.

Reliability network upgrades have the following two components:

1. Interconnection reliability network upgrades: Achieve physical interconnection to the grid, e.g., equipping a bus position at the Point of Interconnection (POI) substation to terminate the gen-tie
2. Generation reliability network upgrades (GRNUs): Mitigate reliability impacts, e.g., circuit breaker upgrades, Remedial Action Systems.

From the perspective of transmission planning studies, it is necessary to mitigate the constraints by "congestion management" or system redispatch. If not, they could potentially trigger GRNUs—primarily remedial action system or reconductoring.

It is important to note that there are differences in the study methodologies pursued under an Informational Feasibility Study, Reliability Study and Deliverability Study. The purpose of feasibility

studies is limited to assessing the most conservative study assumptions to provide an indicative estimate of worst-case upgrades. Feasibility studies assess the units at full-capacity deliverable status with a current snapshot of the system for heavy summer and spring off-peak scenarios. Additionally, feasibility studies identify network upgrades without consideration of congestion management to mitigate immediate reliability concerns in the system. The treatment of full-capacity status in feasibility studies does not discount the plant capacity based on their Net Qualifying Capacity (NQC). These inherent differences could result in notable deviations between required network upgrades and their resulting total costs under different types of study methodologies considered.

The methodology used by PG&E6 to determine required transmission upgrades and to estimate associated upgrade costs differed from the approach that Quanta Technologies used in conducting the research presented in this report. PG&E's analysis was a feasibility study, while the methodology used for the analysis presented here is consistent with the CAISO Business Practice Manuals on Generator Interconnection and Deliverability Allocation Procedures (GIDAP) and Generation Interconnection Procedures (GIP) – Reliability and Deliverability Study.

2.3.2 Base Case Data

Table 2-3 and Table 2-4 provide load/generation data in the Humboldt area for the long-term planning models (through 2030).

[6] Pacific Gas and Electric Company (2020). Interconnection Feasibility Study Report. In M. Severy, Z. Alva, G. Chapman, M. Cheli, T. Garcia, C. Ortega, N. Salas, A. Younes, J. Zoellick, & A. Jacobson (Eds.) California North Coast Offshore Wind Studies. Humboldt, CA: Schatz Energy Research Center.

Table 2-3. Load/Generation Data in the Humboldt Area – Summer Peak, 2030 HMBO Summer Peak Case (Total Load = 164.2 MW, Total Generation = 163 MW)

Bus no.	Bus Name	Gen Dispatch (MW)	Maximum Capacity (MW)
31150	FAIRHAVEN	0	17.25
31152	PACIFIC LUMBER	0	12.5
31152	PACIFIC LUMBER	0	12.5
31153	PACIFIC LUMBER	0	7.5
31156	BLUE LAKE POWER PLANT	0	12
31158	LP SOMOA	0	25
31166	KEKAWAKA	0	4.95
31180	HUMBOLDT BAY PP B	16.3	17.4
31180	HUMBOLDT BAY PP B	16.3	16.9
31180	HUMBOLDT BAY PP B	16.3	17.8
31180	HUMBOLDT BAY PP B	16.3	17.3
31181	HUMBOLDT BAY PP A	16.3	17
31181	HUMBOLDT BAY PP A	16.3	17.2
31181	HUMBOLDT BAY PP A	16.3	17.1
31182	HUMBOLDT BAY PP C	16.3	16.8
31182	HUMBOLDT BAY PP C	16.3	17.5
31182	HUMBOLDT BAY PP C	16.3	17.2

Table 2-4. Load/Generation Data in the Humboldt Area – Winter Peak, 2030 HMBO Winter Peak Case (Total Load = 178.45 MW, Total Generation = 200.12 MW)

Bus no.	Bus Name	Gen Dispatch (MW)	Maximum Capacity (MW)
31150	FAIRHAVEN	13.5	17.25
31152	PACIFIC LUMBER	6.44	12.5
31152	PACIFIC LUMBER	6.44	12.5
31153	PACIFIC LUMBER	3.86	7.5
31156	BLUE LAKE POWER PLANT	0	12
31158	LP SOMOA	0	25
31166	KEKAWAKA	0.45	4.95
31180	HUMBOLDT BAY PP B	16.88	17.4
31180	HUMBOLDT BAY PP B	16.39	16.9
31180	HUMBOLDT BAY PP B	17.27	17.8
31180	HUMBOLDT BAY PP B	16.78	17.3
31181	HUMBOLDT BAY PP A	16.89	17
31181	HUMBOLDT BAY PP A	17.08	17.2
31181	HUMBOLDT BAY PP A	16.99	17.1
31182	HUMBOLDT BAY PP C	16.7	16.8
31182	HUMBOLDT BAY PP C	17.37	17.5
31182	HUMBOLDT BAY PP C	17.08	17.2

2.3.3 Deliverability Analysis

A generator deliverability test is applied to ensure that capacity is not "bottled" from a resource adequacy perspective. The proposed ISO generator deliverability study methodology determines if the aggregate of generation output in a given area can be simultaneously transferred to the remainder of the ISO control area. Any generators requesting full or partial capacity deliverability status in their interconnection request to the ISO-controlled grid will be analyzed for “deliverability” to identify the delivery network upgrades necessary to obtain this status. Category P0, P1, P2.2 to P2.4, and P7, and WECC-adjacent circuits contingencies will be analyzed.

The deliverability assessment is performed under three distinct system conditions: 1) the highest system need scenario, 2) the secondary system needs scenario, and 3) the off-peak condition. All models are directly obtained from the Cluster 13 Phase 1 study.

The objective of deliverability studies is to identify the need for local network deliverability upgrades or area deliverability upgrades.

Table 2-5 summarizes the deliverability model assumptions.

Table 2-5. Deliverability Analysis Model Assumptions

	On-Peak Highest System Needs	On-Peak Secondary System Needs	Off-Peak
Year to be represented in base cases	2025	2025	2025
Load Level	1-in-5 Peak Sale	1-in-5 Peak Sale Adjusted to Peak Consumption Hour	55% to 60% of Peak
Solar Generation	Up to 20% Exceedance Level	Up to 50% Exceedance Level	68% of Pmax
Wind Generation	Up to 20% Exceedance Level	Up to 50% Exceedance Level	44% of Pmax
Energy Storage Dispatch	Up to Highest Summer QC*	Up to Highest Summer QC*	0
Thermal Generation	Up to Highest Summer QC*	Up to Highest Summer QC*	~15% of Pmax
Hydro Generation	Up to Highest Summer QC*	Up to Highest Summer QC*	~30% of Pmax
Import Levels	Historical Max Flows Consistent with Resource Adequacy Planning Plus MIC Expansion	Highest Import Scheduled for the Secondary System Need Hours	~6000 MW

*Qualifying Capacity

2.4 Production Cost Study Assumptions

The production cost simulations were performed using the ABB GridView software package. For studies within the WECC territory, GridView is the preferred simulation approach. The analysis methodology combines generation, transmission, loads, fuels, and market economics into one integrated framework to deliver location-dependent market indicators, transmission system utilization measures and power system reliability, and market performance indices. It provides invaluable information for generation and transmission planning, operational decision-making, and risk management.

GridView performs security-constrained unit commitment and economic dispatch. It produces unit commitment and economic dispatch that respect the physical laws of power flow and transmission reliability requirements. Generation dispatch and market-clearing prices are typically considered feasible market solutions in a power transmission network.

The models for studies are obtained from CAISO and referenced as “ISO Planning PCM-2030 Base Portfolio,” reflective of the 2030 study year conditions. Some of the key assumptions applicable to the study are as follows:

1. The model reflects generation additions, retirements, and the overall expected CAISO outlook for the year 2030. The outlook is guided by the California Public Utilities Commission's current integrated resource plan and long-term procurements plan processes.
2. The models include unit-specific cost data (emission rates, variable operations and maintenance [O&M], associated fuel prices). The CAISO models include this information based on plant performance and operating history.
3. The loads and renewable resources were modeled using the 8,760 profiles published by CAISO.
4. The model includes the rest of WECC and interactions between CAISO and neighboring California regions (Northwest, Southwest, etc.).
5. The model simulates the unit commitment and dispatch process, considering generator-forced outages and N-1 system security.
6. The study calculates key parameters, including locational marginal prices (LMPs), production profiles, capacity factors, and curtailments.
7. The Schatz Energy Research Center provided the load profiles associated with the Humboldt area. Three load profiles were evaluated: 1) RCEA base-case load (894 GWh/yr with a peak demand of 136 MW), 2) augmented load (999 GWh/yr with a peak demand of 169 MW), as shown in Figure 2-1, and 3) augmented load plus 20 MW continuous load (1174 GWh/yr with a peak demand of 189 MW).

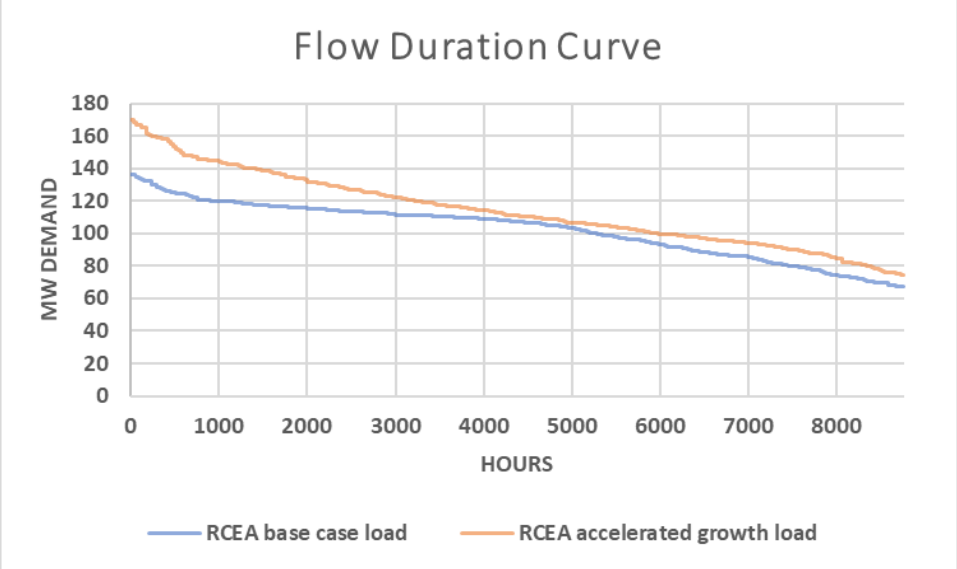

Figure 2-1. Load Profiles Associated with the Humboldt Area

8. The Schatz Energy Research Center provided the estimated hourly generation profiles for OSW farms in the Humboldt Call Area based on wind speed time series estimated by the National Renewable Energy Laboratory[7]. The generation profile of a 144 MW OSW farm is presented in Figure 2-2. Notably, the profile is highly bi-modal, approaching on/off operation, with 27% of the hours in the lowest bin

[7] See the Task 1 report associated with this project for more information regarding the hourly wind farm generation profiles.

and 43% of the hours in the highest bin, leaving 29% of the hours in the intermediate power levels. The total energy yield from the 144 MW OSW farm is 660 GWh.

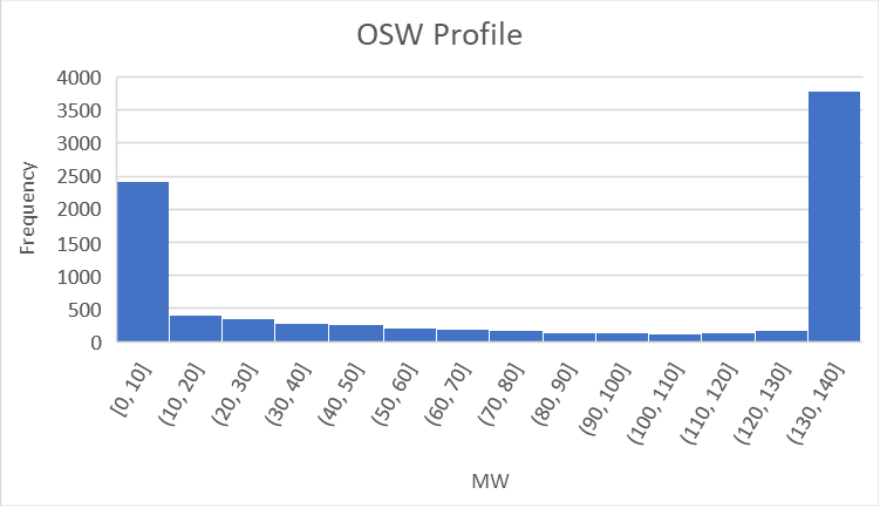

Figure 2-2. Generation Profile of the 144 MW OSW Farm

9. Table 2-6 provides a high-level overview of the assumed/expected generation in the Humboldt area in the year 2030.

Table 2-6. High-Level Overview of Expected Generation in the Humboldt Area: The year 2030

Unit Name	Unit Type	Fuel Type	Maximum Cap (MW)
Carlotta	Hourly Resource	Solar Photo Voltaic	4.2
Hatchery Road Solar	Hourly Resource	Solar Photo Voltaic	4.2
Hoopa Solar	Hourly Resource	Solar Photo Voltaic	4.2
Humboldt OSW	Hourly Resource	WT-Offshore	Scenario Dependent
HumboldtBayIC01	Thermal	ICE-NatGas	16.3
HumboldtBayIC02	Thermal	ICE-NatGas	16.3
HumboldtBayIC03	Thermal	ICE-NatGas	16.3
HumboldtBayIC04	Thermal	ICE-NatGas	16.3
HumboldtBayIC05	Thermal	ICE-NatGas	16.3
HumboldtBayIC06	Thermal	ICE-NatGas	16.3
HumboldtBayIC07	Thermal	ICE-NatGas	16.3
HumboldtBayIC08	Thermal	ICE-NatGas	16.3
HumboldtBayIC09	Thermal	ICE-NatGas	16.3
HumboldtBayIC10	Thermal	ICE-NatGas	16.3
Kekawaka	Hydro	HydroRPS	6
PacificLumber1	Thermal	Bio-ST	12.5
PacificLumber2	Thermal	Bio-ST	12.5
PacificLumber3	Thermal	Bio-ST	7.5
RCAM Solar	Hourly Resource	Solar Photo Voltaic	2.2

10. Within the Humboldt area, all generators at the Humboldt Bay plant were designated with Reliability Must Run (RMR) status. Considering the expected trends in California for renewable energy targets/SB-100, the RMR designation was provided to only half the generation at the Humboldt Bay plant.
11. Consistent with CAISO modeling assumptions: The curtailment price for renewables was set at negative $25/MWh, reflecting the impact of investment tax credits applicable to the facility. No other fixed or variable O&M costs were associated with the renewable projects (including the OSW facility).
12. All revenues estimated for the OSW farms assume merchant operation and reflect energy market opportunities only. The analysis does not consider potential Power Purchase Agreements or capacity market prices as alternative sources of revenue to the OSW facility.
13. The OSW generators were not allowed to participate in any ancillary service market product consistent with the treatment of renewable resources currently in the CAISO market.
14. The scenarios evaluated that use battery energy storage systems (BESS) have the following assumptions:

a. Variable O&M costs of $33.75/MWh
b. No fixed cost
c. Restricted to one charge and discharge cycle per day
d. Opportunity to participate in the Frequency Regulation, Reg up/Reg down, Spin/Non-spin markets
e. No restrictions on the ramp rate.

15. The CAISO models do not include Ancillary Service market prices (primarily due to the confidential nature of the bid data). The prices obtained by the models are proxy representations of the impact of scarcity pricing events.

2.5 Summary of Scenarios

Fifteen scenarios are considered in this study (see Table 2-7). Although several consistencies appear across these scenarios (i.e., A-1 and C-1), they represent different study methodologies outlined in Section 2.3. The scenarios are assigned unique identifiers to assist with compatibility across upcoming sections of the report.

Table 2-7. Summary of the Scenarios

Type of Study	Scenario	Description
Energy Only	A-1	144 MW OSW Farm, RCEA base case load, POI Option 1
Energy Only	A-2	144 MW OSW Farm, RCEA base case load, POI Option 2
Energy Only	A-3	168 MW OSW Farm, RCEA base case load, POI Option 1
Energy Only	A-4	288 MW OSW Farm, RCEA base case load, POI Option 1
Energy Only	A-5	480 MW OSW Farm, RCEA base case load, POI Option 1
Energy Only	A-6	231 MW OSW Farm, Different Load Profiles, POI Option 1
Full Capacity	B-1	144 MW OSW Farm, RCEA base case load, POI Option 1
Full Capacity	B-2	288 MW OSW Farm, RCEA base case load, POI Option 1
Full Capacity	B-3	480 MW OSW Farm, RCEA base case load, POI Option 1
Production Cost	C-1	144 MW OSW Farm, RCEA base case load, POI Option 1
Production Cost	C-2	168 MW OSW Farm, RCEA base case load, POI Option 1
Production Cost	C-3	288 MW OSW Farm, RCEA base case load, POI Option 1
Production Cost	C-4	144 MW OSW Farm, 4 Hr - 15 MW, RCEA base case load, POI Option 1
Production Cost	C-5	168 MW OSW Farm, RCEA augmented growth load, POI Option 1
Production Cost	C-6	168 MW OSW Farm, 4 Hr - 15 MW, RCEA base case load, POI Option 1

3 SYSTEM IMPACT STUDY RESULTS

Quanta Technology performed the power flow analysis on a range of OSW sizes listed in Subsections 2.5. The OSW farm was modeled directly at the Humboldt 115 kV substation POI, as shown in Figure 3-1. The submarine cable landing to the Humboldt Bay substation is not modeled in this study and would not impact the results of the analysis. The proposed configuration is herein referred to as POI Option 1.

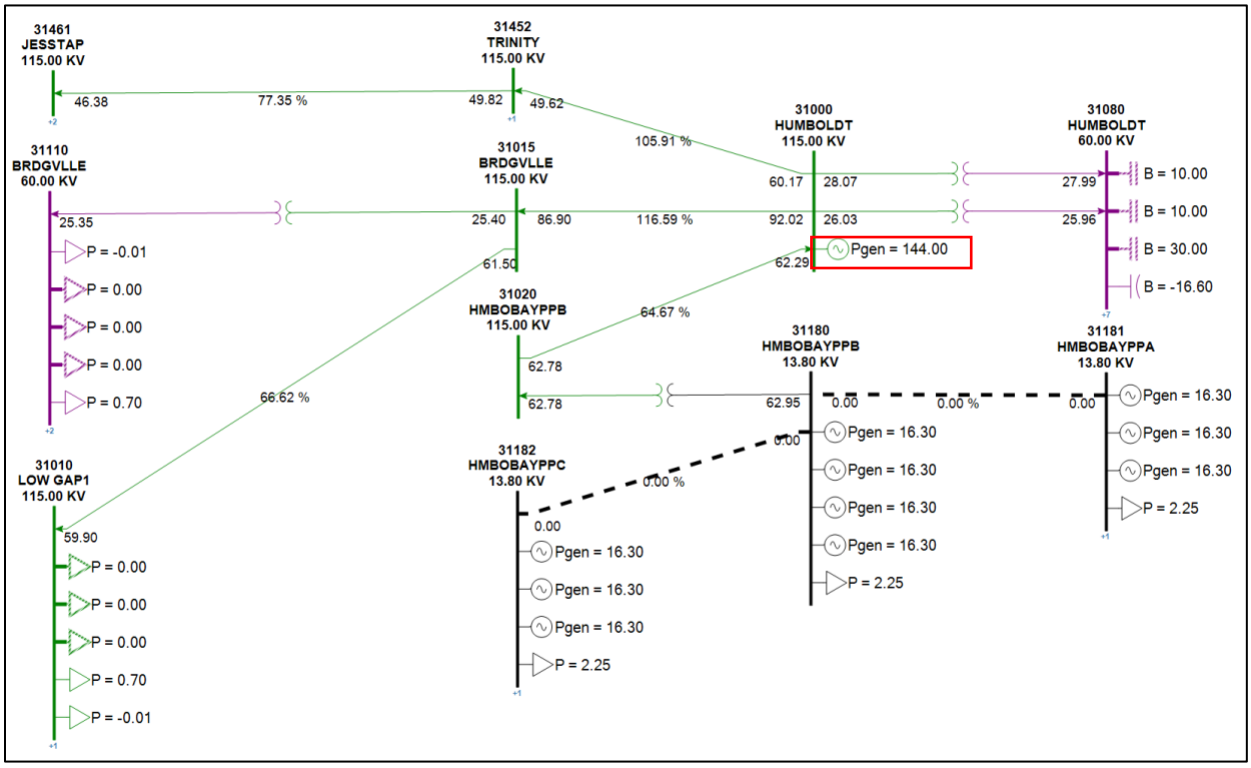

Figure 3-1. Point of Interconnection for the OSW Farm: Power Flow Model. The red box indicates the OSW Farm, which is shown as 144 MW.

3.1 Energy Only Deliverability Results

3.1.1 144 MW OSW Farm (A-1)

Figure 3-1 provides a high-level summary of the impact from 144 MW OSW farm under Summer Peak conditions. Table 3-1 and Table 3-2 list the system elements with post-project loading over 100% of their rated capacity. Table 3-1 illustrates the Summer Peak condition.

Table 3-1. Impact from OSW Farm During Summer Peak Conditions (A-1)

Monitored Facility	Contingency	kV	Rating (MVA)	PreProject Loading (%)	PostProject Loading (%)
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	49.3	89.58	177.66
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	75.7	40.51	174.85
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.8	58.44	174.25
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:17:_BRDGVLLE 115kV - Ring R3 & R2	115	64.3	19.06	173.12
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.8	49.33	164.55
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.8	44.52	159.74
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.8	44.4	158.42
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	49.3	69.63	156.38
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-2:A1:2:_LOW GAP1 115 kV Section 1D	60	35.9	<90	140.63
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	33.5	<90	124.2
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-2:A1:2:_LOW GAP1 115 kV Section 1D	60	36.1	<90	120.64
31452 TRINITY 115 31461 JESSTAP 115	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	115	86.3	12.13	115.57
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	34.6	32.55	114.62
31461 JESSTAP 115 31521 COTWD_1D 115	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	115	86.3	12.07	111.58
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	91.6	4.79	105.55
31580 CASCADE 60.0 31582 STLLWATR 60.0	P2-3:A1:1:_HUMBOLDT - MA 115kV & HUMBOLDT-TRINITY line	60	32.2	62.08	100.5

Table 3-2 provides a high-level summary of the impact of OSW farms during Winter Peak conditions.

Table 3-2. Impact from OSW Farm During Winter Peak Conditions (A-1)

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject Loading (%)	PostProject Loading (%)
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	75.7	56.77	190.51
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	75.7	55.06	185.19
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:11:_HMBLT BY 60 kV - Middle Breaker Bay 3	115	75.7	76.74	174.96
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:17:_BRDGVLLE 115kV - Ring R3 & R2	115	75.7	39.28	169.96
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	115	75.7	70.58	169.09
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	115	75.7	38.48	164.62
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	75.7	65.79	164.04
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	115	75.7	38.17	162.57
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:28:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (EEL RIVR-NEWBURG)	115	75.7	58.85	156.79
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:31:_RIO DELL JCT-BRIDGEVILLE 60 kV [7850] (CARLOTTA-RIODLLTP)	115	75.7	57.23	154.86
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:22:_RIO DELL JCT-BRIDGEVILLE 60 kV [7850] MOAS OPENED on CARLOTTA_SWNS FLT & PCLUMBER	115	75.7	56.34	153.97

The 144 MW project could be accommodated by redispatch of the remaining generation within the Humboldt area (primarily at the Humboldt Bay Generating Station facility) and thereby not triggering any reliability network upgrades, consistent with CAISO study methodology.

An AC transfer analysis using TARA software was performed at the POI exclusively to determine the maximum allowable MW export capability without triggering any overloads or constraints. The findings

from the evaluation indicate a maximum size of 30 MW that can be accommodated without congestion management. The most limiting contingency is the loss of the 115 kV line from Humboldt to Bridgeville, causing overloads in the underlying 60 kV network, as shown in Table 3-3.

Table 3-3. Most Limiting Contingency in Scenario A-1

	Monitored Facility	Contingency Name
Summer Peak	31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]
Winter Peak	31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:11:_HMBLT BY 60 kV - Middle Breaker Bay 3

3.1.2 144 MW OSW Farm: Fairhaven Sub Alternative (A-2)

In this alternative, the cable from the 144 MW OSW plant is modeled at a new FAIRHAVEN 115 kV substation with a new 115 kV transmission line to the Humboldt substation. The project was modeled directly at the FAIRHAVEN 115 kV substation, as shown in Figure 3-2, and is herein referred to as POI Option 2

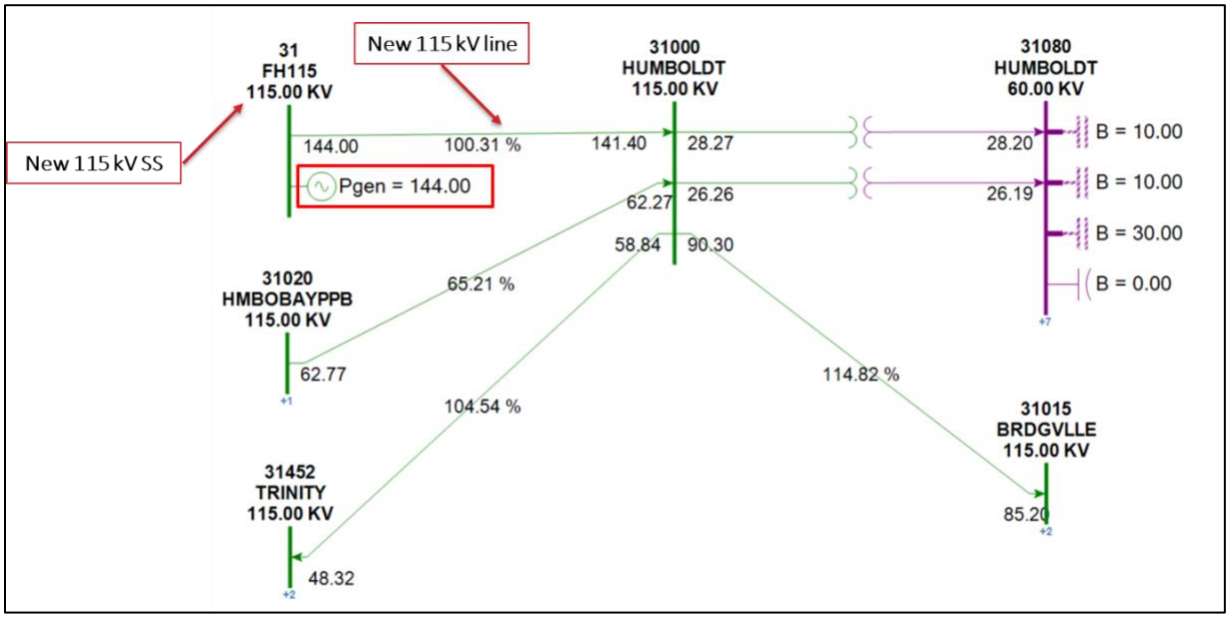

Figure 3-2. Point of Interconnection for the New Alternative OSW Farm: Power Flow Model; Red Box Indicates the OSW Farm, Shown Here as 144 MW Capacity

Table 3-4 provides a high-level summary of the impact of OSW farms during Summer Peak conditions.

Table 3-4. Impact from OSW Farm During Summer Peak Conditions (A-2)

Monitored Facility	Contingency	kV	Rating (MVA)	PreProject Loading (%)	PostProject Loading (%)
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90	168.09
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90	165.39
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	163.98
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	155.53
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90	153.9
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90	153.12
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	151.13
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	150.81
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90	147.18
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90	145.89
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	Base Case	60	35.3	88.61	121.35
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	Base Case	60	37.8	87.75	118.73
31000 HUMBOLDT 115 31015 BRDGVLLE 115	Base Case	115	79.7	<90	116.25
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	Base Case	60	38	83.34	113.75
31000 HUMBOLDT 115 31452 TRINITY 115	Base Case	115	79.7	<90	105.83
31 FH115 115 31000 HUMBOLDT 115	Base Case	115	144	<90	100.31

Table 3-5 provides a high-level summary of the impact of OSW farms during Winter Peak conditions.

Table 3-5. Impact from OSW Farm During Winter Peak Conditions (A-2)

Monitored Facility	Contingency	kV	Rating (MVA)	PreProject Loading (%)	PostProject Loading (%)
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90	185.81
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90	176.57
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90	153.43
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90	152.69
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	140.99
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	137.05
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	136.84
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 option [1810]	60	51.9	<90	133.83
31000 HUMBOLDT 115 31015 BRDGVLLE 115	Base Case	115	79.7	52.77	124.95
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	123.39
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90	110.84
31450 WILDWOOD 115 31011 FRSTGLEN 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	119.5	<90	108.06
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	119.5	<90	107.47
31 FH115 115 31000 HUMBOLDT 115	Base Case	115	144	<90	100.47

The 144 MW project could be accommodated by redispatch of the remaining generation within the Humboldt area (primarily the Humboldt Bay facility) without triggering any reliability network upgrades, consistent with CAISO's study methodology.

According to the evaluation of maximum MW injection findings, the approximate OSW installations of 30 MW would not trigger new system overloads. The most limiting contingency is the loss of the 115 kV line from Humboldt to Bridgeville, causing overloads in the underlying 60 kV network (see Table 3-6).

Table 3-6. Most Limiting Contingency in Scenario A-2

	Monitored Facility	Contingency Name
Summer Peak	31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]
Winter Peak	31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]

The full detailed summary of the impact of OSW farm is presented in Appendix A: System Impact Study.

To support the development of OSW into the alternative POI, the necessary costs are estimated to be $42M. This includes the following transmission expansion:

1. Onshore substation transformation (115/66 kV) 1-3 phase transformer (~200 MVA) at existing Fairhaven 60 kV substation 8.9M
2. Complete loop-in 115 kV Substation, equipped with one line position to terminate a single gen-tie and loop in and out one existing PG&E T line (1 complete Bay and 1 Partial Bay - 5 Circuit Breakers)—$14M
3. 15 miles of circuit strung on wood structures including escalation factors for terrain between new 115 kV substation and existing Humboldt 115kV substation 18.6M. It should be noted that land acquisition costs are excluded in the case that the existing right of way is not able to accommodate the addition of another transmission line.

3.1.3 168 MW OSW Farm (A-3)

Table 3-7 provides a high-level summary of the impact of a 168 MW OSW farm during Summer Peak conditions.

Table 3-7. Impact from OSW Farm During Summer Peak Conditions (A-3)

Monitored Facility	Contingency	kV	Rating (MVA)	PreProject Loading (%)	PostProject Loading (%)
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90	186.68
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	183.4
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90	182.44
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90	181.99
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	115	79.7	<90	175.33
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	174.05
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	79.7	<90	170.75
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	169.48
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	167.92
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90	166.96
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90	165.64
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90	165.36

Table 3-8 provides a high-level summary of the impact of OSW farms during Winter Peak conditions.

Table 3-8. Impact from OSW Farm During Winter Peak Conditions (A-3)

Monitored Facility	Contingency	kV	Rating (MVA)	PreProject Loading (%)	PostProject Loading (%)
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	202.12
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90	201.23
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	197
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90	196.02
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	193.89
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90	192.1
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90	190.1
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90	182.79

The 168 MW project could be accommodated by a redispatch of the remaining generation within the Humboldt area (primarily the Humboldt Bay facility), and thereby not triggering any reliability network upgrades, consistent with CAISO study methodology.

The full detailed summary of the impact of OSW farms is presented in Appendix A: System Impact Study.

3.1.4 288 MW OSW Farm (A-4)

Table 3-9 provides a high-level summary of the impact of a 288 MW OSW farm during Summer Peak conditions.

Table 3-9. Impact from OSW Farm During Summer Peak Conditions (A-4)

Monitored Facility	Contingency	kV	Rating (MVA)	PreProject Loading (%)	PostProject Loading (%)
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90	286.33
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90	282.08
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90	275.3
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90	271.93
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	269.57
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90	267.1
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	259.34
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	254.76
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	251.14

Table 3-10 provides a high-level summary of the impact of OSW farms during Winter Peak conditions.

Table 3-10. Impact from OSW Farm During Winter Peak Conditions (A-4)

Monitored Facility	Contingency	kV	Rating (MVA)	PreProject Loading (%)	PostProject Loading (%)
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90	299.87
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90	298.33
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90	295.86
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90	294.33
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	289
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	283.88
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90	283.82
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	277.73

The 288 MW project size *could not* be accommodated by redispatch of the remaining generation within the Humboldt area. This system condition would trigger the need for network reliability upgrades or direct curtailment of OSW production.

The full detailed summary of the impact of OSW farms is presented in Appendix A: System Impact Study.

3.1.5 480 MW OSW Farm (A-5)

Table 3-11 provides a high-level summary of the impact of OSW farms during Summer Peak conditions.

Table 3-11. Impact from OSW Farm During Summer Peak Conditions (A-5)

Monitored Facility	Contingency	kV	Rating (MVA)	PreProject Loading (%)	PostProject Loading (%)
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90	445.88
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90	442.66
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90	439.86
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90	437.2
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90	434.51
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	400.16
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	388.26
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	383.69

Table 3-12 provides a high-level summary of the impact of OSW farms during Winter Peak conditions.

Table 3-12. Impact from OSW Farm During Winter Peak Conditions (A-5)

Monitored Facility	Contingency	kV	Rating (MVA)	PreProject Loading (%)	PostProject Loading (%)
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90	464.65
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90	459.81
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90	458.53
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90	452.38
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90	451.2
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	418.69
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90	413.58
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	402.36
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	388.59

The 480 MW project size *could not* be accommodated by redispatch of the remaining generation within the Humboldt area. This system condition would trigger the need for reliability network upgrades or direct curtailment of OSW production.

The full detailed summary of the impact of OSW farms is presented in Appendix A: System Impact Study.

3.1.6 Load Growth Scenarios (A-6)

The following additional studies were performed to determine the maximum size of energy-only OSW farms under the RCEA base case load scenario and two alternative load growth scenarios that can be interconnected into the Humboldt 115kV substation (Option 1) :

1. Using the “RCEA base case load”
2. Using the “RCEA augmented growth load ”
3. Using the “RCEA augmented growth load ” and an additional 20 MW continuous load

The magnitude of the loads for the above three scenarios is presented in section 2.4.

All loads have been uniformly scaled throughout the entire Humboldt area (Zone 301 in power flow models) to determine the maximum OSW size under each scenario.

Scenario 1 overloads were captured in the base case study and reported in sections 3.1.1 and 3.1.3. Table 3-13 and Table 3-14 show the additional overloads triggered by the additional load growth for Scenarios 2 and 3.

3.1.6.1 Using the "RCEA Augmented Growth Load "

Table 3-13. Overloads triggered by the Augmented Load

Monitored Facility	Contingency Name	kV	Rating (MVA)	Loading (%)
HUMBOLDT BAY-RIO DELL JCT 60 kV	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	51.9	108.1
RIO DELL JCT-BRIDGEVILLE 60 kV	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	60	38.7	100.9
RIO DELL JCT-BRIDGEVILLE 60 kV	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	60	38.7	100.7

3.1.6.2 Using the RCEA Augmented Growth Load Plus an Additional 20 MW Continuous Load

Table 3-14. Overloads Triggered by the Augmented Load Plus an Additional 20 MW Continuous Load

Monitored Facility	Contingency Name	kV	Rating (MVA)	Loading (%)
HUMBOLDT BAY-RIO DELL JCT 60 kV	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	51.9	118.73
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	60	38.7	109.4
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	60	38.7	109.18
31086 EUREKA 60.0 31090 HMBLT BY 60.0	P1-2:A1:11:_HUMBOLDT BAY-EUREKA 60 kV [7070] MOAS OPENED on HUMBOLDT_HARRIS	60	36	107.13
31086 EUREKA 60.0 31090 HMBLT BY 60.0	P2-1:A1:14:_HUMBOLDT BAY-EUREKA 60 kV [7070] (HUMBOLDT-HARRIS)	60	36	107.13
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	60	38.7	101.83

Table 3-15 summarizes the findings from the evaluation of the energy-only OSW plant. The maximum OSW sizes reflect the amounts that can be accommodated with redispatch of remaining generation in the Humboldt area without triggering potential reliability network upgrades. With the increasing load within the Humboldt area, the generation is locally consumed while minimizing impacts to transmission facilities along the export path.

Table 3-15. Maximum MW Injection that Does Not Trigger New Overloads (A-6)

Scenario	Max OSW Size (MW)
RCEA Base Case Load	174
RCEA Augmented Growth Load	225
RCEA Augmented Growth Load + 20 MW	231

The most limiting contingency is the loss of the 115 kV line from Humboldt to Bridgeville, causing overloads in the underlying 60 kV network (see Table 3-16).

Table 3-16. Most Limiting Contingency in Scenario A-6

Scenario	Monitored Facility	Contingency Name
RCEA Base Case Load	31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]
RCEA Augmented Growth Load	31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)
RCEA Augmented Growth Load + 20 MW	31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES

3.1.7 Findings Summary

For the RCEA base case load profile:

- The approximate OSW installations of 30 MW without generation redispatch/congestion management is the maximum MW injection that does not trigger new overloads in the system.
- The approximate OSW installations of 174 MW with generation redispatch/congestion management is the maximum MW injection that does not trigger new overloads in the system.

For the “RCEA augmented growth load ” profile:

- The approximate OSW installations of 225 MW with generation redispatch/congestion management is the maximum MW injection that does not trigger new overloads in the system.

For the “RCEA augmented growth load + 20 MW":

- The approximate OSW installations of 231 MW with generation redispatch/congestion management is the maximum MW injection that does not trigger new overloads in the system.

3.2 Deliverability Study Results

3.2.1 144 MW OSW Farm (B-1)

Generation deliverability studies were performed for a 144 MW OSW project. As expected, the plant capacity is not fully deliverable with the existing transmission network in the Humboldt area.

Several of the major deliverability constraints are identified in Table 3-17. The Pre-shift %LD refers to the facility percent overload before full capacity deliverability of the OSW project. Post-shift %LD refers to the facility percent overload post full capacity deliverability of the offshore project using DC and AC power flow solutions.

Table 3-17. Major Deliverability Constraints in Scenario B-1

Monitored Facility	kV	Areas	Zones	Contingency	Rating (MVA)	Pre-Shift %LD	Post-FLA DC %LD	Post-FLA AC %LD
31105 RIODLLTP 60.0 31104 CARLOTTA 60.0	60	30	301	P1-2:A1:1001:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	38.7	149.62	202.17	198.82
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	60	30	301	P1-2:A1:1001:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	38.7	148.58	201.4	198.29
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	60	30	301	P1-2:A1:1001:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	38.7	146.12	198.93	197.96
31000 HUMBOLDT 115 31015 BRDGVLLE 115	115	30	301	P2-1:A1:1001:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	79.7	141.51	191.81	179.83
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	60	30	301	P1-2:A1:1001:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	38.7	106.73	153.02	159.45
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	60	30	301	P1-2:A1:1001:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	51.9	112.75	147.27	147.49
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	60	30	301	Base Case	31.5	114.84	133.32	135.19
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	60	30	301	P1-2:A1:1001:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	51.9	98.61	133.13	135
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	60	30	301	Base Case	31.5	96.3	114.78	130.97
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	60	30	301	Base Case	31.5	91.54	110.03	130.11
31450 WILDWOOD 115 31524 COTWD_2E 115	115	30	303	P1-2:A1:1002:_HUMBOLDT-TRINITY 115 kV [1820]	96.4	89.5	133.43	126.66
31000 HUMBOLDT 115 31015 BRDGVLLE 115	115	30	301	Base Case	79.7	99.67	131.04	123.65
31000 HUMBOLDT 115 31452 TRINITY 115	115	30	301/303	Base Case	60.4	90.15	130.99	123.24
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	60	30	301	P2-1:A3:1033:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	36.4	89.5	125.36	121.21
31015 BRDGVLLE 115 31010 LOW GAP1 115	115	30	301	P2-1:A3:1033:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	112.1	79.04	116.82	110.29
31010 LOW GAP1 115 31011 FRSTGLEN 115	115	30	301/303	P2-1:A3:1033:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	112.1	78.11	115.9	109.64
31011 FRSTGLEN 115 31450 WILDWOOD 115	115	30	303	P2-1:A1:1001:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	112.1	77.24	115.02	109.5

To support the full deliverability of 144 MW of OSW, a new channel for exports must be created between the Humboldt area and neighboring electrical areas. The total cost of the portfolio is $238M, as shown in Table 3-18, which includes a detailed description of the projects. As shown in Figure 3-3, the proposed projects are required to support the full deliverability status of the OSW farm. Following the installation of all projects, no deliverability limitations are observed.

Table 3-18. Cost Estimation for the Proposed Projects: 144 MW OSW Farm

Project Description	Cost ($M)
New Humboldt-Trinity-Cottonwood 115 kV Line (Humboldt-Trinity is 60 mi 715 AAC and Trinity-Cottonwood is 46 mi with 715 AAC, 1 new termination at Humboldt 115 kV, 2 new terminations at Trinity 115 kV, 1 new termination at Cottonwood 115 kV)	168
Build a new 115 kV bus and install a 115/60 kV Transformer at Garberville Substation	11
Build a new 36-mile Bridgeville - Garberville No. 2 115 kV Line	59

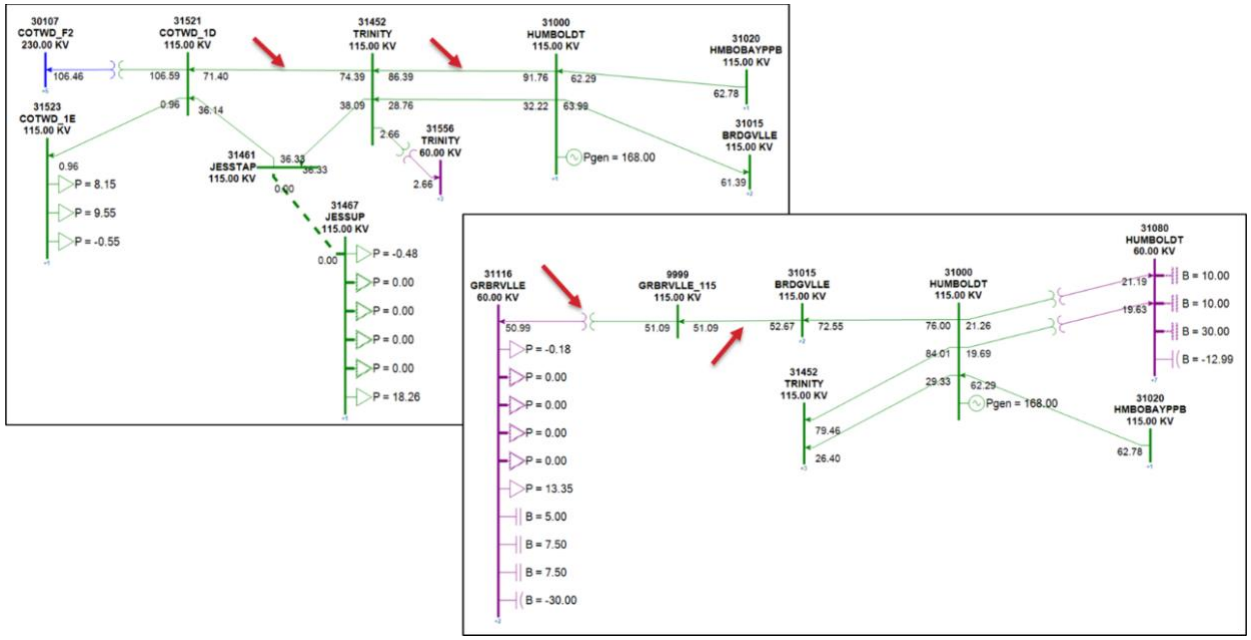

Figure 3-3. Proposed Projects for the Humboldt Area: Power Flow Model; Red Arrows Indicate Proposed Transmission System Upgrade Projects

3.2.2 288 MW OSW Farm (B-2)

Generation deliverability studies were performed for a 288 MW OSW project. As expected, the plant capacity is not fully deliverable with the existing transmission network within the Humboldt area.

Several of the major deliverability constraints are identified in Table 3-19.

Table 3-19. Major Deliverability Constraints in Scenario B-2

Monitored Facility	kV	Contingency	Rating (MVA)	Pre-Shift %LD	Post-FLA DC %LD	Post-FLA AC %LD
31000 HUMBOLDT 115 31015 BRDGVLLE 115	115	P1-2:A1:1002:_HUMBOLDT-TRINITY 115 kV [1820]	79.7	198.47	262.97	Not Converged
31450 WILDWOOD 115 31524 COTWD_2E 115	115	P1-2:A3:1040:_HUMBOLDT-TRINITY 115 kV [1820]	96.4	129.62	185.06	Not Converged
31015 BRDGVLLE 115 31010 LOW GAP1 115	115	P1-2:A3:1040:_HUMBOLDT-TRINITY 115 kV [1820]	112.1	115.21	162.88	Not Converged
31010 LOW GAP1 115 31011 FRSTGLEN 115	115	P2-1:A1:1001:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	112.1	113.7	161.38	Not Converged
31011 FRSTGLEN 115 31450 WILDWOOD 115	115	P2-1:A1:1001:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	112.1	111.74	159.42	Not Converged
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	60	P1-2:A3:1040:_HUMBOLDT-TRINITY 115 kV [1820]	35.3	105.98	152.64	Not Converged
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	60	P1-2:A3:1040:_HUMBOLDT-TRINITY 115 kV [1820]	35.3	104.15	150.81	Not Converged
31093 HYMPOMJT 60.0 31553 BIG BAR 60.0	60	P2-1:A3:1033:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	35	101.67	148.76	Not Converged
31553 BIG BAR 60.0 31555 TAP 65 60.0	60	P2-1:A3:1033:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	35.3	98.33	145.02	Not Converged
31555 TAP 65 60.0 31556 TRINITY 60.0	60	P1-2:A3:1040:_HUMBOLDT-TRINITY 115 kV [1820]	35.3	98.29	144.98	Not Converged
31105 RIODLLTP 60.0 31104 CARLOTTA 60.0	60	P2-1:A1:1001:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	38.7	84	117	Not Converged
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	60	P2-1:A3:1033:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	38.7	82.96	116.23	Not Converged

Monitored Facility	kV	Contingency	Rating (MVA)	Pre-Shift %LD	Post-FLA DC %LD	Post-FLA AC %LD
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	60	P1-2:A3:1040:_HUMBOLDT-TRINITY 115 kV [1820]	38.7	79.48	112.74	Not Converged
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	60	P1-2:A1:1001:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	38.7	157.17	216.06	191.21
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	60	P1-2:A1:1001:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	51.9	150.8	194.72	172.86
31000 HUMBOLDT 115 31452 TRINITY 115	115	Base Case	60.4	132.28	184.05	168.41
31000 HUMBOLDT 115 31015 BRDGVLLE 115	115	Base Case	79.7	137.08	177.57	166.2
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	60	P1-2:A1:1001:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	51.9	136.31	180.23	159.87
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	60	Base Case	31.5	129.97	153.15	151.21
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	60	Base Case	31.5	107.68	130.86	146.72
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	60	Base Case	31.5	101.76	124.94	145.87
31450 WILDWOOD 115 31524 COTWD_2E 115	115	Base Case	82.9	92.53	134.2	133.47
31452 TRINITY 115 31461 JESSTAP 115	115	Base Case	77.7	81.07	120.55	125.72
31461 JESSTAP 115 31521 COTWD_1D 115	115	Base Case	77.7	74.7	114.19	123.46
31015 BRDGVLLE 115 31010 LOW GAP1 115	115	Base Case	98.2	82.38	117.56	114.19

Monitored Facility	kV	Contingency	Rating (MVA)	Pre-Shift %LD	Post-FLA DC %LD	Post-FLA AC %LD
31010 LOW GAP1 115 31011 FRSTGLEN 115	115	Base Case	98.2	80.67	115.85	113.49
31011 FRSTGLEN 115 31450 WILDWOOD 115	115	Base Case	98.2	78.43	113.61	113.33

To support the full deliverability of 288 MW of OSW, a new channel for exports must be created between the Humboldt area and neighboring electrical areas. In addition to the same three projects from the last section, two more projects are required to support the deliverability status of the 288 MW OSW farm. Following the installation of these projects, no deliverability limitations are observed. The total cost of the portfolio is $329M, as shown in Table 3-20.

Table 3-20. Cost Estimation for the Proposed Projects: 288 MW OSW Farm

Project Description	Cost ($M)
New Humboldt-Trinity-Cottonwood 115 kV Line (Humboldt-Trinity is 60 mi 715 AAC and Trinity-Cottonwood is 46 mi with 715 AAC, 1 new termination at Humboldt 115 kV, 2 new terminations at Trinity 115 kV, 1 new termination at Cottonwood 115 kV)	168
Build a new 115 kV bus and install a 115/60 kV Transformer at Garberville Substation	11
Build a new 36-mile Bridgeville - Garberville No. 2 115 kV Line	59
Reconductor 30.3-mile Humboldt- Bridgeville 115 kV Line	54
Reconductor Bridgeville – Rio Del Tap 60 kV	37

3.2.3 480 MW OSW Farm (B-3)

Generation deliverability studies were performed for a 480 MW OSW project at the Humboldt substation. As expected, the plant capacity is not fully deliverable with the existing transmission network within the Humboldt area. The size of the OSW project interacts with CAISO's bulk 500 kV high voltage network.

Several of the major deliverability constraints are identified in Table 3-21.

Table 3-21. Major Deliverability Constraints in Scenario B-3

Monitored Facility	kV	Contingency
31000 HUMBOLDT 115 31452 TRINITY 115	115	Base Case
31000 HUMBOLDT 115 31015 BRDGVLLE 115	115	Base Case
31450 WILDWOOD 115 31524 COTWD_2E 115	115	Base Case
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	60	Base Case
31015 BRDGVLLE 115 31010 LOW GAP1 115	115	Base Case
31452 TRINITY 115 31461 JESSTAP 115	115	Base Case
31010 LOW GAP1 115 31011 FRSTGLEN 115	115	Base Case
31011 FRSTGLEN 115 31450 WILDWOOD 115	115	Base Case
300301 VD_TS_11 500 30040 TESLA 500	500	Base Case
30030 VACA-DIX 500 300301 VD_TS_11 500	500	Base Case
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	60	Base Case
31461 JESSTAP 115 31521 COTWD_1D 115	115	Base Case
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	60	Base Case
366667 Q1491ONSHR 115 31000 HUMBOLDT 115	115	Base Case
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	60	Base Case
31105 RIODLLTP 60.0 31104 CARLOTTA 60.0	60	Base Case
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	60	Base Case
300053 RM_TM_21 500 300055 RMTMSWSTA 500	500	Base Case
300055 RMTMSWSTA 500 300054 RM_TM_22 500	500	Base Case
300051 RM_TM_11 500 300055 RMTMSWSTA 500	500	Base Case
300055 RMTMSWSTA 500 300052 RM_TM_12 500	500	Base Case
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	60	Base Case
30015 TABLE MT 500 300151 TM_VD_11 500	500	Base Case
300151 TM_VD_11 500 300152 TM_VD_12 500	500	Base Case
300152 TM_VD_12 500 30030 VACA-DIX 500	500	Base Case
300153 TM_TS_11 500 300154 TM_TS_12 500	500	Base Case
30015 TABLE MT 500 300153 TM_TS_11 500	500	Base Case
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	60	P1-2:A1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	60	P1-2:A1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]
30450 CORTINA 230 30460 VACA-DIX 230	230	P2-4:A4:_VACA-DIX 230 kV - Section 1E & 2E
30114 DELEVAN 230 30460 VACA-DIX 230	230	P2-4:A4:_VACA-DIX 230 kV - Section 1E & 2E
30114 DELEVAN 230 30460 VACA-DIX 230	230	P7-1:A4:_DELEVAN-CORTINA 230 kV Line and DELEVAN-VACA #1 230 kV Line
30114 DELEVAN 230 30460 VACA-DIX 230	230	P7-1:A4:_DELEVAN-CORTINA 230 kV Line and DELEVAN-VACA #1 230 kV Line

Significant upgrades are required in the Humboldt Bay area to support the full deliverability of 480 MW of OSW. Almost all the underlying 115 kV and 60 kV lines would require an upgrade in combination with

new line buildouts. The following projects are required to support the full deliverability status for the OSW farm:

- New North 500 kV Path with Delevan 500 kV station on Table Mountain-Vaca 500 kV Line ($2.8B)
- The OSW project records a 19% contribution toward the ADNU

After the installation of these projects, no deliverability limitations are observed. In addition to the same three projects required by the 144 MW OSW farm and the two additional projects required by the 288 MW OSW farm, three additional projects are required to support the deliverability status of the 480 MW OSW farm. The total cost of the portfolio is $591M to $1.12B, as shown in Table 3-22.

Table 3-22. Cost Estimation for the Proposed Projects: 480 MW OSW Farm

Project Description	Cost ($M)
New Humboldt-Trinity-Cottonwood 115 kV Line (Humboldt-Trinity is 60 mi 715 AAC and Trinity-Cottonwood is 46 mi with 715 AAC, 1 new termination at Humboldt 115 kV, 2 new terminations at Trinity 115 kV, 1 new termination at Cottonwood 115 kV)	168
Build a new 115 kV bus and install a 115/60 kV Transformer at Garberville Substation	11
Build a new 36-mile Bridgeville - Garberville No. 2 115 kV Line	59
Reconductor 30.3-mile Humboldt- Bridgeville 115 kV Line	54
Reconductor Bridgeville – Humboldt Bay 60 kV Line	70
Reconductor 40 miles of Garberville - Laytonville 60 kV Line	69
Reconductor 23 miles of Laytonville - Willits 60 kV Line	40
Reconductor 68.58 miles of Humboldt - Trinity 115 kV Line	120

3.2.4 Cost Estimates

- The costs provided are non-binding and not based on any transmission owner's preliminary engineering and design. Costs were based on the 2021 PG&E Proposed Generator Interconnection Unit Cost Guide submitted to CAISO for third-party interconnections to use for high-level cost estimates. A link to the guide is as follows:

  http://www.caiso.com/informed/Pages/StakeholderProcesses/ParticipatingTransmissionOwnerPerUnitCosts.aspx
- More detailed estimates will be available once the project has been submitted through the CAISO interconnection study process. Therefore, the costs provided are subject to modification and do not include environmental and permitting requirements.
- As a precursor, costs were baselined using PG&E-provided cost estimates for the new Humboldt-Trinity-Cottonwood line. The baselining was performed to verify consistency in cost assumptions (escalation factors, inflation) between the CAISO per unit cost guide and PG&E provided cost estimates from feasibility studies for OSW.
- All costs are provided in nominal dollars for the year 2031.
- No contingency factors were assumed for the transmission lines because CAISO's published costs do not include them.

- While the identified upgrade costs are initially borne by the project developers, they are reimbursed over time through the current regulatory process. Deliverability network upgrades are socialized to ratepayers if the upgrades were built following transmission deliverability allocation from the CAISO. The reimbursement is funded through transmission access charge (TAC), which is collected as a "postage stamp" addition on the rate-payers bill.

3.2.5 Summary of Findings

To support the full deliverability of OSW, transmission expansion is required to create new export channels between the region and the rest of the state.

- The analysis estimated upgrades to be $238M to support the full deliverability of 144 MW of OSW.
- The analysis estimated upgrades to be $329M to support the full deliverability of 288 MW of OSW.
- The analysis estimated upgrades to be $591M to support the full deliverability of 480 MW of OSW. While taking into consideration contribution toward area deliverability network upgrades, the cost of those estimated upgrades would be $1.12B.
- Beyond 480 MW, significant expansion must include voltage transformation to the 500 kV level while considering potential interactions with Path 66 and other PG&E bulk electric infrastructure.

Table 3-23 summarizes the proposed transmission network expansion associated with the different OSW farm sizes.

Table 3-23. Summary of the Generation Deliverability Studies

Project Description	Cost ($M)	144 MW	288 MW	480 MW
New Humboldt-Trinity-Cottonwood 115 kV Line (Humboldt-Trinity is 60 mi 715 AAC and Trinity-Cottonwood is 46 mi with 715 AAC, 1 new termination at Humboldt 115 kV, 2 new terminations at Trinity 115 kV, 1 new termination at Cottonwood 115 kV)	168	✓	✓	✓
Build a new 115 kV bus and install a 115/60 kV Transformer at Garberville Substation	11	✓	✓	✓
Build a new 36-mile Bridgeville - Garberville No. 2 115 kV Line	59	✓	✓	✓
Reconductor 30.3-mile Humboldt- Bridgeville 115 kV Line	54	NA	✓	✓
Reconductor Bridgeville – Rio Del Tap 60 kV	37	NA	✓	
Reconductor Bridgeville – Humboldt Bay 60 kV Line	70	NA	NA	✓
Reconductor 40 miles of Garberville - Laytonville 60 kV Line	69	NA	NA	✓
Reconductor 23 miles of Laytonville - Willits 60 kV Line	40	NA	NA	✓
Reconductor 68.58 miles of Humboldt - Trinity 115 kV Line	120	NA	NA	✓
Total Cost ($M)		**238**	**329**	**591**

4 PRODUCTION COST ESTIMATION RESULTS

4.1 Background of Humboldt Area

In the baseline production cost model, the Humboldt area load profile was adjusted to reflect the "RCEA base case load" received from the Schatz Energy Research Center (Schatz) team, as shown in Figure 4-1.

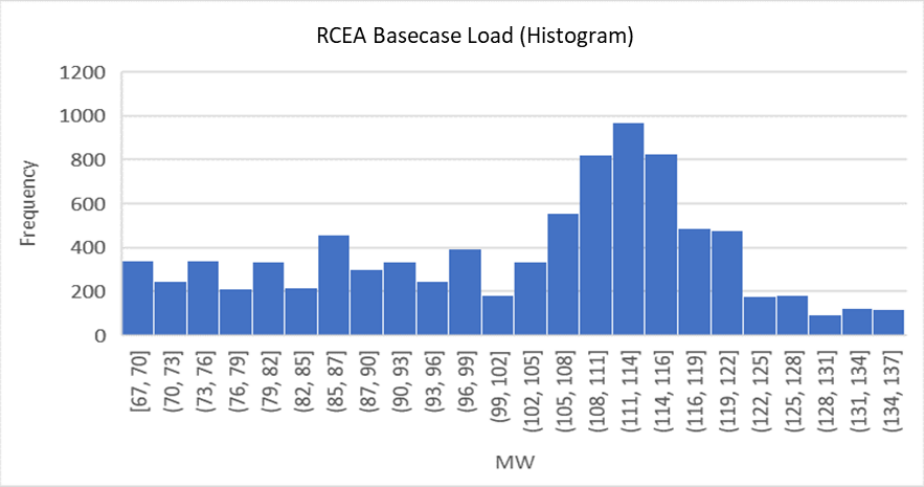

Figure 4-1. 2030 RCEA base-case load

OSW farm project was added at Humboldt 115 kV substation with OSW farm power production profile provided by the Schatz team, as shown in Figure 4-2. The OSW profile has a capacity factor of 52.35%.

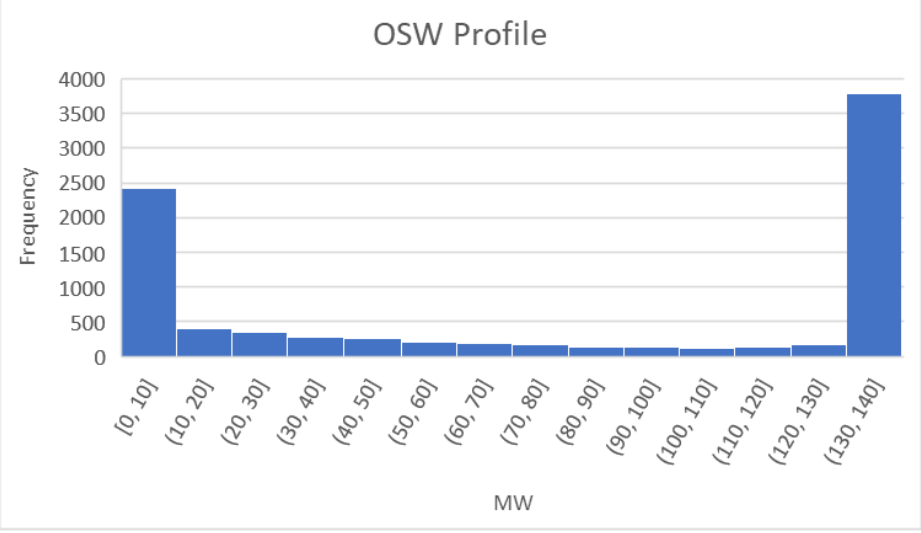

Figure 4-2. 2030 OSW Power Profile for 144 MW OSW Farm

The list of constraints (monitored facilities and contingencies) identified from power flow studies were included in the simulation model to evaluate the impact on market dispatch. Table 4-1 outlines the generation within the process communication model for the Humboldt area.

Table 4-1. Generation for the Humboldt Area

Name	KV	Type	Min Cap (MW)	Max Cap (MW)	Must Run	Forced Outage Rate Occurrences /yr	Outage Duration (Hr/yr)
HumboldtBayIC09	13.8	ICE-NatGas	3.26	16.3	#FALSE#	0.0309	37
HumboldtBayIC08	13.8	ICE-NatGas	3.26	16.3	#FALSE#	0.0309	37
HumboldtBayIC10	13.8	ICE-NatGas	3.26	16.3	#FALSE#	0.0309	37
HumboldtBayIC07	13.8	ICE-NatGas	3.26	16.3	#FALSE#	0.0309	37
HumboldtBayIC06	13.8	ICE-NatGas	3.26	16.3	#FALSE#	0.0309	37
HumboldtBayIC05	13.8	ICE-NatGas	3.26	16.3	#FALSE#	0.0309	37
HumboldtBayIC04	13.8	ICE-NatGas	3.26	16.3	#FALSE#	0.0309	37
HumboldtBayIC03	13.8	ICE-NatGas	3.26	16.3	#FALSE#	0.0309	37
HumboldtBayIC02	13.8	ICE-NatGas	3.26	16.3	#FALSE#	0.0309	37
HumboldtBayIC01	13.8	ICE-NatGas	3.26	16.3	#FALSE#	0.0309	37
BlueLake	12.47	Bio-ST	6.9	13.8	#TRUE#	0.0309	38
PacificLumber3	2.4	Bio-ST	3.75	7.5	#TRUE#	0.0309	38
PacificLumber2	13.8	Bio-ST	3.75	12.5	#TRUE#	0.0309	38
PacificLumber1	13.8	Bio-ST	3.75	12.5	#TRUE#	0.0309	38
Fairhaven_Pwr	13.8	Bio-ST	5.97	19.9	#TRUE#	0.0309	38
Evergreen_Pulp	12.47	Bio-ST	6	20	#TRUE#	0.0309	38
Kekawaka	4.16	HydroRPS	0	6	#FALSE#	0	1
Humboldt OSW	115	WT-Onshore	0	120.4	#FALSE#	0	1

The following assumptions are considered for the production cost simulation:

1. The Blue Lake, Evergreen Pulp, and Fairhaven power plants are retired.
2. Three 4 MW and one 2.2 MW solar photovoltaic project will be added at substations within the Humboldt area.
3. There will be a redistribution of must-run capacity to the Humboldt Bay power plant generators from the assumed retirements.

Unless otherwise noted, the revenues reported do not include tax credits.

4.2 144 MW OSW Farm (C-1)

The results from the production simulation studies demonstrate a 4.5% curtailment of production (MWh) over the year for the OSW project. This is from 358 hours of curtailments in a year. Relevant statistics are provided below, as shown in Figure 4-3 and Table 4-2.

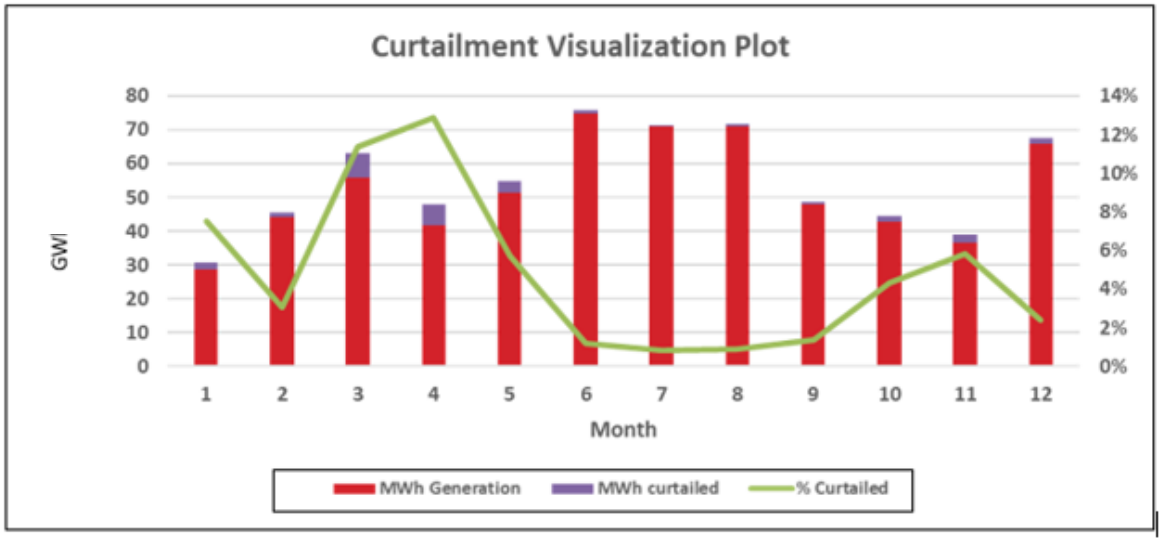

Figure 4-3. Curtailment Visualization Plot for the 144 MW OSW Farm

Table 4-2. Summary of the OSW Curtailment for the 144 MW OSW Farm

Month	MWh Production	MWh Curtailed	MWh Expected Total (Production + Curtailed)	% Curtailed	Number of Hours of Curtailment
1	28,506	2312	30,818	8%	29
2	44,196	1391	45,588	3%	14
3	55,816	7141	62,957	11%	82
4	41,891	6176	48,067	13%	86
5	51,517	3133	54,649	6%	42
6	74,745	923	75,668	1%	8
7	70,809	608	71,417	1%	5
8	70,853	660	71,512	1%	5
9	48,015	676	48,691	1%	6
10	42,673	1915	44,588	4%	26
11	36,631	2279	38,910	6%	37
12	65,859	1631	67,490	2%	18

Most curtailments are during off-peak months with lighter loads in the area coinciding with peak OSW production. The peak curtailment observed each month is 133 MW (maximum of OSW farm power production profile including losses).

Table 4-3 shows relevant statistics associated with all generations in the Humboldt area.

Table 4-3. Generation in the Humboldt Area for the 144 MW OSW Farm

Unit Name	Unit Type	Maximum Capacity (MW)	Minimum Capacity (MW)	Total Gen (MWh)	Cap Factor Post Curtail	Total Curtailment (MWh)	Total Revenue ($M)
Carlotta	Hourly Resource	4.2	0	5,126	15%	793	0.06
Hatchery Road Solar	Hourly Resource	4.2	0	5,168	15%	750	0.07
Hoopa Solar	Hourly Resource	4.2	0	5,161	15%	757	0.06
Humboldt OSW	Hourly Resource	120.4	0	631,511	50%	28845	20.91
HumboldtBayIC01	Thermal	16.3	3.26	29,766	21%	0	1.06
HumboldtBayIC02	Thermal	16.3	3.26	29,729	21%	0	1.07
HumboldtBayIC03	Thermal	16.3	3.26	29,435	21%	0	1.04
HumboldtBayIC04	Thermal	16.3	3.26	124	0%	0	0.02
HumboldtBayIC05	Thermal	16.3	3.26	95	0%	0	0.01
HumboldtBayIC06	Thermal	16.3	3.26	231	0%	0	0.03
HumboldtBayIC07	Thermal	16.3	3.26	228	0%	0	0.03
HumboldtBayIC08	Thermal	16.3	3.26	106	0%	0	0.02
HumboldtBayIC09	Thermal	16.3	3.26	203	0%	0	0.03
HumboldtBayIC10	Thermal	16.3	3.26	108	0%	0	0.02
Kekawaka	Hydro	6	0	7,919	18%	0	0.27
PacificLumber1	Thermal	12.5	3.75	57,731	53%	0	2.18
PacificLumber2	Thermal	12.5	3.75	60,962	56%	0	2.32
PacificLumber3	Thermal	7.5	3.75	46,300	70%	0	1.61
RCAM Solar	Hourly Resource	2.2	0	2,826	15%	429	0.03

It is observed that all curtailment is congestion driven. Table 4-4 presents the most limiting constraints and their corresponding hours of congestion.

Table 4-4. Most Limiting Constraints in Scenario C-1

Contingency	From_ Bus_ID	From_Bus_ Name	To_Bus_ID	To_Bus_Name	CKT	Average Power Flow (MW)	Shadow Price ($/MW)	Congestion Cost ($K)	Congestion Hours (Hrs)	Loading Factor
Basecase	31101	SCOTIATP	31105	RIODLLTP	1	16.86	-0.58	135.49	852	0
Basecase	32218	DRUM	32244	BRNSWCKP	2	45.52	-10.53	5,668.80	524	0
P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	31104	CARLOTTA	31105	RIODLLTP	1	17.0	0.1	21.6	20	36%
P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	31000	HUMBOLDT	31015	BRDGVLLE	1	40.7	0.0	24.6	5	54%
P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	31000	HUMBOLDT	31452	TRINITY	1	36.6	0.0	1.3	13	48%

The findings from the production simulation study are consistent with power flow analysis, and the 115 kV circuits between Humboldt to Bridgeville and Humboldt to Trinity are overloaded for several N-1 conditions. There are N-0 overloads on the underlying 60 kV network that contribute to OSW curtailment. The curtailments are directly attributed to the amount of generation and load within the Humboldt pocket.

Table 4-5 summarizes the OSW project economics. Net Revenues are indicative of the summation of hourly positive and negative revenues from the scenario under study. During hours with negative LMP prices, the plant is curtailed if the LMPs are less than negative $25/MWh, resulting in zero revenues. In hours with LMPs between -$25/MWh and $0, the plant was generating negative revenues.

Table 4-5. 144 MW OSW Economics

OSW Size (MW)	Average LMPs Weighted by Generation ($/MWh)	Curtailment (%)	Net Revenues $M	Net Revenues + Production Tax Credits, $M	Cap Factor
144	32	4.4	21	37	50%

Figure 4-4 presents the LMPs at the Humboldt substation and summarizes the total annual revenues.

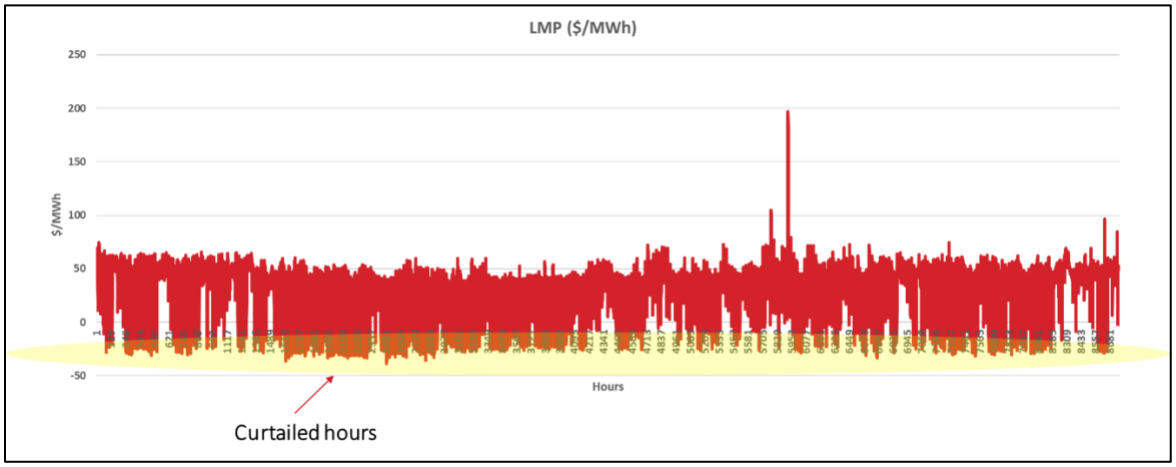

Figure 4-4. LMPs at the Humboldt Substation for the 144 MW OSW Farm

4.3 168 MW OSW Farm (C-2)

The 168 MW OSW studies demonstrate a 6% curtailment of production (MWh) over the year for the OSW project. This is from 1909 hours of curtailment in a year. Relevant statistics are provided below, as shown in Figure 4-5 and Table 4-6.

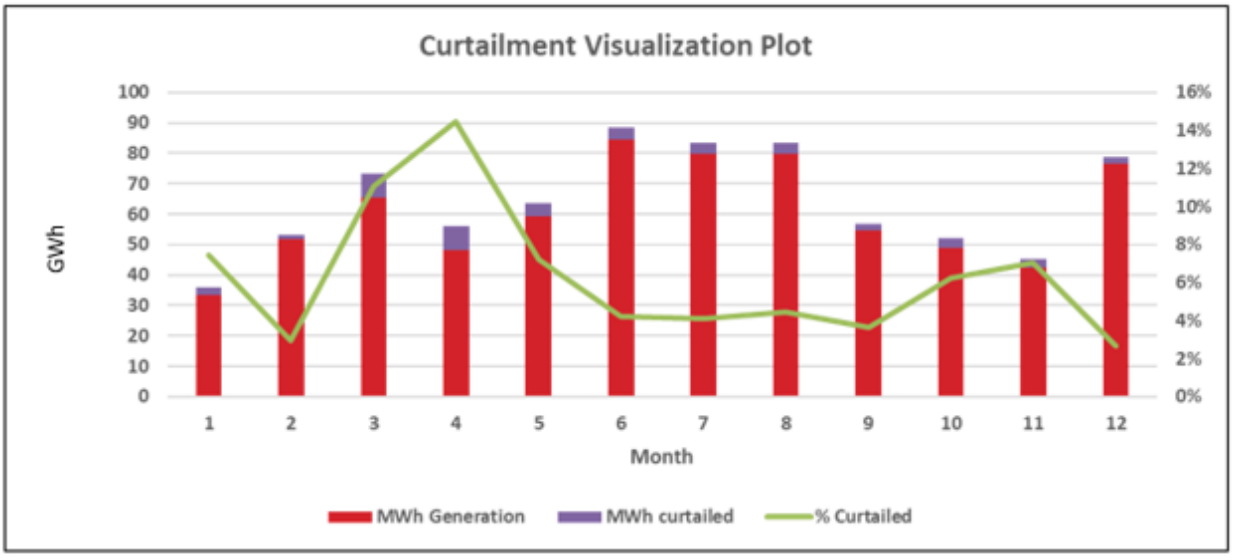

Figure 4-5. Curtailment Visualization Plot for the 168 MW OSW Farm

Table 4-6. Summary of the OSW Curtailment for the 168 MW OSW Farm

Row Labels	MWH Production	MWh Curtailed	MWh Expected Total (Production + Curtailed)	% Curtailed	Number of Hours of Curtailment
1	33,271	2,683	35,954	7%	45
2	51,615	1,571	53,186	3%	16
3	65,327	8,123	73,450	11%	92
4	47,961	8,117	56,079	14%	159
5	59,170	4,588	63,758	7%	201
6	84,577	3,703	88,280	4%	334
7	79,906	3,414	83,320	4%	322
8	79,701	3,730	83,431	4%	319
9	54,725	2,081	56,806	4%	170
10	48,788	3,232	52,020	6%	119
11	42,195	3,200	45,395	7%	95
12	76,626	2,112	78,738	3%	37

Most curtailments are during off-peak months with lighter loads in the area coinciding with peak OSW production. The peak curtailment observed each month is 156 MW (maximum of OSW profile including losses).

Table 4-7 shows relevant statistics associated with all generation facilities in the Humboldt area.

Table 4-7. Generation in the Humboldt Area for the 168 MW OSW Farm

Unit Name	Unit Type	Maximum Capacity (MW)	Minimum Capacity (MW)	Total Gen (MWh)	Cap Factor Post Curtail	Total Curtailment (MWh)
Carlotta	Hourly Resource	4.2	0	5,068	14.5%	850
Hatchery Road Solar	Hourly Resource	4.2	0	5,088	14.5%	831
Hoopa Solar	Hourly Resource	4.2	0	5,108	14.6%	811
Humboldt OSW	Hourly Resource	120.4	0	723,861	49.2%	46,555
HumboldtBayIC01	Thermal	16.3	3.26	29,581	20.7%	0
HumboldtBayIC02	Thermal	16.3	3.26	29,479	20.6%	0
HumboldtBayIC03	Thermal	16.3	3.26	29,218	20.5%	0
HumboldtBayIC04	Thermal	16.3	3.26	134	0.1%	0
HumboldtBayIC05	Thermal	16.3	3.26	109	0.1%	0
HumboldtBayIC06	Thermal	16.3	3.26	170	0.1%	0
HumboldtBayIC07	Thermal	16.3	3.26	235	0.2%	0
HumboldtBayIC08	Thermal	16.3	3.26	217	0.2%	0
HumboldtBayIC09	Thermal	16.3	3.26	250	0.2%	0
HumboldtBayIC10	Thermal	16.3	3.26	121	0.1%	0
Kekawaka	Hydro	6	0	7,919	18.4%	0
PacificLumber1	Thermal	12.5	3.75	54,655	49.9%	0
PacificLumber2	Thermal	12.5	3.75	57,613	52.6%	0
PacificLumber3	Thermal	7.5	3.75	44,633	67.9%	0
RCAM Solar	Hourly Resource	2.2	0	2,793	14.5%	462

It is observed that all curtailment is congestion driven. Table 4-8 presents the most limiting constraints and their corresponding hours of congestion.

Table 4-8. Most Limiting Constraints in Scenario C-2

Contingency	From_ Bus_ID	From_Bus_ Name	To_Bus_ID	To_Bus_Name	CKT	Average Power Flow (MW)	Shadow Price ($/MW)	Congestion Cost ($K)	Congestion Hours (Hrs)	Loading Factor
P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	31104	CARLOTTA	31105	RIODLLTP	1	19.4	0.2	49.6	135.0	0.4
P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	31000	HUMBOLDT	31015	BRDGVLLE	1	47.0	-8.0	5,331.9	1,254.0	0.6
P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	31000	HUMBOLDT	31452	TRINITY	1	42.1	-4.8	2,720.2	588.0	0.6

The findings from the production simulation study are consistent with power flow analysis. The 115 kV circuits between Humboldt to Bridgeville and Humboldt to Trinity are overloaded for several N-1 conditions. There are N-0 overloads on the underlying 60 kV network that contributes to OSW curtailment. The curtailments are directly attributed to the amount of generation and load within the Humboldt pocket.

Table 4-9 summarizes the OSW project economics.

Table 4-9. 168 MW OSW Project Economics

OSW Size (MW)	Average LMPs Weighted by Generation ($/MWh)	Curtailment (%)	Net Revenues $M	Net Revenues + Production Tax Credits, $M	Cap Factor
168	23	6	12	30	49%

Figure 4-6 presents the LMPs at the Humboldt substation and summarizes the total annual revenues.

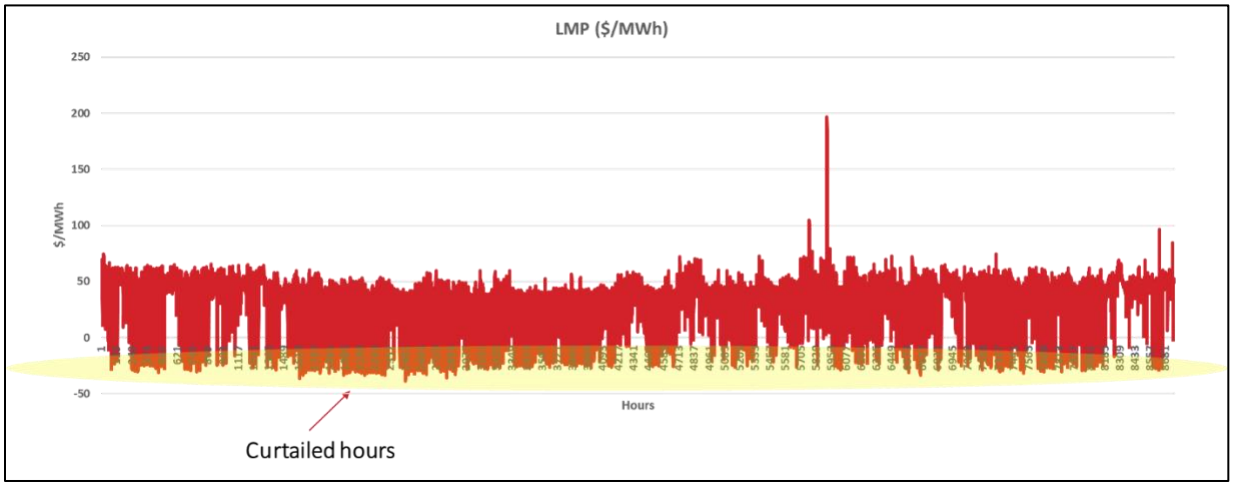

Figure 4-6. LMPs at the Humboldt Substation for the 168 MW OSW Farm

4.4 288 MW OSW Farm (C-3)

The results from the 288 MW OSW studies demonstrate 37% curtailment of production (MWh) over the year for the OSW project. This is from 4,660 hours of curtailment in a year. Relevant statistics are provided below, as shown in Figure 4-7 and Table 4-10.

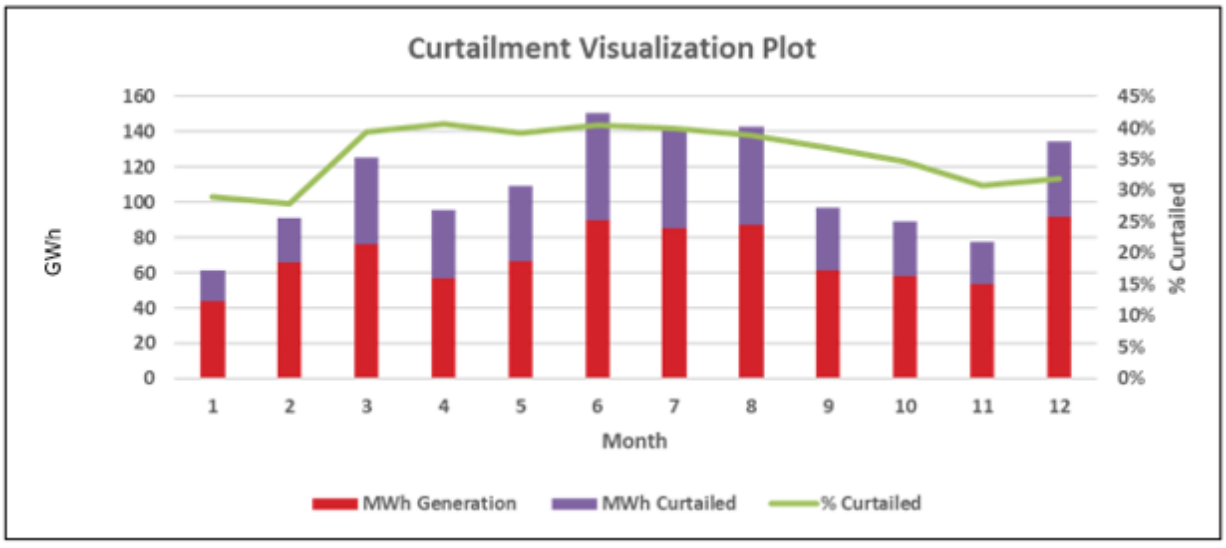

Figure 4-7. Curtailment Visualization Plot for the 288 MW OSW Farm

Table 4-10. Summary of the OSW Curtailment for the 288 MW OSW Farm

Row Labels	MWH Production	MWh Curtailed	MWh Expected Total (Production + Curtailed)	% Curtailed	Number of Hours of Curtailment
1	43,623	17,820	61443	29%	187
2	65,611	25,281	90,892	28%	286
3	76,063	49,459	125,522	39%	465
4	56,842	38,994	95,836	41%	373
5	66,331	42,627	108,959	39%	398
6	89,856	61,010	150,866	40%	554
7	85,518	56,872	142,390	40%	514
8	87,256	55,323	142,579	39%	523
9	61,274	35,806	97,079	37%	342
10	58,131	30,769	88,899	35%	299
11	53,687	23,892	77,579	31%	256
12	91,708	42,851	134,559	32%	463

Most curtailments are during off-peak months with lighter loads in the area coinciding with peak OSW production. The peak curtailment observed each month is 156 MW (maximum of OSW profile including losses).

Table 4-11 shows relevant Statistics associated with all generations in the Humboldt area.

Table 4-11. Generation in the Humboldt Area for the 288 MW OSW Farm

Unit Name	Unit Type	Maximum Capacity (MW)	Minimum Capacity (MW)	Total Gen (MWh)	Cap Factor Post Curtail	Total Curtailment (MWh)
Carlotta	Hourly Resource	4.2	0	5,093	14.5%	826
Hatchery Road Solar	Hourly Resource	4.2	0	5,051	14.4%	868
Hoopa Solar	Hourly Resource	4.2	0	5,072	14.5%	846
Humboldt OSW	Hourly Resource	288.00	0	835,899	33.1%	480,705
HumboldtBayIC01	Thermal	16.3	3.26	29,180	20.4%	-
HumboldtBayIC02	Thermal	16.3	3.26	29,135	20.4%	-
HumboldtBayIC03	Thermal	16.3	3.26	28,720	20.1%	-
HumboldtBayIC04	Thermal	16.3	3.26	68	0.0%	-
HumboldtBayIC05	Thermal	16.3	3.26	102	0.1%	-
HumboldtBayIC06	Thermal	16.3	3.26	117	0.1%	-
HumboldtBayIC07	Thermal	16.3	3.26	117	0.1%	-
HumboldtBayIC08	Thermal	16.3	3.26	170	0.1%	-
HumboldtBayIC09	Thermal	16.3	3.26	212	0.1%	-
HumboldtBayIC10	Thermal	16.3	3.26	104	0.1%	-
Kekawaka	Hydro	6	0	7,919	18.4%	-
PacificLumber1	Thermal	12.5	3.75	46,919	42.8%	-
PacificLumber2	Thermal	12.5	3.75	48,508	44.3%	-
PacificLumber3	Thermal	7.5	3.75	39,877	60.7%	-
RCAM Solar	Hourly Resource	2.2	0	2,802	14.5%	453

It is observed that all curtailment is congestion driven. Table 4-12 presents the most limiting constraints and their corresponding hours of congestion.

Table 4-12. Most Limiting Constraints in Scenario C-3

Contingency	From_Bus_ID	From_Bus_Name	To_Bus_ID	To_Bus_Name	CKT	Average Power Flow (MW)	Shadow Price ($/MW)	Congestion Cost ($K)	Congestion Hours (Hrs)	Loading Factor
P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	31104	CARLOTTA	31105	RIODLLTP	1	21.19	0.03	11.00	11.00	0.45
P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	31000	HUMBOLDT	31015	BRDGVLLE	1	52.48	-32.81	21,763.62	3,686.00	0.69
P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	31000	HUMBOLDT	31452	TRINITY	1	45.91	-5.82	3,278.45	681.00	0.61

The findings from the production simulation study are consistent with power flow analysis. The 115 kV circuits between Humboldt to Bridgeville and Humboldt to Trinity are overloaded for several N-1 conditions. There are N-0 overloads on the underlying 60 kV network that contributes to OSW curtailment. The curtailments are directly attributed to the amount of generation and load within the Humboldt pocket.

Table 4-13 summarizes the OSW project economics.

Table 4-13. 288 MW OSW Project Economics

OSW Size (MW)	Average LMPs Weighted by Generation ($/MWh)	Curtailment (%)	Net Revenues $M	Net Revenues + Production Tax Credits, $M	Cap Factor
288	3.7	36.5	5.6	9	33%

The plot in Figure 4-8 presents the LMPs at the Humboldt substation and summarizes the total annual revenues.

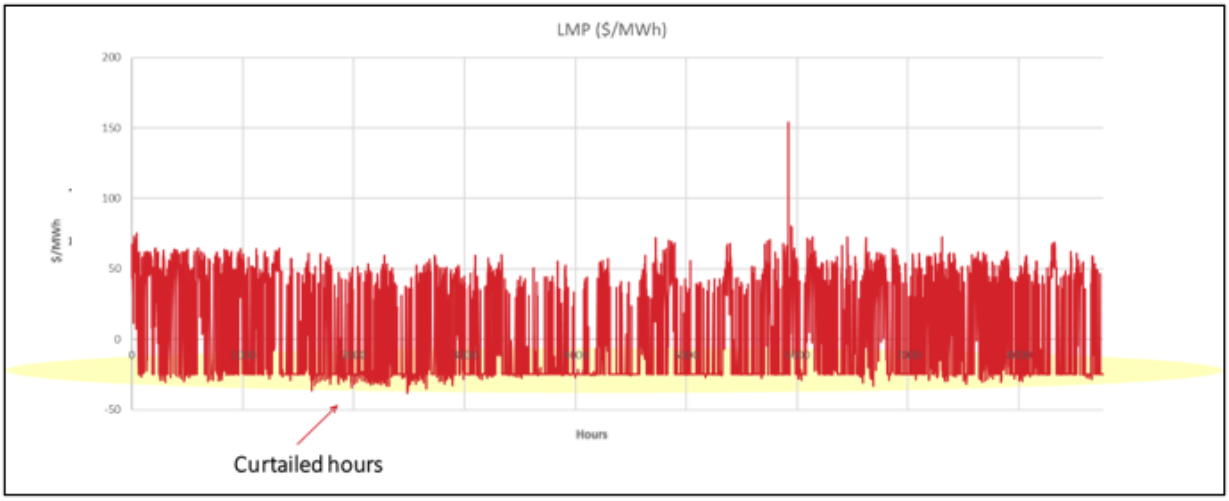

Figure 4-8. LMPs at the Humboldt Substation for the 288 MW OSW Farm

4.5 144 MW OSW Farm with 4 Hr, 15 MW BESS, RCEA Base Case Load (C-4)

In this scenario, the 144 MW OSW was complemented by a 15 MW 4-hour BESS at the Humboldt substation. The battery was modeled with the following attributes consistent with other batteries in the CAISO model:

- Variable O&M costs of $33.75/MWh
- No fixed cost
- Restricted to one cycle per day
- Opportunity to participate in Frequency Regulation, Reg up/Reg down, Spin/Non-spin markets
- No restrictions on the ramp rate
- Batteries allowed to arbitrage the market and identify opportunities for maximizing profit.

The results from the 144 MW OSW farm with 4 hr, 15 MW BESS studies demonstrate a 4.75% curtailment of production (MWh) over the year for the OSW project. This is from 329 hours of curtailment in a year. Relevant statistics are provided below, as shown in Figure 4-9 and Table 4-14. Most curtailments are during off-peak months with lighter loads in the area coincident with peak OSW production.

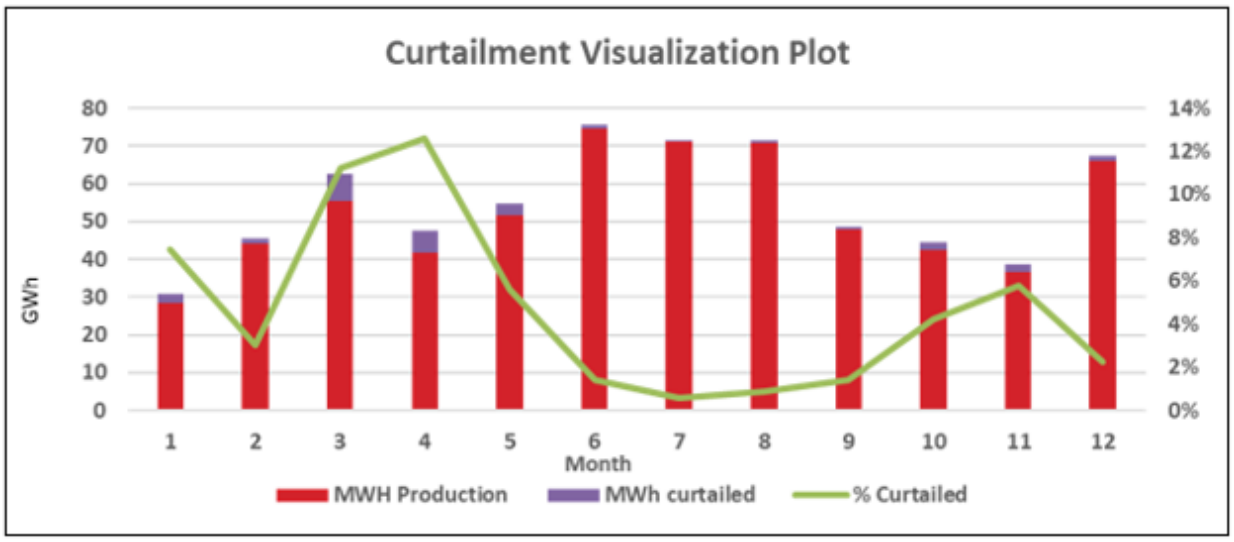

Figure 4-9. Curtailment Visualization Plot for the 144 MW OSW Farm with BESS

Table 4-14. Summary of the OSW Curtailment for the 144 MW OSW Farm with BESS

Month	MWH Production	MWh curtailed	MWh Expected Total (Production + Curtailed)	% Curtailed	Number of Hours of Curtailment
1	28,427	2,300	3,0818	7%	21
2	44,109	1,379	4,5588	3%	13
3	55,507	7,050	6,2957	11%	81
4	41,618	6,049	4,8067	13%	82
5	51,606	3,044	5,4649	6%	42
6	74,599	1,070	7,5668	1%	8
7	71,016	401	7,1417	1%	5
8	70,881	631	7,1512	1%	3
9	48,015	676	4,8691	1%	5
10	42,413	1,876	4,4588	4%	22
11	36,554	2,256	3,8910	6%	31
12	65,961	1,528	6,7490	2%	16

Table 4-15 shows relevant statistics associated with all generation facilities in the Humboldt area for the case with the 144 MW OSW Farm with BESS storage.

Table 4-15. Generation in the Humboldt Area for the 144 MW OSW Farm with BESS Storage

Unit Name	Unit Type	Maximum Capacity (MW)	Minimum Capacity (MW)	Total Gen (MWh)	Cap Factor Post Curtail	Total Curtailment (MWh)
Carlotta	Hourly Resource	4.2	0	5,114	14.6%	805
Hatchery Road Solar	Hourly Resource	4.2	0	5,144	14.7%	774
Hoopa Solar	Hourly Resource	4.2	0	5,140	14.7%	779
Humboldt OSW	Hourly Resource	144	0	630,705	50.0%	29,651
Humboldt Battery	Pumped Storage	15	0	17,899	13.6%	0
HumboldtBayIC01	Thermal	16.3	3.26	29,440	20.6%	0
HumboldtBayIC02	Thermal	16.3	3.26	29,402	20.6%	0
HumboldtBayIC03	Thermal	16.3	3.26	29,120	20.4%	0
HumboldtBayIC04	Thermal	16.3	3.26	72	0.1%	0
HumboldtBayIC05	Thermal	16.3	3.26	97	0.1%	0
HumboldtBayIC06	Thermal	16.3	3.26	218	0.2%	0
HumboldtBayIC07	Thermal	16.3	3.26	333	0.2%	0
HumboldtBayIC08	Thermal	16.3	3.26	110	0.1%	0
HumboldtBayIC09	Thermal	16.3	3.26	248	0.2%	0
HumboldtBayIC10	Thermal	16.3	3.26	111	0.1%	0
Kekawaka	Hydro	6	0	7,919	18.4%	0
PacificLumber1	Thermal	12.5	3.75	57,675	52.7%	0
PacificLumber2	Thermal	12.5	3.75	60,727	55.5%	0
PacificLumber3	Thermal	7.5	3.75	46,248	70.4%	0
RCAM Solar	Hourly Resource	2.2	0	2,812	14.6%	443

The OSW farm and battery performance are summarized as shown in Table 4-16 and Table 4-17.

Table 4-16. Summary of the OSW Farm and Battery Performance

OSW Size (MW)	Curtailment (%)	Average LMPs Weighted by Generation ($/MWh)	Net Revenues - $M	Net Revenues Including Production Tax Credits-$M	Cap Factor
144 (w/o Batteries)	4.4	32	20	37	50%
144 (w/ Batteries) *	4.5	36	23	41*	50%

*including BESS revenues

Table 4-17. Summary of Annual Battery Revenues

Additional Battery Revenues	Net Revenues $M
Energy Market	1.3
Ancillary Service Market Revenues	0.6

Ancillary service revenues are not accurate because the model does not have Ancillary Service market - bid data. However, these revenues serve as a proxy of pricing signals during scarcity pricing events. Annual participation from BESS is shown in Table 4-18.

Table 4-18. Ancillary Service Participation

Total Gen (MWh)	17,019
Pumping (MWh)	20,187
Regulation Down (RD) Served Amount (MW)	2,048
Load Following Down (LFD) Served Amount (MW)	1,429
Regulation Up (RU) Served Amount (MW)	7,046
Spinning Reserve (SR) Served Amount (MW)	2,012
Load Following Up (LFU) Served Amount (MW)	5,859
Frequency Response (FR) Served Amount (MW)	11,655

4.6 168 MW OSW Farm with No BESS, RCEA Augmented Growth Load (C-5)

The results from the 168 MW OSW studies demonstrate a 5.8% curtailment of production (MWh) over the year for the OSW project. This is from 1479 hours of curtailment in a year. Relevant statistics are provided below, as shown in Figure 4-10 and Table 4-19.

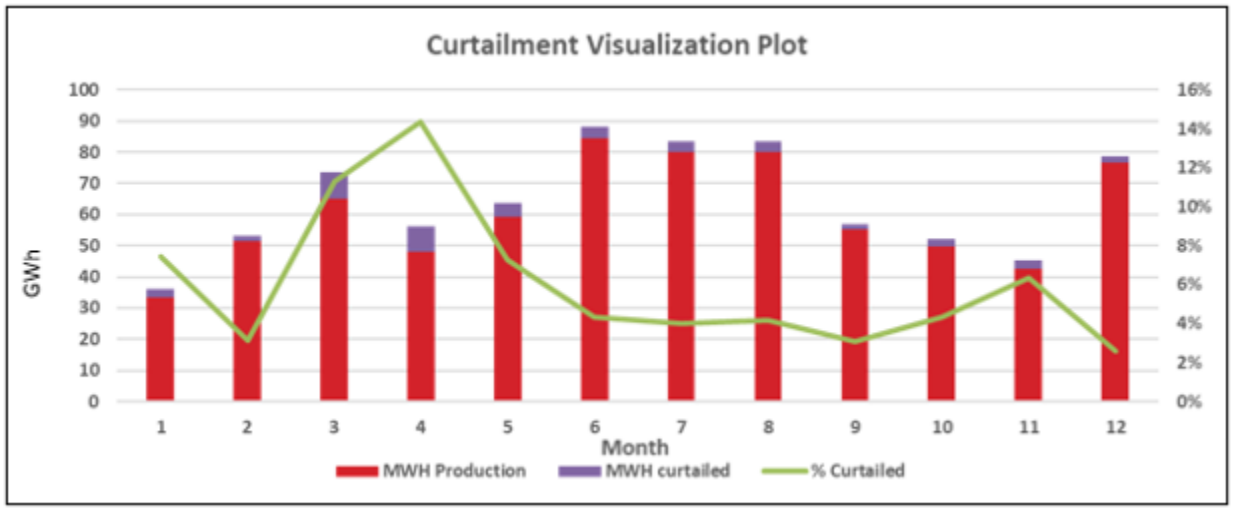

Figure 4-10. Curtailment Visualization Plot for the 168 MW OSW Farm with No BESS

Table 4-19. Summary of the OSW Curtailment for the 168 MW OSW Farm with No BESS

Row Labels	MWH Production	MWh Curtailed	MWh Expected Total (Production + Curtailed)	% Curtailed	Number of Hours of Curtailment
1	33,288	2,666	35,954	7%	31
2	51,510	1,676	53,186	3%	15
3	65,158	8,291	73,450	11%	96
4	48,033	8,046	56,079	14%	106
5	59,104	4,654	63,758	7%	136
6	84,445	3,835	88,280	4%	260
7	79,966	3,354	83,320	4%	281
8	79,976	3,455	83,431	4%	263
9	55,052	1,755	56,806	3%	127
10	49,778	2,242	52,020	4%	82
11	42,511	2,884	45,395	6%	53
12	76,714	2,024	78,738	3%	29

Most curtailments are during off-peak months with lighter loads in the area coinciding with peak OSW production. The peak curtailment observed each month is 156 MW (maximum of OSW profile including losses).

Table 4-20 shows relevant statistics associated with all generations in the Humboldt area.

Table 4-20. Generation in the Humboldt Area for the 168 MW OSW Farm with No BESS and RCEA Augmented Growth Load

Unit Name	Unit Type	Maximum Capacity (MW)	Minimum Capacity (MW)	Total Gen (MWh)	Cap Factor Post Curtail	Total Curtailment (MWh)
Carlotta	Hourly Resource	4.2	0	5,071	14.5%	848
Hatchery Road Solar	Hourly Resource	4.2	0	5,055	14.4%	864
Hoopa Solar	Hourly Resource	4.2	0	5,083	14.5%	835
Humboldt OSW	Hourly Resource	168	0	72,5534	49.3%	44,882
HumboldtBayIC01	Thermal	16.3	3.26	32,077	22.5%	0
HumboldtBayIC02	Thermal	16.3	3.26	31,163	21.8%	0
HumboldtBayIC03	Thermal	16.3	3.26	30,886	21.6%	0
HumboldtBayIC04	Thermal	16.3	3.26	186	0.1%	0
HumboldtBayIC05	Thermal	16.3	3.26	222	0.2%	0
HumboldtBayIC06	Thermal	16.3	3.26	377	0.3%	0
HumboldtBayIC07	Thermal	16.3	3.26	406	0.3%	0
HumboldtBayIC08	Thermal	16.3	3.26	497	0.3%	0
HumboldtBayIC09	Thermal	16.3	3.26	699	0.5%	0
HumboldtBayIC10	Thermal	16.3	3.26	370	0.3%	0
Kekawaka	Hydro	6	0	7,919	18.4%	0
PacificLumber1	Thermal	12.5	3.75	58,006	53.0%	0
PacificLumber2	Thermal	12.5	3.75	61,016	55.7%	0
PacificLumber3	Thermal	7.5	3.75	46,109	70.2%	0
RCAM Solar	Hourly Resource	2.2	0	2,781	14.4%	474

Table 4-21 presents the most limiting constraints and their corresponding hours of congestion.

Table 4-21. Most Limiting Constraints in Scenario C-5

Contingency	From_ Bus_ID	From_Bus_Name	To Bus ID	To_Bus_Name	CKT	Average Power Flow (MW)	Shadow Price ($/MW)	Congestion Cost ($K)	Congestion Hours (Hrs)	Loading Factor
P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	31000	HUMBOLDT	31015	BRDGVLLE	1	46.27	-5.52	3,659.30	829.00	0.61
P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	31000	HUMBOLDT	31452	TRINITY	1	41.77	-3.47	1,956.16	534.00	0.55
P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOWGAP1)	31000	HUMBOLDT	31452	TRINITY	1	41.75	0.19	111.63	99.00	0.55

The findings from the production simulation study are consistent with power flow analysis. The 115 kV circuits between Humboldt to Bridgeville and Humboldt to Trinity are overloaded for several N-1 conditions. There are N-0 overloads on the underlying 60 kV network that contributes to OSW curtailment. The curtailments are directly attributed to the amount of generation and load within the Humboldt pocket.

Table 4-22 summarizes the OSW project economics.

Table 4-22. 168 MW OSW Plant economics with No BESS and RCEA Augmented Growth Load

OSW Size (MW)	Average LMPs weighted by Generation ($/MWh)	Curtailment (%)	Net Revenues $M	Net Revenues Including Production Tax Credits, $M	Cap Factor
168	26	5.8	16	34	50%

The plot in Figure 4-11 presents the LMPs at the Humboldt substation and summarizes the total revenues.

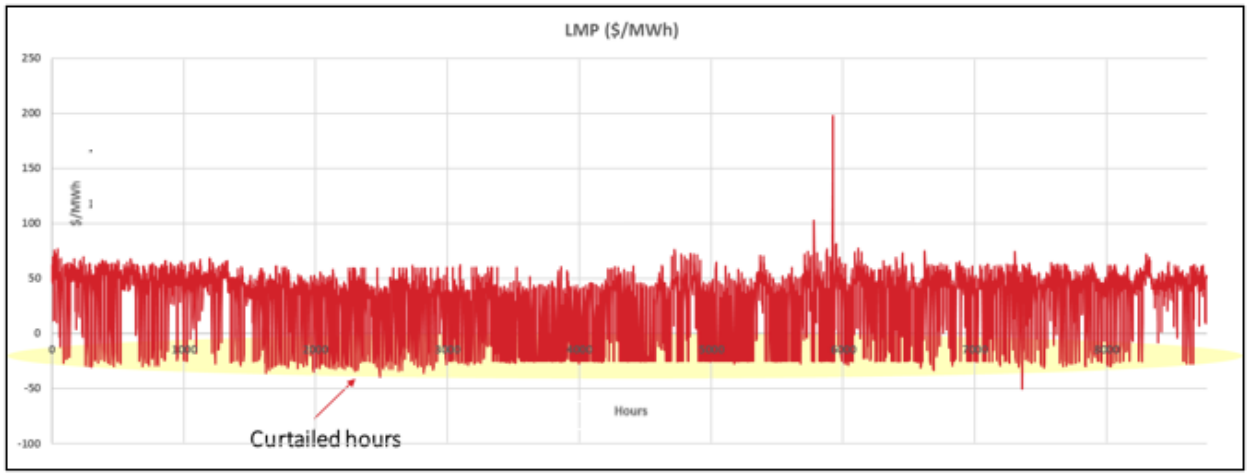

Figure 4-11. LMPs at the Humboldt Substation for the 168 MW OSW, No BESS RCEA Augmented Growth Load

4.7 168 MW OSW Farm with 4 Hr, 15 MW BESS (C-6)

The results from the 168 MW OSW farm with 4 hr, 15 MW BESS studies demonstrate a 5.6% curtailment of production (MWh) over the year for the OSW project. This is from 1351 hours of curtailment in a year. Relevant statistics are provided below, as shown in Figure 4-12 and Table 4-23. Most curtailments are during off-peak months with lighter loads in the area coincident with peak OSW production.

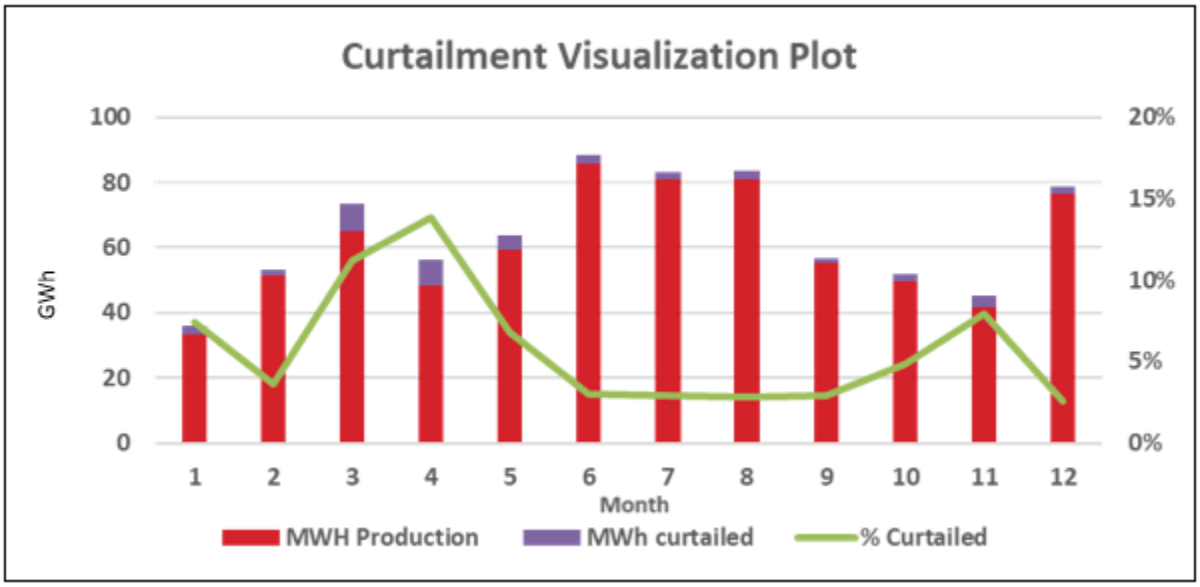

Figure 4-12. Curtailment Visualization Plot for the 168 MW OSW Farm with BESS

Table 4-23. Summary of the OSW Curtailment for the 168 MW OSW Farm with BESS

Month	MWH Production	MWh curtailed	MWh Expected Total (Production + Curtailed)	% Curtailed	Number of Hours of Curtailment
1	3,3299	2,655	35,954	7%	34
2	5,1252	1,933	53,186	4%	17
3	6,5201	8,249	73,450	11%	89
4	4,8308	7,770	56,079	14%	112
5	5,9416	4,342	63,758	7%	151
6	8,5648	2,632	88,280	3%	220
7	8,0930	2,390	83,320	3%	241
8	8,1047	2,384	83,431	3%	225
9	5,5148	1,658	56,806	3%	95
10	4,9504	2,516	52,020	5%	69
11	4,1809	3,586	45,395	8%	66
12	7,6728	2,010	78,738	3%	32

Table 4-24 shows relevant statistics associated with all generations in the Humboldt area with storage.

Table 4-24. Generation in the Humboldt Area with for the 168 MW OSW Farm with BESS Storage

Unit Name	Unit Type	Maximum Capacity (MW)	Minimum Capacity (MW)	Total Gen (MWh)	Cap Factor Post Curtail	Total Curtailment (MWh)
Carlotta	Hourly Resource	4.2	0	5,062	14%	857
Hatchery Road Solar	Hourly Resource	4.2	0	5,063	14%	856
Hoopa Solar	Hourly Resource	4.2	0	5,089	15%	829
Humboldt OSW	Hourly Resource	168	0	728,290	49%	42,125
Humboldt Battery	Pumped Storage	15	0	17,019	13%	
HumboldtBayIC01	Thermal	16.3	3.26	29,512	21%	-
HumboldtBayIC02	Thermal	16.3	3.26	29,290	21%	-
HumboldtBayIC03	Thermal	16.3	3.26	29,469	21%	-
HumboldtBayIC04	Thermal	16.3	3.26	108	0%	-
HumboldtBayIC05	Thermal	16.3	3.26	121	0%	-
HumboldtBayIC06	Thermal	16.3	3.26	121	0%	-
HumboldtBayIC07	Thermal	16.3	3.26	178	0%	-
HumboldtBayIC08	Thermal	16.3	3.26	164	0%	-
HumboldtBayIC09	Thermal	16.3	3.26	131	0%	-
HumboldtBayIC10	Thermal	16.3	3.26	176	0%	-
Kekawaka	Hydro	6	0	7,919	18%	-
PacificLumber1	Thermal	12.5	3.75	54,737	50%	-
PacificLumber2	Thermal	12.5	3.75	57,978	53%	-
PacificLumber3	Thermal	7.5	3.75	44,920	68%	-
RCAM Solar	Hourly Resource	2.2	0	2,789	14%	466

Table 4-25 summarizes the OSW farm and battery performance.

Table 4-25. Summary of the OSW Farm and Battery Performance

OSW Size (MW)	Average LMPs weighted by Generation ($/MWh)	Curtailment (%)	Net Revenues $M	Net Revenues Including Production Tax Credits, $M	Cap Factor
168 (w/o Batteries)	23	6	12	30	49.1%
168 (w/ Batteries) *	26	5.5	16	36*	49.5%

*including BESS revenues

Figure 4-13 shows the battery performance plots from July 10, 2030, to July 12, 2030.

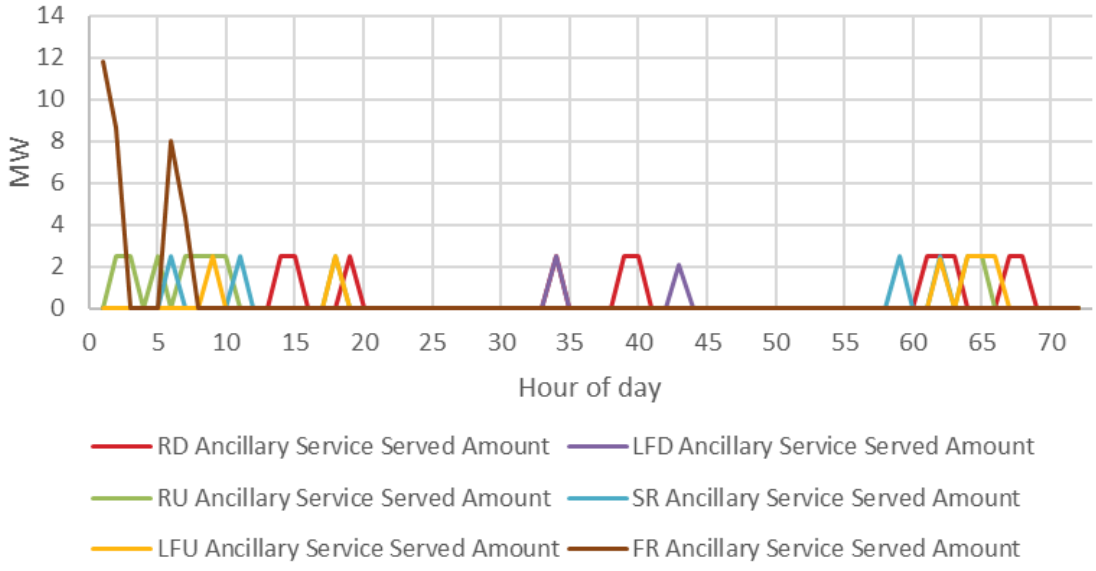

Figure 4-13. Battery Performance for 168 MW OSW Farm with 4 Hr, 15 MW BESS

4.8 Summary of Findings

The findings of the production simulation studies for OSW farms without batteries are as follows:

- The 144 MW OSW farm demonstrates 4.4% curtailment of production (MWh) over the year with total revenues equal to $37M, and the capacity factor of the OSW farm is 50% (post curtailment).
- The 168 MW OSW farm demonstrates a 6% curtailment of production (MWh) over the year with total revenues equal to $30M, and the capacity factor of the OSW farm is 49.1% (post curtailment).
- The 288 MW OSW farm demonstrates a 37% curtailment of production (MWh) over the year with total revenues equal to $9M, and the capacity factor of the OSW farm is 33% (post curtailment).

The findings of the production simulation studies for OSW farms with batteries are as follows:

- The 144 MW OSW farm demonstrates a 4.5% curtailment of production (MWh) over the year with total revenues equal to $41M, and the capacity factor of the OSW farm is 50% (post curtailment).
- The 168 MW OSW farm demonstrates a 5.5% curtailment of production (MWh) over the year with total revenues equal to $36M, and the capacity factor of the OSW farm is 49.5% (post curtailment).

5 SUMMARY OF FINDINGS

A summary of the major findings is as follows:

- The potential for energy-only OSW development in California's North Coast region is limited to 174 MW under the projected peak loading conditions. The increase in load supported by electrification and other incentives can increase the OSW capacity to 231 MW.
- The current transmission topology within the Humboldt area is limited under normal and emergency operating conditions. These restrictions manifest due to limited export capability between Humboldt and the rest of California's grid.
- The most critical constraints that need to be addressed are Humboldt to Bridgeville 115 kV, and Humboldt to Trinity 115 kV transmission facilitates before significant OSW can be accommodated into the region.
- Under the existing system topology, only 30 MW of OSW capacity is fully deliverable without the need for upgrades.
- To support the full deliverability of OSW beyond 30 MW, transmission expansion is required to create new export channels between the region and the rest of the state.
  - The analysis estimated upgrades in the range of $168M to $238M to support the full deliverability of 144 MW of OSW.
  - The analysis estimates upgrades in the range of $329M to support the full deliverability of 288 MW of OSW.
  - The analysis estimated upgrades in the range of $591 M to $1.04B to support the full deliverability of 480 MW of OSW.
  - Beyond 480 MW, significant expansion must include voltage transformation to 500 kV level while considering potential interactions with Path 66 and other PG&E bulk electric infrastructure.
- The economic studies evaluated the potential curtailment risk associated with OSW projects at the Humboldt substation. The projects were evaluated as energy-only under the existing system configuration.
  - The 144 MW OSW farm demonstrates 4.4% curtailment of production (MWh) over the year with total revenues equal to $37M, and the capacity factor of the OSW farm is 50% (post curtailment).
  - The 168 MW OSW farm demonstrates a 6% curtailment of production (MWh) over the year with total revenues equal to $30M, and the capacity factor of the OSW farm is 49.1% (post curtailment).
  - The 288 MW OSW farm demonstrates a 37% curtailment of production (MWh) over the year with total revenues equal to $9M, and the capacity factor of the OSW farm is 33% (post curtailment).
  - The increase in project sizes directly increases congestion and negative pricing signals that trigger curtailment, thereby lowering overall LMPs and plant revenues.
  - The curtailment prices consider the impact of production tax credits at $25/MWh, which is an assumption around the future value of these payments, consistent with CAISO models.

- The economic studies evaluated the potential curtailment risk associated with OSW and co-located batteries at the Humboldt substation. The batteries were 15 MW, 60 MWh.
  - The batteries did not significantly reduce plant curtailments due to their size but contributed to increasing overall plant revenues through participation in arbitrage and ancillary service markets.
  - The 144 MW OSW farm demonstrates a 4.5% curtailment of production (MWh) over the year with total revenues equal to $41M, and the capacity factor of the OSW farm is 50% (post curtailment).
  - The 168 MW OSW farm demonstrates a 5.5% curtailment of production (MWh) over the year with total revenues equal to $36M, and the capacity factor of the OSW farm is 49.5% (post curtailment).
- The analysis considered alternative POIs, including the Fairhaven substation, which resulted in similar conclusions.
- The OSW plant production is also restricted by the dispatch and operation of the Humboldt Bay generating plant. Due to the resource adequacy contracts of the plant and their reliability must-run status, their output minimizes the available transmission capacity on the existing network. Their operation as must-run units for reliability purposes influences the curtailment trends at the OSW sites.
- The overall studies identified the need for further transmission expansion to support the buildout of fully deliverable OSW energy to the rest of Northern California.

APPENDIX A: SYSTEM IMPACT STUDY

A-1 Impact of OSW Farms During Summer Peak Conditions for the Energy-Only 144 MW OSW Farm

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	49.3	89.58	177.66
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	75.7	40.51	174.85
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.8	58.44	174.25
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:11:_HMBLT BY 60 kV - Middle Breaker Bay 3	115	75.7	75.01	173.54
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	115	64.3	19.06	173.12
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	75.7	40.19	170.2
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	115	75.7	69.62	168.51
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	115	64.3	18.53	167.85
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	115	64.3	18.33	165.82
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.8	49.33	164.55
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	75.7	65.19	163.75
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.8	44.52	159.74
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.8	44.4	158.42
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:28:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (EEL RIVR-NEWBURG)	115	75.7	58.77	156.93

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	49.3	69.63	156.38
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	64.3	26.65	153.2
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	64.3	9.31	152.66
31000 HUMBOLDT 115 31452 TRINITY 115	P2-2:A1:2:_LOW GAP1 115 kV Section 1D	115	64.3	9.31	152.65
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	64.3	9.31	151.23
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	115	75.7	62.75	148.84
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on NEWBURG_RIODLLTP	115	75.7	44.61	142.56
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:29:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (NEWBURG-RIODLLTP)	115	75.7	44.61	142.56
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:6:_HUMBOLDT 60 kV - Middle Breaker Bay 5	115	75.7	56.05	142.16
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P7-1:A1:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT LINES	115	75.7	56.05	142.16
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	60	36.8	76.24	142.14
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-2:A1:2:_LOW GAP1 115 kV Section 1D	60	35.9		140.63
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.9		140.62
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.9		139.76
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:31:_RIO DELL JCT-BRIDGEVILLE 60 kV [7850] (CARLOTTA-RIODLLTP)	115	75.7	40.92	138.63

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:5:_HUMBOLDT 60 kV - Middle Breaker Bay 6	115	75.7	46.41	137.88
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:22:_RIO DELL JCT-BRIDGEVILLE 60 kV [7850] MOAS OPENED on CARLOTTA_SWNS FLT & PCLUMBER	115	75.7	40.12	137.83
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:32:_RIO DELL JCT-BRIDGEVILLE 60 kV [7850] (CARLOTTA-SWNS FLT)	115	75.7	38.97	136.68
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:23:_RIO DELL JCT-BRIDGEVILLE 60 kV [7850] MOAS OPENED on CARLOTTA_SWNS FLT	115	75.7	38.95	136.46
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P7-1:A1:3:_HUMBOLDT #1 & ESSEX JCT-ARCATA-FAIRHAVEN LINES	115	75.7	49.63	135.77
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:20:_FAIRHAVN 60 kV - Ring R1 & R2	115	75.7	47.78	133.92
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:21:_FAIRHAVN 60 kV - Ring R1 & R2 (2)	115	75.7	47.78	133.92
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P7-1:A1:5:_ESSEX JCT-ARCATA-FAIRHAVEN & FAIRHAVEN-HUMBOLDT LINES	115	75.7	47.78	133.92
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:4:_ARCATA - 1D 60 kV & ARCATA line	115	75.7	47.27	133.41
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	60	36.8	67.13	132.44
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	60	49.3	82.9	132.43
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	115	75.7	39.21	130.7
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	115	75.7	39.21	130.7
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	60	36.8	75.09	130.58

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-4:A1:1:_ARCATA 60 kV - Section 1E & 1D	115	75.7	43.54	129.7
31000 HUMBOLDT 115 31015 BRDGVLLE 115	EE:A1:4:_Loss of a large load-Arcata Substation	115	75.7	43.49	129.65
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:8:_ARCATA 60 kV [0] MOAS OPENED on ARCTAJT2_FAIRHAVN	115	75.7	42.93	129.09
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:6:_ESSEX JCT-ARCATA-FAIRHAVEN 60 kV [6800] (JANCK TP-ARCTAJT2)	115	75.7	42.88	129.04
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:15:_HMBLT BY-HARRIS 60 kV [0] MOAS OPENED on HARRIS_HARRISST	115	75.7	42.35	128.69
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P7-1:A1:4:_HUMBOLDT #1 & ARCATA-HUMBOLDT LINES	115	75.7	42.13	128.3
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:6:_HUMBOLDT #1 60 kV [7113] MOAS OPENED on ARCTAJT1_LP_FLKBD	115	75.7	42.05	128.21
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:8:_HUMBOLDT #1 60 kV [7113] (ARCTAJT1-LP_FLKBD)	115	75.7	42.05	128.21
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	60	36.8	74.83	127.97
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	60	36.8	62.31	127.62
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:5:_BLUE LAKE TAP 60 kV [6801] (ESSX JCT-BCHIP_TP)	115	75.7	41.03	127.2
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:17:_TRINITY-MAPLE CREEK 60 kV [8170] MOAS OPENED on BIG BAR_HYMPOMJT	115	75.7		126.96
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:22:_TRINITY-MAPLE CREEK 60 kV [8170] (MPLE CRK-RDGE CBN)	115	75.7		126.71
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.9	77.46	126.34
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	60	36.8	62.19	126.31
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:20:_HUMBOLDT BAY-EUREKA 60 kV [7070] (EUREKA A-EUREKA)	115	75.7	39.7	125.87

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:4:_ARCATA 60 kV Section 1D	115	75.7	39.69	125.86
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:3:_ARCATA - 1E 60 kV & ARCATA-HUMBOLDT line	115	75.7	39.4	125.57
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:7:_ULTRA POWER TAP 60 kV [6803] (BLUE LKE-SMPSNTAP)	115	75.7	39.36	125.53
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:3:_ARCATA 60 kV Section 1E	115	75.7	39.32	125.49
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:18:_MAPLE CREEK-HOOPA 60 kV [7490] MOAS OPENED on WILLWCRK_HOOPA	115	75.7	39.25	125.45
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:23:_MAPLE CREEK-HOOPA 60 kV [7490] (MPLE CRK-RUSS RCH)	115	75.7	39.25	125.45
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:24:_MAPLE CREEK-HOOPA 60 kV [7490] (RUSS RCH-WILLWCRK)	115	75.7	39.22	125.42
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.9		124.47
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	33.5		124.2
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-2:A1:2:_LOW GAP1 115 kV Section 1D	60	33.5		124.2
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	49.3	99.48	124.03
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:9:_FAIRHAVEN-HUMBOLDT 60 kV [6860] MOAS OPENED on SIERA_PC_FAIRHAVN	115	75.7	37.83	124.01
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:5:_HUMBOLDT 60 kV - Middle Breaker Bay 6	115	64.3	27.04	123.93
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	60	49.3	82.05	123.81
31000 HUMBOLDT 115 31452 TRINITY 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	115	64.3	39.29	123.44

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	33.5		123.28
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	60	49.3	81.85	121.87
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	60	36.8	65.98	120.88
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-2:A1:2:_LOW GAP1 115 kV Section 1D	60	36.1		120.64
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	36.1		120.63
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	36.1		119.78
31000 HUMBOLDT 115 31015 BRDGVLLE 115	EE:A1:5:_Tsunami- Humboldt Bay Power Plant and Fairhaven Generating Stations	115	75.7	13.14	118.35
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	60	36.8	65.72	118.27
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	35.9	87.74	117.4
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:37:_GARBERVILLE-LAYTONVILLE 60 kV [8365] (KEKAWAKA-LYTNVLLE)	115	75.7		116.8
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:13:_BRDGVLLE - MA 60 kV & RIO DELL JCT-BRIDGEVILLE line	115	75.7	24.56	116.71
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:25:_GARBERVILLE-LAYTONVILLE 60 kV [8365]	115	75.7		116.65
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:36:_GARBERVILLE-LAYTONVILLE 60 kV [8365] (GRBRVLLE-KEKAWAKA)	115	75.7		116.65
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:6:_GRBRVLLE 60 kV Section 1E	115	75.7	32.88	116.65
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:8:_KEKAWAKA 60 kV Section 1D	115	75.7		116.65
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:15:_GRBRVLLE - 1E 60 kV & GARBERVILLE-LAYTONVILLE line	115	75.7	32.88	116.65

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:5:_BRDGVLLE 60 kV Section MA	115	75.7	24.53	116.42
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:14:_BRDGVLLE - MA 60 kV & BRIDGEVILLE-GARBERVILLE line	115	75.7	24.53	116.42
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:6:_HUMBOLDT 60 kV - Middle Breaker Bay 5	115	64.3	31.95	116.13
31000 HUMBOLDT 115 31452 TRINITY 115	P7-1:A1:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT LINES	115	64.3	31.95	116.13
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	60	36.8	61.17	116.06
31452 TRINITY 115 31461 JESSTAP 115	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	115	86.3	12.13	115.57
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:11:_HMBLT BY 60 kV - Middle Breaker Bay 3	115	64.3	28.77	115.48
31000 HUMBOLDT 115 31015 BRDGVLLE 115	Base Case	115	75.7	33.58	115.46
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	115	64.3	18.51	115.42
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	115	64.3	18.51	115.42
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:13:_BRDGVLLE - MA 60 kV & RIO DELL JCT-BRIDGEVILLE line	115	64.3	23.62	115.17
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	60	35.9	60.54	115.12
31000 HUMBOLDT 115 31452 TRINITY 115	P2-2:A1:5:_BRDGVLLE 60 kV Section MA	115	64.3	23.6	114.85
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:14:_BRDGVLLE - MA 60 kV & BRIDGEVILLE-GARBERVILLE line	115	64.3	23.6	114.85
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	60	36.8	61.04	114.75
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	34.6	32.55	114.62

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-3:A1:6:_HUMBOLDT 60 kV - Middle Breaker Bay 5	60	35.9	84.72	114.39
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P7-1:A1:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT LINES	60	35.9	84.72	114.39
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:10:_HMBOBAYPPA 13.80 kV Gen Unit 3	115	75.7	27.28	113.49
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:11:_HMBOBAYPPC 13.80 kV Gen Unit 10	115	75.7	27.28	113.49
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:12:_HMBOBAYPPC 13.80 kV Gen Unit 8	115	75.7	27.28	113.49
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:13:_HMBOBAYPPC 13.80 kV Gen Unit 9	115	75.7	27.28	113.49
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:8:_HMBOBAYPPA 13.80 kV Gen Unit 1	115	75.7	27.28	113.49
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:9:_HMBOBAYPPA 13.80 kV Gen Unit 2	115	75.7	27.28	113.49
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	60	36.8	60.91	113.46
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	64.3	23.35	113.14
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	64.3	23.35	113.14
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	60	35.9	60.27	112.45
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:4:_HMBOBAYPPB 13.80 kV Gen Unit 5	115	75.7	26.05	112.27
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:5:_HMBOBAYPPB 13.80 kV Gen Unit 6	115	75.7	26.05	112.27
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:6:_HMBOBAYPPB 13.80 kV Gen Unit 7	115	75.7	26.05	112.27

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:7:_HMBOBAYPPB 13.80 kV Gen Unit 4	115	75.7	26.05	112.27
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-3:A1:5:_HUMBOLDT 60 kV - Middle Breaker Bay 6	60	35.9	80.29	112.27
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	60	36.8	60.79	112.14
31452 TRINITY 115 31461 JESSTAP 115	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	115	86.3	11.75	111.67
31461 JESSTAP 115 31521 COTWD_1D 115	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	115	86.3	12.07	111.58
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P7-1:A1:3:_HUMBOLDT #1 & ESSEX JCT-ARCATA-FAIRHAVEN LINES	60	35.9	81.83	111.52
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:26:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on FTSWRDJT_GRBRVLLE	115	75.7	27.73	111.15
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:41:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FTSWRDJT-GRBRVLLE)	115	75.7	27.73	111.15
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:7:_GRBRVLLE 60 kV Section 1D	115	75.7	27.71	111.1
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:16:_GRBRVLLE - 1D 60 kV & BRIDGEVILLE-GARBERVILLE line	115	75.7	27.71	111.1
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-4:A1:2:_GRBRVLLE 60 kV - Section 1E & 1D	115	75.7	27.7	111.09
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	Base Case	60	35.9	79.41	110.69
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-3:A1:20:_FAIRHAVN 60 kV - Ring R1 & R2	60	35.9	81	110.68
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-3:A1:21:_FAIRHAVN 60 kV - Ring R1 & R2 (2)	60	35.9	81	110.68
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P7-1:A1:5:_ESSEX JCT-ARCATA-FAIRHAVEN & FAIRHAVEN-HUMBOLDT LINES	60	35.9	81	110.68
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	75.7	27.3	110.47
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-3:A1:4:_ARCATA - 1D 60 kV & ARCATA line	60	35.9	80.77	110.46

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31452 TRINITY 115 31461 JESSTAP 115	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	115	86.3	11.61	110.24
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	64.3	20.93	109.54
31000 HUMBOLDT 115 31452 TRINITY 115	P7-1:A1:3:_HUMBOLDT #1 & ESSEX JCT-ARCATA-FAIRHAVEN LINES	115	64.3	24.94	109.14
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	60	35.9		109.04
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	60	35.9		109.04
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:15:_HMBLT BY-HARRIS 60 kV [0] MOAS OPENED on HARRIS_HARRISST	60	35.9	79.29	108.95
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	33.5	65.39	108.91
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-4:A1:1:_ARCATA 60 kV - Section 1E & 1D	60	35.9	79.09	108.78
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	EE:A1:4:_Loss of a large load-Arcata Substation	60	35.9	79.07	108.76
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:26:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on FTSWRDJT_GRBRVLLE	115	64.3	20.3	108.55
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:41:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FTSWRDJT-GRBRVLLE)	115	64.3	20.3	108.55
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:8:_ARCATA 60 kV [0] MOAS OPENED on ARCTAJT2_FAIRHAVN	60	35.9	78.82	108.51
31000 HUMBOLDT 115 31452 TRINITY 115	P2-2:A1:7:_GRBRVLLE 60 kV Section 1D	115	64.3	20.27	108.49
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:16:_GRBRVLLE - 1D 60 kV & BRIDGEVILLE-GARBERVILLE line	115	64.3	20.27	108.49
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:6:_ESSEX JCT-ARCATA-FAIRHAVEN 60 kV [6800] (JANCK TP-ARCTAJT2)	60	35.9	78.79	108.49

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31452 TRINITY 115	P2-4:A1:2:_GRBRVLLE 60 kV - Section 1E & 1D	115	64.3	20.26	108.48
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P7-1:A1:4:_HUMBOLDT #1 & ARCATA-HUMBOLDT LINES	60	35.9	78.46	108.15
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	60	35.9	59.84	108.12
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:6:_HUMBOLDT #1 60 kV [7113] MOAS OPENED on ARCTAJT1_LP_FLKBD	60	35.9	78.42	108.11
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:8:_HUMBOLDT #1 60 kV [7113] (ARCTAJT1-LP_FLKBD)	60	35.9	78.42	108.11
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	75.7	25.62	107.97
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	75.7	25.62	107.97
31461 JESSTAP 115 31521 COTWD_1D 115	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	115	86.3	11.69	107.68
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:5:_BLUE LAKE TAP 60 kV [6801] (ESSX JCT-BCHIP_TP)	60	35.9	77.96	107.66
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:17:_TRINITY-MAPLE CREEK 60 kV [8170] MOAS OPENED on BIG BAR_HYMPOMJT	60	35.9		107.45
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:22:_TRINITY-MAPLE CREEK 60 kV [8170] (MPLE CRK-RDGE CBN)	60	35.9		107.33
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:20:_FAIRHAVN 60 kV - Ring R1 & R2	115	64.3	22.9	107.11
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:21:_FAIRHAVN 60 kV - Ring R1 & R2 (2)	115	64.3	22.9	107.11
31000 HUMBOLDT 115 31452 TRINITY 115	P7-1:A1:5:_ESSEX JCT-ARCATA-FAIRHAVEN & FAIRHAVEN-HUMBOLDT LINES	115	64.3	22.9	107.11
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	33.5		106.9

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:4:_ARCATA - 1D 60 kV & ARCATA line	115	64.3	22.35	106.56
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	36.1		106.43
31461 JESSTAP 115 31521 COTWD_1D 115	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	115	86.3	11.55	106.25
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	64.3	19.48	106.22
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:22:_TRINITY-MAPLE CREEK 60 kV [8170] (MPLE CRK-RDGE CBN)	115	64.3		105.91
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:17:_TRINITY-MAPLE CREEK 60 kV [8170] MOAS OPENED on BIG BAR_HYMPOMJT	115	64.3		105.55
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	91.6	4.79	105.55
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-4:A1:4:_GRBRVLLE SHUNT=7h	60	35.9	75.4	105.11
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-4:A1:5:_GRBRVLLE SHUNT=5h	60	35.9	75.4	105.11
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-4:A1:6:_GRBRVLLE SHUNT=8h	60	35.9	75.4	105.11
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	36.1		104.57
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	49.3	79.53	102.75
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:31:_RIO DELL JCT-BRIDGEVILLE 60 kV [7850] (CARLOTTA-RIODLLTP)	60	35.9		102.62
31000 HUMBOLDT 115 31452 TRINITY 115	P2-4:A1:1:_ARCATA 60 kV - Section 1E & 1D	115	64.3	18.27	102.49
31000 HUMBOLDT 115 31452 TRINITY 115	EE:A1:4:_Loss of a large load-Arcata Substation	115	64.3	18.22	102.44
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	60	35.9		102.38

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:15:_HMBLT BY-HARRIS 60 kV [0] MOAS OPENED on HARRIS_HARRISST	115	64.3	18.11	102.36
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	36.8	71.72	102.33
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	34.6	31.71	102.31
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on NEWBURG_RIODLLTP	60	35.9		102.05
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:29:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (NEWBURG-RIODLLTP)	60	35.9		102.05
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:8:_ARCATA 60 kV [0] MOAS OPENED on ARCTAJT2_FAIRHAVN	115	64.3	17.6	101.83
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	115	64.3	15.32	101.8
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:6:_ESSEX JCT-ARCATA-FAIRHAVEN 60 kV [6800] (JANCK TP-ARCTAJT2)	115	64.3	17.55	101.77
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	91.6	4.52	101.64
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:12:_HMBLT BY 60 kV - Middle Breaker Bay 5	115	75.7	15.03	101.3
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:38:_FRUITLAND TAP 60 kV [6221] (FRUTLDJT-FRUITLND)	60	35.9	71.53	101.23
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-1:A1:4:_HMBOBAYPPB 13.80 kV Gen Unit 5	60	35.9	71.41	101.13
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-1:A1:5:_HMBOBAYPPB 13.80 kV Gen Unit 6	60	35.9	71.41	101.13
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-1:A1:6:_HMBOBAYPPB 13.80 kV Gen Unit 7	60	35.9	71.41	101.13
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-1:A1:7:_HMBOBAYPPB 13.80 kV Gen Unit 4	60	35.9	71.41	101.13
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	86.3	5.22	101
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-1:A1:10:_HMBOBAYPPA 13.80 kV Gen Unit 3	60	35.9	71.27	100.99

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-1:A1:11:_HMBOBAYPPC 13.80 kV Gen Unit 10	60	35.9	71.27	100.99
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-1:A1:12:_HMBOBAYPPC 13.80 kV Gen Unit 8	60	35.9	71.27	100.99
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-1:A1:13:_HMBOBAYPPC 13.80 kV Gen Unit 9	60	35.9	71.27	100.99
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-1:A1:8:_HMBOBAYPPA 13.80 kV Gen Unit 1	60	35.9	71.27	100.99
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-1:A1:9:_HMBOBAYPPA 13.80 kV Gen Unit 2	60	35.9	71.27	100.99
31452 TRINITY 115 31461 JESSTAP 115	P2-2:A1:2:_LOW GAP1 115 kV Section 1D	115	86.3	5.22	100.99
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	49.3	64.44	100.97
31000 HUMBOLDT 115 31452 TRINITY 115	P7-1:A1:4:_HUMBOLDT #1 & ARCATA-HUMBOLDT LINES	115	64.3	16.73	100.96
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:6:_HUMBOLDT #1 60 kV [7113] MOAS OPENED on ARCTAJT1_LP_FLKBD	115	64.3	16.64	100.87
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:8:_HUMBOLDT #1 60 kV [7113] (ARCTAJT1-LP_FLKBD)	115	64.3	16.64	100.87
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	86.3	17.75	100.83
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:25:_GARBERVILLE-LAYTONVILLE 60 kV [8365]	115	64.3	12.88	100.61
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:36:_GARBERVILLE-LAYTONVILLE 60 kV [8365] (GRBRVLLE-KEKAWAKA)	115	64.3	12.88	100.61
31000 HUMBOLDT 115 31452 TRINITY 115	P2-2:A1:6:_GRBRVLLE 60 kV Section 1E	115	64.3	12.88	100.61
31000 HUMBOLDT 115 31452 TRINITY 115	P2-2:A1:8:_KEKAWAKA 60 kV Section 1D	115	64.3	12.88	100.61
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:15:_GRBRVLLE - 1E 60 kV & GARBERVILLE-LAYTONVILLE line	115	64.3	12.88	100.61
31580 CASCADE 60.0 31582 STLLWATR 60.0	P2-3:A1:1:_HUMBOLDT - MA 115 kV & HUMBOLDT-TRINITY line	60	32.2	62.08	100.5

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:37:_GARBERVILLE-LAYTONVILLE 60 kV [8365] (KEKAWAKA-LYTNVLLE)	115	64.3	12.84	100.4
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	60	34.6	31.41	100.24

A-2 Impact of OSW Farms During Winter Peak Conditions for the Energy-Only 144 MW OSW Farm

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	75.7	56.77	190.51
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	75.7	55.06	185.19
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:11:_HMBLT BY 60 kV - Middle Breaker Bay 3	115	75.7	76.74	174.96
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	115	75.7	39.28	169.96
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	115	75.7	70.58	169.09
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	115	75.7	38.48	164.62
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	75.7	65.79	164.04
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	115	75.7	38.17	162.57
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:28:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (EEL RIVR-NEWBURG)	115	75.7	58.85	156.79
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:31:_RIO DELL JCT-BRIDGEVILLE 60 kV [7850] (CARLOTTA-RIODLLTP)	115	75.7	57.23	154.86
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:22:_RIO DELL JCT-BRIDGEVILLE 60 kV [7850] MOAS OPENED on CARLOTTA_SWNS FLT & PCLUMBER	115	75.7	56.34	153.97
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:32:_RIO DELL JCT-BRIDGEVILLE 60 kV [7850] (CARLOTTA-SWNS FLT)	115	75.7	55.05	152.68
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	75.7	32.94	152.47
31000 HUMBOLDT 115 31452 TRINITY 115	P2-2:A1:2:_LOW GAP1 115 kV Section 1D	115	75.7	32.94	152.46
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	46.7	61.83	152.46

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:23:_RIO DELL JCT-BRIDGEVILLE 60 kV [7850] MOAS OPENED on CARLOTTA_SWNS FLT	115	75.7	54.93	152.22
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	115	75.7	65.07	151.05
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	75.7	32.25	150.93
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	46.7	57.59	148.22
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:5:_HUMBOLDT 60 kV - Middle Breaker Bay 6	115	75.7	56.19	147.53
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	46.7	57.02	146.03
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	75.7	37.78	145.63
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P7-1:A1:3:_HUMBOLDT #1 & ESSEX JCT-ARCATA-FAIRHAVEN LINES	115	75.7	58.23	144.23
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:6:_HUMBOLDT 60 kV - Middle Breaker Bay 5	115	75.7	57.69	143.69
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P7-1:A1:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT LINES	115	75.7	57.69	143.69
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	59.3	69.17	141.97
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:4:_ARCATA - 1D 60 kV & ARCATA line	115	75.7	55.69	141.69
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on NEWBURG_RIODLLTP	115	75.7		140.98
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:29:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (NEWBURG-RIODLLTP)	115	75.7		140.98
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	115	75.7	48.26	139.63
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	115	75.7	48.26	139.63

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-4:A1:1:_ARCATA 60 kV - Section 1E & 1D	115	75.7	51.98	138
31000 HUMBOLDT 115 31015 BRDGVLLE 115	EE:A1:4:_Loss of a large load-Arcata Substation	115	75.7	51.95	137.97
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:8:_ARCATA 60 kV [0] MOAS OPENED on ARCTAJT2_FAIRHAVN	115	75.7	50.85	136.87
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:15:_HMBLT BY-HARRIS 60 kV [0] MOAS OPENED on HARRIS_HARRISST	115	75.7	50.61	136.84
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:6:_ESSEX JCT-ARCATA-FAIRHAVEN 60 kV [6800] (JANCK TP-ARCTAJT2)	115	75.7	50.79	136.82
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P7-1:A1:4:_HUMBOLDT #1 & ARCATA-HUMBOLDT LINES	115	75.7	50.31	136.33
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:6:_HUMBOLDT #1 60 kV [7113] MOAS OPENED on ARCTAJT1_LP_FLKBD	115	75.7	50.24	136.27
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:8:_HUMBOLDT #1 60 kV [7113] (ARCTAJT1-LP_FLKBD)	115	75.7	50.24	136.27
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:17:_TRINITY-MAPLE CREEK 60 kV [8170] MOAS OPENED on BIG BAR_HYMPOMJT	115	75.7		135.46
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:22:_TRINITY-MAPLE CREEK 60 kV [8170] (MPLE CRK-RDGE CBN)	115	75.7		135.13
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:5:_BLUE LAKE TAP 60 kV [6801] (ESSX JCT-BCHIP_TP)	115	75.7	48.74	134.77
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:20:_FAIRHAVN 60 kV - Ring R1 & R2	115	75.7	48.52	134.56
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:21:_FAIRHAVN 60 kV - Ring R1 & R2 (2)	115	75.7	48.52	134.56
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P7-1:A1:5:_ESSEX JCT-ARCATA-FAIRHAVEN & FAIRHAVEN-HUMBOLDT LINES	115	75.7	48.52	134.56
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:20:_HUMBOLDT BAY-EUREKA 60 kV [7070] (EUREKA A-EUREKA)	115	75.7	47.72	133.75
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:4:_ARCATA 60 kV Section 1D	115	75.7	47.7	133.74
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:3:_ARCATA - 1E 60 kV & ARCATA-HUMBOLDT line	115	75.7	47.36	133.39

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:3:_ARCATA 60 kV Section 1E	115	75.7	47.3	133.33
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:18:_MAPLE CREEK-HOOPA 60 kV [7490] MOAS OPENED on WILLWCRK_HOOPA	115	75.7	47.23	133.27
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:23:_MAPLE CREEK-HOOPA 60 kV [7490] (MPLE CRK-RUSS RCH)	115	75.7	47.23	133.27
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:24:_MAPLE CREEK-HOOPA 60 kV [7490] (RUSS RCH-WILLWCRK)	115	75.7	47.2	133.23
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:13:_BRDGVLLE - MA 60 kV & RIO DELL JCT-BRIDGEVILLE line	115	75.7		133.08
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:7:_ULTRA POWER TAP 60 kV [6803] (BLUE LKE-SMPSNTAP)	115	75.7	46.88	132.92
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:5:_BRDGVLLE 60 kV Section MA	115	75.7		132.46
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:14:_BRDGVLLE - MA 60 kV & BRIDGEVILLE-GARBERVILLE line	115	75.7		132.46
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:9:_FAIRHAVEN-HUMBOLDT 60 kV [6860] MOAS OPENED on SIERA_PC_FAIRHAVN	115	75.7	45.33	131.38
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:5:_ESSEX JCT-ORICK 60 kV [6810] MOAS OPENED on BIG_LAGN_TRINIDAD	115	75.7	44.88	130.93
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:34:_PACIFIC LUMBER (SCOTIA) TAP 60 kV [7852] (SCTIATP2-SCOTIATP)	115	75.7	40.21	126.29
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	46.7	34.58	125.51
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:25:_GARBERVILLE-LAYTONVILLE 60 kV [8365]	115	75.7		124.97
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:36:_GARBERVILLE-LAYTONVILLE 60 kV [8365] (GRBRVLLE-KEKAWAKA)	115	75.7		124.97
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:6:_GRBRVLLE 60 kV Section 1E	115	75.7		124.97
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:8:_KEKAWAKA 60 kV Section 1D	115	75.7		124.97

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:15:_GRBRVLLE - 1E 60 kV & GARBERVILLE-LAYTONVILLE line	115	75.7		124.97
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:37:_GARBERVILLE-LAYTONVILLE 60 kV [8365] (KEKAWAKA-LYTNVLLE)	115	75.7		124.92
31000 HUMBOLDT 115 31015 BRDGVLLE 115	Base Case	115	75.7	40.72	122.47
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:10:_FAIRHAVEN #1 60 kV [6850]	115	75.7	36.37	122.44
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-3:A1:5:_FPC 60/13.8 kV TB 1	115	75.7	36.37	122.44
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:11:_FAIRHAVEN #1 60 kV [6850] (FAIRHAVN-LP_JCT)	115	75.7	36.37	122.44
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:9:_FAIRHAVN 13.8 kV Section 1D	115	75.7	36.34	122.41
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:1:_FAIRHAVN 13.80 kV Gen Unit 1	115	75.7	35.49	121.57
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:5:_HUMBOLDT 60 kV - Middle Breaker Bay 6	115	75.7	38.82	121.55
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:11:_HMBOBAYPPC 13.80 kV Gen Unit 10	115	75.7	34.6	120.68
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:8:_HMBOBAYPPA 13.80 kV Gen Unit 1	115	75.7	34.51	120.59
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:10:_HMBOBAYPPA 13.80 kV Gen Unit 3	115	75.7	34.46	120.54
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:13:_HMBOBAYPPC 13.80 kV Gen Unit 9	115	75.7	34.41	120.5
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:9:_HMBOBAYPPA 13.80 kV Gen Unit 2	115	75.7	34.41	120.5
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:12:_HMBOBAYPPC 13.80 kV Gen Unit 8	115	75.7	34.27	120.35
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:5:_HMBOBAYPPB 13.80 kV Gen Unit 6	115	75.7	33.52	119.6
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:7:_HMBOBAYPPB 13.80 kV Gen Unit 4	115	75.7	33.3	119.38
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:4:_HMBOBAYPPB 13.80 kV Gen Unit 5	115	75.7	33.24	119.32
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-1:A1:6:_HMBOBAYPPB 13.80 kV Gen Unit 7	115	75.7	33.02	119.1
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:26:_BRIDGEVILLE-GARBERVILLE 60 kV [6220]	115	75.7	35.83	118.95

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
	MOAS OPENED on FTSWRDJT_GRBRVLLE				
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:41:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FTSWRDJT-GRBRVLLE)	115	75.7	35.83	118.95
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:7:_GRBRVLLE 60 kV Section 1D	115	75.7	35.8	118.89
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:16:_GRBRVLLE - 1D 60 kV & BRIDGEVILLE-GARBERVILLE line	115	75.7	35.8	118.89
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-4:A1:2:_GRBRVLLE 60 kV - Section 1E & 1D	115	75.7	35.8	118.88
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	75.7	35.39	118.26
31010 LOW GAP1 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	100.7	25.79	117.59
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-2:A1:2:_LOW GAP1 115 kV Section 1D	60	44.8	64.53	116.15
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	44.8	64.52	116.14
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	63.1	48.14	115.74
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	75.7	33.66	115.73
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	75.7	33.66	115.73
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	44.8	64.13	115.27
31452 TRINITY 115 31461 JESSTAP 115	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	115	100.7	28.22	114.31
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	60	46.7	60.43	113.92
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	115	75.7	30.84	113.6
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	115	75.7	30.84	113.6

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	100.7	24.48	113.51
31000 HUMBOLDT 115 31452 TRINITY 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	115	75.7	40.55	112.47
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	115	75.7	27.66	112.2
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	60	59.3	68.07	111.58
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:13:_BRDGVLLE - MA 60 kV & RIO DELL JCT-BRIDGEVILLE line	115	75.7	32.71	111.24
31000 HUMBOLDT 115 31015 BRDGVLLE 115	EE:A1:5:_Tsunami- Humboldt Bay Power Plant and Fairhaven Generating Stations	115	75.7		110.89
31000 HUMBOLDT 115 31452 TRINITY 115	P2-2:A1:5:_BRDGVLLE 60 kV Section MA	115	75.7	32.56	110.66
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:14:_BRDGVLLE - MA 60 kV & BRIDGEVILLE-GARBERVILLE line	115	75.7	32.56	110.66
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:11:_HMBLT BY 60 kV - Middle Breaker Bay 3	115	75.7	36.66	110.64
31452 TRINITY 115 31461 JESSTAP 115	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	115	100.7	27.62	110.33
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	60	46.7	56.19	109.68
31461 JESSTAP 115 31521 COTWD_1D 115	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	115	100.7	27.86	109.67
31452 TRINITY 115 31461 JESSTAP 115	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	115	100.7	27.4	108.88
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	75.7	31.21	108.07
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	75.7	31.21	108.07
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:12:_HMBLT BY 60 kV - Middle Breaker Bay 5	115	75.7	21.45	107.59
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	60	46.7	55.61	107.49

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31452 TRINITY 115	P7-1:A1:3:_HUMBOLDT #1 & ESSEX JCT-ARCATA-FAIRHAVEN LINES	115	75.7	34.2	106.13
31461 JESSTAP 115 31521 COTWD_1D 115	P2-3:A1:19:_BRDGVLLE 115 kV - Ring R1 & R3	115	100.7	27.26	105.69
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:6:_HUMBOLDT 60 kV - Middle Breaker Bay 5	115	75.7	33.7	105.63
31000 HUMBOLDT 115 31452 TRINITY 115	P7-1:A1:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT LINES	115	75.7	33.7	105.63
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	43.7	40.32	105.52
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:20:_HMBOBAYPPA-HMBLT BY #1 60 kV [0]	115	75.7	18.82	104.97
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-3:A1:7:_HMBOBAYPPA 60/13.8 kV TB 1	115	75.7	18.82	104.97
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:27:_HMBOBAYPPA-HMBLT BY 60 kV [0] No Fault	115	75.7	18.82	104.97
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	75.7	29.08	104.96
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:19:_HMBOBAYPPC-HMBLT BY #1 60 kV [0]	115	75.7	18.73	104.87
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-3:A1:6:_HMBOBAYPPC 60/13.8 kV TB 2	115	75.7	18.73	104.87
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:26:_HMBOBAYPPC-HMBLT BY 60 kV [0] No Fault	115	75.7	18.73	104.87
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:11:_HMBOBAYPPA 13.8 kV Section 1D	115	75.7	18.73	104.87
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-2:A1:12:_HMBOBAYPPC 13.8 kV Section 1D	115	75.7	18.63	104.78
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:22:_TRINITY-MAPLE CREEK 60 kV [8170] (MPLE CRK-RDGE CBN)	115	75.7	22.6	104.48
31461 JESSTAP 115 31521 COTWD_1D 115	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	115	100.7	27.04	104.23
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:26:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on FTSWRDJT_GRBRVLLE	115	75.7	28.54	104.13
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:41:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FTSWRDJT-GRBRVLLE)	115	75.7	28.54	104.13

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:17:_TRINITY-MAPLE CREEK 60 kV [8170] MOAS OPENED on BIG BAR_HYMPOMJT	115	75.7	22.55	104.07
31000 HUMBOLDT 115 31452 TRINITY 115	P2-2:A1:7:_GRBRVLLE 60 kV Section 1D	115	75.7	28.51	104.06
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:16:_GRBRVLLE - 1D 60 kV & BRIDGEVILLE-GARBERVILLE line	115	75.7	28.51	104.06
31000 HUMBOLDT 115 31452 TRINITY 115	P2-4:A1:2:_GRBRVLLE 60 kV - Section 1E & 1D	115	75.7	28.5	104.06
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-3:A1:10:_HMBLT BY 60 kV - Middle Breaker Bay 4	115	75.7	16.43	104
31000 HUMBOLDT 115 31452 TRINITY 115	P2-3:A1:4:_ARCATA - 1D 60 kV & ARCATA line	115	75.7	31.83	103.77
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	60	46.7	58.79	103.08
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P2-3:A1:17:_BRDGVLLE 115 kV - Ring R3 & R2	60	59.3	66.78	103.04
31011 FRSTGLEN 115 31010 LOW GAP1 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	113.5	22.15	102.68
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	75.7	27.87	101.87
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	100.7	23.7	101.72
31452 TRINITY 115 31461 JESSTAP 115	P2-2:A1:2:_LOW GAP1 115 kV Section 1D	115	100.7	23.7	101.71
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	44.8	61.58	101.47
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	60	59.3	66.49	101.12
37565 OLINDAW 230 37591 KE_SOUTH 230	P2-3:A1:1:_HUMBOLDT - MA 115 kV & HUMBOLDT-TRINITY line	230	306.9		100.91
31450 WILDWOOD 115 31011 FRSTGLEN 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	113.5	22.03	100.9
37565 OLINDAW 230 37591 KE_SOUTH 230	EE:A1:2:_Loss of one voltage level sub or SS plus trfr-Humboldt 115 kV	230	306.9		100.89
37565 OLINDAW 230 37591 KE_SOUTH 230	P2-2:A1:1:_HUMBOLDT 115 kV Section MA	230	306.9		100.89

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
37565 OLINDAW 230 37591 KE_SOUTH 230	P2-3:A1:2:_HUMBOLDT - MA 115 kV & HUMBOLDT BAY-HUMBOLDT #2 line	230	306.9		100.89
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	113.5	21.85	100.72
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P2-3:A1:18:_BRDGVLLE 115 kV - Ring R1 & R2	60	46.7	58.42	100.64
31452 TRINITY 115 31461 JESSTAP 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	100.7	23.19	100.59
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-2:A1:2:_LOW GAP1 115 kV Section 1D	60	44.8	53.77	100.44
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	44.8	53.76	100.43
31000 HUMBOLDT 115 31452 TRINITY 115	P2-4:A1:1:_ARCATA 60 kV - Section 1E & 1D	115	75.7	28.38	100.34
31000 HUMBOLDT 115 31452 TRINITY 115	EE:A1:4:_Loss of a large load-Arcata Substation	115	75.7	28.36	100.31
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:15:_HMBLT BY-HARRIS 60 kV [0] MOAS OPENED on HARRIS_HARRISST	115	75.7	28.23	100.22

A-3 Impact of OSW Farms During Summer Peak Conditions for the Energy-Only 168 MW OSW Farm

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90%	186.68
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	183.4
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	182.44
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90%	181.99
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	115	79.7	<90%	175.33
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	174.05
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	79.7	<90%	170.75
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	169.48
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	167.92
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90%	166.96
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90%	165.64
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90%	165.36
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:28:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (EEL RIVR-NEWBURG)	115	79.7	<90%	164.2
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	161.96
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	37.8	<90%	142.56
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	37.8	<90%	141.6
31000 HUMBOLDT 115 31452 TRINITY 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-	115	67.7	<90%	130.87

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
	HUMBOLDT & HUMBOLDT #1 LINES				
31000 HUMBOLDT 115 31015 BRDGVLLE 115	Base Case	115	79.7	<90%	128.68
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	37.8	<90%	126.93
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	126.02
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	115	67.7	<90%	125.38
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	37.8	<90%	125.04
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	124.99
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	38	<90%	122.4
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	36.4	<90%	122.39
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	51.9	94.52	121.49
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	38	<90%	121.45
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	37.8	<90%	115.5
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	Base Case	60	37.8	<90%	115.09
31000 HUMBOLDT 115 31452 TRINITY 115	Base Case	115	67.7	<90%	114.89
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	96.4	<90%	114.72
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	96.4	<90%	110.77
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	36.4	<90%	109.96
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	109.27

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	108.98
31010 LOW GAP1 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	106	<90%	108.02
31452 TRINITY 115 31461 JESSTAP 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	107.81
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	90.8	<90%	107.42
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	107.25
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38	<90%	106.85
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38	<90%	104.97
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	106	<90%	104.42
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	103.99
31461 JESSTAP 115 31521 COTWD_1D 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	102.83
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	90.8	<90%	102.43
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	101.67
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	51.9	<90%	101.64
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	51.9	<90%	101.01
31011 FRSTGLEN 115 31010 LOW GAP1 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	112.1	<90%	100.62
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	51.9	<90%	100.13

A-4 Impact of OSW Farms During Winter Peak Conditions for the Energy-Only 168 MW OSW Farm

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	202.12
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90%	201.23
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	197
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90%	196.02
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	193.89
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90%	192.1
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90%	190.1
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90%	182.79
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	175.95
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	115	79.7	<90%	175.85
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	79.7	<90%	171
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	169.69
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:28:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (EEL RIVR-NEWBURG)	115	79.7	<90%	164.05
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	154.24
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	37.8	<90%	146.8
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV	60	37.8	<90%	145.6

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
	[1110] (FRSTGLEN-LOW GAP1)				
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	115	67.7	<90%	142.73
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	115	67.7	<90%	142.73
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	36.4	<90%	140.29
31000 HUMBOLDT 115 31015 BRDGVLLE 115	Base Case	115	79.7	<90%	135.53
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	96.4	<90%	132.53
31000 HUMBOLDT 115 31452 TRINITY 115	Base Case	115	67.7	<90%	130.34
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	130.29
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	129.01
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	96.4	<90%	128.13
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	37.8	<90%	127.41
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	36.4	<90%	126.48
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	38	<90%	126.36
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	37.8	<90%	125.31
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	125.22
31010 LOW GAP1 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	106	<90%	125.17
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV	60	38	<90%	125.17

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
	[1110] (FRSTGLEN-LOW GAP1)				
31452 TRINITY 115 31461 JESSTAP 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	123.76
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	106	<90%	121.17
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	118.71
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	90.8	<90%	117.79
31461 JESSTAP 115 31521 COTWD_1D 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	117.25
31011 FRSTGLEN 115 31010 LOW GAP1 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	112.1	<90%	116.45
31450 WILDWOOD 115 31011 FRSTGLEN 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	112.1	<90%	114.15
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	36.4	<90%	113.55
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	112.1	<90%	112.67
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	36.4	<90%	112.65
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	112.32
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	Base Case	60	37.8	<90%	112.23
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]			<90%	111.27
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	37.8	<90%	110.7

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	112.1	<90%	110.37
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	110.07
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	109.53
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.4	<90%	107.57
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	107.28
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38	<90%	107.08
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35	<90%	106.73
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38	<90%	104.99
31555 TAP 65 60.0 31553 BIG BAR 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	102.84
31556 TRINITY 60.0 31555 TAP 65 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	102.79
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	96.4	<90%	102.04
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	96.4	<90%	102.04

A-5 Impact of OSW Farms During Summer Peak Conditions for the Energy-Only 288 MW OSW Farm

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90%	286.33
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90%	282.08
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90%	275.3
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90%	271.93
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	269.57
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90%	267.1
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	259.34
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	254.76
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	251.14
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	115	79.7	<90%	248.99
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	248.78
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	79.7	<90%	244.04
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:28:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (EEL RIVR-NEWBURG)	115	79.7	<90%	236.99
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	226.71
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	115	67.7	<90%	206.77

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	115	67.7	<90%	206.77
31000 HUMBOLDT 115 31452 TRINITY 115	Base Case	115	67.7	<90%	193.68
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	36.4	<90%	192.46
31000 HUMBOLDT 115 31015 BRDGVLLE 115	Base Case	115	79.7	<90%	192.2
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	36.4	<90%	181.2
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	96.4	<90%	180.61
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	37.8	<90%	179.56
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	37.8	<90%	177.54
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	96.4	<90%	177.03
31010 LOW GAP1 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	106	<90%	173.09
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	106	<90%	169.84
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	165.96
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	165.32
31452 TRINITY 115 31461 JESSTAP 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	163.49
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	160.48
31011 FRSTGLEN 115 31010 LOW GAP1 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	112.1	<90%	160.47

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	90.8	<90%	159.08
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	112.1	<90%	157.39
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	157.28
31450 WILDWOOD 115 31011 FRSTGLEN 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	112.1	<90%	155.58
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	37.8	<90%	155.44
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	155.11
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	37.8	<90%	153.73
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	153.72
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	38	<90%	153.24
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35	<90%	153
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	112.1	<90%	152.5
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	152.32
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	38	<90%	151.23
31461 JESSTAP 115 31521 COTWD_1D 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	149.86
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	148.87

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	36.4	<90%	148.17
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	36.4	<90%	146.67
31555 TAP 65 60.0 31553 BIG BAR 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	145.62
31556 TRINITY 60.0 31555 TAP 65 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	145.5
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	90.8	<90%	145.44
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.4	<90%	141.94
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35	<90%	141.29
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	51.9	94.52	137.54
31555 TAP 65 60.0 31553 BIG BAR 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	134.01
31556 TRINITY 60.0 31555 TAP 65 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	133.89
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	96.4	<90%	130.81
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	96.4	<90%	130.81
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	Base Case	60	37.8	<90%	130.76
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	51.9	<90%	129.96
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	37.8	<90%	129.6
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	51.9	<90%	128.59

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31010 LOW GAP1 115 31015 BRDGVLLE 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	106	<90%	127.8
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	106	<90%	127.8
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	96.4	<90%	124.95
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	106	<90%	122.48
31450 WILDWOOD 115 31524 COTWD_2E 115	Base Case	115	96.4	<90%	120.64
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	120.39
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	119.66
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	Base Case	60	51.9	<90%	118.64
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	118.11
31011 FRSTGLEN 115 31010 LOW GAP1 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	112.1	<90%	117.64
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	112.1	<90%	117.64
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	Base Case	60	36.4	<90%	115.63
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	51.9	<90%	115.47
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	114.82
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	51.9	<90%	113.65

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	113.26
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35.3	<90%	113.24
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	112.77
31450 WILDWOOD 115 31011 FRSTGLEN 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	112.1	<90%	112.75
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	112.1	<90%	112.75
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	112.1	<90%	112.61
31452 TRINITY 115 31461 JESSTAP 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	115	90.8	<90%	111.86
31010 LOW GAP1 115 31015 BRDGVLLE 115	Base Case	115	106	<90%	111.39
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	110.6
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	110.22
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	110.15
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	109.9
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35.3	<90%	108.39
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	108.39
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	51.9	<90%	107.88

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31011 FRSTGLEN 115 31010 LOW GAP1 115	Base Case	115	112.1	<90%	107.73
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	107.73
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	112.1	<90%	107.72
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35	<90%	106.94
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	90.8	<90%	106.91
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	51.9	<90%	106.52
31452 TRINITY 115 31461 JESSTAP 115	Base Case	115	90.8	<90%	106.3
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	105.58
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35	<90%	105.37
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	35.3	<90%	103.78
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	38	<90%	103.54
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	Base Case	60	38	<90%	102.78
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	Base Case	60	35.3	<90%	102.33
31556 TRINITY 60.0 31564 FRNCHGLH 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	33.9	<90%	102.28
31450 WILDWOOD 115 31011 FRSTGLEN 115	Base Case	115	112.1	<90%	102.15

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	101.95
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P7-1:A1:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT LINES	60	35.3	<90%	100.73
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P7-1:A1:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT LINES	60	38	<90%	100.71
31556 TRINITY 60.0 31564 FRNCHGLH 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	33.9	<90%	100.54
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35	<90%	100.46

A-6 Impact of OSW Farms During Winter Peak Conditions for the Energy-Only 288 MW OSW Farm

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90%	299.87
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90%	298.33
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90%	295.86
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90%	294.33
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	289
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	283.88
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90%	283.82
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	277.73
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	257.59
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	115	79.7	<90%	250
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	79.7	<90%	244.83
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	243.21
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:28:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (EEL RIVR-NEWBURG)	115	79.7	<90%	237.47
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	115	67.7	<90%	223.58

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	115	67.7	<90%	223.58
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	220.16
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	36.4	<90%	209.78
31000 HUMBOLDT 115 31452 TRINITY 115	Base Case	115	67.7	<90%	208.67
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	36.4	<90%	199.17
31000 HUMBOLDT 115 31015 BRDGVLLE 115	Base Case	115	79.7	<90%	199.02
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	96.4	<90%	194.99
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	96.4	<90%	191.62
31010 LOW GAP1 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	106	<90%	187.78
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	37.8	<90%	185.52
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	106	<90%	184.71
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	37.8	<90%	183.12
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	179.55
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	177.99
31452 TRINITY 115 31461 JESSTAP 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	175.07
31011 FRSTGLEN 115 31010 LOW GAP1 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	112.1	<90%	173.76

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	173.72
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	112.1	<90%	170.86
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	168.6
31450 WILDWOOD 115 31011 FRSTGLEN 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	112.1	<90%	167.86
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	90.8	<90%	166.46
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	112.1	<90%	164.96
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35	<90%	164.63
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	36.4	<90%	162.84
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	162.78
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	162.51
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	161.82
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	36.4	<90%	161.05
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	159.94
31461 JESSTAP 115 31521 COTWD_1D 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	158.9
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	37.8	<90%	158.26

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	38	<90%	158.26
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	37.8	<90%	156.65
31555 TAP 65 60.0 31553 BIG BAR 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	155.97
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	38	<90%	155.87
31556 TRINITY 60.0 31555 TAP 65 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	155.83
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.4	<90%	153.7
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35	<90%	153.59
31555 TAP 65 60.0 31553 BIG BAR 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	145.03
31556 TRINITY 60.0 31555 TAP 65 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	144.88
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	96.4	<90%	139.76
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	96.4	<90%	139.76
31010 LOW GAP1 115 31015 BRDGVLLE 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	106	<90%	137.55
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	106	<90%	137.55
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	96.4	<90%	133.7
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	106	<90%	132.04

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	131.14
31450 WILDWOOD 115 31524 COTWD_2E 115	Base Case	115	96.4	<90%	131.01
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	Base Case	60	37.8	<90%	130.94
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	129.3
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	37.8	<90%	127.55
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	Base Case	60	36.4	<90%	127.32
31011 FRSTGLEN 115 31010 LOW GAP1 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	112.1	<90%	126.26
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	112.1	<90%	126.26
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	125.32
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	125.18
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	123.47
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	123.45
31010 LOW GAP1 115 31015 BRDGVLLE 115	Base Case	115	106	<90%	121.88
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35.3	<90%	121.71
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	51.9	<90%	121.06
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	112.1	<90%	121.05

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31450 WILDWOOD 115 31011 FRSTGLEN 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	112.1	<90%	120.37
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	112.1	<90%	120.37
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	120.06
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	51.9	<90%	119.77
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	119.37
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	118.34
31011 FRSTGLEN 115 31010 LOW GAP1 115	Base Case	115	112.1	<90%	117.54
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	51.9	<90%	116.73
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35.3	<90%	115.89
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35	<90%	115.81
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	112.1	<90%	115.15
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	114.25
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35	<90%	113.95
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	113.91
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	112.18
31452 TRINITY 115 31461 JESSTAP 115	Base Case	115	90.8	<90%	112.11
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220]	115	90.8	<90%	111.9

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
	MOAS OPENED on BRDGVLLE_FRUTLDJT				
31452 TRINITY 115 31461 JESSTAP 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	90.8	<90%	111.9
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	111.66
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P2-1:A1:34:_PACIFIC LUMBER (SCOTIA) TAP 60 kV [7852] (SCTIATP2-SCOTIATP)	60	51.9	<90%	111.45
31450 WILDWOOD 115 31011 FRSTGLEN 115	Base Case	115	112.1	<90%	110.81
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	110.28
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	109.09
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	108.09
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	107.71
31555 TAP 65 60.0 31553 BIG BAR 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	107.57
31556 TRINITY 60.0 31555 TAP 65 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	107.43
31556 TRINITY 60.0 31564 FRNCHGLH 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	33.9	<90%	107.03
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	Base Case	60	51.9	<90%	106.49
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35	<90%	106.29
31555 TAP 65 60.0 31553 BIG BAR 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	105.72

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31556 TRINITY 60.0 31555 TAP 65 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	105.58
31556 TRINITY 60.0 31564 FRNCHGLH 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	33.9	<90%	104.96
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	Base Case	60	38	<90%	101.94
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	Base Case	60	35.3	<90%	101.23
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	38	<90%	100.59
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	Base Case	60	38.7	<90%	100.53
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	35.3	<90%	100.43

A-7 Impact of OSW Farms During Summer Peak Conditions for the Energy-Only 480 MW OSW Farm

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90%	445.88
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90%	442.66
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90%	439.86
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90%	437.2
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90%	434.51
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	400.16
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	388.26
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	383.69
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	375.42
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	115	79.7	<90%	364.26
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	79.7	<90%	358.86
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:28:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (EEL RIVR-NEWBURG)	115	79.7	<90%	351.24
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	348.69
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	115	67.7	<90%	341.06
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	115	67.7	<90%	341.06
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	324.74

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31452 TRINITY 115	Base Case	115	67.7	<90%	324.67
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	36.4	<90%	321.86
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	36.4	<90%	305.91
31000 HUMBOLDT 115 31015 BRDGVLLE 115	Base Case	115	79.7	<90%	295.21
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	288.54
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	96.4	<90%	275.78
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	274.78
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	272.09
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	96.4	<90%	270.71
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	106	<90%	265.74
31010 LOW GAP1 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	106	<90%	261.13
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	258.34
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35	<90%	252.69
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	112.1	<90%	246.08
31011 FRSTGLEN 115 31010 LOW GAP1 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	112.1	<90%	241.72
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	37.8	<90%	240.24
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	112.1	<90%	237.42
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	37.8	<90%	236.96

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35	<90%	236.1
31555 TAP 65 60.0 31553 BIG BAR 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	233.9
31556 TRINITY 60.0 31555 TAP 65 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	233.57
31450 WILDWOOD 115 31011 FRSTGLEN 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	112.1	<90%	233.06
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	36.4	<90%	223.25
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	36.4	<90%	220.8
31555 TAP 65 60.0 31553 BIG BAR 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	217.46
31556 TRINITY 60.0 31555 TAP 65 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	217.12
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	216.79
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.4	<90%	215.66
31452 TRINITY 115 31461 JESSTAP 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	212.8
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	212.48
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	90.8	<90%	209.47
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	208.97
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	37.8	<90%	208.24
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	207.41
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	38	<90%	206.59
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	37.8	<90%	205.82

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31461 JESSTAP 115 31521 COTWD_1D 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	203.41
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	38	<90%	203.33
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	90.8	<90%	200.09
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	96.4	<90%	186.96
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	96.4	<90%	186.96
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	186.85
31010 LOW GAP1 115 31015 BRDGVLLE 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	106	<90%	184.96
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	106	<90%	184.96
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	184.33
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35.3	<90%	179.03
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	178.22
31450 WILDWOOD 115 31524 COTWD_2E 115	Base Case	115	96.4	<90%	177.85
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	175.62
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	Base Case	60	36.4	<90%	174.94
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38	<90%	174.77
31450 WILDWOOD 115 31524 COTWD_2E 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-	115	96.4	<90%	174.6

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
	HUMBOLDT & HUMBOLDT #1 LINES				
31010 LOW GAP1 115 31015 BRDGVLLE 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	115	106	<90%	173.72
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	173.1
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38	<90%	172.36
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	170.58
31011 FRSTGLEN 115 31010 LOW GAP1 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	112.1	<90%	169.7
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	112.1	<90%	169.7
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	51.9	<90%	167.47
31010 LOW GAP1 115 31015 BRDGVLLE 115	Base Case	115	106	<90%	166.26
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	165.92
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	51.9	94.52	165.89
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	51.9	<90%	165.53
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35.3	<90%	165.28
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	Base Case	60	37.8	<90%	164.38
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	162.4
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	161.21
31450 WILDWOOD 115 31011 FRSTGLEN 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	112.1	<90%	161.04

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	112.1	<90%	161.04
31011 FRSTGLEN 115 31010 LOW GAP1 115	Base Case	115	112.1	<90%	160.33
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	37.8	<90%	159.88
31011 FRSTGLEN 115 31010 LOW GAP1 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	115	112.1	<90%	159.07
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	157.7
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	157.13
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	155
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	154.53
31450 WILDWOOD 115 31011 FRSTGLEN 115	Base Case	115	112.1	<90%	150.45
31450 WILDWOOD 115 31011 FRSTGLEN 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	115	112.1	<90%	150.41
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35	<90%	150.13
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35	<90%	147.59
31566 KESWICK 60.0 31582 STLLWATR 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	29.3	<90%	145.43
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	145.23
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	Base Case	60	51.9	<90%	144.25
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	51.9	<90%	143.52

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	143.1
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	142.63
31566 KESWICK 60.0 31582 STLLWATR 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	29.3	<90%	142.16
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	51.9	<90%	141.93
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	51.9	<90%	141.58
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	140.66
31556 TRINITY 60.0 31564 FRNCHGLH 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	33.9	<90%	140.32
31566 KESWICK 60.0 31582 STLLWATR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	29.3	<90%	139.87
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	138.53
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	138.06
31556 TRINITY 60.0 31564 FRNCHGLH 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	33.9	<90%	137.49
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	51.9	<90%	136.17
31556 TRINITY 60.0 31564 FRNCHGLH 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	33.9	<90%	135.51
31564 FRNCHGLH 60.0 31566 KESWICK 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	33.9	<90%	134.14
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	132.38
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	131.66
31564 FRNCHGLH 60.0 31566 KESWICK 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	33.9	<90%	131.31
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	130.26

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	Base Case	60	35.3	<90%	130.25
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	129.79
31564 FRNCHGLH 60.0 31566 KESWICK 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	33.9	<90%	129.33
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	129.06
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	Base Case	60	38	<90%	128.68
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	Base Case	60	35.3	<90%	127.78
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	126.95
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	38	<90%	126.66
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	35.3	<90%	126.43
31452 TRINITY 115 31461 JESSTAP 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	115	90.8	<90%	125.65
31452 TRINITY 115 31461 JESSTAP 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	90.8	<90%	124.9
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	124.36
31452 TRINITY 115 31461 JESSTAP 115	Base Case	115	90.8	<90%	122.53
31306 WILLITS 60.0 31308 LYTNVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	37.8	<90%	121.2
31306 WILLITS 60.0 31308 LYTNVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	37.8	<90%	117.92
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	Base Case	60	51.9	<90%	117.05
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	Base Case	60	38.7	<90%	116.76

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31461 JESSTAP 115 31521 COTWD_1D 115	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	115	90.8	<90%	116.27
31461 JESSTAP 115 31521 COTWD_1D 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	90.8	<90%	115.51
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	38.7	<90%	115.16
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	Base Case	60	35.3	<90%	114.83
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	51.9	<90%	112.22
31461 JESSTAP 115 31521 COTWD_1D 115	Base Case	115	90.8	<90%	111.56
31580 CASCADE 60.0 31582 STLLWATR 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	33.9	<90%	106.57
31580 CASCADE 60.0 31582 STLLWATR 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	33.9	<90%	103.74
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P7-1:A2:1:_ARCATA-HUMBOLDT & FAIRHAVEN-HUMBOLDT & HUMBOLDT #1 LINES	60	38.7	<90%	103.26
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	Base Case	60	38.7	<90%	103.25
31580 CASCADE 60.0 31581 OREGNTRL 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	33.9	<90%	102.01
31580 CASCADE 60.0 31582 STLLWATR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	33.9	<90%	101.76
31580 CASCADE 60.0 31581 OREGNTRL 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	33.9	<90%	100.73
31580 CASCADE 60.0 31581 OREGNTRL 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	33.9	<90%	100.08

A-8 Impact of OSW Farms During Winter Peak Conditions for the Energy-Only 480 MW OSW Farm

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	67.7	<90%	464.65
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	79.7	<90%	459.81
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	67.7	<90%	458.53
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	79.7	<90%	452.38
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	67.7	<90%	451.2
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	418.69
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	413.58
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	402.36
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	38.7	<90%	388.59
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:21:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (HMBLT BY-EEL RIVR)	115	79.7	<90%	365.53
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P1-2:A1:16:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] MOAS OPENED on EEL RIVR_NEWBURG	115	79.7	<90%	359.92
31000 HUMBOLDT 115 31452 TRINITY 115	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	115	67.7	<90%	357.73
31000 HUMBOLDT 115 31452 TRINITY 115	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	115	67.7	<90%	357.73
31000 HUMBOLDT 115 31015 BRDGVLLE 115	P2-1:A1:28:_HUMBOLDT BAY-RIO DELL JCT 60 kV [7100] (EEL RIVR-NEWBURG)	115	79.7	<90%	352.01
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	343.36
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	36.4	<90%	342.83

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31000 HUMBOLDT 115 31452 TRINITY 115	Base Case	115	67.7	<90%	339.5
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	36.4	<90%	323.15
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	51.9	<90%	318.47
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	305.95
31000 HUMBOLDT 115 31015 BRDGVLLE 115	Base Case	115	79.7	<90%	302.26
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	290.64
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	96.4	<90%	289.2
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	285.65
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	96.4	<90%	282.94
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	106	<90%	279.66
31010 LOW GAP1 115 31015 BRDGVLLE 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	106	<90%	273.97
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	270.34
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35	<90%	265.94
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	112.1	<90%	258.62
31011 FRSTGLEN 115 31010 LOW GAP1 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	112.1	<90%	253.23
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	115	112.1	<90%	248.87
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	37.8	<90%	246.83
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35	<90%	245.46

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31555 TAP 65 60.0 31553 BIG BAR 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	245.16
31556 TRINITY 60.0 31555 TAP 65 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	244.78
31450 WILDWOOD 115 31011 FRSTGLEN 115	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	115	112.1	<90%	243.49
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	37.8	<90%	243.15
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	36.4	<90%	237.5
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	36.4	<90%	234.76
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	36.4	<90%	227.45
31555 TAP 65 60.0 31553 BIG BAR 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	224.86
31556 TRINITY 60.0 31555 TAP 65 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	224.48
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	223.87
31452 TRINITY 115 31461 JESSTAP 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	219.39
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	219.01
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	215.07
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	115	90.8	<90%	214.06
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	38	<90%	212.74
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	115	90.8	<90%	212.64
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	37.8	<90%	212.31
31461 JESSTAP 115 31521 COTWD_1D 115	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	115	90.8	<90%	209.58

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	37.8	<90%	209.32
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	38	<90%	209.08
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]			<90%	202.83
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	197.33
31450 WILDWOOD 115 31524 COTWD_2E 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	96.4	<90%	195.07
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	96.4	<90%	195.07
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	194.51
31010 LOW GAP1 115 31015 BRDGVLLE 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	106	<90%	194.06
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	106	<90%	194.06
31450 WILDWOOD 115 31524 COTWD_2E 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	96.4	<90%	187.51
31010 LOW GAP1 115 31015 BRDGVLLE 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	106	<90%	187.18
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35.3	<90%	186.97
31450 WILDWOOD 115 31524 COTWD_2E 115	Base Case	115	96.4	<90%	186.93
31080 HUMBOLDT 60.0 31092 MPLE CRK 60.0	Base Case	60	36.4	<90%	186.62
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	182.04
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	182.02

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	179.2
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	178.84
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38	<90%	178.4
31011 FRSTGLEN 115 31010 LOW GAP1 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	112.1	<90%	177.67
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	112.1	<90%	177.67
31010 LOW GAP1 115 31015 BRDGVLLE 115	Base Case	115	106	<90%	175.78
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38	<90%	175.43
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35.3	<90%	171.66
31011 FRSTGLEN 115 31010 LOW GAP1 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	112.1	<90%	171.17
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	171.04
31011 FRSTGLEN 115 31010 LOW GAP1 115	Base Case	115	112.1	<90%	169.13
31450 WILDWOOD 115 31011 FRSTGLEN 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	112.1	<90%	167.93
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	112.1	<90%	167.93
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	167.83
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	165.92
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	Base Case	60	37.8	<90%	165.86
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	164.79

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	162.72
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	161.96
31450 WILDWOOD 115 31011 FRSTGLEN 115	P2-1:A1:39:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (FRUTLDJT-FTSWRDJT)	115	112.1	<90%	161.43
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	160.85
31110 BRDGVLLE 60.0 31120 FRUTLDJT 60.0	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	60	37.8	<90%	159.5
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	51.9	<90%	158.69
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	158.02
31450 WILDWOOD 115 31011 FRSTGLEN 115	Base Case	115	112.1	<90%	158.01
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35	<90%	156.39
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	51.9	<90%	156.3
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	154.71
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	153.7
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35	<90%	153.54
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	151.5
31566 KESWICK 60.0 31582 STLLWATR 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	29.3	<90%	150.28
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	148.59
31566 KESWICK 60.0 31582 STLLWATR 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	29.3	<90%	146.61
31553 BIG BAR 60.0 31093 HYMPOMJT 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35	<90%	145.94

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	51.9	<90%	145.76
31556 TRINITY 60.0 31564 FRNCHGLH 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	33.9	<90%	142.18
31566 KESWICK 60.0 31582 STLLWATR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	29.3	<90%	141.52
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	38.7	<90%	140.94
31556 TRINITY 60.0 31564 FRNCHGLH 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	33.9	<90%	139
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	38.7	<90%	137.73
31092 MPLE CRK 60.0 31091 RDGE CBN 60.0	Base Case	60	35.3	<90%	137.46
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	137.37
31564 FRNCHGLH 60.0 31566 KESWICK 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	33.9	<90%	136.66
31555 TAP 65 60.0 31553 BIG BAR 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	136.54
31556 TRINITY 60.0 31555 TAP 65 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	35.3	<90%	136.17
31556 TRINITY 60.0 31564 FRNCHGLH 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	33.9	<90%	134.61
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	P2-1:A1:34:_PACIFIC LUMBER (SCOTIA) TAP 60 kV [7852] (SCTIATP2-SCOTIATP)	60	51.9	<90%	134.12
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	51.9	<90%	133.81
31555 TAP 65 60.0 31553 BIG BAR 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	133.72
31564 FRNCHGLH 60.0 31566 KESWICK 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	33.9	<90%	133.48
31556 TRINITY 60.0 31555 TAP 65 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	35.3	<90%	133.34
31090 HMBLT BY 60.0 31100 EEL RIVR 60.0	Base Case	60	51.9	<90%	132.18

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	51.9	<90%	131.42
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	Base Case	60	38.7	<90%	129.73
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	Base Case	60	38	<90%	129.7
31564 FRNCHGLH 60.0 31566 KESWICK 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	33.9	<90%	129.09
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	Base Case	60	35.3	<90%	128.78
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	127.82
31306 WILLITS 60.0 31308 LYTNVLLE 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	37.8	<90%	126.42
31104 CARLOTTA 60.0 31105 RIODLLTP 60.0	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	60	38.7	<90%	126.32
31555 TAP 65 60.0 31553 BIG BAR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35.3	<90%	126.18
31120 FRUTLDJT 60.0 31122 FTSWRDJT 60.0	P2-1:A1:16:_HUMBOLDT-MAPLE CREEK 60 kV [7130] (HUMBOLDT-MPLE CRK)	60	38	<90%	125.87
31556 TRINITY 60.0 31555 TAP 65 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	35.3	<90%	125.8
31452 TRINITY 115 31461 JESSTAP 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	90.8	<90%	125.74
31452 TRINITY 115 31461 JESSTAP 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	90.8	<90%	125.74
31122 FTSWRDJT 60.0 31116 GRBRVLLE 60.0	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	60	35.3	<90%	125.49
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P2-1:A1:1:_HUMBOLDT-TRINITY 115 kV [1820] (HUMBOLDT-TRINITY)	60	35.3	<90%	124.99
31116 GRBRVLLE 60.0 31118 KEKAWAKA 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	124.62
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	Base Case	60	38.7	<90%	123.93
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	38.7	<90%	123.6

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31452 TRINITY 115 31461 JESSTAP 115	Base Case	115	90.8	<90%	123.31
31306 WILLITS 60.0 31308 LYTNVLLE 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	37.8	<90%	122.74
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P1-2:A1:2:_HUMBOLDT-TRINITY 115 kV [1820]	60	35.3	<90%	121.79
31104 CARLOTTA 60.0 31108 SWNS FLT 60.0	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	60	38.7	<90%	121.2
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P1-3:A1:4:_BRDGVLLE 115/60 kV TB 1	60	51.9	<90%	120.88
31306 WILLITS 60.0 31308 LYTNVLLE 60.0	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	60	37.8	<90%	120.42
31306 WILLITS 60.0 31308 LYTNVLLE 60.0	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	60	37.8	<90%	120.42
31091 RDGE CBN 60.0 31093 HYMPOMJT 60.0	Base Case	60	35.3	<90%	120.3
31580 CASCADE 60.0 31582 STLLWATR 60.0	P1-2:A1:3:_BRIDGEVILLE-COTTONWOOD 115 kV [1110]	60	33.9	<90%	116.24
31461 JESSTAP 115 31521 COTWD_1D 115	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	115	90.8	<90%	115.93
31461 JESSTAP 115 31521 COTWD_1D 115	P2-1:A1:35:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] (BRDGVLLE-FRUTLDJT)	115	90.8	<90%	115.93
31580 CASCADE 60.0 31582 STLLWATR 60.0	P2-1:A1:2:_BRIDGEVILLE-COTTONWOOD 115 kV [1110] (FRSTGLEN-LOW GAP1)	60	33.9	<90%	113.07
31461 JESSTAP 115 31521 COTWD_1D 115	Base Case	115	90.8	<90%	111.85
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	Base Case	60	38.7	<90%	111.2
31108 SWNS FLT 60.0 31110 BRDGVLLE 60.0	P1-2:A1:14:_HUMBOLDT-MAPLE CREEK 60 kV [7130] MOAS OPENED on HUMBOLDT_MPLE CRK	60	38.7	<90%	109.98
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	P2-1:A1:34:_PACIFIC LUMBER (SCOTIA) TAP 60 kV [7852] (SCTIATP2-SCOTIATP)	60	51.9	<90%	109.23

Monitored Facility	Contingency	Voltage Level (kV)	Rating (MVA)	PreProject %Loading	PostProject %Loading
31580 CASCADE 60.0 31582 STLLWATR 60.0	P1-2:A1:1:_HUMBOLDT-BRIDGEVILLE 115 kV [1810]	60	33.9	<90%	108.67
31102 NEWBURG 60.0 31105 RIODLLTP 60.0	P2-1:A1:34:_PACIFIC LUMBER (SCOTIA) TAP 60 kV [7852] (SCTIATP2-SCOTIATP)	60	38.7	<90%	107.98
31100 EEL RIVR 60.0 31102 NEWBURG 60.0	Base Case	60	51.9	<90%	103.92
31118 KEKAWAKA 60.0 31308 LYTNVLLE 60.0	P1-2:A1:24:_BRIDGEVILLE-GARBERVILLE 60 kV [6220] MOAS OPENED on BRDGVLLE_FRUTLDJT	60	35.3	<90%	102.36

APPENDIX: KEY ABBREVIATIONS AND ACRONYMS

Note: This list excludes units of measurement.

BES: Bulk Electric System

BESS: Battery energy storage systems

CAISO: California Independent System Operator

CB: Circuit Breaker

GRNU: Generation reliability network upgrade

ICE: Internal combustion engine

ISO: Independent system operator

LMP: Locational marginal price

OSW: Off-shore wind

Max Cap: Maximum Plant Rated Capacity

Min Cap: Minimum Plant Capacity

NERC: North American Electric Reliability Corporation

PGen: Resource generated power in MW

Pmax: Resource maximum power in MW, typically a resource rated power

POI: Point of Interconnection

RMR: Reliability Must Run

TARA: Transmission Adequacy & Reliability Assessment, a software product

WECC: Western Electricity Coordinating Council