Appendix C:
Data Tables

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1. Data Tables

1.1 Fuel Price Forecast

The cost of producing electricity is dependent upon, in part, the cost of fuels utilized to generate power. Hawaiian Electric uses the following fuel types:

- Low Sulfur Fuel Oil (LSFO): A residual fuel oil similar to No. 6 fuel oil that contains less than 5,000 parts per million of sulfur; about 0.5% sulfur content
- No. 2 Diesel Oil
- Ultra-Low Sulfur Diesel (ULSD)
- Naphtha
- High Sulfur Fuel Oil (HSFO): Also called Industrial Fuel Oil (IFO), HSFO contains less than 2% sulfur

The fuel price forecast was developed using a correlation between historical, actual fuel prices and the Brent North Sea Crude Oil Benchmark (Brent) from 1983-2019. The R^2 value for petroleum fuels was greater than 0.93. Hawaiian Electric's 2021 forecast was based on the Brent forecast provided by the Energy Information Administration ("EIA") Annual Energy Outlook ("AEO").[1] Shown below in Table C-1, Table C-2, and Table C-3 is the fuel price forecast for Oʻahu, Hawaiʻi Island, and Maui County, respectively.

[1] Hawaiian Electric updated its assumptions to use the fuel price forecast provided by the EIA AEO instead of FGE in response to stakeholder feedback to use publicly available, non-proprietary sources.

Table C-1. O'ahu Fuel Price Forecast

Year $/MMBTU	LSFO	Diesel	ULSD - CIP	ULSD - SGS	Biodiesel
2021	8.73	11.49	11.93	12.72	28.55
2022	9.43	12.24	12.71	13.51	29.32
2023	10.51	13.38	13.87	14.68	30.39
2024	11.36	14.28	14.80	15.62	31.37
2025	12.14	15.14	15.68	16.52	32.41
2026	13.03	16.11	16.68	17.54	33.60
2027	13.82	16.99	17.58	18.46	34.78
2028	14.67	17.94	18.56	19.46	36.04
2029	15.49	18.85	19.50	20.42	37.30
2030	16.36	19.82	20.49	21.45	38.60
2031	17.14	20.69	21.38	22.36	39.82
2032	18.03	21.67	22.40	23.40	41.12
2033	18.74	22.47	23.22	24.25	42.29
2034	19.47	23.29	24.07	25.11	43.45
2035	20.10	24.02	24.81	25.88	44.56
2036	20.90	24.90	25.72	26.82	45.77
2037	21.76	25.86	26.70	27.82	47.03
2038	22.63	26.82	27.69	28.83	48.31
2039	23.18	27.46	28.35	29.52	49.37
2040	24.37	28.76	29.69	30.88	50.91
2041	25.34	29.83	30.79	32.00	52.32
2042	26.15	30.75	31.74	32.98	53.65
2043	27.22	31.93	32.95	34.22	55.21
2044	28.16	32.99	34.04	35.34	56.73
2045	28.65	33.59	34.66	36.00	57.99
2046	29.99	35.08	36.19	37.56	59.92
2047	31.08	36.31	37.46	38.86	61.72
2048	32.03	37.40	38.59	40.03	63.49
2049	33.05	38.57	39.79	41.28	65.38
2050	34.10	39.79	41.05	42.57	67.35

Table C-2. Hawai'i Island Fuel Price Forecast

Year $/MMBTU	IFO	Diesel	ULSD	Naphtha	Biodiesel
2021	7.45	12.16	12.68	13.71	28.55
2022	8.06	12.98	13.52	14.50	29.32
2023	8.99	14.21	14.78	15.69	30.39
2024	9.72	15.18	15.78	16.65	31.37
2025	10.40	16.10	16.73	17.56	32.41
2026	11.17	17.15	17.81	18.61	33.60
2027	11.85	18.09	18.77	19.56	34.78
2028	12.59	19.11	19.82	20.58	36.04
2029	13.29	20.09	20.83	21.58	37.30
2030	14.05	21.13	21.91	22.63	38.60
2031	14.71	22.06	22.87	23.57	39.82
2032	15.48	23.13	23.96	24.64	41.12
2033	16.10	23.99	24.85	25.52	42.29
2034	16.72	24.86	25.75	26.41	43.45
2035	17.27	25.64	26.55	27.21	44.56
2036	17.96	26.59	27.53	28.17	45.77
2037	18.70	27.62	28.59	29.20	47.03
2038	19.45	28.65	29.65	30.24	48.31
2039	19.93	29.34	30.36	30.96	49.37
2040	20.96	30.74	31.80	32.35	50.91
2041	21.79	31.88	32.98	33.50	52.32
2042	22.50	32.87	34.00	34.51	53.65
2043	23.42	34.14	35.31	35.78	55.21
2044	24.23	35.28	36.48	36.94	56.73
2045	24.65	35.92	37.15	37.64	57.99
2046	25.81	37.52	38.79	39.24	59.92
2047	26.75	38.84	40.15	40.59	61.72
2048	27.57	40.01	41.37	41.81	63.49
2049	28.44	41.27	42.66	43.11	65.38
2050	29.35	42.57	44.01	44.46	67.35

Table C-3. Maui County Fuel Price Forecast

Year	Maui				Moloka'i	Lāna'i
$/MMBTU	IFO	Diesel	ULSD	Biodiesel	ULSD	ULSD
2021	7.09	11.75	12.09	28.55	12.91	16.08
2022	7.69	12.58	12.94	29.32	13.76	16.95
2023	8.62	13.85	14.23	30.39	15.04	18.26
2024	9.33	14.85	15.26	31.37	16.07	19.33
2025	10.00	15.78	16.22	32.41	17.03	20.35
2026	10.75	16.85	17.31	33.60	18.13	21.51
2027	11.42	17.80	18.28	34.78	19.12	22.58
2028	12.14	18.83	19.34	36.04	20.19	23.73
2029	12.83	19.82	20.36	37.30	21.22	24.84
2030	13.57	20.88	21.44	38.60	22.31	26.02
2031	14.22	21.82	22.40	39.82	23.29	27.08
2032	14.97	22.89	23.50	41.12	24.40	28.28
2033	15.57	23.76	24.39	42.29	25.31	29.27
2034	16.19	24.65	25.30	43.45	26.23	30.27
2035	16.72	25.43	26.10	44.56	27.05	31.17
2036	17.39	26.39	27.09	45.77	28.05	32.26
2037	18.12	27.43	28.15	47.03	29.12	33.41
2038	18.85	28.48	29.22	48.31	30.21	34.58
2039	19.31	29.16	29.93	49.37	30.93	35.39
2040	20.33	30.59	31.39	50.91	32.40	36.94
2041	21.14	31.75	32.58	52.32	33.60	38.23
2042	21.83	32.75	33.60	53.65	34.64	39.36
2043	22.73	34.03	34.92	55.21	35.97	40.79
2044	23.52	35.18	36.09	56.73	37.16	42.09
2045	23.93	35.81	36.74	57.99	37.84	42.90
2046	25.07	37.43	38.40	59.92	39.52	44.70
2047	25.98	38.76	39.76	61.72	40.90	46.22
2048	26.78	39.93	40.97	63.49	42.14	47.60
2049	27.63	41.19	42.26	65.38	43.46	49.07
2050	28.51	42.49	43.60	67.35	44.83	50.60

1.2 Existing Resource Portfolios

Hawaiian Electric's thermal generating unit capacity is provided by a mix of utility-owned generation and independent power producers (IPPs). Shown below are some general info about these resources. Further information can be found in the *August 2021 IGP Inputs and Assumptions*.

1.2.1 Oʻahu

1.2.1.1 Oʻahu Firm Generation Portfolio

Shown below in Table C-4. are the various firm thermal generators on Oʻahu, along with their minimum and maximum capacity, fuel type, and age.

Table C-4. Oʻahu Minimum and Maximum Capacity, Fuel Type, and Age of Thermal Resources

Unit	Type	Operating Minimum (Net MW)	Normal Top Load (Net MW)	Fuel Type	Age (Years)
Kahe 1	Baseload	23.2	82.6	LSFO	61
Kahe 2	Baseload	23.3	82.4	LSFO	60
Kahe 3	Baseload	23.1	86.1	LSFO	54
Kahe 4	Baseload	23.1	85.4	LSFO	52
Kahe 5	Baseload	50.4	134.9	LSFO	50
Kahe 6	Baseload	50.4	134.7	LSFO	43
Waiau 3	Cycling	23.5	47.1	LSFO	77
Waiau 4	Cycling	23.5	46.5	LSFO	74
Waiau 5	Cycling	23.4	54.4	LSFO	65
Waiau 6	Cycling	23.5	53.7	LSFO	63
Waiau 7	Baseload	23.1	82.9	LSFO	58
Waiau 8	Baseload	23.1	86.3	LSFO	56
Waiau 9	Peaking	5.9	52.9	Diesel	51
Waiau 10	Peaking	5.9	49.9	Diesel	51
Campbell Industrial Park	Peaking	41.2	129.0	Diesel	15
H-Power	Baseload	35.0	68.5	Refuse	
Kalaeloa Energy Partners	Baseload	65.0	208.0	LSFO	
Airport DSG	Peaking	4.0	8.0	Biodiesel	6
Schofield 1	Peaking	4.0	8.1	ULSD / Biodiesel	5
Schofield 2	Peaking	4.0	8.1	ULSD / Biodiesel	5
Schofield 3	Peaking	4.0	8.1	ULSD / Biodiesel	5
Schofield 4	Peaking	4.0	8.1	ULSD / Biodiesel	5
Schofield 5	Peaking	4.0	8.1	ULSD / Biodiesel	5
Schofield 6	Peaking	4.0	8.1	ULSD / Biodiesel	5

1.2.1.2 O'ahu Variable Renewable, Storage, and Grid Service Resource Portfolio

Shown below in Table C-5 are O'ahu's variable renewable, storage, and grid service resources, their first year in service, along with their maximum capacity, and their capacity factor.

Table C-5. O'ahu Variable Renewable, Storage, and Grid Service Resources

Unit	Year in Service	Capacity (MW)	Storage Capacity (MWh)	Capacity Factor (%)
Kapolei Sustainable Energy Park	2012	1.0	-	21.9%
Kalaeloa Solar Two	2013	5.0	-	25.7%
Kalaeloa Renewable Energy Park	2014	5.0	-	20.5%
Kahuku Wind	2011	30.0	-	27.2%
Kawailoa Wind	2013	69.0	-	19.7%
West Loch	2019	20.0	-	25.1%
Lanikuhana Solar	2019	14.7	-	27.1%
Waipio PV	2019	45.9	-	27.1%
Kawailoa Solar	2019	49.0	-	27.1%
Na Pua Makani	2020	24.0	-	42.5%
Waianae Solar	2017	27.6	-	27.1%
Feed-In-Tariff Tier 1 and 2		24.8	-	19.3%
Feed-In-Tariff Tier 3		20.0	-	
Aloha Solar Energy Fund 1 & 2	2020	10.0	-	19.3%
Mauka FIT 1	2020	3.5	-	19.3%
Waihonu Solar	2016	6.5	-	19.3%
CBRE Phase 1	2023	5.0	-	24.5%
CBRE Phase 2	2027/2029	180.0	-	-
Stage 1				
Ho'ohana Solar 1	2024	52.0	208.0	25.1%
AES West Oahu Solar	2023	12.5	50.0	25.2%
Mililani 1 Solar	2023	39.0	156.0	27.2%
Waiawa Solar Power	2023	36.0	144.0	27.9%
Stage 2				
Waiawa Phase 2 Solar	2024	30.0	240.0	20.5%
Mountain View Solar	2024	7.0	35.0	17.3%
Kupono Solar	2024	42.0	168.0	25.3%
Kapolei Energy Storage	2023	185.0	565.0	-
Grid Services RFP				
Load Build	2021	14.8	-	-
Load Reduce	2021	26.3	-	-
Load Build 3	2023	60	-	-
Load Reduce 3	2023	60	-	-
FFR 3	2023	12	-	-
Demand Response				
Fast Demand Response (FDR)	2018	5.5	-	-
Residential Direct Load Control	2018	13.2	-	-
Commercial Direct Load Control	2018	7.8	-	-
Small Business Direct Load Control	2018	1.6	-	-

1.2.2 Hawai‘i Island

1.2.2.1 Hawai‘i Island Firm Generation Portfolio

Shown below in Table C-6 are the various firm thermal generators on Hawai‘i Island, along with their minimum and maximum capacity, fuel type, and age.

Table C-6. Hawai‘i Island Minimum and Maximum Capacity, Fuel Type, and Age of Thermal Resources

Unit	Type	Operating Minimum (Net MW)	Normal Top Load (Net MW)	Fuel Type	Age (Years)
Puna Geothermal Venture (2024)	Baseload	20	46	Geothermal	31
Puna Geothermal Venture (2021, off-peak)	Baseload	22.0	38.0	Geothermal	31
Puna Geothermal Venture (2021, on-peak)	Baseload	33.9	38.0	Geothermal	31
Hill 5	Cycling	5.0	13.8	IFO (2021-2024) / ULSD(2025+)	58
Hill 6	Cycling	8.0	20.0	IFO (2021-2024) / ULSD(2025+)	49
Kanoelehua CT1	Peaking	2.0	10.3	Diesel	61
Kanoelehua D11	Peaking	2.0	2.0	ULSD	61
Kanoelehua D15	Peaking	2.4	2.5	ULSD	48-51
Kanoelehua D16	Peaking	2.4	2.5	ULSD	48-51
Kanoelehua D17	Peaking	2.4	2.5	ULSD	48-51
Kapua D27	Peaking	1.3	1.3	ULSD	24-25
Keahole CT2	Peaking	6.0	13.8	Diesel	34
Keahole D21	Peaking	2.4	2.5	ULSD	35-39
Keahole D22	Peaking	2.4	2.5	ULSD	35-39
Keahole D23	Peaking	2.4	2.5	ULSD	35-39
Ouli D25	Peaking	1.3	1.3	ULSD	24-25
Panaewa D24	Peaking	1.3	1.3	ULSD	24-25
Puna	Cycling	6.0	15.5	IFO	53
Puna CT3	Peaking	8.0	20.0	Diesel	31
Punaluu D26	Peaking	1.3	1.3	ULSD	24-25
Waimea D12	Peaking	2.4	2.5	ULSD	51-53
Waimea D13	Peaking	2.4	2.5	ULSD	51-53
Waimea D14	Peaking	2.4	2.5	ULSD	51-53
Keahole CT4	Cycling	8.0	20.5	Diesel	19/13
Keahole CT5	Cycling	8.0	20.5	Diesel	19/13
Keahole ST7	Cycling	1.0	9.5	-	19/13
Hamakua Energy CT1	Cycling	7.0	20.8	80% Naphtha / 20% Biodiesel	23
Hamakua Energy CT2	Cycling	7.0	20.8	80% Naphtha / 20% Biodiesel	23
Hamakua Energy ST	Cycling	5.5	16.4	-	23

1.2.2.2 Hawai'i Island Variable Renewable, Storage, and Grid Service Resource Portfolio

Shown below in Table C-7 are Hawai'i Island's variable renewable, storage, and grid service resources, along with their first year in service, their maximum capacity, and their capacity factor.

Table C-7. Hawai'i Island Variable Renewable, Storage, and Grid Service Resources

Unit	Year in Service	Capacity (MW)	Storage Capacity (MWh)	Capacity Factor (%)
Small Hydros		0.2	-	85.7%
Wailuku Hydro	1993	12.1	-	18.9%
HRD Wind	2006	10.5	-	42.4%
Tawhiri	2007	20.5		63.6%
Feed-In-Tariff		9.1		18.1%
Puueo Hydro	2005	3.3	-	54.8%
Waiau Hydro	1920	2.0	-	53.2%
CBRE Phase 1	2023	0.75	-	16.9%
CBRE Phase 2	2027/ 2029	20/ 12.5	-	-
Stage 1 RFP				
Hale Kuawehi Solar	2024	30.0	120.0	33.2%
Waikoloa Solar	2023	30.0	120.0	30.9%
Grid Services RFP				
Load Reduce	2021	4.0	-	-
Load Build	2021	3.2	-	-

1.2.3 Maui

1.2.3.1 Maui Firm Generation Portfolio

Shown below in Table C-8. are the various firm thermal generators on Maui, along with their minimum and maximum capacity, fuel type, and age.

Table C-8. Maui Minimum and Maximum Capacity, Fuel Type, and Age of Thermal Resources

Unit[2]	Type	Operating Minimum (Net MW)	Normal Top Load (Net MW)	Fuel Type	Age (Years)
Kahului 1	Peaking	2.26	4.71	IFO	75
Kahului 2	Peaking	2.28	4.76	IFO	74
Kahului 3	Baseload	3.00	11.50	IFO	69
Kahului 4	Baseload	3.00	11.50	IFO	57
Maalaea 1	Peaking	2.50	2.50	ULSD	52
Maalaea 2	Peaking	2.50	2.50	ULSD	51
Maalaea 3	Peaking	2.50	2.50	ULSD	51
Maalaea 4	Peaking	1.86	5.51	Diesel	50
Maalaea 5	Peaking	1.86	5.51	Diesel	50
Maalaea 6	Peaking	1.86	5.51	Diesel	50
Maalaea 7	Peaking	1.86	5.51	Diesel	45
Maalaea 8	Peaking	1.86	5.48	Diesel	45
Maalaea 9	Peaking	1.86	5.48	Diesel	45
Maalaea 10	Cycling	7.87	12.34	Diesel	43
Maalaea 11	Cycling	7.87	12.34	Diesel	43
Maalaea 12	Cycling	7.87	12.34	Diesel	35
Maalaea 13	Cycling	7.87	12.34	Diesel	35
Maalaea X1	Peaking	2.50	2.50	ULSD	36
Maalaea X2	Peaking	2.50	2.50	ULSD	36
Maalaea 14	Baseload	5.88	21.13	Diesel	31
Maalaea 15	Baseload	3.73	13.38	-	30
Maalaea 16	Baseload	5.88	21.13	Diesel	30
Maalaea 17	Cycling	5.93	21.47	Diesel	25
Maalaea 18	Cycling	2.96	12.99	-	17
Maalaea 19	Cycling	5.93	21.47	Diesel	23
Hana 1	Peaking	0.00	0.97	ULSD	34/39
Hana 2	Peaking	0.00	0.97	ULSD	34/39

1.2.3.2 Maui Variable Renewable, Storage, and Grid Service Resource Portfolio

Shown below in Table C-9 are Maui's variable renewable, storage, and grid service resources, along with their first year in service, their maximum capacity, and their capacity factor.

Table C-9. Maui Variable Renewable, Storage, and Grid Service Resources

Unit	Year in Service	Capacity (MW)	Storage Capacity (MWh)	Capacity Factor (%)
Feed-In-Tariff		6.9	-	17%
Kaheawa Wind Farm I	2006	30.0	-	43%
Kaheawa Wind Farm II	2012	21.0	-	47%
Auwahi Wind Farm	2012	21.0	-	51%
South Maui Renewable Resources	2018	2.9	-	29%
Kuia Solar	2018	2.9	-	29%
CBRE Phase 1	2021	0.02832	-	28%
CBRE Phase 2	2027/2029	33.475	-	-
Stage 1 RFP				
Kuihelani	2024	60.0	240.0	31%
Paeahu Solar	2025	15.0	60.0	31%
Stage 2 RFP				
Kamaole Solar	2025	40.0	160.0	35%
Waena BESS	2023	40.0	160.0	-
Grid Services RFP				
Load Build	2023	2.0	-	-
Load Reduce	2023	7.2	-	-
FFR1	2023	6.1	-	-
Demand Response				
Fast Demand Response	2021	4.9	-	-

1.2.4 Moloka‘i

1.2.4.1 Moloka‘i Firm Generation Portfolio

Shown below in Table C-10. are the various firm thermal generators on Moloka‘i, along with their minimum and maximum capacity, fuel type, and age.

Table C-10. Moloka‘i Minimum and Maximum Capacity, Fuel Type, and Age of Thermal Resources

Unit	Type	Operating Minimum (Net MW)	Normal Top Load (Net MW)	Fuel Type	Age (Years)
Palaau 01	Peaking	0.31	1.25	ULSD	38
Palaau 02	Peaking	0.31	1.25	ULSD	38
Palaau 03	Peaking	0.25	0.97	ULSD	38/32
Palaau 04	Peaking	0.25	0.97	ULSD	38/32
Palaau 05	Peaking	0.25	0.97	ULSD	38/32
Palaau 06	Peaking	0.25	0.97	ULSD	38/32
Palaau 07	Baseload	0.66	2.20	ULSD	27
Palaau 08	Baseload	0.66	2.20	ULSD	27
Palaau 09	Baseload	0.66	2.20	ULSD	27
Palaau GT1	Peaking	1.1	2.20	ULSD	41

1.2.4.2 Moloka‘i Variable Renewable, Storage, and Grid Service Resource Portfolio

Shown below in Table C-11 are Moloka‘i’s variable renewable, storage, and grid service resources, along with their first year in service, their maximum capacity, and their capacity factor.

Table C-11. Moloka‘i Variable Renewable, Storage, and Grid Service Resources

Unit	Year in Service	Capacity (MW)	Storage Capacity (MWh)	Capacity Factor (%)
CBRE Phase 1	2023	0.25	-	21.8%
CBRE Phase 2	2027	2.75	-	25.7%

1.2.5 Lānaʻi

1.2.5.1 Lānaʻi Firm Generation Portfolio

Shown below in Table C-12. are the various firm thermal generators on Lānaʻi, along with their minimum and maximum capacity, fuel type, and age.

Table C-12. Lānaʻi Minimum and Maximum Capacity, Fuel Type, and Age of Thermal Resources

Unit	Type	Operating Minimum (Net MW)	Normal Top Load (Net MW)	Fuel Type	Age (Years)
LL 1	Peaking	0.5	1.0	ULSD	67
LL 2	Peaking	0.5	1.0	ULSD	67
LL 3	Peaking	0.5	1.0	ULSD	67
LL 4	Peaking	0.5	1.0	ULSD	67
LL 5	Peaking	0.5	1.0	ULSD	67
LL 6	Peaking	0.5	1.0	ULSD	67
LL 7	Baseload	0.3	2.2	ULSD	27
LL 8	Baseload	0.3	2.2	ULSD	27

1.2.5.2 Lānaʻi Variable Renewable, Storage, and Grid Service Resource Portfolio

Shown below in Table C-13 are Lānaʻi's variable renewable, storage, and grid service resources, along with their first year in service, their maximum capacity, and their capacity factor.

Table C-13. Lānaʻi Variable Renewable, Storage, and Grid Service Resources

Unit	Year in Service	Capacity (MW)	Storage Capacity (MWh)	Capacity Factor (%)
CBRE Phase 2	2027	15.8	63.2	25.8%

1.3 Resource Plans

This section provides the resource plans for each island that was analyzed in Section 8 of the Integrated Grid Plan Report. The resource plans include the Status Quo, Base, and Land-Constrained resource plans produced by RESOLVE, and the preferred Base and Land-Constrained resource plans which includes adjustments based on the Resource Adequacy analysis and Transmission and System Security analysis.

1.3.1 Oʻahu

1.3.1.1 Status Quo Resource Plan

Shown below in Table C-14 are the Status Quo resource plan, which assumed the Base forecast, commercial operations of Stage 1, Stage 2, and CBRE Phase 2 Tranche 1 projects; successful renegotiation of existing independent power producers; and continued operation of most existing thermal units. The Status Quo plan excluded CBRE Phase 2 Tranche 2, Stage 3 RFP resources, and future resources selected by RESOLVE.

Table C-14. Oʻahu – Status Quo resource plan.

Oʻahu: Status Quo		
	Planned	**New Additions**
2022		
2023	Installed 3 MW of CBRE Ph 1 PV Installed 12.5 MW West Oahu Installed 39 MW Mililani Solar Installed 36 MW Waiawa Solar Installed 185 MW Kapolei Energy Storage Installed 60 MW Load Build 3 Installed 60 MW Load Reduce 3	
2024	Installed 2 MW of CBRE Ph 1 PV Installed 52 MW Hoohana Solar Installed 7 MW Mountain View Solar Installed 30 MW Waiawa Ph 2 Solar Installed 42 MW Kupono Solar Removed 93.5 MW Waiau 3-4	
2025		
2026	Removed 15 MW Load Build Removed 26 MW Load Reduce	
2027	Installed 75 MW of CBRE Ph 2 RFP PV Installed 30 MW of CBRE Ph 2 Small PV	
2028		
2029		
2030		
2031		
2032		
2033	Removed 60 MW Load Build 3 Removed 60 MW Load Reduce 3	
2034		
2035		
2036		
2037		
2038		
2039		

O'ahu: Status Quo		
2040		
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	
2046		
2047		
2048		
2049		
2050		

1.3.1.2 Base Resource Plan

Shown below in Table C-15 is the Base resource plan produced by RESOLVE.

Table C-15. O'ahu – Base resource plan.

O'ahu: Base		
	Planned	**New Additions**
2022		
2023	Installed 3 MW of CBRE Ph 1 PV Installed 12.5 MW West Oahu Installed 39 MW Mililani Solar Installed 36 MW Waiawa Solar Installed 185 MW Kapolei Energy Storage Installed 60 MW Load Build 3 Installed 60 MW Load Reduce 3	
2024	Installed 2 MW of CBRE Ph 1 PV Installed 52 MW Hoohana Solar Installed 7 MW Mountain View Solar Installed 30 MW Waiawa Ph 2 Solar Installed 42 MW Kupono Solar Removed 93.5 MW Waiau 3-4	
2025	Installed 15 MW Barbers Point Solar	
2026	Removed 15 MW Load Build Removed 26 MW Load Reduce	
2027	Installed 75 MW of CBRE Ph 2 RFP PV Installed 30 MW of CBRE Ph 2 Small PV Installed 450 MW RFP 3 Hybrid Solar Removed 108.1 MW Waiau 5-6	
2028		
2029	Installed 75 MW of CBRE Ph 2 RFP PV Installed 300 MW RFP 3 CT Removed 169.1 MW Waiau 7-8	Installed 82 MW 155 MWh Standalone BESS Installed 82 MW Group 1 Onshore Wind Installed 82 MW Group 3 Onshore Wind
2030		Installed 85 MW 158 MWh Standalone BESS Installed 84 MW 140 MWh Group 1 Hybrid Solar 15% Slope Installed 344 MW 553 MWh Group 1 Hybrid Solar 30% Slope Installed 282 MW 674 MWh Group 2 Hybrid Solar 15% Slope Installed 435 MW 923 MWh Group 3 Hybrid Solar 15% Slope
2031	Removed 30 MW Kahuku Wind	
2032	Removed 1 MW Kapolei Sustainable Energy Park	

O'ahu: Base		
2033	Removed 5 MW Kalaeloa Solar Two Removed 164.9 MW Kahe 1-2 Removed 60 MW Load Build 3 Removed 60 MW Load Reduce 3 Removed 208 MW KPLP Installed 208 MW RFP 3 CC	
2034	Removed 5 MW Kalaeloa Renewable Energy Park	
2035		Installed 76 MWh Group 2 Hybrid Solar 15% Slope BESS Installed 151 MWh Group 3 Hybrid Solar 15% Slope BESS Installed 400 MW New Offshore Wind
2036		
2037	Removed 171.5 MW Kahe 3-4	
2038	Removed 69 MW Kawailoa Wind	
2039	Removed 27.6 MW Waianae Solar	
2040	Removed 24 MW Na Pua Makani Wind	Installed 157 MW 340 MWh Group 2 Hybrid Solar 15% Slope Installed 273 MW 755 MWh Group 2 Hybrid Solar 30% Slope Installed 86 MW 88 MWh Group 3 Hybrid Solar 30% Slope
2041	Removed 109.6 MW Clearway Projects	
2042		
2043		
2044	Removed 20 MW West Loch Solar	
2045	Biodiesel Conversion on all firm units	Installed 20 MW Biomass Installed 45 MWh Group 2 Hybrid Solar 15% Slope BESS Installed 912 MW 1631 MWh Group 2 Hybrid Solar 30% Slope Installed 108 MW 106 MWh Group 3 Hybrid Solar 30% Slope Installed 22 MW Recovered Wind Potential
2046	Removed 269.5 MW Kahe 5-6	
2047		
2048		
2049		
2050		Installed 80 MW Biomass Installed 5 MWh Group 2 Hybrid Solar 15% Slope BESS Installed 50 MW 161 MWh Group 2 Hybrid Solar 30% Slope Installed 449 MW 911 MWh Group 3 Hybrid Solar 30% Slope Installed 101 MW Recovered Wind Potential

1.3.1.3 Base Preferred Resource Plan

Shown below in Table C-16 is the Preferred Base resource plan. This plan incorporates any adjustments based on the Resource Adequacy analysis and Transmission and System Security analysis. Changes made to the RESOLVE resource plan are highlighted in red and green.

Table C-16. O'ahu – Preferred – Base resource plan.

O'ahu: Preferred – Base		
	Planned	**New Additions**
2022		
2023	Installed 3 MW of CBRE Ph 1 PV Installed 12.5 MW West Oahu Installed 39 MW Mililani Solar Installed 36 MW Waiawa Solar Installed 185 MW Kapolei Energy Storage	

O'ahu: Preferred – Base		
	Installed 60 MW Load Build 3 Installed 60 MW Load Reduce 3	
2024	Installed 2 MW of CBRE Ph 1 PV Installed 52 MW Hoohana Solar Installed 7 MW Mountain View Solar Installed 30 MW Waiawa Ph 2 Solar Installed 42 MW Kupono Solar Removed 93.5 MW Waiau 3-4	
2025	~~Installed 15 MW Barbers Point Solar~~	
2026	Removed 15 MW Load Build Removed 26 MW Load Reduce	
2027	Installed 75 MW of CBRE Ph 2 RFP PV Installed 30 MW of CBRE Ph 2 Small PV Installed ~~450~~ 470 MW RFP 3 Hybrid Solar Removed 108.1 MW Waiau 5-6	
2028		
2029	Installed 75 MW of CBRE Ph 2 RFP PV Installed 300 MW RFP 3 CT Removed 169.1 MW Waiau 7-8	Installed 82 MW ~~155~~ 328 MWh Standalone BESS ~~Installed 82 MW Group 1 Onshore Wind~~ ~~Installed 82 MW Group 3 Onshore Wind~~
2030		Installed 85 MW ~~158~~ 340 MWh Standalone BESS Installed 84 MW ~~140~~ 336 MWh Group 1 Hybrid Solar 15% Slope Installed ~~344~~ 276 MW ~~553~~ 1104 MWh Group 1 Hybrid Solar 30% Slope Installed ~~282~~ 272 MW ~~674~~ 1088 MWh Group 2 Hybrid Solar 15% Slope Installed 435 MW ~~923~~ 1740 MWh Group 3 Hybrid Solar 15% Slope
2031	Removed 30 MW Kahuku Wind	
2032	Removed 1 MW Kapolei Sustainable Energy Park	
2033	Removed 5 MW Kalaeloa Solar Two Removed 164.9 MW Kahe 1-2 Removed 60 MW Load Build 3 Removed 60 MW Load Reduce 3 Removed 208 MW KPLP Installed 208 MW RFP 3 CC	
2034	Removed 5 MW Kalaeloa Renewable Energy Park	
2035		~~Installed 76 MWh Group 2 Hybrid Solar 15% Slope BESS~~ ~~Installed 151 MWh Group 3 Hybrid Solar 15% Slope BESS~~ Installed 400 MW New Offshore Wind
2036		
2037	Removed 171.5 MW Kahe 3-4	
2038	Removed 69 MW Kawailoa Wind	
2039	Removed 27.6 MW Waianae Solar	
2040	Removed 24 MW Na Pua Makani Wind	Installed ~~157~~ 167 MW ~~340~~ 668 MWh Group 2 Hybrid Solar 15% Slope Installed ~~273~~ 263 MW ~~755~~ 1052 MWh Group 2 Hybrid Solar 30% Slope Installed 86 MW ~~88~~ 344 MWh Group 3 Hybrid Solar 30% Slope
2041	Removed 109.6 MW Clearway Projects	
2042		
2043		
2044	Removed 20 MW West Loch Solar	

O'ahu: Preferred – Base		
2045	Biodiesel Conversion on all firm units	~~Installed 20 MW Biomass~~ ~~Installed 45 MWh Group 2 Hybrid Solar 15% Slope BESS~~ Installed 912 MW ~~1631~~ 3648 MWh Group 2 Hybrid Solar 30% Slope Installed 108 MW ~~106~~ 432 MWh Group 3 Hybrid Solar 30% Slope Installed 22 MW Recovered Wind Potential
2046	Removed 269.5 MW Kahe 5-6	
2047		
2048		
2049		
2050		~~Installed 80 MW Biomass~~ ~~Installed 5 MWh Group 2 Hybrid Solar 15% Slope BESS~~ Installed 50 MW ~~161~~ 200 MWh Group 2 Hybrid Solar 30% Slope Installed ~~449~~ 311 MW ~~911~~ 1244 MWh Group 3 Hybrid Solar 30% Slope Installed 101 MW Recovered Wind Potential

1.3.1.4 Land-Constrained Resource Plan

Shown below in Table C-17 is the Land-Constrained resource plan produced by RESOLVE.

Table C-17. O'ahu – Land-Constrained resource plan.

O'ahu: Land-Constrained		
	Planned	**New Additions**
2022		
2023	Installed 3 MW of CBRE Ph 1 PV Installed 12.5 MW West Oahu Installed 39 MW Mililani Solar Installed 36 MW Waiawa Solar Installed 185 MW Kapolei Energy Storage Installed 60 MW Load Build 3 Installed 60 MW Load Reduce 3	
2024	Installed 2 MW of CBRE Ph 1 PV Installed 52 MW Hoohana Solar Installed 7 MW Mountain View Solar Installed 30 MW Waiawa Ph 2 Solar Installed 42 MW Kupono Solar Removed 93.5 MW Waiau 3-4	
2025	Installed 15 MW Barbers Point Solar	
2026	Removed 15 MW Load Build Removed 26 MW Load Reduce	
2027	Installed 75 MW of CBRE Ph 2 RFP PV Installed 30 MW of CBRE Ph 2 Small PV Installed 450 MW RFP 3 Hybrid Solar Removed 108.1 MW Waiau 5-6	
2028		
2029	Installed 75 MW of CBRE Ph 2 RFP PV Installed 300 MW RFP 3 CT Removed 169.1 MW Waiau 7-8	Installed 29 MW 55 MWh Standalone BESS
2030		Installed 25 MW 47 MWh Standalone BESS
2031	Removed 30 MW Kahuku Wind	
2032	Removed 1 MW Kapolei Sustainable Energy Park	

O'ahu: Land-Constrained		
2033	Removed 5 MW Kalaeloa Solar Two Removed 164.9 MW Kahe 1-2 Removed 60 MW Load Build 3 Removed 60 MW Load Reduce 3 Removed 208 MW KPLP Installed 208 MW RFP 3 CC	
2034	Removed 5 MW Kalaeloa Renewable Energy Park	
2035		Installed 140 MW 261 MWh Standalone BESS Installed 153 MW LM6000 2x1 CC Installed 30 MW Recovered Wind Potential Installed 400 MW New Offshore Wind
2036		
2037	Removed 171.5 MW Kahe 3-4	
2038	Removed 69 MW Kawailoa Wind	
2039	Removed 27.6 MW Waianae Solar	
2040	Removed 24 MW Na Pua Makani Wind	Installed 12 MW 24 MWh Standalone BESS Installed 39 MW Recovered PV Potential Installed 93 MW Recovered Wind Potential
2041	Removed 109.6 MW Clearway Projects	
2042		
2043		
2044	Removed 20 MW West Loch Solar	
2045	Biodiesel Conversion on all firm units	Installed 182 MW 800 MWh Standalone BESS Installed 1310 MW 2619 MWh Aggregated DER Installed 129 MW Recovered PV Potential
2046	Removed 269.5 MW Kahe 5-6	
2047		
2048		
2049		
2050		Installed 127 MW 920 MWh Standalone BESS Installed 947 MW 1894 MWh Aggregated DER

1.3.1.5 Land-Constrained Preferred Resource Plan

Shown below in Table C-18 is the Preferred Land-Constrained resource plan. This plan incorporates any adjustments based on the Resource Adequacy analysis and Transmission and System Security analysis. Changes made to the RESOLVE resource plan are highlighted in red and green.

Table C-18. O'ahu – Preferred – Land-Constrained resource plan.

O'ahu: Preferred – Land-Constrained		
	Planned	**New Additions**
2022		
2023	Installed 3 MW of CBRE Ph 1 PV Installed 12.5 MW West Oahu Installed 39 MW Mililani Solar Installed 36 MW Waiawa Solar Installed 185 MW Kapolei Energy Storage Installed 60 MW Load Build 3 Installed 60 MW Load Reduce 3	
2024	Installed 2 MW of CBRE Ph 1 PV Installed 52 MW Hoohana Solar Installed 7 MW Mountain View Solar Installed 30 MW Waiawa Ph 2 Solar	

O'ahu: Preferred – Land-Constrained		
	Installed 42 MW Kupono Solar Removed 93.5 MW Waiau 3-4	
2025	~~Installed 15 MW Barbers Point Solar~~	
2026	Removed 15 MW Load Build Removed 26 MW Load Reduce	
2027	Installed 75 MW of CBRE Ph 2 RFP PV Installed 30 MW of CBRE Ph 2 Small PV Installed ~~450~~ 470 MW RFP 3 Hybrid Solar Removed 108.1 MW Waiau 5-6	
2028		
2029	Installed 75 MW of CBRE Ph 2 RFP PV Installed 300 MW RFP 3 CT Removed 169.1 MW Waiau 7-8	Installed 29 MW ~~55~~ 116 MWh Standalone BESS
2030		Installed 25 MW ~~47~~ 100 MWh Standalone BESS
2031	Removed 30 MW Kahuku Wind	
2032	Removed 1 MW Kapolei Sustainable Energy Park	
2033	Removed 5 MW Kalaeloa Solar Two Removed 164.9 MW Kahe 1-2 Removed 60 MW Load Build 3 Removed 60 MW Load Reduce 3 Removed 208 MW KPLP Installed 208 MW RFP 3 CC	
2034	Removed 5 MW Kalaeloa Renewable Energy Park	
2035		Installed 140 MW ~~261~~ 560 MWh Standalone BESS ~~Installed 153 MW LM6000 2x1 CC~~ Installed 30 MW Recovered Wind Potential Installed 400 MW New Offshore Wind
2036		
2037	Removed 171.5 MW Kahe 3-4	
2038	Removed 69 MW Kawailoa Wind	
2039	Removed 27.6 MW Waianae Solar	
2040	Removed 24 MW Na Pua Makani Wind	Installed 12 MW ~~24~~ 48 MWh Standalone BESS Installed 39 MW Recovered PV Potential Installed 93 MW Recovered Wind Potential
2041	Removed 109.6 MW Clearway Projects	
2042		
2043		
2044	Removed 20 MW West Loch Solar	
2045	Biodiesel Conversion on all firm units	Installed 182 MW ~~800~~ 728 MWh Standalone BESS Installed 1310 MW 2619 MWh Aggregated DER Installed 129 MW Recovered PV Potential
2046	Removed 269.5 MW Kahe 5-6	
2047		
2048		
2049		
2050		Installed 127 MW ~~920~~ 508 MWh Standalone BESS Installed 947 MW 1894 MWh Aggregated DER

1.3.2 Hawai‘i Island

1.3.2.1 Status Quo Resource Plan

Shown below in Table C-19 is the Status Quo resource plan, which assumed the Base forecast, commercial operations of Stage 1, Stage 2, and CBRE Phase 2 Tranche 1 projects; successful renegotiation of existing independent power producers; and continued operation of most existing thermal units. The Status Quo plan excluded CBRE Phase 2 Tranche 2, Stage 3 RFP resources, and future resources selected by RESOLVE.

Table C-19. Hawai‘i Island – Status Quo resource plan.

Hawai‘i Island: Status Quo		
Year	**Planned**	**New Additions**
2022		
2023	Installed 0.75 MW CBRE_PV_1 Installed 30 MW 120 MWh PV_Waikoloa_Hybrid_Solar HRD Wind contract renewed Wailuku Hydro contract renewed	
2024	Installed 30 MW 120 MWh PV_Hale_Kuawehi_Hybrid_Solar	
2025	Removed 15.5 MW Puna_Steam	
2026	Removed 3.17 MW Load_Build Removed 4 MW Load_Reduction Waiau capacity increased to 2 MW PGV capacity increased to 46 MW	
2027	Installed 12.5 MW 50 MWh CBRE_PV_Phase_2_T1_RFP_Hybrid_Solar Installed 7.5 MW CBRE_PV_Phase_2_Small Removed 33.8 MW Hill5-6	
2028		
2029		
2030		
2031		
2032		
2033		
2034		
2035		
2036		
2037		
2038		
2039		
2040		
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	
2046		
2047		
2048		
2049		
2050		

1.3.2.2 Base Resource Plan

Shown below in Table C-20 is the Base resource plan produced by RESOLVE.

Table C-20. Hawai'i Island – Base resource plan.

Hawai'i Island: Base		
Year	**Planned**	**New Additions**
2022		
2023	Installed 0.75 MW CBRE_PV_1 Installed 30 MW 120 MWh PV_Waikoloa_Hybrid_Solar HRD Wind contract renewed Wailuku Hydro contract renewed	
2024	Installed 30 MW 120 MWh PV_Hale_Kuawehi_Hybrid_Solar	
2025	Removed 15.5 MW Puna_Steam	
2026	Removed 3.17 MW Load_Build Removed 4 MW Load_Reduction Waiau capacity increased to 2 MW PGV capacity increased to 46 MW	
2027	Installed 12.5 MW 50 MWh CBRE_PV_Phase_2_T1_RFP_Hybrid_Solar Installed 7.5 MW CBRE_PV_Phase_2_Small Removed 33.8 MW Hill5-6	
2028	Removed 7 MW Tawhiri-A_Wind Removed 13.5 MW Tawhiri-B_Wind	
2029	Installed 12.5 MW 50 MWh CBRE_PV_Phase_2_T2_RFP_Hybrid_Solar	Installed 7 MW 12 MWh Standalone BESS Installed 48 MW Wind_New_AggA
2030	Installed 140 MW 560 MWh PV_Stage_3_RFP_Hybrid_Solar	
2031	Removed 57.6 MW HEP Combined Cycle	
2032		
2033		
2034		
2035		Installed 2 MW 5 MWh Standalone BESS Installed 3 MW 3 MWh Hybrid_Solar_AggA
2036		
2037		
2038		
2039		
2040		Installed 1 MW 1 MWh Standalone BESS Installed 20 MW 20 MWh Hybrid_Solar_AggA Installed 1 MW Wind_New_AggA
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	Installed 2 MW 4 MWh Standalone BESS Installed 30 MW Geothermal_New
2046		
2047		
2048		
2049		
2050		Installed 15 MW 15 MWh Hybrid_Solar_AggA Installed 2 MW Wind_New_AggA

1.3.2.3 Base Preferred Resource Plan

Shown below in Table C-21 is the Preferred Base resource plan. These plans incorporate any adjustments based on the Resource Adequacy analysis and Transmission and System Security analysis. Changes made to the RESOLVE resource plan are highlighted in red and green.

Table C-21. Hawai'i Island – Preferred – Base resource plan.

Hawai'i Island: Base		
Year	**Planned**	**New Additions**
2022		
2023	Installed 0.75 MW CBRE_PV_1 Installed 30 MW 120 MWh PV_Waikoloa_Hybrid_Solar HRD Wind contract renewed Wailuku Hydro contract renewed	
2024	Installed 30 MW 120 MWh PV_Hale_Kuawehi_Hybrid_Solar	
2025	Removed 15.5 MW Puna_Steam	
2026	Removed 3.17 MW Load_Build Removed 4 MW Load_Reduction Waiau capacity increased to 2 MW PGV capacity increased to 46 MW	
2027	Installed 12.5 MW 50 MWh CBRE_PV_Phase_2_T1_RFP_Hybrid_Solar Installed 7.5 MW CBRE_PV_Phase_2_Small Removed 33.8 MW Hill5-6	
2028	Removed 7 MW Tawhiri-A_Wind Removed 13.5 MW Tawhiri-B_Wind	
2029	Installed 12.5 MW 50 MWh CBRE_PV_Phase_2_T2_RFP_Hybrid_Solar	Installed 7 MW ~~12~~ 28 MWh Standalone BESS Installed 48 MW Wind_New_AggA
2030	Installed 140 MW 560 MWh PV_Stage_3_RFP_Hybrid_Solar	
2031	Removed 57.6 MW HEP Combined Cycle	
2032		
2033		
2034		
2035		Installed 2 MW ~~5~~ 8 MWh Standalone BESS Installed 3 MW ~~3~~ 12 MWh Hybrid_Solar_AggA
2036		
2037		
2038		
2039		
2040		Installed 1 MW ~~1~~ 4 MWh Standalone BESS Installed 20 MW ~~20~~ 80 MWh Hybrid_Solar_AggA Installed 1 MW Wind_New_AggA
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	Installed 2 MW ~~4~~ 8 MWh Standalone BESS Installed 30 MW Geothermal_New
2046		

Hawai'i Island: Base		
2047		
2048		
2049		
2050		Installed 15 MW ~~15~~ 60 MWh Hybrid_Solar_AggA Installed 2 MW Wind_New_AggA

1.3.3 Maui

1.3.3.1 Status Quo Resource Plan

Shown below in Table C-22 is the Status Quo resource plan, which assumed the Base forecast, commercial operations of Stage 1, Stage 2, and CBRE Phase 2 Tranche 1 projects; successful renegotiation of existing independent power producers; and continued operation of most existing thermal units. The Status Quo plan excluded CBRE Phase 2 Tranche 2, Stage 3 RFP resources, and future resources selected by RESOLVE.

Table C-22. Maui – Status Quo resource plan.

Maui: Status Quo		
Year	**Planned**	**New Additions**
2022		
2023	Installed 6.07 MW FFR Grid Service Installed 7.15 MW Load Reduce Grid Service Installed 1.98 MW Load Build Grid Service Installed 40MW/ 160 MWH Waena BESS	
2024	Installed 60 MW/ 240 MWH Kuihelani Solar + Battery	
2025	Installed 40 MW/ 160MWh Kamaole Solar Installed 15 MW/ 60 MWH Paeahu Solar + Battery Removed 2.42 MW Load Reduce Grid Service Removed 0.1 MW Load Build Grid Service	
2026	Removed 6.07 MW FFR Grid Service Removed 4.73 MW Load Reduce Grid Service Removed 1.88 MW Load Build Grid Service	
2027	Removed 9.47 MW Kahului 1-2 Removed 23 MW Kahului 3-4 Removed 49.36 MW Maalaea 10-13 Installed 12.5 MW CBRE Phase 2 RFP Paired Installed 8.475 MW CBRE Phase 2 Small Projects	
2028		
2029		
2030		
2031		
2032		
2033		
2034		
2035		
2036		
2037		
2038		
2039		
2040		
2041		

Maui: Status Quo		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	
2046		
2047		
2048		
2049		
2050		

1.3.3.2 Base Resource Plan

Shown below in Table C-23 is the Base resource plan produced by RESOLVE.

Table C-23. Maui – Base resource plan.

Maui: Base		
Year	**Planned**	**New Additions**
2022		
2023	Installed 6.07 MW FFR Grid Service Installed 7.15 MW Load Reduce Grid Service Installed 1.98 MW Load Build Grid Service Installed 40MW/ 160 MWH Waena BESS	
2024	Installed 60 MW/ 240 MWH Kuihelani Solar + Battery Installed 20 MW/ 80 MWH Kahana Solar + Battery	
2025	Installed 40 MW/ 160MWh Kamaole Solar Installed 15 MW/ 60 MWH Paeahu Solar + Battery Removed 2.42 MW Load Reduce Grid Service Removed 0.1 MW Load Build Grid Service	
2026	Removed 6.07 MW FFR Grid Service Removed 4.73 MW Load Reduce Grid Service Removed 1.88 MW Load Build Grid Service	
2027	Removed 30 MW Kaheawa Wind Power 1 Removed 9.47 MW Kahului 1-2 Removed 23 MW Kahului 3-4 Removed 49.36 MW Maalaea 10-13 Installed 36 MW ICE S3 RFP Installed 171 MW Hybrid Solar with 764 MWh Battery S3 RFP Installed 12.5 MW CBRE Phase 2 RFP Paired Installed 8.475 MW CBRE Phase 2 Small Projects	
2028		
2029	Installed 12.5 MW CBRE Phase 2 RFP Paired	Installed 5 MW Onshore Wind (AggC)
2030	Removed 33 MW Maalaea 4-9 Removed 7.5 MW Maalaea 1-3	Installed 7.6 MW Onshore Wind (AggC)
2031		
2032		
2033	Removed 21 MW Kaheawa Wind Power 2 Removed 21 MW Auwahi Wind	

Maui: Base		
2034		
2035		Installed 53 MW Onshore Wind (AggC) Installed 37 MW 37 MWh Hybrid Solar(AggC)
2036		
2037		
2038		
2039		
2040	Removed 5.7 MW SMRR PV	Installed 18 MW Onshore Wind (AggC) Installed 43 MW 43 MWh Hybrid Solar(AggC)
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	Installed 15 MW 15 MWh Hybrid Solar(AggB) Installed 66 MW 100 MWh Hybrid Solar(AggC) Installed 41 MW Onshore Wind (AggC)
2046		
2047		
2048		
2049		
2050		Installed 57 MW 134 MWh Hybrid Solar(AggB) Installed 57 MW 72 MWh Hybrid Solar(AggC)

1.3.3.3 Base Preferred Resource Plan

Shown below in Table C-24 is the Preferred Base resource plan. These plans incorporate any adjustments based on the Resource Adequacy analysis and Transmission and System Security analysis. Changes made to the RESOLVE resource plan are highlighted in red and green.

Table C-24. Maui – Preferred – Base resource plan.

Maui: Base		
Year	**Planned**	**New Additions**
2022		
2023	Installed 6.07 MW FFR Grid Service Installed 7.15 MW Load Reduce Grid Service Installed 1.98 MW Load Build Grid Service Installed 40MW/ 160 MWH Waena BESS	
2024	Installed 60 MW/ 240 MWH Kuihelani Solar + Battery ~~Installed 20 MW/ 80 MWH Kahana Solar + Battery~~	
2025	Installed 40 MW/ 160MWh Kamaole Solar Installed 15 MW/ 60 MWH Paeahu Solar + Battery Removed 2.42 MW Load Reduce Grid Service Removed 0.1 MW Load Build Grid Service	
2026	Removed 6.07 MW FFR Grid Service Removed 4.73 MW Load Reduce Grid Service Removed 1.88 MW Load Build Grid Service	

Maui: Base		
2027	Removed 30 MW Kaheawa Wind Power 1 Removed 9.47 MW Kahului 1-2 Removed 23 MW Kahului 3-4 Removed 49.36 MW Maalaea 10-13 Installed ~~36~~ 16.28 MW ICE S3 RFP Installed ~~171~~191 MW Hybrid Solar with 764 MWh Battery S3 RFP Installed 12.5 MW CBRE Phase 2 RFP Paired Installed 8.475 MW CBRE Phase 2 Small Projects	
2028		
2029	Installed 12.5 MW CBRE Phase 2 RFP Paired	Installed 5 MW Onshore Wind (AggC)
2030	Removed 33 MW Maalaea 4-9 Removed 7.5 MW Maalaea 1-3	Installed 7.6 MW Onshore Wind (AggC)
2031		
2032		
2033	Removed 21 MW Kaheawa Wind Power 2 Removed 21 MW Auwahi Wind	
2034		
2035		Installed 53 MW Onshore Wind (AggC) Installed 37 MW ~~37~~ 148 MWh Hybrid Solar(AggC)
2036		
2037		
2038		
2039		
2040	Removed 5.7 MW SMRR PV	Installed 18 MW Onshore Wind (AggC) Installed 43 MW ~~43~~ 172 MWh Hybrid Solar(AggC)
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	Installed ~~15~~ 8 MW ~~15~~ 32 MWh Hybrid Solar(AggB) Installed 66 MW ~~100~~ 264 MWh Hybrid Solar(AggC) Installed 41 MW Onshore Wind (AggC)
2046		
2047		
2048		
2049		
2050		Installed 57 MW ~~134~~ 228 MWh Hybrid Solar(AggB) Installed 57 MW ~~72~~ 228 MWh Hybrid Solar(AggC)

1.3.4 Molokaʻi

1.3.4.1 Status Quo Resource Plan

Shown below in Table C-25 is the Status Quo resource plan, which assumed the Base forecast, commercial operations of Stage 1, Stage 2, and CBRE Phase 2 Tranche 1 projects; successful renegotiation of existing independent power producers; and continued operation of most existing thermal units. The Status Quo plan excluded CBRE Phase 2 Tranche 2, Stage 3 RFP resources, and future resources selected by RESOLVE.

Table C-25. Molokaʻi – Status Quo resource plan.

Molokaʻi: Status Quo		
	Planned	**New Additions**
2022		
2023	Install 0.25 MW Standalone PV (CBRE Phase 1)	
2024		
2025		
2026		
2027	Install 2.75 MW 11 MWh Hybrid Solar Storage Install 2.75 MW Hybrid Solar (CBRE Phase 2)	
2028		
2029		
2030		
2031		
2032		
2033		
2034		
2035		
2036		
2037		
2038		
2039		
2040		
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	
2046		
2047		
2048		
2049		
2050		

1.3.4.2 Base Resource Plan

Shown below in Table C-26 is the Base resource plan produced by RESOLVE.

Table C-26. Molokaʻi – Base resource plan.

Molokaʻi: Base		
	Planned	**New Additions**
2022		
2023	Install 0.25 MW Standalone PV (CBRE Phase 1)	
2024		
2025		
2026		
2027	Install 2.75 MW 11 MWh Hybrid Solar Storage Install 2.75 MW Hybrid Solar(CBRE Phase 2)	
2028		
2029		Installed 0.4 MW 0.7 MWh Standalone BESS Installed 3 MW 3 MWh Hybrid Solar
2030		Installed 0.1 MW 0.3 MWh Standalone BESS Installed 8.5 MW 29.7 MWh Hybrid Solar
2031		
2032		
2033		
2034		
2035		Installed 0.1 MW 0.1 MWh Standalone BESS Installed 2.3 MW 1.9 MWh Hybrid Solar
2036		
2037		
2038		
2039		
2040		Installed 0 MW 0.1 MWh Standalone BESS Installed 1.1 MW 2.8 MWh Hybrid Solar
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	Installed 0.1 MW 0.2 MWh Standalone BESS Installed 2.6 MW 6.9 MWh Hybrid Solar
2046		
2047		
2048		
2049		
2050		Installed 0 MW 0.1 MWh Standalone BESS Installed 1.2 MW 2.9 MWh Hybrid Solar

1.3.4.3 Base Preferred Resource Plan

Shown below in Table C-27 is the Preferred Base resource plan. The original plan produced by RESOLVE was modified to match market conditions in which most batteries had a minimum duration of 4 hours. The MWh only additions of standalone battery in 2040 and 2050 were removed since more MWH's were added when the batteries were modified to four hour duration. Changes made to the RESOLVE resource plan are highlighted in red and green.

Table C-27. Molokaʻi – Preferred – Base resource plan.

Molokaʻi: Base		
	Planned	**New Additions**
2022		
2023	Install 0.25 MW Standalone PV (CBRE Phase 1)	
2024		
2025		
2026		
2027	Install 2.75 MW 11 MWh Hybrid Solar Storage Install 2.75 MW Hybrid Solar (CBRE Phase 2)	
2028		
2029		Installed 0.4 MW ~~0.7~~ 1.6 MWh Standalone BESS Installed 3 MW ~~3~~ 12 MWh Hybrid Solar
2030		Installed 0.1 MW ~~0.3~~ 0.4 MWh Standalone BESS Installed 8.5 MW ~~29.7~~ 34 MWh Hybrid Solar
2031		
2032		
2033		
2034		
2035		Installed 0.1 MW ~~0.1~~ 0.4 MWh Standalone BESS Installed 2.3 MW ~~1.9~~ 9.2 MWh Hybrid Solar
2036		
2037		
2038		
2039		
2040		~~Installed 0 MW 0.1 MWh Standalone BESS~~ Installed 1.1 MW ~~2.8~~ 4.4 MWh Hybrid Solar
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	Installed 0.1 MW ~~0.2~~ 0.4 MWh Standalone BESS Installed 2.6 MW ~~6.9~~ 10.4 MWh Hybrid Solar
2046		
2047		
2048		
2049		
2050		~~Installed 0 MW 0.1 MWh Standalone BESS~~ Installed 1.2 MW ~~2.9~~ 4.8 MWh Hybrid Solar

1.3.5 Lānaʻi

1.3.5.1 Status Quo Resource Plan

Shown below in Table C-28 is the Status Quo resource plan, which assumed the Base forecast, commercial operations of Stage 1, Stage 2, and CBRE Phase 2 Tranche 1 projects; successful renegotiation of existing independent power producers; and continued operation of most existing thermal units. The Status Quo plan excluded CBRE Phase 2 Tranche 2, Stage 3 RFP resources, and future resources selected by RESOLVE.

Table C-28. Lānaʻi – Status Quo resource plan.

Lānaʻi: Status Quo		
Year	**Planned**	**New Additions**
2022		
2023		
2024		
2025		
2026		
2027	Install 15.8 MW 63.2 MWh Hybrid Solar Storage Install 15.8 MW 63.2 MWh Hybrid Solar (CBRE RFP)	
2028		
2029		
2030		
2031		
2032		
2033		
2034		
2035		
2036		
2037		
2038		
2039		
2040		
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	
2046		
2047		
2048		
2049		
2050		

1.3.5.2 Base Resource Plan

Shown below in Table C-29 is the Base resource plan produced by RESOLVE.

Table C-29. Lānaʻi – Preferred – Base resource plan.

Lānaʻi: Base		
Year	**Planned**	**New Additions**
2022		
2023		
2024		
2025		
2026		
2027	Install 15.8 MW 63.2 MWh Hybrid Solar Storage Install 15.8 MW 63.2 MWh Hybrid Solar (CBRE RFP)	
2028		
2029		Installed 0.6 MW 1.1 MWh Standalone BESS Installed 0.3 MW 0.3 MWh Hybrid Solar
2030		Installed 4.9 MW 4.9 MWh Hybrid Solar
2031		
2032		
2033		
2034		
2035		Installed 0.3 MW 0.3 MWh Hybrid Solar
2036		
2037		
2038		
2039		
2040		Installed 1 MW 1 MWh Hybrid Solar
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	Installed 0.2 MW 0.3 MWh Standalone BESS Installed 1.5 MW 1.5 MWh Hybrid Solar
2046		
2047		
2048		
2049		
2050		Installed 0.1 MW 0.1 MWh Standalone BESS Installed 0.9 MW 0.9 MWh Hybrid Solar

1.3.5.3 Base Preferred Resource Plan

Shown below in Table C-30 is the Preferred Base resource plan. The original plan produced by RESOLVE was modified to match market conditions in which batteries had a minimum duration of 4 hours. Changes made to the RESOLVE resource plan are highlighted in red and green.

Table C-30. Lānaʻi – Preferred – Base resource plan.

Lānaʻi: Base		
Year	**Planned**	**New Additions**
2022		
2023		
2024		
2025		
2026		
2027	Install 15.8 MW 63.2 MWh Hybrid Solar Storage Install 15.8 MW 63.2 MWh Hybrid Solar (CBRE RFP)	
2028		
2029		Installed 0.6 MW ~~1.1~~ 2.4 MWh Standalone BESS Installed 0.3 MW ~~0.3~~ 1.2 MWh Hybrid Solar
2030		Installed 4.9 MW ~~4.9~~ 19.6 MWh Hybrid Solar
2031		
2032		
2033		
2034		
2035		Installed 0.3 MW ~~0.3~~ 1.2 MWh Hybrid Solar
2036		
2037		
2038		
2039		
2040		Installed 1 MW ~~1~~ 4 MWh Hybrid Solar
2041		
2042		
2043		
2044		
2045	Biodiesel Conversion on all firm units	Installed 0.2 MW ~~0.3~~ 0.8 MWh Standalone BESS Installed 1.5 MW ~~1.5~~ 6 MWh Hybrid Solar
2046		
2047		
2048		
2049		
2050		Installed 0.1 MW ~~0.1~~ 0.4 MWh Standalone BESS Installed 0.9 MW ~~0.9~~ 3.6 MWh Hybrid Solar

1.4 Resource Adequacy

This section provides additional details to the resource adeqaucy analysis provided in Section 8 and Section 12 of the Integrated Grid Plan Report. We provide the relationship between the 2030 LOLE and firm capacity or hybrid solar capacity for each island under the base forecast. This section also provides the relationship between the 2035 LOLE and firm capacity or hybrid solar capacity for each island under the high load forecast. For forecasts where additional firm capacity is needed to achieve the reliability target, resources are presented in terms of the amount of firm capacity added to the system. For forecasts where existing firm capacity is sufficient to meet the reliability target, resources are presented in terms of the cumulative firm capacity in the system.

1.4.1 O‘ahu

1.4.1.1 2030 Outlook

Variable Resource Curve Fit

Shown below in Figure C-1 is the relationship between the LOLE in 2030 and the amount of future hybrid solar capacity that is added after Stage 3.

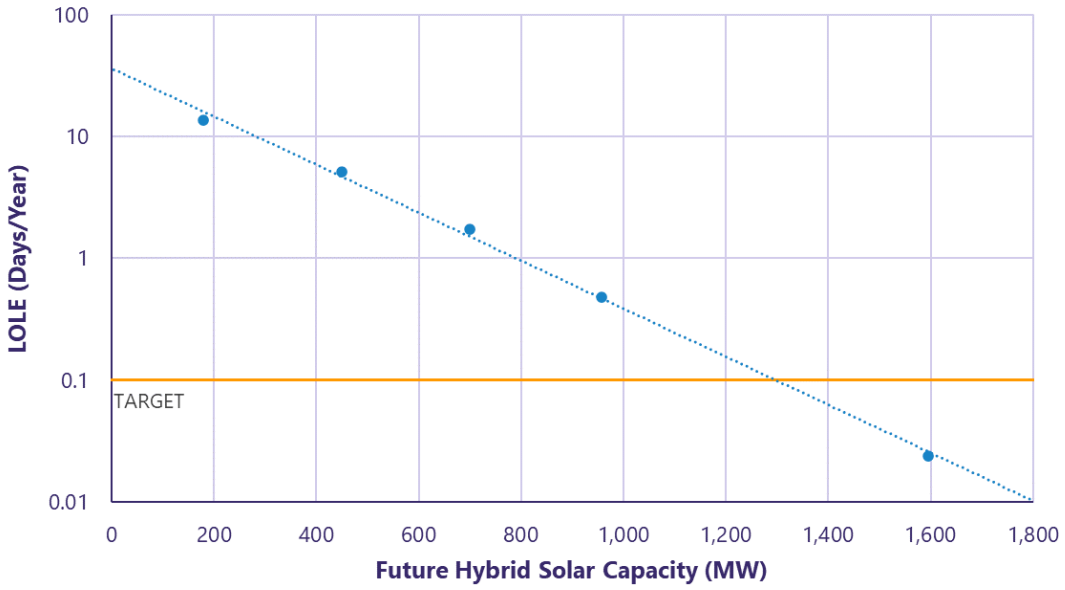

Figure C-1. O‘ahu – Loss of Load vs Future Hybrid Solar Capacity. Base Load, 2030.

Firm Resource Curve Fit

Shown below in Figure C-2 is the relationship between the LOLE in 2030 and the amount of future firm capacity that is added after Stage 3.

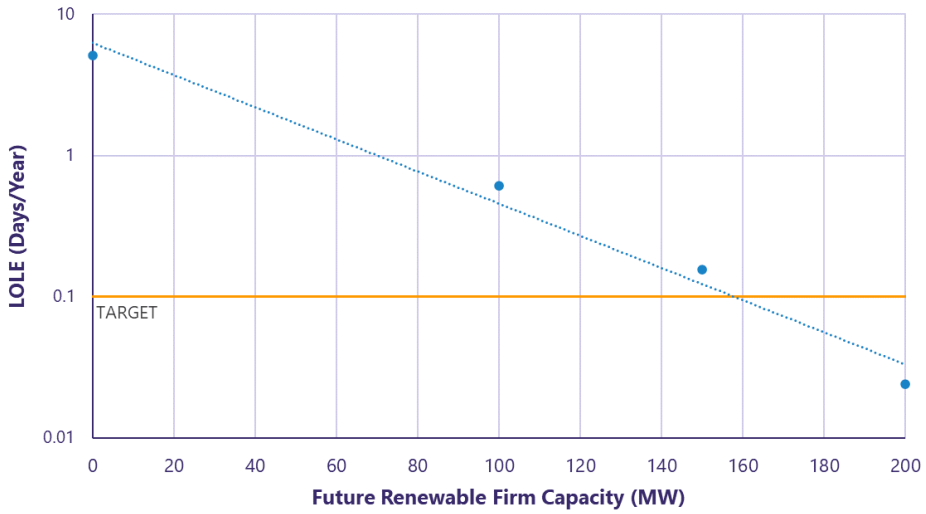

Figure C-2. O'ahu – Loss of Load vs Future Renewable Firm Capacity. Base Load, 2030.

1.4.1.2 2035 Outlook

Variable Resource Curve Fit

Shown below in Figure C-3 is the relationship between the LOLE in 2035 and the amount of future hybrid solar capacity that is added after Stage 3, assuming the high-load forecast.

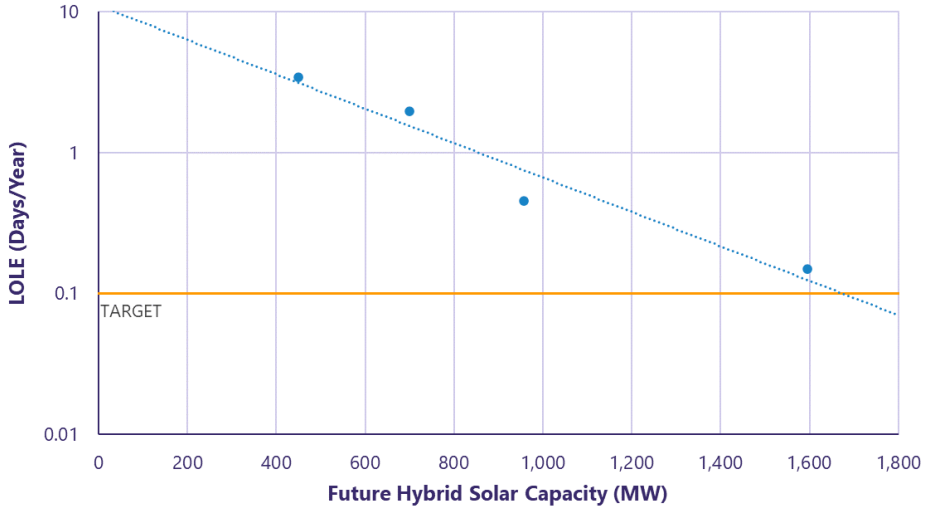

Figure C-3. O'ahu – Loss of Load vs Future Hybrid Solar Capacity. High Load, 2035.

Firm Resource Curve Fit

Shown below in Figure C-4 is the relationship between the LOLE in 2035 and the amount of future firm capacity that is added after Stage 3, assuming the high-load forecast.

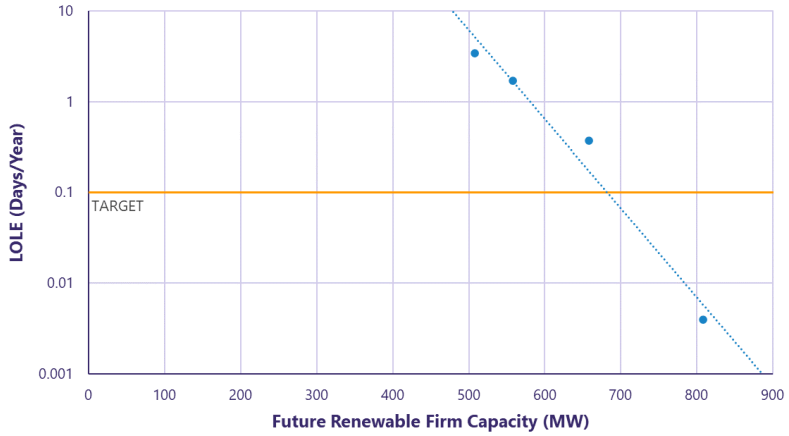

Figure C-4. Oʻahu – Loss of Load vs Future Renewable Firm Capacity. High Load, 2035.

1.4.2 Hawaiʻi Island

1.4.2.1 2030 Outlook

Variable Resource Curve Fit

Shown below in Figure C-5 is the relationship between the LOLE in 2030 and the amount of future hybrid solar capacity that is added in Stage 3.

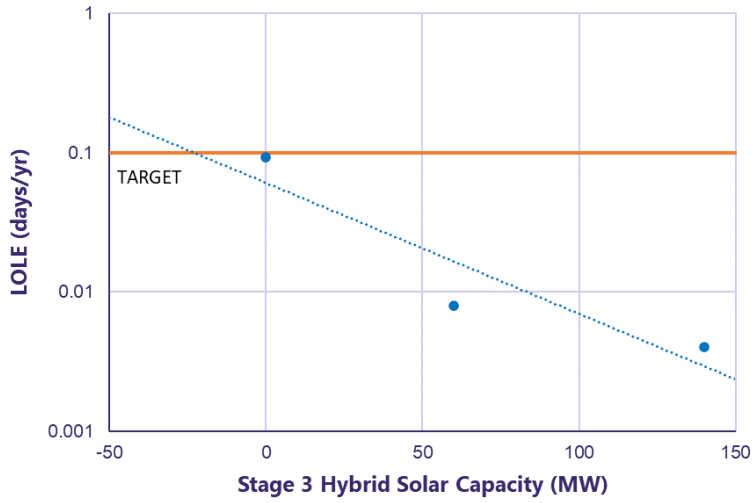

Figure C-5. Hawaiʻi Island – Loss of Load vs Stage 3 Hybrid Solar Capacity. Base Load, 2030.

Firm Resource Curve Fit

Shown below in Figure C-6 is the relationship between the LOLE in 2030 and the amount of firm capacity remaining on the system after Stage 3.

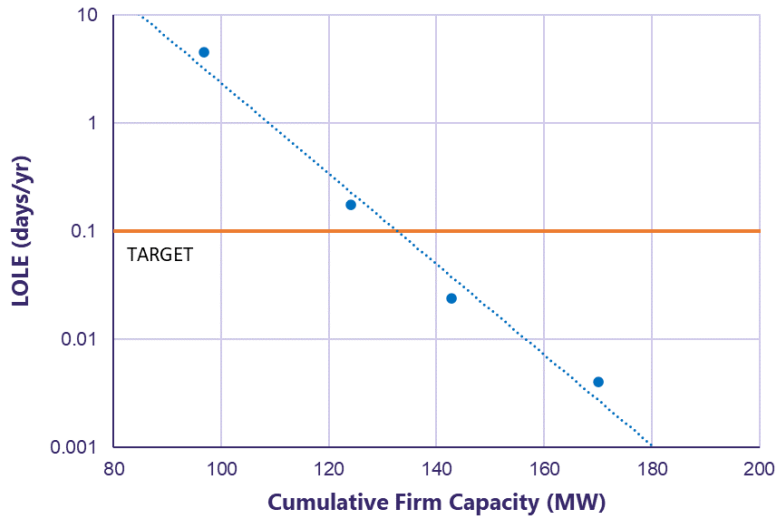

Figure C-6. Hawai'i Island – Loss of Load vs Cumulative Firm Capacity. Base Load, 2030.

1.4.2.2 2035 Outlook

Variable Resource Curve Fit

Shown below in Figure C-7 is the relationship between the LOLE in 2035 and the amount of future hybrid solar capacity that is added after Stage 3, assuming the high-load forecast.

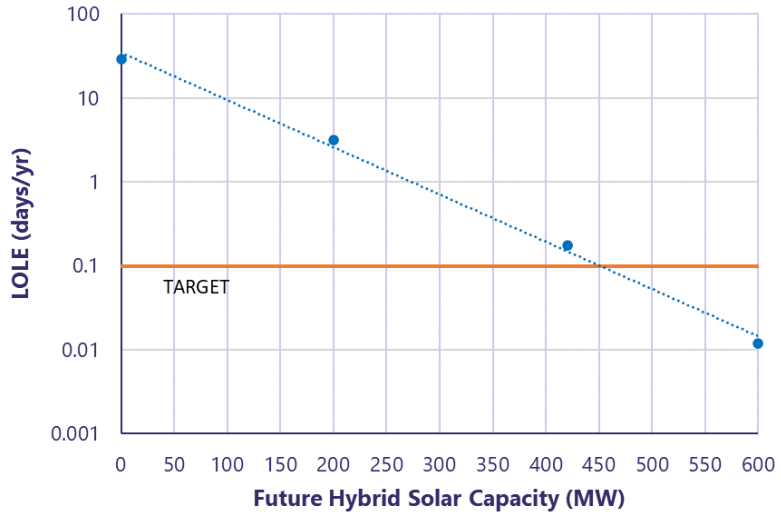

Figure C-7. Hawai'i Island – Loss of Load vs Future Hybrid Solar Capacity. High Load, 2035.

Firm Resource Curve Fit

Shown below in Figure C-8 is the relationship between the LOLE in 2035 and the amount of future firm capacity that is added after Stage 3, assuming the high-load forecast.

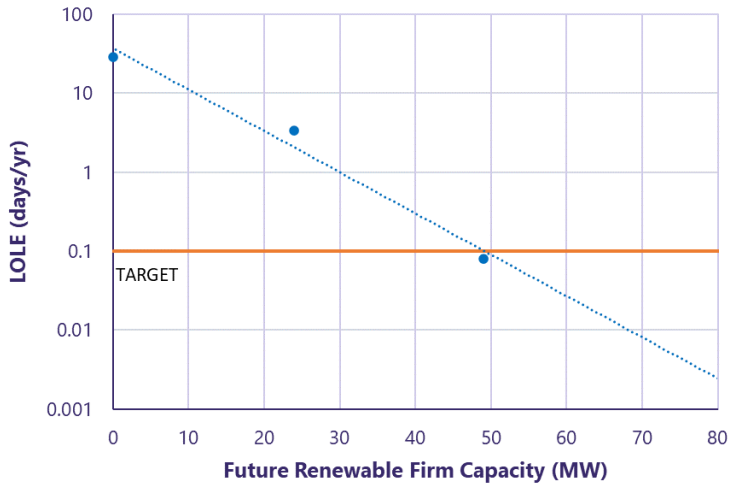

Figure C-8. Hawai'i Island – Loss of Load vs Future Renewable Firm Capacity. High Load, 2035.

1.4.3 Maui

1.4.3.1 2030 Outlook

Variable Resource Curve Fit

Shown below in Figure C-9 is the relationship between the LOLE in 2030 and the amount of future hybrid solar capacity that is added in Stage 3.

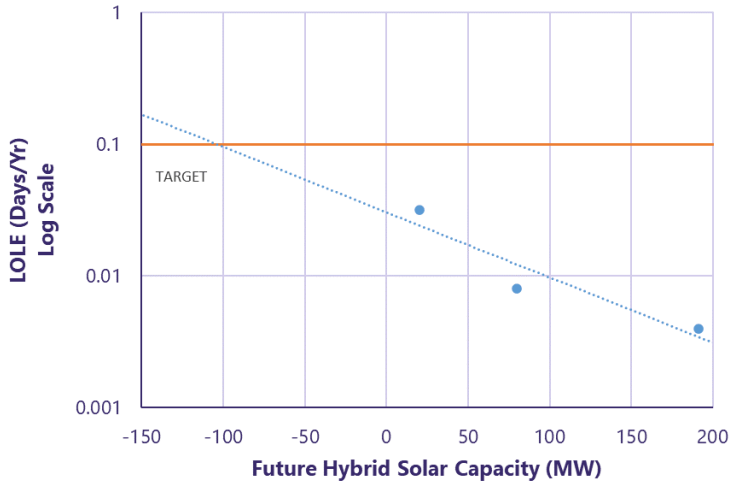

Figure C-9. Maui – Loss of Load vs Future Hybrid Solar Solar Capacity. Base Load, 2030.

Firm Resource Curve Fit

Shown below in Figure C-10 is the relationship between the LOLE in 2030 and the amount of future firm capacity that is added in Stage 3.

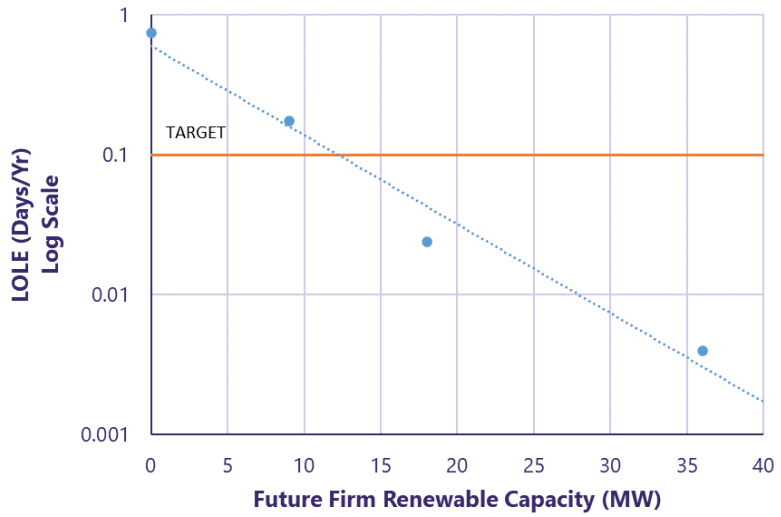

Figure C-10. Maui – Loss of Load vs Future Renewable Firm Capacity. Base Load, 2030.

1.4.3.2 2035 Outlook

Variable Resource Curve Fit

Shown below in Figure C-11 is the relationship between the LOLE in 2035 and the amount of future hybrid solar capacity that is added in Stage 3, assuming the high-load forecast.

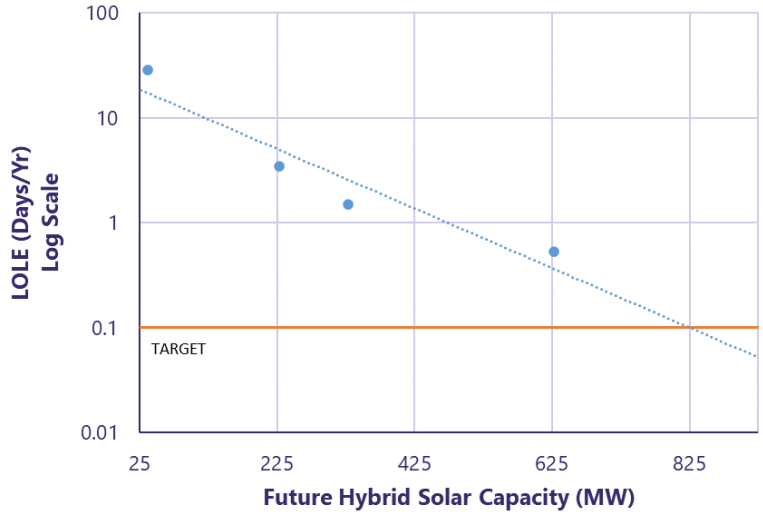

Figure C-11. Maui – Loss of Load vs Future Hybrid Solar Capacity. High Load, 2035.

Firm Resource Curve Fit

Shown below in Figure C-12 is the relationship between the LOLE in 2035 and the amount of future firm capacity that is added after Stage 3, assuming the high-load forecast.

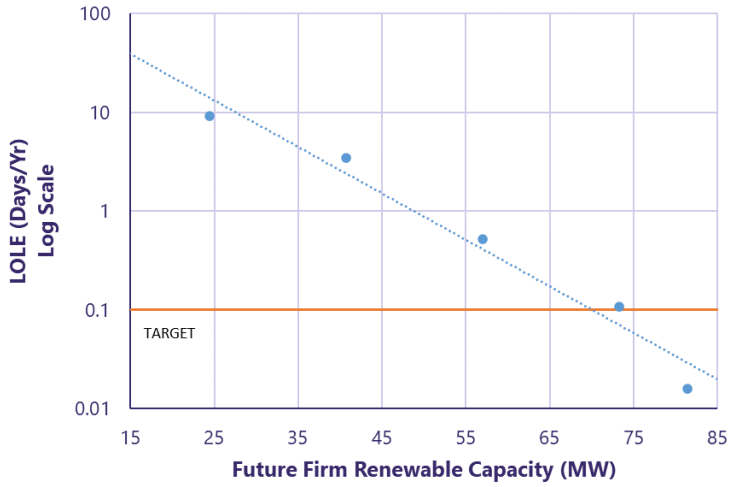

Figure C-12. Maui – Loss of Load vs Future Renewable Firm Capacity. High Load, 2035.

1.4.4 Moloka'i

1.4.4.1 2030 Outlook

Variable Resource Curve Fit

Shown below in Figure C-13 is the relationship between the LOLE in 2030 and the amount of future hybrid solar capacity.

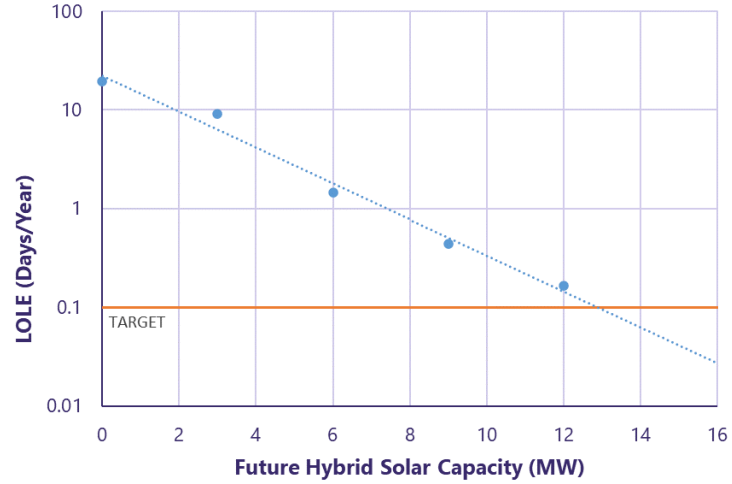

Figure C-13. Moloka'i – Loss of Load vs New Hybrid Solar Capacity. Base Load, 2030.

Firm Resource Curve Fit

Shown below in Figure C-14 is the relationship between the LOLE in 2030 and the amount of firm capacity remaining on the system.

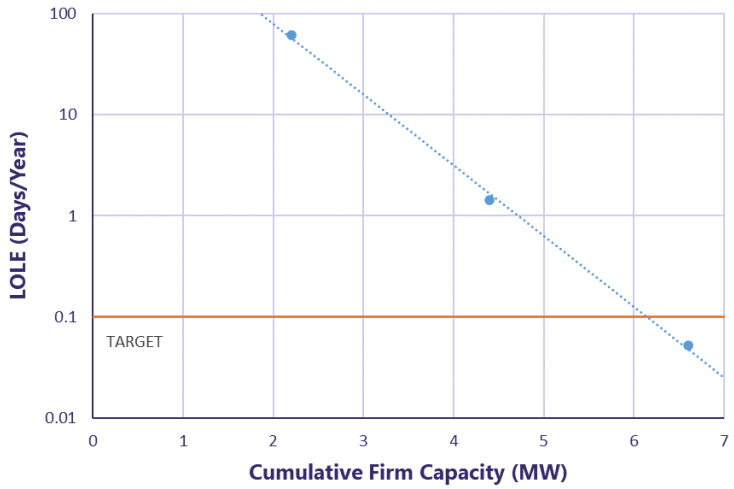

Figure C-14. Moloka'i – Loss of Load vs Cumulative Firm Capacity. Base Load, 2030.

1.4.4.2 2035 Outlook

Variable Resource Curve Fit

Shown below in Figure C-15 is the relationship between the LOLE in 2035 and the amount of future hybrid solar capacity that is added, assuming the high-load forecast.

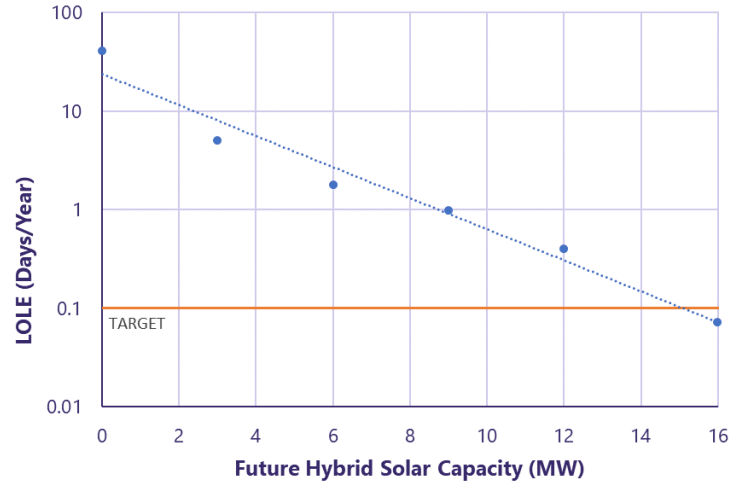

Figure C-15. Moloka'i – Loss of Load vs Future Hybrid Solar Capacity. High Load, 2035.

Firm Resource Curve Fit

Shown below in Figure C-16 is the relationship between the LOLE in 2035 and the amount of firm capacity remaining on the system, assuming the high-load forecast.

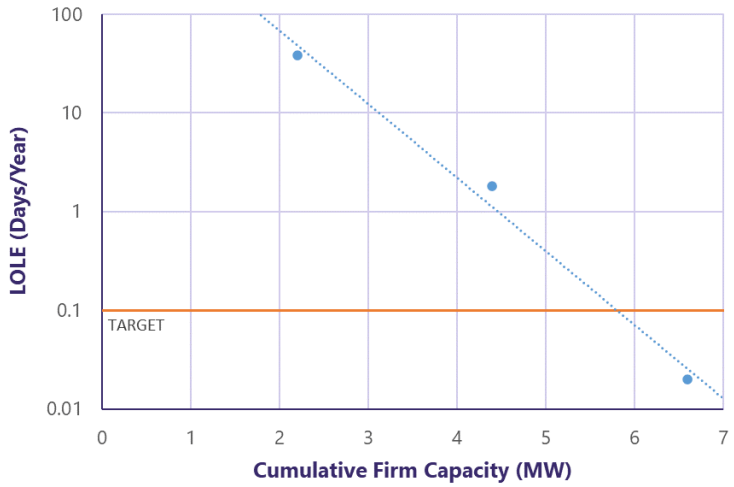

Figure C-16. Moloka'i – Loss of Load vs Cumulative Firm Capacity. High Load, 2035.

1.4.5 Lāna'i

1.4.5.1 2030 Outlook

Variable Resource Curve Fit

Shown below in Figure C-17 is the relationship between the LOLE in 2030 and the amount of future hybrid solar capacity that is added.

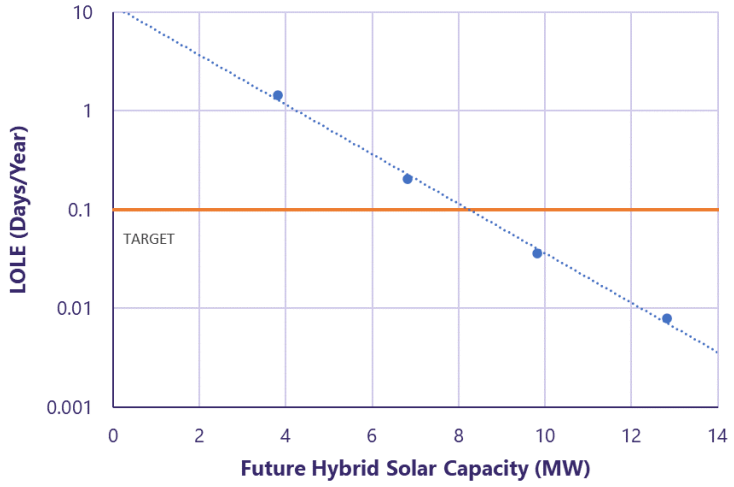

Figure C-17. Lāna'i – Loss of Load vs New Hybrid Solar Capacity. Base Load, 2030.

Firm Resource Curve Fit

Shown below in Figure C-18 is the relationship between the LOLE in 2030 and the amount of firm capacity remaining on the system.

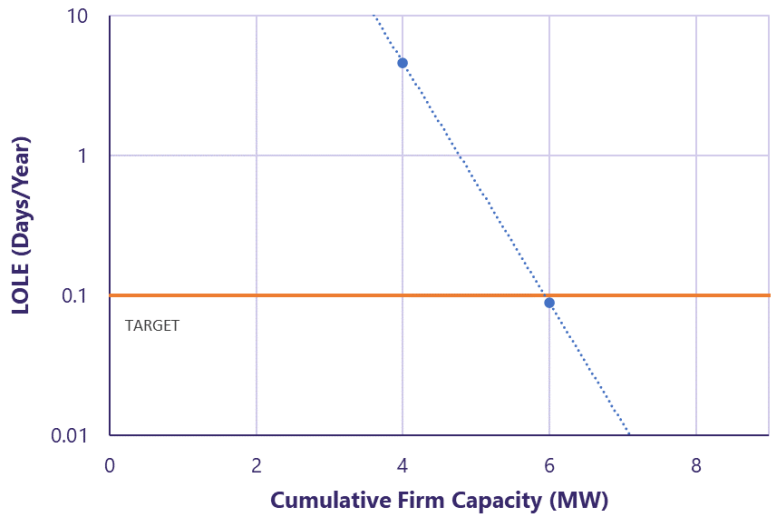

Figure C-18. Lāna'i – Loss of Load vs Cumulative Firm Capacity. Base Load, 2030.

1.4.5.2 2035 Outlook

Variable Resource Curve Fit

Shown below in Figure C-19 is the relationship between the LOLE in 2035 and the amount of future hybrid solar capacity that is added, assuming the high-load forecast.

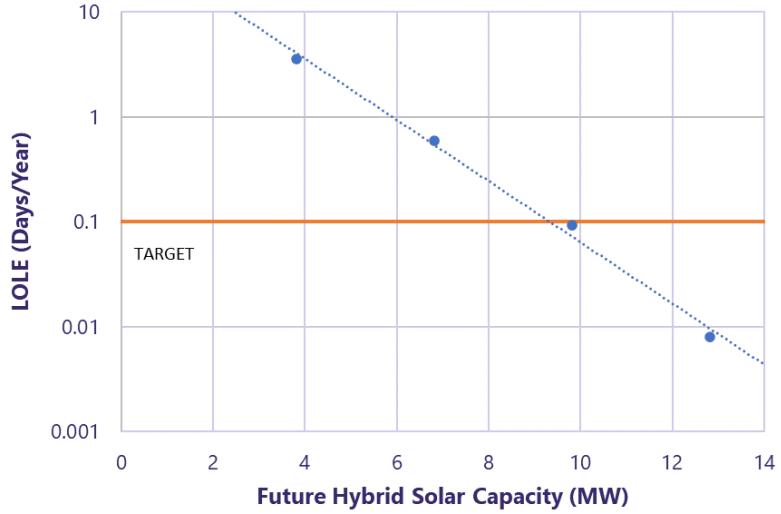

Figure C-19. Lāna'i – Loss of Load vs Future Hybrid Solar Capacity. High Load, 2035.

Firm Resource Curve Fit

Shown below in Figure C-20 is the relationship between the LOLE in 2035 and the amount of firm capacity remaining on the system, assuming the high-load forecast.

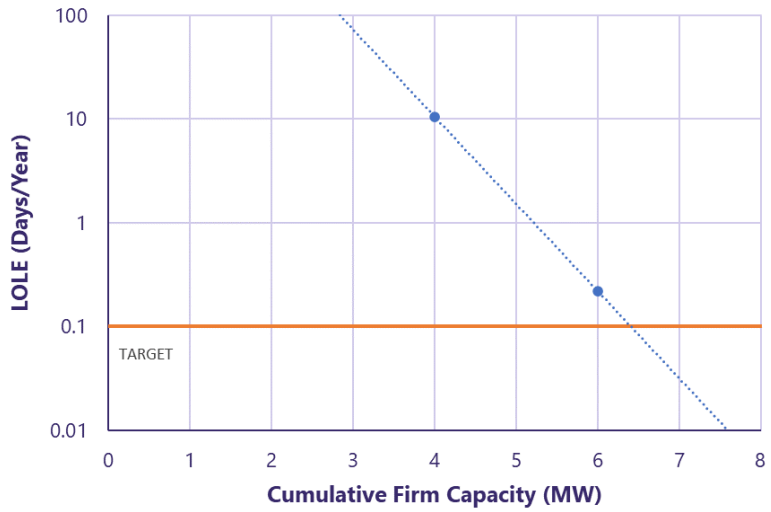

Figure C-20. Lānaʻi – Loss of Load vs Cumulative Firm Capacity. High Load, 2035.

1.5 Operational Statistics

The transition to 100% renewables will necessitate a change in how the thermal generators on our system operate. Scenarios with more renewable resources will use thermal generators less often. This is shown in the operational statistics provided in this section. The grid operations statistics shown in this section use the resource plans that were modeled before including the transmission constraints identified in the transmission needs analysis.

1.5.1 Oʻahu

1.5.1.1 Grid Operations – Status Quo

Shown below in Table C-31 and Table C-32 are the estimated number of starts and capacity factor, respectively, for thermal generators in 2030 and 2035 with the Status Quo resource plan.

Table C-31. Oʻahu – Number of Starts for existing utility-owned thermal generators under the Status Quo resource plan.

Number of Starts	2030	2035
Kahe 1	42	35
Kahe 2	28	41
Kahe 3	38	29
Kahe 4	25	26
Kahe 5	3	4
Kahe 6	3	3
Waiau 3	Deactivated	Deactivated
Waiau 4	Deactivated	Deactivated
Waiau 5	65	71
Waiau 6	74	68
Waiau 7	29	31
Waiau 8	29	28
Waiau 9	218	223
Waiau 10	191	201
CIP CT	224	298
Airport DSG	68	112
Schofield (6 units)	1693	1810

Table C-32. Oʻahu – Capacity Factor for existing utility-owned thermal generators under the Status Quo resource plan.

Capacity Factor (%)	2030	2035
Kahe 1	62	62
Kahe 2	61	47
Kahe 3	38	57
Kahe 4	66	66
Kahe 5	7	14
Kahe 6	7	10
Waiau 3	Deactivated	Deactivated
Waiau 4	Deactivated	Deactivated
Waiau 5	42	43
Waiau 6	35	35
Waiau 7	66	65
Waiau 8	65	66
Waiau 9	24	25
Waiau 10	15	19
CIP CT	6	11
Airport DSG	7	10
Schofield (6 units)	15	21

1.5.1.2 Grid Operations – Base

Shown below in Table C-33 and Table C-34 are the estimated number of starts and capacity factor, respectively, for thermal generators in 2030 and 2035 with the Base resource plan.

Table C-33. Oʻahu – Number of Starts for existing utility-owned thermal generators and future thermal generators under the Base resource plan.

Number of Starts	2030	2035
Kahe 1	72	Deactivated
Kahe 2	73	Deactivated
Kahe 3	49	59
Kahe 4	73	57
Kahe 5	2	3
Kahe 6	2	3
Waiau 3	Deactivated	Deactivated
Waiau 4	Deactivated	Deactivated
Waiau 5	Deactivated	Deactivated
Waiau 6	Deactivated	Deactivated
Waiau 7	Deactivated	Deactivated
Waiau 8	Deactivated	Deactivated
Waiau 9	25	52
Waiau 10	12	38
CIP CT	23	21
Airport DSG	4	2
Schofield (6 units)	220	412
300MW CT – RFP3 Firm (6 units)	9	13
208MW CC – RFP3 Firm	N/A	26

Table C-34. Oʻahu – Capacity Factor for existing utility-owned thermal generators and future thermal generators under the Base resource plan.

Capacity Factor (%)	2030	2035
Kahe 1	13	Deactivated
Kahe 2	14	Deactivated
Kahe 3	7	17
Kahe 4	19	21
Kahe 5	0	1
Kahe 6	1	2
Waiau 3	Deactivated	Deactivated
Waiau 4	Deactivated	Deactivated
Waiau 5	Deactivated	Deactivated
Waiau 6	Deactivated	Deactivated
Waiau 7	Deactivated	Deactivated
Waiau 8	Deactivated	Deactivated
Waiau 9	2	5
Waiau 10	1	3
CIP CT	0	0
Airport DSG	0	0
Schofield (6 units)	3	7
300MW CT – RFP3 Firm (6 units)	0	0
208MW CC – RFP3 Firm	N/A	2

1.5.1.3 Grid Operations – Land-Constrained

Shown below in Table C-35 and Table C-36 are the estimated number of starts and capacity factor, respectively, for thermal generators in 2030 and 2035 with the Land-Constrained resource plan.

Table C-35. Oʻahu – Number of Starts for existing utility-owned thermal generators and future thermal generators under the Land-Constrained resource plan.

Number of Starts	2030	2035
Kahe 1	57	Deactivated
Kahe 2	33	Deactivated
Kahe 3	51	57
Kahe 4	42	66
Kahe 5	4	4
Kahe 6	4	4
Waiau 3	Deactivated	Deactivated
Waiau 4	Deactivated	Deactivated
Waiau 5	Deactivated	Deactivated
Waiau 6	Deactivated	Deactivated
Waiau 7	Deactivated	Deactivated
Waiau 8	Deactivated	Deactivated
Waiau 9	167	101
Waiau 10	168	87
Schofield (6 units)	1,274	586
CIP CT	180	85
Airport DSG	29	21
300MW CT – RFP3 Firm (6 units)	471	34
208MW CC – RFP3 Firm	N/A	89
151MW CC	N/A	161

Table C-36. Oʻahu – Capacity Factor for existing utility-owned thermal generators and future thermal generators under the Land-Constrained resource plan.

Capacity Factor	2030	2035
Kahe 1	62	Deactivated
Kahe 2	63	Deactivated
Kahe 3	38	31
Kahe 4	68	43
Kahe 5	12	7
Kahe 6	12	4
Waiau 3	Deactivated	Deactivated
Waiau 4	Deactivated	Deactivated
Waiau 5	Deactivated	Deactivated
Waiau 6	Deactivated	Deactivated
Waiau 7	Deactivated	Deactivated
Waiau 8	Deactivated	Deactivated
Waiau 9	25	12
Waiau 10	18	9
Schofield (6 units)	28	16
CIP CT	4	1
Airport DSG	0	0
300MW CT – RFP3 Firm (6 units)	4	0
208MW CC – RFP3 Firm	N/A	4
151MW CC	N/A	77

1.5.2 Hawai'i Island

1.5.2.1 Grid Operations – Status Quo

Shown below in Table C-37 and Table C-38 are the estimated number of starts and capacity factor, respectively, for thermal generators in 2030 and 2035 with the Status Quo resource plan.

Table C-37. Hawai'i Island – Number of Starts for existing utility-owned thermal generators under the Status Quo resource plan.

Number of Starts	2030	2035
Hill5	Deactivated	Deactivated
Hill6	Deactivated	Deactivated
Kanoelehua CT1	6	5
Kanoelehua D11	11	4
Kanoelehua D15	11	7
Kanoelehua D16	4	3
Kanoelehua D17	1	3
Kapua D27	184	157
Keahole CT2	26	27
Keahole D21	2	3
Keahole D22	0	4
Keahole D23	4	4
Ouli D25	120	124
Panaewa D24	306	272
Puna CT3	168	157
Puna Steam	Deactivated	Deactivated
Punaluu D26	213	199
Waimea D12	31	18
Waimea D13	14	10
Waimea D14	50	43
Keahole CT4	346	376
Keahole CT5	380	367
Keahole ST7	303	327

Table C-38. Hawai'i Island – Capacity Factor for existing utility-owned thermal generators under the Status Quo resource plan.

Capacity Factor (%)	2030	2035
Hill5	Deactivated	Deactivated
Hill6	Deactivated	Deactivated
Kanoelehua CT1	0	0
Kanoelehua D11	0	0
Kanoelehua D15	0	0
Kanoelehua D16	0	0

Capacity Factor (%)	2030	2035
Kanoelehua D17	0	0
Kapua D27	5	4
Keahole CT2	0	0
Keahole D21	0	0
Keahole D22	0	0
Keahole D23	0	0
Ouli D25	3	3
Panaewa D24	8	7
Puna CT3	2	1
Puna Steam	Standby status	Standby status
Punaluu D26	5	5
Waimea D12	0	0
Waimea D13	0	0
Waimea D14	1	1
Keahole CT4	51	50
Keahole CT5	42	44
Keahole ST7	43	44

1.5.2.2 Grid Operations – Base

Shown below in Table C-39 and Table C-40 are the estimated number of starts and capacity factor, respectively, for thermal generators in 2030 and 2035 with the Base resource plan.

Table C-39. Hawai'i Island – Number of Starts for existing utility-owned thermal generators and future thermal generators under the Base resource plan.

Number of Starts	2030	2035
Hill5	Deactivated	Deactivated
Hill6	Deactivated	Deactivated
Kanoelehua CT1	0	2
Kanoelehua D11	0	1
Kanoelehua D15	0	0
Kanoelehua D16	0	0
Kanoelehua D17	0	0
Kapua D27	1	4
Keahole CT2	1	1
Keahole D21	0	0
Keahole D22	0	0
Keahole D23	0	0

Ouli D25	1	4
Panaewa D24	53	69
Puna CT3	23	34
Puna Steam	Standby status	Standby status
Punaluu D26	11	13
Waimea D12	0	0
Waimea D13	0	1
Waimea D14	0	0
Keahole CT4	92	98
Keahole CT5	103	101
Keahole ST7	114	107

Table C-40. Hawai‘i Island – Capacity Factor for existing utility-owned thermal generators and future thermal generators under the Base resource plan.

Capacity Factor (%)	2030	2035
Hill5	Deactivated	Deactivated
Hill6	Deactivated	Deactivated
Kanoelehua CT1	0	0
Kanoelehua D11	0	0
Kanoelehua D15	0	0
Kanoelehua D16	0	0
Kanoelehua D17	0	0
Kapua D27	0	0
Keahole CT2	0	0
Keahole D21	0	0
Keahole D22	0	0
Keahole D23	0	0
Ouli D25	0	0
Panaewa D24	1	2
Puna CT3	0	0
Puna Steam	Standby status	Standby status
Punaluu D26	0	0
Waimea D12	0	0
Waimea D13	0	0
Waimea D14	0	0
Keahole CT4	4	5
Keahole CT5	4	4
Keahole ST7	3	4

1.5.3 Maui

1.5.3.1 Grid Operations – Status Quo

Table C-41 and Table C-42 are the estimated number of starts and capacity factor, respectively, for thermal generators in 2030 and 2035 with the Status Quo resource plan.

Table C-41. Maui – Number of Starts for existing utility-owned thermal generators under the Status Quo resource plan.

Number of Starts	2030	2035
Hana	0	0
Kahului1	Deactivated	Deactivated
Kahului2	Deactivated	Deactivated
Kahului3	Deactivated	Deactivated
Kahului4	Deactivated	Deactivated
Maalaea01	30	38
Maalaea02	2	9
Maalaea03	16	22
Maalaea04	85	141
Maalaea05	50	69
Maalaea06	23	36
Maalaea07	16	38
Maalaea08	35	50
Maalaea09	66	120
Maalaea10	Deactivated	Deactivated
Maalaea11	Deactivated	Deactivated
Maalaea12	Deactivated	Deactivated
Maalaea13	Deactivated	Deactivated
Maalaea14cc	304	289
Maalaea15cc	0	0
Maalaea16cc	232	269
Maalaea17cc	154	157
Maalaea18cc	47	45
Maalaea19cc	103	126
MaalaeaX1	6	15
MaalaeaX2	4	8

Table C-42. Maui – Capacity Factor for existing utility-owned thermal generators under the Status Quo resource plan.

Capacity Factor (%)	2030	2035
Hana	1	1
Kahului1	Deactivated	Deactivated
Kahului2	Deactivated	Deactivated
Kahului3	Deactivated	Deactivated
Kahului4	Deactivated	Deactivated
Maalaea01	1	2
Maalaea02	0	1
Maalaea03	1	1
Maalaea04	3	6
Maalaea05	2	2
Maalaea06	1	1
Maalaea07	0	1
Maalaea08	2	2
Maalaea09	4	7
Maalaea10	Deactivated	Deactivated
Maalaea11	Deactivated	Deactivated
Maalaea12	Deactivated	Deactivated
Maalaea13	Deactivated	Deactivated
Maalaea14cc	43	53
Maalaea15cc	0	0
Maalaea16cc	28	37
Maalaea17cc	46	51
Maalaea18cc	36	39
Maalaea19cc	37	45
MaalaeaX1	0	1
MaalaeaX2	0	0

1.5.3.2 Grid Operations – Base

Shown below in Table C-43 and Table C-44 are the estimated number of starts and capacity factor, respectively, for thermal generators in 2030 and 2035 with the Base resource plan.

Table C-43. Maui – Number of Starts for existing utility-owned thermal generators and future thermal generators under the Base resource plan.

Number of Starts	2030	2035
9 MW RICE 1	311	249
9 MW RICE 2	305	253
Hana	0	0
Kahului1	Deactivated	Deactivated
Kahului2	Deactivated	Deactivated
Kahului3	Deactivated	Deactivated
Kahului4	Deactivated	Deactivated
Maalaea01	Deactivated	Deactivated
Maalaea02	Deactivated	Deactivated
Maalaea03	Deactivated	Deactivated
Maalaea04	Deactivated	Deactivated
Maalaea05	Deactivated	Deactivated
Maalaea06	Deactivated	Deactivated
Maalaea07	Deactivated	Deactivated
Maalaea08	Deactivated	Deactivated
Maalaea09	Deactivated	Deactivated
Maalaea10	Deactivated	Deactivated
Maalaea11	Deactivated	Deactivated
Maalaea12	Deactivated	Deactivated
Maalaea13	Deactivated	Deactivated
Maalaea14cc	164	122
Maalaea15cc	0	0
Maalaea16cc	126	83
Maalaea17cc	74	27
Maalaea18cc	0	1
Maalaea19cc	15	7
MaalaeaX1	26	27
MaalaeaX2	23	27

Table C-44. Maui – Capacity Factor for existing utility-owned thermal generators and future thermal generators under the Base resource plan.

Capacity Factor (%)	2030	2035
9 MW RICE 1	26	21
9 MW RICE 2	25	21
Hana	0	1
Kahului1	Deactivated	Deactivated
Kahului2	Deactivated	Deactivated
Kahului3	Deactivated	Deactivated
Kahului4	Deactivated	Deactivated
Maalaea01	Deactivated	Deactivated
Maalaea02	Deactivated	Deactivated
Maalaea03	Deactivated	Deactivated
Maalaea04	Deactivated	Deactivated
Maalaea05	Deactivated	Deactivated
Maalaea06	Deactivated	Deactivated
Maalaea07	Deactivated	Deactivated
Maalaea08	Deactivated	Deactivated
Maalaea09	Deactivated	Deactivated
Maalaea10	Deactivated	Deactivated
Maalaea11	Deactivated	Deactivated
Maalaea12	Deactivated	Deactivated
Maalaea13	Deactivated	Deactivated
Maalaea14cc	20	12
Maalaea15cc	0	0
Maalaea16cc	18	9
Maalaea17cc	6	2
Maalaea18cc	0	0
Maalaea19cc	1	1
MaalaeaX1	11	13
MaalaeaX2	10	11

1.5.4 Moloka'i

1.5.4.1 Grid Operations – Status Quo

Shown below in Table C-45 and Table C-46 are the estimated number of starts and capacity factor, respectively, for thermal generators in 2030 and 2035 with the Status Quo resource plan.

Table C-45. Moloka'i – Number of Starts for existing utility-owned thermal generators under the Status Quo resource plan.

Number of Starts	2030	2035
Palaau 1	12	1
Palaau 2	91	22
Palaau 3	6	0
Palaau 4	9	4
Palaau 5	13	6
Palaau 6	568	417
Palaau 7	364	262
Palaau 8	510	466
Palaau 9	1,029	920
Palaau GT	3	1

Table C-46. Moloka'i – Capacity Factor for existing utility-owned thermal generators under the Status Quo resource plan.

Capacity Factor (%)	2030	2035
Palaau 1	0	0
Palaau 2	1	0
Palaau 3	0	0
Palaau 4	0	0
Palaau 5	0	0
Palaau 6	11	9
Palaau 7	4	3
Palaau 8	64	65
Palaau 9	46	48
Palaau GT	0	0

1.5.4.2 Grid Operations – Base

Shown below in Table C-47 and Table C-48 are the estimated number of starts and capacity factor, respectively, for thermal generators in 2030 and 2035 with the Base resource plan.

Table C-47. Molokaʻi – Number of Starts for existing utility-owned thermal generators and future thermal generators under the Base resource plan.

Number of Starts	2030	2035
Palaau 1	0	0
Palaau 2	1	8
Palaau 3	0	0
Palaau 4	0	0
Palaau 5	4	2
Palaau 6	68	53
Palaau 7	6	2
Palaau 8	547	445
Palaau 9	126	59
Palaau GT	0	0

Table C-48. Molokaʻi – Capacity Factor for existing utility-owned thermal generators and future thermal generators under the Base resource plan.

Capacity Factor (%)	2030	2035
Palaau 1	0	0
Palaau 2	0	0
Palaau 3	0	0
Palaau 4	0	0
Palaau 5	0	0
Palaau 6	0	0
Palaau 7	0	0
Palaau 8	18	13
Palaau 9	1	0
Palaau GT	0	0

1.5.5 Lānaʻi

1.5.5.1 Grid Operations – Status Quo

Shown below in Table C-49 and Table C-50 are the estimated number of starts and capacity factor, respectively, for thermal generators in 2030 and 2035 with the Status Quo resource plan.

Table C-49. Lānaʻi – Number of Starts for existing utility-owned thermal generators under the Status Quo resource plan.

Number of Starts	2030	2035
LL1	105	123
LL2	43	62
LL3	217	233
LL4	268	273
LL5	202	197
LL6	229	251
LL7	74	60
LL8	366	344

Table C-50. Lānaʻi – Capacity Factor for existing utility-owned thermal generators under the Status Quo resource plan.

Capacity Factor (%)	2030	2035
LL1	1	2
LL2	12	12
LL3	17	17
LL4	9	9
LL5	15	15
LL6	1	2
LL7	18	18
LL8	0	0

1.5.5.2 Grid Operations – Base

Shown below in Table C-51 and Table C-52 are the estimated number of starts and capacity factor, respectively, for thermal generators in 2030 and 2035 with the Base resource plan.

Table C-51. Lānaʻi – Number of Starts for existing utility-owned thermal generators and future thermal generators under the Base resource plan.

Number of Starts	2030	2035
LL1	123	115
LL2	94	95
LL3	152	139
LL4	212	216
LL5	137	126
LL6	190	164
LL7	0	1
LL8	17	18

Table C-52. Lānaʻi – Capacity Factor for existing utility-owned thermal generators and future thermal generators under the Base resource plan.

Capacity Factor (%)	2030	2035
LL1	3	2
LL2	5	4
LL3	7	7
LL4	4	4
LL5	6	6
LL6	0	0
LL7	0	0
LL8	0	0