

GLW's Request Window Proposal

CAISO 2026-2027 TPP Stakeholder Meeting

September 23-24, 2026

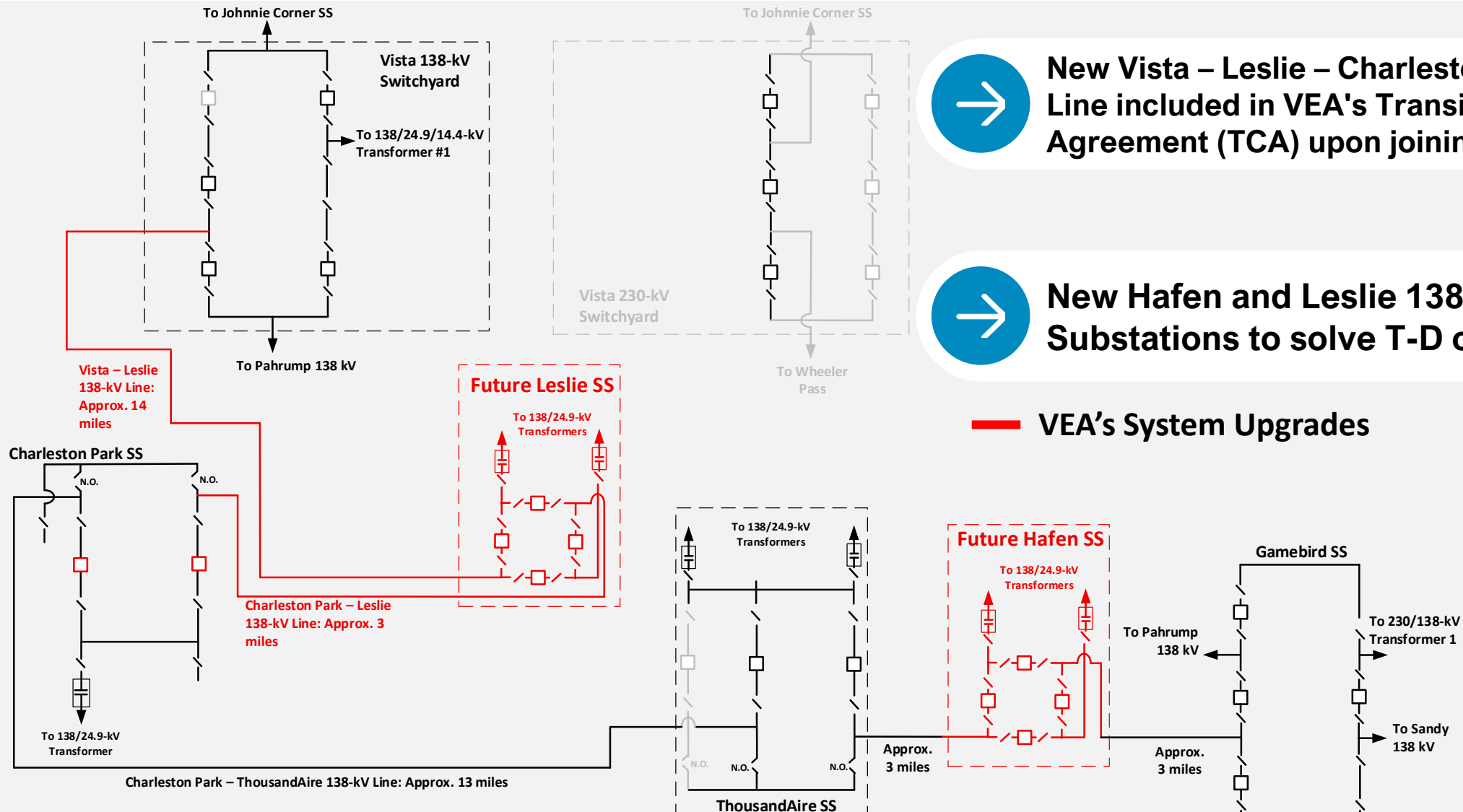


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VEA's System Upgrades included in 2026-2027 TPP



New Vista – Leslie – Charleston Park 138-kV Line included in VEA's Transition Control Agreement (TCA) upon joining CAISO



New Hafen and Leslie 138/24.9-kV Substations to solve T-D overloads

— VEA's System Upgrades

Summary of Critical Contingency Results – Thermal



Overloaded Facility	Contingency ⁽¹⁾	Category	2031 SP	2036 SP	2041 SP	2041 WP
			Max % Loading			
Pahrump 230/138-kV Transformer 1	Gamebird 230/138-kV Transformer	P1	104	129	140	137
	Gamebird 230/138-kV Transformer and Gamebird - Sandy 138-kV Line	P4	115	141	152	157
Pahrump 230/138-kV Transformer 2	Gamebird 230/138-kV Transformer	P1	<100	110	119	116
	Gamebird 230/138-kV Transformer and Gamebird - Sandy 138-kV Line	P4	<100	120	129	133
Pahrump - Vista 138-kV Line	Gamebird - Hafen 138-kV Line	P1	109	128	144	150
	Sandy - Gamebird 138-kV Line and Hafen - Gamebird 138-kV Line	P4	109	128	143	150
Gamebird 230/138-kV Transformer	Pahrump 230/138-kV Transformer 1	P1	<100	114	117	114
	Pahrump - Wheeler Pass 230-kV Line Ckt 1 and Pahrump 230/138-kV Transformer 1	P4	<100	113	117	114

Note 1: Additional P3, P6, and P7 contingency events resulting in overload conditions have been excluded from this summary.

Summary of Critical Contingency Results – Voltage



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Impacted Bus	Contingency ⁽¹⁾	Category	2031 SP	2036 SP	2036 SmrOP	2041 SP	2041 WP
			Voltage Issue (p.u.)				
Charleston 138 kV	Gamebird - Hafen 138-kV Line	P1	0.85	0.81	0.88	0.79	0.79
	ThousandAire - Hafen 138-kV Line	P1	0.88	0.88	0.9 < V < 1.1	0.88	0.87
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.85	0.80	0.89	0.78	0.78
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.85	0.81	0.88	0.79	0.79
	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.9 < V < 1.1	0.86	0.9 < V < 1.1	0.86	0.86
Gamebird 138 kV	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.87	0.82	0.9 < V < 1.1	0.81	0.81
Hafen 138 kV	Gamebird - Hafen 138-kV Line	P1	0.80	0.74	0.84	0.73	0.73
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.80	0.73	0.85	0.71	0.72
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.80	0.74	0.84	0.73	0.73
	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.87	0.81	0.9 < V < 1.1	0.81	0.81
Johnnie 138 kV	Gamebird - Hafen 138-kV Line	P1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.89	0.89
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.9 < V < 1.1	0.89	0.9 < V < 1.1	0.87	0.87
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.89	0.89
Leslie 138 kV	Gamebird - Hafen 138-kV Line	P1	0.88	0.85	0.9 < V < 1.1	0.83	0.83
	ThousandAire - Hafen 138-kV Line	P1	0.9 < V < 1.1	0.9 < V < 1.1	0.9 < V < 1.1	0.90	0.89
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.88	0.84	0.9 < V < 1.1	0.82	0.81
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.88	0.85	0.9 < V < 1.1	0.83	0.83
	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.9 < V < 1.1	0.89	0.9 < V < 1.1	0.88	0.89
Sandy 138 kV	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.89	0.85	0.9 < V < 1.1	0.85	0.85
ThousandAire 138 kV	Gamebird - Hafen 138-kV Line	P1	0.80	0.74	0.84	0.73	0.73
	ThousandAire - Hafen 138-kV Line	P1	0.84	0.84	0.9 < V < 1.1	0.84	0.83
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.80	0.74	0.85	0.72	0.72
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.80	0.74	0.84	0.73	0.73
	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.87	0.81	0.9 < V < 1.1	0.81	0.81
Vista 138 kV	Gamebird - Hafen 138-kV Line	P1	0.9 < V < 1.1	0.88	0.9 < V < 1.1	0.87	0.86
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.9 < V < 1.1	0.87	0.9 < V < 1.1	0.85	0.85
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.9 < V < 1.1	0.88	0.9 < V < 1.1	0.87	0.86

Note 1: Additional P3, P6, and P7 contingency events resulting in low voltage violations have been excluded from this summary.

Summary of Critical Contingency Results – Voltage Deviation



Impacted Bus	Contingency ⁽¹⁾	Category	Post Cont. Voltage Deviation % (Baseline Scenarios)					
			CAISO B2_2031- SmrPk	CAISO B3_2036- SmrPk	CAISO B4_2041- SmrPk	CAISO B5_2036- SmrOP	CAISO B6_2041- WtrPk	CAISO B8_2031- SprOP
189024 CHARLSTN 138 kV	P1_16b_DU_Line THSNDAIR 138.0 to HAFEN 138.0 Circuit 1	P1	12.53	12.40	11.83	< 8	12.72	< 8
189070 LESLIE 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	12.61	15.41	15.88	10.65	16.38	< 8
189024 CHARLSTN 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	15.68	19.42	19.88	13.21	20.34	< 8
189022 THSNDAIR 138 kV	P1_16b_DU_Line THSNDAIR 138.0 to HAFEN 138.0 Circuit 1	P1	16.75	16.83	15.94	< 8	16.89	< 8
189022 THSNDAIR 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	20.84	26.20	26.52	17.57	26.89	< 8
189050 HAFEN 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	21.48	27.09	27.49	18.12	27.79	< 8
189013 VISTA 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	< 8	12.01	12.48	< 8	12.99	< 8
189013 VISTA 138 kV	P1_16b_DU_Line THSNDAIR 138.0 to HAFEN 138.0 Circuit 1	P1	< 8	< 8	< 8	< 8	< 8	< 8
189018 JOHNNIE 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	< 8	10.20	10.63	< 8	11.17	< 8
189018 JOHNNIE 138 kV	P1_16b_DU_Line THSNDAIR 138.0 to HAFEN 138.0 Circuit 1	P1	< 8	< 8	< 8	< 8	< 8	< 8
189070 LESLIE 138 kV	P1_16b_DU_Line THSNDAIR 138.0 to HAFEN 138.0 Circuit 1	P1	< 8	9.84	9.43	< 8	10.28	< 8

Note 1: Additional P3 contingency events resulting in voltage deviation violations have been excluded from this summary.

GLW's 2026 – 2027 TPP Recommended Project



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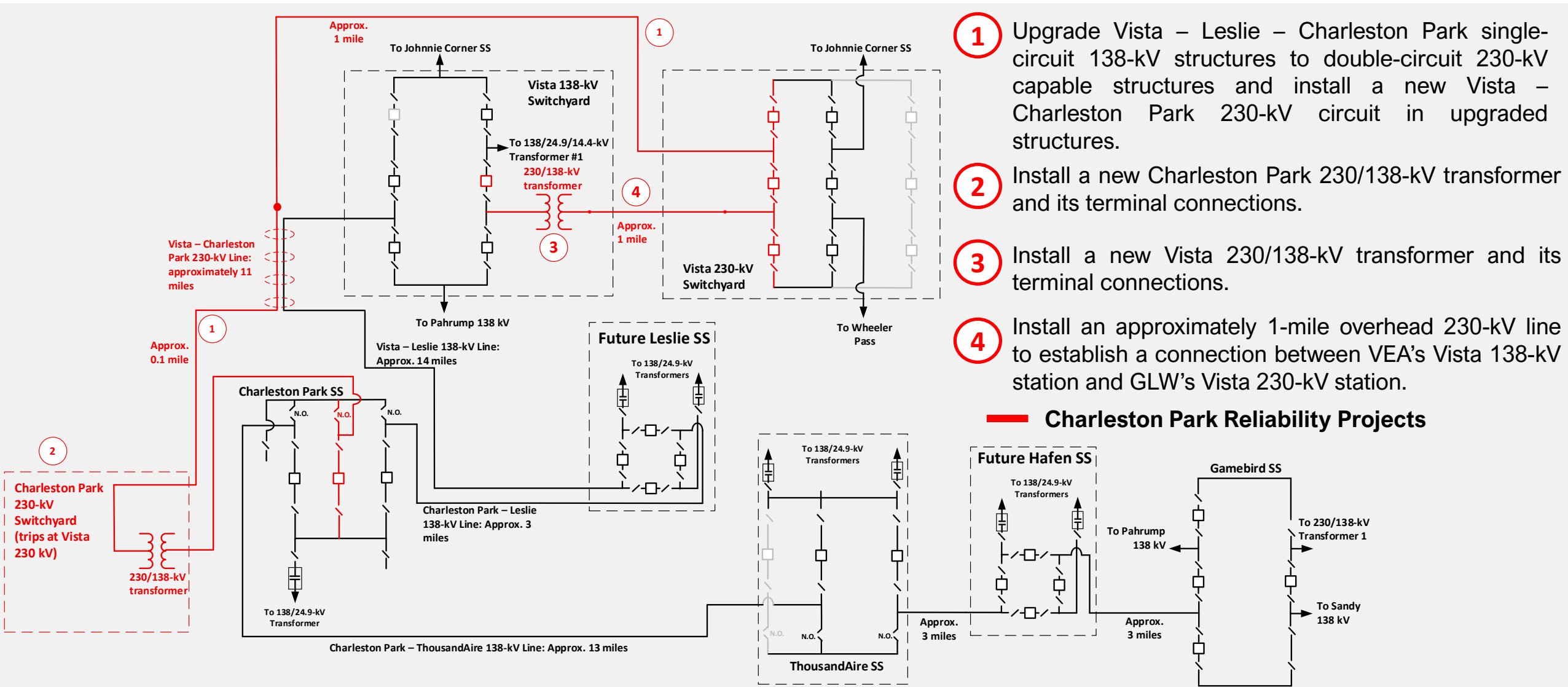


Charleston Park Reliability Projects

- **Project Objectives:** Address NERC TPL-001-5 P1, P3, P4, P6, and P7 thermal overloads and voltage violations.
- **Project Scope:**
 - Upgrade Vista – Leslie – Charleston Park single-circuit 138-kV structures to double-circuit 230-kV capable structures.
 - Install a new Vista – Charleston Park 230-kV circuit in upgraded structures.
 - Install a new Charleston Park 230/138-kV transformer and its terminal connections.
 - Install a new Vista 230/138-kV transformer and its terminal connections.
 - Install an approximately 1-mile overhead 230-kV line to establish a connection between the existing Vista 138-kV station and the future Vista 230-kV station.
- **Proposed In-Service Date:** December 2031
- **Estimated Cost:** \$84M - \$177M (100% Contingency)



GLW's 2026 – 2027 TPP Recommended Project



Solution Summary after Proposed Upgrades

Critical Contingency Results – Thermal



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Overloaded Facility	Contingency ⁽¹⁾	Category	2031 SP		2036 SP		2041 SP		2041 WP	
			Worst Max % Loading							
			Pre	Post	Pre	Post	Pre	Post	Pre	Post
Pahrump 230/138-kV Transformer 1	Gamebird 230/138-kV Transformer	P1	104	62	129	39	140	43	137	40
	Gamebird 230/138-kV Transformer and Gamebird - Sandy 138-kV Line	P4	115	65	141	40	152	43	157	43
Pahrump 230/138-kV Transformer 2	Gamebird 230/138-kV Transformer	P1	<100	53	110	33	119	37	116	34
	Gamebird 230/138-kV Transformer and Gamebird - Sandy 138-kV Line	P4	<100	55	120	34	129	37	133	36
Pahrump - Vista 138-kV Line	Gamebird - Hafen 138-kV Line	P1	109	19	128	<10	144	<10	150	<10
	Sandy - Gamebird 138-kV Line and Hafen - Gamebird 138-kV Line	P4	109	18	128	<10	143	<10	150	<10
Gamebird 230/138-kV Transformer	Pahrump 230/138-kV Transformer 1	P1	<100	<10	114	<10	117	<10	114	<10
	Pahrump - Wheeler Pass 230-kV Line Ckt 1 and Pahrump 230/138-kV Transformer 1	P4	<100	<10	113	47	117	<10	114	<10

Solution Summary after Proposed Upgrades

Critical Contingency Results – Voltage



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Bus	Contingency ⁽¹⁾	Category	2031 SP		2036 SP		2036 SmrOP		2041 SP		2041 WP		
			Voltage Issue (p.u.)										
			Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Charleston 138 kV	Gamebird - Hafen 138-kV Line	P1	0.85	0.9<V<1.1	0.81	0.9<V<1.1	0.88	0.9<V<1.1	0.79	0.9<V<1.1	0.79	0.9<V<1.1	
	ThousandAire - Hafen 138-kV Line	P1	0.88	0.9<V<1.1	0.88	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.88	0.9<V<1.1	0.87	0.9<V<1.1	
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.85	0.9<V<1.1	0.80	0.9<V<1.1	0.89	0.9<V<1.1	0.78	0.9<V<1.1	0.78	0.9<V<1.1	
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.85	0.9<V<1.1	0.81	0.9<V<1.1	0.88	0.9<V<1.1	0.79	0.9<V<1.1	0.79	0.9<V<1.1	
	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.9<V<1.1	0.9<V<1.1	0.86	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.86	0.9<V<1.1	0.86	0.9<V<1.1	
Gamebird 138 kV	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.87	0.9<V<1.1	0.82	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.81	0.9<V<1.1	0.81	0.9<V<1.1	
Hafen 138 kV	Gamebird - Hafen 138-kV Line	P1	0.80	0.9<V<1.1	0.74	0.9<V<1.1	0.84	0.9<V<1.1	0.73	0.9<V<1.1	0.73	0.9<V<1.1	
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.80	0.9<V<1.1	0.73	0.9<V<1.1	0.85	0.9<V<1.1	0.71	0.9<V<1.1	0.72	0.9<V<1.1	
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.80	0.9<V<1.1	0.74	0.9<V<1.1	0.84	0.9<V<1.1	0.73	0.9<V<1.1	0.73	0.9<V<1.1	
	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.87	0.9<V<1.1	0.81	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.81	0.9<V<1.1	0.81	0.9<V<1.1	
Johnnie 138 kV	Gamebird - Hafen 138-kV Line	P1	0.9<V<1.1	0.9<V<1.1		0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.89	0.9<V<1.1	0.89	0.9<V<1.1	
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.9<V<1.1	0.9<V<1.1	0.89	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.87	0.9<V<1.1	0.87	0.9<V<1.1	
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.9<V<1.1	0.9<V<1.1		0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.89	0.9<V<1.1	0.89	0.9<V<1.1	
Leslie 138 kV	Gamebird - Hafen 138-kV Line	P1	0.88	0.9<V<1.1	0.85	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.83	0.9<V<1.1	0.83	0.9<V<1.1	
	ThousandAire - Hafen 138-kV Line	P1	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.90	0.9<V<1.1	0.89	0.9<V<1.1	
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.88	0.9<V<1.1	0.84	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.82	0.9<V<1.1	0.81	0.9<V<1.1	
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.88	0.9<V<1.1	0.85	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.83	0.9<V<1.1	0.83	0.9<V<1.1	
	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.9<V<1.1	0.9<V<1.1	0.89	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.88	0.9<V<1.1	0.89	0.9<V<1.1	
Sandy 138 kV	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.89	0.9<V<1.1	0.85	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.85	0.9<V<1.1	0.85	0.9<V<1.1	
ThousandAire 138 kV	Gamebird - Hafen 138-kV Line	P1	0.80	0.9<V<1.1	0.74	0.9<V<1.1	0.84	0.9<V<1.1	0.73	0.9<V<1.1	0.73	0.9<V<1.1	
	ThousandAire - Hafen 138-kV Line	P1	0.84	0.9<V<1.1	0.84	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.84	0.9<V<1.1	0.83	0.9<V<1.1	
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.80	0.9<V<1.1	0.74	0.9<V<1.1	0.85	0.9<V<1.1	0.72	0.9<V<1.1	0.72	0.9<V<1.1	
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.80	0.9<V<1.1	0.74	0.9<V<1.1	0.84	0.9<V<1.1	0.73	0.9<V<1.1	0.73	0.9<V<1.1	
	Gamebird - Pahrump 138-kV Line and Gamebird 230/138-kV Transformer	P4	0.87	0.9<V<1.1	0.81	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.81	0.9<V<1.1	0.81	0.9<V<1.1	
Vista 138 kV	Gamebird - Hafen 138-kV Line	P1	0.9<V<1.1	0.9<V<1.1	0.88	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.87	0.9<V<1.1	0.86	0.9<V<1.1	
	Gamebird - Pahrump 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.9<V<1.1	0.9<V<1.1	0.87	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.85	0.9<V<1.1	0.85	0.9<V<1.1	
	Gamebird - Sandy 138-kV Line and Gamebird - Hafen 138-kV Line	P4	0.9<V<1.1	0.9<V<1.1	0.88	0.9<V<1.1	0.9<V<1.1	0.9<V<1.1	0.87	0.9<V<1.1	0.86	0.9<V<1.1	

Solution Summary after Proposed Upgrades

Critical Contingency Results – Voltage Deviation

Impacted Bus	Contingency ⁽¹⁾	Category	CAISO B2_2031- SmrPk	CAISO B3_2036- SmrPk	CAISO B4_2041- SmrPk	CAISO B5_2036- SmrOP	CAISO B6_2041- WtrPk	CAISO B8_2031- SprOP						
			Post Cont. Voltage Deviation % (Baseline Scenarios)											
			Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
189024 CHARLSTN 138 kV	P1_16b_DU_Line THSNDAIR 138.0 to HAFEN 138.0 Circuit 1	P1	12.53	< 8	12.40	< 8	11.83	< 8	< 8	< 8	12.72	< 8	< 8	< 8
189070 LESLIE 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	12.61	< 8	15.41	< 8	15.88	< 8	10.65	< 8	16.38	< 8	< 8	< 8
189024 CHARLSTN 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	15.68	< 8	19.42	< 8	19.88	< 8	13.21	< 8	20.34	< 8	< 8	< 8
189022 THSNDAIR 138 kV	P1_16b_DU_Line THSNDAIR 138.0 to HAFEN 138.0 Circuit 1	P1	16.75	< 8	16.83	< 8	15.94	< 8	< 8	< 8	16.89	< 8	< 8	< 8
189022 THSNDAIR 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	20.84	< 8	26.20	< 8	26.52	< 8	17.57	< 8	26.89	< 8	< 8	< 8
189050 HAFEN 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	21.48	< 8	27.09	< 8	27.49	< 8	18.12	< 8	27.79	< 8	< 8	< 8
189013 VISTA 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	< 8	< 8	12.01	< 8	12.48	< 8	< 8	< 8	12.99	< 8	< 8	< 8
189013 VISTA 138 kV	P1_16b_DU_Line THSNDAIR 138.0 to HAFEN 138.0 Circuit 1	P1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8
189018 JOHNNIE 138 kV	P1_16a_DU_Line GAMEBIRD 138.0 to HAFEN 138.0 Circuit 1	P1	< 8	< 8	10.20	< 8	10.63	< 8	< 8	< 8	11.17	< 8	< 8	< 8
189018 JOHNNIE 138 kV	P1_16b_DU_Line THSNDAIR 138.0 to HAFEN 138.0 Circuit 1	P1	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8	< 8
189070 LESLIE 138 kV	P1_16b_DU_Line THSNDAIR 138.0 to HAFEN 138.0 Circuit 1	P1	< 8	< 8	9.84	< 8	9.43	< 8	< 8	< 8	10.28	< 8	< 8	< 8

Alternatives Considered



Do-Nothing Alternative



Other combinations involving 138 kV lines and other Transformer locations and Reactive Resources.



Non-Transmission Alternatives (e.g. Energy Storage)



Grid Enhancing Technologies Alternatives

Alternatives were insufficient due to prevailing reliability issues, cost, or not providing adequate transmission capacity.



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Questions?



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