



Fuel-Security Reliability Need for Mystic 8 and 9 – Results Updated to include Hours of 30 Minute (OP4 Action 1) and 10 Minute Reserve Depletion

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Fuel-Security Reliability Need: Determination for Loss of Mystic 8 and 9

- The ISO, for the purpose of this analysis and the upcoming FERC filing, has measured a fuel-security reliability need as both maintaining ten-minute Operating Reserves and not shedding load (OP-7)
 - Maintaining ten-minute Operating Reserves is a core NERC balancing standard
 - OP-7 conditions are not an appropriate means to maintain a reliable system
- The ISO modeled the fuel-security reliability need for Winter 2022/23 and Winter 2023/24 for Mystic 8 and 9
- The underlying model is the same as that used in the Operational Fuel Security Analysis (OFSA)
 - The inputs have been adjusted for the two relevant winter periods (slide 4)



Model Assumptions

- The model has several simplifying assumptions that are optimistic (in contrast to actual observations)
 - The model assumes an unconstrained fuel logistics deliveries – LNG cargos, dual-fuel replenishments, and oil replenishments will occur with no interruption
 - The model assumes an unconstrained emissions profile – All units will run as dispatched without regulatory emissions constraints
 - The model assumes an unconstrained transmission system
 - The model assumes all units that cleared in FCA12 will be available in FCA13 and FCA14
 - Model does not account for resource delist bids in FCA13 and FCA14
 - New resources that cleared in prior auctions with stated dual-fuel capability are assumed to operate at those levels; though there have been delays in the commercial operation of new resources
- The model, as previously noted in the OFSA discussions, has limitations with regards to modeling market response



Model Inputs for Winter 2022/2023

- Peak Load (90/10 forecast) and PV forecasts: Updated to reflect Draft 2018 CELT forecast for Winter 2022-2023
- Retirements: Mystic 7, 8, 9; Bridgeport Harbor 3; Pilgrim
- Operating Reserve requirements: Reduced from 2,300 MW to 2,100 MW; ten-minute Operating Reserve requirements reduced from 1,600 MW to 1,400 MW
 - With the modeled retirement of Mystic 8 and 9, the largest resource operating reserve requirement is expected to be reduced during the winter period
- Renewables: total 6,600 MW, based on CELT 2018
- Only variables in this model are LNG cap, imports and dual-fuel replenishments
 - The sensitivities are meant to be informative
 - Retirements are fixed (as described above)
 - Renewables are fixed (as outlined in CELT 2018)



2022/2023 Winter Scenario Results



2022/2023 Winter Scenario Summary:

Retirement of Mystic Station and Distrigas – Lower LNG Cap

INPUTS				OUTPUTS									
				OP 4 Actions				10-Minute Reserve Depletion	OP 7 Action: Load Shedding	LNG			
LNG Cap (Bcf/Day)	Imports (MW)	Dual-Fuel (Oil Tank Fills)	Peak Load (MW)	Action 1 (MWh)	Action 1 (Hours)	Actions 2-5 (MWh)	Actions 6-11 (MWh)	Load at Risk (MWh)	Load at Risk (Hours)	Unserved Load (MWh)	Days	Max LNG Days	Days of ≥95% LNG at Assumed Cap
0.8	2,500	2	20,342	163,905	265	113,321	55,941	85,444	92	34,715	7	37	39
0.8	3,000	2	20,342	112,512	191	74,816	34,955	54,404	62	17,220	6	35	37
0.8	3,500	2	20,342	71,981	126	46,543	21,956	29,832	37	5,139	5	34	35
0.8	3,000	1	20,342	222,125	355	158,832	76,303	120,476	132	51,372	11	35	37
0.9	2,500	2	20,342	112,372	187	72,511	36,114	52,258	60	19,175	6	35	36
0.9	3,000	2	20,342	69,354	121	45,115	21,230	28,904	38	5,460	5	34	35
0.9	3,500	2	20,342	38,807	72	24,196	9,545	11,349	17	649	1	31	35
0.9	3,000	1	20,342	152,715	253	102,361	48,693	74,000	81	27,943	9	34	35



2022/2023 Winter Scenario Summary:

Retirement of Mystic Station – Higher LNG Cap

INPUTS				OUTPUTS									
				OP 4 Actions				10-Minute Reserve Depletion		OP 7 Action: Load Shedding		LNG	
LNG Cap (Bcf/Day)	Imports (MW)	Dual-Fuel (Oil Tank Fills)	Peak Load (MW)	Action 1 (MWh)	Action 1 (Hours)	Actions 2-5 (MWh)	Actions 6-11 (MWh)	Load at Risk (MWh)	Load at Risk (Hours)	Unserved Load (MWh)	Days	Max LNG Days	Days of ≥95% LNG at Assumed Cap
1	2,500	2	20,342	65,482	112	42,189	19,970	25,568	35	4,307	5	34	35
1	3,000	2	20,342	36,506	66	20,997	8,949	8,519	16	459	1	31	35
1	3,500	2	20,342	17,511	37	8,853	3,635	1,715	5	-	-	28	33
1	3,000	1	20,342	106,469	180	67,960	31,459	48,022	51	11,781	6	31	35
1.1	2,500	2	20,342	33,500	64	19,332	7,659	6,944	12	269	1	31	35
1.1	3,000	2	20,342	15,785	30	7,943	3,150	1,086	4	-	-	28	33
1.1	3,500	2	20,342	6,775	14	2,596	500	55	1	-	-	24	31
1.2	2,500	2	20,342	13,731	27	7,115	2,485	561	3	-	-	27	33
1.2	3,000	2	20,342	5,501	10	1,795	365	-	-	-	-	24	31



2022/2023 Winter Scenario Summary: *Contingency Scenarios with Higher LNG Cap*

- Modeled contingencies of ~1,000 - 1,250 MW, which is much lower than outages during recent cold weather snap

INPUTS				OUTPUTS									
				OP 4 Actions				10-Minute Reserve Depletion		OP 7 Action: Load Shedding		LNG	
LNG Cap (Bcf/Day)	Imports (MW)	Dual-Fuel (Oil Tank Fills)	Peak Load (MW)	Action 1 (MWh)	Action 1 (Hours)	Actions 2-5 (MWh)	Actions 6-11 (MWh)	Load at Risk (MWh)	Load at Risk (Hours)	Unserviced Load (MWh)	Days	Max LNG Days	Days of ≥95% LNG at Assumed Cap
1.1	3,000	2	20,342	38,993	72	21,076	8,542	8,821	13	204	1	28	33
1	3,000	2	20,342	83,911	151	53,857	24,237	34,960	40	4,974	5	31	35



Conclusions for Winter 2022/2023

- The ISO is not basing its assessment on a single scenario or set of inputs, but rather across a spectrum of scenarios
 - The ISO is planning on further discussion regarding fuel security criteria with stakeholders for FCA 14
- The ISO believes that this analysis demonstrates a fuel-security reliability need
 - Exposure to both ten-minute Operating Reserve depletion and OP-7 conditions
 - Scenarios with higher LNG cap, when stressed modestly, also show exposure to ten-minute Operating Reserve depletion and OP-7 conditions

2023/2024 Winter Scenario Results



Model Inputs for Winter 2023/2024

- Peak Load (90/10 forecast) and PV forecasts: Updated to reflect Draft 2018 CELT forecast for Winter 2023-2024
- Retirements: Mystic 7, 8, 9; Bridgeport Harbor 3; Pilgrim
- Operating Reserve requirements: Reduced from 2,300 MW to 2,100 MW; ten-minute Operating Reserve requirements reduced from 1,600 MW to 1,400 MW
 - With the modeled retirement of Mystic 8 and 9, the largest resource operating reserve requirement is expected to be reduced during the winter period
- Renewables: Total 6,900 MW, based on CELT 2018
- Only variables in this model are LNG cap, imports and dual-fuel replenishments
 - The sensitivities are meant to be informative
 - Retirements are fixed (as described above)
 - Renewables are fixed (as outlined in CELT 2018)

2023/2024 Winter Scenario Summary:

Retirement of Mystic Station and Distrigas – Lower LNG Cap

INPUTS				OUTPUTS									
				OP 4 Actions				10-Minute Reserve Depletion		OP 7 Action: Load Shedding		LNG	
LNG Cap (Bcf/Day)	Imports (MW)	Dual-Fuel (Oil Tank Fills)	Peak Load (MW)	Action 1 (MWh)	Action 1 (Hours)	Actions 2-5 (MWh)	Actions 6-11 (MWh)	Load at Risk (MWh)	Load at Risk (Hours)	Unserviced Load (MWh)	Days	Max LNG Days	Days of ≥95% LNG at Assumed Cap
0.8	2,500	2	20,205	178,281	293	123,388	62,398	95,404	107	42,003	7	37	39
0.8	3,000	2	20,205	120,405	202	83,170	39,333	61,875	66	20,363	7	35	37
0.8	3,500	2	20,205	80,552	138	51,919	25,230	35,746	41	7,578	5	34	36
0.8	3,000	1	20,205	237,879	378	175,256	87,815	138,795	149	60,376	12	35	37
0.9	2,500	2	20,205	121,424	200	84,481	39,449	61,641	69	22,443	7	35	37
0.9	3,000	2	20,205	78,894	136	52,263	25,173	35,534	42	7,904	6	34	36
0.9	3,500	2	20,205	46,958	85	29,411	11,967	14,136	18	1,246	3	31	35
0.9	3,000	1	20,205	164,462	276	112,404	53,964	83,727	92	32,557	10	34	36



2023/2024 Winter Scenario Summary: Retirement of Mystic Station – Higher LNG Cap

INPUTS				OUTPUTS									
				OP 4 Actions				10-Minute Reserve Depletion		OP 7 Action: Load Shedding		LNG	
LNG Cap (Bcf/Day)	Imports (MW)	Dual-Fuel (Oil Tank Fills)	Peak Load (MW)	Action 1 (MWh)	Action 1 (Hours)	Actions 2–5 (MWh)	Actions 6–11 (MWh)	Load at Risk (MWh)	Load at Risk (Hours)	Unserved Load (MWh)	Days	Max LNG Days	Days of ≥95% LNG at Assumed Cap
1	2,500	2	20,205	76,404	134	50,928	23,629	33,472	40	6,717	6	34	35
1	3,000	2	20,205	43,300	81	27,378	10,718	13,170	18	850	3	31	35
1	3,500	2	20,205	24,354	47	12,210	4,608	3,675	8	-	-	29	34
1	3,000	1	20,205	117,203	201	78,176	36,230	57,052	62	16,273	8	31	35
1.1	2,500	2	20,205	41,193	76	25,024	9,621	11,391	17	530	1	31	35
1.1	3,000	2	20,205	20,343	43	10,429	4,408	2,633	7	-	-	28	34
1.1	3,500	2	20,205	9,559	20	4,967	1,469	378	2	-	-	24	31
1.2	2,500	2	20,205	17,871	37	9,487	3,800	1,585	6	-	-	28	33
1.2	3,000	2	20,205	7,886	15	3,680	932	126	1	-	-	24	31



2023/2024 Winter Scenario Summary: *Contingency Scenarios with Higher LNG Cap*

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INPUTS				OUTPUTS									
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LNG Cap (Bcf/Day)	Imports (MW)	Dual-Fuel (Oil Tank Fills)	Peak Load (MW)	Action 1 (MWh)	Action 1 (Hours)	Actions 2-5 (MWh)	Actions 6-11 (MWh)	Load at Risk (MWh)	Load at Risk (Hours)	Unserved Load (MWh)	Days	Max LNG Days	Days of ≥95% LNG at Assumed Cap
1.1	3,000	2	20,205	46,492	81	27,421	11,102	13,163	18	733	2	28	34
1	3,000	2	20,205	95,406	173	61,097	28,647	44,804	49	7,928	5	31	35



Conclusions for Winter 2023/2024

- Conclusions for 2023/24 mimic those of 2022/23
- The results for the 2023/24 year are slightly worse than the 2022/23 year because of the increased natural gas consumption by LDC's (thereby reducing availability for generation)
- The ISO believes that this analysis demonstrates a fuel-security reliability need
 - Exposure to both ten-minute Operating Reserve depletion and OP-7 conditions
 - Scenarios with higher LNG cap, when stressed modestly, also show exposure to ten-minute Operating Reserve depletion and OP-7 conditions