



Jupiter
POWER

Storage Made
Strategic.™

Attachment B-4: Daymark BESS Winter Resiliency Model

Pictured: Jupiter's Callisto | BESS in Harris County, TX

Prepared For:

Massachusetts Department of Energy Resources

Electric Distribution Companies:

Fitchburg Gas & Electric Light Company d/b/a Unitil

Massachusetts Electric Company and Nantucket Electric Company,
each d/b/a National Grid

NSTAR Electric Company d/b/a Eversource Energy

Applicant Information

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Jupiter Power / Trimount Energy BESS Winter Resiliency and other Unique Benefits

FEBRUARY 2024

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Trimount Energy Storage Brings Unique Grid Benefits and Consumer Benefits

- ▶ 15-20 acres of former Exxon oil terminal site (20 acres if Chapter 91 RDA is confirmed)
- ▶ Acreage itself brings enormous long-term flexibility
- ▶ 200 MW, 115 kV Interconnection Agreement executed
- ▶ 500 MW, 345 kV Interconnection Agreement pending final signature
- ▶ No network upgrades identified with either interconnection, only substation attachment facilities
- ▶ Pronounced consumer benefits by avoiding network upgrades that would be necessary elsewhere
- ▶ Pronounced consumer benefits to avoiding future price separation between NEMA and rest of ISONE
- ▶ Facilitates future HVDC delivery of offshore wind to Mystic
- ▶ Storage at this location is far more deployable than new transmission around Boston





Trimount Energy Storage Unique Benefits for Everett and Massachusetts, continued

Bringing Investment, Resiliency, Taxes, Cleaner Air, Green Energy to Everett

- ▶ \$500 million to \$1 billion total project investment in Everett
- ▶ Significant local property tax revenues
- ▶ Significant support for school district in EJ community
- ▶ Under Chapter 91 rules, much of site would otherwise be surface parking only if not a WDI
- ▶ BESS use avoids more traffic-intensive use on site, with resulting air quality benefits
- ▶ Battery project facilitates environmental remediation of historically contaminated site in EJ community
- ▶ Battery dispatch will offset brown power emissions impacting EJ communities across the region

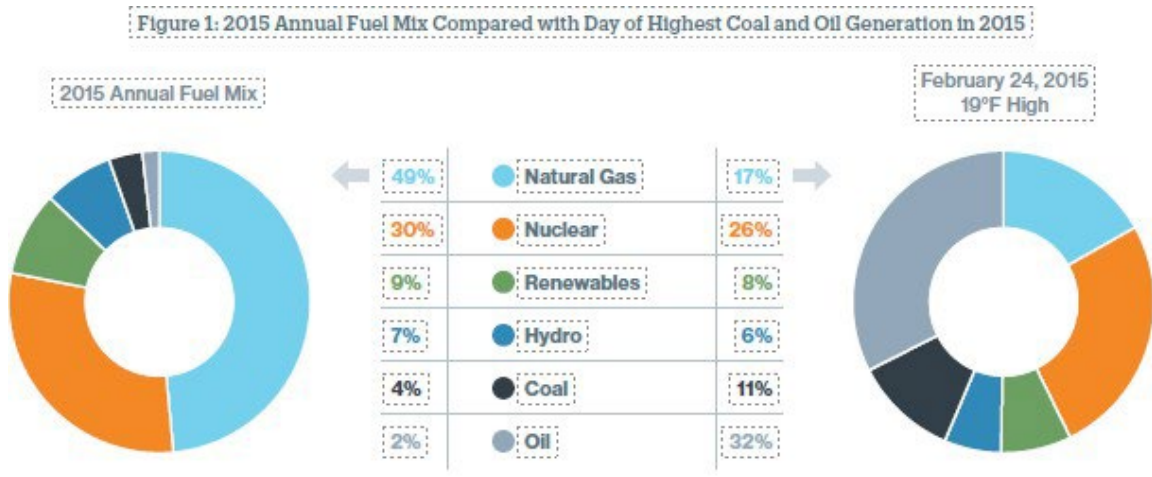


Boston Region Winter Resiliency is a Long-Standing Problem

ISONE 2018 Operational Fuel Security Analysis (Jan 2018)

“Fuel-security risk—the possibility that power plants won’t have or be able to get the fuel they need to run, particularly in winter—is the foremost challenge to a reliable power grid in New England.”

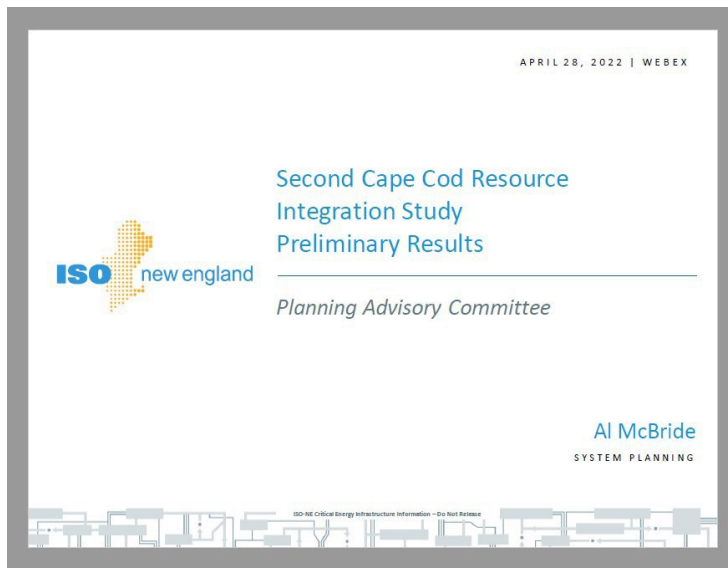
Study found limits to gas system and electric load shedding resulted in 19 of 23 scenarios in winter of 24/25



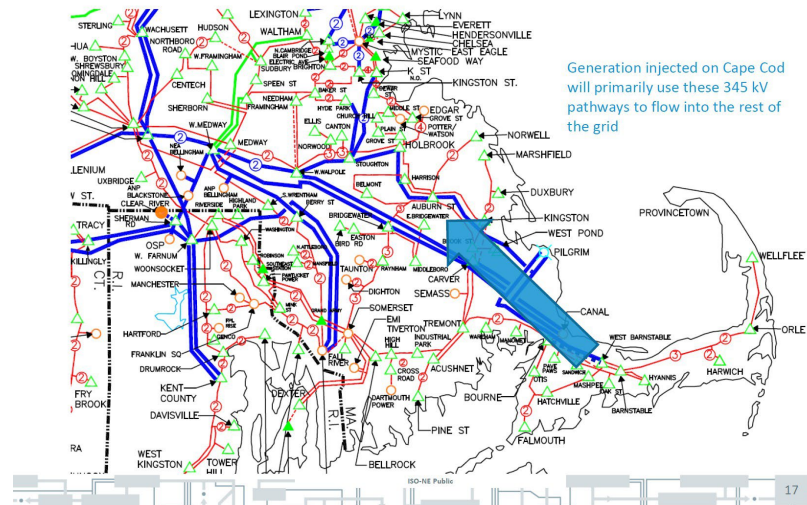
Source: ISO New England, 2000-2015 Net Energy and Peak Load by Source and Daily Generation by Fuel Type 2015

First and Second Cape Cod Resource Integration Study

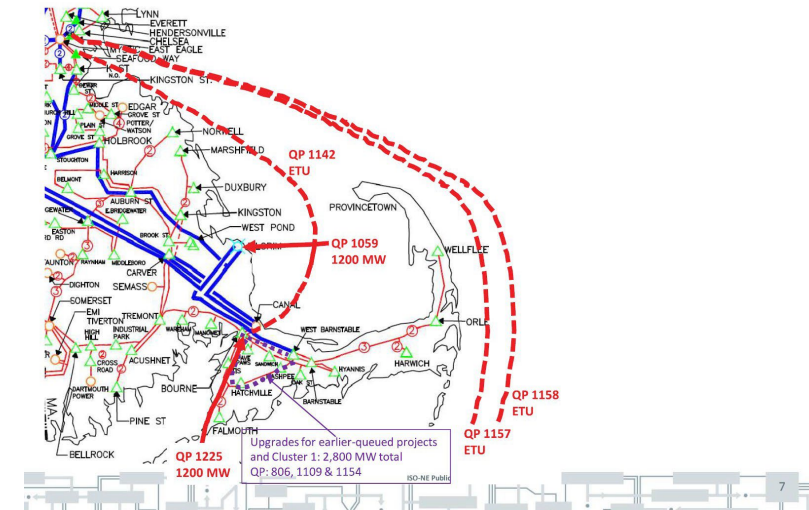
- ▶ First Cape Cod Resource Integration Study identified limit of 2,800 MW of OSW delivered through Cape Cod and a ROW limit (existing ROW cannot be expanded)
- ▶ Second CCRIS determined HVDC directly into Mystic ideal solution (“Cluster Enabling Transmission Upgrade” of 1,200 MW HVDC connect direct from OSW to Mystic 345 kV)



Generation Flows Out of Cape Cod



Second CCRIS: Remaining Relevant Projects





Overall Load Shape and Resource Mix

- ▶ The Future Grid (FGRS) “Matrix 1” Resource & Load Scenario:
- ▶ Resource: OSW 8000MW; PV 16,000 MW; BESS 2000 MW
- ▶ Load: Buildings 9600 GWh; Transport 7,300 GWh

Resource Adequacy Screen Scenario Matrix 5 Scenarios for Study				
	(Resource 0) OSW 3,100 MW PV 14,444 MW BESS ~600 MW	(Resource 1) OSW 8,000 MW PV 16,000 MW BESS 2,000 MW	(Resource 2) OSW 8,000 MW PV 22,000 MW BESS 3,940 MW	(Resource 3) OSW 17,000 MW PV 28,000 MW BESS 600 MW
(Load 0) Buildings: CELT Transport: CELT	Matrix Scenario 0			
(Load 1) Buildings 9,600 GWh Transport 7,300 GWh		Matrix Scenario 1		
(Load 2) Buildings 6,600 GWh Transport 18,500 GWh			Matrix Scenario 2	
(Load 3) Buildings 38,900 GWh Transport 37,500 GWh				(2 Scenarios) Matrix Scenario 3 plus Alternative B

Boston Winter Resiliency—Jupiter Daymark Study Brings them All Together

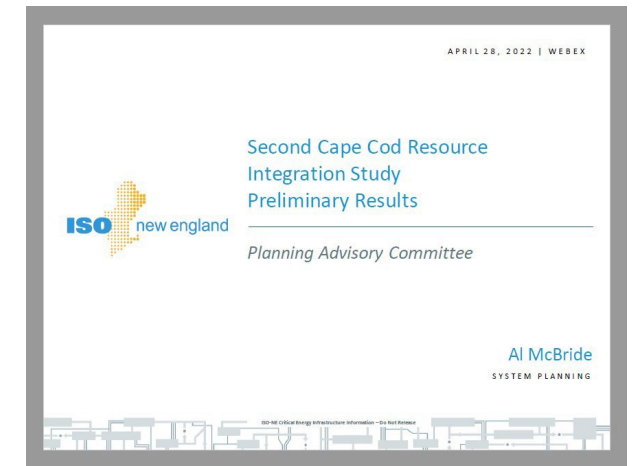
- ▶ Jupiter commissioned Daymark to study:
- ▶ The 2018 Polar Vortex Fuel Security Analysis/ gas pipeline constraints, and
- ▶ The Future Grid (FGRS)“Matrix 1” Resource & Load Scenario, and
- ▶ Cape Cod Resource Integration Studies and need for HVDC OSW directly into Boston



Resource Adequacy Screen Scenario Matrix
5 Scenarios for Study

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ISO-NE PUBLIC





Winter Resiliency: Study Results Find Major Problems and Solutions

Problem

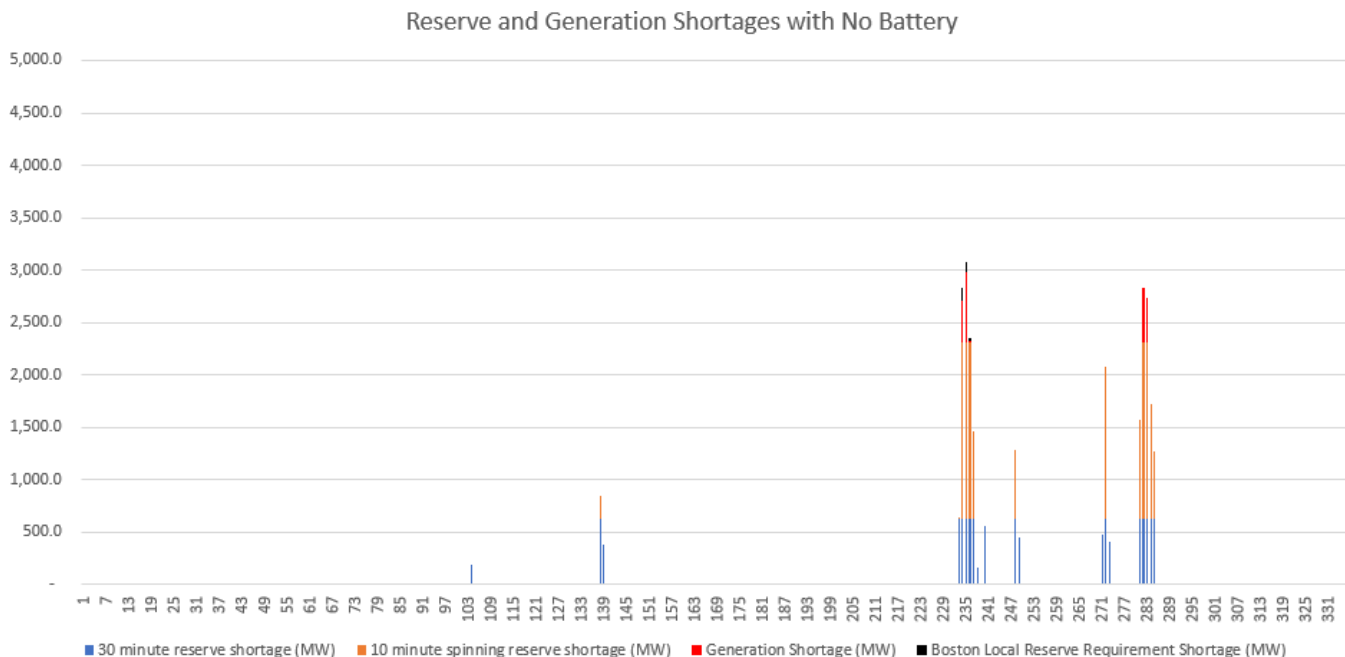
- ▶ Study finds 5 winter load shedding events in 2-week polar vortex period in Boston load pocket without batteries (OP-7): 2,055 MWh of firm load shedding, **almost 40% of Boston (NEMA) load**

Solution

- ▶ 4-hour duration batteries in load pocket
- ▶ HVDC cables direct from offshore wind into Boston (Mystic)

Key Concepts

- ▶ More charging windows available for 4-5-hour duration than 10-hour duration
- ▶ Batteries in load pocket alleviate gas pipeline constraints





ISONE Recent/Ongoing studies

Operational Impact of Extreme Weather Events

- ▶ Probabilistic Energy Adequacy Tool (PEAT)
- ▶ Goal—to inform region on energy shortfall risks over the next decade
- ▶ Problem—regional only; does not evaluate internal transmission constraints such as Boston Load Pocket in context of extreme weather events

Regional Energy Shortfall Threshold (REST)

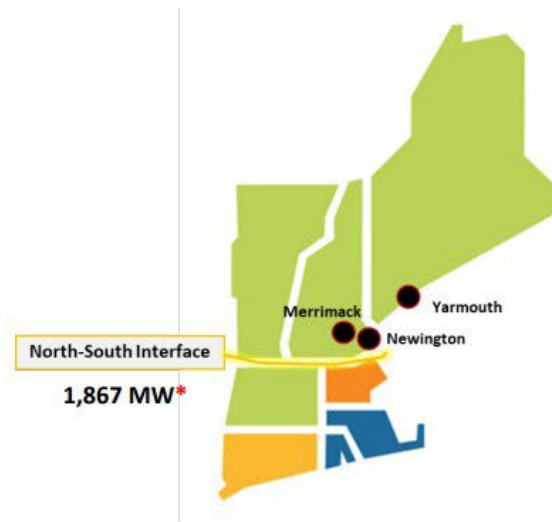
- ▶ Under establishment now; also planning a regional approach
- ▶ Consider cooperative effort to influence study design
- ▶ Process schedule is slow—develop final REST proposal by Dec 2024

Transmission Deferral / Renewables Integration Advantages of Mystic

- BESS at Mystic opens opportunity for procurement of additional renewable generation by Massachusetts

New renewable generation potential from the north:

- The North-South interface moves significant amounts of generation into MA, supported by critical non-renewable generation sources in Maine (such as Yarmouth – oil) and New Hampshire (such as Newington – gas/oil and Merrimack – gas/oil)
- Adding storage at Mystic removes the need to pull power from northern non-renewable sources and opens opportunity for procurement of additional northern renewable generation by Massachusetts



* - from a representative ISO-NE 2027 peak load case



* - from a representative ISO-NE 2027 peak load case by dispatching Mystic BESS to the three indicated units

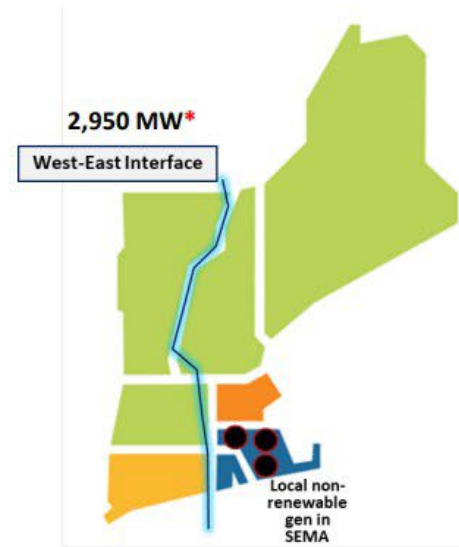
This qualitative assessment shows a potential for around 1,000 MW of new renewable generation that can be procured from Northern New England

Transmission Deferral / Renewables Integration Advantages of Mystic

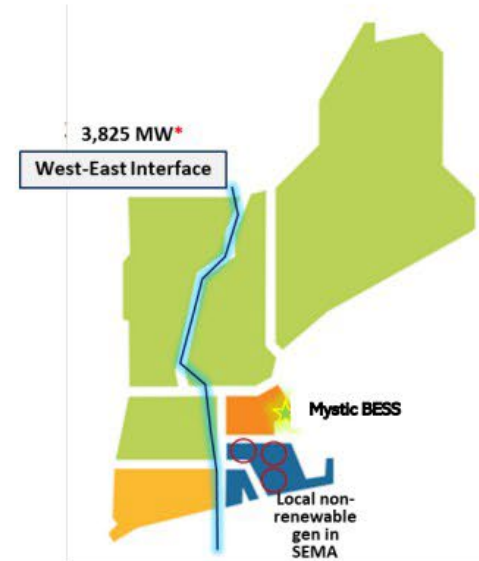
- BESS at Mystic opens opportunity for procurement of additional renewable generation by Massachusetts

New renewable generation potential from within the state:

- The West-East interface moves significant amounts of generation into eastern MA, supported by critical non-renewable generation sources in southeastern MA
- Adding storage at Mystic provides critical generation-support to local Boston load while creating an opportunity for procurement of additional renewable generation from within the state (such as OSW generation procurement in SEMA or renewable generation procurement in WCMA)



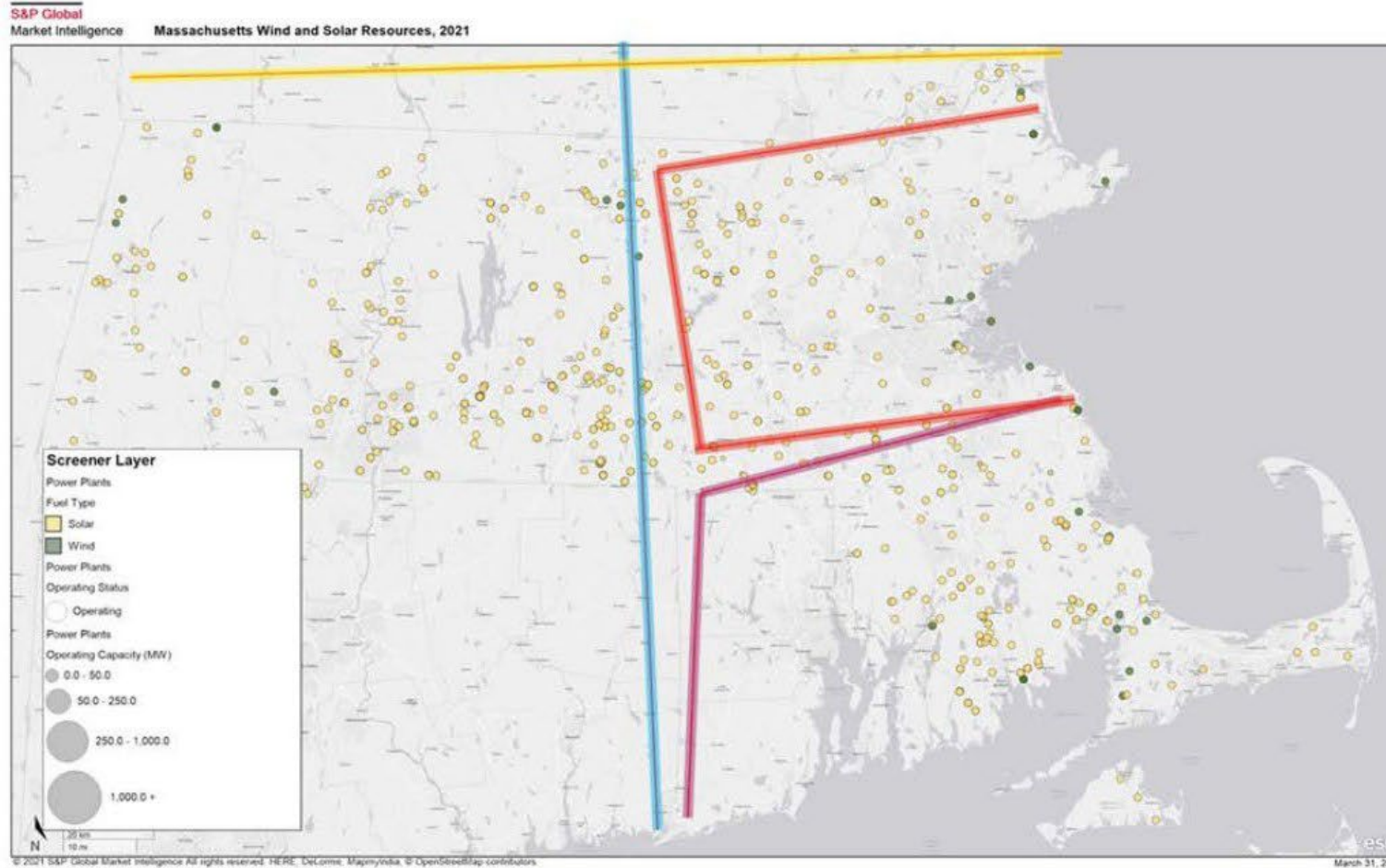
* - from a representative ISO-NE 2027 peak load case



* - from a representative ISO-NE 2027 peak load case by dispatching Mystic BESS to non-renewable SEMA generation

This qualitative assessment shows a potential for around 1,000 MW of new renewable generation that can be procured from within the state

Battery at Mystic Facilitates Additional In-State Renewable Deployment



- Alleviation of East-West (blue) and SEMA-RI (purple) constraints will facilitate delivery of more Massachusetts-based renewable resources to Boston load pocket



Batteries Value to Consumers, Savings from Lost Load Costs and Other Integration costs

- ▶ What is the value of the saved lost load?
- ▶ 2021 Synapse Report* calculated Value of Lost Load in New England as \$73/kWh
- ▶ 2,055 MWh of saved load shed identified
- ▶ $2,055 \text{ MWh of saved load shed} \times \$73,000/\text{MWh} = \$150 \text{ million in load shed savings value}$

Mystic additional consumer benefits:

- ▶ Ability to inject 700 MW without network upgrades saves potentially hundreds of millions of costs to inject at other locations
- ▶ Facilitates offshore wind injection and solar integration from north and west, expanding options for in-state renewables

JUPITER POWER 200 MW BESS
WITH POWER SUBSTATION
CROSETT, TEXAS

