

Northeast Hydrogen Fuel Cell Activity Review 2019

Charlie Myers
President
Massachusetts Hydrogen Coalition

Northeast Infrastructure Investment – Air Liquide Progress

Littleton, MA Hub Site



Braintree, MA
(Under Construction)



Mansfield, MA



Hempstead, NY



Hartford, CT



Providence, RI

Hydrogen Infrastructure

NEL, Wallingford, CT



SimpleFuel (IVSY), Somerville, MA



Distribution Centers Using Fuel Cell Fork Lift Trucks

Martignetti Liquors
Taunton, MA
(Nuvera/Hyster Yale)



Sysco
Plympton, MA
(Plug Power)



Training – First Responder / Fire Marshalls

PNNL Hydrogen Safety Course Material



- Firefighters from more than 50 NE departments have received hydrogen and fuel cell training (over 1000 firefighters).
- Hydrogen Infrastructure Introduction have been made to more than 20 NE fire chiefs.
- State Fire Marshalls in MA, RI, CT, NY, NH, VT, ME have been introduced to hydrogen infrastructure.
- Live fire prop training done at both MA and CT Fire Academies.
- Local fire marshal permitting hydrogen introductions have been done to over 400 marshals in MA, CT, RI, NY.

Fire Department Training



Connecticut Fire Academy



Massachusetts Fire Academy



Metrology (Weights & Measures)

MA, NY, CT and RI have all agreed and are following California hydrogen metering, purity and particle test standards. Using those protocols, these same states have issued hydrogen dispenser seals to all stations in their respective jurisdictions.



CT Weights & Measures receiving education on hydrogen dispensing at NEL, Wallingford, CT

Air Liquide dispenser seals
(Left – Providence)(Right – Mansfield)



CT Weights & Measures
metering testing at Hartford
(Right)

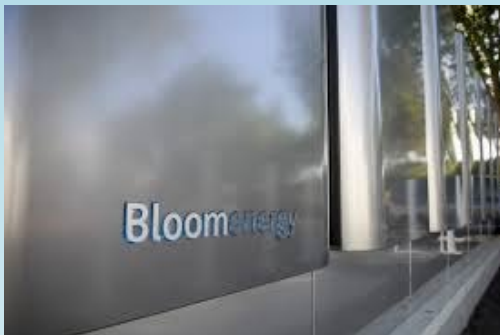
SAE J2601 Performance
Testing at Providence (Left)



Activity and Regulation

Massachusetts Alternative Portfolio Standards now includes fuel cells. Under the new APS regulations, Bloom Energy developed and received an order from Partners Healthcare for three hospital sites following Massachusetts update of the Alternative Energy Portfolio regulations to include fuel cells. They will be deployed at the Spaulding Rehabilitation Hospital, North Shore Medical Center, and at its 65,000 square foot Marlborough data center.

Spaulding, Charlestown, MA



North Shore Medical



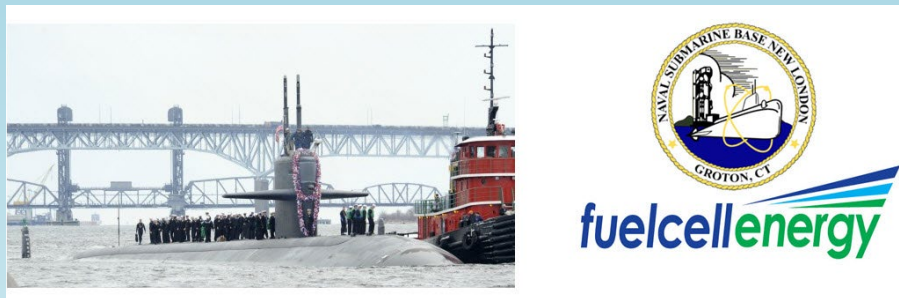
ITM Power receives grant from the Massachusetts Clean Energy Center to study renewable hydroelectric power hydrogen energy storage in collaboration with Holyoke Municipal Gas & Electric, Holyoke, MA.

Holyoke Hydroelectric Canal System



Activity and Regulation

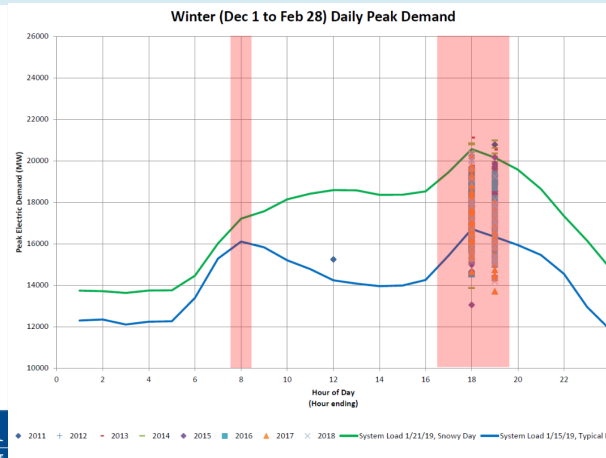
FuelCell Energy will install two SureSource 4000™ power plants for long-term supply of power at the U.S. Navy Submarine Base in Groton, Connecticut.



Massachusetts Clean Peak Standard in development now, mandated by legislation, 1st of it's kind in the nation. Actively seeking input.

CPC Multipliers: Core Design – Seasonal Multiplier

- Adjusts the number of CPCs generated by season, where Summer/Winter receive the highest multiplier and Spring/Fall receive a lower multiplier
- Summer electricity demand is the highest peak of the year and drives infrastructure costs for Generation, Transmission, and Distribution
 - As such, Summer Peaks have the highest multiplier
 - DOER considering multiplier of **3x**
- Winter electricity demand incurs the highest energy costs and the highest emissions rate plants
 - As such, Winter Peaks have the highest multiplier
 - DOER considering multiplier of **3x**
- Spring and Fall peaks cause ramping requirements, but otherwise are relatively inconsequential
 - Spring and Fall Peaks have the lowest multiplier
 - DOER considering multiplier of **1x**



Creating A Clean, Affordable, and Resilient Energy Future For the Commonwealth



COMMONWEALTH OF MASSACHUSETTS
 Charles D. Baker, Governor
 Karyn E. Polito, Lt. Governor
 Matthew A. Beaton, Secretary
 Judith Judson, Commissioner

Clean Peak Standard Straw Proposal

DRAFT

Creating A Clean, Affordable, and Resilient Energy Future For the Commonwealth



CPS Straw Proposal Presentation
 Boston, MA
 April 2, 2019

Hyster Yale (Nuvera) – Fuel Cell Port Equipment - International

Port of Los Angeles, California



Port of Valencia, Spain



Top Handler
80,000 lbs lift capacity



Reach Stacker
80,000 lbs lift capacity

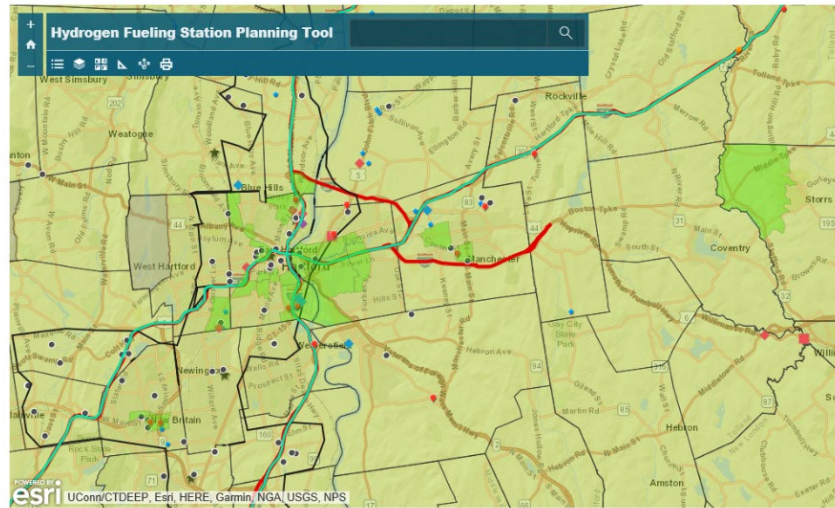


Nuvera Fuel Cells
Billerica, MA

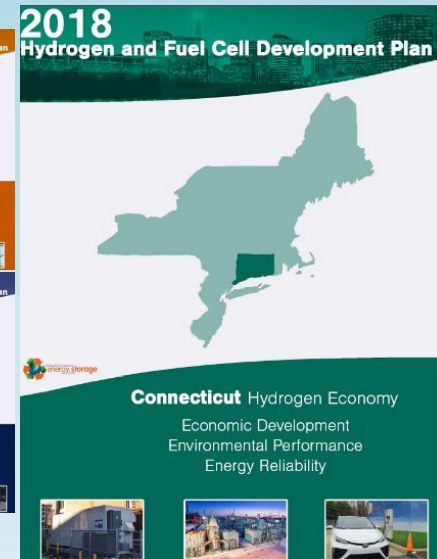
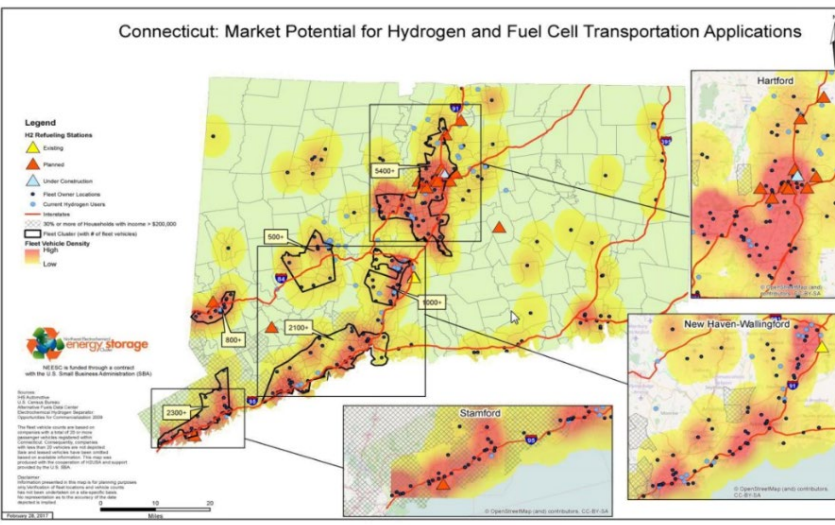
CT Center For Advanced Technology (CCAT)

Hydrogen Fueling Station Planning Tool

The map below depicts potential locations for the development of hydrogen fueling stations.



Interactive hydrogen station planning tool



Hydrogen and fuel cell development plans, fleet based, created for each of the Northeast States

Fleet and demographic mapping targeting fuel cell applications

FCV Outreach

Middle School STEM Fair



Lions Dinner Meeting



MA DOER Ride & Drive



MA CEC & State Senator



Memorial Day Parade



NEECE Utility Conference



Boston Fire Department



Hartford At Capital

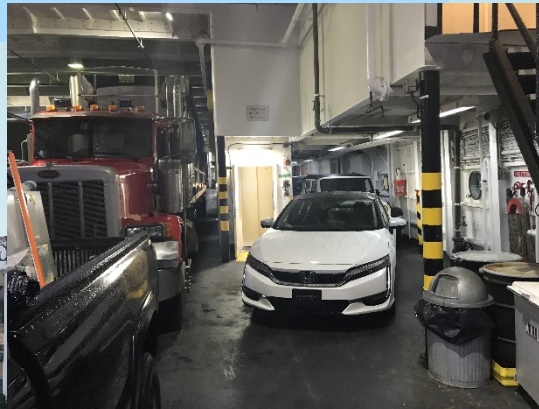
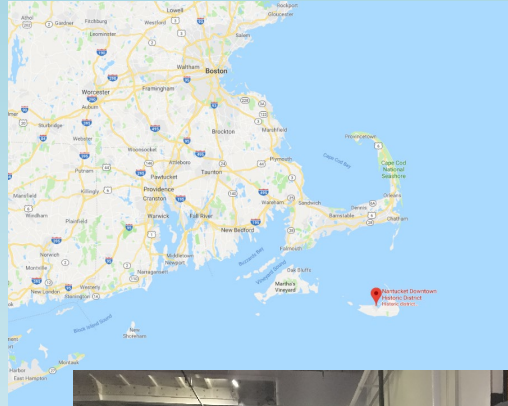


Parked At Station



FCV Northeast Experiences

Daffodil Festival, Nantucket Island



Zero degrees F and 16 inches of snow
FCV's just start right up

The Future, A Northeast Renewable Hydrogen Cluster

Renewably generated hydrogen supports these Massachusetts applications to strengthen resilience and support efforts to lower emissions: Light duty vehicles, Heavy duty vehicles, Mass transit bus, Mass transit rail, Port infrastructure, Power-to-gas and Department of Defense special projects.

Freight Infrastructure



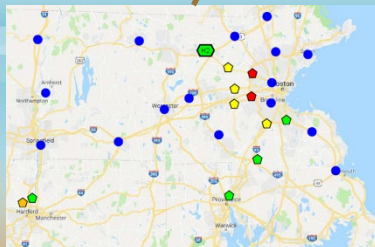
Massport Connelly Terminal



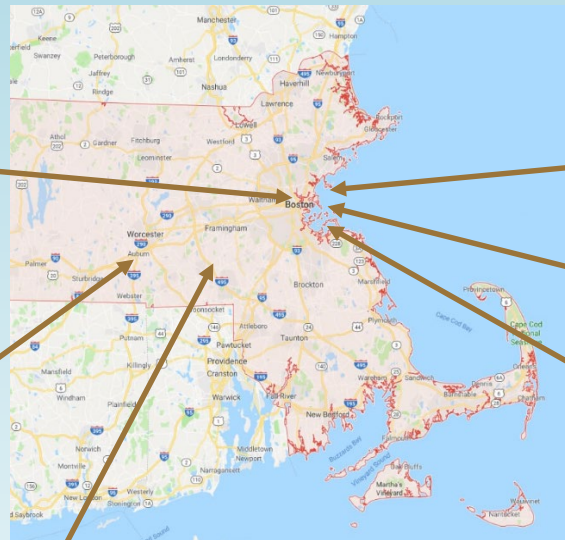
Heavy Duty Truck



CSX Intermodal Terminal



Hydrogen Retail Station Network



Mass Transit



MBTA FCV Bus Fleet



Massport Harbor Ferries



MBTA Commuter Rail



Offshore Wind / MA & RI Multiple Interconnect Points

Thank You

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