

Hydrogen and Fuel Cell Technical Advisory Committee (HTAC)

**Joel M. Rinebold
Connecticut Center for
Advanced Technology, Inc.
April 1, 2014**

This presentation does not contain any proprietary, confidential, or otherwise restricted information.

- Roadmap development (2014 Update)
- IMPLAN Economic Analysis
- Supply Chain Mapping
- Searchable Database
- H₂USA Survey
- H₂USA Roadmaps
- Outreach
 - Technology Briefing
 - Ride and Drive
 - Webinars
 - Presentations



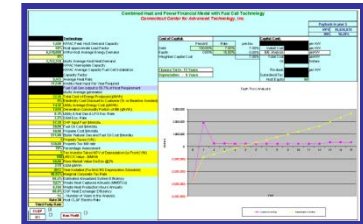
Plan



Briefing



Outreach



Analysis



Database



Demonstration

Updating (2012) strategic guidance documents:

- Economic impacts (jobs, revenue, companies)
- Technology, Applications, and Markets
- Stationary and Transportation Deployment Targets
- Policy and Drivers
 - Job Development
 - Energy Reliability
 - Storm Preparation
 - Environmental
 - Carbon Control





IMPLAN Economic Analysis

- **Supply Chain:**
 - 1,179 companies (30 OEMS)
 - 96 percent are US owned
 - 90 percent are commercial companies

- **Total Annual Revenue and Investment:**
 - \$1.2 Billion (2.32 Revenue Multiplier)

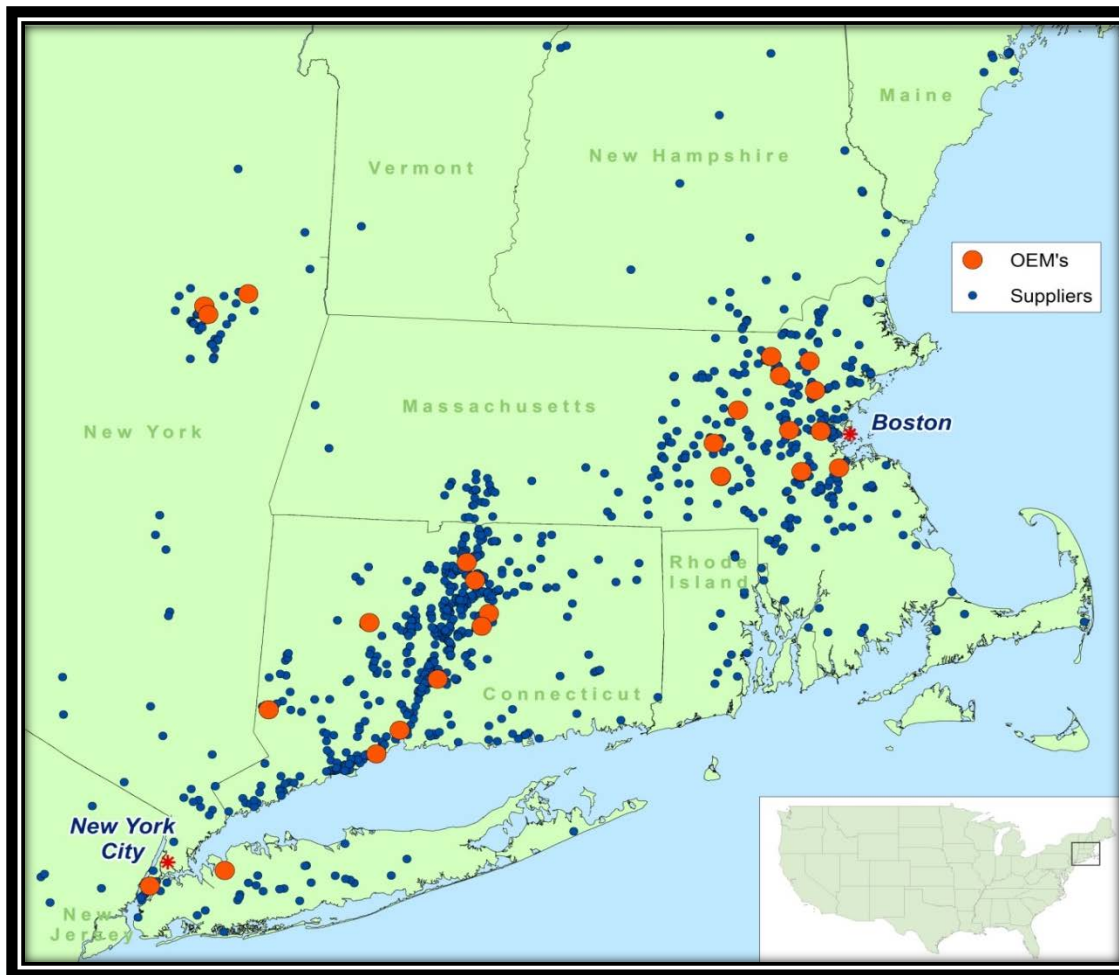
- **Total Jobs (Direct, indirect, and induced):**
 - 5,770 (2.70 Job Multiplier)

⁴ * NEESC 2011 regional data includes ME, MA, VT, RI, CT, NH, NY, NJ



Integrated Supply Chain

Supply Chain Mapping





Supply Chain Analysis

Searchable Database

Northeast Electrochemical energy storage Cluster

Home About Us Searchable Databases Benefits Tools Opportunities Publications News Events Education Login

Home

Supplier

Incubator

Academic

Workforce

Economic and Business Development

Low Cost/No Cost Legal Services

Low Cost/No Cost Manufacturing Assistance

Hydrogen Refueling Stations

Export Advisory Services

Supply Chain Database Search

Product:

- and / or -

Key Word:

State:

- or -

Within: of (zip code)

Add a company, click [here](#)

Company name:

Type of business:

Level:

Country:

Street address:

State:

Town/City:

Zip Code:

Web site (incl. http://):

Phone #:

Geo location Latitude:

Geo location Longitude:

Select your categories

Components

- Abrasives
- Air
- Batteries
- Cables and wires
- Casters and wheels
- Catalyst
- Ceramic
- Electrical
- Electronic
- Fans and Blowers
- Fasteners
- Hoses and tubes
- HVAC
- Hydraulics
- Industrial
- Miscellaneous
- Plumbing
- Pumps
- Sensing and controls

© 2014 Northeast Electrochemical Energy Storage Cluster

14 Supply Products

- Batteries
- Components
- Abrasives
- Air
- Batteries**
- Cables and wires
- Casters and wheels
- Catalyst
- Ceramic
- Electrical
- Electronic
- Fans and Blowers
- Fasteners
- Hoses and tubes
- HVAC
- Hydraulics
- Industrial
- Miscellaneous
- Plumbing
- Pneumatics

Over 100 Categories

Search Type: Supplier Product: Components - Batteries

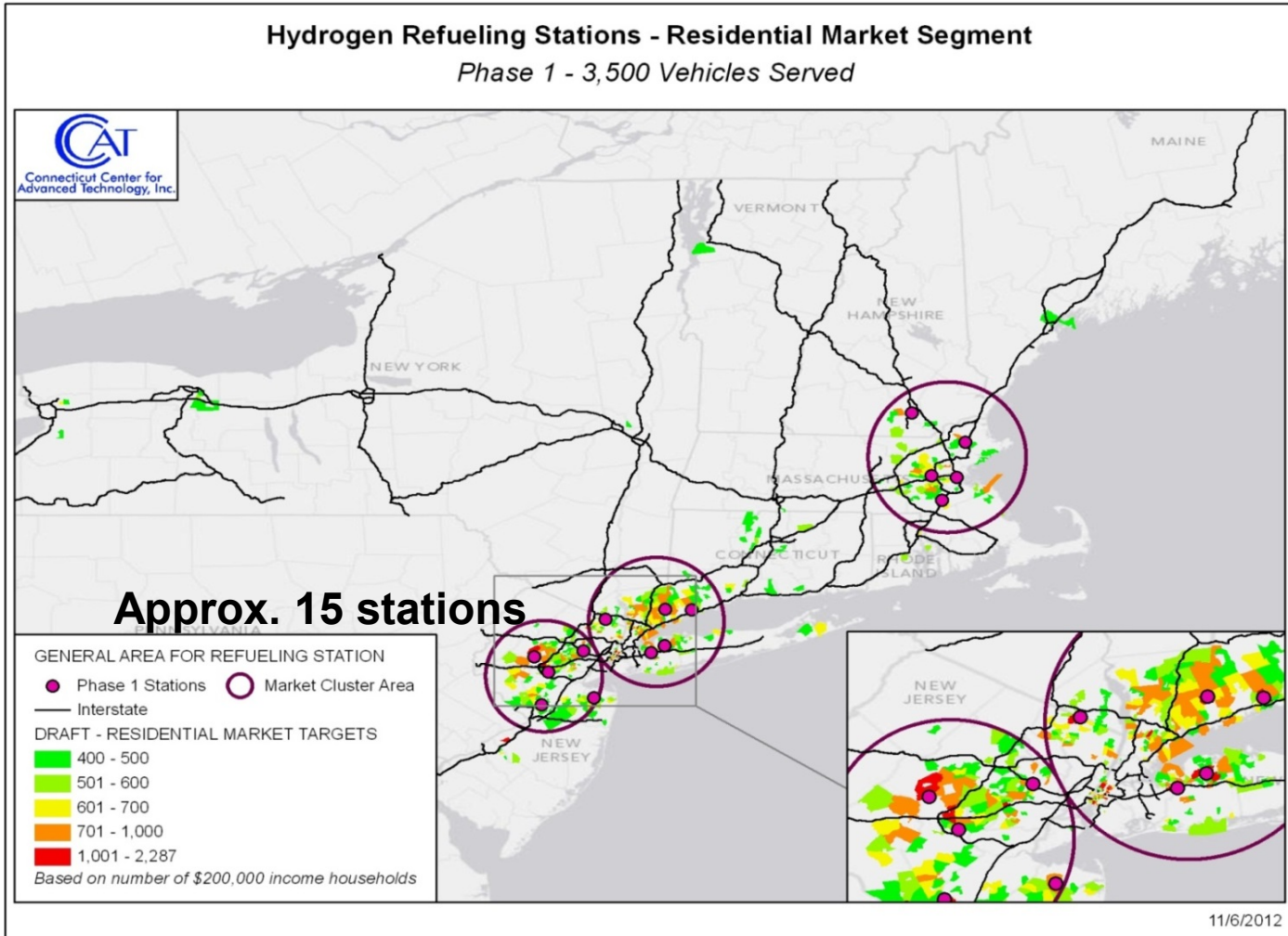
Company Name	Address	City	State	Website
Attek Electronics Inc.	200 Shoemaker Blvd	Wareham	MA	http://www.attekelec.com
AMETEK Power Systems & Instruments	255 North Union Street	Rochester	NY	http://www.ametekpower.com/
Bren-Tronics Inc.	10 Braibon Court	Comstock	NY	http://www.bren-tronics.com/index.asp
Curtis Instruments Inc.	200 Kiaco Avenue	Mount Kisco	NY	http://www.curtisinstruments.com/
Digitron/Firing Circuits	230 Long Hill Cross Road	Shelton	CT	http://www.digitron.com
Granger	428 University Avenue	Hanover	MA	http://www.granger.com
Harco Feest	30 Mariani Building Blvd	Fair Hope	MA	http://www.harcofeest.com
Hardware Specialt, Co. Inc.	48-75 31th Street	Long Island City	NY	http://www.hardware-specialty.com/
Interstate Batteries	See Website for nearest Dealer Location			http://proprope.enr.com/interstate-batteries.com/
Inus Inc.	118 Winney Hill Road	Oneonta	NY	http://www.inus.com/index.html

H₂USA Survey

- What are the "drivers" for the deployment of fuel cell electric vehicles?
- What are the "implementers" for the deployment of FCEVs?
- What are the existing "barriers" that must be addressed for the development of hydrogen infrastructure?
- What are the existing "barriers" that must be addressed for the deployment of FCEVs?
- If sufficient hydrogen infrastructure was available, where and when would your company choose to deploy FCEVs?

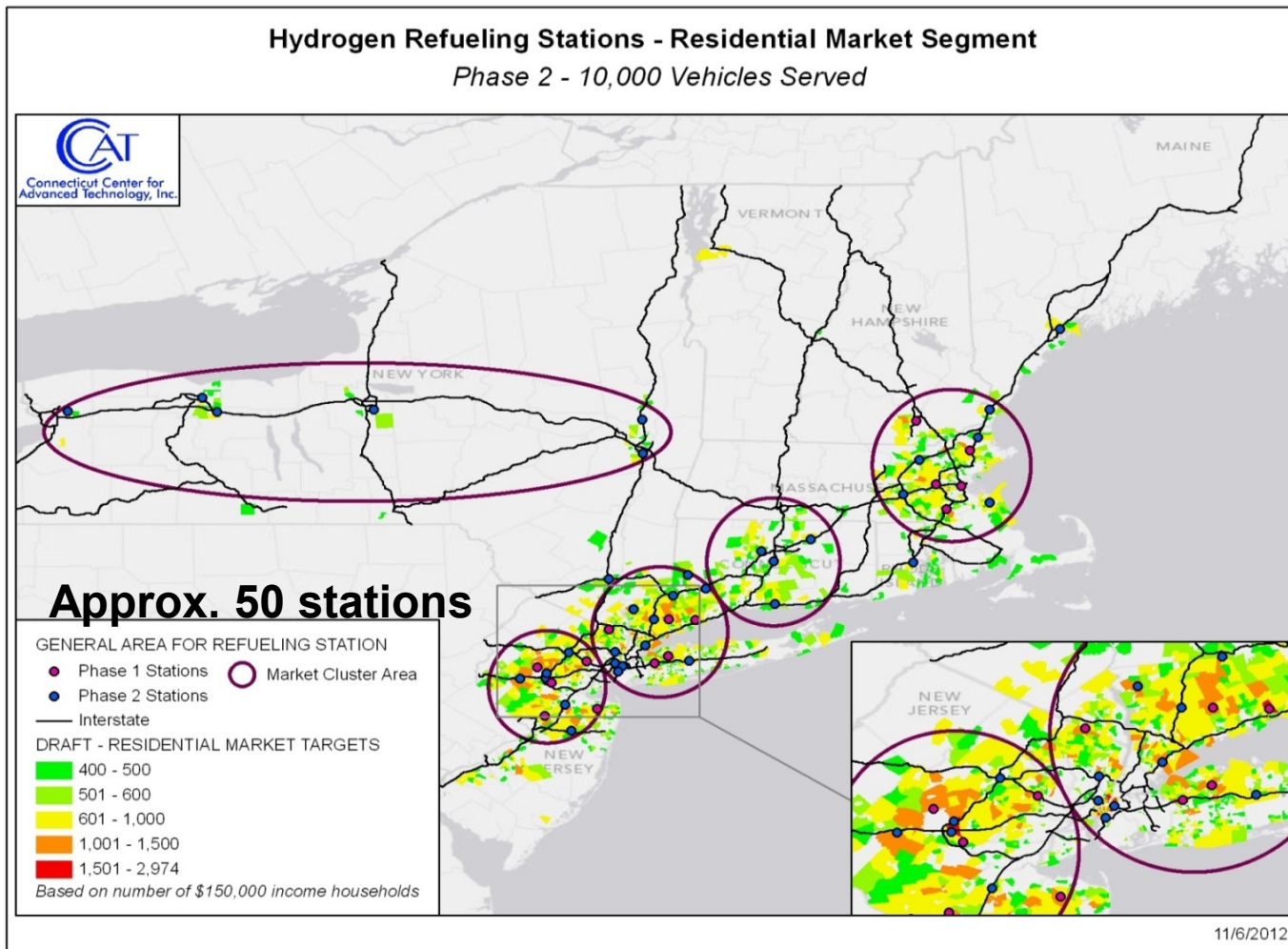


H₂USA Roadmaps



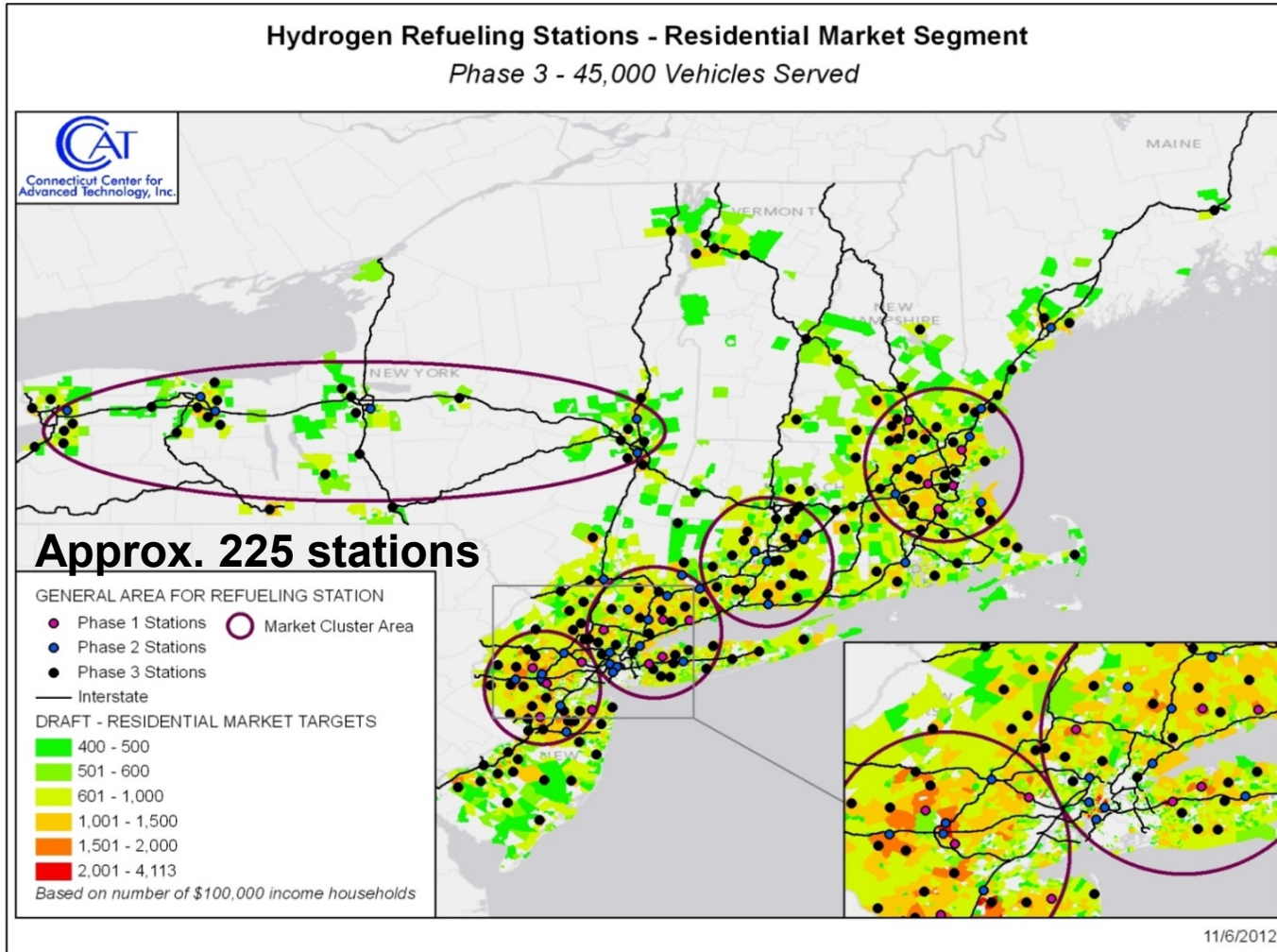


H₂USA Roadmaps





H₂USA Roadmaps





H₂USA Roadmaps (CT)

PRELIMINARY

Northeast Hydrogen Roadmap - CT PHASE I

3/28/2014

H₂USA



Existing Infrastructure

- Fleet Owner Locations
- Current Hydrogen Users

H2 Refueling Stations Status

- ▲ Existing
- ▲ Planned

— Interstates

▭ Fleet Clusters

▨ 30% or more of Households with income > \$200,000

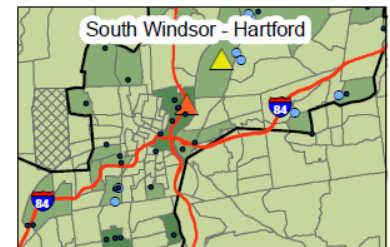
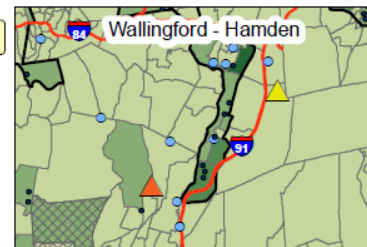
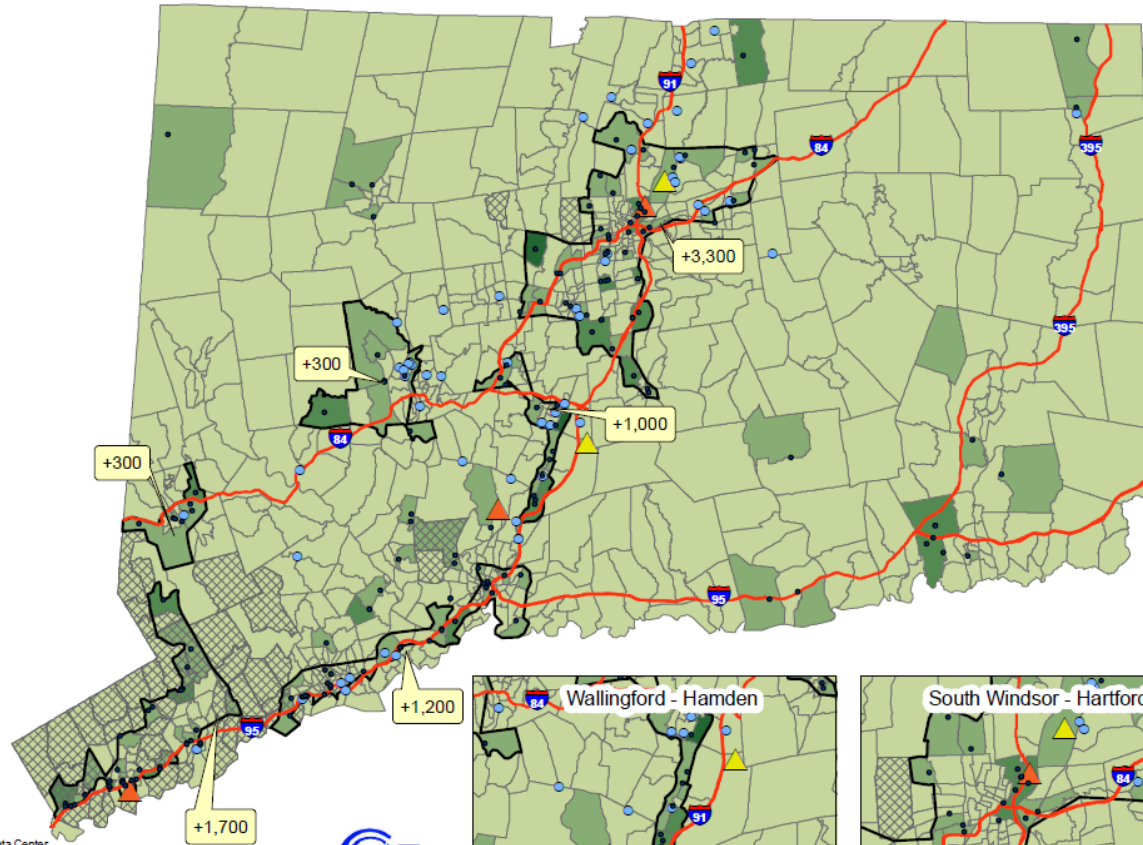
Total Passenger Fleet Vehicles

- 0
- 20 - 100
- 101 - 500
- 501 - 1000

The fleet vehicle counts are based on companies with a total of 20 or more passenger vehicles registered within Connecticut. Consequently, companies with less than 20 vehicles are not depicted. Most rental and leased vehicles have been omitted. The information presented on this map is for planning purposes only. No representation as to the accuracy of the data depicted is implied.

Fleet vehicle data provided by R. L. Polk & Co., 2013.
Hydrogen Refueling Station locations provided by US DOE Alternative Fuels Data Center.
Household income based on 2010 US Census.
Interstates and Census Tracts provided by US Census.

0 9.5 19 28.5 Miles



Connecticut Center for Advanced Technology, Inc.



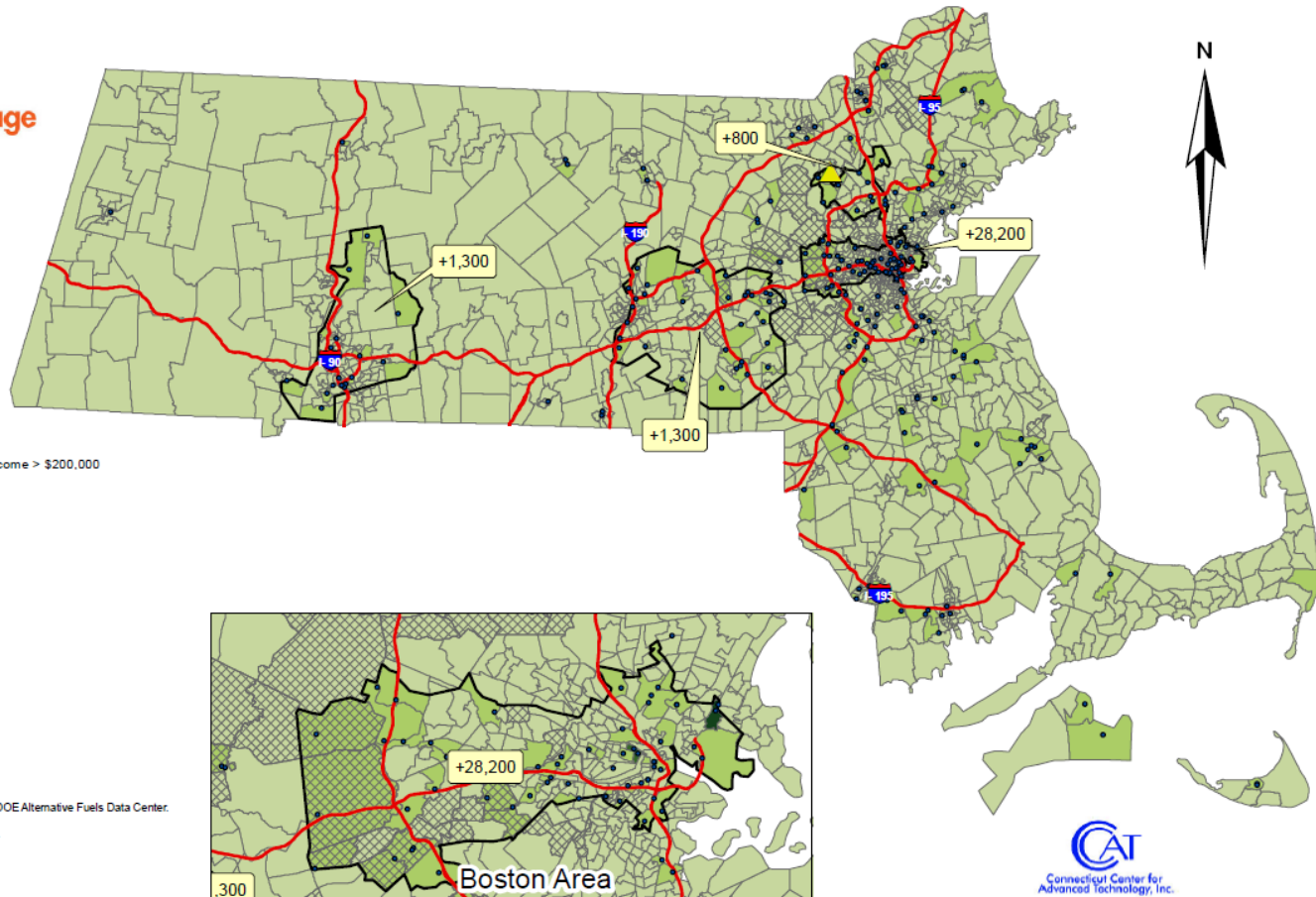
H₂USA Roadmaps (MA)

PRELIMINARY

Northeast Hydrogen Roadmap - MA

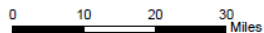
3/28/2014

PHASE I



The fleet vehicle counts are based on companies with a total of 20 or more passenger vehicles registered within Massachusetts. Consequently, companies with less than 20 vehicles are not depicted. Most rental and leased vehicles have been omitted. The information presented on this map is for planning purposes only. No representation is to the accuracy of the data depicted is implied.

Fleet vehicle data provided by R. L. Polk & Co., 2013.
 Hydrogen Refueling Station locations provided by US DOE Alternative Fuels Data Center.
 Household income based on 2010 US Census.
 Interstates and Census Tracts provided by US Census.





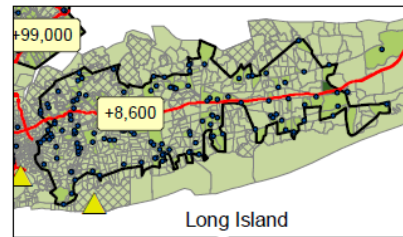
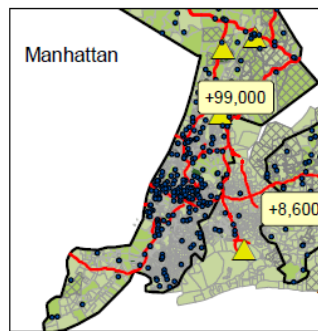
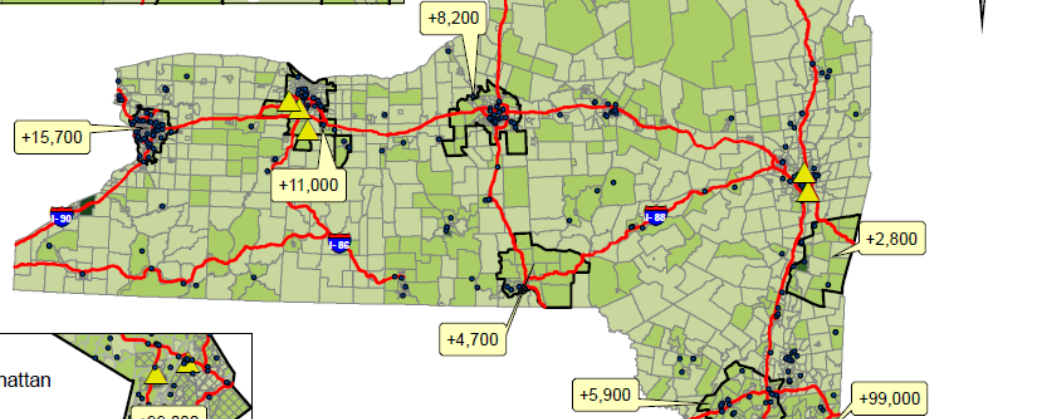
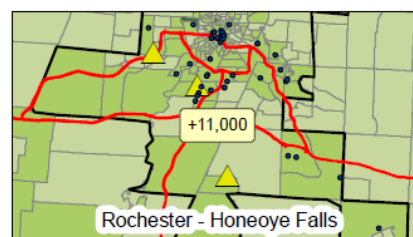
H₂USA Roadmaps (NY)

PRELIMINARY

Northeast Hydrogen Roadmap - NY

3/28/2014

PHASE I



Existing Infrastructure

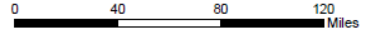
- ▲ Existing H₂ Refueling Stations
- Fleet Owner Locations
- Interstates
- ▭ Fleet Clusters
- ▨ 30% or more of Households with income > \$200,000

Total Passenger Fleet Vehicles

- No Data
- 20 - 500
- 501 - 2000
- 2001 - 7000

The fleet vehicle counts are based on companies with a total of 20 or more passenger vehicles registered within New York. Consequently, companies with less than 20 vehicles are not depicted. Most rental and leased vehicles have been omitted. The information presented on this map is for planning purposes only. No representation as to the accuracy of the data depicted is implied.

Fleet vehicle data provided by R. L. Polk & Co., 2013.
 Hydrogen Refueling Station locations provided by US DOE Alternative Fuels Data Center.
 Household income based on 2010 US Census.
 Interstates and Census Tracts provided by US Census.





Technology Briefing

Hydrogen & Fuel Cell Industry Present Status and Future Direction Industry Briefing and Technology Showcase

◆ Reliable Energy ◆ Transportation ◆ Jobs ◆ Innovation

Room xx, Legislative Office Building, January 21, 2014

Commerce Committee Senator LeBeau, Representative Perone

Energy Technology Committee Senator Duff, Representative Reed



Welcome and Introduction 9:00 am

Federal Policy U.S. Congressman John B. Larson

Transportation and Economic Policy Commissioner James P. Redeker, Commissioner Catherine Smith

Fuel Cells for Reliable Stationary Power

- ClearEdge Power - Joe Triompo
- FuelCell Energy – Frank Wolak

Hydrogen / Fuel Cells for Transportation:

- Proton OnSite- Robert Friedland
- Toyota – Kevin Kinnaw
- Honda – Stephen Ellis
- Hyundai – Bill MacLeod
- BMW – Jesse Schneider
- Daimler – Matthew Forrest

Emerging Technologies / Innovation

- Infinity Fuel Cell & Hydrogen – William Smith
- Sustainable Innovations – Trent Molter
- Precision Combustion Inc. - Kevin Burns
- Advent Technologies – Vasilis Gregoriou
- UConn – Prabhakar Singh

Jobs / Economic Growth / Supply Chain

- CCAT - Joel Rinebold
- GrowJobsCT - John Harry
- U.S. Dept. of Energy – Nancy Garland

Execution of State Energy Policy Commissioner Daniel C. Esty, CT DEEP

Ride and Drive with Zero Emission Fuel Cell Electric Vehicles – 11:00 am – 1:00 pm

Ride and Drive



Agenda

Sponsored by the College of Nanoscale Science & Engineering, New York State Energy and Research Development Authority, and the Northeast Electrochemical Energy Storage Cluster

1. Welcome and Introduction 2:00 PM
2. Administration
 - a. Antitrust Guidelines (standing activity for every meeting)
 - b. Charter for Governance and Structure
 - c. Memorandum of Understanding
3. Public Projections for Vehicle Deployment
 - a. Summary of workshop session presentations
 - b. NREL projections for vehicle deployment
 - c. Conference of New England Governors and Eastern Canadian Premiers Resolution 36 - Concerning Transportation
4. Identify technical barriers for vehicle deployment
5. Identify standards for development of hydrogen infrastructure
 - a. Projected volume and distribution of refueling stations
 - b. Develop criteria for selection of potential refueling station locations:
 1. Proximity to major interstates, population centers, fuel cell forklift deployment sites, etc.
 2. Locations of existing alternative fuel stations, transit districts, fleet locations, etc.
6. Establish subcommittee to develop policy recommendations to maximize the potential for and accelerate the deployment of hydrogen refueling and alternative fuel vehicles
7. Schedule of tasks, and assignments to address desired outcomes
8. Wrap Up 4:00PM



Webinars

Take Action: Refine Your Marketing Plan for 2014

Webinar
January 28, 2014
12:00 - 1:00 PM

Attending and participating in a profitable conference substitutes your current marketing activities. This webinar will show you how to determine which marketing connections with customers in 2014. It will also determine if the right path for every course connects to an new strategy.

Find out more

The estimate is 30-40 minutes followed by a Q&A. Attendees may consult with marketing/business experts, following the presentation. For more information, contact Paul Arends at parends@ccat.us or 800-202-4206.

Coming Soon:
[European Fuel Cell and Hydrogen Markets With a Focus on Germany](#) - February 11, 2014
[10 Tips to Generate Revenue from Conferences](#) - February 25, 2014
[Ensuring Your DOE Review is Successful](#) - March 2014

European Fuel Cell and Hydrogen Markets With a Focus on Germany

Webinar
February 11, 2014
10:00 - 11:00 AM

In anticipation of international events such as Hannover Messe, this webinar presentation will cover the following topics:

- Market Entry
- Current Market Trends
- Current Demand
- Competitors
- Barriers
- Trade Events / Associations
- U.S. Commercial Service Contact Information

Besides Germany, Italy, France, and Belgium are known for a well-developed and hydrogen generation industry, have the most exhibitors attending Hannover 2014, and will be covered in this webinar.

Find out more on our website...

The estimate is 30-40 minutes followed by a Q&A. Attendees may schedule a 1-hour private consultation with marketing/business experts, following the presentation. For more information, contact Paul Arends at parends@ccat.us or 800-202-4206.

Coming Soon:
[10 Tips to Generate Revenue from Conferences](#) - February 2014
[Ensuring Your DOE Review is Successful](#) - March 2014

10 Tips to Generate Revenue from Conferences

Webinar
February 25, 2014
12:00 - 1:00 PM

Conference attendance and exhibition are a great way to promote your products to potential and current customers. Unfortunately they can also be a failed investment if you do not prepare and follow-up with new contacts. By planning for a conference, you can ensure it will not simply be a social gathering and create no future opportunities for your business. This session will focus on methods to ensure your business receives the most value from conferences.

Find out more on our website...

The estimate is 30-40 minutes followed by a Q&A. Attendees may schedule a 1-hour private consultation with marketing/business experts, following the presentation. For more information, contact Paul Arends at parends@ccat.us or 800-202-4206.

Coming Soon:
[Ensuring Your DOE Review is Successful](#) - March 2014

Ensuring Your DOE Review is Successful

Webinar
March 25, 2014
12:00 - 1:00 PM

Final Mark Review and Peer Evaluation Meeting scheduled for June 2014, if your business is fully prepared for the U.S. Department of Energy and Fuel Cells Program and Vehicle Technologies event in Washington, DC, your business will be successful and your project will capture the attention it deserves.

Find out more on our website...

The estimate is 30-40 minutes followed by a Q&A. Attendees may schedule a 1-hour private consultation with marketing/business experts, following the presentation. For more information, contact Paul Arends at parends@ccat.us or 800-202-4206.

Distributed Wind Technology for Hydrogen Production

Webinar
March 14, 2014
12:00 - 1:00 PM

Use attendees to renewable hydrogen production from wind, solar, and the National Renewable Energy Laboratory (NREL) are working to improve overall system efficiencies and cost reductions. This technology, provide an overview of an operating wind farm and share efforts to bring the technology to scale in the U.S.

REGISTER NOW

For more information, contact info@nrel.gov or 802-223-2854.

Interested in attending?
[Click on this link to Register](#)

Presentations

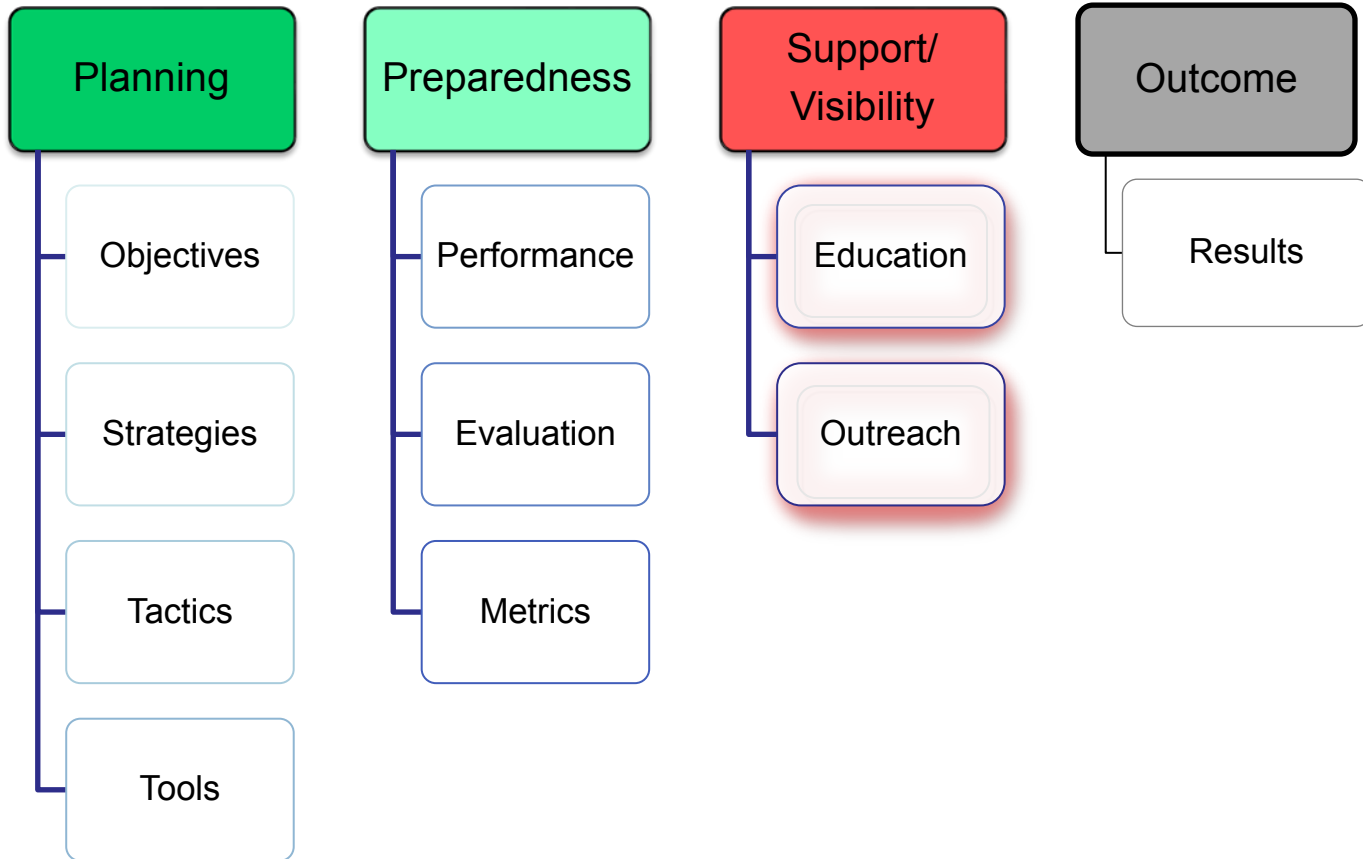


SBIR/STTR
SMALL BUSINESS INNOVATION RESEARCH
SMALL BUSINESS TECHNOLOGY TRANSFER





Future Action





Fuel Cell/H₂ Policy Summary

	ME	NH	VT	MA	RI	CT	NY	NJ
Energy Policy for Fuel Cells								
Mandatory Renewable Portfolio Standard (RPS)	Eligible	Eligible		Eligible	Eligible if renewable	Eligible	Eligible	Eligible if renewable
Net Metering	Eligible	Eligible	Eligible if renewable	Eligible	Eligible if renewable	Eligible	Eligible	Eligible if renewable
Public Benefits Fund	Eligible		Eligible if renewable	Eligible	Eligible if renewable	Eligible	Eligible	Eligible if renewable
State Incentives for Fuel Cells								
Performance-Based Power Purchase	Eligible				Eligible if renewable	Eligible	Eligible	
State Grant Program		Eligible if renewable	Eligible if renewable		Eligible	Eligible		Eligible
State Loan Program			Eligible if renewable		Eligible if renewable	Eligible		
Property Tax Incentive (Commercial)			Eligible if renewable			Eligible		Eligible
Sales Tax Incentive			Eligible if renewable			Eligible	Eligible	
Property-Assessed Clean Energy (PACE) Financing						Eligible	Eligible	Eligible if renewable
State Incentives for Hydrogen Fuel								
Zero Emission Vehicle Program (FCEV/H ₂ Infrastructure)			Eligible	Eligible	Eligible	Eligible	Eligible	



Eligible



Eligible if renewable



Joel Rinebold
Director of Energy Initiatives
Connecticut Center for Advanced Technology
jrinebold@ccat.us
(860) 291-8832