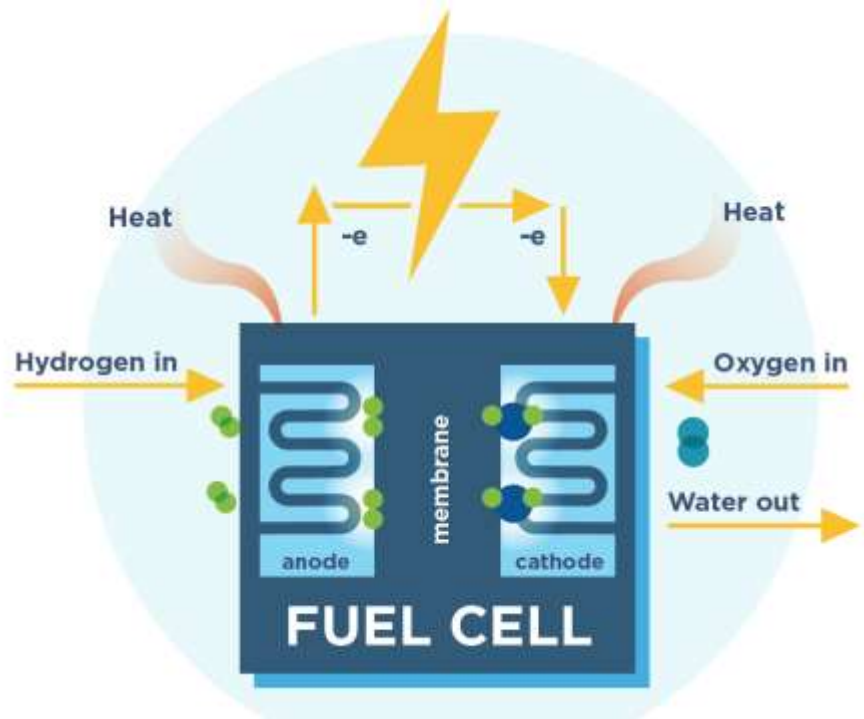


Fuel Cells and Hydrogen Energy in the United States

Fuel Cells 101

Fuel cells generate electricity and heat using hydrogen and oxygen to drive an electro-chemical reaction, not combustion – the only byproduct is water.



Today's Fuel Cell Markets



Transportation

- Cars
- Buses
- Scooters
- Material Handling



Hydrogen Fueling

- Distribution
- Generation
- Station components



Stationary Power

- Primary Power
- Distributed
- Generation
- Back up power



Portable Power

- Battery Chargers
- Remote/off-grid
- Recreation
- Military

Fuel Cell Vehicles



Zero Emissions, Zero Compromise

FCVs are the only electric vehicle that replicates today's drivers experience of traveling 300-400 miles on a single tank and refueling in just three to five minutes, while having zero tailpipe emissions

Advantages of Fuel Cells and Hydrogen Technologies

- ✓ Low or Zero emissions
- ✓ Resilient, reliable, and scalable
- ✓ Uses domestic fuels – both conventional or renewable
- ✓ Can partner with batteries, solar, wind, and other renewable technologies
- ✓ American innovative technology

Automotive Developments



Hyundai Tucson Fuel Cell

- Began leasing to customers in Southern California in June 2014
- EPA range of 265 miles



Toyota Mirai Fuel Cell Vehicle

- Began selling and leasing to customers in California in October 2015
- EPA Range of 312 miles



Honda Clarity Fuel Cell Vehicle

- Leasing to customers in California began in December 2016
- EPA rated range of 366 miles

Automotive Fuel Cell Collaborations

General Motors / Honda

- Co-developing a next generation fuel cell and hydrogen storage system for 2020 timeframe
- Announced joint manufacturing plant in Michigan in January 2017



Toyota / BMW

- Working on joint next-generation FCV platform for 2020



Ford / Nissan-Renault / Daimler

- Jointly Developing FCV stacks and systems targeting 2017



Hydrogen Fueling Infrastructure

Hydrogen Fueling

- Pressurized hydrogen is used to fuel FCVs
- Hydrogen can be produced a number of ways, from natural gas to renewables
- Hydrogen fueling is as safe as gasoline vehicles, and meets NHTSA's strictest safety standards
- Hydrogen has been safely stored, transported, and utilized in America for 50 years



State Progress

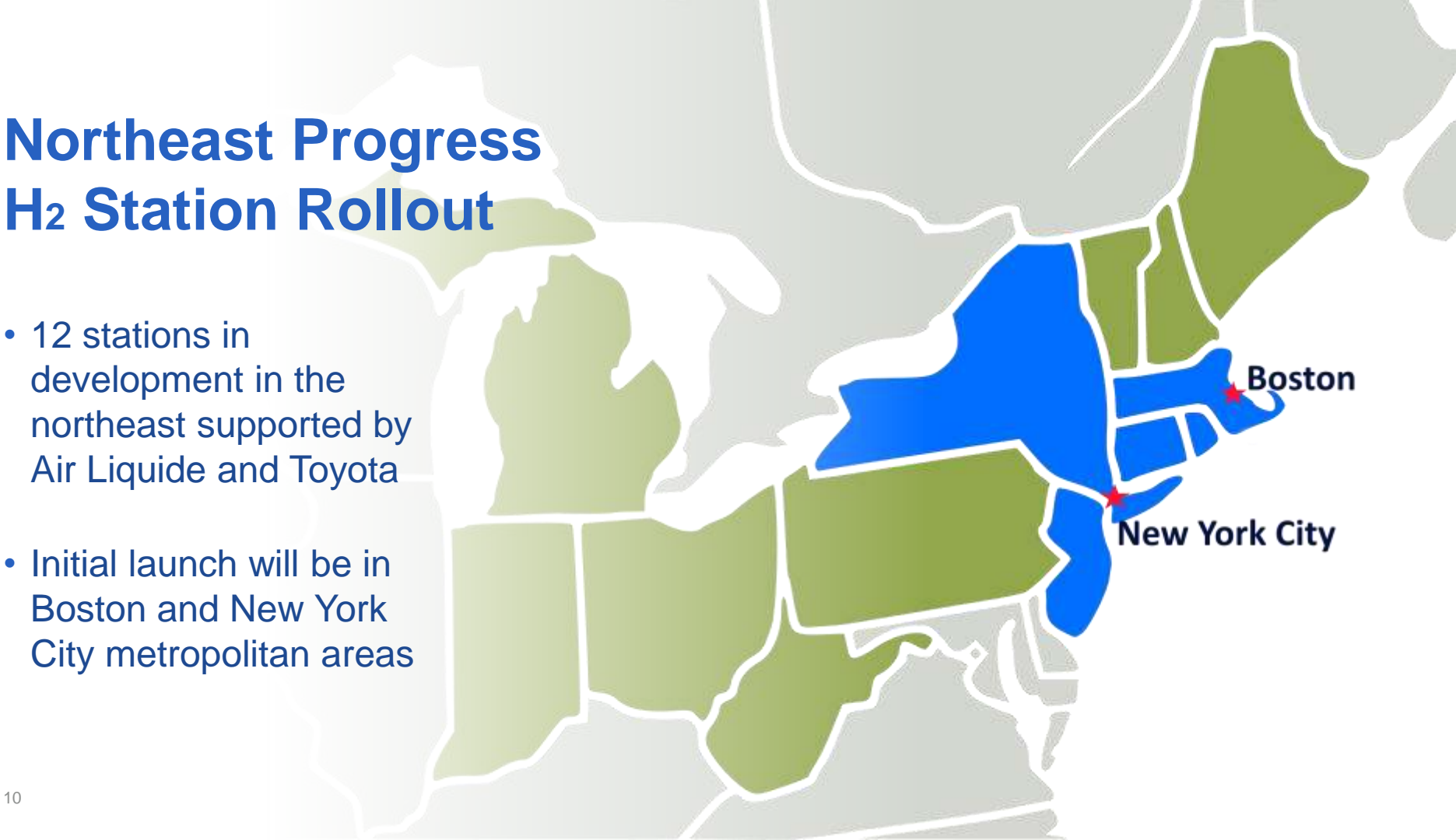
California

- A.B 8 provides \$20 million per year to build 100 hydrogen fueling stations through 2024
- 29 hydrogen stations open as of end of July
- Station rollout is based on a cluster and connector model



Northeast Progress H₂ Station Rollout

- 12 stations in development in the northeast supported by Air Liquide and Toyota
- Initial launch will be in Boston and New York City metropolitan areas



Eight State Zero Emissions Vehicle MOU

3.3 million ZEVs on the road by 2025

- California
- Connecticut
- Maryland
- Massachusetts
- New York
- Oregon
- Rhode Island
- Vermont

Several NE states have FC rebates in place

Automakers and Hydrogen Infrastructure Companies investing in station rollout



State Zero-Emission Vehicle Program Memorandum of Understanding

WHEREAS, the Signatory States have adopted regulations requiring increasing sales of zero-emission vehicles (ZEVs), or are considering doing so; and

WHEREAS, accelerating the ZEV market is a critical strategy for achieving our goals to reduce transportation-related air pollution, including criteria air pollutants, mobile source air toxics and greenhouse gas emissions (GHGs), enhance energy diversity, save consumer money, and promote economic growth; and

WHEREAS, our states are committed to reducing air pollution, including the emission of GHGs and other air pollutants from the mobile source sector; and

WHEREAS, many of our states have obligations or otherwise seek to reduce GHGs consistent with science-based targets by 2050; and

WHEREAS, motor vehicles are among the largest sources of GHGs and criteria air pollutants that adversely affect the health and well-being of our citizens in all of our states; and

WHEREAS, providing transportation alternatives such as ZEVs will help improve air quality, reduce the use of petroleum-based fuels in the transportation sector, protect consumers against volatile energy prices, and support the growth of jobs, businesses and services in a clean energy economy; and

WHEREAS, an increasing variety of vehicles that operate on hydrogen and low-cost electricity are commercially available and have the potential to significantly reduce emissions of criteria pollutants and GHGs, enhance consumer choice, and allow for home fueling; and

What can you do to help?

Support state fuel cell and hydrogen energy policies...

- ✓ **Provide financial and non-financial incentives**
 - Incentives for infrastructure
 - Consumer incentives
 - HOV lane access, and others
- ✓ **Station siting & permitting**
 - Harmonization of codes, standards, and safety regulations
- ✓ **Development of FCV fleets**
- ✓ **Inclusion of fuel cell systems as qualifying technologies in your state's Environmental Mitigation Trust Beneficiary Plans**

Questions?

A long-exposure photograph of a city street at night, showing light trails from cars and streetlights. The trails are in shades of orange, yellow, and white, creating a sense of motion and energy. The background is dark, with some distant lights and structures visible.

Thank you.

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