

2015 STATE POLICY ACTIVITY WRAP UP: FUEL CELLS & HYDROGEN



Fuel Cell &
Hydrogen Energy
Association

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About the Fuel Cell and Hydrogen Energy Association

The Fuel Cell and Hydrogen Energy Association is the trade association dedicated to the commercialization of fuel cells and hydrogen energy technologies, representing the full global supply chain, including material component and system manufacturers, hydrogen producers and fuel distributors, government laboratories and agencies, trade associations, utilities, and other end users. Visit us online at www.fchea.org.

To learn more about the fuel cell and hydrogen energy industry, please see our other market analysis report series, the *Business Case for Fuel Cells*, *State of the State: Fuel Cells in America*, *Fuel Cell Technologies Market Report*, and more at <http://www.fchea.org/reports/>.

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Table of Contents

2015 State Policies Overview.....	1
State Summaries	3
California	3
Connecticut.....	8
Delaware	9
Florida	9
Hawaii	9
Massachusetts	11
New Jersey	12
New York.....	13
Ohio.....	15
Pennsylvania	16
Vermont	16
Wyoming.....	17
Regional and Multi-State Fuel Cell and Hydrogen Activities	18
Federal Fuel Cell and Hydrogen Activities Impacting States.....	21



2015 State Policies Overview

This report profiles state-level legislation, policies, and incentives that impacted the fuel cell and hydrogen industry during calendar year 2015.

Fuel cells generate power electrochemically, without combustion, and emit only heat and water as byproducts. As highly efficient, low-to-zero emission power sources, fuel cells generate power today for both the private and public sector, in applications that include power for on-road and industrial vehicles, and primary, backup and portable power for facilities and off-grid locations. Fuel cells can operate using a range of fuels, including renewables like biogas and hydrogen generated from wind or solar power, and provides very efficient utilization of the hydrogen found in natural gas or other hydrocarbon fuels.

End-users report that fuel cells help to achieve emission reduction goals of thousands (and sometimes tens of thousands) of tons of greenhouse gas pollutants each year. As states seek greater carbon and emission reductions, business and government increasingly turn to fuel cells to help meet these goals. In addition, many end-users report significant savings in electricity costs, as well as lower water use.

During 2015, many states encouraged greater use of zero-emission fuel cell electric vehicles (FCEVs) and supported ongoing development of hydrogen fueling infrastructure, including California where three automakers have commercial FCEVs available to customers: the Hyundai Tucson FCEV, Toyota Mirai, and Mercedes FCELL. Policy initiatives in California, Hawaii, and several northeastern and mid-Atlantic states included funding for hydrogen fueling station development and incentives for FCEV purchases. Several of these states are signatories on a 2013 memorandum of understanding (MOU) committing to coordinated state actions to ensure successful implementation of their state zero-emission vehicle (ZEV) programs.¹

Fuel cells play a role in zero-emission stationary energy production, including distributed generation and megawatt-scale energy production for the power grid. States and businesses continue to invest in fuel cell power generation to reduce emissions and to support or supplant aging electric infrastructure. Fuel cells can help bolster the electric grid, supply power to remote and rural parts of the country, reduce emissions, and utilize readily-available domestic sources of energy, including natural gas.

One of the most attractive fuel cell attributes, especially in storm-prone areas such as the northeastern states, is their resiliency and reliability. Many northeastern states are investing in distributed generation

¹ ZEV MOU signatories are California, Connecticut, Maryland, Massachusetts, New York, Oregon, Rhode Island, and Vermont. New Jersey and Maine have also adopted California's ZEV emissions standards, but are not signatories to the MOU.



(DG) and microgrids to keep emergency and other vital services operating during power outages and fuel cells are part of this solution. Several northeastern states have enacted new policies enabling shared or community ownership of projects to encourage growth in DG resources and the use of renewable energy.

States also promote their homegrown fuel cell industry to enhance economic growth, job development, and innovation. Nationally, the fuel cell and hydrogen industry has produced thousands of jobs and millions of dollars in state and local tax revenues, and in gross state product. Fuel cell developers and supporting supply chain companies contribute to American manufacturing, exports and job growth.

States efforts play a key role in building America's fuel cell and hydrogen future. State-level initiatives, policies, and funding are crucial drivers for growing deployments of zero-emission FCEVs, hydrogen fueling infrastructure, and clean fuel cell power generation across the states. Their accomplishments are having a profound and positive impact.



State Summaries

California

California Establishes Aggressive Greenhouse Gas (GHG) Reduction Goal. In April, the state's governor issued an [Executive Order](#) to establish a California GHG reduction target of 40 percent below 1990 levels by 2030. California is on track to reduce GHG emissions to 1990 levels by 2020 and the new emission reduction target will make it possible reduce emissions 80 percent below 1990 levels by 2050.

California Increases Renewable Energy and Energy Efficiency Goals. In October, the [Clean Energy and Pollution Reduction Act of 2015](#) was signed into law, codifying goals the governor laid out in his inaugural address to double the rate of energy efficiency savings in California buildings and generate half of the state's electricity from renewable sources by 2030.

California Energy Commission (CEC) Update Report Examines Transportation Energy Use. In February, the CEC adopted its [2014 Integrated Energy Policy Report \(IEPR\) Update](#) focusing on next steps for transforming transportation energy use in California. The report notes that California is making good progress in achieving a low carbon, zero-emission transportation system, including a growing fuel cell market. The report also finds:

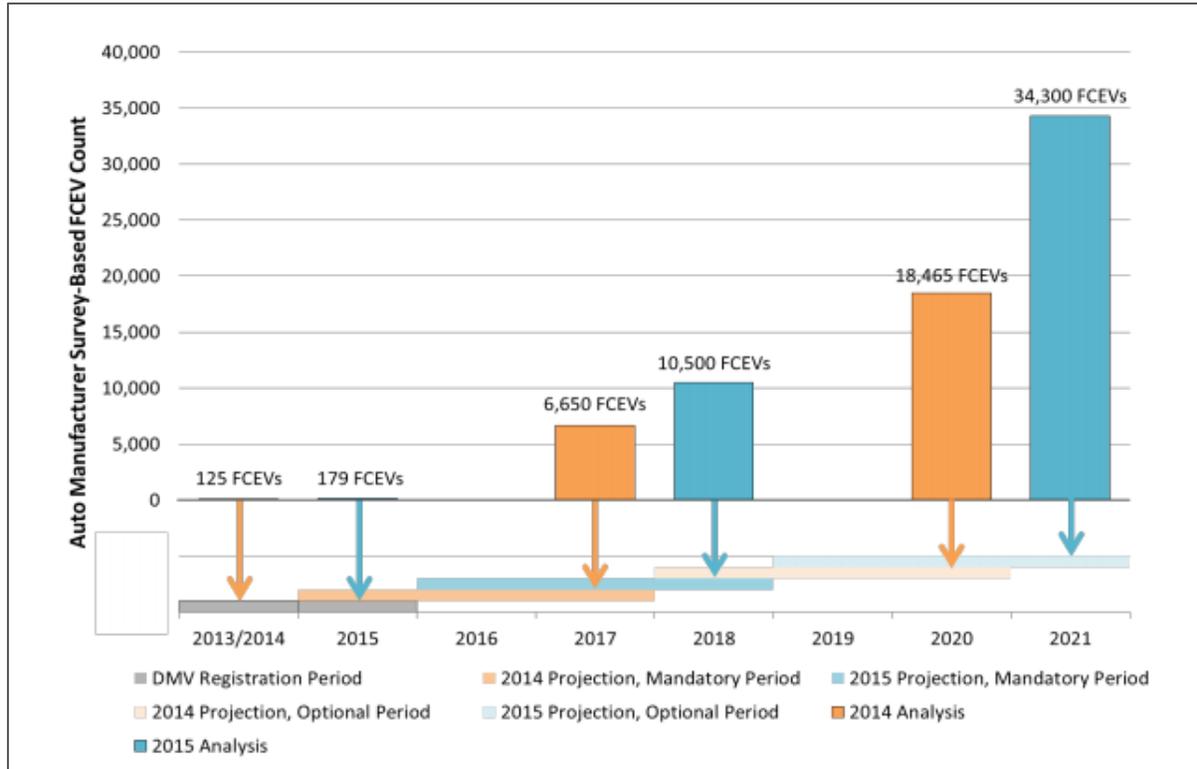
- Hydrogen fuel cell technology is poised to become a zero-emission option across the transportation sector. While the state put several strategies in place to help reduce early investment risks for this technology and ensure that fueling stations are ready to serve the first wave of FCEVs, stations, and equipment, costs continue to be a barrier. More directed research on hydrogen station storage and dispensing equipment and innovative funding partnerships are needed to bring down hydrogen infrastructure costs and advance market deployment.
- State incentive programs like the Energy Commission's Alternative and Renewable Fuel and Vehicle Technology Program (ARFVTP) help advance development and commercialization of medium- and heavy-duty vehicle technologies, with investments across multiple near-term and long-term fuel pathways, including hydrogen fuel cell electric drive and other technologies. However, market uptake of the cleanest trucks remains slow due to cost. Targeted incentives to help bring down the cost of electric trucks are an area of opportunity.

Annual Evaluation of FCEV and Hydrogen Fuel Station Development. The newest edition of the California Air Resources Board (ARB) report, [Annual Evaluation of Fuel Cell Electric Vehicle Deployment and Hydrogen Fuel Station Network Development](#), published in July 2015, finds that:

- 179 FCEVs were registered with Department of Motor Vehicles, a growth of 43 percent from the previous year's estimate.



- Auto manufacturer projections indicate California’s FCEV fleet will grow to 10,500 by the end of 2018 and 34,300 by the end of 2021, almost double the previously reported projections of 18,465 FCEVs in 2020.
- The 2015 auto manufacturer survey suggested the FCEV market may grow faster than previously projected in the 2014 survey. As a result, currently funded stations will support hydrogen demand of California’s FCEV fleet through 2018. After 2018, the number of vehicles on the road may need more fuel than can be provided by the number of hydrogen stations that can be built with currently available public funding, assuming funding levels and station capacity remain unchanged.
- Addressing the expected gaps in hydrogen capacity and coverage may require exploring innovative actions to maximize public investment and rapidly accelerate industry momentum to expand the fueling network.
- Station technical capabilities must continue to advance to satisfy customer fueling expectations for a retail fueling experience, including meeting current fueling protocols and expanding capacity to fuel growing numbers of FCEVs.
- ARB’s analysis finds that the full \$20 million annual allocation for FY 2016/2017, available from ARFVTP funding, is necessary to support additional hydrogen stations. Innovative approaches to utilize this funding could help meet projected accelerating demand for hydrogen fuel from a growing FCEV fleet.



Current and Projected On-Road FCEV Populations.

Source: California Air Resource Board's 2015 Annual Evaluation of Fuel Cell Electric Vehicle Deployment and Hydrogen Fuel Station Network Development

Hydrogen Fueling Station Assessment Report Released. In December 2015, ARB and CEC issued a joint report, [Assessment of Time and Cost Needed to Attain 100 Hydrogen Fueling Stations in California](#), evaluating the time and ARFVTP funding needed to reach the 100 hydrogen fueling station milestone set by Assembly Bill 8 in California.² This report is a companion to the annual ARB assessments of the hydrogen station network and number FCEVs being deployed by automakers in California. The report finds that:

- Overall hydrogen refueling station development timelines have shortened by more than three years, showing an average of 1.6 years for the six stations funded in 2013 that have achieved operational status, compared to 4.9 years needed for development of five stations funded in 2009.
- Early market hydrogen refueling stations costs range from \$2.1 million to more than \$3 million for 180 kilogram-per-day (kg/day) and 350 kg/day stations, respectively. Equipment costs are

² Assembly Bill 8 directs the California Energy Commission to allocate up to \$20 million annually from the ARFVTP for development of light duty hydrogen refueling stations for FCEVs and sets a 100 station milestone.



not expected to decrease significantly in the near term, but have the potential to decrease by 50 percent through 2025.

- CEC incentive funding levels, ranging from 70 to 85 percent of total capital costs, will need to be sustained for the next several years to reach the 100 station target, with \$157 million to \$170 million in cumulative ARFVTP incentive funding needed to support station development.
- California will attain the 100 hydrogen refueling station milestone goal between 2020 and 2024, depending on market conditions and consumer response to FCEVs.

Air Resources Board Revises Zero Emission Vehicle (ZEV) Rules. In May, the Air Resources Board (ARB) approved ZEV regulatory modifications providing compliance flexibility for smaller volume manufacturers such as Jaguar Land Rover, Mazda, Mitsubishi, Subaru, and Volvo. The smaller manufacturers may meet compliance requirements with plug-in hybrid electric vehicles beginning in 2018. The adopted modifications provide additional lead time for the manufacturers before compliance with full ZEVs (battery electric vehicles and fuel cell electric vehicles) is required, but still ensures all manufacturers will produce full ZEVs by 2026.³

ARB Approves Advanced Vehicle Technologies Funding. In June, ARB approved a [\\$373 million Funding Plan](#) for fiscal year 2015-16 covering all investments in advanced technologies, from zero-emission heavy-duty trucks and buses to rebates for low- and zero-emission passenger vehicles. Most funding (\$350 million) comes from the state's Greenhouse Gas Reduction Fund dedicated to low-carbon transportation investments. The Air Quality Improvement Program (AQIP) will provide \$23 million under the 2013 Clean Fuels Reinvestment Act.

California to Offer Higher FCEV Rebates to Low-Income Earners. The ARB approved the [Fiscal Year 2015-16 Low Carbon Transportation Investments and AQIP Funding Plan](#) in late June 2015, which included several changes to the [Clean Vehicle Rebate Project \(CVRP\)](#): an income cap for higher-income consumers and increased rebate levels for low- and moderate-income consumers.

Low-income purchasers of FCEVs will be able to receive a [\\$6,500 state rebate](#), \$1,500 more than other buyers under the Clean Vehicle Rebate Project (CVRP). To qualify for the low-income rebate, buyers must make no more than 300 percent of the federal poverty level – about \$73,000 for a four-person family, or \$48,000 for a two-person household.

Implementation of the income eligibility changes is anticipated in mid-March 2016 and will be announced [ARB](#) and [CVRP](#) websites and through a press release. CVRP will continue to operate without income eligibility changes until the implementation date.

³ Information on the ZEV rules revision was provided by ARB.



Hydrogen Station Permitting Guidebook Released. The California Governor’s Office of Business Development published the first edition of a [guidebook](#) that provides a detailed discussion of the permitting process and suggested best practices for local and regional governments and station developers seeking to open (or in the process of opening) a hydrogen fueling station.

CEC Awards Funds for Fuel Cell and Hydrogen Infrastructure Projects. The CEC has announced an array of fuel cell and hydrogen fueling infrastructure funding awards under the ARFVTP:

- In 2015, 38 stations were proposed to receive Operation and Maintenance (O&M) Support Grants totaling up to \$11.4 million. O&M grant award amounts are contingent upon the actual station operational date, therefore, if stations are delayed, recipients are not eligible to receive the maximum award amount. The proposed 2015 grant funding awards are in addition to six O&M support grants proposed in 2014.
- Medium- and Heavy-Duty Advanced Vehicle Technology Demonstration program [funding awards](#) of \$2.6 million for an advanced fuel cell truck to transport containers from ports in Los Angeles and Long Beach along a 150-mile loop to a rail network, and \$2.1 million for an advanced fuel cell electric bus to be tested in the Coachella Valley.
- A \$2.4 million [award](#) to develop and apply a vehicle architecture that blends existing zero-emission battery electric technology and a zero emission hydrogen fuel cell engine acting as a range extender to create a zero-emission drayage truck. This vehicle will meet the range and power for near-dock, local, and near-regional trips.

In addition, the CEC approved research grants for natural gas innovations under the Public Interest Energy Research Program (PIER), including a \$146,000 [award](#) to determine the feasibility of using a newly developed, small solid-oxide fuel cell that can use natural gas directly to generate electricity in an electric all-terrain vehicle.

Bay Area Air Quality Management District Awards Funds for Hydrogen Fueling Stations. The Bay Area Air Quality Management District [approved \\$2.2 million](#) in funding for completion of 12 hydrogen refueling stations in the Bay Area.

The California Independent System Operator (ISO) Allows Aggregation of Distributed Energy Resources. California ISO approved the [Distributed Energy Resource \(DER\) Provider Draft Final Proposal](#), enabling a DER provider to aggregate DER to meet the ISO’s 0.5 MW minimum participation requirement, opening a pathway for aggregated DER to participate in the wholesale market. For purposes of this initiative, the ISO defines DER as any distribution connected resource, regardless of size or whether it is connected behind or in front of the end-use customer meter.



Connecticut

Electric Vehicle Incentives for Purchasers and Dealers. The [Connecticut Hydrogen and Electric Automobile Purchase Rebate \(CHEAPR\)](#) program was launched in May to increase the number of clean vehicles in the state and help Connecticut meet goals of the eight-state multistate MOU and Action Plan to put 3.3 million ZEVs on the states' collective roadways by 2025. Connecticut drivers can receive a rebate of up to \$3,000 toward the purchase or lease of new, eligible electric vehicles, which include battery electric vehicles, plug-in hybrid electric vehicles and FCEVs. CHEAPR is the first statewide electric vehicle incentive program to offer an additional incentive of up to \$300 for licensed Connecticut auto dealerships for each eligible fuel cell vehicle purchase or lease. The Hyundai Tucson Fuel Cell and the Toyota Mirai FCEVs qualify for the program.

H2Fuels Program to Fund Hydrogen Stations. EVConnecticut, a partnership between the Connecticut Department of Energy and Environmental Protection (DEEP) and the Connecticut Department of Transportation, announced a hydrogen fueling station grant program called [H2Fuels](#). Administered by the Connecticut Center for Advanced Technology, the program will provide grants of up to \$450,000 to develop and operate two public hydrogen fueling stations in the greater Hartford area.

Shared Clean Energy Facility Program Launched. A law passed in June directs DEEP to establish a two-year [Shared Clean Energy Facility pilot program](#). A "shared clean energy facility" means a Class I renewable energy source, that:

- Is served by an electric distribution company,
- Is within the same electric distribution company service territory as the individual billing meters for subscriptions,
- Has a nameplate capacity rating of 4 MW or less, and
- Has at least two subscribers.

Class I renewable resources include fuel cells. Project criteria include the following restrictions:

<i>Electric Distribution Company Service Area</i>	<i>Aggregate Nameplate Capacity for Project(s) May Not Exceed the Following:</i>
Not more than 17 cities and towns	2 MW
18 or more cities and towns	4 MW
All projects selected by DEEP	6 MW

Delaware

Out-of-State Fuel Cell Manufacturers May Participate in Renewable Portfolio Standard (RPS)

Program. A [federal court ruling](#) in October allows out-of-state fuel cell manufacturers to participate in Delaware's RPS program.⁴ Prior to the decision, only providers that manufactured fuel cells in Delaware were eligible for the program.

Florida

Florida Awards Funding for Fuel Cell Unmanned Aerial Vehicle Research and Development.

Space Florida, the state's aerospace and spaceport development authority, and MATIMOP, Israel's Industrial Center for Research and Development, [awarded a research and development grant](#) under the Florida-Israel Innovation Partnership Program to Cella Energy (Florida) and Israel Aerospace for a collaborative project in the field of unmanned aerial systems. The project was selected because of the near-term potential for commercialization and economic benefit for both Florida and Israel.

Hawaii

Hawaii Commits to 100% Renewable Energy. Hawaii's governor signed new [legislation](#) strengthening Hawaii's commitment to clean energy by directing the state's utilities to generate 100 percent of electricity sales from renewable energy resources by 2045. Fuel cells using renewable fuels are eligible under the program.

In addition, the Hawaii State Energy Office (SEO), Department of Business, Economic Development & Tourism, and other state agencies worked in the areas of policy and regulation to:

- Make it easier for residents to take advantage of clean energy.
- Establish energy equilibrium requirements at state bodies, such as the University of Hawaii, that will generate as much or more energy as they use.
- Encourage Hawaii's utilities to plan effectively for a clean energy future, modernize grids, integrate renewable energy and attain sustainable and secure generation and distribution.
- Enable hydrogen-based energy.
- Advance the feasibility of owning and operating an electric vehicle.

⁴ A Renewable Portfolio Standard (RPS) is a regulatory mandate for utilities to increase production of energy from renewable sources.



Hydrogen Implementation Coordinator Appointed. In June, a [new law](#) designated a state hydrogen implementation coordinator who will facilitate the establishment of infrastructure and policies across all state agencies to promote the expansion of hydrogen-based energy in Hawaii. The coordinator will convene and chair a new hydrogen implementation working group that will study and examine methods to promote the expansion of hydrogen energy in Hawaii.

Transportation Planning Charrette for Fuel Cell Vehicles and Hydrogen Infrastructure. In 2014 the SEO convened a planning process to provide the underlying assessments, analysis, and recommendations for an updated Hawaii Clean Energy Initiative transportation plan to significantly reduce the consumption of petroleum products in Hawaii's transportation sector. A [Hydrogen Fuel Cell and Battery Electric Vehicle Stakeholder Charrette](#) (multi-stakeholder planning process) identified a number of specific actions to spur the hydrogen fuel cell vehicle market and develop hydrogen fueling infrastructure in the state:

- Establish a regulatory definition of hydrogen FCEVs as electric-drive vehicles.
- Provide incentives for early adopters to purchase FCEVs.
- Encourage commercial vehicle operators to replace diesels with alternative fueled vehicles, e.g. FCEVs
- Support the development of fueling infrastructure.
- Standardize codes and permitting to ensure safe operation of facilities.
- Pilot demand response systems for hydrogen electrolysis facilities.

These actions will be further evaluated in terms of potential benefits, costs, social acceptability, and likelihood of implementation, as well as alignment with existing plans and budgets.

Public Utility Commission (PUC) Reforms Distributed Energy Resources (DER) Program.

Hawaii's PUC established [DER reforms](#) to promote rapid adoption of the next generation of solar photovoltaic and other distributed energy technologies, encourage more competitive pricing of DER systems, reduce overall energy supply costs for all customers, and help manage each island grid's scarce capacity. The Phase 1 Decision and Order contains three major elements:

- Streamlines the interconnection process for customers by adopting new technical standards for advanced inverters and energy storage systems that utilize grid-supportive features.
- Caps the Net Energy Metering (NEM) program at existing levels.⁵
- Creates three new customer options:

⁵ Net metering policies allow a utility customer to receive value for distributed (onsite) energy generation that exceeds the customer's usage.



- **“Self-Supply” systems.** For customers that primarily intend to consume all of the energy produced by their system onsite at their home or business, and do not need to export excess energy to the grid.
- **“Grid-Supply” systems.** Will allow customers to export excess energy to the grid as needed, and customers will receive energy credits on their monthly bills, similar to the NEM program.
- **“Time-of-Use” tariff.** The PUC directed the Hawaiian Energy Company and its subsidiaries to develop a new, expanded time-of-use tariff that allows customers to save money by shifting energy demand to the middle of the day to take advantage of lower-cost solar energy.

Phase 2 will focus on developing competitive markets for DER, including energy storage.

Massachusetts

Funding Allocated for Electric Vehicle Rebates. Massachusetts allocated an additional \$2 million in funding to the [Massachusetts Offers Rebates for Electric Vehicles \(MOR-EV\) program](#), administered by the Department of Energy Resources (DOER). MOR-EV offers rebates of up to \$2,500 to Massachusetts residents who buy or lease electric vehicles, including eligible BEVs, PHEVs, FCEVs, and zero-emission motorcycles. The initial \$2 million program was funded by Regional Greenhouse Gas Initiative auction proceeds, as is the new funding.

Clean Energy Resiliency Program Expands Fuel Cell Eligibility. DOER oversees the [Community Clean Energy Resiliency Initiative](#) grant program, which supports the use of clean energy technologies to protect communities from interruptions in energy services due to severe weather. After the first solicitation awards in September 2014, DOER amended the solicitation documents, which initially included only combined heat and power (CHP) fuel cells. Eligible fuel cell technologies now also include fuel cell systems with waste heat utilization (annual system efficiency of at least 65 percent) and high efficiency (at least 50 percent) fuel cells.

AmplifyMass Awards Funding for Fuel Cell Project. The Massachusetts Clean Energy Center (MassCEC) AmplifyMass program provides awards to Massachusetts-based clean technology companies and university research projects funded by the U.S. Department of Energy's ARPA-E (Advanced Research Projects Agency-Energy) program. In 2015, the program awarded a grant of [\\$300,000](#) to SiEnergy Systems, a 2014 ARPA-E winner. The company is commercializing low temperature, thin film, solid oxide fuel cell technology from Harvard University.



New Jersey

New Jersey State Energy Master Plan (EMP) Update Released. In November, New Jersey released a [Draft Update](#) to its 2011 EMP. The state is pursuing strategic measures to advance new combined heat and power (CHP), such as leveraging the outreach and funding available through New Jersey's Energy Resilience Bank (ERB), the first public infrastructure bank in the nation to focus on energy resilience, and by revisions to the New Jersey Clean Energy Program (NJCEP) CHP and fuel cell incentive programs.

The report highlights how state agencies are collaborating to develop 1,500 MW of new CHP projects:

- The New Jersey Department of Environmental Protection has simplified approvals for CHP technology by developing streamlined general permits under its air quality permitting program.
- The New Jersey Board of Public Utilities (BPU) administers a CHP-Fuel Cells incentive program for both large and small facilities. Both BPU and the Economic Development Authority (EDA) made the advancement of CHP a priority program under the ERB to finance energy resiliency projects for critical facilities important to public health, safety, and the environment.
- The ERB will advance the state's goal of increasing local energy resiliency through CHP and other forms of DG such as fuel cells, storage technology, solar inverters, and microgrids.

The state plans to continue new DG of all forms and expand the use of CHP by reducing financial, regulatory, and technical barriers, and identifying opportunities for new entries. The report recommends the BPU initiate a stakeholder process to determine how to achieve these objectives, with a focus on CHP and fuel cells within a microgrid, including revisions to the CHP and fuel cell incentives to promote local energy resiliency.

Combined Heat & Power and Fuel Cell (CHP/FC) Program Experienced Surge in Applications.

As of December 11, 2015, New Jersey's Clean Energy Program (CEP) [temporarily ceased accepting applications](#) for the CHP/FC program due to a surge in applications since the start of FY16 and a pipeline that exceeds the CHP/FC Board-approved program budget by more than \$19 million. CEP staff recommends that this amount be allocated to the CHP-Fuel Cell program budget from other programs to provide sufficient funds to consider applications submitted prior to December 11, 2015. The staff also plans to reevaluate program rules, incentives and eligibility requirements to improve and enhance the program.



New York

New York State Energy Plan Released. The [2015 New York State Energy Plan](#) coordinates Governor Andrew Cuomo’s new energy initiative, [Reforming the Energy Vision \(REV\)](#), with other energy policies and initiatives to stimulate the clean energy market for communities and individual customers throughout New York. The plan includes the following measures:

- In 2016, the New York Department of Environmental Conservation, New York Power Authority (NYPA), New York State Energy Research & Development Authority (NYSERDA), and other agencies, as part of a pilot program, will ensure that at least 50 percent of new, administrative-use vehicles will be ZEVs, including FCEVs, BEVs, and PHEVs.
- REV will facilitate and encourage investment (particularly private capital investment) in cost-effective, clean distributed energy resources and other solutions that will reduce peak load and improve system efficiency as a complement to necessary transmission and distribution infrastructure upgrades.
- The governor’s initiative will facilitate development of community microgrids, which incorporate clean distributed generation sources that connect critical facilities, allowing them to operate independently of the central grid during power outages and as a cost-effective complement to the grid under normal circumstances.
- NYSERDA will continue to support CHP and increase market confidence by vetting equipment, developers, and project designs while expanding customer interest, accelerating deployment, and driving-down soft costs through standardization.

New Community Distributed Generation Program Initiated. In July, New York’s Public Service Commission issued a final order instituting a shared renewables program, called [Community Distributed Generation](#), which extends the state’s current net energy metering policy guidelines to expand access to renewable energy. The new program will allow utility customers to set up shared renewable energy facilities and shared net metering credits. Eligible technologies include fuel cells up to 1.5 MW; however, New York legislation limits the rate at which fuel cells are compensated for excess power to the wholesale, rather than retail, rate.

Qualifying entities include project developers, energy service companies, business or non-profits, limited liability companies, partnerships, or other forms of business or civic associations. Membership conditions include the following:

- At least 10 members must participate.
- Members must be located in the same utility territory and New York Independent System Operator load zone where the project is located.



- Minimum member allocation of 1,000 kWh annually.
- Maximum member allocation of the member's historic average annual consumption.
- Members sized at larger than 25 kW may not take up more than 40 percent of the facility output in total (with the exception of master metered multi-unit buildings).

For multi-unit master metered buildings, the building owner may represent building occupants as indirect participants. The building owner would serve as the Community DG project member and would distribute credits to the building's participating occupants.

Phase 1 Projects must advance the state's Renewable Energy Vision goals and meet one of the following two conditions:

- Be located in a Community DG Opportunity Zone.
- Include low-income participation, with membership to include at least 20 percent low-income customers, defined as a customer participating in an Assistance Program, Home Energy Assistance Program, or a utility-administered low-income discount program.

Community DG projects are eligible for funding under existing NYSERDA Customer Sited Tier Programs, including [PON 2157 - Large Fuel Cell](#).

NYSERDA Funding Award for Fuel Cell Installation. NYSERDA [awarded](#) five projects in support of its REV goals to reduce the grid's greenhouse gas emissions and improve resiliency by increasing the amount of electricity generation from renewable energy sources. For the first time, fuel cell projects were eligible for 20-year contracts. One of the five awards was given to Morgan Stanley for a 790-kW fuel cell system at the company's Manhattan headquarters office. Funding for the awards is provided through the Main Tier of the State's Renewable Portfolio Standard (RPS).

New York reports that for every \$1 invested in RPS Main Tier projects, the state realizes \$3 in economic benefits. More than \$3 billion of direct investment in New York State is expected as a result of existing Main Tier projects in the form of jobs, payments to public entities, in-state purchase of goods and services and land leases.

NY Prize Microgrid Stage 1 Awards Include Fuel Cells. New York awarded approximately \$100,000 each to 83 communities through the NYSERDA-administered [NY Prize](#) microgrid competition to support a community-based power under REV strategy. Six of the awarded Stage 1 grant projects include fuel cells (Babylon, Brookhaven, Freeport, Hempstead, Long Beach, and Manhattan).

NY Prize is a three-stage competition. During Stage 1, competitively selected communities receive funding to conduct engineering assessments that evaluate the feasibility of installing and operating a



community microgrid. The next stage of the project will be identifying approximately ten projects to develop detailed designs, with awards of up to \$1 million each. The final stage will approve up to \$7 million each for approximately five projects for final build and construction.

NYSERDA Awards Funding to Fuel Cell Manufacturer. NYSERDA has [awarded](#) funds to several New York companies, members of the New York Battery and Energy Storage Technology (NY-BEST) Consortium, to scale-up or demonstrate new approaches to energy storage. One recipient is American Fuel Cell, which will scale-up its new fuel cell technology for multiple stationary and mobility applications, offering reduced manufacturing costs from existing technology. American Fuel Cell has also participated in NYSERDA's Rochester-based proof-of-concept center, NEXUS-NY, which helps early-stage researchers turn lab successes into commercial products.

PSEG Long Island Multi-MW Renewable RFP Includes Fuel Cells, Feed-in Tariff. Generation and energy services company PSEG Long Island issued a [2015 Renewable RFP](#) in support of its goal of adding 400 MW of new renewable energy generation to its resource portfolio. The company anticipates that approximately 210 MW of additional renewable capacity will be required to meet this goal. To fill this gap, several procurement initiatives are planned that take into account all RPS eligible technologies. Fuel cells are eligible under Parts 1 and 2 of the RFP:

- ***Part 1 - 2015 Renewable RFP.*** This RFP, issued in December, is open to any renewable resource 1 MW or larger using one point of interconnection and offering a fixed price. Projects offering fixed-price energy from fuel cells using renewable fuel are eligible. All other fuel cell projects should apply to Part 2. Resources must inject power directly to the Zone K (Long Island) system or be connected by a new transmission line dedicated to the delivery of power to Zone K. Project developers will be required to obtain community support for their proposed projects.
- ***Part 2 - Fuel Cell Feed-in Tariff.*** These resources must inject power directly into the PSEG Long Island system at points that will benefit from the highly reliable injection of a constant power supply. Fuel supply costs may be passed through to LIPA at an indexed price. Up to 40 MW of projects may be selected. The proposed tariff language is targeted for release for public comment during the 1st quarter of 2016.

Ohio

Payment in Lieu of Taxes (PILOT) Program for Renewable and Advanced Energy Technologies Extended. Ohio's [budget bill \(H.B. 64\)](#) extends the state's PILOT program for five years to allow for facilities using renewable energy to qualify for an ongoing real and tangible personal property exemption.



The PILOT program was established by [S.B. 232 \(2010\)](#) to address state policy that has hampered development of renewable energy projects: Ohio law considers renewable and advanced energy project owners to be an energy company when generating, transmitting, or distributing electricity within the state for use by others solely from an energy facility with an aggregate nameplate capacity in excess of 250 kilowatts. These owners are subject to payment of tangible personal property tax amounting to tens of thousands of dollars.

Under the PILOT program, in lieu of personal property tax, payments (ranging from \$6,000-\$8,000 per MW) are made to the county where the renewable energy facility is located. The property tax exemption must be approved by local county commissioners if the project is 5 MW or larger. Local county commissioners are allowed to require an additional payment as long as the overall payment does not exceed \$9,000 per MW.

PILOT is part of the [Qualified Energy Project Tax Exemption](#), which provides owners (or lessees) of renewable, clean coal, advanced nuclear, and cogeneration energy projects with an exemption from the public utility tangible personal property tax. If the project meets the requirements of the exemption, the Director of the Ohio Development Services Agency will certify the project as a Qualified Energy Project. Qualified Energy Projects will remain exempt from taxation so long as the project is completed within the statutory deadlines, meets the "Ohio Jobs Requirement," and continues to meet several ongoing obligations including providing Development Services Agency with project information on an annual basis.

Pennsylvania

Fuel Cell Vehicle Rebate. Pennsylvania's Department of Environmental Protection announced the continuation of the [Alternative Fuel Vehicle Rebate Program](#), which provides rebates to consumers for the purchase of new FCEV, PHEV, plug-in electric, natural gas, and propane vehicles. FCEVs are eligible for a rebate of \$1,000.

Vermont

New Utility Renewables Requirement. Vermont established a new [Renewable Energy Standard and Energy Transformation \(RESET\) Program](#) for electric utilities that will take effect in 2017. The new requirement states that renewable energy must comprise 55 percent of sales in 2017, rising to 75 percent by 2032, and establishes a requirement for new distributed renewable energy generation of 5 MW or less, to provide 1 percent of electricity in 2017, rising to 10 percent by 2032.

The new program defines renewable energy as, "energy produced using a technology that relies on a resource that is being consumed at a harvest rate at or below its natural regeneration rate." Methane



gas and other flammable gases produced by the decay of sewage treatment plant wastes or landfill wastes and anaerobic digestion of agricultural products, byproducts, or wastes, or of food wastes, are considered renewable energy resources, but no other form of solid waste, other than agricultural or silvicultural waste, are considered renewable. Fuel cells using such fuels could be potentially eligible under this program.

Wyoming

Hydrogen Included in Definition of Alternative Fuels. Effective July 1, 2015, Wyoming [defines](#) alternative fuels as biodiesel, coal-derived liquid fuels, electricity, ethanol, hydrogen, liquefied petroleum gas (propane), methanol, natural gas, renewable diesel, fuels other than alcohol that are derived from biological materials, and P-series fuels.



Regional and Multi-State Fuel Cell and Hydrogen Activities

Seven U.S. States Join International ZEV Alliance. Eleven European and North American governments [founded an international alliance](#) in August to accelerate global adoption of ZEVs, including FCEVs, BEVs, and PHEVs. Members of the International ZEV Alliance will promote innovation and investment, and raise international awareness of expanding ZEV markets and opportunities. Founding members of the alliance include California, Connecticut, Maryland, Massachusetts, Oregon, Rhode Island and Vermont in the United States; The Netherlands, Norway and the United Kingdom in Europe; and Québec, Canada.

Joint Regional Procurement of Clean Energy Resources. Connecticut, Massachusetts and Rhode Island initiated a coordinated process for a three-state [Request for Proposals \(RFP\)](#) for clean energy resources, stating that the joint enables the procurement of large-scale clean energy projects and transmission on a scale that no single state could secure on its own. The procurements also will help to diversify the New England fuel mix and help to address winter reliability issues. The three states issued an RFP in November 2015 seeking bids on new Class I Renewable Energy projects, which include fuel cells, wind, solar, small hydro, and biomass.

Northeast U.S. Hydrogen and Fuel Cell Development Plans Released. The Northeast Electrochemical Energy Storage Cluster (NEESC), administered by the nonprofit economic development organization Connecticut Center for Advanced Technology, released its [2015 Hydrogen and Fuel Cell Development Plans](#), one for each of the eight states in the Northeast U.S. – Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont – to increase awareness of the technologies and facilitate their deployment in the region. The plans were produced with support from the U.S. Small Business Administration and input from automakers, government agencies, gas suppliers, and hydrogen and fuel cell companies.

The number of hydrogen and fuel cell projects is growing in northeastern states and the region is home to a robust hydrogen and fuel cell industry. The state-by-state NEESC development plans provide data regarding the industry's economic value and highlight further deployment opportunities to increase environmental performance and energy reliability. The development plans provide links to relevant information to help assess, plan, and initiate demand for, and deployment of hydrogen or fuel cell projects to help meet the energy, economic, and environmental goals in the region.



NEESC Analysis of the Fuel Cell and Hydrogen Industry in the Northeast

State	Number of companies in the fuel cell and hydrogen supply chain	Economic Analysis		
		Revenue and investment generated by these companies	State and local tax revenue contributed by these companies	Gross state product generated by these companies
Connecticut	At least 600	Approx. \$604.34 million	More than \$22 million	More than \$211.23 million
	<i>Eight of the Connecticut companies are original equipment manufacturers (OEMs) of hydrogen and/or fuel cell systems and were responsible for supplying 1,010 direct jobs and \$311.65 million in direct revenue and investment in 2011.</i>			
Maine	At least 28	Approx. \$3.44 million	More than \$0.113 million	Approx. \$2.9 million
Massachusetts	At least 300	Approx. \$184 million	More than \$11 million	Approx. \$147 million
	<i>Eight of the Massachusetts companies are OEMs of hydrogen and/or fuel cell systems and were responsible for supplying 406 direct jobs and \$56.8 million in direct revenue and investment in 2011.</i>			
New Hampshire	At least 25	Approx. \$10.7 million	More than \$0.428 million	More than \$8.5 million
New Jersey	At least 8	More than \$32.3 million	More than \$1.49 million	Approx. \$18.6 million
New York	At least 182	Approx. \$332 million	More than \$18 million	Approx. \$166 million
	<i>Eight of the New York companies are OEMs of hydrogen and/or fuel cell systems and were responsible for supplying 719 direct jobs and \$140 million in direct revenue and investment in 2011.</i>			
Rhode Island	At least 15	Approx. \$8.4 million	More than \$0.329 million	Approx. \$6.9 million
Vermont	At least 5	More than \$4.1 million	More than \$0.183 million	Approx. \$3.3 million
TOTALS	At least 1,163	Approx. \$1.179 billion	More than \$53 million	Approx. \$565 million
Summary chart created by FCHEA, based on NEESC's 2015 Development Plans .				



NEESC Recommendations - Goals for Stationary and Transportation Hydrogen Fuel Cell Deployment to meet Economic, Environmental, and Energy Needs in the Northeast

State	Fuel cell electric generation			Transport		
	By 2025 (MW)	Annual output (MWh)	CO ₂ emissions reductions (tons/yr)	FCEVs	CO ₂ emissions reductions (tons/yr)	Hydrogen refueling stations
Connecticut	131 – 175	912,135 – 1,211,000	277,000 – 368,000	477 FCEVs – 445 FCEVs (40 for state fleet) 32 transit/paratransit buses	4,200 – 7,300	4 – 5
Maine	54 – 73	440,000 – 590,000	90,000 – 128,000	83 FCEVs – 80 FCEVs 3 transit/paratransit buses	500 – 900	1 – 2
Massachusetts	234 – 312	2,307,000 – 3,100,000	842,000 – 1.2 million	1,867 FCEVs – 1,818 FCEVs (101 for state fleet) 49 transit/paratransit buses	11,800 – 16,600	18 – 19
New Hampshire	45 – 61	370,000 – 490,500	40,800 – 54,400	25 FCEVs – 21 FCEVs for state fleet 4 transit/paratransit buses	360 – 750	1 – 2
New Jersey	254 – 339	2.24 million – 2.99 million	295,400 – 394,600	5,758 FCEVs – 5,585 FCEVs (130 for state fleet) 173 transit/paratransit buses	37,000 – 54,000	55 – 60
New York	543 – 724	3,786,510 – 5,051,235	993,000 – 1.4 million	3,172 FCEVs – 2,808 FCEVs (188 for state fleet) 364 transit/paratransit buses	37,000 – 72,700	27 – 32
Rhode Island	37 – 49	307,000 – 414,000	12,400 – 16,700	153 FCEVs – 142 FCEVs (21 for State fleet) 11 transit/paratransit buses	1,400 – 2,400	1 – 2
Vermont	15 – 20	91,900 – 122,600	11,500 – 15,400	82 FCEVs – 80 FCEVs (8 for State fleet) 2 transit/paratransit buses	500 – 700	1 – 2
TOTALS	1,313 – 1,753 MW	10,454,545 – 13,969,335 MWh	2,562,100 – 3,577,100 tons/yr	11,617 FCEVs 10,979 FCEVs 638 buses/paratransit buses	92,760 – 155,350 tons/yr	108 – 124 stations

MW = megawatt, MWh = megawatt-hours, FCEVs = fuel cell electric vehicles, CO₂ = carbon dioxide
Summary chart created by FCHEA, based on NEESC's [2015 Development Plans](#).



Federal Fuel Cell and Hydrogen Activities Impacting States

Hydrogen Fueling Corridors to be Established Along National Highways. Section 1413 of the [Fixing America's Surface Transportation Act](#), signed into law in December 2015, establishes national electric vehicle charging and hydrogen, propane, and natural gas fueling corridors at strategic locations along major national highways to improve the mobility of passenger and commercial vehicles using these fuels. In designating the corridors, the Secretary of Transportation is directed to:

- Solicit nominations from state and local officials for facilities to be included in the corridors.
- Incorporate existing electric vehicle charging, hydrogen fueling, propane fueling, and natural gas fueling corridors designated by a state or group of states.
- Consider the demand for, and location of, existing electric vehicle charging stations, hydrogen fueling stations, propane fueling stations, and natural gas fueling infrastructure.

Federal Transit Administration Funds Next Round of LoNo Bus Program. The U.S. Department of Transportation's (DOT) Federal Transit Administration (FTA) [announced](#) it will make \$22.5 million in funding available through the latest round of the Low or No Emission Vehicle Deployment Program (LoNo). The funds encourage adoption of green technologies in transit buses, such as fuel cells and electric and hybrid engines. Funds are awarded on a competitive basis to transit agencies and state transportation departments working independently or jointly with bus manufacturers already making low- and zero-emission buses.