U.S. Department of Transportation
Federal Highway Administration

Office of the Administrator
March 9, 2017

1200 New Jersey Ave., SE
Washington, D.C. 20590

In Reply Refer To:
HIN-1

The Honorable Patrick J. Leahy
Vice Chairman
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Senator Leahy:

This letter transmits the Report to Congress on Alternative Fuels Infrastructure requested in Senate Report 113-45, *Transportation, Housing and Urban Development, and Related Agencies Appropriations Bill, 2014*, which directed the Federal Highway Administration (FHWA) to report on options for financing alternative fueling stations, including public-access electric vehicle charging stations.

The report discusses current efforts in the U.S. Department of Energy and FHWA to identify barriers to greater private investment in alternative fuels infrastructure, and describes current traditional and innovative financing mechanisms that could be used to help address them. These ongoing efforts, some of which have only recently been initiated, are expected to help deepen our understanding of the issues surrounding the deployment of refueling and recharging infrastructure for alternative fuel vehicles (AFV) and point the way to overcoming these challenges.

A similar letter has been sent to the Chairman of the Senate Committee on Appropriations; Chairman and Ranking Member of the House Committee on Appropriations; the Chairman and Ranking Member of the House Subcommittee on Transportation, Housing and Urban Development, and Related Agencies, Committee on Appropriations; and the Chairman and Ranking Member of the Senate Subcommittee on Transportation, Housing and Urban Development, and Related Agencies, Committee on Appropriations.

Sincerely,

Walter C. Waidelich, Jr.
Acting Deputy Administrator

U.S. Department of Transportation
Federal Highway Administration

Office of the Administrator
March 9, 2017

1200 New Jersey Ave., SE
Washington, D.C. 20590

In Reply Refer To:
HIN-1

The Honorable David Price
Ranking Member
Subcommittee on Transportation, Housing
and Urban Development, and Related Agencies
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Congressman Price:

This letter transmits the Report to Congress on Alternative Fuels Infrastructure requested in Senate Report 113-45, *Transportation, Housing and Urban Development, and Related Agencies Appropriations Bill, 2014*, which directed the Federal Highway Administration (FHWA) to report on options for financing alternative fueling stations, including public-access electric vehicle charging stations.

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Walter C. Waidelich, Jr.
Acting Deputy Administrator

U.S. Department of Transportation
Federal Highway Administration

Office of the Administrator
March 9, 2017

1200 New Jersey Ave., SE
Washington, D.C. 20590

In Reply Refer To:
HIN-1

The Honorable Rodney Frelinghuysen
Chairman
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

This letter transmits the Report to Congress on Alternative Fuels Infrastructure requested in Senate Report 113-45, *Transportation, Housing and Urban Development, and Related Agencies Appropriations Bill, 2014*, which directed the Federal Highway Administration (FHWA) to report on options for financing alternative fueling stations, including public-access electric vehicle charging stations.

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Sincerely,

Walter C. Waidelich, Jr.
Acting Deputy Administrator

U.S. Department of Transportation
Federal Highway Administration

Office of the Administrator
March 9, 2017

1200 New Jersey Ave., SE
Washington, D.C. 20590

In Reply Refer To:
HIN-1

The Honorable Jack Reed
Ranking Member
Subcommittee on Transportation, Housing
and Urban Development, and Related Agencies
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Senator Reed:

This letter transmits the Report to Congress on Alternative Fuels Infrastructure requested in Senate Report 113-45, *Transportation, Housing and Urban Development, and Related Agencies Appropriations Bill, 2014*, which directed the Federal Highway Administration (FHWA) to report on options for financing alternative fueling stations, including public-access electric vehicle charging stations.

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Sincerely,

Walter C. Waidelich, Jr.
Acting Deputy Administrator

U.S. Department of Transportation
Federal Highway Administration

Office of the Administrator
March 9, 2017

1200 New Jersey Ave., SE
Washington, D.C. 20590

In Reply Refer To:
HIN-1

The Honorable Mario Diaz-Balart
Chairman
Subcommittee on Transportation, Housing
and Urban Development, and Related Agencies
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

This letter transmits the Report to Congress on Alternative Fuels Infrastructure requested in Senate Report 113-45, *Transportation, Housing and Urban Development, and Related Agencies Appropriations Bill, 2014*, which directed the Federal Highway Administration (FHWA) to report on options for financing alternative fueling stations, including public-access electric vehicle charging stations.

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Sincerely,

Walter C. Waidelich, Jr.
Acting Deputy Administrator

U.S. Department of Transportation
Federal Highway Administration

Office of the Administrator
March 9, 2017

1200 New Jersey Ave., SE
Washington, D.C. 20590

In Reply Refer To:
HIN-1

The Honorable Nita Lowey
Ranking Member
Committee on Appropriations
U.S. House of Representatives
Washington, DC 20515

Dear Congresswoman Lowey:

This letter transmits the Report to Congress on Alternative Fuels Infrastructure requested in Senate Report 113-45, *Transportation, Housing and Urban Development, and Related Agencies Appropriations Bill, 2014*, which directed the Federal Highway Administration (FHWA) to report on options for financing alternative fueling stations, including public-access electric vehicle charging stations.

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Sincerely,

Walter C. Waidelich, Jr.
Acting Deputy Administrator

U.S. Department of Transportation
Federal Highway Administration

Office of the Administrator
March 9, 2017

1200 New Jersey Ave., SE
Washington, D.C. 20590

In Reply Refer To:
HIN-1

The Honorable Susan M. Collins
Chairman
Subcommittee on Transportation, Housing
and Urban Development, and Related Agencies
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Madam Chairman:

This letter transmits the Report to Congress on Alternative Fuels Infrastructure requested in Senate Report 113-45, *Transportation, Housing and Urban Development, and Related Agencies Appropriations Bill, 2014*, which directed the Federal Highway Administration (FHWA) to report on options for financing alternative fueling stations, including public-access electric vehicle charging stations.

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Sincerely,

Walter C. Waidelich, Jr.
Acting Deputy Administrator

U.S. Department of Transportation
Federal Highway Administration

Office of the Administrator
March 9, 2017

1200 New Jersey Ave., SE
Washington, D.C. 20590

In Reply Refer To:
HIN-1

The Honorable Thad Cochran
Chairman
Committee on Appropriations
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

This letter transmits the Report to Congress on Alternative Fuels Infrastructure requested in Senate Report 113-45, *Transportation, Housing and Urban Development, and Related Agencies Appropriations Bill, 2014*, which directed the Federal Highway Administration (FHWA) to report on options for financing alternative fueling stations, including public-access electric vehicle charging stations.

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Sincerely,

Walter C. Waidelich, Jr.
Acting Deputy Administrator

REPORT ON
INNOVATIVE FINANCING TO SUPPORT
ALTERNATIVE FUELS INFRASTRUCTURE

FEBRUARY 2017

U.S. Department of Transportation
Federal Highway Administration

Background

This Report to Congress on *Innovative Financing to Support Alternative Fuels Infrastructure* was requested in Senate Report 113-45, *Transportation, Housing and Urban Development, and Related Agencies Appropriations Bill, 2014*, which directed the Federal Highway Administration (FHWA) to report on options for financing alternative fueling stations, including public-access electric vehicle charging stations (see Attachment). An earlier version of this report was completed in November 2015 before passage of the Fixing America's Surface Transportation (FAST) Act. Passage of the FAST Act made it necessary for FHWA to incorporate new legislative initiatives in the report, delaying its release.

The report discusses current efforts in the U.S. Department of Energy (DOE) and the FHWA to identify barriers to greater private investment in alternative fuels infrastructure, and describes current traditional and innovative financing mechanisms that could be used to help address them. These ongoing efforts, some of which have only recently been initiated, are expected to help deepen our understanding of the issues surrounding the deployment of refueling and recharging infrastructure for alternative fuel vehicles (AFV) and point the way to overcoming these challenges.

As was noted in the Senate Report, to date, development of an AFV refueling network has relied extensively on government funds, provided as traditional grants. Given the level of investment needed to build out such a network, direct government spending alone is unlikely to support the desired growth of the AFV market. Private entrepreneurial spending, however, faces clear hurdles. As an April 2013 report by the Center for Automotive Research titled *Financing the Infrastructure to Support Alternative Fuel Vehicles*[1] summarized, "Because the cost of installing new refueling infrastructure is high and the adoption of AFVs is uncertain, private investment is risky and relatively unattractive." Government can help boost private investment using procurement and financing programs to lower the financial barriers to private investment. Although only part of the solution, such programs can focus their limited public funds on ways to reduce the risk to private investors.

Current U.S. Department of Energy Efforts: Clean Cities Program

In April 2014, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE) issued a report titled *Alternative Fuel Vehicle & Fueling Infrastructure Deployment Barriers & the Potential Role of Private Sector Financial Solutions.*[2] The report was developed by the Center for Climate and Energy Solutions in partnership with the National Association of State Energy Officials and funded under the EERE's Clean Cities Program, to develop innovative finance mechanisms aimed at accelerating the deployment of AFVs and fueling infrastructure. This AFV Finance Initiative has researched financial barriers, prepared case studies, and is currently developing business models for consideration by State partners.

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[1] Available at: http://www.cargroup.org/?module=Publications&event=View&pubID=100

[2] Available at: http://www.afdc.energy.gov/uploads/publication/afv_fueling_infrastructure_deployment_barriers.pdf.

The initiative specifically emphasizes electricity and natural gas, two alternative fuels that offer significant opportunity for growth.

The AFV Finance Initiative team identified AFV deployment barriers for the different categories of market participants, i.e., vehicle buyers and vehicle manufacturers as well as the fuel and infrastructure providers. For the latter category, the fundamental barriers include:

- **High upfront cost of AFVs:** Currently, AFVs are generally more expensive than similar gasoline or diesel vehicles. Government incentives designed to reduce the upfront costs have increased demand for AFVs, but not all buyers are able to use these incentives. This limits demand for the products of AFV infrastructure providers.
- **Inadequate near-term demand for widespread AFV fueling infrastructure:** While certain types of refueling infrastructure can be heavily used (e.g. airports and fleet hubs), development of a more dispersed fueling infrastructure for all AFVs is limited by the relatively small market for the vehicles themselves. This is especially true for hydrogen, which has few vehicles available for purchase. Because revenue from the sale of alternative fuels is low, investors face a long payback period for the cost of installing the stations. The "chicken or egg" nature of this dilemma has led to government support for the installation of new fueling infrastructure.
- **Uncertainty about benefits and costs of AFVs and related infrastructure:** Consumers do not fully understand the vehicle total cost of ownership, performance, and fueling needs of AFVs. This limits demand for AFVs as well as the products of AFV infrastructure providers.

The AFV Finance Initiative research indicates that innovative investment tools can help to overcome some of the existing barriers facing infrastructure providers, but acknowledges that private investment faces its own set of barriers including:

- **Information failures:** Interest in private sector financial solutions is limited by lack of credible, reliable information about new technology, including batteries (cost, life and recharging), and future market demand for AFVs and fueling infrastructure.
- **Legal and regulatory hurdles:** Investment in AFV and its infrastructure is limited by rules about the kinds of financial instruments investors can hold, and restrictions on contract types and terms.
- **Liquidity risk:** New technologies and new financial products initially face a market uncertain of their benefits and costs and are often considered more risky and harder to buy and sell, or in other words they are challenged by "liquidity" concerns. Rules related to the liquidity of financial products and investment require banks to hold safe capital in reserve when they own assets that are harder to sell. This increases the cost of capital.
- **Scale:** The transaction costs associated with loan origination, attorney fees, monitoring, and servicing financial products are higher per product when only a few financial products are transacted. More transactions that use the same processes, templates and formulations reduce the per product cost.

Because developing a public-access refueling/recharging network currently offers a high-risk, low-return investment proposition, it is necessary for governments to continue to combine traditional funding mechanisms with innovative financing tools to support its growth. To address this challenge in the electric vehicle (EV) market, the AFV Finance Initiative researchers suggest that States offer flexible financing assistance via programs that leverage private capital and offer attractive financing terms to spur market growth. Such governmental or quasi-governmental institutions are often referred to collectively as Clean Energy Banks (CEB).

In their November 2014 report titled *The Role of Clean Energy Banks in Increasing Private Investment in Electric Vehicle Charging Infrastructure,*[3] the researchers describe how States such as Connecticut and Hawaii have demonstrated how these quasi-public or public financing entities can leverage limited public dollars to attract significantly more private capital for investment. In helping to overcome business barriers, a potential CEB would:

- Use tools such as grants, low-interest loans, longer loan terms and/or flexible repayment schedules, credit enhancements and interest-rate buydowns to share upfront cost/risk with project developers during early market development;
- Reduce project cost/risk by disseminating needed information, facilitating partnerships, developing standardized contracts and/or conducting community-based marketing campaigns; and
- Expand access to low-cost capital in the long-term by fostering the development of secondary markets for EV charging loans and leases, enabling loan and lease originators to recapitalize and fund more projects.

An earlier 2012 Brookings-Rockefeller report on S*tate Clean Energy Finance Banks*[4] noted that CEBs could be capitalized from multiple sources, including existing grant-based financing authorities, which could be combined with private funds via a partnering agreement.

Existing CEBs have focused on energy efficiency and clean energy improvements in residential and commercial real estate. Through an alternative collateralization technique known as Property Assessed Clean Energy (PACE), for instance, a CEB can allow owners to repay their energy improvement loans via a property tax assessment, obtaining a lien while ensuring that repayment remains attached to the property realizing the energy benefit. Such an approach, which extends a typical investment horizon, could be applied to the provision of EV recharging stations at multifamily housing and office buildings – two location types identified as part of the EV "infrastructure gap."

As the industry matures, the potential for bond market activity arises. A March 2014 article in *The Economist*[5] noted that, to reach the secondary capital market, a CEB could bundle such loans

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[3] Available at: http://www.c2es.org/docUploads/cebs-and-ev-charging-december-2015.pdf.
[4] Available at: http://www.brookings.edu/research/papers/2012/09/12-state-energy-investment-muro.
[5] Available at: http://www.economist.com/news/finance-and-economics/21599400-bonds-tied-green-investments-are-booming-spring-air.

into a securitized portfolio, known as clean/green bonds, to be sold to private investors, whose capital would provide resources for additional clean energy investment. An obvious source of such capital is the municipal bond market, where the recent surge of interest in such "clean/green bonds" indicates significant investor appetite for projects that promise climate and environmental sustainability benefits. As of August 2016, there are six State and local green banks in the U.S., according to the Coalition for Green Capital. They are in Montgomery County, Maryland, Connecticut, New York, California, Rhode Island, and Hawaii.[6]

Federal Financial Assistance Programs

Federal financial assistance programs offer both traditional and innovative sources of funding, which can help address some of the barriers noted above. These programs support many State and local priorities, however, so their track record in alternative fueling infrastructure financing – other than direct grant assistance – has been limited to date.

Traditional Funding Sources

Since 1991, the Congestion Mitigation and Air Quality (CMAQ) Improvement Program has provided funds to help State and local governments meet the requirements of the Clean Air Act. Funds are available for transportation projects that reduce emissions in regions designated as "non-attainment" (not meeting the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter) or "maintenance" (former non-attainment areas now in compliance) areas. All project phases are eligible for CMAQ funding.

The CMAQ program has provided FHWA's main financial support for alternative fueling infrastructure. Among recent examples, the Massachusetts Department of Energy Resources (DOER) Clean Vehicle Project is using $400,000 in CMAQ funding to attract partners to expand the State's direct current (DC) fast charging infrastructure for EVs. The DOER will contribute up to $50,000 per site for publicly accessible stations. Similarly, the city of Chicago is using $1,450,000 in CMAQ funding to support its Drive Clean Station Program. The funds will be awarded competitively and can cover up to 30 percent of capital costs for compressed natural gas (CNG) fueling and DC fast charging stations.

The majority of CMAQ-funded alternative fuel projects are completed under its Public-Private Partnership (P3) provision. The P3 provision allows a private or non-profit entity's resources to replace or supplement State or local funds and possibly a portion of the Federal-aid in selected projects. The P3 component of CMAQ has evolved into a critical element of the program and gives FHWA the flexibility to work with the private sector to implement emission reduction projects that have a strong public benefit.

The FHWA's Federal-aid program also allows CMAQ funds to be loaned – rather than awarded as a grant – for eligible projects. Known as a Section 129 loan in reference to its statutory enabling language in 23 U.S. Code (U.S.C.) 129 (a)(8)(A), States may lend to a public or private

[6] The Bond Buyer, Tuesday, August 16, 2016, "How Prospects May Improve for Federal Green Bank Bill."

entity to construct a project eligible for Federal-aid funding as long as that project has a dedicated revenue source to repay the loan. Any FHWA program category authorized under Title 23 may be used for a Section 129 loan, provided that the project receiving the loan is eligible for funding from that category. Funds received in repayment of the loan must be used for eligible Title 23 purposes, although they need not be administered under Federal rules.

Under the FAST Act, the long-standing Surface Transportation Program was converted into the Surface Transportation Block Grant (STBG) Program. The STBG promotes flexibility in State and local transportation decisions and provides flexible funding to best address State and local transportation needs. As under the CMAQ program (23 U.S.C 149), AFV fueling stations that benefit air quality are eligible to be funded. Funds apportioned to a State for the STBG provide for the construction of AFV fueling stations associated with construction of truck parking facilities (23 U.S.C. 133(b)(1)(E); and fringe and corridor parking facilities (e.g. park and ride facilities) (23 U.S.C. 133 (b)(5)).

Under the Tribal Transportation Program (TTP), Federal Lands Transportation Program (FLTP), and Federal Lands Access Program (FLAP), any project eligible for funding under Title 23 of the U.S.C. is eligible for funding as long as the project meets the purpose associated with the respective program. Therefore TTP, FLTP, and FLAP funds may be applied to AFV fueling improvements.

The National Highway Performance Program (NHPP) provides support for the condition and performance of the National Highway System (NHS), for the construction of new facilities on the NHS, and to ensure that investments of Federal-aid funds in highway construction are directed to support progress toward the achievement of performance targets established in a State's asset management plan for the NHS. The NHPP-eligible activities include the installation of AFV fueling stations along the NHS as part of the construction of fringe and corridor parking lots, i.e., park-and-ride lots (23 U.S.C. 137) and of truck parking rest areas (Section 1401 of Pub. L. 112-141).

The DOT's Advanced Transportation and Congestion Management Technologies Deployment initiative (23 U.S.C. 503(c)(4)) provides grants to eligible entities to develop model deployment sites for large scale installation and operation of advanced transportation technologies to improve safety, efficiency, system performance, and infrastructure return on investment. Grant funds may be used to deploy advanced transportation and congestion management technologies, including integration of intelligent transportation systems with the smart grid and other energy distribution and charging systems.

Since 2009, Congress has provided more than $5.1 billion in discretionary funds to DOT for projects of national or regional significance. Through eight competitive rounds, the Transportation Investment Generating Economic Recovery (TIGER) grant program has invested in road, rail, transit, and port projects that address critical objectives. In 2010, DOT awarded a $2 million TIGER grant to the Oregon DOT to support its Electric Vehicle Corridor project. Part of a statewide network of EV charging stations, the project has provided DC Fast Charge (the current state of the art) stations along Oregon's Interstate 5. In 2015, the DOT awarded a $9 million TIGER grant to the Rhode Island DOT to construct a multimodal travel plaza near I-95

in Hopkinton, Rhode Island. The project includes AFV fueling stations, including EV charging stations.

Innovative Funding Sources

The FHWA provides financial assistance through tools other than grants. Since 1999, the Transportation Infrastructure Finance and Innovation Act (TIFIA) credit program has offered direct loans, loan guarantees, and lines of credit to surface transportation projects of national and regional significance. Through its flexible repayment terms and favorable interest rates, TIFIA assistance can improve capital market access for large-scale projects facing the challenges of size, complexity, or uncertainty over the timing of revenues. Highway, transit, railroad, intermodal freight, and port access projects are eligible for TIFIA assistance. To date, the program has provided over $24 billion in credit assistance for projects representing nearly $88 billion in infrastructure spending.

With an effective minimum project size of $10 million, for which TIFIA can loan up to 49 percent,[7] the program could be a source of capital for efforts to extend refueling infrastructure costing $10 million or more. TIFIA eligibility mirrors that of FHWA grant programs, which means that creditworthy CMAQ projects of sufficient size would be eligible.

Beyond the TIFIA credit program, the Federal government provides private developers additional access to lower cost capital through the tax-exempt bond market. Generally, the private sector is precluded from borrowing funds in the tax-exempt market. However, there are certain qualified exceptions listed in the Internal Revenue Code for which private entities may borrow funds in the tax-exempt capital market to finance projects that serve a public purpose such as hospitals and housing through the sale of Private Activity Bonds (PABs). In 2005, however, with the passage of the Safe Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU), the Code was amended to add highways and freight transfer facilities to the list of privately developed and operated projects for which PABs may be issued. SAFETEA-LU limited the total amount of PABs for highway purposes to $15 billion. Typically issuance of non-highway, qualifying facility PABs is managed according to individual state volume caps. For highway projects, the $15 billion authorization is not subject to any state's PAB volume cap, but instead is allocated to qualifying projects by the Secretary of Transportation.

Since 1996, the FHWA has supported the development of State Infrastructure Banks (SIB) for highway and other transportation projects. The FAST Act authorizes a State DOT to capitalize a SIB using funds from three FHWA programs: the National Highway Performance Program, the Surface Transportation Block Grant Program, and the National Highway Freight Program. However, a SIB can assist a project eligible for Federal-aid under any FHWA program, such as the CMAQ program.

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[7] Applicants requesting assistance in excess of 33% must provide a strong rationale for requiring additional assistance.

Initially capitalized from a variety of sources, including FHWA Federal-aid funds, SIBs are revolving funds established and administered by State DOTs. As with a CEB, a SIB can offer a range of loans and credit enhancement products to public and private borrowers, including those developing CMAQ-eligible projects. Its likewise similar objectives include the more efficient use of public funds to attract private investment. As loans or other credit assistance are repaid, the funds can be used to support a new round of lending.

Nationally, there is much variance among the services provided by SIBs, and to date few have addressed air quality projects. The State of Vermont, however, currently offers SIB financing of up to $100,000 at 1 percent interest for the construction of EV charging stations and natural gas refueling stations. The loan can cover up to the total cost of a project.

Under DOE's Title XVII Renewable Energy and Efficient Energy (REEE) Projects program, certain EV charging facilities are an eligible technology. The program can provide up to $4.5 billion in loan guarantees to support innovative renewable energy and energy efficiency projects. Loan guarantees can be an important tool to commercialize innovative technologies because these projects may be unable to obtain full commercial financing due to the perceived risks associated with technology that has limited deployment experience at commercial scale in the United States.

Public Law 114-113; 26 U.S.C. 30C and 38; and IRS Notice 2007-43 allow a tax credit of 30 percent of the cost, not to exceed $30,000, for fueling equipment installed between January 1, 2015, and December 31, 2016, for electricity, E85, liquefied hydrogen, liquefied petroleum gas (propane), natural gas, or diesel fuel blends containing a minimum of 20 percent biodiesel. Fueling station owners who install qualified equipment at multiple sites are allowed to use the credit toward each location. Consumers who purchased qualified residential fueling equipment prior to December 31, 2016, may receive a tax credit of up to $1,000. Unused credits that qualify as general business tax credits, as defined by the Internal Revenue Service (IRS), may be carried backward one year and carried forward 20 years.[8]

Recent and On-Going Efforts

Section 1413 of the FAST Act requires the Secretary of Transportation to designate national EV charging, hydrogen, propane, and natural gas fueling corridors. It is FHWA's goal and intent to encourage and support the development of a national network of alternative fueling and charging infrastructure along NHS corridors. The FHWA has held webinars[9] and issued a Federal Register Notice[10] inviting nominations from State and local officials to assist in designating the corridors. FHWA identified 55 routes spanning 35 States that will serve as the basis for a

[8] Note that this incentive originally expired on December 31, 2013, but was retroactively extended through December 31, 2016, by H.R. 2029.
[9] See: http://www.fhwa.dot.gov/environment/climate_change/mitigation/webinars/.
[10] https://www.federalregister.gov/articles/2016/07/22/2016-17132/fixing-americas-surface-transportation-act-designation-of-alternative-fuel-corridors

national network of "alternative fuel" corridors in January 2017[11] and will continue designating initial corridors on a rolling basis. FHWA is also developing signage and other means to inform the travelling public about these corridors. Some corridors are designated as "Signage Ready," meaning that there are a sufficient number of facilities on the corridor to warrant signage that alerts drivers of the availability of alternative fueling stations. Corridors that do not have sufficient alternative fuel facilities to warrant highway signage are designated as "Signage Pending." The FHWA will work with State and local agencies to assist in bringing corridors designated as Signage Pending up to the necessary standard to be designated as Signage Ready.

In July 2016 DOE and DOT jointly published a *Guide to Federal Funding, Financing, and Technical Assistance for Plug-in Electric Vehicles and Charging Stations*[12] to highlight examples of Federal programs that support funding and financing for plug-in electric vehicles (PEVs) and charging infrastructure.

Also in July 2016, the Administration announced a set of actions geared toward accelerating the deployment of electric vehicle charging infrastructure and putting more electric vehicles on the road. The actions, to be undertaken in collaboration with vehicle manufacturers, electric utilities, electric vehicle charging companies, and States are centered on a set of *Guiding Principles to Promote Electric Vehicles and Charging Infrastructure* that nearly 50 organizations signed.[13] The Federal Government will work with the private sector to ensure that electric vehicle drivers have access to charging stations at home, at work, and on the road.

The DOE and DOT will partner on the development of a 2020 vision for a national network of fast charging stations for EVs in order to facilitate coast to coast, nationwide zero emissions travel. Building upon DOT's planned designation of alternative fuel corridors under the FAST Act, DOE and DOT, in cooperation with the DOE National Laboratories, the DOT Volpe Center, and other government and industry stakeholders, will commence efforts in fiscal year 2017 to develop criteria that will help identify specific locations for siting fast charging infrastructure adjacent to the DOT-designated corridors.

The proposed effort will address four key areas important to evaluating the potential for a national network for fast charging including: (1) siting criteria for charging locations; (2) charging and utility infrastructure needs and cost assessment; (3) impacts of electric demand charges to consumers and utilities; and (4) potential longer-term innovations including evolution up to 350 kilowatt (kW) fast charging. The partnership will address these questions to provide the necessary information for the basis of a dialogue with stakeholders to help define P3s, funding, and financing models for implementing a national fast charging network. Along those

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[11] See FHWA report *National Electric Vehicle Charging and Hydrogen, Propane, and Natural Gas Fueling Corridors* available at: https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/resources/section_1413_report/fhwahep170.pdf

[12] Available at: http://energy.gov/sites/prod/files/2016/07/f33/Guide%20to%20Federal%20Funding%20and%20Financing%20for%20PEVs%20and%20PEV%20Charging.pdf

[13] Fact sheet at: https://www.whitehouse.gov/the-press-office/2016/07/21/fact-sheet-obama-administration-announces-federal-and-private-sector

lines, the DOE and DOT will be convening stakeholders this fall to identify critical needs for a national network of fast charging stations.

The FHWA's Transportation Pooled Fund (TPF) program allows State DOTs, commercial entities, and the FHWA to combine resources and achieve common research goals. Since June 2014, the TPF program has been developing toolkits for the deployment of alternative vehicle and fuel technologies,[14] working directly with States that have committed funds toward alternative refueling infrastructure.

The TPF program has produced an *Alternative Fuels Innovative Finance Toolkit*.[15] This toolkit addresses challenges to AFV deployment by providing resources and information to support the adoption of AFVs through greater use of innovative finance mechanisms. It stems from a workshop held on February 22, 2016, titled "Accelerating Alternative Fuel Vehicle and Infrastructure Deployment with Innovative Finance Mechanisms." Hosted by FHWA in conjunction with the Oregon DOT, this workshop was organized around two case studies that explored financing of AFV and infrastructure deployment. Among the findings of the workshop related to AFV infrastructure deployment were the following:

- While the business case for EV infrastructure deployment looks challenging in the near term, continued government support will result in more financing options, specifically those that leverage the private sector.
- The business case for EV infrastructure can be improved by capturing value from traditionally external stakeholders like automakers, utilities, and retailers.
- Alternative fuel infrastructure deployment can be challenging because of restrictions on commercial operations on the Interstate right-of-way. Coordination of multiple stakeholders tends to be the most challenging aspect of building strong P3s.
- Co-location of several types of alternative fuel infrastructure (e.g., fast charging stations adjacent to (CNG) dispensers) can lower the fixed capital cost of the station.
- The speed of technology change and the relatively slow pace of the government procurement process and policy development process is a challenge because of the rapidly evolving needs of alternative fuel vehicles.

Additionally, the Oregon DOT and FHWA hosted an "EV Infrastructure Corridor Development" Workshop on July 28, 2015, and an "AFV Adoption in Fleets" Workshop on April 18, 2016. Both workshops produced toolkits, which are available at the Web site http://altfueltoolkit.org/, a dynamic and evolving hub for tools, presentations, and other useful resources. Two more workshops are scheduled to assist State and local transportation agencies interested in promoting the use of alternative fuel vehicles and fueling infrastructure, one in the fall of 2016 and the other in spring 2017.

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[14] http://altfueltoolkit.org/.

[15] http://altfueltoolkit.org/alternative-fuels-innovative-finance-toolkit/#workshop

Finally, the DOE's Workplace Charging Challenge seeks to achieve a tenfold increase in the number of U.S. employers offering workplace charging by 2018. The Challenge offers a variety of resources, including technical assistance, to help employers install, promote, and increase the use of workplace charging.[16]

[16] http://energy.gov/eere/vehicles/ev-everywhere-workplace-charging-challenge

ATTACHMENT

Senate Report 113-45, *Transportation, Housing and Urban Development, and Related Agencies Appropriations Bill, 2014*

Alternative Fuels Infrastructure. — Recent years have seen meaningful growth in the alternative fuel vehicle sector. By helping to decrease fuel consumption, this sector plays an important role in our Nation's energy security. As automobile manufacturers design new vehicles to meet stronger fuel economy standards in coming years, alternative fuel vehicles are expected to comprise a larger share of the vehicle fleet in the United States. At this time, efforts to encourage the deployment of refueling and recharging infrastructure to support alternative fuel vehicles have relied primarily on State and Federal incentives, grants and matching programs. As the industry looks to the future, however, the development of new, innovative funding mechanisms will be important to continued market growth.

The Committee recognizes FHWA's ongoing efforts to evaluate the prospects for deployment of electric vehicles and to analyze the potential impact of this deployment on its mission, including the financial implications for available highway revenues. The Committee directs FHWA to provide the House and Senate Committees on Appropriations, not later than 1 year after enactment of this Act, a report on options for financing alternative fueling stations, including public-access electric vehicle charging stations. The Committee expects the report to address a variety of financing mechanisms, including, but not limited to, Federal grants and credit assistance, public-private partnerships and membership-based cooperatives. The Committee further directs that, in developing its report, FHWA consult with interested stakeholders, including the Department of Energy, relevant industry members, and State departments of transportation actively participating in alternative and electric vehicle infrastructure deployment.