

# Alternative Fuels Signing: State-of-the-Practice

February 2019

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## CHAPTER 1. INTRODUCTION

Six alternative fuel vehicle types have been designated to be promoted for use on highways by the United States Congress:

- Electric.
- Compressed Natural Gas (CNG).
- Liquified Natural Gas (LNG).
- Hydrogen.
- Propane (LPG).
- Ethanol (E85).

Estimates suggest more than 800,000 alternative fuel vehicles currently operate on U.S. roads, and more than 23,000 public facilities are available for fueling these vehicles. More alternative fuel facilities will be needed as the number of alternative fuel powered vehicles grows.

An issue related to alternative fuels adoption is access to these fuels. Currently, prospective purchasers of alternative fuel vehicles must perform preliminary research to determine whether the fuels will be available in the range of areas where they intend to drive. At present, electric vehicles (both plug-in hybrid-electric and fully electric) are the most common alternative fuel vehicles in the passenger fleet. Because they can be charged at home or in employer parking lots, availability of public fueling facilities may be a secondary consideration for electric vehicle purchases. On the other end of the spectrum, availability of public refueling facilities is a major factor in adoption of hydrogen powered vehicles because facilities for refueling them are available in only a few areas.

Section 1413 of the Fixing America's Surface Transportation (FAST) Act (114th Congress, 2014) requires the Secretary of Transportation to designate and promote national Alternative Fuels Corridors, an Interstate network of stations that will enable commercial and passenger vehicles to reliably travel between cities, regions, and across the nation. A Federal Highway Administration (FHWA) pamphlet on alternative fuels corridors summarizes the current status of progress in responding to FAST mandate (Federal Highway Administration, 2018).

Alternative fuels signs are intended to aid drivers in finding alternative fuel stations. Commercial on-premise signs are often adequate to inform drivers of the availability of alternative fuels in urban areas where the alternative fuel vehicle drivers live and work. However, highway guide and service signs may be critical to these drivers when they travel outside their home area. Pre-trip online planning is one method to locate stations. However, highway signing may still be helpful in guiding drivers as they approach pre-planned refueling locations. Standardized signing can aid these drivers in recognizing and understanding these signs. Familiar standardized signs may aid in overcoming the effects of visual clutter in populated urban and suburban environments. Thus, standardizing alternative fuel signs to make them easily detectable is a high priority for the FHWA, State, and local transportation agencies.

### PURPOSE

This document focuses on the state of practice in roadside signing for fueling facilities that provide alternative fuels; specifically, how to guide drivers alternative fuel stations with the type of fuel they need, as not all stations provide all types of fuel.

## **BACKGROUND**

With the designation of alternative fuel corridors, FHWA is promoting the development of a national network of alternative fueling and charging infrastructure along National Highway System corridors (Federal Highway Administration, 2018). FHWA intends to support the expansion of this national network through a process that provides the opportunity for formal corridor designations on an annual basis and ensures that corridor designations are based on criteria that promote the build out of the national network. One factor in the support is national signing standards that will brand the network and encourage public interest and applications for corridor designation. In conjunction with the Department of Energy, FHWA encourages multi-State and regional cooperation and collaboration in establishing corridors and brings together consortiums of stakeholders that include state agencies, utilities, alternative fuel providers, and car manufacturers to promote and advance alternative fuel corridor designations.

Two designations for corridors have been defined:

- Corridor Ready.
- Corridor Pending.

**Corridor Ready** refers to designated corridors that have enough facilities to enable travel along them with one or more of the alternative fuels.

**Corridor Pending** refers to planned corridors that currently lack enough facilities.

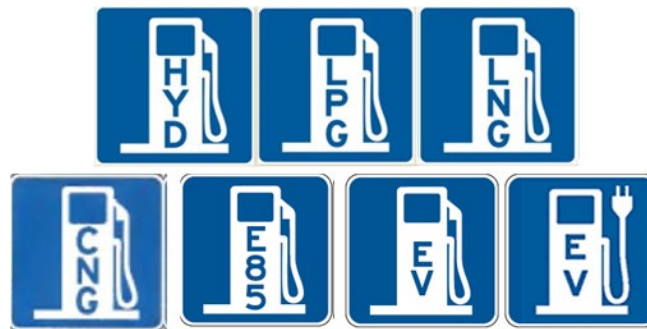
Rounds 1 and 2 (FY 2016 and FY 2017) of FHWA's Alternative Fuel Corridor Designations saw 58 nominations for corridor designation. Segments or entire lengths of 84 interstate corridors. Forty-four States and the District of Columbia have corridor-ready or corridor-pending segments for one or more alternative fuel types. Altogether (all fuels combined), there are over 100,000 miles on the National Highway System with alternate fuels corridor designation.

## **MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)**

This section is intended to summarize MUTCD standards and guidance specifically for alternative fuel signing. Alternative fuels signs are included in the MUTCD section on general service signs. All general service sign standards and guidance apply to alternative fuels signing. Standards and guidance not specific to alternative fuel signing is included here only for emphasis.

It may be appropriate to sign for alternative fuels in urban areas where alternative fueling facilities are infrequent, as paragraph 2 of section 2I.02 states that “General Service signs (see Figure 2I-1) may be used where such services are infrequent and are found only on an intersecting highway or crossroad.” However, such signing should be reconsidered periodically to determine if the signed services are still uncommon. The MUTCD recommends that states establish policies for general service signs in general and specifically for alternative fuel signs where those fuels are available (Federal Highway Administration, 2009, 2I.02, ¶ 5 and 6).

Approved alternative fuel logo signs for use on directional assemblies or general service logo signs are shown in figure 1. Note that two electric vehicle charging station specific service have been approved. The electric vehicle charging logo with the electric cord in place of a hose has interim approval (Federal Highway Administration, 2011). The alternative fuel logo signs may be used outside of alternative fuel corridors, but where their placement would conflict with other permanent or temporary traffic control signs, the other signs have priority such that the alternative fuel signs must be removed, covered, or placed elsewhere. The hydrogen (HYD), liquefied petroleum gas (LPG), and liquified natural gas (LNG) specific service are not in the 2009 MUTCD, but were approved in a 2016 FHWA memorandum on alternative fuel signing (Federal Highway Administration, 2016).



**Figure 1. FHWA approved alternative fuel specific service.**

For limited access roadways, the MUTCD specifies the order in which the top six, four, or three general service categories (i.e., gas, food, lodging, phone, hospital, or camping) may appear on a general service sign (Federal Highway Administration, 2009, 2I.03). However, it also specifies that the substitutions may appear on the bottom right portion of a panel. Thus, any of the alternative fuel specific service may appear at the bottom right of a general service logo or alternative word panels. At rural interchanges where a service such as an alternative fuel is unlikely to be available for a considerable distance (“some time”) the MUTCD permits up to three general service specific service to be appended below a post mounted interchange guide sign.

## **ALTERNATIVE FUELS CORRIDORS**

The FAST Act requires the Secretary of Transportation to designate national electric vehicle (EV) charging, hydrogen, propane, and natural gas fueling corridors. The Federal Highway Administration (FHWA) is working with other Federal, State, and local officials, as well as private industry, to help plan and promote an interstate network of stations that will fuel vehicles powered by domestically produced alternative fuels, so commercial and passenger vehicles can reliably use them to travel between cities, regions, and across the nation.

The considerations for designation as alternative fuel corridors are the following:

- The number of existing alternative fuel facilities on corridor.
- The number of additional planned/projected alternative fuel facilities on corridor.
- The distance between existing and planned/projected alternative fuel facilities on corridor.

- The visibility, convenience, and accessibility of the fueling stations to corridor users.
- A history of successful development alternative fuel facilities along the corridor.

The alternative fuels corridor sign (see figure 2) indicates that a following section of road is a federally designated alternative fuel corridor. This post mounted sign may be 24 or 36 in square. Alternative fuel logo signs, or a placard of the same width with alternative fuel letters are used to indicate which alternative fuels are available. The alternative fuels corridor sign should not be displayed along a “future,” “proposed,” or other routes where alternative fueling infrastructure is incomplete, pending, or does not currently meet the established designation criteria to qualify for signing. Placards with the words “begin” and “end” may be placed above the alternative fuels corridor sign and the beginning and end, respectively, of a corridor. The alternative fuels corridor sign shown in figure 2 may be repeated at locations other than the beginning or end of the corridor if those locations immediately follow major interchanges where significant traffic enters the corridor.



**Figure 2. Sign used to indicate an FHWA designated alternative fuels corridor.**

For designation as alternative fuels corridors, the following rules apply:

- Sign-ready corridors should have 2-3 stations and be at least 150 mi in length – or cover the entire length of the State.
- Sign-pending corridors do not have facilities, but agencies must submit a plan/timeline for build-out.
- EV corridor nominations are encouraged to coordinate with Electrify America (Electrify America LLC, 2018) on targeted Interstates.
- Public and private sector coordination is essential; State and local agencies, Clean Cities Coordinators, and other stakeholders should work together to further the initiative.
- There should be coordination with State freight plans and/or long-range transportation plans.

The distance between stations on the corridor must meet the fuel-specific requirements shown in table 1. Qualifying stations must be within 5 miles of the corridor. Qualifying propane stations

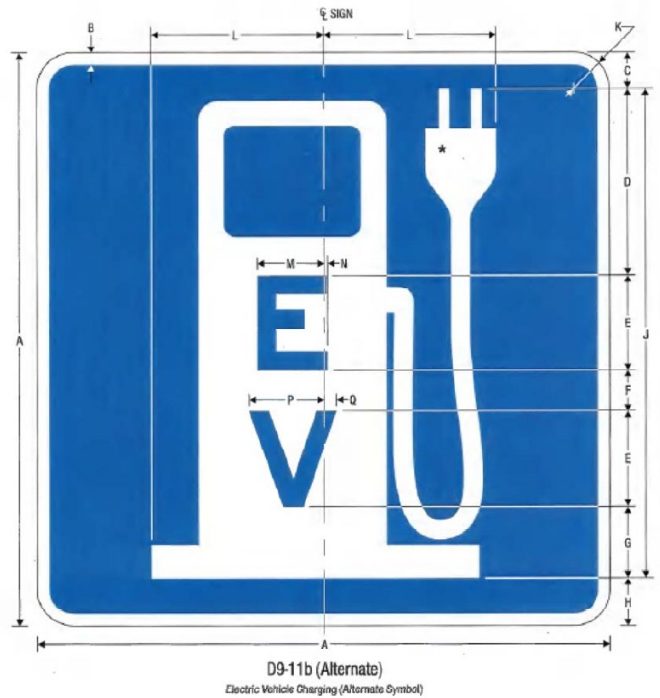
must have fuel, facilities, and pricing specifically for propane powered vehicles. Hydrogen fueling facilities must meet the requirements of SAE J2601. Complete information on application for the alternative fuel corridor designations may be found on the FHWA web site (Federal Highway Administration, 2017a)

**Table 1. Fuel specific requirements for consideration of an alternative fuel designation by FHWA.**

<b>Fuel/ Technology</b>	<b>Requirement</b>
<b>EV Charging</b>	DC Fast Charging stations with no more than 50 miles between one station and the next.
<b>Hydrogen</b>	No more than 100 miles between one station and the next.
<b>Propane</b>	Primary propane stations no more than 150 miles between one station and the next.
<b>CNG</b>	Fast fill, 3,600 psi stations no more than 150 miles between one station and the next.
<b>LNG</b>	No more than 200 miles between one station and the next.

States are not required to use alternative fuels corridor signs on designated Alternative Fuels Corridors. The 2016 FHWA memorandum provides complete guidance on how to implement alternative fuels corridor specific signing (Federal Highway Administration, 2016). The alternative fuel symbols signs, for which the memorandum provides detailed dimension information (see figure 3), may be used on roads not designated as alternative fuel corridors. The alternative fuel symbols signs may be used to guide motorists to publicly available alternative fuel facilities.





Source: FHWA

**Figure 3. Example of symbol sign specification in FHWA Alternative Fuels Corridor memorandum.**

### Alternative to General Service Signs for Alternative Fuels

Specific service signs may be used to inform drivers of the availability of an alternative fuel at businesses displayed on them. Figure 3 shows an example of how this may be done by inserting a horizontally aligned message at the bottom of the logo (see Federal Highway Administration, 2009, section 2J.02). Any of the alternative fuel two or three letter designations may be used in the logo legend. The message background and lettering colors should provide clear contrast between the logo and the message.



Source: MUTCD

**Figure 4. Logo sign with supplemental information.**

### Sign Clutter and Other Distractions

Because Alternative Fuels Corridor signs will presumably be additions to existing traffic control infrastructure, the FHWA memorandum on signing a designated Alternative Fuels Corridor contains the following precautionary words:

*Because regulatory, warning, and guide signs have a higher priority, installations of Alternative Fuels Corridor sign assemblies shall be limited to those locations where adequate spacing is available between the Alternative Fuels Corridor sign and other higher priority signs.*

*Alternative Fuels Corridor signs shall not be installed in a location where they would obscure the road users' view of other traffic control devices or distract driver's attention from the roadway in a complex roadway environment.*

*Alternative Fuels Corridor sign shall not be installed at any of the following locations:*

- A. On the front or back of, adjacent to, or around any other traffic control device, including traffic signs, highway traffic signals, and changeable message signs;*
- B. On the front or back of, adjacent to, or around the supports or structures of other traffic control devices;*
- C. At key decision points where a road user's attention is more appropriately focused on other traffic control devices, roadway geometry, or traffic conditions, including exit and entrance ramps, intersections, grade crossings, toll plazas, temporary traffic control zones, and areas of limited sight distance; or*
- D. On routes other than those officially designated as Alternative Fuels Corridors, even if to provide directional information to such corridors, i.e., they shall not appear on supplemental signs or on any other information sign on or along the highway or its intersecting routes.*

*The minimum spacing between Alternative Fuels Corridor signs and any other traffic control signs, except parking regulation signs, should be:*

- A. 150 feet on roadways with speed limits of less than 30 mph,*
  - B. 200 feet on roadways with speed limits of 30 to 45 mph, and*
  - C. 500 feet on roadways with speed limits greater than 45 mph.*
- If the placement of a newly-installed, higher-priority traffic control device, such as a higher-priority sign, a highway traffic signal, or a temporary traffic control device, conflicts with an existing Alternative Fuels Corridor sign, the Alternative Fuels Corridor sign should be relocated, covered, or removed.*

The same cautionary words apply to all alternative fuel signing, whether on a corridor or elsewhere.

## CHAPTER 2. FUEL TYPES AND NATIONAL DISTRIBUTION

This section summarizes the various recognized alternative fuel types. It also provides maps showing the distribution of stations across the United States for each fuel type.

### ELECTRIC VEHICLES

EV indicates fueling for plug-in electric vehicles. EV charging pulls energy from an off-board power source to recharge on-board batteries. Electric vehicles include hybrids which can travel 10–50 mi (16–80 km) using an electric motor alone, and fully electric vehicles which can travel 60–300 mi (96–482 km) without recharging. The electric vehicle market is strongest on the west coast, in the Northeast, and in Hawaii. The U.S. Department of Energy has funded 16 electric vehicle charging projects in 24 States and the District of Columbia to help prepare for electric vehicles and charging infrastructure (U.S. Department of Energy, 2014).

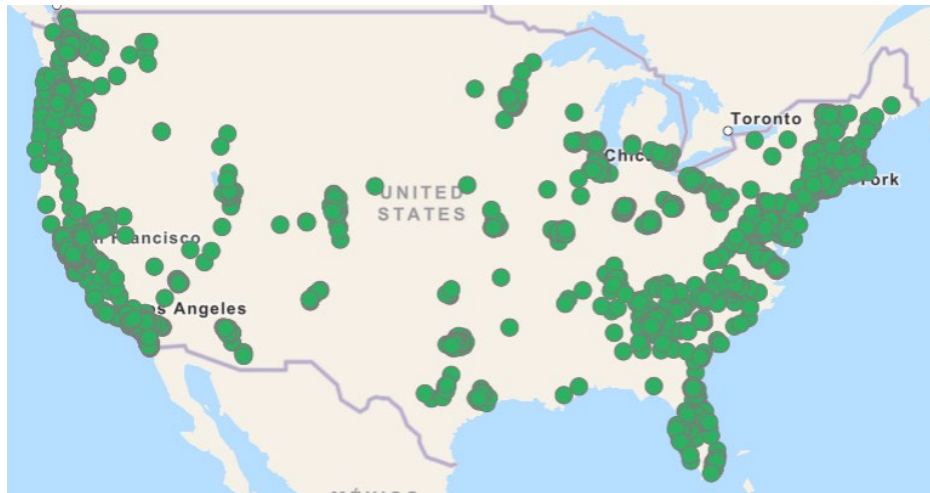
There are three types of charging available for electric vehicles:

- Level 1 charging uses the charger included with the car. These chargers plug into any standard 120 V outlet. Level 1 charging is most common in-home charging, and approximately 85 percent of all charging is accomplished with it. Level 1 requires 8 to 15 hours for a full recharge.
- Level 2 chargers are plugged into a 240 V outlet and can also be used for home charging. Level 2 requires 3 to 8 hours for a full recharge.
- Level 3 is the quickest means to recharge a vehicle. These chargers will be available along alternative fuel corridors. A full recharge takes 20 minutes to 1 hr.

There is not yet a globally accepted standard for level 3 charging. Per the United States Department of Energy, all currently available electric vehicles have level 1 and 2 charging receptacles. Direct current fast charging receptacles (DCFC), necessary for level 3 charging are not yet standard (U.S. Department of Energy, 2018b). The Society of Automotive Engineers has developed the combo charging system (CSS) as a standard that has been adopted by BMW, General Motors, and Volkswagen, among others (Greentransportation.info, 2018). Japanese manufacturers have developed a different charger standard, CHAdeMO, which is used by Kia, Mitsubishi, Nissan, Subaru, and Toyota (Greentransportation.info, 2018). Tesla uses a proprietary charger that is not compatible with either CSS or CHAdeMO. China and some European manufactures use other Level 3 charging approaches (Greentransportation.info, 2018). Fortunately, an increasing number of charging stations in the U.S. provide for chargers for both CHAdeMO and CSS equipped vehicles (U.S. Department of Energy, 2018b). An adapter is available for Tesla owners so that they can use CHAdeMO chargers. Although it is advisable for electric vehicle owners to check ahead to ensure compatible charges will be available when they plan their trips, it is becoming increasingly likely that trips on EV alternative vehicle corridors will accommodate their vehicles. The FHWA has not developed signs to indicate which DCFC charging technologies are available at EV charging stations available to the public.

Figure 5 shows the location of DCFC stations in the United States that have CHAdeMO compatible connectors. Of the 1,919 charging stations shown in figure 5, 1,800 support CHAdeMO charging, and 1,316 support CSS (U.S. Department of Energy, 2018a). Figure 6 shows the location of DCFC charging stations with CSS compatible connectors. The alternative

fuels corridors program focuses on the DCFC charging types, since charge times are relatively short and may be more convenient for travelers. Charging Levels 1 and 2 take longer, but are ubiquitous and availability is widespread. Figure 7 shows the location of 401 Tesla DCFC stations in the United States. Although there are fewer Tesla DCFC stations, they are better dispersed across the center of the nation. However, they are not publicly available and therefore not eligible for signing in the alternative fuels corridor program.



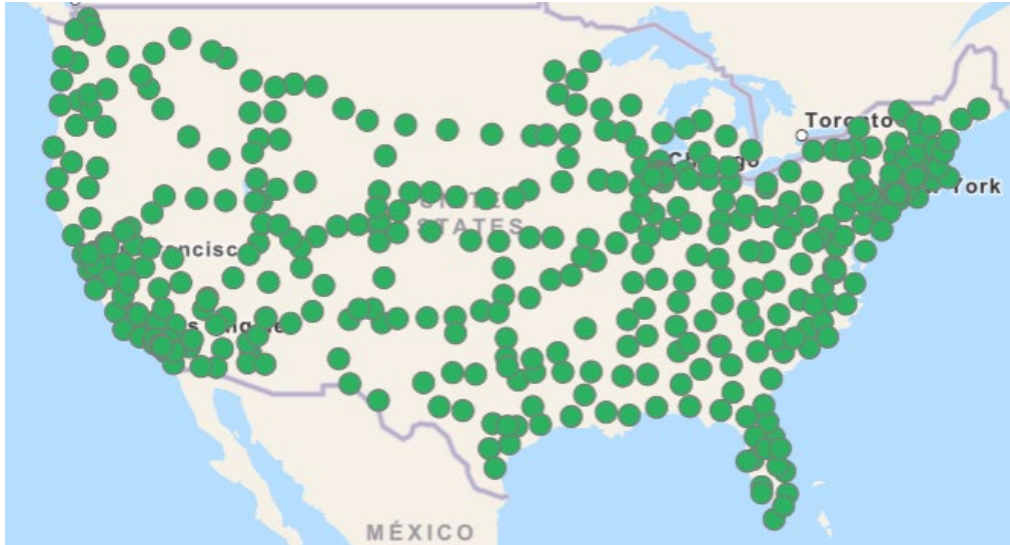
Map Source: US Department of Energy (2018).

**Figure 5: EV DC Fast Charging Stations with CHAdeMO compatible connectors as of 8/27/2018.**



Map Source: US Department of Energy (2018).

**Figure 6. DCFC stations with CSS compatible connectors.**



Map Source: US Department of Energy (2018).  
**Figure 7. Tesla DCFC stations in the United States.**

## HYDROGEN

According to the U.S. Department of Energy, hydrogen is considered an alternative fuel. It can power fuel cells in zero-emission fuel cell electric vehicles (FCEVs), has the potential for domestic production, and has a short refueling time. Coupled with an electric motor, hydrogen fuel cells are two to three times more efficient than an internal combustion engine running on gasoline. The average refueling time is less than four minutes.

Although FCEVs produce only water vapor as emissions, hence their potential for environmental benefits, the most common method of extracting hydrogen is steam reforming (combining high-temperature steam with natural gas), which generates air polluting emissions. Electrolysis can be used to extract hydrogen from water, which, if powered by solar or wind energy sources, could be a less polluting alternative.

Currently, hydrogen has very limited distribution that is mostly confined to California (see figure 8).



Map Source: US Department of Energy (2018).

**Figure 8. Hydrogen (HYD) Stations.**

## **COMPRESSED NATURAL GAS/LIQUEFIED NATURAL GAS**

Natural gas is stored onboard a vehicle in either compressed or liquefied form. Compressed natural gas fuel systems transfer natural gas from the tank to the engine while reducing the fuel pressure. Liquefied natural gas fuel systems convert the liquefied fuel into gas before it is injected into the engine. Because of the size and weight of the double-walled containers needed to store it, LNG is used almost exclusively by large transport vehicles. CNG may be used by light duty vehicles.

Both CNG and LNG are largely derived from domestically produced fossil fuels. Both can be derived from renewable sources such as animal waste and landfill methane recovery. Tail pipe emissions from CNG and LNG are comparable to those from gasoline and diesel fuels. However, the lifecycle greenhouse gas emissions from both production and use are somewhat lower (15 percent) for CNG and LNG compared to conventional transportation fuels (US Department of Energy, 2018).

Figure 9 shows the location of CNG refueling stations in the United States. Figure 10 shows the location of LNG refueling stations in the United States.



Map Source: US Department of Energy (2018).

**Figure 9: Compressed Natural Gas (CNG) Stations.**



Map Source: US Department of Energy (2018).

**Figure 10: Liquefied Natural Gas (LNG) Stations.**

## **PROPANE (LPG)**

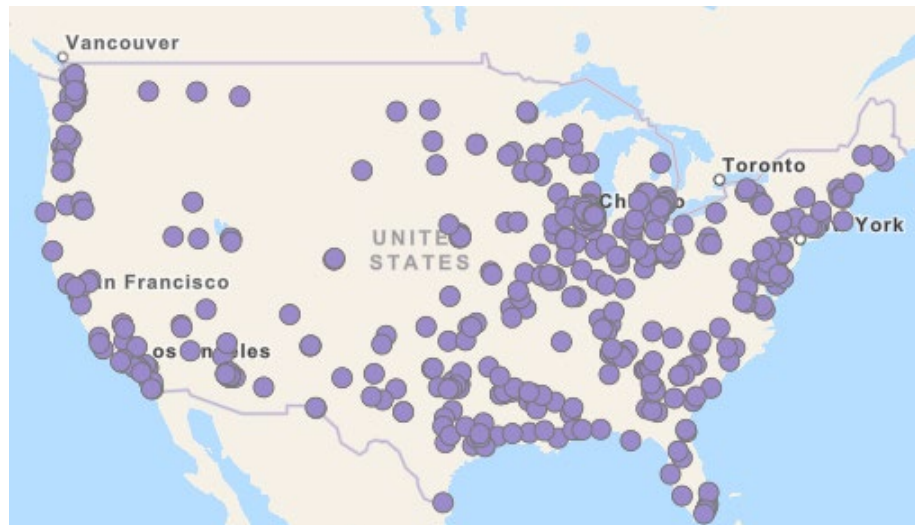
According to the Department of Energy, propane is considered an alternative transportation fuel because of its domestic availability, high-energy density, clean-burning qualities, and relatively low cost. It is used in light-, medium-, and heavy-duty vehicles. Consumers can purchase LPG fueled vehicles from a manufacturer or convert an existing vehicle.

Propane is a by-product of natural gas processing and crude oil refining with almost equal amounts of production derived from each of these sources. Most of the propane consumed in the



United States is produced in North America, although 19 percent of the crude oil used to produce LPG is imported.

Figure 12 shows the location of public LPG service stations in the U.S.



Map Source: US Department of Energy (2018).

**Figure 11: Propane (LPG) Service Stations.**

## **ETHANOL (E85)**

Ethanol (E85) or flex fuel contains blends containing 51 percent to 83 percent ethanol with gasoline, with the exact formulations varying with region and season. It can be used in flexible fuel vehicles (FFVs), which are available from domestic and foreign automakers. There are more than 3,100 public E85 stations in 42 States that offer E85 blends to the nearly 20 million FFVs.

Ethanol is not officially included in the Alternative Fuels Corridor program for defining corridors. However, it is included here because some regions use signs to guide motorists to ethanol stations. Figure 12 shows the location of service stations that provide E85 blends.





Map Source: US Department of Energy (2018).

**Figure 12: The location of E85 service stations.**

## CHAPTER 3. STATE ALTERNATIVE FUEL PROGRAMS

This chapter provides information on the alternative fuel programs and signing policies of selected states that are members of the Traffic Control Devices Pooled Fund Study (Federal Highway Administration, 2017b). The pooled fund study members were asked to provide descriptions of the policies in their state regarding when to sign for alternative fuels, how to sign for alternative fuels, and whether any modifications were made to alternative fuels signs. A related question asked for policies regarding the potential for sign clutter when signing for alternative fuels.

### Delaware

Delaware is aware of the sign-clutter issue and is working towards making changes that will alleviate this problem wherever possible. The initiative here goes beyond just alternative fuel signage, but is significant in terms of addressing the sign clutter issue as related in this document. DelDOT owns and maintains over 300,000 signs, with only 15 Sign Installers, statewide. Many sign standards have changed over time, leaving out-of-date and unnecessary signs along the roadways. Sign clutter reduces the effectiveness of critical regulatory, warning, and guidance signs, and is a burden on our staff and resources.

Although many out of date and unnecessary signs have been removed, the goals of this challenge are to further reduce sign clutter on Delaware's roadways, and eliminate certain out of date signs altogether. The challenge is defined in the following terms:

- Remove as many out-of-date and unnecessary signs as possible between February 13, 2017, and March 31, 2017.
- Keep a list of the sign and the location in which the sign was removed.
- Additional signs may be removed based on supervisor-level input.
- If there is a question about the applicability of a specific sign, please consult a supervisor.
- Do not remove signs within municipalities without a supervisor's permission (exception: Drug Free School Zone signs in municipalities should be removed).

### Illinois

Illinois currently displays alternative fuel availability in conjunction with specific service signs. Businesses may have supplemental messages associated with their logo if related to the business primary purpose – “E85,” “alternative fuels,” and “diesel” are specifically called out in the policy and “CNG” and “LNG” supplemental messages would also be permitted. The specific wording is in Section 542.500 c) of the administrative code:

<http://ilga.gov/commission/jcar/admincode/092/09200542sections.html>

Illinois DOT allows alternative messages on logo panels such as E85 (ethanol) and Alternative Fuels, but has no formal Illinois sponsored signing. A Logo sign is based on eligibility for the primary service. Illinois assumes that owners of alternative fuel vehicles have a plan of their own to fuel or recharge their vehicles.

1. The text of the code regarding adding alternative fuel supplemental messages on specific services signs is as follows:

- a. c) *Business Sign Design*

- 1) *The business signs will be designed and supplied by the business to the Department. These signs shall consist of the business' name, trademark, symbol, or combination thereof, providing it does not resemble any traffic sign, signal, or device. The business' trademark, name, etc., must be the primary message on the sign and directly related to the type of service being accommodated on the specific service panel. The business signs may also contain supplemental messages relating to the primary business, including credit cards honored by that business, ATM machines actually on the property that the business owns or leases, and messages such as "family restaurant", "buses welcome", "E85", "alternative fuels" and "diesel". Specific service or symbols identifying a second business or a supplementary service will not be allowed. A business sign may also contain one supplemental word message directly relating to a second motorist service, including, but not limited to, "food mart" on a gas sign, "gas" on a lodging sign, or "restaurant" on a gas or lodging sign. A business sign shall not display the symbol/trademark or name of more than one business. Messages that are not related to motorist services, including, but not limited to, alcoholic beverages, area tourist attractions, dancing, lottery tickets, antiques, and vehicle sales will not be allowed as supplemental messages. Food signs for establishments that are closed one day a week shall include a supplemental message including the day of closure. The business sign may also contain one supplemental message identifying that the business is RV-friendly, subject to the following requirements:*

- A) *The entrance to and egress from the business establishment shall be hard surfaced, kept free of potholes and at least 12 feet wide with a minimum swing radius of 50 feet to enter and exit the facility.*
      - B) *The entrance to and egress from the business establishment and the parking area shall be free of any electrical wires, tree branches, canopies or other obstructions up to 14 feet above the surface.*

- C) *Fueling facilities with canopies are required to have a 14-foot clearance, and those selling diesel fuel are required to have pumps with non-commercial nozzles.*
  - D) *Fueling facilities must allow for pull-through with a swing radius of 50 feet.*
  - E) *Restaurants and 24-hour pharmacies shall have a minimum of two RV spaces that are a minimum of 12 feet wide and 65 feet long with a minimum swing radius of 50 feet to enter and exit the spaces.*
  - F) *Campgrounds shall have a minimum of two spaces that are a minimum of 18 feet wide and 45 feet long.*
  - G) *Business establishments shall post signs on their sites directing motorists to RV-friendly parking spaces and other on-site RV-friendly services.*
  - H) *The supplemental message shall either be "RV access" or "RV friendly". It may also consist of an abbreviation "RV" in six inch black letters inside a 10" diameter yellow circle with a black border displayed within and near the lower right-hand corner of the business sign.*
- 2) *Any supplemental messages must be an integral part of the business sign and not added as stickers or decals after the business sign has been installed. Any signs that are tampered with by adding or deleting supplemental messages or by altering the name, logo, or symbol or any other portion of the message or design subsequent to their installation will be removed by the Department and the business must furnish new signs in addition to the \$50 per sign reinstallation fee required by Section 542.600(b)(4). Should the service indicated by a supplemental message be discontinued, the business must furnish new business signs without the discontinued message along with the \$50 per sign reinstallation fee required by Section 542.600(b)(4) within 60 days after discontinuation of the service. Covering over the message will not be allowed. Supplemental messages*

*may be omitted on ramp and trailblazer signs if the business desires. Signs shall be fabricated on an aluminum base material between .080 and .125 inches thick. High-performance reflectorized background sheeting material shall be utilized for the signs. The size of the signs to be placed on freeway panels, exit ramp panels, and trailblazer assemblies shall be as follows:*

	GAS		FOOD, LODGING, CAMPING, 24-HR PHARMACY	
	Width	Height	Width	Height
FREEWAY	48"	36"	60"	36"
EXIT RAMP	24"	18"	24"	18"
TRAILBLAZER	24"	18"	24"	18"

*Business sign lettering, other than that which is part of a logo/trademark, shall be a minimum of 8" high on freeway signs and 4" high on ramp and trailblazer signs. Supplemental message lettering shall be a minimum of 5" high on freeway signs and 2.5" high on ramp and trailblazer signs.*

- 3) *In order to ensure that the signs meet all of the requirements of this Section, businesses shall furnish a sign design to the Department for approval within 30 calendar days after approval of their application. If the sign design is not received by the Department within the 30 day time period, the space will be declared available.*
- 4) *Any campground not open the entire year must have its opening and closing months shown on its freeway business signs, but is not required to have the months shown on the exit ramps. This provision applies to those businesses who receive approval of their applications on or after January 1, 2012.*

## **Iowa**

Iowa does not currently have a signing policy for alternative fuel facilities. It is handling alternative signs in conjunction with specific service logo signs or Tourist Oriented Directional Signs.

## **Maryland**

Maryland uses general service signs to guide motorists to electric vehicle charging stations. The general service signs are attached to the bottom of guide signs (see Figure 14).



Source: Maryland State Highway Authority.

**Figure 13. Example of Maryland electric vehicle charging station general service sign.**

To be eligible for general service signing for electric vehicle charging, the business must provide level 2 and level 3 charging and accommodate charge of at least two vehicles simultaneously. The business must be in operation 7 days per week and open for at least 16 hours per day. Trail blazers are required if the business is not visible from the interchange. The electric vehicle charging eligibility sections does not specify requirements for lighting, restrooms, or other services. This may be because it is assumed that the businesses offering public electric vehicle charging will be required to provide these as under other provisions of the guidelines (i.e., gas, food, or lodging).

## Minnesota

The U.S. DOE's Alternative Fuels Data Center lists 763 public and private alternative fuel stations located in Minnesota. Minnesota recognizes E85 and biodiesel as alternative fuels, although they are not part of the Alternative Fuels Corridor program. There are EV stations throughout the state, and there are defined alternative fuels corridors for electronic vehicle charging (see figure 15).



Source: Minnesota DOT

**Figure 14. Alternative Fuels Corridor sign on Minnesota roadway.**

The number of electric vehicles and charging stations in the state has steadily increased. In 2017 there were an estimated 5,515 electric vehicles on Minnesota roads and 286 public charging stations. The EV charging stations must meet the following requirements:

- Fast charging station (DCFC).
- Located within 2 miles of the interchange.
- Available to the public 12 hours per day/ 7 days per week.
- The route leading to the EV charging station and the charging station itself should be clearly identified with EV charging station signs.
- Charging spaces identified with regulatory signs for electric vehicle charging only.
- The EV charging station and parking facilities are lighted.
- Installation and maintenance of trailblazing signs beyond the exit ramp and on the site of the facility signing will be the responsibility of the local road authority and requester, respectively.
- Trailblazing signs located on local roads may use either white legend on blue background or the alternate symbol.

## **Mississippi**

Mississippi has not signed for alternative fuels.

## **Missouri**

Missouri does not technically have a policy for alternate fuels. However, Missouri has provisions in the Traveler Oriented Destination and Specific Service Sign programs. Missouri does not have plans on installing the corridor signs since the assumption here is that most routes probably have alternative fuels available. The locations with alternative fuel stations will be indicated by giving directional information to these sites at the appropriate locations. However, each vendor must request the alternate fuel message be added to their tourist oriented directional sign or specific services Logo sign.

The following are the general rules that Missouri requires:

- Alternate vehicle fuels availability at these sites can be displayed as a secondary message at the bottom of a Logo panel or within the traveler oriented direction sign (TODS) legend.
- If this information cannot be displayed as part of the Logo or TODS sign, it may be displayed as a general service sign placed below the gas Logo mainline and ramp signs or below the TODS sign for the facility offering the alternate fuel.
- A maximum of two signs may be displayed below a TODS sign, one attached to each of the TODS sign posts.
- When general service signs are used, the fuel station shall be within three miles of the interchange, located along the crossroad of the interchange, be clearly visible from the

crossroad, with the availability of the alternate fuel clearly identified on the on premise signing of the fuel station.

- The distance to the service fuel station will be displayed along with the general service logo where the distance is greater than one mile;
- Electric Vehicle Charging (EV) sites shall be equipped with level 2 or 3 systems compatible with all electric vehicles, have the capacity to charge a minimum of two vehicles at the same time, and be available to any user regardless if the user is a patron of the site offering the EV charging station. EV availability may be displayed as a supplemental message at the bottom of a Logo panel or within a TODS sign legend for any of the program categories as long as the site meets all the minimum qualifications for the category

## **Nebraska**

To provide a uniform policy for providing alternative fuel signing along the State Highway and Interstate System, the following criteria apply:

- Interstate and Full-Access-Controlled Freeways, rural or urban:
  - The alternative fuel station must be open for business at least twelve (12) hours per day, seven (7) days per week.
  - The station must be located within three (3) miles of the interchange and must be visible from the crossroad accessed from the interchange. If no qualified station exists within three miles of the interchange, then qualified stations within the next successive three-mile increment may be included.
  - Alternate fuel stations located more than six miles from the interchange will not be eligible for signing.
  - Alternative Fuel signs will not be installed on urban interchanges.
- Non-Interstate/Freeway State Highway System, rural or urban:
  - The alternative fuel station must be open for business at least twelve (12) hours per day, seven (7) days per week.
  - The station must be located within three (3) miles of the State Highway in rural areas, and within one (1) mile of the State Highway when located within the corporate limits of a municipality. Alternative fuel stations located further than these distances will not be eligible for signing.
  - Stations which are clearly visible from the highway will not qualify for signing.
  - Only one sign will be installed for each direction of travel on the State Highway System at the intersection of the roadway providing the most direct routes to the station.
  - However, if in the Department of Road's opinion, the area or location of the sign causes road clutter the sign will not be allowed.



- Where alternative fuel services are not visible from the interchange or intersection, the controlling authority must install follow-through (trailblazer) type signs to the station. The trailblazer signs shall consist of a reduced size service sign and an appropriate arrow.
- The alternative fuel motorist service signs will be developed by the Traffic Engineering.
- Alternative fuel service stations must clearly display the type of alternative fuel provided at the station to the traveler. Nebraska Department of Roads will not install signs to direct travelers directly into the drive of the service station.
- The following alternate fuels will be considered for signing:
  - E-85
  - Compressed Natural Gas
  - Propane Auto Gas
  - Other alternate fuels may be considered upon review by the Traffic Engineer.

On rural conventional highway and rural Interstate routes, alternative fuel service signs will be permitted on approved specific service sign installations. Such installations will follow all pertinent rules and regulations that apply to the specific service sign program.

When an interchange has specific service signing, the Department of Roads will not provide any additional alternative fuel signing. A station participating in the specific service program may display a supplemental message inside their logo panel such as “ALTERNATIVE FUELS” per Nebraska Specific Service Signing Program. Alternative Fuel Signs will not be placed at urban freeway interchanges where specific services signs are not permitted.

## **New Hampshire**

New Hampshire does not currently have a separate policy for alternative fuels – it follows the same practice as it does for gas and diesel in terms of placement, and uses the MUTCD D9-11 series symbols for alternative fuels where they apply.

## **North Carolina**

North Carolina limits general and specific service signs to rural areas and communities with populations of less than 40,000. It will not sign for facilities that are clearly visible from the roadway. Refueling stations must be within 3 mi of the roadway. The requirements for alternative fuels are as follows:

Gas, diesel, and alternative fuel sources if all of the following are available:

- appropriate licensing to operate as required by law;
- vehicle services for fuel, motor oil, tire repair and water;
- restroom facilities and drinking water suitable for public use;
- an on-premise attendant to collect monies, make change, and make or arrange for vehicle services; and
- year-round operation at least 16 continuous hours per day, 7 days per week.

- Exception for signing to unmanned stations, providing scarce source alternative fuels (EV, CNG, and LP) if all of the following are available:
  - i. Canopy
  - ii. Well lighted area
  - iii. On-premise signing that clearly shows the facility is open to public
  - iv. Emergency call box

## **Oregon**

Oregon provides mostly EV signs around the State, and there are charge stations along most highways. Oregon is part of the Alternative Fuels Corridor highway system that includes California and Washington for routes of I-5 and US 101. For information, see:

Oregon's electric vehicle charging policy states "electric vehicle charging station signs are approved for use on all roadways in Oregon."

Oregon is looking to implement the American Association of State Highway and Transportation Officials (*AASHTO*) *Guidelines for Supplemental Guide Signing* on Oregon's highways.

Currently the priority for signs on any highways is:

1. Regulatory signs\*
2. Warning signs\*
3. Temporary traffic control
4. Guide signs
  - a. Major city destination
  - b. Major Streets crossings
  - c. Major traffic generators (non-businesses first, such as State parks, then non-profits like museums, then for businesses. An exception is that traffic generators such as certain malls, auditoriums, stadiums take priority over non-businesses.
5. General and Specific service signs

## **Pennsylvania**

Pennsylvania has provisions in our Logo program policy to sign alternative fuel facilities under the Gas service. The Gas designation indicates a station for cars or trucks, which provides any one of gasoline, diesel, CNG, LPG, LNG, electric (must be Level 3) or other alternative fuel. The additional regulations are:

- Free public rest rooms with sinks and running water.
- Continuous operation for at least 16 hours per day, 7 days per week.
- A telephone on or within 500 feet of the property shall be available during hours of operation.

- If the facility does not sell gasoline, the supplemental message of the alternative fuels provided must be followed by the word “ONLY.”

## Texas

The Texas DOT is developing a signing policy for alternative fuel vehicle refueling facilities (to include electric vehicle charging stations).

The *Texas Manual on Uniform Traffic Control Devices (TMUTCD)* contains guidelines for businesses qualifying for general services signing. This section expands and elaborates on the use of these signs along conventional highways for alternative fuel facilities such as CNG, LNG, LPG, HYD and EV stations.

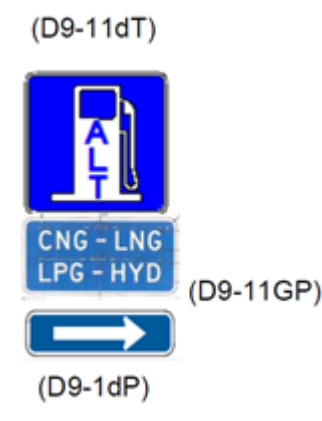
The general eligibility requirements determine the decision to install general services signing on conventional State highways for alternative fuel facilities:

- The facility should be immediately adjacent to the signed conventional highway or lie on a roadway intersected by the signed highway.
- The facility must be open to the general public while continuously operating for at least 12 hours per day, 7 days per week.
- The facility must have an on premise sign, visible to motorists, that identifies the specific fuels available at the facility.
- The maximum distance of the facility from the signed highway:
  - Cities with populations over 250,000 – ½ mile.
  - Urban/suburban areas with populations between 15,000 and 250,000 – 1 mile.
  - Locations with populations less than 15,000 – 2 miles.
- Level 2 and Level 3 electric charging stations must contain a cluster with four or more charging posts. Level 1 charging stations do not qualify for signing.

General services signs for eligible alternative fuel facilities can only be used on conventional roads. One sign assembly per direction can be placed in advance of the cross street where the alternative fuel facility resides. Signing for alternative fuel facilities along freeways is incorporated into the Specific Service (LOGO) Signs program, as referenced in Chapter 2J in the TMUTCD.

The general services symbol signs (D9-11a), (D9-11b), (D9-11d), (D9-11e) and (D9-11f) with a directional arrow plaque (D9-1dp) should be used to sign for qualifying alternative fuel facilities. If a facility has more than one available alternative fuel, then the (D9-11gT) with the supplemental plaque (D9-11GP) or (D9-11GPT) and a directional arrow plaque (D9-1dp) should be used. The name of the facility or a logo/emblem is not included on the sign.

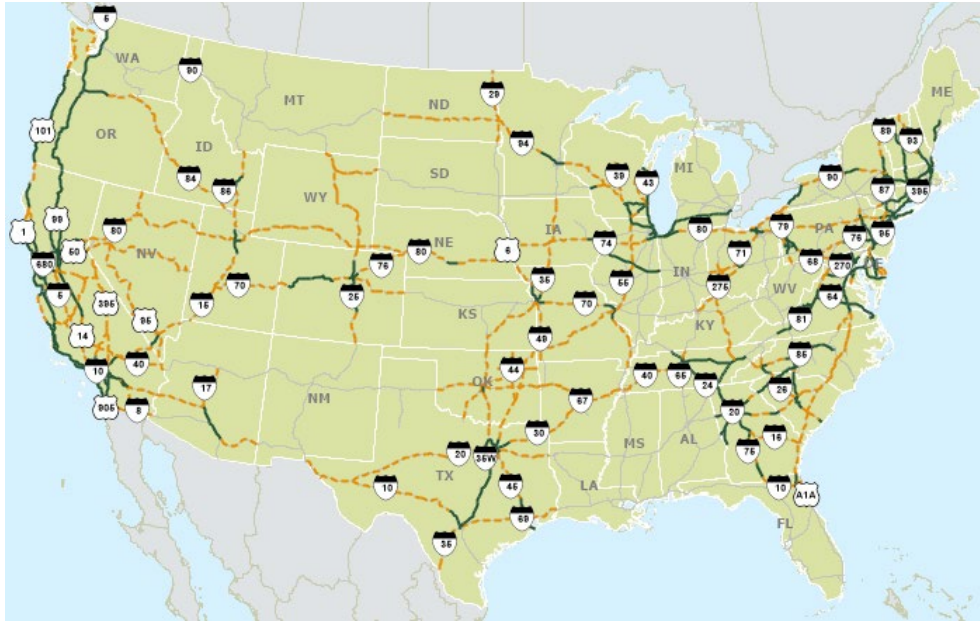
The FHWA has ruled that Texas’ use of the Fuel Pump symbol abbreviation for the multiple alternative fuels signing, using the abbreviation “ALT” oriented vertically down the interior of a pump symbol sign (see figure 15) is not compliant with the FHWA policy guidance on the Alternative Fuel Corridor program signing. The issue is “ALT” does not have a clear meaning to motorist or those looking for Alternative Fuels.



**Figure 15. Texas DOT alternative fuels sign that has been ruled non-compliant with the MUTCD.**

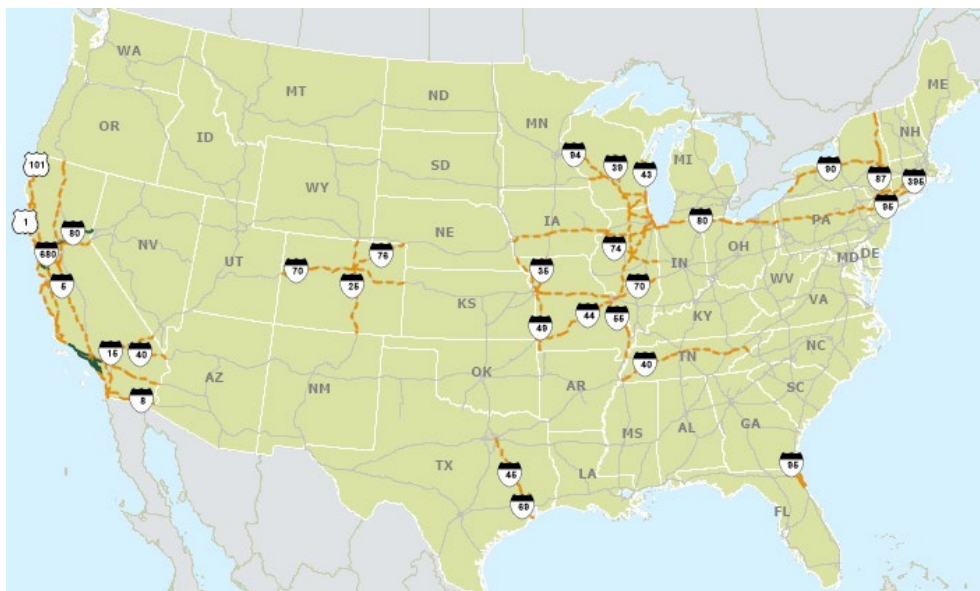
## CHAPTER 4. ALTERNATIVE FUEL CORRIDORS (2017)

The following maps show the defined alternative fuel corridors by fuel type. The green lines indicate established, operational corridors where alternative fuel stations are available based on the FHWA guidelines. The orange lines show pending corridors that have been defined and are currently under consideration and evaluation for becoming established corridors.



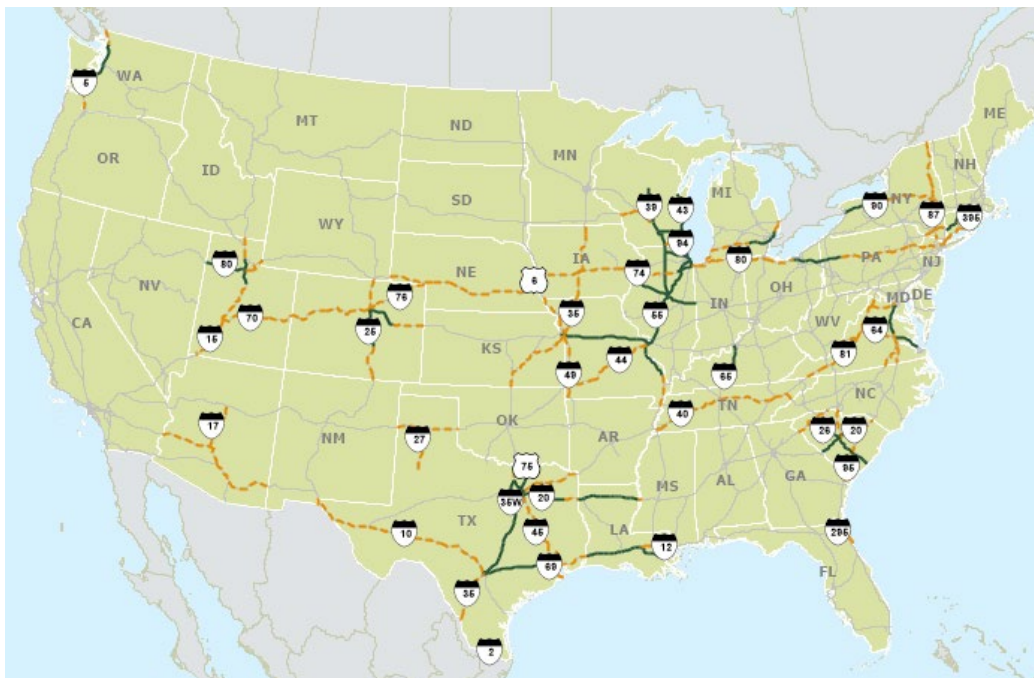
Map source: FHWA 2017

**Figure 16: EV Corridors**



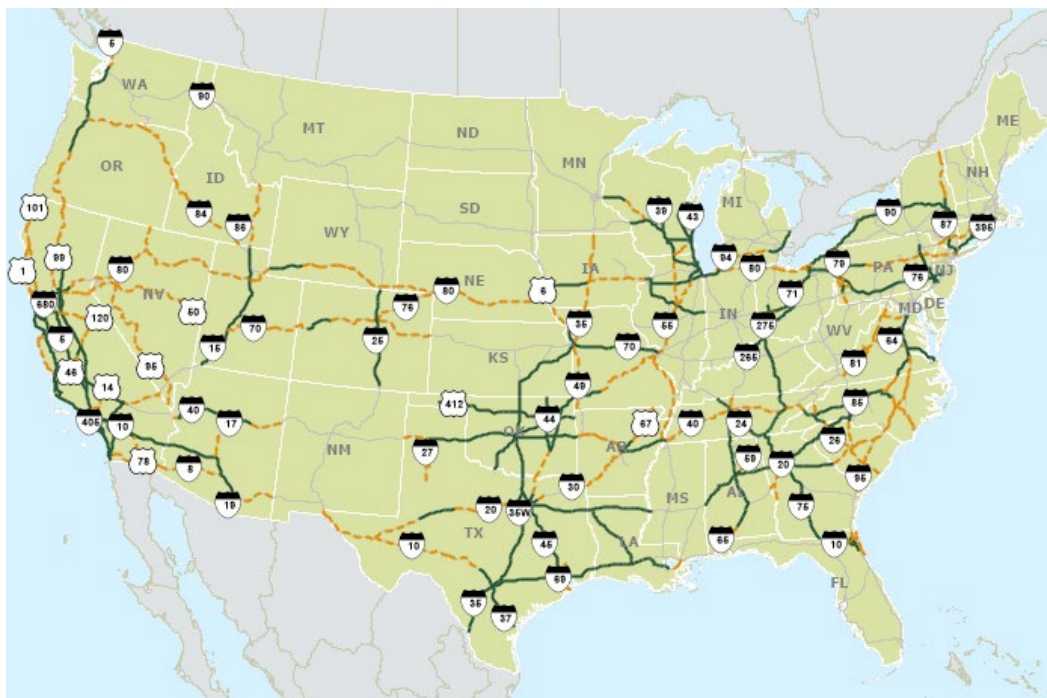
Map source: FHWA 2017

**Figure 17: Hydrogen Corridors**



Map source: FHWA 2017

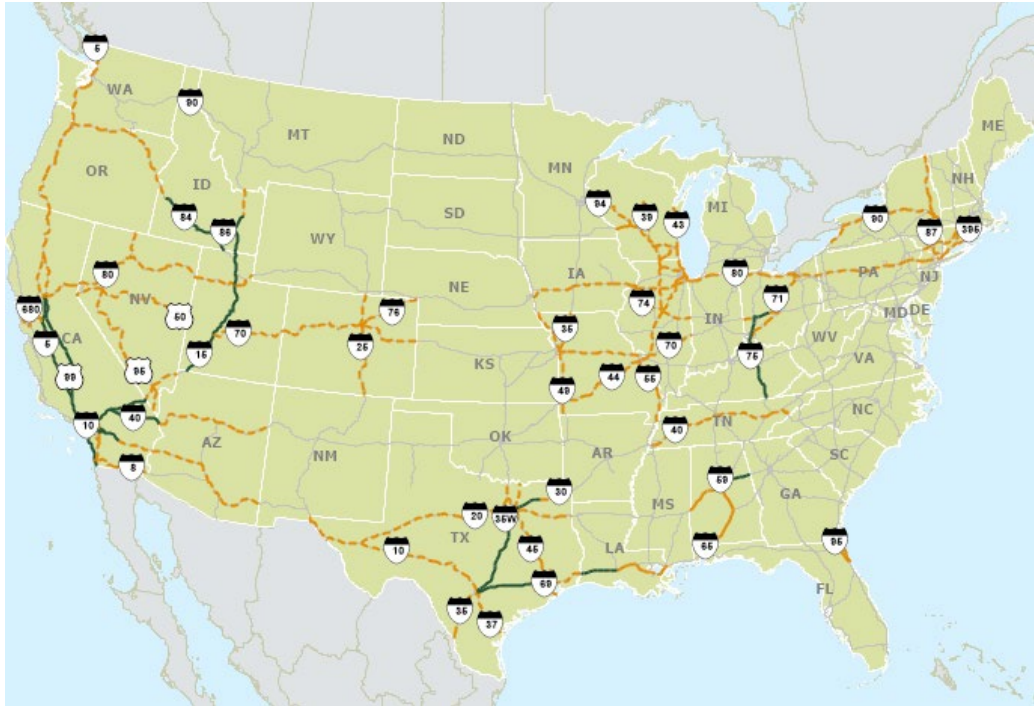
**Figure 18: Propane (LPG) Corridors**



Map source: FHWA 2017

**Figure 19: Compressed Natural Gas (CNG) Corridors**





Map source: FHWA 2017

**Figure 20: Liquefied Natural Gas (LNG) Corridors**

Corridor-Ready Alternative Fuel Corridors (2017)

The tables below show the Corridor Ready and Corridor Pending information for all States with current and future corridors under consideration at this time. This table includes the following information:

- Lead agency and contact;
- Fuels nominated;
- States covered; and,
- Corridors, or segments of corridors, that are "Corridor-Ready" for each fuel based on the footnotes included in the table.

Source: [https://www.fhwa.dot.gov/environment/alternative\\_fuel\\_corridors/ready/#ftn1](https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/ready/#ftn1)

**Table 2: Corridor Ready Alternative Fuel Corridors (2017).**

<b>Lead Agency</b>	<b>Fuels</b>	<b>EV Ready<sup>1</sup></b>	<b>CNG Ready<sup>2</sup></b>	<b>LNG Ready<sup>3</sup></b>	<b>LPG Ready<sup>4</sup></b>	<b>Hydrogen Ready<sup>5</sup></b>
<b>AL DOT</b>	CNG, LNG		<b>I-65:</b> From AL/TN border to Evergreen, AL <b>I-59:</b> From AL/MS border to Trussville, AL <b>I-20:</b> From AL/MS border to AL/GA border	<b>I-20:</b> From AL/GA border to Birmingham, AL		
<b>ADEQ</b>	EV, CNG, LPG		<b>I-40:</b> From AR/TN border to Conway, AR <b>US 67/167:</b> From Little Rock/North Little Rock, AR to Searcy, AR			
<b>AZ DOT</b>	EV, CNG, LNG, LPG	<b>I-10:</b> From Tucson, AZ to Phoenix, AZ	<b>I-10:</b> From AZ/CA border to Tucson, AZ (201 W 14 <sup>th</sup> Ave, Blythe, CA to 3034 E Corona Rd, Tucson, AZ) <b>I-40:</b> From Lake Havasu City, AZ to Winslow, AZ (14750 S Highway 95, Lake Havasu City, AZ to 404 Transcon Ln, Winslow, AZ)			
<b>CA Governor's Office</b>	EV, CNG, LNG, H2	<b>SR-14:</b> From Santa Clarita, CA to Lancaster, CA <b>US-50:</b> From West Sacramento, CA to South Lake Tahoe, CA <b>SR-111-78-86:</b> From Palm Springs, CA to Coachella, CA <b>I-215:</b> From San Bernardino, CA to Murrieta, CA	<b>SR-41:</b> From Fresno, CA to Lemoore, CA <b>SR-46:</b> From Paso Robles, CA to Wasco, CA <b>SR-58:</b> From Buttonwillow, CA (at the intersection of I-5) to Barstow, CA (at the intersection of I-15) <b>SR-111-78-86:</b> From Palm Springs, CA to Indio, CA <b>I-215:</b> From San Bernardino, CA to Murrieta, CA	<b>I-215:</b> From Riverside, CA to Perris, CA		
<b>DE DNR</b>	EV	<b>SR-1:</b> From Smyrna, DE to Milford, DE <b>US-13:</b> From New Castle, DE to DE/MD border <b>US-113:</b> From Milford, DE to Georgetown, DE				



Lead Agency	Fuels	EV Ready <sup>1</sup>	CNG Ready <sup>2</sup>	LNG Ready <sup>3</sup>	LPG Ready <sup>4</sup>	Hydrogen Ready <sup>5</sup>
GA DOT	EV, CNG	<b>I-185:</b> From Columbus, GA to LaGrange, GA (at the intersection of I-85) <b>I-20:</b> From GA/AL border to Madison, GA, and from Thomson, GA to GA/SC border	<b>I-20:</b> From GA/AL border to GA/SC border			
HI State Energy Office	EV, H2	<b>Hwy 19:</b> From Kailua-Kona to Hilo (74-5519 Kaiwi St, Kailua-Kona, HI to 1200 Kilauea Ave, Hilo, HI) <b>Hwy 190:</b> From Kailua-Kona to Waimea (74-5519 Kaiwi St, Kailua-Kona, HI to 65-1158 Mamalahoa Hwy, Waimea, HI 96743)				
Iowa Economic Dev. Authority	EV, CNG, LNG and LPG		<b>I-35:</b> From KS/MO border to KS/OK border			
KY Transportation Cabinet	EV, CNG, LNG and LPG	<b>I-275:</b> From KY/IN border to KY/OH border <b>I-71:</b> From KY/OH border to Florence KY <b>I-75:</b> From KY/OH border to Florence KY	<b>I-75:</b> From KY/OH border to KY/TN border <b>I-71:</b> From KY/OH border to Carrollton, KY	<b>I-75:</b> From KY/TN to KY/OH border	<b>I-65:</b> From the KY/IN border to KY/TN border	
LA DEQ	CNG and LPG		<b>I-10:</b> From New Orleans, LA to LA/TX border <b>I-49:</b> From Shreveport, LA to Lafayette, LA <b>I-20:</b> From TX border to LA/MS border.	<b>I-10:</b> From Lafayette, LA to LA/TX border	<b>I-10:</b> From TX border to LA/MS border <b>I-20:</b> From LA/TX border to Tallulah, LA	
MD DOT <a href="mailto:cturner@mdot.state.md.us">cturner@mdot.state.md.us</a>	EV	<b>I-81:</b> From MD/PA border to MD/VA border <b>I-83:</b> From MD/PA border to Baltimore City, MD <b>I-495:</b> From MD/VA border to Adelphi, MD (@ I-95) <b>I-695:</b> Entire length <b>US 301:</b> From MD/DE border to Waldorf, MD				
MI DOT	CNG and LPG		<b>I-94:</b> From Port Huron, MI to Ann Arbor, MI		<b>I-94:</b> From Clinton Township, MI to Jackson, MI	

Lead Agency	Fuels	EV Ready <sup>1</sup>	CNG Ready <sup>2</sup>	LNG Ready <sup>3</sup>	LPG Ready <sup>4</sup>	Hydrogen Ready <sup>5</sup>
Miami Valley RPC	EV, CNG, LNG	<b>I-275:</b> Entire length <b>I-71:</b> Cleveland, OH to Medina, OH, from Worthington, OH to Grove City, OH; and from Mason, OH to the I-71/I-75 split near Walton, KY <b>I-75:</b> West Chester Township, OH to the I-71/I-75 split near Walton, KY <b>I-270:</b> Entire length	<b>I-70:</b> From OH/IN border to Columbus, OH (@ Exit 108 with intersection of I-270 East) <b>I-71:</b> From I-71/I-75 split near Walton, KY to Cleveland, OH <b>I-75:</b> From I-71/I-75 split near Walton, KY to Piqua, OH <b>I-270:</b> Entire length	<b>I-75:</b> From I-71/I-75 split near Walton, KY to Vandalia, OH <b>I-70:</b> From Vandalia, OH to London, OH		
NC DOT	EV and CNG	<b>I-26:</b> From Asheville, NC to NC/SC border. <b>I-85:</b> From Gastonia, NC to the NC/SC border <b>I-77:</b> From Charlotte, NC to Mooresville, NC	<b>I-40:</b> From Asheville, NC to NC/TN border <b>I-26:</b> From Asheville, NC to NC/SC border <b>I-85:</b> From Charlotte, NC to NC/SC border <b>I-77:</b> From NC/SC border to Statesville (@ I-40)			
ND DOT	EV					
NJ DEP	EV	<b>I-78:</b> From Newark, NJ to Warren Township, NJ (@ Exit 40) <b>I-287:</b> From Edison, NJ to Bridgewater, NJ (@ Exit 13B) <b>I-295:</b> From NJ/DE border to Lawrence Twp., NJ (at the intersection w/ I-95)				
NY DOT	EV	<b>I-495:</b> Entire length (Queens, NY to Riverhead, NY) <b>I-678:</b> From Queens, NY (at the intersection w/ I-495) to Bronx, NY (at the intersection w/ I-95)				
OK DOT Indian Nations COG	EV and CNG		<b>US-412:</b> From OK/AR border to Guymon, OK <b>US-75/Indian Nations Highway:</b> From OK/KS border to intersection with US-69 in McAlester, OK <b>US-69:</b> From McAlester, OK to intersection with I-44 in Vinita, OK			
Penn DOT	EV and CNG	<b>I-376:</b> From Monroeville, PA (at the intersection of I-76) to Aliquippa, PA <b>I-79:</b> From Washington, PA to Slippery Rock, PA	<b>I-79:</b> From Washington, PA to Cranberry, PA <b>I-90:</b> From Cleveland, OH to PA/NY border			

<b>Lead Agency</b>	<b>Fuels</b>	<b>EV Ready<sup>1</sup></b>	<b>CNG Ready<sup>2</sup></b>	<b>LNG Ready<sup>3</sup></b>	<b>LPG Ready<sup>4</sup></b>	<b>Hydrogen Ready<sup>5</sup></b>
<b>RI DEM</b>	CNG and HYD		<b>I-95:</b> From RI/CT border to RI/MA border			
<b>TN DOT</b>	EV and CNG	<b>I-24:</b> Entire length - from TN/KY border to TN/GA border (at interchange with I-75) <b>I-75:</b> From Knoxville, TN to TN/GA border <b>I-65:</b> From Madison, TN to Franklin, TN	<b>I-24:</b> Entire length - from TN/KY border to TN/GA border (at interchange with I-75) <b>I-75:</b> Entire length - from TN/KY to TN/GA border <b>I-65:</b> From Nashville, TN to TN/AL border			
<b>TX DOT</b> <b>North Central Texas COG</b>	EV, CNG, LNG and LPG	<b>US-75:</b> From Dallas, TX to McKinney, TX	<b>I-37:</b> From Corpus Christi, TX to San Antonio, TX <b>I-40:</b> From Amarillo, TX to the TX/OK border <b>US-75:</b> From Dallas, TX to McKinney, TX		<b>US-75:</b> From Dallas, TX to the TX/OK border	
<b>WI DOT</b>	EV, CNG, LNG, LPG and HYD	<b>I-41:</b> From New Berlin, WI to Wauwatosa, WI	<b>I-41:</b> From Green Bay, WI to Milwaukee, WI			
<b>WY DOT</b>	EV, CNG and LPG		<b>I-80:</b> From Evanston, WY to Rock Springs, WY			

NOTE: Several proposals covered the same highway segments. Designated sections of highway may appear in multiple locations in the above Table.

<sup>1</sup> Includes only DCFC, 50 miles between stations, 5 miles from highway, public stations only, no Tesla facilities

<sup>2</sup> 150 miles between stations, 5 miles from highway, public stations only, fast fill, 3,600 psi

<sup>3</sup> 200 miles between stations, 5 miles from highway, public stations only

<sup>4</sup> 150 miles between stations, 5 miles from highway, public stations only, primary stations only

<sup>5</sup> 100 miles between stations, 5 miles from highway, public stations only (includes non-road facilities that are compliant with SAE J2601 standards)

## CORRIDOR-PENDING ALTERNATIVE FUEL CORRIDORS (2017)

This table includes the following information:

- Lead agency and contact;
- Fuels nominated;
- States covered; and,
- Corridors, or segments of corridors, that are "Corridor-Pending" for each fuel based on the footnotes included in the table.

**Table 3: Corridor Pending Alternative Fuel Corridors (2017)**

Lead Agency	Fuels	EV Pending <sup>1</sup>	CNG Pending <sup>2</sup>	LNG Pending <sup>3</sup>	LPG Pending <sup>4</sup>	Hydrogen Pending <sup>5</sup>
AL DOT	CNG, LNG		<b>I-65:</b> From Evergreen, AL to Intersection with I-10 (Mobile, AL) <b>I-59:</b> From Trussville, AL to AL/GA border	<b>I-65:</b> From Birmingham, AL to Theodore, AL <b>I-20:</b> From Birmingham, AL to AL/MS border		
ADEQ	EV, CNG, LPG	<b>I-40:</b> From AR/TN border to AR/OK border <b>I-30:</b> From North Little Rock, AR to AR/TX border	<b>I-40:</b> From Conway, AR to AR/OK border <b>US 67/167:</b> From Searcy, AR to AR/MO border <b>I-55:</b> From West Memphis, AR to AR/MO border <b>I-30:</b> From North Little Rock, AR to AR/TX border			
AZ DOT	EV, CNG, LNG, LPG	<b>I-10:</b> From AZ/NM border to Tucson, AZ; and from Phoenix, AZ to AZ/CA border <b>I-17:</b> From Phoenix, AZ to Flagstaff, AZ	<b>I-10:</b> From AZ/NM border to Tucson, AZ <b>I-40:</b> From AZ/CA border to Lake Havasu City, AZ and from Winslow, AZ to AZ/NM border <b>I-17:</b> From Phoenix, AZ to Flagstaff, AZ <b>I-19:</b> From AZ/Mexico border to Tucson, AZ (at the intersection of I-10) <b>I-8:</b> From AZ/CA border to Casa Grande, AZ (at the intersection of I-10)	<b>I-10:</b> From AZ/CA border to AZ/NM border <b>I-40:</b> From AZ/CA border to AZ/NM border	<b>I-10:</b> From AZ/CA border to AZ/NM border <b>I-17:</b> From Phoenix, AZ to Flagstaff, AZ	

Lead Agency	Fuels	EV Pending <sup>1</sup>	CNG Pending <sup>2</sup>	LNG Pending <sup>3</sup>	LPG Pending <sup>4</sup>	Hydrogen Pending <sup>5</sup>
CA Governor's Office	EV, CNG, LNG, H2	<b>SR-14:</b> From Sylmar, CA (start at intersection of SR-14 and I-5) to Santa Clarita, CA, and from Lancaster, CA to Inyokern, CA (end at intersection of SR-14 and US-395) <b>SR-41:</b> From Fish Camp, CA to Shandon, CA <b>SR-46:</b> From Paso Robles, CA to McFarland, CA <b>SR 58:</b> From Buttonwillow, CA (at the intersection of I-5) to Barstow, CA (at the intersection of I-15) <b>SR-111-78-86:</b> From Whitewater, CA to Palm Springs, CA, and, from Coachella, CA to Calexico, CA <b>SR-120:</b> From Lathrop CA (intersection w/ I-5) to Lee Vining CA (Intersection w/ US-395) <b>SR-152:</b> From Watsonville, CA to Chowchilla, CA <b>US-395:</b> From Topaz, CA to Hesperia, CA <b>SR-905:</b> From CA/Mexico border to San Diego CA (at intersection with I-5)	<b>SR-14:</b> From Sylmar, CA to Inyokern, CA <b>SR-41:</b> From Fish Camp, CA to Fresno, CA, and from Lemoore, CA to Shandon, CA <b>SR-46:</b> From Wasco, CA to McFarland, CA (at intersection with SR-99) <b>US-50:</b> From West Sacramento, CA to South Lake Tahoe, CA <b>SR-111-78-86:</b> From Whitewater, CA to Palm Springs, CA, and from Indio, CA to Calexico, CA <b>SR-120:</b> From Lathrop CA (intersection w/ I-5) to Lee Vining CA (Intersection w/ US-395)	<b>I-215:</b> From San Bernardino, CA to Riverside, CA, and from Perris, CA to Murrieta, CA		<b>US-50:</b> From West Sacramento, CA to South Lake Tahoe
DE DNR	EV	<b>SR-1:</b> From Newark, DE (at the intersection of I-95) to Smyrna, DE and from Milford, DE to DE/MD border <b>US-13:</b> From New Castle, DE to Wilmington, DE <b>US-113:</b> From Georgetown, DE to the DE/MD border				
GA DOT	EV, CNG	<b>I-20:</b> From Madison, GA to Thomson, GA <b>I-16:</b> From Macon, GA to Savannah, GA <b>I-95:</b> From GA/FL border to the GA/SC border	<b>I-185:</b> From Columbus, GA to LaGrange, GA (at the intersection of I-85)			
HI State Energy Office	EV, H2	<b>Hwy 11:</b> From Hilo (at the intersection with Route 19) to Kailua-Kona <b>Hwy 130:</b> From Keaau (at the intersection with Route 11) to Kalapana <b>Hwy 200:</b> From Waimea to Hilo <b>Hwy 250:</b> From Waimea to Hawi <b>Hwy 270:</b> From Kawaihae to Hawi				

Lead Agency	Fuels	EV Pending <sup>1</sup>	CNG Pending <sup>2</sup>	LNG Pending <sup>3</sup>	LPG Pending <sup>4</sup>	Hydrogen Pending <sup>5</sup>
<b>Iowa Economic Dev. Authority</b>	EV, CNG, LNG and LPG	<b>I-35:</b> From IA/MN border to IA/MO border, and from KS/MO border to KS/OK border	<b>I-35:</b> From IA/MN border to IA/MO border		<b>I-35:</b> From IA/MN border to IA/MO border, and from KS/MO border to KS/OK border	
<b>KY Transportation Cabinet</b>	EV, CNG, LNG and LPG	<b>I-71:</b> From Florence KY to Louisville KY <b>I-75:</b> From Florence KY to KY/TN border	<b>I-265:</b> From Louisville, KY (@ I-71) to Louisville, KY (@ I-65) <b>I-71:</b> From Carrollton, KY to Louisville, KY <b>I-275:</b> Entire length			
<b>LA DEQ</b>	CNG and LPG		<b>I-10:</b> From New Orleans, LA to LA/MS border	<b>I-10:</b> From Lafayette, LA to the LA/MS border	<b>I-12:</b> From Baton Rouge, LA to Slidell, LA (at the intersection at I-10) <b>I-20:</b> From Tallulah, LA to LA/MS border	
<b>MD DOT</b>	EV	<b>US 301:</b> From Waldorf, MD to MD/VA border				
<b>MI DOT</b>	CNG and LPG		<b>I-94:</b> From Ann Arbor, MI to the MI/IN border		<b>I-94:</b> From Port Huron, MI to Clinton Township MI, and from Jackson, MI to MI/IN border	
<b>Miami Valley RPC</b>	EV, CNG, LNG	<b>I-70:</b> OH/IN border to Columbus, OH (@ Exit 108 with intersection of I-270 East) <b>I-71:</b> From Medina, OH to Worthington, OH, and from Grove City, OH to Mason, OH <b>I-75:</b> From West Chester Township, OH to Piqua, OH <b>I-675:</b> Entire length	<b>I-275:</b> Entire length <b>I-675:</b> Entire length	<b>I-70:</b> OH/IN border to Vandalia, OH, and from London, OH to Columbus, OH (@ Exit 108 with intersection of I-270 East) <b>I-71:</b> Cleveland, OH to the I-71/I-75 split near Walton, KY		
<b>NC DOT</b>	EV and CNG	<b>I-26:</b> From Asheville, NC to NC/TN border <b>I-40:</b> From Asheville, NC to NC/TN border <b>I-95:</b> From NC/VA border to NC/SC border <b>I-77:</b> From NC/SC border to Charlotte, NC, and from Mooresville, NC to Statesville, NC (@ the I-40 intersection)	<b>I-26:</b> From Asheville, NC to NC/TN border. <b>I-85:</b> From Durham, NC to NC/VA border <b>I-95:</b> From VA border to NC/SC border. <b>I-40:</b> From Raleigh, NC to Wilmington, NC			
<b>ND DOT</b>	EV	<b>I-94:</b> From ND/MN border to ND/MT border <b>I-29:</b> From ND/SD border to ND/Canada border				

Lead Agency	Fuels	EV Pending <sup>1</sup>	CNG Pending <sup>2</sup>	LNG Pending <sup>3</sup>	LPG Pending <sup>4</sup>	Hydrogen Pending <sup>5</sup>
NJ DEP	EV	<b>I-78:</b> From Warren Township, NJ (@ Exit 40) to the NJ/PA border <b>I-287:</b> From Bridgewater, NJ (@ Exit 13B) to the NJ/NY border				
NY DOT	EV					
OK DOT Indian Nations COG	EV and CNG	<b>US-69:</b> From OK/TX border to intersection with I-44 in Vinita, OK <b>US-75/Indian Nations Highway:</b> From OK/KS border to intersection with US-69 in McAlester, OK <b>US-412:</b> From OK/AR border to Pawnee, OK	<b>US-69:</b> From OK/TX border to McAlester, OK			
Penn DOT	EV and CNG	<b>I-79:</b> From PA/WV border to Washington, PA, and from Slippery Rock, PA to Erie, PA <b>I-376:</b> From Aliquippa, PA to West Middlesex, PA (at the intersection with I-80) <b>I-90:</b> From Elyria, OH (at the intersection of I-80/I-90) to PA/NY border	<b>I-79:</b> From PA/WV border to Washington, PA, and from Cranberry, PA to Erie, PA <b>I-376:</b> From Monroeville, PA (at the intersection of I-76) to West Middlesex, PA (at the intersection with I-80) <b>I-90:</b> From Elyria, OH (at the intersection of I-80/I-90) to Cleveland, OH			
RI DEM	CNG and HYD					<b>I-95:</b> From RI/CT border to RI/MA border <b>US-6:</b> From RI/CT border to RI/MA border
TN DOT OR	EV and CNG	<b>I-75:</b> From Knoxville, TN to TN/KY border <b>I-65:</b> From TN/KY border to Madison, TN, and from Franklin, TN to TN/AL border	<b>I-65:</b> From Nashville, TN to TN/KY border			
TX DOT North Central Texas COG	EV, CNG, LNG and LPG	<b>US-75:</b> From McKinney, TX to the TX/OK border	<b>I-27:</b> From Lubbock, TX to Amarillo, TX (@ intersection with I-40) <b>I-40:</b> From Amarillo, TX to the TX/NM border <b>US-75:</b> From McKinney, TX to the TX/OK border	<b>I-37:</b> From Corpus Christi, TX to San Antonio, TX <b>US-75:</b> From Dallas, TX to the TX/OK border	<b>I-2:</b> From Penitas, TX (@ western terminus w/ US-83) to Harlingen, TX <b>I-27:</b> From Lubbock, TX to Amarillo, TX (@ intersection with I-40) <b>I-40:</b> From TX/NM border to TX/OK border	

<b>Lead Agency</b>	<b>Fuels</b>	<b>EV Pending<sup>1</sup></b>	<b>CNG Pending<sup>2</sup></b>	<b>LNG Pending<sup>3</sup></b>	<b>LPG Pending<sup>4</sup></b>	<b>Hydrogen Pending<sup>5</sup></b>
<b>WI DOT</b>	EV, CNG, LNG, LPG and HYD	<b>I-41:</b> From Wauwatosa, WI to Green Bay, WI				
<b>WY DOT</b>	EV, CNG and LPG	<b>I-80:</b> Entire length <b>I-25:</b> Entire length <b>I-90:</b> Entire length	<b>I-80:</b> From Rock Springs, WY to Pine Bluffs, WY			

NOTE: Several proposals covered the same highway. Designated sections of highway may appear in multiple locations in the above Table.

<sup>1</sup> To become corridor-ready, will need only DCFC, 50 miles between stations, 5 miles from highway, public stations only, no Tesla facilities

<sup>2</sup> To become -ready, will need 150 miles between stations, 5 miles from highway, public stations only, fast fill, 3,600 psi

<sup>3</sup> To become corridor-ready, will need 200 miles between stations, 5 miles from highway, public stations only

<sup>4</sup> To become corridor-ready, will need 150 miles between stations, 5 miles from highway, public stations only, primary stations only

<sup>5</sup> To become corridor-ready, will need 100 miles between stations, 5 miles from highway, public stations only (includes non-road facilities that are compliant with SAE J2601 standards)



## CHAPTER 5. CONCLUSIONS

With adoption of the FAST Act, the congress has mandated a goal of promoting the adoption of alternative fuels. The FHWA Office of Operations has incorporated the into the MUTCD (along with 2016 Memorandum) clear options for the States to sign for alternative fuels and thus assist early adopters of these fuels to find refueling stations. The designation of Alternative Fuels Corridors is another effort to promote awareness of alternative fuels availability. States have the option of using the new Alternative Fuels Corridor sign at the beginning, end, and major junctions of FHWA designated corridors. Applications for corridor designation are solicited by FHWA each fall when the FHWA releases a Request for Nominations (RFN).

The guidelines for signing services on designated corridors (Federal Highway Administration, 2016) provide good guidance for decisions regarding whether to sign facilities and whether they are on designated corridors or elsewhere. This guidance includes recommendations regarding hours of operations, other required amenities, and distance from sign locations.

## CHAPTER 6. REFERENCES

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