I-40 Alternative Fuel Corridor

Deployment Plan

November 2020

TN TDOT Department of Transportation

Contents

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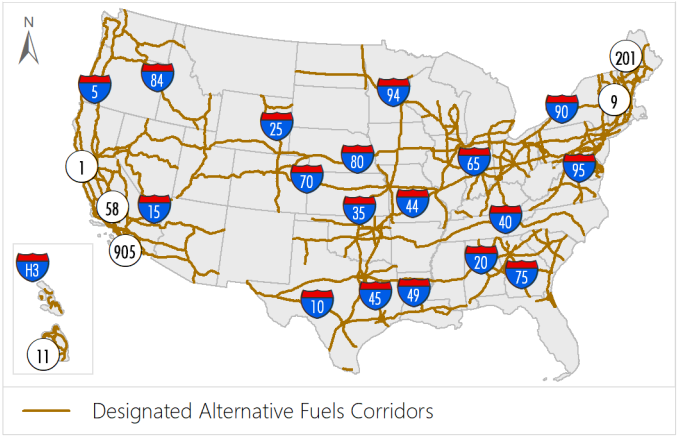
I-40 Deployment Plan Executive Summary

Introduction

The Fixing America's Surface Transportation (FAST) Act, passed in 2015, called on states to nominate corridors along their major roadways that would support plug-in electric vehicle charging and hydrogen, propane, and natural gas refueling with existing or planned infrastructure. To qualify as an Alternative Fuel Corridor, the routes need stations that are accessible to the public and within close range of the corridor. Additional requirements (e.g., minimum distance between stations along a corridor and type of refueling or charging station) were also specified to establish criteria for infrastructure coverage along a given corridor. In 2016, the Federal Highway Administration (FHWA) developed specifications for Signing for Designated Alternative Fuel Corridors in compliance with The Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways. As of September 2020, the Alternative Fuel Corridor network includes approximately 145,000 miles of the National Highway System, including sections of 119 interstates and 100 U.S. highways and state roads in 49 states and the District of Columbia. After FHWA makes a designation determination, segments are classified as "corridor-ready" or "corridor-pending," based on the maximum distance between fueling stations for a given fuel type.

The I-40 Alternative Fuel Corridor study was initiated in 2019 to plan for the deployment of alternative vehicle fueling and charging facilities along the interstate corridor, spanning from Wilmington, North Carolina through Tennessee and Arkansas. The study focused exclusively on compressed natural gas (CNG) and electric vehicle (EV) infrastructure along the I-40 corridor, bringing together agencies and stakeholders across all three states to provide regional insight and expertise on the current and future deployment of EV and CNG stations, as well as available funding sources and constraints. The final product of this collaborative effort is the I-40 Alternative Fuel Deployment Plan, which will serve as a guide for agencies and stakeholders across the southeast to efficiently implement the deployment of future stations.

Figure 1: Alternative Fuel Corridors in the U.S.



Existing Conditions

Fueling station data in the study comes from the U.S. Department of Energy's (U.S. DOE) Alternative Fuels Data Center [1] (AFDC). In accordance with FHWA's Round 4 criteria, qualifying stations included in the study were those within five miles of I-40 with 50 kilowatt (kW) fast-charging EV stations [2] located at least every 50 miles along a corridor and 3600 PSI fast-fill CNG stations no more than 150 miles apart. There are currently 25 qualifying EV stations along I-40 in the three states and 35% (403 miles) of the overall corridor designated as corridor-ready, which includes all previous rounds of corridor-ready designations. For CNG, there are 19 total

[1] https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/

[2] Direct Current Fast Chargers (DCFC) chargers included had both J1772 combo (CCS) and CHAdeMO connectors

qualifying stations across the corridor, bringing the corridor to 50% (579 miles) corridor-ready. Figure 2 and Figure 3 show the location of qualifying EV and CNG stations across the corridor, while Table 1 provides the mileage of corridor-ready and corridor-pending segments of I-40.

Figure 2: Corridor-Ready and Corridor-Pending EV Segments in Tennessee, Arkansas, and North Carolina

Figure 3: Corridor-Ready and Corridor-Pending CNG Segments in Tennessee, Arkansas, and North Carolina

Table 1: Corridor Status of EV and CNG Segments along I-40

	EV Status		CNG Status	
	Corridor-Pending Segments (miles)	Corridor-Ready Segments (miles)	Corridor-Pending Segments (miles)	Corridor-Ready Segments (miles)
Arkansas	285	0	125	159
Tennessee	245	209	339	117
North Carolina	225	194	117	303
Total	**755**	**403**	**580**	**579**

Implementation Strategies and Best Practices

To address alternative fuel infrastructure gaps along the I-40 corridor, the deployment plan defines a set of implementation strategies drawn from regional and national best practices. The implementation strategies and best practices focus on the following topics:

- Funding – There are multiple funding sources for alternative fuels infrastructure, including federal transportation programs, the Volkswagen Diesel Settlement Environmental Mitigation Trust (EV eligible only), and several smaller state and local grant and rebate programs.
- Partnership Types – Several different partnership models exist for infrastructure expansion, including fleet or end-user ownership, local distribution company ownership, and third party or commercial ownership. Successful public-private partnerships for EV and CNG stations exist across the region and can be used as a model for future hosts.
- Site Selection – Providing more and better information on market potential, user needs, geographic considerations, and local building codes will help accelerate site selection.
- Site Selection Opportunities – Most of the EV and four CNG corridor-pending gaps in the I-40 corridor need only one station to become corridor-ready.
- Site Host Attraction and Recruitment – Incentives for site hosts include new revenue sources, branding and advertising opportunities, and local economic development.
- Signage – Signage and wayfinding strategies play an important role in promoting an alternative fuel corridor and supporting site hosts.

Recommendations

Through a series of regional meetings, state agencies and local stakeholders identified opportunities and challenges for EV and CNG infrastructure expansion along the I-40 corridor. While funding opportunities exist, additional efforts must be made to clearly communicate the benefits of and funding availability for EV and CNG implementation to local stakeholders. Funding at both the federal and state level often comes with varying and inconsistent requirements, and information about eligible activities and program requirements should be made more readily available and easier to understand.

Stakeholder meetings also provided insights on potential site locations and hosts, building on recent state efforts such as Drive Electric Tennessee and Plug-In North Carolina. Using the location of gas stations, truck stops, and retail businesses as a broad assessment framework, a geospatial analysis was completed that identified exits within the corridor-pending segments of I-40 that had the highest number of potential site locations. While this data-driven approach identified areas along the corridor with the most potential for implementation, other factors such as distance from the previous station, power and CNG gas availability, and proximity to attractions and amenities must also be considered when selecting a location for a new station.

Additionally, a workflow for both EV and CNG stations was developed to guide potential station owners from idea to implementation as well as screening tools to assist potential site hosts and state agencies evaluating

sites across the region. The key recommendations from the study can be found in Table 2. Taken together, these action steps will allow the Tennessee Department of Transportation and its partnering agencies to expand EV and CNG infrastructure across the I-40 corridor by improving access to information, partnerships, and funding.

Table 2: Key Recommendations

Key Recommendation	Time Frame	Partners
State and other public agencies across the corridor should collaborate to ensure that funding opportunities for EV and CNG infrastructure are communicated widely and requirements for use of funds is clear.	Ongoing	State DOTs State Environmental Departments MPOs/RPOs TVA
Funding providers should continue to explore outreach opportunities with local utilities and ensure public funding information is shared at a statewide level.	Ongoing	Southeast Corridor Council State DOTs Clean Cities Coalitions Local Utility Providers Local Electric Cooperatives MPOs/RPOs
State officials and local governments should identify all companies potentially interested in hosting EV or CNG infrastructure and develop programs to support business to business partnerships.	Ongoing	State DOTs Southeast Corridor Council Clean Cities Coalitions Local Utility Providers Local Electric Cooperatives MPOs/RPOs
Funding partners should consider making station repairs and replacements eligible activities within existing and future funding opportunities.	FY 2021	State DOTs State Environmental Departments Clean Cities Coalitions TVA
State leadership should pursue opportunities to guide and educate the public and local governments on the availability of alternative fuel sources to help promote public knowledge and adoption of alternative fuel vehicles in the region.	FY 2021	State DOTs State Tourism Departments Clean Cities Coalitions Local Utility Providers Local Electric Cooperatives MPOs/RPOs

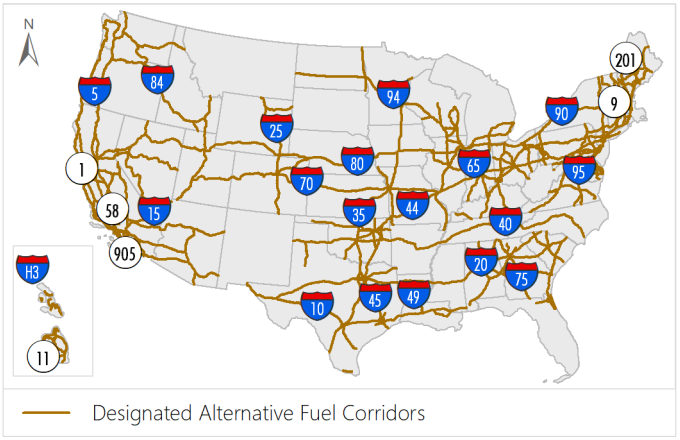
Chapter 1: I-40 Alternative Fuel Corridor

1.1. Alternative Fuel Corridors

Creation and Purpose

Alternative fuel corridors were created in Section 1413 of the Fixing America's Surface Transportation (FAST) Act, passed in 2015. Section 1413 requires the Secretary of Transportation to strategically designate a network of roadways throughout the United States that adequately serves electric vehicle (EV) charging, propane-, hydrogen-, and natural gas-fueled vehicles to improve the mobility of vehicles powered by alternative fuels. Corridor designations must identify the needs and locations of stations along each route. The Federal Highway Administration (FHWA) has been working with state and local jurisdictions through the Alternative Fuel Corridor Program (AFC) to create a network of these stations along major corridors throughout the country to provide consistent, reliable infrastructure for fueling and recharging alternative fuels vehicles. The Alternative Fuel Corridor network currently includes approximately 145,000 miles of the National Highway System (NHS), including sections of 119 interstates and 100 U.S. highways and state roads, extending through 49 states and the District of Columbia, as seen in Figure 4.

Figure 4: Alternative Fuel Corridors in the U.S.



Designation Process

To qualify as an Alternative Fuel Corridor, routes require stations that are accessible to the public and within close range of the corridor. After FHWA has made the designation determination, segments are classified as corridor-ready and corridor-pending based on the maximum distance between fueling stations, which is specific to each fuel type. Stations need to be spaced frequently enough along the corridor so that alternative fuel vehicles can travel long distances without drivers having to worry about finding fuel or charging stations along the way, often referred to as "range anxiety".

With each round of corridor designations since 2015, qualification requirements for corridor-ready and corridor-pending statuses have evolved. These changes ensure that the designation requirements keep pace with advances in alternative fuel technologies and vehicles. As of 2019, all qualifying stations must be within five driving miles of the designated route, while the maximum distance between stations varies by fuel type. The I-40 corridor study specifically focuses on EV charging and compressed natural gas (CNG) refueling stations. A corridor-ready EV segment has at least one 50-kilowatt (kW) public direct current fast charging (DCFC) station located every 50 miles, complete with both J1772 combo (CCS) and CHAdeMO connectors. A corridor-ready CNG segment has a public fast-fill, 3,600 psi CNG station separated by no more than 150 miles along the corridor. Table 3 details the current requirements for qualifying EV and CNG stations.

Launched by the United States Department of Energy (U.S. DOE) in 1991, the Alternative Fuels Data Center (AFDC) provides resources and data for alternative fuel vehicles, including performance data, station locations, recent publications, and case studies. The AFDC features several online tools, including a station locator and corridor measurement tool. The AFDC is the principal data source for alternative fuel corridors and is used to identify stations that meet the most recent FHWA designation requirements.

Table 3: FHWA Corridor Designation Criteria (Summer 2020)

	Corridor-Ready Segment	Corridor-Pending Segment
EV	Public DC Fast Charging, no greater than 50 miles between one station and the next on the corridor, and no greater than 5 miles off the highway. Additionally, each DC Fast Charging site should have both J1772 combo (CCS) and CHAdeMO connectors* and be capable of supplying at least 50 kW to the vehicle.	Public DC Fast Charging separated by more than 50 miles. Location of station/site is no greater than 5 miles off the highway.
CNG	Public, fast-fill, 3,600 psi CNG stations no greater than 150 miles between one station and the next on the corridor, and no greater than 5 miles off the highway.	Public, fast-fill, 3,600 psi CNG stations separated by more than 150 miles. Location of station/site is no greater than 5 miles off the highway.

**Because Tesla stations are proprietary, these are not included.*

Electric Vehicle Charging

Electric vehicle supply equipment, or EVSE, is the equipment used to deliver energy from an electricity source to a plug-in electric vehicle, or PEV. There are three types of EVSE chargers: Level 1, Level 2 (AC), and DCFC, which require different connector plugs, deliver a range of mileage per hour, and charge at different rates.

- Level 1 chargers add about 2 to 5 miles of range per hour to a plug-in electric vehicle and are best used for overnight charging at residential locations. These chargers plug into common household 120-Volt outlets.
- Level 2 EVSE adds about 20 miles of range to an electric vehicle per hour of charging and is ideal for residential, workplace, and retail locations. These chargers require a 240-Volt power source and draw power similar to a clothes dryer.
- DCFC is the highest power and can supply an 80% charge in 20-30 minutes. Newer EVs with higher ranges may take more than 30 minutes to reach an 80% charge. DCFC are the preferred infrastructure type along interstate and other major highway corridors, as they provide rapid charging at short duration destinations, such as public fueling stations, along a well-traveled corridor. CCS and CHAdeMO are two types of DCFC connectors that serve different makes of cars. For a station to be considered qualifying under FHWA's Round 4 designation criteria, EV stations should have both CCS and CHAdeMO connectors and must be able to supply at least 50 kW.

CNG Refueling

CNG stations are classified as either time-fill or fast-fill stations. The primary structural differences among CNG stations are the amount of storage capacity, the size of the compressor(s), and dispensing rate. Selection of station type is dependent on user type, fleet size, fuel use, and refueling time window.

Time-fill stations are those where vehicles connect to a hands-off unmetered dispenser, which is set to refuel the vehicle over a certain amount of time. Of the station types, time-fill stations generally have lower development costs because of smaller compressors and less required storage. These stations are ideal for private fleet use with predictable fueling needs and time frames.

Fast-fill stations, which are considered qualifying under Round 4 AFC requirements, have the capacity and storage to handle on-demand retail refueling, similar to a traditional gas station. These stations require larger compressors and metered dispensers. They also require larger storage tanks than time-fill stations to provide for the unpredictable refueling that comes with retail use.

Some stations are classified as combination-fill, which includes both time-fill and fast-fill CNG dispensers. These stations have multiple fuel areas: time-fill meters for a private fleet and fast-fill, metered dispensers for on-demand retail users.

1.2. I-40 Alternative Fuel Corridor Study

Overview

In July 2019, FHWA released a solicitation for an applied research funding opportunity to assist transportation agencies with planning for the deployment of alternative vehicle fueling and charging facilities along Interstate corridors across the nation, with the goal of filling infrastructure gaps and designating targeted corridors as "ready" using FHWA's current criteria. I-40 was selected as the first corridor of focus for the AFC Deployment Plan program in the southeast. Following multi-state engagement efforts across Tennessee, Arkansas, and North Carolina, the I-40 Alternative Fuel Corridor Study resulted in a regionally designed Alternative Fuel Corridor Deployment Plan that promotes infrastructure implementation across the corridor. The Deployment Plan provides:

- An inventory and maps of existing CNG and EV infrastructure and network gaps;
- An overview of study methodology and work performed;
- A summary of stakeholder engagement;
- A review of challenges, issues, and barriers encountered;
- Key findings, results, and lessons learned; and
- Future actions.

By focusing on gaps identified in the Deployment Plan, the Tennessee Department of Transportation (TDOT), Arkansas Department of Transportation (ArDOT), North Carolina Department of Transportation (NCDOT), and partners can identify specific infrastructure needs to convert corridor-pending segments into corridor-ready segments. The plan includes an implementation strategy that identifies funding sources for installation, maintenance, and other implementation costs.

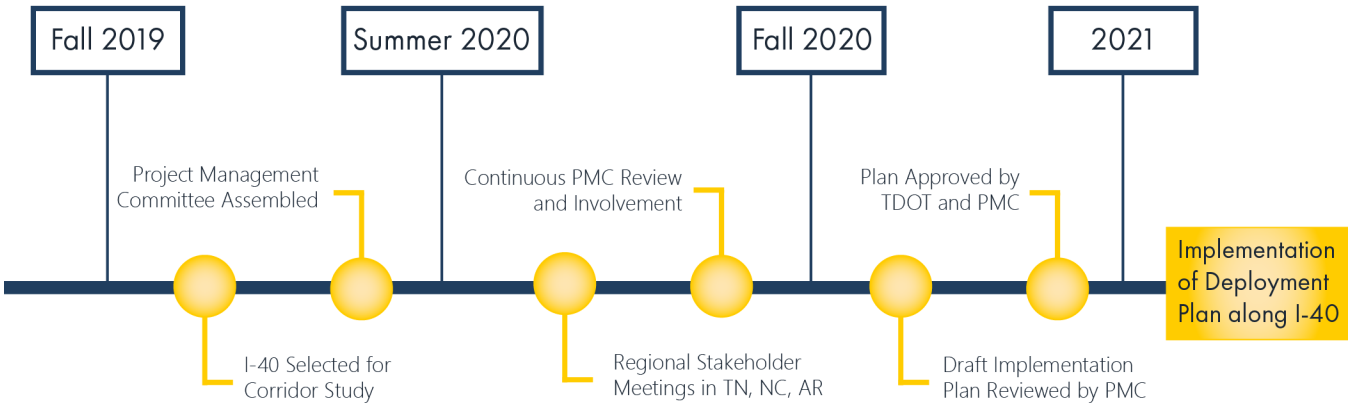
Project Management Committee

The plan's project management committee (PMC) provided technical expertise and assisted in guiding the planning process. PMC members included agency representatives from the Arkansas Department of Transportation, Arkansas Department of Energy & Environment's (ADEE) Division of Environmental Quality, Arkansas Clean Cities Coalition, North Carolina Department of Transportation, Land of Sky Regional Council and Clean Vehicles Coalition, Centralina Regional Council, Triangle J Council of Governments and Clean Cities Coalition, Tennessee Department of Transportation, Tennessee Department of Environment and Conservation (TDEC), Middle-West Tennessee Clean Fuels Coalition, East Tennessee Clean Fuels Coalition, Tennessee Valley Authority (TVA), and Tennessee Valley Public Power Association, Inc. This group of multi-state stakeholders worked together throughout the development of the plan to ensure that the final product increased connectivity for all sections of the corridor. Following the completion of the final Deployment Plan, the PMC will play a key role in its implementation.

Stakeholder Engagement

Along with the PMC, the planning process included a multi-jurisdictional engagement initiative for stakeholders in Arkansas, North Carolina, and Tennessee (Figure 5). With the support of the PMC, representatives from local governments, utility companies, and national alternative fuels companies participated in four regional meetings in East Tennessee, North Carolina, Middle/West Tennessee, and Arkansas. Due to the COVID-19 pandemic, the engagement strategy was altered from in-person stakeholder meetings to an online platform. These meetings provided critical feedback on potential locations for future sites, as well as regional best practices for site selection, host recruitment, and regional barriers for station implementation.

Figure 5: Project Timeline



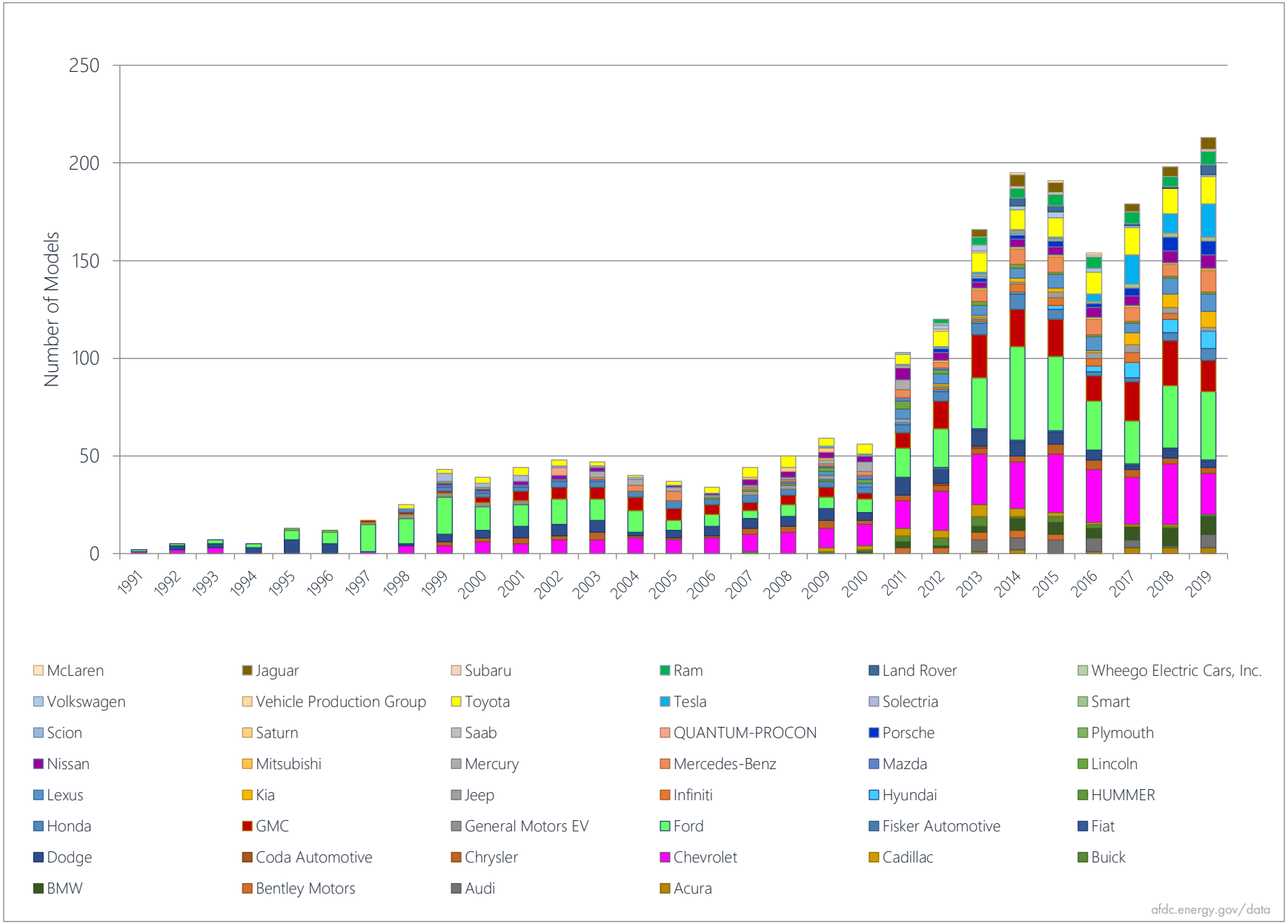
1.3. I-40 Corridor Analysis

Market Overview

In recent years there has been a shift within the energy sector to focus on the diversification of the energy grid. Regulators now allow utilities to incorporate distributed energy sources, rather than continuing with a focus on fossil fuels only. More than a dozen alternative fuels are in production or are under development for use in alternative fuel vehicles and advanced technology vehicles. Government and private-sector vehicle fleets are the primary users for most of these fuels and vehicles, but individual consumers are increasingly interested in them. Using alternative fuels and advanced vehicles instead of conventional fuels and vehicles helps reduce fuel costs, minimize pollution, and increase energy security.

Data suggests that the utilization of electric and CNG vehicles will continue to increase in the future. Research from the AFDC shows that over the past decade, alternative fuel vehicle acquisitions by regulated fleets have shown an average annual growth rate of 14% and 30% for CNG and electric vehicles, respectively, as shown in Figure 6. Auto manufacturers are producing more models of alternative fuels vehicles than ever before.

Figure 6: AFV and Hybrid Electric Vehicle Model Offerings by Manufacturer, 1991-2019



Throughout the study's three states - Tennessee, Arkansas, and North Carolina - the electric vehicle market has been continually growing. As of August 2019, approximately 9,600 electric cars were registered in the state. There are approximately 10,000 light-duty electric vehicles in Tennessee. In a 2018 nationwide comparison [3] of electric vehicle sales, North Carolina, Tennessee, and Arkansas were ranked as 20th, 29th, and 46th, respectively.

Additionally, public agencies throughout the region have been switching to electric buses and vehicles. Agencies that are incorporating electric vehicles into their fleets include Rock Region METRO, the City of Kingsport, the University of Tennessee, Chattanooga Area Regional Transportation Authority (CARTA), Great Smoky Mountains National Park, East Tennessee State University, the City of Greensboro (NC), Duke University, GoRaleigh, Asheville Redefines Transit, and the Charlotte Area Transit System.

In addition to electric, natural gas vehicles have become a cost-saving option for fleets to consider. Both public and private fleets are continuing to incorporate CNG vehicles through conversion and new car purchases for cost saving purposes. Most natural gas vehicles cost more than conventional gas or diesel vehicles due to the expense of the on-board fuel tanks, though the cost of refueling with natural gas is usually less expensive than gasoline or diesel.

Piedmont Natural Gas Company has operations across the southeast and is continuing to expand its own private fleet with CNG vehicles. By early 2020, 40% of Piedmont's fleet had been converted to natural gas. In 2017, Piedmont company vehicles and its CNG customers saved 6 million gallons of gasoline and diesel by using natural gas vehicles [4]. There are also conversion opportunities for light and medium duty vehicles. Altech Eco in Asheville and Cummins Westport in Rocky Mount are two companies in North Carolina that produce or upfit engines for natural gas.

Tennessee has public and private entities across the state that are switching to CNG fleets, such as UPS, Dollywood, Scott Appalachian Industries, Waste Management, the cities of Gatlinburg and Sevierville, Flatrock Concrete, and numerous gas utility districts. Tennessee Clean Fuels, a designated coalition with the U.S. DOE Clean Cities Program, offers recognition through the Tennessee Green Fleets (TGF) Certification Program, an opportunity for in-state fleets to receive certification for their efforts to reduce petroleum consumption, use alternative fuels or advanced vehicle technologies, and reduce emissions. While not exclusively CNG vehicle adoption, the program has recognized many fleets in the state for their CNG fleets. In 2016, the city of North Little Rock, Arkansas, added 16 compressed natural gas vehicles to its police fleet. North Little Rock was also the municipality that opened Arkansas's first publicly accessible CNG station in the state in 2011.

Leaders in many states are promoting increased adoption of electric vehicles. In October 2018, Governor Cooper of North Carolina signed Executive Order 80, which addresses climate change and the state's transition to a clean energy economy. The Order calls for the state Department of Environmental Quality (DEQ) to create a Clean Energy Plan and Zero Emission Vehicle Plan for North Carolina that will encourage the use of clean energy resources and technologies and to foster the development of a modern and resilient electrical system. In mid-2020, the Arkansas Energy Office, an office of ADEE, received approval for two EVSE infrastructure

[3] https://autoalliance.org/in-your-state/

[4] https://news.duke-energy.com/releases/piedmont-natural-gas-demonstrates-commitment-to-compressed-natural-gas-technology-with-new-refueling-station

programs: A Level 2 EVSE Rebate Program and a DC Fast Charger RFP Program, to promote electric vehicle adoption throughout the state.

Recent Studies in the Region

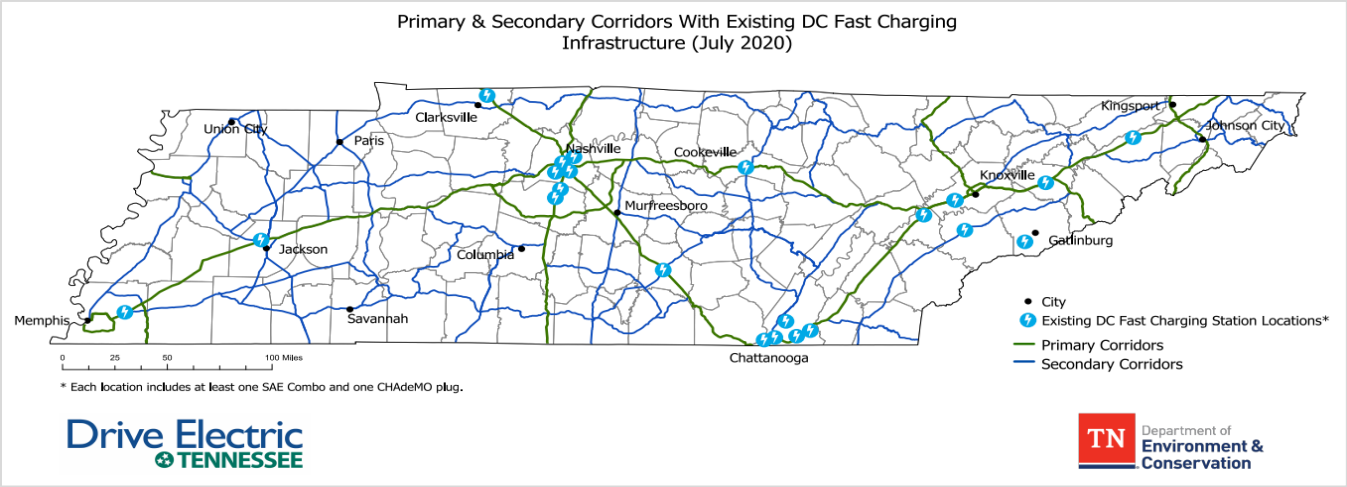
Major efforts have been made in Tennessee and North Carolina to promote EV adoption and public education. In 2019, TVA, TDEC, TDOT, and numerous stakeholders worked together to develop Drive Electric Tennessee (DET), a public-private consortium that developed a shared vision for electric transportation in the state, identified projects and initiatives for local stakeholder implementation, and set goals and guiding principles for increased electric vehicle adoption over the next 5-10 years. DET issued a Statewide Electric Vehicle Charging Infrastructure Needs Assessment that evaluated the condition of Tennessee's current electric vehicle charging infrastructure and identified where new chargers should be placed to promote electric vehicle adoption. It also established a strategic assessment of all existing public charging infrastructure for electric vehicles in Tennessee, taking note of station usage, coverage of the overall charging network, and the state of repair of existing EV stations.

Drive Electric Tennessee primarily examined infrastructure conditions and experiences of station hosts and users. This plan will continue to build on that existing knowledge by using DET's conclusion to promote widespread implementation of EV stations. The key takeaways from the study included the following:

- An optimized DC fast charging network was needed on highway corridors to relieve range anxiety and to connect rural and urban areas;
- Highway corridor charging was identified as the best candidate for public investment when compared to other charging use cases;
- Introduction of the "FAST 50" designation for highway corridors, meaning at least two chargers capable of 50 kW or more would be located at least every 50 miles (including CHAdeMO and CCS plugs) on designated corridors in Tennessee;
- There are opportunities to improve the user experience of stations, such as directional signage and display screens; and
- There are opportunities to improve the experience of the site hosts, specifically in planning for future maintenance and repairs.

Following the EV Infrastructure Needs Assessment, TDEC published an "opportunity map" for DC Fast charging which identified primary and secondary corridors to be electrified in Tennessee when future funding is available. These corridors include select State and U.S. highways and all of Tennessee's interstates which connect rural and urban parts of the state. I-40 is included as the main East-West interstate corridor.

Figure 7: Drive Electric Tennessee Primary and Secondary Corridors



Plug-in North Carolina, which includes Clean Cities Coalitions and other key stakeholders, has been working since 2011 to establish electric transportation throughout the state, promoting electric vehicles through education and outreach, consulting, and resource development. A state-wide plan was published in 2013, as well as regional plans for Charlotte, Asheville, the Piedmont Triad region, and the Triangle region.

Following Governor Cooper's Executive Order 80, the Clean Energy Plan was released in September 2019, following a series of stakeholder workshops hosted by the DEQ with Clean Cities assistance. The plan outlines policy and action recommendations to encourage use of clean energy sources, including electrification strategies. The first recommendation for electrification strategies was aimed at encouraging off-peak charging of EV vehicles and would require utilities to develop innovative rate design pilots. This strategy would also test the effectiveness of different rate structures at shifting customer usage of the grid, which could encourage the adoption of electric vehicles. The second recommendation focused on a cost/benefit analysis of electrification as a means to reduce greenhouse gas emissions in consumer sectors, such as homes and transportation.

Executive Order 80 also established a goal to have 80,000 registered Zero Emission Vehicles in the state by 2025. Through a collaboration of NCDOT and DEQ, the Zero Emission Vehicle Plan was created and released in 2019. The planning process involved stakeholders representing multiple auto manufacturer companies, environmental nonprofits, community organizations, businesses, Metropolitan Planning Organizations, and universities. Additionally, there was a high level of public input, including a survey that was completed by 1,200 people, capturing statewide attitudes towards electric vehicles and identifying features or motivations that influence the decision for drivers to switch to electric. The final plan identified four action areas - education, convenience, affordability, and policy, to support EV adoption, with key strategies for each action area.

Existing Legislation, State and Regional Incentives

All three of the study states have existing legislation applicable to EV and CNG. Some provide simple legal definitions, while others govern station reporting and supplier requirements. Table 4 includes all related legislation regarding CNG and EV vehicles and infrastructure that serves as the foundation for implementation strategies.

Table 4: Applicable Laws and Regulations

Name	Regulation/ Law Type	Reference
Tennessee		
Alternative Fuel Tax Exemption	Taxes & Fees	Tennessee Code 67-3-1101
Compressed Natural Gas (CNG) Permit	Permitting	Tennessee Codes 67-3-1119 and 67-3-1120
Natural Gas Measurement	Regulatory	Tennessee Code 47-26-914
Natural Gas Station Property Tax Reduction	Taxes & Fees	Tennessee Codes 67-5-601 and 67-4-2004
Plug-In Electric Vehicle (PEV) Fee	Taxes & Fees	Tennessee Code 55-4-116
Tennessee Alternative Fuel and Fuel-Efficient Vehicle Acquisition and Use Requirements	State-Enforced Promotion	Tennessee Code 4-3-1109, Executive Order 33 (2006)
Propane and Natural Gas Liability Immunity	Regulatory	Tennessee Codes 29-34-202 and 29-34-207
Utility District Natural Gas Fueling Station Regulation	Regulatory	Tennessee Code 7-82-302
Arkansas		
Alternative Fuel Definition	Regulatory	Arkansas Codes 15-13-102 and 26-62-102
Alternative Fuel Vehicle Conversion Notification	Regulatory	Arkansas Codes 26-56-315 and 26-62-214
Alternative Fuels Tax and Reporting	Regulatory	Arkansas Code 19-6-301
Environmental Assistance Low-Interest Loans for Small Businesses	Incentives	Arkansas DEQ
Plug-In Electric Vehicle (PEV) Fee	Taxes & Fees	Senate Bill 336 (2019)
Public Utility Definition	Regulatory	Arkansas Code 23-1-101(9)
Natural Gas Metering	Regulatory	Arkansas Code 26-62-203
North Carolina		
Alternative Fuels Tax Exemption	Taxes & Fees	North Carolina General Statutes § 105-164.13: Retail Sales and Use Tax
Alternative Fuel Use and Fuel-Efficient Vehicle Requirements for State-Owned Fleets	State-Enforced Promotion	North Carolina General Assembly; Session Law 2013-265, 2013
Alternative Fuel Vehicle (AFV) Acquisition Goal for State-Owned Fleets	State-Enforced Promotion	North Carolina General Statutes 143-58.4, 143-58.5,143-341, and 136-28.13
Definition of Plug-in Electric Vehicle	Regulatory	North Carolina General Statutes 20-4.01 (28a)
Electric Vehicle Registration Fees	Taxes & Fees	Senate Bill 446, 2019 *(Pending)*
EV Charging Stations & Parking	Enforcement	Senate Bill 511, 2019 *(Pending)*

Table 4: Applicable Laws and Regulations (Continued)

Name	Regulation/ Law Type	Reference
North Carolina		
Exemption from Emissions Inspection	Incentives	North Carolina General Statutes 20-4.01, 20-183.2
HOV Lane Access	Incentives	North Carolina General Statutes 20-4.01, 20-146.2
Natural Gas Vehicle (NGV) Weight Exemption	Incentives	North Carolina General Statutes 20-118
Reselling Electricity	Incentives	Senate Law 2019-132

1.4. Existing Inventory: EV Stations

Current EV qualification requirements for AFC Round 4 specify that stations must be within 5 miles of the highway, have *both* a J1772 combo (CCS) and a CHAdeMO connector, and be located no greater than 50 miles apart along the corridor. Qualifying criteria has evolved in previous designation rounds for some alternative fuels, including EV. The initial (Round 1) designation criteria in 2016 included stations with both Level 2 and DCFC capabilities as qualifying stations. Additionally, rounds 1-3 allowed DCFC chargers to have either a J1772 combo (CCS) or CHAdeMO connector. All segments designated as corridor-ready under previous criteria retain this initial designation, even if the infrastructure does not meet the current Round 4 qualifying criteria for connector type. Corridor-ready segments that were designated in previous rounds but do not meet current criteria are highlighted in blue on the maps. These segments can be prioritized for smaller investments that update DCFC infrastructure. Corridor-pending segments, shown in red on the maps, indicate all segments that have not met any qualifying criteria throughout all rounds of nominations. Across the three states, 35% of I-40 is corridor-ready, including 209 miles of corridor-ready segments in Tennessee and 194 miles in North Carolina (Figure 8). Arkansas is corridor-pending for EV. Table 5 details the specific mileage of corridor-ready and corridor-pending segments across the region.

In Arkansas, there are two qualifying EV stations (Figure 9) located within range of the I-40 corridor and an additional four qualifying stations outside of the corridor. All six of these stations are located at Walmart or Sam's Club and were launched through a partnership with Electrify America, a subsidiary of Volkswagen Group of America. The partnership aims[5] to reach customers outside of large urban areas and connect rural communities with public charging sources. Table 6 lists all qualifying EV stations in Arkansas along the I-40 corridor.

In Tennessee, there are 21 total EV stations that meet FHWA's current qualifications, nine of which are located along the I-40 corridor (Figure 10). I-40 is corridor-ready from Nashville to Dandridge, and the remainder of I-40 in Tennessee is corridor-pending. An 8-mile segment within Nashville and the 50-mile segment from Lenoir

[5] https://corporate.walmart.com/newsroom/2019/06/06/electrify-america-walmart-announce-completion-of-over-120-charging-stations-at-walmart-stores-nationwide-with-plans-for-further-expansion

City to Dandridge are corridor-ready in accordance with current EV Round 4 criteria. The corridor-ready segment that stretches 151 miles from Nashville to Lenoir City was designated using Round 1 criteria. Released in late 2020, FHWA's Refresh analysis identified Dandridge to Lenoir City as the only corridor-ready segment in Tennessee. The station networks along the corridor are almost all Electrify America or EVgo. All qualifying EV stations in Tennessee are listed in Table 7.

North Carolina has 40 qualifying EV stations throughout the state, 14 of which are located along the I-40 corridor (Figure 11). I-40 is corridor-ready from Asheville to Black Mountain and from Hickory to Raleigh. A 5-mile segment within Asheville and the 81-mile segment from Greensboro to Raleigh are corridor-ready according to Round 4 criteria. There are two corridor-ready segments designated in Round 1 that do not meet current qualifying station criteria: Asheville to Black Mountain and Hickory to Greensboro. Over half of the corridor's qualifying stations are on the EVgo network. Electrify America has a large presence in the state but has primarily installed Level 2 charging infrastructure, which does not qualify under the most recent federal designation requirements. Table 8 outlines all North Carolina EV stations in the corridor.

Figure 8: I-40 EV Corridor Status

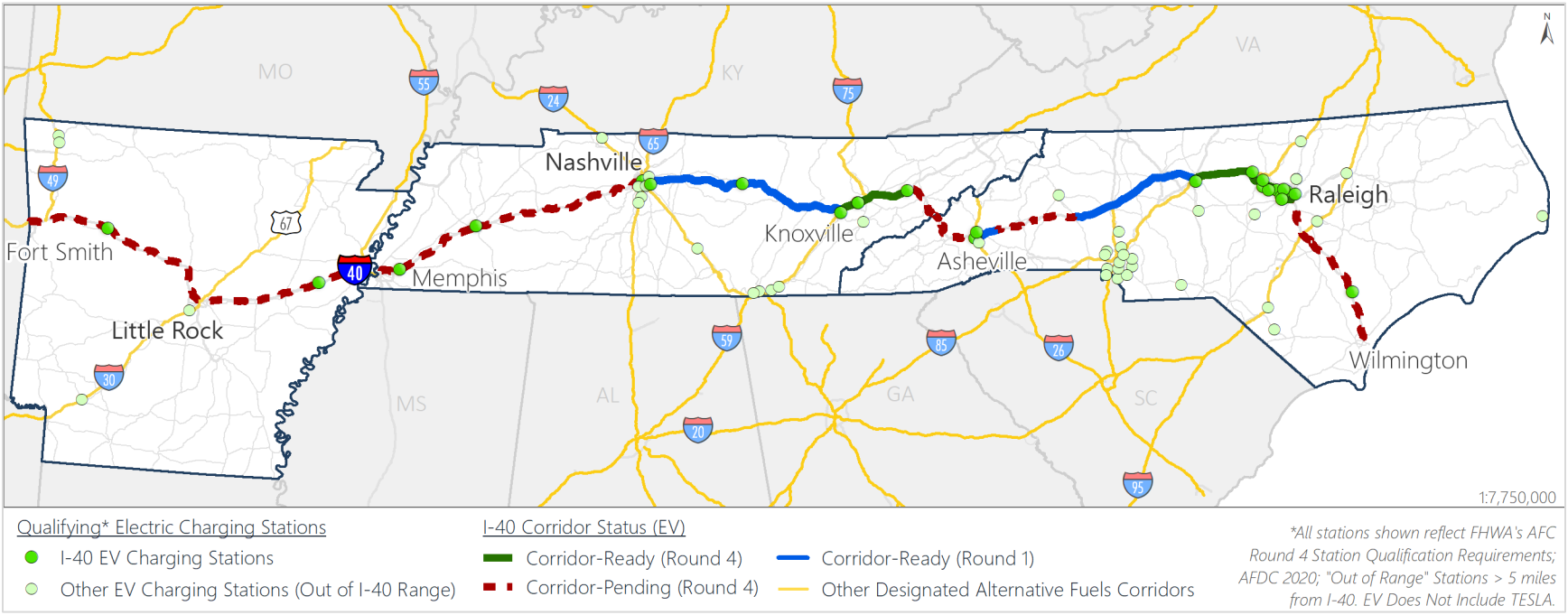


Table 5: I-40 EV Corridor Status

	Corridor-Pending Segments (miles)	Corridor-Ready Segments (miles)
Arkansas	285	0
Tennessee	245	209
North Carolina	225	194
Total	**755**	**403**

Figure 9: Qualifying I-40 Corridor EV Stations in Arkansas

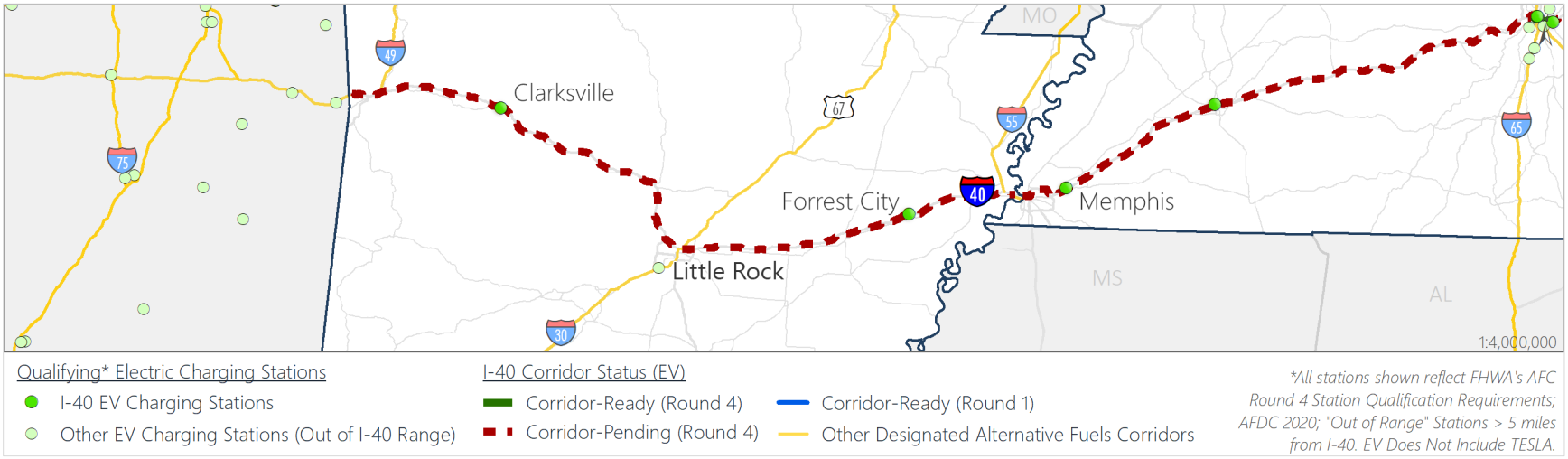


Table 6: Qualifying I-40 Corridor EV Stations in Arkansas

Name	City	Partnering Company	EV Network
Walmart 66	Clarkesville	Walmart, Inc.	Electrify America
Walmart 91	Forrest City	Walmart, Inc.	Electrify America

Figure 10: Qualifying I-40 Corridor EV Stations in Tennessee

Table 7: Qualifying I-40 Corridor EV Stations in Tennessee

Name	City	Partnering Company	EV Network
Sam's Club 4930	Cookeville	Walmart, Inc.	Electrify America
Exxon	Dandridge	Exxon	EVgo Network
Walmart 335	Jackson	Walmart, Inc.	Electrify America
EZ Stop	Knoxville	EZ Stop	EVgo Network
Walmart 2065	Knoxville	Walmart, Inc.	Electrify America
Exxon	Lenoir City	Exxon	EVgo Network
Commons at Wolf Creek	Memphis	--	Electrify America
Nissan Stadium	Nashville	--	EVgo Network
Terminal Garage 2	Nashville	BNA	ChargePoint Network

Figure 11: Qualifying I-40 Corridor EV Stations in North Carolina

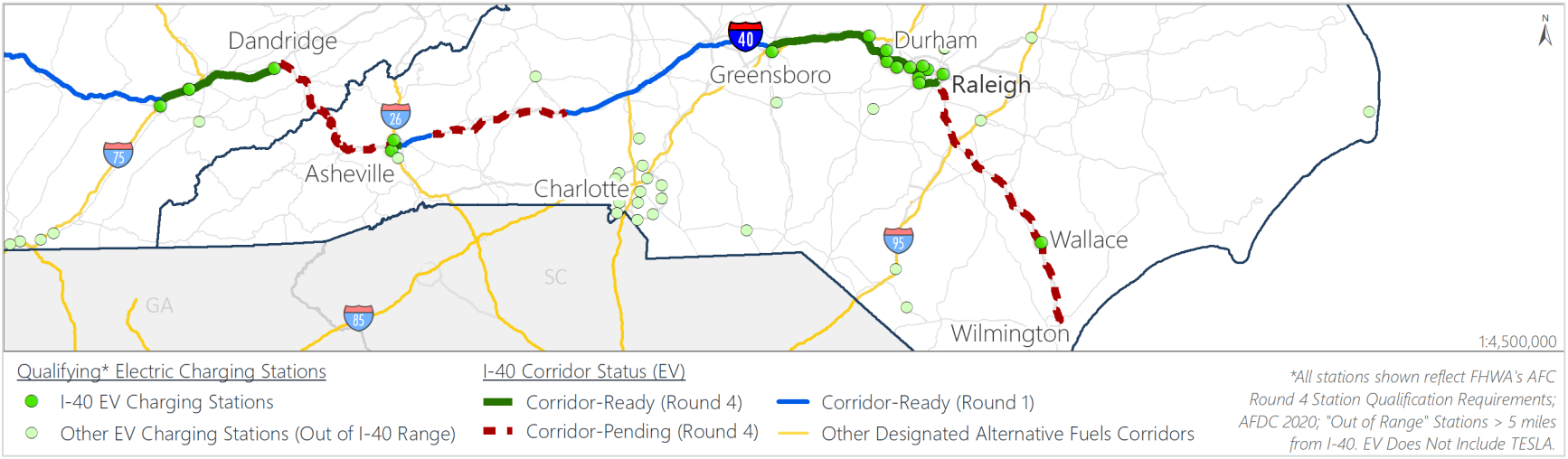


Table 8: Qualifying I-40 Corridor EV Stations in North Carolina

Name	City	Partnering Company	EV Network
Asheville Outlet Mall	Asheville	--	EVgo Network
Sam's Club 6452	Asheville	Walmart, Inc.	Electrify America
Sheetz	Cary	Sheetz	EVgo Network
Target 0961	Cary	Target	Electrify America
Hyatt Place Durham Southpoint	Durham	Hyatt	EVgo Network
AAA	Durham	AAA	EVgo Network
Walmart 5320	Greensboro	Walmart, Inc.	Electrify America
Sheetz 647	Hillsborough	Sheetz	Electrify America
Sheetz	Morrisville	Sheetz	EVgo Network
Courtyard Marriot	Raleigh	Courtyard Marriot	EVgo Network
Sheetz	Raleigh	Sheetz	EVgo Network
AAA	Raleigh	AAA	EVgo Network
Pleasant Valley Promenade	Raleigh	--	Electrify America
Four County Electric	Wallace	--	ChargePoint Network

1.5. Existing Inventory: CNG Stations

Approximately half of the I-40 corridor from Arkansas through North Carolina is classified as corridor-ready for CNG refueling stations (Figure 12). I-40 is corridor-ready from Conway, Arkansas eastbound to just over the Tennessee state line to Memphis. Tennessee has two corridor-ready segments: Dickson to Nashville and Knoxville to the state line. I-40 is corridor-ready in North Carolina from the Tennessee state line to Raleigh. Table 9 details the specific mileage of corridor-ready and corridor-pending segments along the I-40 corridor.

There are 10 qualifying CNG stations in Arkansas, four of which are along I-40 (Figure 13). All four of the stations are privately owned. Two are located at a convenience store and two are standalone stations. Love's Travel Stop in West Memphis has the largest capacity with six dispensers. The western half of the state, starting at Conway, is corridor-pending. Table 10 lists the qualifying I-40 CNG stations in Arkansas.

In Tennessee, there are 13 qualifying CNG stations and eight of those are located along the I-40 corridor (Figure 14). Of the three states in the study area, Tennessee shows the highest variety in CNG station owner facility types. The city of Memphis owns two stations. Three stations are privately owned at convenience stores and truck stops. The Greater Dickson Gas Authority station and the Memphis Light Gas and Water-South Center station both have time-fill for private fleets and fast-fill for retail use. All qualifying Tennessee CNG stations along the I-40 corridor are listed in Table 11.

There are 26 CNG stations that are qualifying across North Carolina, with seven located along the I-40 corridor (Figure 15). All but one of the stations along I-40 are owned by and located at utility providers. The station owned by the City of Asheville is the only CNG station along the corridor located at a government-owned facility. Table 12 details all the qualifying North Carolina CNG stations along the I-40 corridor.

Figure 12: I-40 CNG Corridor Status

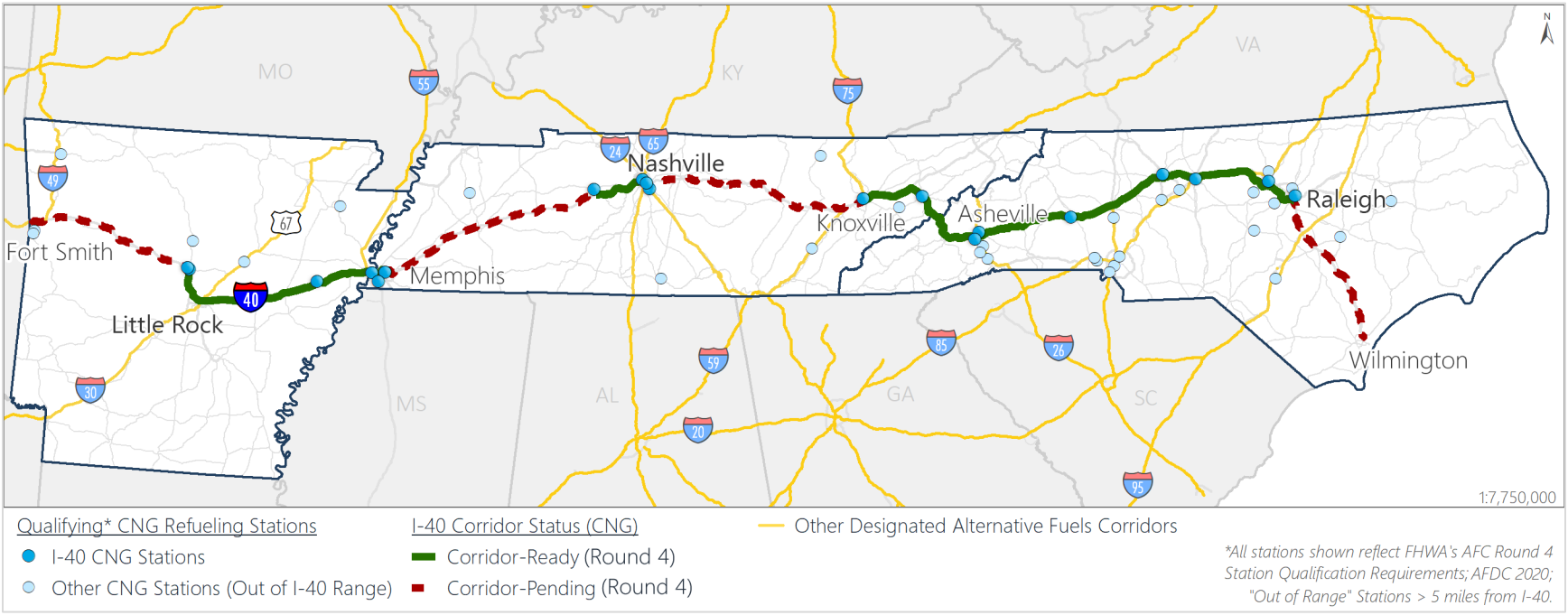


Table 9: I-40 CNG Corridor Status

	Corridor-Pending Segments (miles)	Corridor-Ready Segments (miles)
Arkansas	125	159
Tennessee	339	117
North Carolina	117	303
Total	**580**	**579**

Figure 13: Qualifying I-40 Corridor CNG Stations in Arkansas

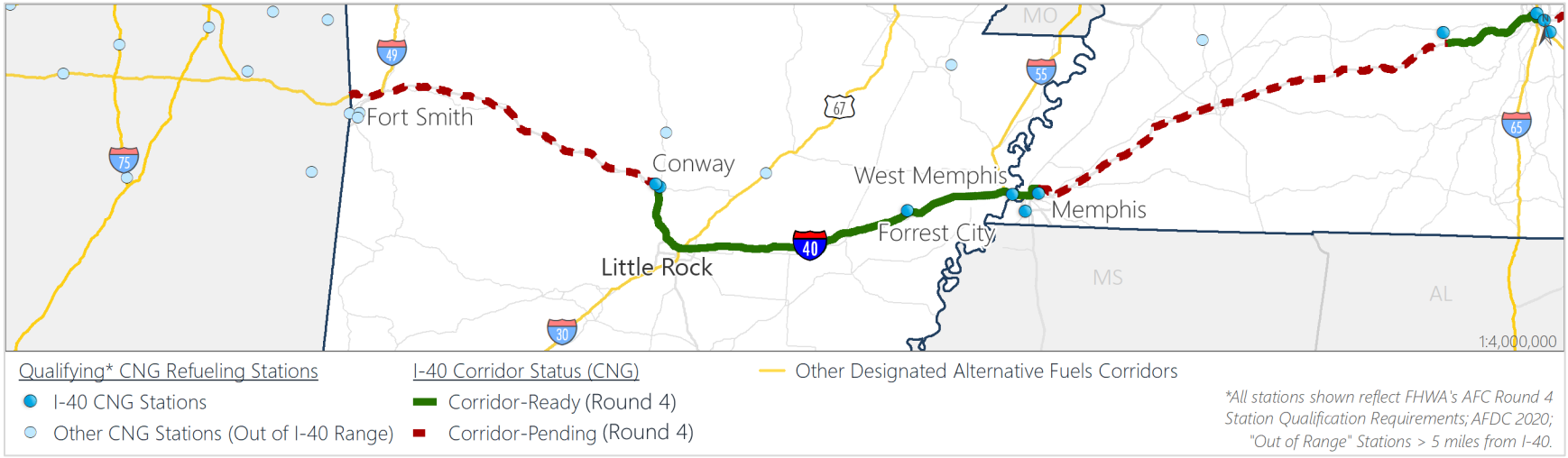


Table 10: Qualifying I-40 Corridor CNG Stations in Arkansas

Station Name	City	Owner Type	Facility Type	Number of Dispensers	Compression Capacity (psi)	Storage Capacity (SCF)
Satterfield Oak Street Gulf	Conway	Private	Convenience Store	1	450	25,950
American Natural Gas	Conway	Private	Standalone Station	2	500	38,925
GAIN Clean Fuel	Forrest City	Private	Standalone Station	2	975	36,000
Love's Travel Stop #450	West Memphis	Private	Convenience Store	6	NA	NA

Figure 14: Qualifying I-40 Corridor CNG Stations in Tennessee

Table 11: Qualifying I-40 Corridor CNG Stations in Tennessee

Station Name	City	Owner Type	Facility Type	Number of Dispensers	Compression Capacity (psi)	Storage Capacity (SCF)
Greater Dickson Gas Authority*	Dickson	Utility	Utility	1	NA	NA
Knoxville Utilities Board	Knoxville	Utility	Standalone Station	2	NA	NA
Memphis Light Gas and Water (North)	Memphis	Local Government	Utility	2	185	NA
Memphis Light Gas and Water (South*)	Memphis	Local Government	Utility	4	185	NA
Trillium	Nashville	Private	Standalone Station	1	700	NA
Clean N' Green	Nashville	Private	Standalone Station	1	NA	NA
Piedmont Natural Gas	Nashville	Utility	Utility	4	NA	NA
American Natural Gas	Newport	Private	Truck Stop	3	755	56,250

** Stations with both fast-fill and time-fill meters*

Figure 15: Qualifying I-40 Corridor CNG Stations in North Carolina

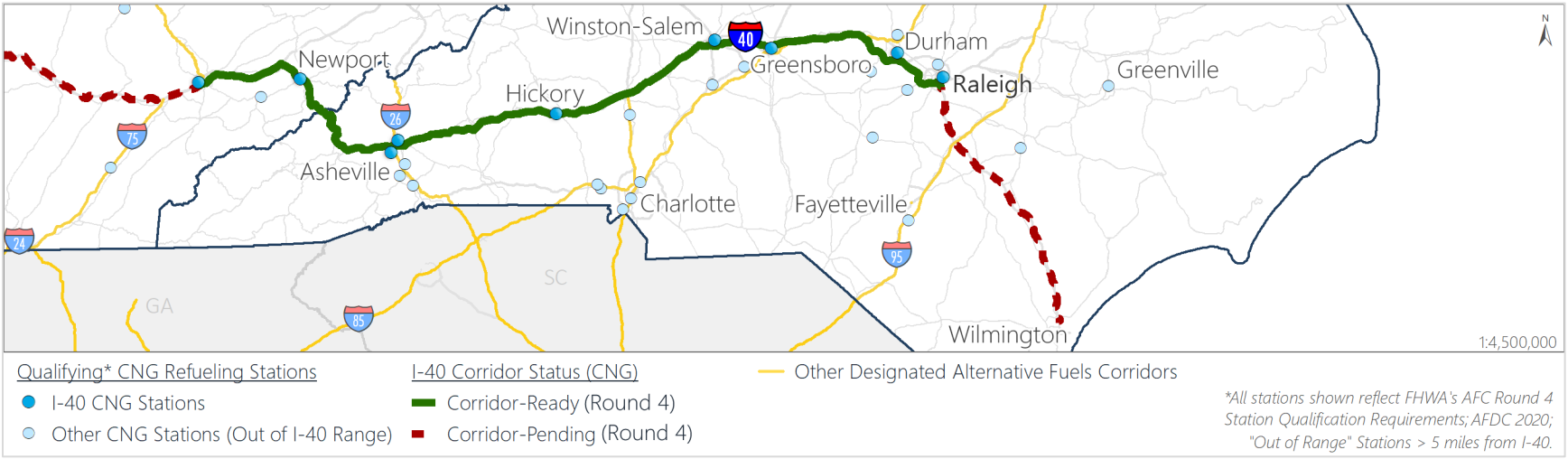


Table 12: Qualifying I-40 Corridor CNG Stations in North Carolina

Station Name	City	Owner Type	Facility Type	Number of Dispensers	Compression Capacity (psi)	Storage Capacity (SCF)
City of Asheville	Asheville	Local Government	Government Building	1	741	207,598
Dominion Energy	Asheville	Utility	Utility	1	116	72,000
Dominion Energy	Durham	Utility	Utility	1	116	72,000
Piedmont Natural Gas	Greensboro	Utility	Utility	2	30	NA
Piedmont Natural Gas	Hickory	Utility	Utility	3	NA	NA
Dominion Energy	Raleigh	Utility	Utility	1	116	72,000
Piedmont Natural Gas	Winston-Salem	Utility	Utility	2	NA	NA

Chapter 2: Implementation Strategies and Best Practices

2.1. Funding

Available Funding

Federal, state, regional, and local funding is available for CNG and EV infrastructure along the I-40 corridor. Administered by FHWA, the Congestion Mitigation and Air Quality Improvement (CMAQ) Program has been reauthorized under every successive transportation bill up to and including the FAST Act in 2015. The CMAQ Program provides funding to state DOTs, MPOs, and transit agencies to support surface transportation projects and other related efforts that contribute to air quality improvements and provide congestion relief. Typically, CMAQ funding can only be used to fund projects that benefit current or former nonattainment and maintenance areas for ozone, carbon monoxide (CO), and small particulate matter (PM2.5 or PM10). However, the FAST Act continues eligibility for electric vehicle and natural gas vehicle infrastructure and adds priority for infrastructure located on the alternative fuel corridors designated under 23 U.S.C. 149(c)(2) anywhere in a state.

All counties in Tennessee, North Carolina, and Arkansas are eligible for CMAQ funding for new EV and CNG infrastructure along designated AFC corridors, including I-40. In Arkansas, Crittenden County, bordering Tennessee, is the only county where CMAQ funds are apportioned. The remainder of the CMAQ funds (known as CMAQ flex) are programmed based on the eligibility of their parent funding category. These funds are not currently available for EV or CNG infrastructure.

In February 2020, FHWA's Highway Infrastructure Program [6] (HIP) released an apportionment of funds for necessary EV charging infrastructure. This eligible funding is available to Tennessee, Arkansas, and North Carolina. TVA has also been engaged in the planning of EV charging infrastructure along I-40, as well as other major travel corridors across their seven-state territory and plans to engage with local power companies in the future development of charging infrastructure.

The Volkswagen Diesel Settlement Environmental Mitigation Trust is another funding source that states may utilize to support EV infrastructure along corridors. In 2016, Volkswagen was found to have violated the Clean Air Act for knowingly producing vehicles with devices that circumvent federal emissions tests [7]. Part of the settlement included a $2.7 billion Environmental Mitigation Trust (EMT) fund, to which all states elected to become beneficiaries. Allocations of the Volkswagen funds, which are based on the number of registered Volkswagen vehicles in each state, can support a variety of projects that reduce NOx emissions, including charging infrastructure for light duty zero emission passenger vehicles, and the replacement and repower of medium and heavy-duty trucks, school buses and transit buses. Other non-road projects were eligible under this funding source, such as freight switchers, ferries, and port cargo handling equipment. The settlement also required an additional $2 billion investment by Volkswagen in projects that support the increased use of EVs, including the development of associated charging infrastructure. Volkswagen created a separate entity within Volkswagen Group of America,

[6] https://www.fhwa.dot.gov/legsregs/directives/notices/n4510842/

[7] https://www.epa.gov/dera/volkswagen-vw-settlement-dera-option

known as Electrify America, LLC [8], to oversee the ZEV investment, which will be invested over a 10-year period. Electrify America is currently implementing its second investment cycle, focusing investments on ZEV infrastructure, education, awareness, and marketing.

Other funding sources for recharging and refueling infrastructure include regional government entities and private sources. In North Carolina, Duke Energy is promoting EV adoption with a proposed Electric Transportation Pilot Program. Table 13, Table 14, and Table 15 highlight the major sources of funding for EV and CNG infrastructure by state. Created after a series of engagement efforts, the funding overview tables provide a snapshot of available funding for EV and CNG infrastructure and vehicles. The tables denote the overall funding available and the percent of funding available to private and public entities when a local match will be required. Application eligibility is addressed for sources to which an applicant may only be awarded funding for a specific project one time.

Engagement efforts during the I-40 study revealed various communication shortfalls regarding funding for stations. In the online survey, 62% of utility providers listed "funding availability" as the top barrier to CNG and EV infrastructure implementation along the corridor. This was also generally reflected by local utility representatives in the stakeholder meetings. Many funding sources are available only for capital construction costs, leaving providers and site hosts to figure out how to repair broken equipment or replacements in the future. Often, eligibility allowances are not flexible and cannot be changed at the state or local level. If possible, funding partners should consider making station repairs and replacements eligible activities within the existing funding opportunities. Moving forward, available funding sources need to be clearly communicated to local governments and potential site hosts to promote implementation.

[8] https://www.electrifyamerica.com/our-plan/

Table 13: Tennessee Funding Programs [9]

Program Name	Distributing Agencies	Description		Funding Available		Application Eligibility	Fuel Types
				Public	Private		
Volkswagen Settlement EMT *(Priority funding for Alternate Fueled and All-Electric vehicle replacements)*	TDEC	Truck Repowers, Replacements, and All-Electric Infrastructure *(Eligible Class 4-7 Local Freight Trucks; Class 8 Local Freight Trucks and Port Drayage Trucks)*	All Repowers/ Replacements	50% *(Maximum)*	25% *(Maximum)*	☑ Multiple Applications for One Location Host Allowed	EV, CNG
			Projects in Current/ Former Nonattainment [10] Areas	75% *(Maximum)*	25% *(Maximum)*		
			Projects in Projects in Distressed [11] Counties	75% *(Maximum)*	25% *(Maximum)*		
			Acquisition/Installation Costs for All-Electric Infrastructure	25% *(Maximum)*	50% *(Maximum)*		EV
		School Bus Repowers, Replacements, and All-Electric Infrastructure *(Eligible Class 4-8 School Buses)*	All Repowers/ Replacements	50% *(Maximum)*	25% *(Maximum)*	☑ Multiple Applications for One Location Host Allowed	EV, CNG
			Projects in Current/ Former Nonattainment Areas	75% *(Maximum)*	NA		
			Projects in Projects in Distressed Counties	75% *(Maximum)*	NA		
			Acquisition/Installation Costs for All-Electric Infrastructure	25% *(Maximum)*	50% *(Maximum)*		EV
		Light Duty ZEV Supply Equipment	-Purchase/install publicly accessible light duty EVSE and public and private properties Recurring operation and maintenance costs available for public, state-owned EVSE	TBD		TBD	EV

[9] Funding programs and requirements shown are current as of July 2020.
[10] Current or former nonattainment areas for Ozone and/or PM2.5 NAAQS
[11] Distressed Counties are defined as those counties that rank amongst the 10% most economically distressed counties in the nation based on a three-year average unemployment rate, per capita market income, and poverty rate.

Table 13: Tennessee Funding Programs (Continued)

Program Name	Distributing Agencies	Description		Funding Available		Application Eligibility	Fuel Types
				Public	Private		
Volkswagen Settlement EMT *(Priority funding for Alternate Fueled and All-Electric vehicle replacements)*	TDEC	Shuttle and Transit Bus Repowers, Replacements, and All-Electric Infrastructure *(Eligible Class 4-8 Shuttle and Transit Buses)*	All Repowers/ Replacements	50% *(Maximum)*	25% *(Maximum)*	☑ Multiple Applications for One Location Host Allowed	 
			Projects in Current/ Former Nonattainment Areas	75% *(Maximum)*	NA		
			Projects in Projects in Distressed counties	75% *(Maximum)*	NA		
			Acquisition/Installation Costs for All-Electric Infrastructure	25% *(Maximum)*	50% *(Maximum)*		
Highway Infrastructure Program [12] *(Under 23 U.S.C. 133(b)(1) and 23 U.S.C. 133(b)(4))*	TDOT	Activities Eligible to Provide Necessary Charging Infrastructure Along Designated Alternative Fuel Corridors	Z909: Any Area			☑ One Time Funding	
			Z910: Urbanized Areas with a Population Over 200,000				
			Z911: Areas with a Population Over 5,000 to 200,000				
			Z912: Areas with a Population 5,000 and Under				

[12] https://www.fhwa.dot.gov/legsregs/directives/notices/n4510842/n4510842_t1.cfm

Table 13: Tennessee Funding Programs (Continued)

Program Name	Distributing Agencies	Description		Funding Available		Application Eligibility	Fuel Types
				Public	Private		
CMAQ *(FAST Act adds a CMAQ priority for EV and natural gas stations along designated corridors)*	TDOT	Establishment of Alternative Fuel Vehicles (AFV) Refueling Facilities and Related Other Infrastructure	-Must provide an emission (PM 2.5, NOx or VOCs) reduction -Not available in areas where private AFV stations are reasonably accessible	80% *(Maximum)*	50%*	☑ Multiple Applications for One Location Host Allowed	
		Diesel Emission Reduction Solutions	Certified alternative fuel conversion	80% *(Incremental Cost)*	50% *(Incremental Cost)*		
			Engine upgrade / remanufacture	80%	50%		
			Engine replacement/repower	80% *(Purchase/ Installation of New Engine)*	80% *(Purchase/ Installation of New Engine)*		
			Vehicle replacement with certified alternative fuel vehicle	80% *(Incremental Cost)*	50% *(Incremental Cost)*		

** Private entities may be eligible for AFV funding through CMAQ if they project is created through a formal, public-private partnership.*

Table 14: North Carolina Funding Programs [13]

Program Name	Distributing Agencies	Description		Funding Available		Application Eligibility	Fuel Types
				Public	Private		
Volkswagen Settlement EMT	North Carolina DEQ	Phase 1: Diesel Bus and Vehicle Program and the ZEV Infrastructure Program	School Bus Repower/ Replacements *(All-Electric)*	100% *(Maximum)*	75% *(Maximum)*	☑ One Time Funding during Phase 1 *(2018-2020)*	EV
			School Bus Repower/ Replacements *(Propane, Natural Gas, Diesel)*	100% *(Maximum)*	25-40% *(Maximum)*		EV, CNG
			Transit Bus Replacements	100% *(Maximum)*	25-75% *(Maximum)*		
			On-Road Heavy Duty Equipment *(Refuse Haulers, Dump/Debris Trucks)*	100% *(Maximum)*	25-75% *(Maximum)*		
			Off-Road Equipment *(Ferry Repower Projects)*	100% *(Maximum)*	25-75% *(Maximum)*		
			ZEV Stations and Infrastructure	100% *(Maximum)*	80% *(Maximum)*		EV
		Phase 2	*Phase 2 (2020-2022) Spending Plan TBD*			*TBD*	*TBD*
		Phase 3	*Phase 3 (2022-2024) Spending Plan TBD*			*TBD*	*TBD*
Clean Fuel Advanced Technology (CFAT) Grant *(Supported with CMAQ) funds provided by NCDOT*	North Carolina Clean Energy Technology Center (NCCETC)	Technologies or projects that will help reduce mobile pollution emissions. - *Available for 24 non-attainment counties only* - *Includes: Alternative Fuel Vehicle (AFV) Purchases, Leases, and Conversions; Mobile Idle Reduction Technologies; Diesel Retrofit Technologies*		80% *(Maximum; Total Funding per Project $5,000-$400,000)*	80% *(Maximum; Total Funding per Project $5,000-$400,000)*	☑ One Time Funding	EV, CNG
		Electric Vehicle Charging Stations - *Available for all NC Counties* - *Projects must be Non-Ground Disturbing*					EV

[13] Funding programs and requirements shown are current as of July 2020.

Table 14: North Carolina Funding Programs (Continued)

Program Name	Distributing Agencies	Description		Funding Available		Application Eligibility	Fuel Types
				Public	Private		
Highway Infrastructure Program *(Under 23 U.S.C. 133(b)(1) and 23 U.S.C. 133(b)(4))*	FHWA	Activities Eligible to Provide Necessary Charging Infrastructure Along Designated Alternative Fuel Corridor	Z909: Any Area			☑ One Time Funding	
			Z910: Urbanized Areas with a Population Over 200,000				
			Z911: Areas with a Population Over 5,000 to 200,000				
			Z912: Areas with a Population 5,000 and Under				
Proposed Duke Energy Electric Transportation Pilot Program	Duke Energy Corporation	Residential Charging	800 Level 2 Charging Stations	$1,000 Rebate		*TBD*	
		Public Charging	800 Charging Stations (120 DCFC) -*Owned/operated by Duke Energy*	NA			
		Fleet EV Charging	900 Charging Stations for Commercial and Industrial Customers who Operate Fleets that are Transitioning to EV	$2,500 Rebate			
		EV School Bus Charging Station	Financial Support to Eligible Customers to Procure Up To 85 Electric School Buses. -*Installation of associated Charging Infrastructure by Duke Energy*	Cost of Charging Infrastructure			
		EV Transit Bus Charging Station	100+ Electric Transit Bus Charging Stations for Eligible Transit Agencies -*Installation/operated by Duke Energy*	Cost of Charging Infrastructure			
CMAQ	FHWA	Alternative Fuels Vehicles	Incremental cost of an AFV compared to a conventionally fueled vehicle in nonattainment and maintenance areas	80% *(Incremental Cost)*	100% *(Incremental Cost)*	☑ Multiple Applications for One Location Host Allowed	

Table 15: Arkansas Funding Programs* [14]

Program Name	Distributing Agencies	Description		Funding Available		Application Eligibility	Fuel Types
				Public	Private		
Highway Infrastructure Program *(Under 23 U.S.C. 133(b)(1) and 23 U.S.C. 133(b)(4))*	FHWA	Activities Eligible to Provide Necessary Charging Infrastructure Along Designated Alternative Fuel Corridor	Z909: Any Area			☑ One Time Funding	
			Z910: Urbanized Areas with a Population Over 200,000				
			Z911: Areas with a Population Over 5,000 to 200,000				
			Z912: Areas with a Population 5,000 and Under				
Volkswagen Settlement EMT	Arkansas DEQ	ABC (Advanced Bus & Clean) Transportation	TBD	TBD	TBD	TBD	
		Level 2 Rebate Program	TBD	TBD	TBD	TBD	
		DC Fast Charger RFP	TBD	TBD	TBD	TBD	

** While the FAST Act allows for the expenditure of CMAQ funds on alternative fuel corridors, these funds are not currently used as a funding source in Arkansas for alternative fuel infrastructure.*

[14] Funding programs and requirements shown are current as of July 2020.

Additional Funding Considerations

The two federal funding sources listed above, HIP and CMAQ, are some of the largest funding sources available for alternative fuel infrastructure, although none of the three states have earmarked funds for EV infrastructure. Funds allotted through the HIP are reevaluated annually (i.e., future funding for alternative fuel infrastructure through this program is not guaranteed). An extensive list of all potential federal funding sources for electric vehicle infrastructure is published in the Guide to Federal Funding, Financing, and Technical Assistance for Plug-In Electric Vehicles and Charging Stations [15]. As listed in Table 16, use of various federal funding programs will impose additional requirements for recipients. TDOT's Local Government Guidelines manual further explains requirements for federally-funded projects.

Engagement efforts revealed that while most state agencies are aware of funding opportunities, additional requirements by various funding sources are not well-known and have proven to be a huge barrier to the implementation of alternative fuels stations across the southeast. Federal requirements vary by the source of the funding, even in certain cases where the program name is the same. Buy America, for example, is required by all federal funding sources, but has different requirements through FHWA than with the Federal Transit Administration (FTA). Varied reporting may be required for certain funding sources. Moving forward, efforts must be made among state and federal agencies to coordinate and communicate all requirements and regulations that accompany funding for stations.

Table 16: Additional Requirements for Funding Recipients

Program Name	State	Additional Requirements	Applicable Phases
Congestion Mitigation and Air Quality (CMAQ) Improvement Program	TN NC AR	- Buy America - Competitive Procurement - Davis-Bacon Act *(When Applicable)* - Disadvantaged Business Enterprise - NEPA - Uniform Act	☑ Land Acquisition ☑ Design ☑ Equipment ☑ Construction/ Installation ☐ Operations/ Maintenance
CFAT (Supported with CMAQ Funding)	NC	- Buy America - CFAT Signage - Competitive Procurement Requirements - Davis-Bacon Act *(When Applicable)* - Disadvantaged Business Enterprise - NEPA - Participation in NC Smart Fleet Initiative - Uniform Act	☐ Land Acquisition ☐ Design ☑ Equipment ☑ Construction/ Installation ☐ Operations/ Maintenance
Highway Infrastructure Program (HIP) *(Surface Transportation Block Grant Program)*	TN NC AR	- Buy America - Competitive Procurement - Davis-Bacon Act *(When Applicable)* - Disadvantaged Business Enterprise - NEPA - Uniform Act	☑ Land Acquisition ☑ Design ☑ Equipment ☑ Construction/ Installation ☐ Operations/ Maintenance

[15] *Guide to Federal Funding, Financing, and Technical Assistance for Plug-in Electric Vehicles and Charging Stations*. U.S. Department of Energy; U.S. Department of Transportation, July 2016, http://www.energy.gov/sites/prod/files/2016/07/f33/Guide to Federal Funding and Financing for PEVs and PEV Charging.pdf.

Table 16: Additional Requirements for Funding Recipients (Continued)

Program Name	State	Additional Requirements	Applicable Phases
Duke Energy Initiative	NC	*NA*	☐ Land Acquisition ☐ Design ☑ Equipment ☑ Construction/ Installation ☑ Operations/ Maintenance
Volkswagen Settlement EMT	TN	*NA*	☑ Land Acquisition ☐ Design ☑ Equipment ☑ Construction/ Installation ☐ Operations/ Maintenance
	NC	*NA*	☐ Land Acquisition ☑ Design ☑ Equipment ☑ Construction/ Installation ☑ Operations/ Maintenance
	AR	*NA*	☐ Land Acquisition ☐ Design ☑ Equipment ☐ Construction/ Installation ☐ Operations/ Maintenance

Station Cost Estimates

The cost of installing EV and CNG infrastructure varies by product type and site restraints. For EV, certain site characteristics can drastically reduce capital costs, such as sites with existing electrical service and those that do not require any trenching for a conduit. For CNG, access to an adequate natural gas supply and property size are critical criteria. Installation costs can be generally broken down into labor, materials, permits, taxes, and utility upgrades. While the tables in this section provide a range of costs for the respective infrastructure, all sites for EV and CNG come with unique needs, requirements, and costs. The cost estimates provided do not account for other project development activities such as National Environmental Policy Act (NEPA) review, right-of-way (ROW) land acquisition, and legal fees.

The Rocky Mountain Institute released a study that provided cost estimates for the equipment components of a DCFC charger (Table 17). The Drive Natural Gas Initiative, a collaboration between the American Gas Association and America's Natural Gas Alliance, created a handbook for prospective CNG infrastructure developers that included cost estimates for the general components of a project (Table 18). The study also provided sample scenarios for fueling needs and the equipment needed to meet those demands. Table 19 outlines these scenarios and provides high-level estimates for the total cost of the station components. As previously mentioned, time-fill stations do not meet the FHWA qualification requirements for stations. However, the cost estimations were included in this data for those considering opening a combination-fill station that serves both a private fleet and public on-demand retail customers.

Table 17: Rocky Mountain Institute [16] DCFC Infrastructure Estimated Costs

Component	Estimated Cost for DCFC
DCFC Equipment	$20,000 - $150,000
Transformer	$35,000 - $173,000
Data Contracts	$85 - $240 /year/charger
Network Fees	$200 - $250 /year/charger
Credit Card Reader	$325 - $1,000
Cable	$1,500 - $3,500
Installation Costs [17]	$4,000 - $51,000 /charger
Maintenance[14]	$400
Total	**$61,510 - $379,390**

Table 18: CNG Fueling Station Component Estimated Costs [18]

Component	Estimated Costs
Gas Supply Line	$20,000 - $150,000
Compressor Package	$200,000 - $400,000
Noise Abatement	$0 - $40,000
Gas Dryer	$50,000 - $80,000
Storage (3 or 6 ASME)	$100,000 - $200,000
Dispenser (1 or 2 00M-hose)	$60,000 - $120,000
Card Reader Interface	$20,000 - $30,000
Engineering	$25,000 - $75,000
Construction	$300,000 - $600,000
Contingencies	$10 - $150,000
Estimated Total (excludes land cost)	**$805,000 - $1,845,000**

[16] Chris Nelder and Emily Rogers, *Reducing EV Charging Infrastructure Costs*, page 7, Rocky Mountain Institute, 2019, https://rmi.org/ev-charging-costs.
[17] Margaret Smith and Jonathan Castellano, *Costs Associated With Non-Residential EVSE*, U.S. Department of Energy Vehicle Technologies Office, 2015, https://afdc.energy.gov/files/u/publication/evse_cost_report_2015.pdf,
[18] *CNG Infrastructure Guide for the Prospective CNG Developer*. Drive Natural Gas Initiative: America's Natural Gas Alliance (ANGA) and the American Gas Association (AGA).

Table 19: AGA Cost Estimate Scenarios for Qualifying CNG Stations

	Fast-Fill Station 1	Fast-Fill Station 2	Time-Fill Station
Vehicle Fueling Scenarios	15 light-duty/15 GGE* consecutively fueling in a 1-hour peak period *or* Randomly arriving light-duty/10 GGE *or* 10 heavy-duty/20 DGE consecutively fueling in a 1-hour peak period *or* Randomly arriving heavy-duty/DGE	15 light-duty/15 GGE consecutively fueling in a 1-hour peak period *or* Randomly arriving light-duty/10 GGE *or* 10 heavy-duty/20 DGE consecutively fueling in a 1-hour peak period *or* Randomly arriving heavy-duty/10 DGE	40 vehicles/38 GGE in a 10-hour period *or* 40 vehicles/33 DGE in each vehicle in a 10-hour period
Equipment	• Natural gas dryer • (1) 300 SCFM compressor • (3) ASME vessel high-pressure storage systems • (1) two-hose fast-fill dispenser *(no redundancy)*	• Natural gas dryer • (2) 300 SCFM compressors • (3) ASME vessel high-pressure storage systems • (1) two-hose fast-fill dispenser *(with redundancy)*	• Natural gas dryer • (1) 300 SCFM compressor • (20) two-hose, time-fill dispensers *(no redundancy)*
Component Cost	$500,000	$650,000	$375,000
Installation Cost	$300,000	$350,000	$300,000
Total Cost	**$800,000**	**$1,000,000**	**$675,000**

**Gallon of gasoline equivalent (GGE) and diesel gallon equivalent (DGE) are the metrics by which CNG is sold at public fueling stations. A typical tank will hold 20 GGE [19].*

[19] https://afdc.energy.gov/vehicles/natural_gas_filling_tanks.html

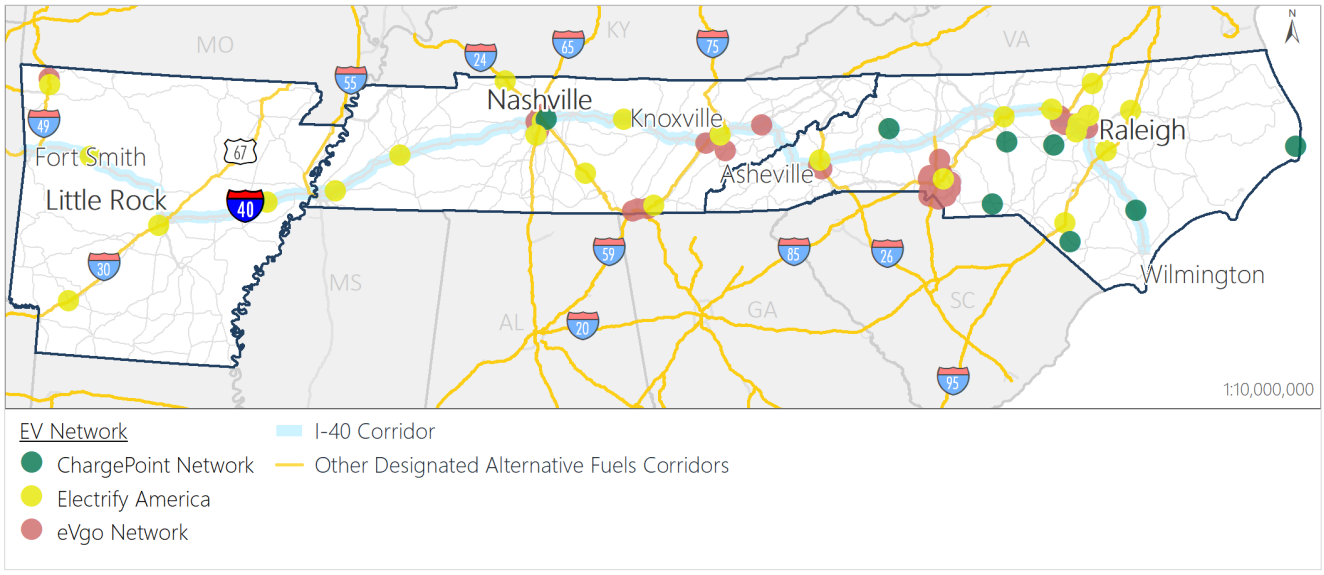
2.2. Partnership Types

EV Partnerships

There are many different business models that can be leveraged for EV. Corporate partnerships between large companies, such as Electrify America and Walmart, have proved successful across the country. Businesses that deal directly with consumers have many clear incentives to provide charging stations on-site, such as the opportunity to sell goods and services while customers are waiting for their vehicle to charge. Of the three states along this corridor, only North Carolina currently allows non-utility EV owners to sell electricity. Along the I-40 corridor, 28% of the qualifying DCFC stations are located at a Walmart or Sam's Club. While waiting for the battery to charge, customers can use that time to patron the businesses. Installing chargers at additional retail stores consistently throughout a region can increase driver attraction and demand for charging.

Many EV drivers are part of a charging network. Though they vary by company, most networks offer incentives, such as reduced rates, for subscribing to the network. When selecting a network for a charging partner, it is important to consider the presence of networks within a region. The three networks with corridor-ready, DCFC chargers in Tennessee, Arkansas, and North Carolina are Electrify America, EVgo Network, and ChargePoint. Figure 16 shows a regional overview of each network. Along the I-40 corridor, there are 12 EVgo stations, 11 Electrify America stations, and two ChargePoint Stations.

Figure 16: Charging Networks in the Study Area



CNG Partnerships

Developing partnerships for CNG refueling stations can be achieved in several ways that vary by ownership type, rate structure, user availability, and the responsible party for operations and maintenance. There are significant costs with constructing a CNG station. Business models must take into account the current and projected fuel demand for the station, ensuring there will be a future positive cash flow and return on investment for the station. In their infrastructure guide[20], the Drive Natural Gas Initiative identified three main business models for developing a CNG station plan. While all CNG stations do not necessarily meet each of these models exactly, they provide a basis for developing a CNG business plan.

1. Fleet or End-User Ownership

   Fleet or end-user ownership is a standard owner and operator model. The owner may use its own employees for the operation and maintenance of the station or use a third-party. The CNG source may be from a local, regulated utility provider or a commercial vendor using the local utility for transport.

2. Local Distribution Company Ownership

   Under the local distribution company (LDC) ownership model, the CNG station is owned, operated, and maintained by a local utility company. LDC models can be rate-based, where the capital funds for the project are reimbursed by a regulated rate charged to customers. This can be achieved by a special natural gas utility tax or CNG tariff. LDCs can be owned by multiple parties and would be considered a partial ownership model. In this scenario, the local utility company owns part of the overall rate-based facility, including the compressor, storage, and auxiliaries, and a third-party commercial vendor owns the retail features of the site, such as the land, card-reader, and retail processing equipment. The retailer can then sell the gas under the regulated price and the utility provider is reimbursed for capital costs via compression fees charged to the retail vendor. LDCs can own standalone stations that are for public access or private fleets.

3. Third Party or Commercial Ownership

   Commercial vendors, such as retail businesses, can own and operate a CNG refueling station under the third party or commercial ownership model. Commercial vendors have the most flexibility in developing a business model, financing, and operating the station. Commercial vendors can own and operate the station or contract out the operations with another commercial entity.

Figure 17: CNG Refueling at Loves in West Memphis, Arkansas

Trillium CNG, which was recently acquired by Loves Travel Stops, is a commercial vendor that provides design, construction, operations, and maintenance for CNG stations. They offer multiple maintenance packages with various services to customers. The Loves shown in the photo is in West Memphis, Arkansas and is one of the corridor-ready stations along I-40.

[20] *CNG Infrastructure Guide for the Prospective CNG Developer*. Drive Natural Gas Initiative: America's Natural Gas Alliance (ANGA) and the American Gas Association (AGA).

Alternative Fuel Fleets

Regional Fleets

Figure 18: Utility-Owned CNG Station

Gibson County Utility District's first CNG refueling station in Trenton, TN. Photo: Gibson County Utility District

Throughout Arkansas, North Carolina, and Tennessee, many fleets have incorporated electric and CNG-powered vehicles into their operations. In Tennessee, the Gibson County Utility District has seen success in promoting CNG vehicles within their own fleet, as well as promoting the fuel in the region. The District created a CNG Vehicle Committee within the Tennessee Gas Association (TGA), which promoted the use of CNG to the public and provided local education on its benefits. The utility district began converting its fleet in 2011[21] to CNG and opened its first CNG station in 2015, moving half[22] of its 36-vehicle fleet to CNG. Waste Management in Antioch, Tennessee transitioned 68 of their 90 refuse trucks to CNG vehicles[19]. In Arkansas, the North Little Rock Police Department added 16 CNG vehicles to its fleet. Within the CNG sector, anchor fleets are crucial to ensure an adequate CNG demand for a new station. Outreach to local fleet organizations can connect them with potential station owners and create a financial base for the station. Within the I-40 corridor, existing CNG fleets are found within many entities, including waste management trucks, UPS, municipal vehicles, transit agencies, and even city mowers. The CNG Business Owner Considerations Checklist, found in Appendix C of this document, can provide a basis of information for interested site hosts as they connect with potential fleets in their region.

Benefits and Cost Savings Estimates for Fleet Conversions

Nationally and in the southeast, more fleet managers are choosing to convert their vehicles to alternative fuels for cost savings and environmental benefits. Purchasing new, fuel-efficient vehicles is a high cost option, which can incentivize existing vehicle conversions. There are many ways to migrate vehicles to alternative fuel power sources depending on fleet size, end goals, and financial availability. Three common ways to turn a gas- or diesel-powered vehicle into one that runs on alternative fuels are conversions, repowers, and retrofits. A conversion entails modifying the existing engine with a kit so it can be powered by a fuel source not allowed for in the vehicle's original design. Repowering is a process by which the engine, as well as any additional necessary components, is replaced completely by a new one that is powered by a new energy source. Retrofitting an engine is a process by which the diesel emission system is altered, usually by adding an engine exhaust aftertreatment. In North Carolina, Altech Eco [23] and Cummins Westport [24] are two companies involved with the manufacturing or retrofitting of medium- and heavy-duty engines.

Clean Cities have assisted fleet conversions to alternative fuels across the country and produced a list[15] of best practices and considerations. With the collaboration of the U.S. Office of Energy Efficiency and Renewable Energy, key recommendations are listed on the following page.

[21] https://gibsoncountygas.com/wp-content/uploads/2020/07/July-2020-Newsletter.pdf
[22] https://www.turfmanagersllc.com/wp-content/uploads/TNCleanFuels-PR_TN-Green-Fleets_5-17-16.pdf
[23] http://www.transecoenergy.com/
[24] https://www.cumminswestport.com/models/isl-g

- It is necessary to understand the scientific properties of the desired alternative fuel. For CNG conversions, a "prep ready" engine will aid in damage prevention from the high temperatures that occur during the combustion of CNG.
- There is a need to ensure that there are plentiful refueling or recharging locations for the fleet.
- The frame of the vehicle will need to have enough space for new equipment, such as storage tanks or new engines. Some vehicles require a new engine footprint that will need to be engineered so that the new design does not interfere with the vehicle operations.
- Certain fuel types are better suited for particular driving patterns. Fleets traveling long distances may be better suited for different fuel types than those in urban, stop-and-go traffic.
- Federal Motor Vehicle Safety Standards and other National Highway Traffic Safety Administration regulations should be checked to ensure that the modified vehicle meets all safety requirements. For EVs and CNG in particular, added fuel tanks or batteries may offset a vehicle's center of gravity.
- It is mandated to use EPA- or CARB-certified kits for the conversion of vehicles and request emissions and compliance data from the manufacturer to double check that a conversion has not increased emissions.
- If converting a large number of vehicles to a new fuel, staggering the actual conversions ensures a fleet is not all absent at once.
- Planning ahead for a vendor, including a business strategy, references, and ensuring trained personnel, can save time and money.
- Understand all new maintenance requirements and costs of the new alternative fuel.

2.3. Site Selection

EV Site Selection

Local planning regulations and siting requirements may require a permitting process prior to construction of the site. Installation will need to meet all local building codes. An audit of the site footprint can help identify electricity savings for the facility and ensure it will work well with the site's energy system as a whole. Planning ahead for infrastructure expansion and upgrades can provide cost savings in the future. For example, installing an extra panel and conduit capacity at project construction will allow for easy addition of future circuits and electrical capacity. Curbs or wheel stops should be installed near the chargers to prevent accidental impact and damage from cars. Parking areas must be adequate, meeting ADA accessibility requirements and providing adequate shelter from weather. Older EV models require ventilation while charging. If a site is requiring payment for a charge, the system will need to be established beforehand. A plan will need to be in place should users have trouble with charging, including a contact to call for the organization. While DCFC chargers are required for the corridor-ready designation, there may be circumstances in which a level 2 charger would better serve the community. Researching the local market share of electric vehicles and community charging needs is recommended in the early stages of site selection. Additionally, user site amenities are recommended, including restrooms, food, site lighting, and security.

CNG Site Selection

Site selection for CNG is influenced by many factors, including user needs, geographic considerations, and other costs. For public-private stations that plan to serve a specific private fleet, the location will need enough space to store vehicles overnight as they are refueled. Storage capacity for on-demand refueling will need to be estimated beforehand, along with daily fuel use for fleet vehicles. Fast-fill stations for vehicles with unpredictable fuel windows, such as travelers along the I-40 corridor, may require larger compressors and more storage capacity to ensure they have adequate CNG supplied for users. FHWA considers it a best practice to design stations with multiple compressors to provide more than the estimated fuel throughput. Known as compressor redundancy, this requires installing more compressors than needed so that the station can continue operating if one compressor requires maintenance and cannot be used.

CNG stations must also have adequate proximity to a gas line. Another significant cost factor is the available gas pressure, as high-pressure gas lines reduce costs associated with compressors. For sites where only low-pressure lines are available, additional compression may need to be installed, leading to higher operating costs. High-pressure lines may require a regulator to meet compressor requirements. Capital costs for installation include the station design, construction, and due diligence operations testing. Depending on the geographic location and climate, additional enclosures or protections, such as a canopy shelter, may be required. Regulatory and permitting requirements can add significant costs and time delays to CNG station implementation.

2.4. Site Selection Opportunities

Site Analysis

EV Site Analysis

The purpose of the siting analysis is to identify potential station locations that would address existing corridor gaps. Along the I-40 corridor from Arkansas to North Carolina, there are 11 gaps where the distance between qualifying EV stations is greater than 50 miles. Based on best practices discussed during the stakeholder engagement process, data was collected for potential EV infrastructure locations in Arkansas, Tennessee, and North Carolina. Gas stations, truck stops, certain retail businesses, including big box retailers and restaurants, and hotels are primary destinations for EV, and the siting analysis documented where these destinations lie within one mile of each I-40 exit.

Tennessee data was collected from Infogroup, which provided an up-to-date, detailed snapshot of businesses along the corridor. The same data source was not available for Arkansas and North Carolina, so the retail businesses for these states were gathered using parcel data that specified land use and zoning. While the parcel data may contain a margin of error by including businesses that may not be currently operational, it provides a useful snapshot of commercial properties along the I-40 corridor that could be suitable for EV site hosts. The truck parking data was gathered from a national source that identified private parking areas along interstate corridors.

Table 20, Table 21, and Table 22 in the following pages highlight the existing ESVE corridor gaps, according to Round 4 criteria, in each state and the results of the high-level siting analysis. Most of the corridor-pending segments need only one station to become corridor-ready. The largest gaps - Clarksville to Forest City in Arkansas, Jackson to Nashville in Tennessee, and Asheville to Greensboro in North Carolina - will require more

than one EV station to change the status of the segment. For each gap, the top exits for potential charging sites are indicated by the total number of EV-oriented destinations for site hosts. Two EV corridor-pending gaps stretched over the Tennessee state boundary into Arkansas and North Carolina. Due to the differing data sources for each state, the bi-state gaps were split at the state line and are referred to as 'a' and 'b' in the following tables. The ultimate purpose of this analysis is to provide partners with a starting point for identifying potential exits along the corridor where existing businesses may be conducive to becoming a site host.

CNG Site Analysis

Similar to the EV siting methodology, corridor-pending CNG segments were identified along I-40 through Arkansas, Tennessee, and North Carolina. CNG stations must be within 150 miles of one another to meet FHWA requirements. Each of the four corridor-pending gaps in the study area needs only one well-placed station to close the 150-mile gap and switch the segment to corridor-ready.

CNG site selection is typically achieved by first identifying an anchor fleet, which will ensure fuel demand for the station while the customer demand builds for retail, on-demand CNG sales. In areas with travel stops and gas stations, CNG refueling infrastructure could potentially be added to existing stations.

Successful fleet conversions to CNG along the corridor include municipalities and local utility companies, so these entities were identified along the I-40 corridor as potential anchor fleets. The site analysis for CNG identified specific exits along the corridor-pending gaps that are home to potential anchor fleets and were relatively high in the number of gas stations and truck parking stops at the exit, which are summarized in Table 23. While an anchor fleet and truck parking could be an indicator for potential sites, other key factors will need to be addressed when identifying new CNG locations, such as the significant space required to accommodate fueling infrastructure and storage.

Table 20: Arkansas EV Site Analysis

Corridor Gap	Total Gap Length (miles)	Stations Required for "Corridor-Ready"	Exit Number	County	Existing Potential Site Locations				
					Gas Stations	Truck Parking	Big Box Retail	Other Retail	Total Potential Site Locations
Gap #1: OK-AR State Line to Clarksville	63	1	Exit 12 at I-49	Crawford	9	1	NA	176	186
			Exit 5 at Highway 59	Crawford	5	0	NA	161	166
			Exit 57 at South Crawford St	Johnson	2	1	NA	69	72
			Exit 55 at Hwy 109	Johnson	1	1	NA	36	38
			Exit 37 at Hwy 219	Franklin	2	1	NA	15	18
Gap #2: Clarksville to Forest City	182	3	Exit 127 at Highway 64	Faulkner	5	0	NA	451	456
			Exit 152 at Pike Avenue MacArthur Dr	Pulaski	4	0	NA	216	220
			Exit 83 at Weir Rd	Pope	3	0	NA	161	164
			Exit 153A at J.F.K. Blvd	Pulaski	5	0	NA	157	162
			Exit 129 at SR 60	Faulkner	5	0	NA	147	152
Gap #3a: Forest City to AR-TN State Line	40	1	Exit 5 at Ingram Blvd	Crittenden	3	0	NA	81	84
			Exit 281 at Mound City Road	Crittenden	3	4	NA	74	81
			Exit 278 at 7th St	Crittenden	3	0	NA	71	74
			Exit 275 at North Airport Rd	Crittenden	1	0	NA	11	12
			Exit 260 at State Route 149	St Francis	4	2	NA	1	7

Table 21: Tennessee EV Site Analysis

Corridor Gap	Total Gap Length (miles)	Stations Required for "Corridor-Ready"	Exit Number	County	Existing Potential Site Locations				
					Gas Stations	Truck Parking	Big Box Retail	Other Retail	Total Potential Site Locations
Gap #3b: AR-TN State Line to Memphis	21	1	Exit 1B-F at SR 1	Shelby	1	0	2	3	6
			Exit 1B-D at SR 1	Shelby	1	0	2	3	6
			Exit 1F-E at SR 14	Shelby	0	0	7	7	14
			Exit 2-B at Smith Ave	Shelby	0	0	3	3	6
			Exit 10-B at Covington Pk	Shelby	2	0	2	4	8
Gap #4: Memphis to Jackson	64	1	Exit 35-B at SR 59	Fayette	1	1	0	1	3
			79-D at SR 79	Madison	1	1	0	1	3
			80-B at SR 186	Madison	2	0	0	2	4
			80-D at SR 186	Madison	1	0	2	3	6
Gap #5: Jackson to Nashville	129	2	126-B at SR 69	Benton	2	1	0	2	5
			201-C at SR 24	Davidson	0	0	3	3	6
			209-D at SR 24	Davidson	0	0	3	3	6
			172-D at SR 46	Dickson	2	1	0	3	6
			85-C at Dr. F.E. Wright Dr	Madison	1	2	0	2	5
Gap #6: Nashville to Cookeville	70	1	221-E at SR 45	Davidson	1	0	1	2	4
			258-B at SR 53	Smith	1	1	0	1	3
			226-E at SR 171	Wilson	1	0	2	3	6
			226-D at SR 171	Wilson	1	0	1	2	4
			238-B at SR 10	Wilson	1	0	1	3	5
Gap #7: Cookeville to Lenoir City	81	1	320-A at SR 298	Cumberland	0	2	0	1	3
			288-A at SR 111	Putnam	1	1	0	1	3
			300-C at SR 24	Putnam	1	1	0	1	3
			347-C at SR 61	Roane	0	0	3	3	6
			352-B at SR 58	Roane	2	0	1	3	6
Gap #8a: Dandridge to TN-NC State Line	34	1	432-D at SR 9	Cocke	2	1	0	3	6
			435-A at SR 32	Cocke	2	0	0	2	4
			447-B at Hartford Road	Cocke	2	1	0	2	5

Table 22: North Carolina EV Site Analysis

Corridor Gap	Total Gap Length (miles)	Stations Required for "Corridor-ready"	Exit Number	County	Existing Potential Site Locations				
					Gas Stations	Truck Parking	Big Box Retail	Other Retail	Total Potential Site Locations
Gap #8b:TN-NC State Line to Asheville	46	1	Exit 31 at NC 215	Haywood	5	1	0	47	53
			Exit 44 at U.S. 19	Buncombe	6	0	2	42	50
			Exit 37 at SR 1200	Buncombe	4	1	0	11	16
			Exit 24 at NC 209	Haywood	2	2	0	8	12
			Exit 33 at Newfound Rd	Haywood	1	0	0	8	9
Gap #9: Asheville to Greensboro	169	3	Exit 193 at South Main St	Forsyth	1	0	0	416	417
			Exit 189 at Stratford	Forsyth	5	0	3	395	403
			Exit 203 at Kernersville High Point	Forsyth	7	0	0	373	380
			Exit 151 at U.S. 21	Iredell	5	0	0	347	352
			Exit 128 at Fairgrove Church Rd	Catawba	8	2	0	259	269
Gap #10: Raleigh to Wallace	86	1	Exit 312 at NC 42	Johnston	6	1	8	83	98
			Exit 306B at U.S. 70 East	Wake	2	0	0	43	45
			Exit 362 at NC 24	Duplin	5	4	0	30	39
			Exit 319 at NC 210	Johnston	3	0	4	26	33
			Exit 303 at Jones Sausage Rd	Wake	2	2	0	14	18
Gap #11: Wallace to Wilmington	33	1	Exit 408 NC 210	Pender	3	2	0	58	63
			Exit 414 at SR 1002	New Hanover	1	0	0	48	49
			Exit 420B at U.S. 17	New Hanover	1	0	0	34	35
			Exit 398 at NC 53	Pender	0	0	0	7	7
			Exit 390 at U.S. 117	Pender	0	0	0	6	6

Table 23: I-40 Corridor CNG Site Analysis

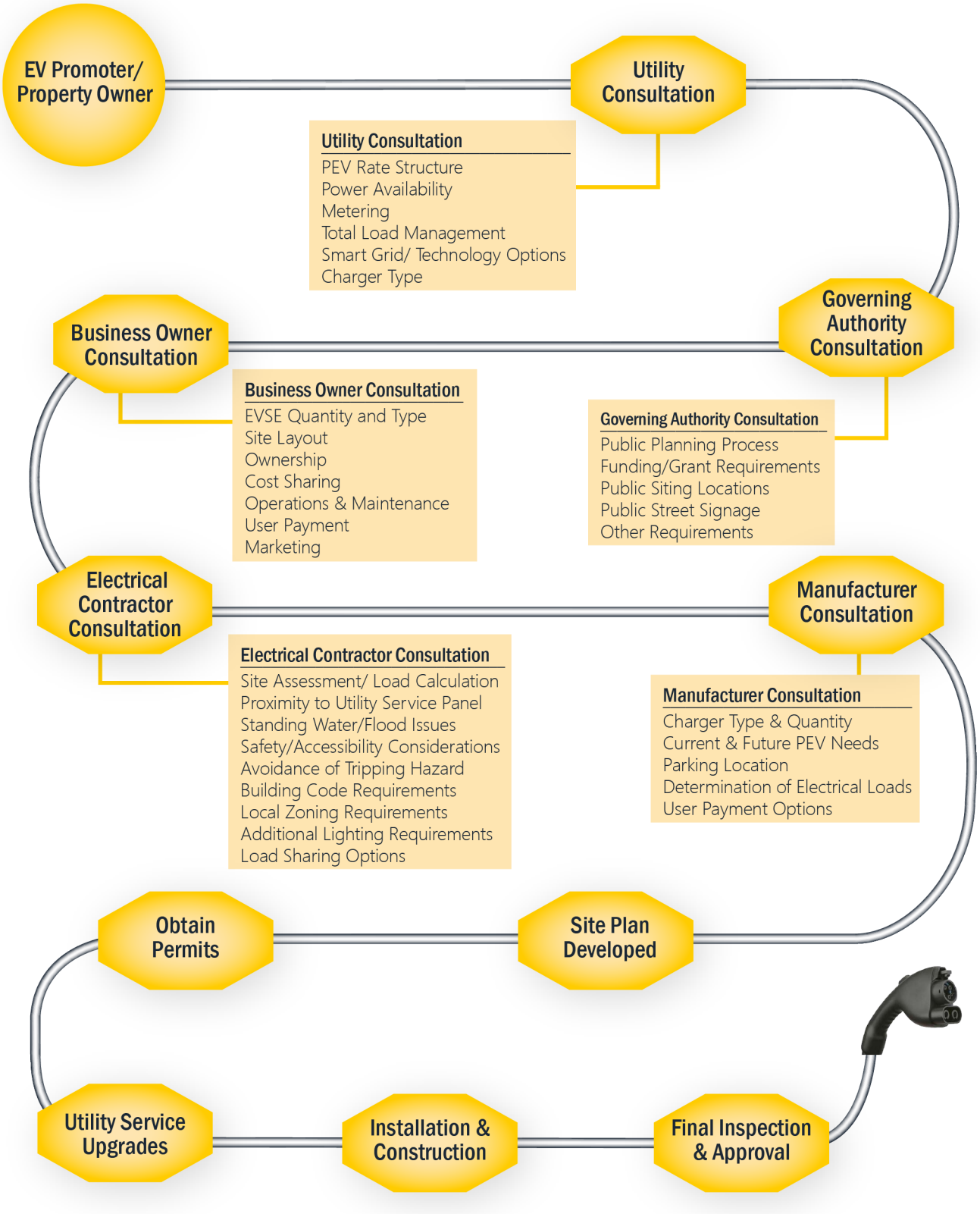
Corridor Gap	Total Gap Length (miles)	Stations Required for "Corridor-ready"	Potential Site Locations				Potential Anchor Fleets	
			Exit Number	County	Gas Stations	Truck Parking	Municipalities	Utility Companies
Gap #1: OK-AR State Line to Conway	125	1	Exit 12 at I-49	Crawford	9	1	Alma	Oklahoma Gas & Electric GE Oil & Gas
			Exit 83 at SR 124	Pope	5	3	Russellville Pottsville Dardanelle	Center Point Energy
			Exit 125 at U.S. 65	Faulkner	7	0	Conway	American Natural Gas Gulf Gas Station Oil & Natural Gas Conway Corporation
Gap #2: Memphis to Dickson	168	1	Exit 126B at SR 69	Benton	2	1	Yellow Springs Sugar Tree	Tennessee Valley Authority
			Exit 108-C at SR 22	Henderson	1	2	Parkers Crossroads Lexington	Meriwether Lewis Electric Co-Op
			Exit 85C at F. E. Wright Dr	Madison	1	2	Jackson Huntersville	Jackson Energy Authority Southwest Tennessee Electric
Gap #3: Nashville to Knoxville	171	1	Exit 320A at Genesis Rd	Cumberland	1	2	Crossville	South Cumberland Utility District
			Exit 288-A at SR 111	Putnam	1	1	Cookeville	Double Springs Utility District Old Gainesboro Rd Utility District
			Exit 300C at SR 24	Putnam	1	1	Monterey	West Cumberland Utility District
			Exit 258B at SR 53	Smith	1	1	Gordonsville	Middle TN Natural Gas Utility District South Side Utility District
Gap #4: Raleigh to Wilmington	117	1	Exit 362 at NC 24	Duplin	5	4	Duplin Clinton	Piedmont Natural Gas
			Exit 408 at NC 210	Pender	3	2	Rocky Point	Pender County Utilities
			Exit 420A at Gordon Rd	New Hanover	1	0	Wilmington	Wave Transit Duke Energy Waste Energies

Siting Considerations

While the data-based siting analysis provided a general overview of the availability of potential site hosts and exits with the highest potential site locations, there are a number of other factors that make a site ideal for an EV or CNG station. Characteristics of the site, such as parking availability, adequate lighting, access to on-demand assistance and security would likely attract more customers. It may also be preferable to locate stations in areas where the density of site options, amenities, and other establishments is higher. Amenities on and near the site, such as food services, restrooms, wi-fi, and entertainment were cited throughout the public engagement process as key amenities to prioritize when choosing a new site. An overview of all best practices collected during the engagement period can be found in Appendix B.

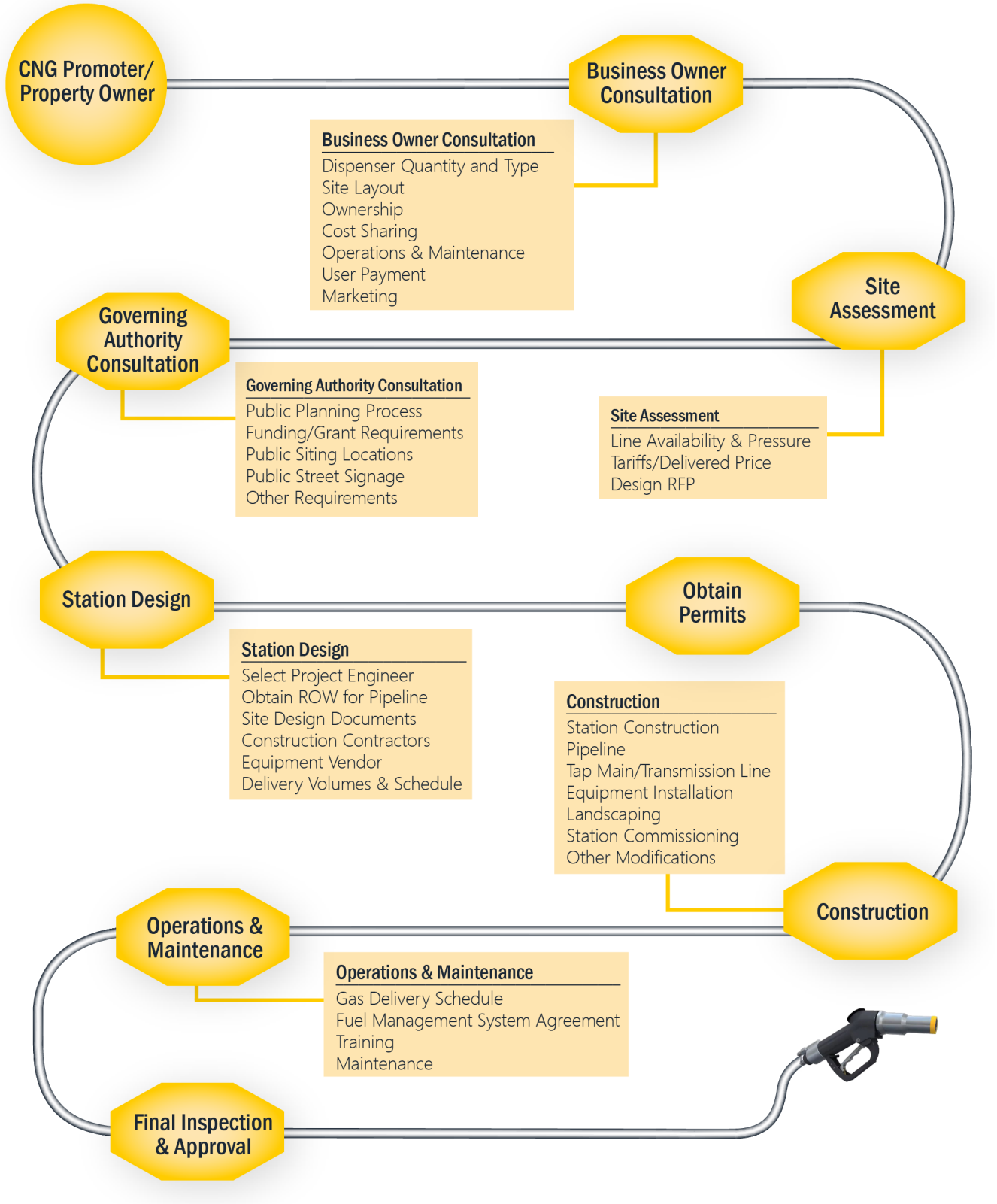
Before a project begins, there are a number of logistical considerations that must be evaluated with regard to the feasibility of a specific site location. Insufficient access to power, a gas line, or incompatible local governing regulations can stop a project before it begins, so it is important to consult with utilities, local permitting authorities, business owners, and contractors early in the process to avoid wasted time or fees. Figure 19 and Figure 20 provide a baseline of necessary considerations when implementing an EV or CNG station. Engagement efforts through this plan identified a need for resources to be available to potential site hosts and state governing authorities to advance the implementation of these stations. The figures below outline top business owner considerations and governing authority considerations. In addition, EV and CNG screening tools for these two groups are included in Appendix C, which can be circulated to advance implementation of stations.

Figure 19: EV Site Selection Considerations [25]



[25] *Plug-In Electric Vehicle Handbook for Public Charging Station Hosts*. National Renewable Energy Laboratory (NREL) and Alliance for Sustainable Energy, LLC, 2012.

Figure 20: CNG Site Selection Considerations [26]



[26] *CNG Infrastructure Guide for the Prospective CNG Developer.* Drive Natural Gas Initiative: America's Natural Gas Alliance

2.5. Site Host Attraction and Recruitment

General Requirements and Discussion

EV Host Recruitment

There are many benefits in becoming a site host for EV, and there are a variety of host types that make ideal candidates for a charger host, including retail stores, quick service dining, gas stations, parking garages, and utilities. Locating a station in an accessible downtown location can promote local economic benefits within historic centers along the I-40 corridor. Offering EV stations attracts and retains customers that drive PEVs. Consumers who prioritize environmentally friendly modes of transportation will likely be attracted to companies with similar environmental values. From a branding perspective, companies are able to share their "green" initiatives and could potentially use chargers for their personal fleets as well as for public use.

Charging station hosts can also generate revenue through their charging stations. In 2019, North Carolina's governor signed House Bill 329, which allows owners of electric vehicle recharging stations to resell electricity and exempts them from regulations as public utilities. If Tennessee and Arkansas were to consider similar regulatory changes, this could help incentivize more site hosts throughout the corridor. Most of Tennessee is served by TVA (and its local power companies) which is self-regulated and would require TVA board review and adoption for any policies relating to the resale of electricity. While electricity cannot be resold in Tennessee and Arkansas, revenue can still be generated by station owners by pay-for-parking or pay-by-time systems. Moreover, charging stations can provide for additional advertisement space targeting consumers waiting for the charge to finish. Site hosts can utilize space for advertisements about its own products or can sell space to other companies for that purpose.

CNG Host Recruitment

Knowing that the upfront capital costs of developing a CNG site can be a significant hurdle, public private partnerships (PPPs) can be an effective mechanism for consideration in constructing a CNG station. Successful PPPs typically involve municipal agencies partnering with private entities to accomplish mutually beneficial goals, which in this case could be the installation of CNG stations. As an example, public agencies could contribute land and/or commit to using a specific amount of natural gas. The private entities would then be responsible for installing the filling station and potentially the continued maintenance and operation of that station.

A common method for CNG station build-out involves a private company paying 100% to build, own, and operate a compressed natural gas fueling station in a preferred location if a fleet agrees to purchase a certain amount of fuel. The company may combine its fuel purchase with another fleet's to meet the minimum threshold for CNG. These stations are publicly accessible and accept CNG fuel cards, major credit cards, and fleet cards. Even with private companies pursuing installation independently, grant funding and tax incentives can be used to offset the cost of installing a natural gas filling station. Creating a station design prior to writing an RFP will allow for the comparison of bids on a cost-effective scale. Operations and maintenance plans should be included in the RFP and contract.

2.6. Signage

A key aspect of creating an alternative fuels network is creating consistent signage for all existing stations, providing easy wayfinding for drivers along high-volume corridors looking to refuel or recharge. The standards for signing alternative fuel corridors and station locations are defined in FHWA's *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD).

In a 2016[27] memorandum, FHWA approved the alternative fuel corridor signage that can be applied to designated, corridor-ready routes only on post-mounted roadside installations. Since I-40 is a route with speeds greater than 45 mph, the minimum placement between Alternative Fuel Corridor signs and any other traffic control signs is 500 feet. Posts will include the "Alternative Fuel Corridor" (D18-1) sign, with applicable available fuels below. When a segment of I-40 is corridor-ready for both CNG and/or EV, the sign could include the CNG (09-11a) and/or EV (09-11 b Alternate) symbols. The Clean Cities Coalitions are currently working with their respective DOTs on AFC identification signage. Those signage recommendations will be reviewed individually by each state DOT prior to adoption. In Tennessee, signage will require TDOT approval and a rulemaking change to the State code before signage can be installed on Tennessee roads. Additional wayfinding signage will be needed to help drivers find the stations when they have exited the interstate.

Figure 21: Example MUTCD Signage

Illustration of Corridor-Ready MUTCD Signage along I-40.

Efforts to advertise stations should be made in concert with the implementation of EV and CNG stations across the corridor to increase public awareness of and demand for stations. Coordination with state and local tourism agencies is encouraged to promote advertising of stations to those traveling along the corridor. Informational materials, such as pamphlets and brochures, can be distributed at public properties, including rest areas, welcome centers, and civic buildings.

[27] https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/resources/mutcd122116.pdf

Chapter 3: Recommendations

3.1. Continued Collaboration

Future collaboration among partners will be key to ensure the continued and successful implementation of EV and CNG infrastructure along the I-40 corridor. In addition to highlighting regional best practices, other strategies can be used to enhance future collaboration. Efforts should be made to maintain relationships among agencies and organizations that were represented in the project management committee.

Continued collaboration among stakeholders is necessary to maintain the momentum needed to implement CNG and EV infrastructure. Regional groups, such as the Southeastern Corridor Council, can provide up-to-date resources and information that can be distributed across the corridor and can maintain engagement and points of contact for various agencies.

3.2. Next Steps and Action Plan

Going forward, this Deployment Plan will be used as a tool for future implementation of EV DCFC and CNG refueling stations. Information gathered through the stakeholder engagement process and expertise of the management committee provided insight on the progress of infrastructure deployment in Tennessee, North Carolina, and Arkansas, as well as opportunities for the future. The following recommendations (Table 24) will help advance refueling and recharging infrastructure networks along I-40 in the southeast.

Table 24: Key Recommendations

Key Recommendation	Time Frame	Partners
State and other public agencies across the corridor should collaborate to ensure that funding opportunities for EV and CNG infrastructure are communicated widely and requirements for use of funds is clear.	Ongoing	State DOTs State Environmental Departments MPOs/RPOs TVA
Funding providers should continue to explore outreach opportunities with local utilities and ensure public funding information is shared at a statewide level.	Ongoing	Southeast Corridor Council State DOTs Clean Cities Coalitions Local Utility Providers Local Electric Cooperatives MPOs/RPOs
State officials and local governments should identify all companies potentially interested in hosting EV or CNG infrastructure and develop programs to support business to business partnerships.	Ongoing	State DOTs Southeast Corridor Council Clean Cities Coalitions Local Utility Providers Local Electric Cooperatives MPOs/RPOs
Funding partners should consider making station repairs and replacements eligible activities within existing and future funding opportunities.	FY 2021	State DOTs State Environmental Departments Clean Cities Coalitions TVA
State leadership should pursue opportunities to guide and educate the public and local governments on the availability of alternative fuel sources to help promote public knowledge and adoption of alternative fuel vehicles in the region.	FY 2021	State DOTs State Tourism Departments Clean Cities Coalitions Local Utility Providers Local Electric Cooperatives MPOs/RPOs

Appendix A: Regional Stakeholder Meeting Attendees

East Tennessee Stakeholder Meeting: April 24, 2020

Kwabena Aboagye
Shauna Basques
Tim Begley
Brianna Benson
Rachael Bergmann
Glenn Berry
Mary Butler
Jasmine Champion
Michelle Christian
Mike Conger
Rich Desgroseilliers
Rachel Durham
Bill Eaker
Troy Ebbertt
Preston Elliot
Kayla Ferguson
Drew Frye
Heather Hildebrandt
John Houghton
Casey Langford
Craig Luebke
Jennifer Marshall
David Murphy
Andrea Noel
Jonathan Overly
Lesley Phillips
Virginia Porta
Scott Pouder
Lia Prince
Brad Rains
Caitlin Rose
Ronda Sawyer
Mike Scarpino
Ronald Snodgrass
Patti Springs
Ryan Stanton
Susan Steffenhagen
Diane Turchetta
Alexa Voytek
Elizabeth Watkins

North Carolina Stakeholder Meeting: June 8, 2020

Bill Albright
Robin Barrows
Shauna Basques
Joe Baum
Brianna Benson
Glenn Berry
Libby Bittman
Jacob Bolin
Michelle Christian
Stan Cross
Rachel Durham
Bill Eaker
Dave Erb
Evan Fitzgerald
Gary Fottrell
David Frescatore
Drew Frye
Kayla Ferguson
Elizabeth Gantt
Chip Gifford
Keith Gindoff
Nicole Hill
Rich Hoffman
John Houghton
Whit Johnson
Don Kiel
Claire Kubitschek
Casey Langford
David Lee
Ian MacDonald
Jennifer Marshall
Lee McElrath
Chase Milner
Stacy Morrison
David Nestor
Sean Parker
Lesley Phillips
Brian Phillips
Lisa Poger
Scott Pouder
Marshall Rand
Mike Riley
Ronda Sawyer
Mike Scarpino
Whitney Schmidt
Patti Springs
Ryan Stanton
Susan Steffenhagen
Diane Turchetta
Brandon Von
Dave Willis
Keith Wingler

Middle/West Tennessee Stakeholder Meeting: June 23, 2020

Raymond Barnes
Shauna Basques
Brianna Benson
Mike Billingsby
Jasmine Champion
Sara Davenport
Andrew Dick
Brent Dillahunty
Rachel Durham
Kayla Ferguson
Mark Finlay
Gwyn Fisher
Gary Fottrell
Drew Frye
Lizzy Gaviria
Jeff Graves
Jimmy Gregory
Daniel Hall
Carl Haney
John Hatfield
Antoine Hawkins
Nicole Hill
John Houghton
Casey Langford
Brett Lashlee
Jennifer Marshall
Shelton Merrell
Mike Montgomery
Stacy Morrison
Loyd Muncy
Melanie Murphy
Mike Nelson
Jonathan Overly
Scott Owens
Ashley Owens
Sean Pfalzer
Stanley Pilant
Virginia Porta
Scott Pouder
Ian Preston
Brad Rains
Jonathan Russell
Mike Scarpino
Brian Smith
Patti Springs
Ryan Stanton
Susan Steffenhagen
Matt Stennett
Tim Suddoth
Michael Taylor
Jacob Thompson
Alexa Voytek
Brent Warf
Pete Westerholm
Becky Williamson
Shana Woods
Kelley Zamboni

Arkansas Stakeholder Meeting: June 25, 2020

Brianna Benson
Bryan Berry
Reese Brewer
Jennah Denney
Rachel Durham
John Fetherston
Gary Fottrell
Kayla Ferguson
Blake Gary
Antoine Hawkins
Nicole Hill
Vivien Hoang
John Houghton
Robert Knott Jr
Jeff Laney
Chris Lutick
Jennifer Marshall
Drew Masters
Jonathan Overly
Ashley Owens
Brad Petersen
Virginia Porta
Scott Pouder
Mitch Ross
John Schafer
Sarah Sheets
Keith Smallwood
Patti Springs
Peter Staebell
Ryan Stanton
Susan Steffenhagen
Jeff Thigpen
Jacob Thompson
John Ware
Michael Willems
Blake Woodward

Appendix B: Engagement Overview

Online Engagement Survey

Survey Questions

1. In which State is your organization or agency located?

   □ Arkansas □ North Carolina □ Tennessee

2. Which best describes your organization?
   a. DOT
   b. MPO
   c. Utility
   d. Non-Profit
   e. COG/Development District
   f. Clean Cities/Fuels Coalition
   g. Other (Please Specify)

3. How is your State and its utilities currently planning for deployment of CNG refueling and/or EVSE stations? [multiple boxes - 4]
4. What do you see as the biggest barriers in your State to implementing a CNG alternative fuels network?

	Not a Barrier	Somewhat of a Barrier	Moderate Barrier	Significant Barrier
Demand for CNG Vehicles	□	□	□	□
Funding for Implementation	□	□	□	□
Public-Private Incentives	□	□	□	□
Site Host Recruitment	□	□	□	□
Site Location Selection	□	□	□	□
Utility Infrastructure: Provision of Service	□	□	□	□
State Willingness to Promote Implementation	□	□	□	□
Adequate Public Signage	□	□	□	□
Equipment Maintenance Procedures	□	□	□	□
Perception of Range Anxiety by General Public	□	□	□	□
Lack of Education to General Public	□	□	□	□
Other: _____	□	□	□	□

5. What do you see as the biggest barriers in your State to implementing an EVSE alternative fuels network?

	Not a Barrier	Somewhat of a Barrier	Moderate Barrier	Significant Barrier
Demand for EV Vehicles	□	□	□	□
Funding for Implementation	□	□	□	□
Public-Private Incentives	□	□	□	□
Site Host Recruitment	□	□	□	□
Site Location Selection	□	□	□	□
Utility Infrastructure: Provision of Service	□	□	□	□
State Willingness to Promote Implementation	□	□	□	□
Adequate Public Signage	□	□	□	□
Equipment Maintenance Procedures	□	□	□	□
Perception of Range Anxiety by General Public	□	□	□	□
Lack of Education to General Public	□	□	□	□
Other: _____	□	□	□	□

6. How is your State addressing barriers to CNG refueling and/or EVSE infrastructure development and implementation? [multiple boxes - 4]
7. In your opinion, what are the principal reasons people in your State decide to switch to a CNG and/or electric vehicle? Select all that apply:
   - □ Energy Independence
   - □ Financial Savings
   - □ Environmental Impact Reduction
   - □ Vehicle Performance
   - □ Local or State Goal Initiative
   - □ Other (Specify)
8. What are the primary mechanisms by which your State is creating awareness for the CNG refueling and/or EVSE infrastructure network?
9. Has your organization recently conducted any surveys or research on CNG and/or EV implementation strategies?

10. How would you rate your State's overall efforts on deployment of alternative fuel networks?

	Very Satisfied	Satisfied	Neither Satisfied nor Dissatisfied	Unsatisfied	Very Unsatisfied
CNG Infrastructure	□	□	□	□	□
EVSE Infrastructure	□	□	□	□	□

11. Which, if any, organizations or agencies have you partnered with that successfully promoted implementation of EVSE and/or CNG refueling stations in your area?
12. How would you rate your organization's communication and ability to partner with other organizations and/or state or national efforts on the advancement of alternative fuels in your area?

	Very Satisfied	Satisfied	Neither Satisfied nor Dissatisfied	Unsatisfied	Very Unsatisfied
CNG Infrastructure	□	□	□	□	□
EVSE Infrastructure	□	□	□	□	□

13. Are there any fleets (public or private) in your area that have successfully switched to EV or CNG vehicles?
14. In your opinion, how would you rate the availability and quality of <u>public</u> charging and refueling stations along the I-40 corridor in your State?

	Very Satisfied	Satisfied	Neither Satisfied nor Dissatisfied	Unsatisfied	Very Unsatisfied
CNG Infrastructure	□	□	□	□	□
EVSE Infrastructure	□	□	□	□	□

15. Please feel free to share any additional comments you may have on this topic that we may have missed and/or that you think would be value in knowing as we develop the I-40 Corridor Alternative Fuels Deployment Plan.

Survey Results and Conclusions

- The majority of respondents (69% and 48 total) were from Tennessee.
- The majority of respondents (42%) identified as utilities.
- Seven respondents identified themselves as local representatives (MPO and County Governments).
- Barriers Identified by Respondents

	Utility Representatives *(21 Total Respondents)*	Local Representatives *(7 Total Respondents)*
Top CNG Barriers	1. Funding (62%) 2. Demand for CNG Vehicles (50%) 3. Lack of Education to General Public (36%)	1. Funding (63%) 2. Lack of Public Education (43%) 3. Perception of Range Anxiety by General Public (43%)
Least Significant CNG Barriers	1. Utility Infrastructure/ Service Provisions (46%) 2. Range Anxiety (38%) 3. Adequate Public Signage (38%)	1. State Willingness to Promote Implementation (67%) 2. Adequate Public Signage (50%) 3. Site Location Selection (33%)
Top EV Barriers	1. Funding for Implementation (62%) 2. Lack of Education to General Public (61%) 3. Perception of Range Anxiety by General Public (44%)	1. Funding for Implementation (50%) 2. Lack of Education to General Public (29%) 3. Perception of Range Anxiety by General Public (29%)
Least Significant EV Barriers	1. Adequate Public Signage (47%) 2. Utility Infrastructure/ Service Provisions (38%) 3. State Willingness to Promote Implementation (28%)	1. State Willingness to Promote Implementation (50%) 2. Adequate Public Signage (50%) 3. Site Host Recruitment (33%) 4. Site Host Selection (33%)

- Open Comments Received:
  - "*There are many stakeholder groups involved in planning and deployment conversations. Primarily these include- Plug-in NC, utility programs (Duke Pilot Filing and NC Electric Cooperative's Rural Electrification Network), Conversations with NCDOT surrounding the ZEV plan and infrastructure support.*"
  - *"I think there is enough funding out there, we just need a coordinated plan and enough high level support (state) to go sell site hosts on installing DC FC"*
- Partners Identified in the Region:
  - *Tesla, ChargePoint, Tennessee Gas Association, TVA, Drive Electric TN, East TN Clean Fuels, Seven States Power Corporation, TVA, TDEC, Entergy eTech, Today's Power Inc, Ozarks Electric Cooperative, Ouachita Electric Cooperative, East TN Clean Fuels Coalition, Clean Cities, Piedmont Natural Gas, PlugIn NC, Land of Sky, Advanced Energy, Arkansas DEQ, NC Clean Energy Tech Center (CFAT grant), Nissan, Brightfield, ETCFC, Local Power Companies*

Stakeholder Meeting Engagement Highlights

Meeting	Needs	Funding	Best Practices
East Tennessee Stakeholder Meeting: April 24, 2020	- The biggest challenge (per TDEC) is finding good site hosts. - Accelerating implementation of infrastructure is a high priority	- The next round of VW funding will look to address other issues (e.g., availability of chargers to multi-family residential).	NA
North Carolina Stakeholder Meeting: June 8, 2020	- Wayfinding/signage is unreliable at this time along I-40. - More coordination is needed near state line.	- Funds are generally unavailable to be used at the same location twice (e.g., replacing batteries at the end of their usable life). - There is a need to encourage funding organizations to include replacement batteries. - North Carolina's General Assembly doesn't realize that incentives are a big motivator and therefore doesn't have plans to introduce any incentives in the near future. - NC has experience in reaching out to local governments to spearhead educational efforts when funding becomes available	- Corporate deals have proven to work best, such as Walmart and EA. - This can allow for implementation of stations at multiple locations with one contract. - Most successful site hosts are sustainably minded businesses that are motivated by environmental causes and branding that complements business (not revenue).
Middle/West Tennessee Stakeholder Meeting: June 23, 2020	- Hosts must proactively plan for maintaining stations after vendor's maintenance contract expires. - The biggest barrier (per TVA) in host recruitment is articulating benefits of adding charging stations. - Consideration of freight vehicles and availability of funding to them for EV and CNG is missing from discussion. - Communication/linkage between state officials and local stakeholders must be strengthened based on general discussion from local stakeholders (Jackson Energy Authority) interested in stations but where unsure of funding source. - Private station developers need to make large scale stations more attractive to potential CNG anchor fleets	- TVA is reviewing policies regarding reselling electricity and EV charging rates. - Per TDEC, several funding sources will be available soon for CNG, especially heavy-duty vehicles. - The upcoming surface transportation bill may include opportunities specifically related to competitive grant programs for alternative fuels.	- Love's is adding charging stations in states where there are incentives. - Document coming out soon (by TVA) on what makes a good site host and questions to ask (likely related to Drive Electric TN).
Arkansas Stakeholder Meeting: June 25, 2020	- The struggle is to gain momentum for EV along interstate corridors aside from large travel stops. - Educational efforts are needed to encourage CNG station momentum in particular. - Level 2 rebate program and DCFC RFP still in internal review process, limiting funding availability. - There was general discussion from local stakeholders that they need to identify more funding sources and information.	- Capital requirements are the biggest hurdle in implementation. - CMAQ funding is not available for emissions reductions for most areas. - State funding is available for CNG conversions, though demand is low.	- Site selection for EV should be in area of high cross traffic, data-supported, and close to traveling amenities such as restaurants

Appendix C: Site Host Screening Tools

EV Business Owner Considerations: Checklist

EVSE Quantity and Type

Is power for EVSE currently available for your site? ☐ Yes (*Provider:* _____) ☐ No
Does the site have adequate cell/internet service? ☐ Yes (*Provider:* _____) ☐ No

Type of EVSE Charging Port (*select all that apply and complete corresponding information*)

Type		# of Charging Ports	Input Power (VAC)	Output Power		Manufacturer & Model
				kW	Charging Range	
Level 1	☐ Nema 515 ☐ Nema 520				_____ miles range/ hour	
Level 2	☐ SAE J1772				_____ miles range/ hour	
DCFC	☐ CHAdeMO ☐ SAE Combo CCS				_____ miles range/ hour	

Charging Ports Type: ☐ Pedestal ☐ Wall Mount ☐ NA Number of Cables per Unit: _____
Length of Cables (*feet*): _____ Cable Type: ☐ Coil ☐ Cable ☐ Retractable
"Smart" Charger Capabilities: ☐ Remote Monitoring ☐ Two-way Communications with Utility Provider

Site Layout

Total Number of Parking Spots: _____ ☐ Lighting ☐ Roof Canopy/Overhead Cover
☐ No Roof Coverage ☐ ADA Accessible ☐ Indoor Facility ☐ Ventilation (*If indoor facility*)

Ownership

Charging Network: ☐ Networked Charger (*Complete Below*) ☐ Non-Networked, Stand-Alone Charger
Network: _____ Monthly/Annual Fees: _____

Cost Sharing

Provide a brief overview of all partners involved and individual funding responsibilities. _____

_____

Operations and Maintenance Responsibilities

Maintenance Plan: ☐ Manufacturer's Warranty (_____ years) ☐ Network Maintenance Plan (_____ years)
Who will monitor ongoing conditions/maintenance at the site? ☐ Network Administrator ☐ Other: _____
Customer Support: *Phone* _____ *Days/Hours Available* _____

User Payment for Service

Payment Options: ☐ Open Access & Will Accept Universal Payments ☐ Subscription-Only Access
Metering/Payment: ☐ Priced by Energy Used ☐ Priced by Time Charging ☐ Flat Per-Session Fee

Marketing

How will you publicize your station? _____

For assistance in completing this checklist, please reach out to your state's DOT contacts for EV implementation.
TDOT: Air Quality Planning Office ArDOT: Division of Environmental Quality NCDOT: Transportation Planning Division

CNG Business Owner Considerations: Checklist

CNG Refueling Equipment Quantity and Type

Does the site have sufficient access to a gas line? ☐ Yes (*List provider below)* ☐ No

Natural Gas Utility Provider: _____ Available Pressure *(PSI)* _____

Maximum Flow Capacity Required *(scfm)* _____Natural Gas Engine Maximum Fuel Consumption *(scfm)* _____

CNG Station Fill Types (*select all that apply and complete corresponding information)*

Type	# of Dispensers	Compressor Count / Capacity	Storage Tank Count / Capacity
☐ Time-fill		_____ / _____CFM	_____ / _____CFM
☐ Fast-fill		_____ / _____CFM	_____ / _____CFM
☐ Combination *(Time-fill and Fast-fill)*		_____ / _____CFM	_____ / _____CFM

Accessibility: ☐ Passenger Vehicles (class 1-2) ☐ Medium Duty (class 3-5) ☐ Heavy-duty (class 6-8)

User Type: ☐ Fleet (*complete below)* ☐ Retail/ On-Demand ☐ Retail and Fleet (*complete below)*

Anchor Fleet Details: Fleet Name _____ Total Fleet Size _____

Types of Vehicles in Fleet _____ Overnight Fleet Storage? ☐ Yes ☐ No

Vehicle Refuels: ☐ Daily ☐ Every _____ day(s) Maximum Miles Driven per Day/Shift (*miles*): _____

Site Layout

Facility Type: ☐ Utility ☐ Standalone CNG Station ☐ Truck Stop/Gas Station ☐ Other

Total Number of Retail Parking Spots: _____ Total Number of Fleet Parking Spots: _____

☐ Overhead Shelter from Elements ☐ No Roof Coverage ☐ ADA Accessible

Ownership

Owner Type: ☐ Private ☐ Utility ☐ Local/Municipal Government

Owner: _____ *Operations/Maintenance provided by:* _____

Cost Sharing

Provide a brief overview of all partners involved and individual funding responsibilities. _____

_____

Operations and Maintenance Responsibilities

Maintenance Plan: ☐ Manufacturer's Warranty (_____ years) ☐ Third-Party Maintenance Plan (_____ years)

*Who will monitor ongoing conditions/maintenance at the site?*_____

Customer Support: *Phone* _____ *Days/Hours Available* _____

User Payment for Service

Payment Options: ☐ Public- Card Only ☐ Subscription-Only Access

Days/ Hours of Operation: _____

Marketing

How will you publicize your station? _____

For assistance in completing this checklist, please reach out to your state's DOT contacts for EV implementation.
TDOT: Air Quality Planning Office ArDOT: Division of Environmental Quality NCDOT: Transportation Planning Division

EV Governing Authority Considerations: Checklist

Public Planning

Site Host _____

Address _____ County _____

Contact Person Name _____ Phone _____

Email _____ Municipality _____

Closest Alternative Fuel Corridor: _____ Closest Exit (Number) _____

AFC Status: ☐ Corridor-Ready ☐ Corridor-Pending ☐ NA

Closest AFC Corridor-Ready Station (*Name and City*) _____

Funding/Grant Requirements

Sources Available: Planning, Design, Construction

Type	*Source*	*Amount*
☐ Federal	_____	_____
☐ State	_____	_____
☐ Local	_____	_____
☐ Other	_____	_____

Sources Available: Operations and Maintenance

Type	*Source*	*Amount*
☐ Federal	_____	_____
☐ State	_____	_____
☐ Local	_____	_____
☐ Other	_____	_____

Public Siting Locations

Site Amenities (check as many as apply)

☐ Host is a Retail Establishment with Sitting Area ☐ Public Bathrooms ☐ Sufficient Lighting

☐ High Cross Traffic ☐ Quick Service Dining/ Coffee Shops (*Number of Establishments:* _____)

☐ Nearby Retail Corporations with Known EV Partnerships: _____

☐ Nearby Retail Corporations with Environmental Branding/PR: _____

Public Street Signage

☐ AFC (D18-1 and 09-11b) Signs Installed ☐ AFC (D18-1 and 09-11b) Signs Needed

Other Requirements

Is power for EVSE currently available at site? ☐ Yes (*Provider:* _____) ☐ No

Does the site have adequate cell/internet service? ☐ Yes (*Provider:* _____) ☐ No

Is there space for future expansion? ☐ Yes (*Approximate Area ft^2)* _____) ☐ No

Governing Municipality: _____ Permit Cost: _____

Time Frame for Approval: _____ Applicable Zoning Laws: _____

For assistance in completing this checklist, please reach out to your state's DOT contacts for EV implementation.

TDOT: Air Quality Planning Office ArDOT: Division of Environmental Quality NCDOT: Transportation Planning Division

CNG Governing Authority Considerations: Checklist

Public Planning

Business Name _____

Address _____ County _____

Contact Person Name _____ Phone _____

Email _____ Municipality _____

Closest Alternative Fuel Corridor: _____ Closest Exit (Number) _____

AFC Status: ☐ Corridor-Ready ☐ Corridor-Pending ☐ NA

Closest AFC Corridor-Ready Station (*Name and City*) _____

Funding/Grant Requirements

Sources Available: Planning, Design, Construction

Type	*Source*	*Amount*
☐ Federal	_____	_____
☐ State	_____	_____
☐ Local	_____	_____
☐ Other	_____	_____

Sources Available: Operations and Maintenance

Type	*Source*	*Amount*
☐ Federal	_____	_____
☐ State	_____	_____
☐ Local	_____	_____
☐ Other	_____	_____

Public Siting Locations

Anchor Fleet Details: Fleet Name _____ Total Fleet Size _____

Types of Vehicles in Fleet _____ Overnight Fleet Storage? ☐ Yes ☐ No

Vehicle Refuels: ☐ Daily ☐ Every _____ day(s) Maximum Miles Driven per Day/Shift (*miles*): _____

Site Amenities (check as many as apply)

☐ Host is a Retail Establishment with Sitting Area ☐ Public Bathrooms ☐ Sufficient Lighting

☐ High Cross Traffic ☐ Quick Service Dining/ Coffee Shops (*Number of Establishments:* _____)

☐ Nearby Retail Corporations with Known CNG Partnerships: _____

☐ Nearby Retail Corporations with Environmental Branding/PR: _____

Public Street Signage

☐ AFC (D18-1 and 09-11a) Signs Installed ☐ AFC (D18-1 and 09-11a) Signs Needed

Other Requirements

Does the site have sufficient access to a gas line? ☐ Yes (*List provider below)* ☐ No

Natural Gas Utility Provider: _____ Available Pressure (*PSI*) _____

Maximum Flow Capacity Required (*scfm*) _____ Natural Gas Engine Maximum Fuel Consumption (*scfm*) _____

Fire Authority _____ Permitting Authority: _____

Permit Cost: _____ Time Frame for Approval: _____

For assistance in completing this checklist, please reach out to your state's DOT contacts for EV implementation.
TDOT: Air Quality Planning Office ArDOT: Division of Environmental Quality NCDOT: Transportation Planning Division