The National Academies of
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TRANSPORTATION RESEARCH BOARD

Straight to Recording for All:

The Alternative Fuels Corridor Program

The Alternative Fuels Corridor Program

Diane Turchetta

Matthew Goetz

Tim Sexton

Kevin Black (moderator)

Sponsored by TRB Committee ADC20

Transportation and Air Quality

The Alternative Fuels Corridor Program

- The Alternative Fuels Corridor (AFC) Program is a Federal Highway Administration (FHWA) program established to promote alternative fuels other than the conventional gasoline and diesel fuels used by most highway vehicles today
- It was established by the Fixing America's Surface Transportation (FAST) Act legislation to promote alternative, cleaner fuels and infrastructure including electric vehicle charging stations and hydrogen, propane, and natural gas fuels in designated fueling corridors
- This program will help in reducing the pollution generated by conventional fueled vehicles as alternatively-fuel vehicles fleets replace aging gasoline and diesel vehicles

The Alternative Fuels Corridor Program

- Today’s webinar will feature three panel members providing three different perspectives of the AFC Program
- First we will hear from Ms. Diane Turchetta who is the Program Manager for the AFC Program at FHWA
- Next we will hear from Mr. Matthew Goetz with the Georgetown Climate Center who will provide a regional perspective
- And our final presenter will be Mr. Tim Sexton who is with the Minnesota Department of Transportation and who will provide a State DOT perspective on the program in Minnesota

The Alternative Fuels Corridor Program

- Diane Turchetta is a Transportation Specialist in FHWA's Office of Natural Environment (HEPN), and primarily works on transportation and sustainability issues. Diane has been with FHWA for 18 years in various positions working on a variety of transportation-related air quality matters including energy use, alternative fuels and freight emissions. She holds a Bachelor of Science degree in Public Administration from the Pennsylvania State University and a Masters Degree in Public Administration from Virginia Polytechnic Institute and State University. Before joining the U.S. DOT, Diane worked at the U.S. Environmental Protection Agency on fuel-related issues
- The following slide illustrates the Alternative Fuels Corridor Program Diane will discuss

National Alternative Fuel Corridors

To improve the mobility of alternative fuel vehicles, the U.S. Department of Transportation (DOT) has designated national corridors in strategic locations along major highways for:

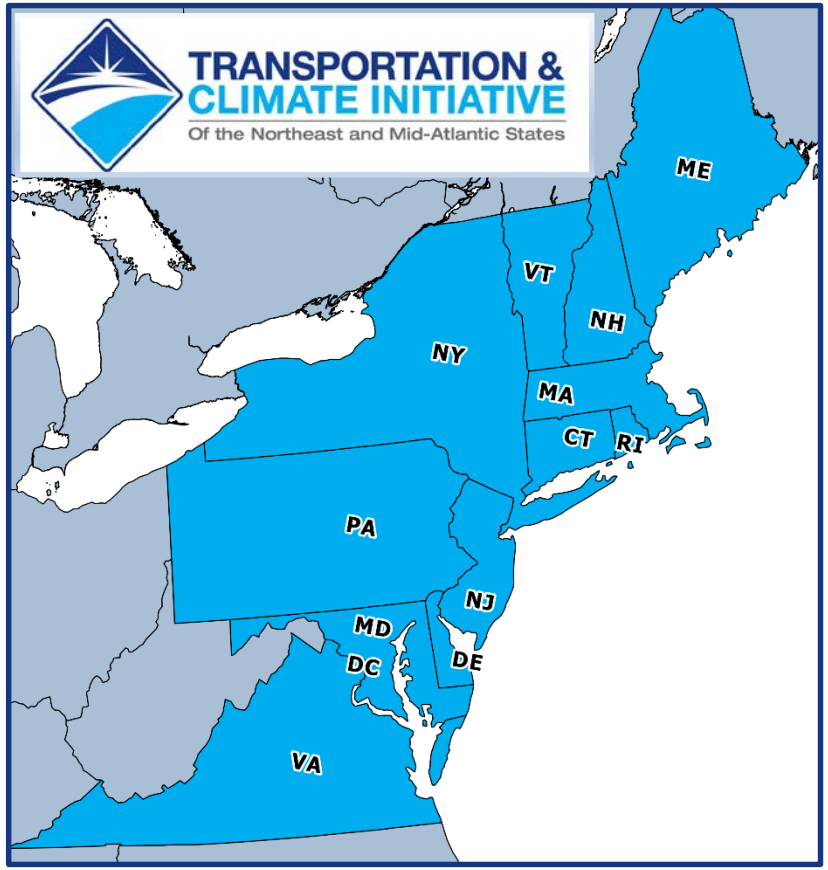
- Plug-in electric vehicle charging
- Hydrogen fueling
- Propane (LPG) fueling
- Natural gas (CNG, LNG) fueling

The Alternative Fuels Corridor Program

- Matthew Goetz is the Electric Vehicle Program Manager at the Georgetown Climate Center, where he coordinates the Climate Center's electric vehicle policy research and facilitates the Transportation and Climate Initiative clean vehicles workgroup--a collaboration of agency staff from 12 northeast states. Matthew conducts legal and regulatory analysis with a focus on State and national policies to support electric vehicles, regional electric vehicle corridor planning, the intersection of electric vehicles with shared and automated mobility, and electric utility regulation
- The next slide provides an illustration of Matthew's presentation on specific corridors in the mid-Atlantic and Northeast

Transportation and Climate Initiative
Regional EV Corridor Planning & Analysis

- Analysis to inform EV Fast Charging infrastructure planning along corridors
- Share best practices and technical expertise
- Engage with other jurisdictions and key stakeholders
- Identify opportunities for regional planning and coordination



The Alternative Fuels Corridor Program

- Tim Sexton has worked on transportation air quality, energy, and climate policy since 2006 for state DOTs in Washington and Minnesota and was recently appointed as the first Chief Sustainability Officer for the Minnesota Department of Transportation. He is a frequent collaborator on national policy and research efforts and is currently chair of TRB's Committee on Transportation Sustainability (ADD40) and serves on steering committees for AASHTO's Committee of Environment and Sustainability and Committee on Transportation System Security and Resilience. Tim has a BA in Anthropology, MS in Urban and Regional Planning, and MPH in Environmental Health from the University of Iowa
- The following slide provides some detail of the issues Tim will be covering on the identified corridors in the upper Midwest States and specifically in Minnesota

I-94 Great Lakes Corridor

1. Minnesota
2. Wisconsin
3. Illinois
4. Indiana
5. Michigan
6. City of Detroit

Tech Support - NREL and Argonne

Other support/partners – Clean Cities, OEMs, others…

The Alternative Fuels Corridor Program

- Thank you for attending our webinar and you interest in the TRB Webinar Series, and if you'd further information about today's topic, please contact any of our presenters at their email addresses listed below.
- Diane Turchetta (Diane.Turchetta@dot.gov)
- Matthew Goetz (goetz@georgetown.edu)
- Tim Sexton (timothy.sexton@state.mn.us)
- Kevin Black (Kevin.Black@dot.gov)

Alternative Fuel Corridors

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DIANE TURCHETTA | U.S. DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation
Federal Highway Administration

National Alternative Fuel Corridors

To improve the mobility of alternative fuel vehicles, the U.S. Department of Transportation (DOT) has designated national corridors in strategic locations along major highways for:

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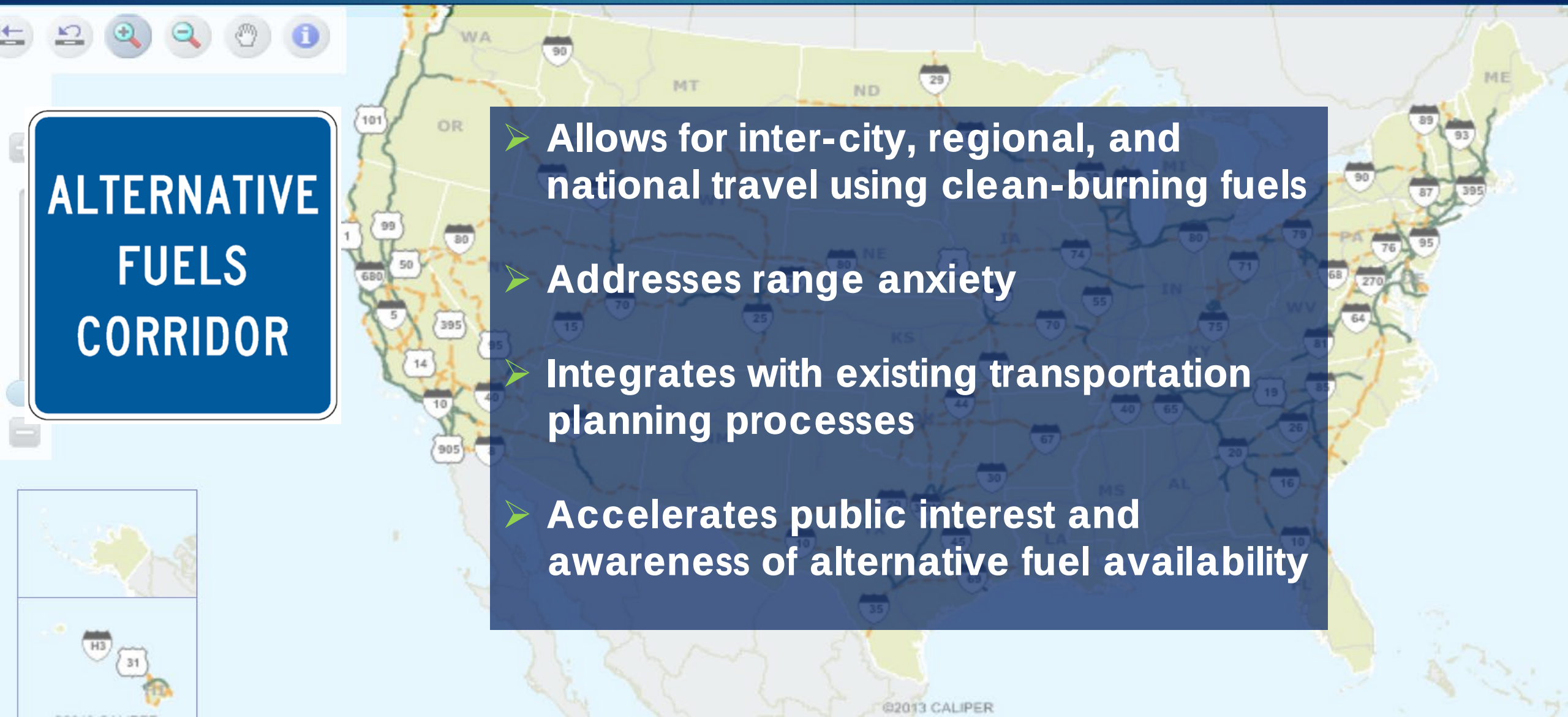
Benefits of a National System



- Allows for inter-city, regional, and national travel using clean-burning fuels
- Addresses range anxiety
- Integrates with existing transportation planning processes
- Accelerates public interest and awareness of alternative fuel availability

Combined Results

- Designations….
  - **58** nominations
  - Includes portions/segments of **84** Interstates, along with **43** US highways/state roads
  - Comprise **44 states plus D.C.**
  - Covers **over 100,000** miles of the National Highway System (all fuels combined)

Corridor-Ready Criteria

EV	CNG	LNG	Hydrogen	Propane
DCFC only	150 miles between stations	200 miles between stations	100 miles between stations	150 miles between stations
50 miles between stations	5 miles from highway	5 miles from highway	5 miles from highway	5 miles from highway
5 miles from highway	Public stations only	Public stations only	Public stations only	Public stations only
Public stations only *(no Tesla)*	Fast fill, 3,600 psi			Primary stations only

FY 2018 Request for Nominations

- Anticipate issuing Round 3 request for nominations in October 2018
- Distributed through FHWA Division Offices
- Nominations due the end of January 2019
- Designations made in spring 2019
- No anticipated change in designation criteria
- Some changes in shapefile submissions

Highway Signage

- **MUTCD Memorandum – Signing for Designated Corridors**
  - ✓ Provides guidance to State DOTs
  - ✓ First corridor signs installed on I-94 and I-26
  - ✓ FHWA developed FAQs to address commonly asked questions (see AFC website)

I-26 (South Carolina)

I-94 (Minnesota)

Regional Alternative Fuel Corridor Convening's

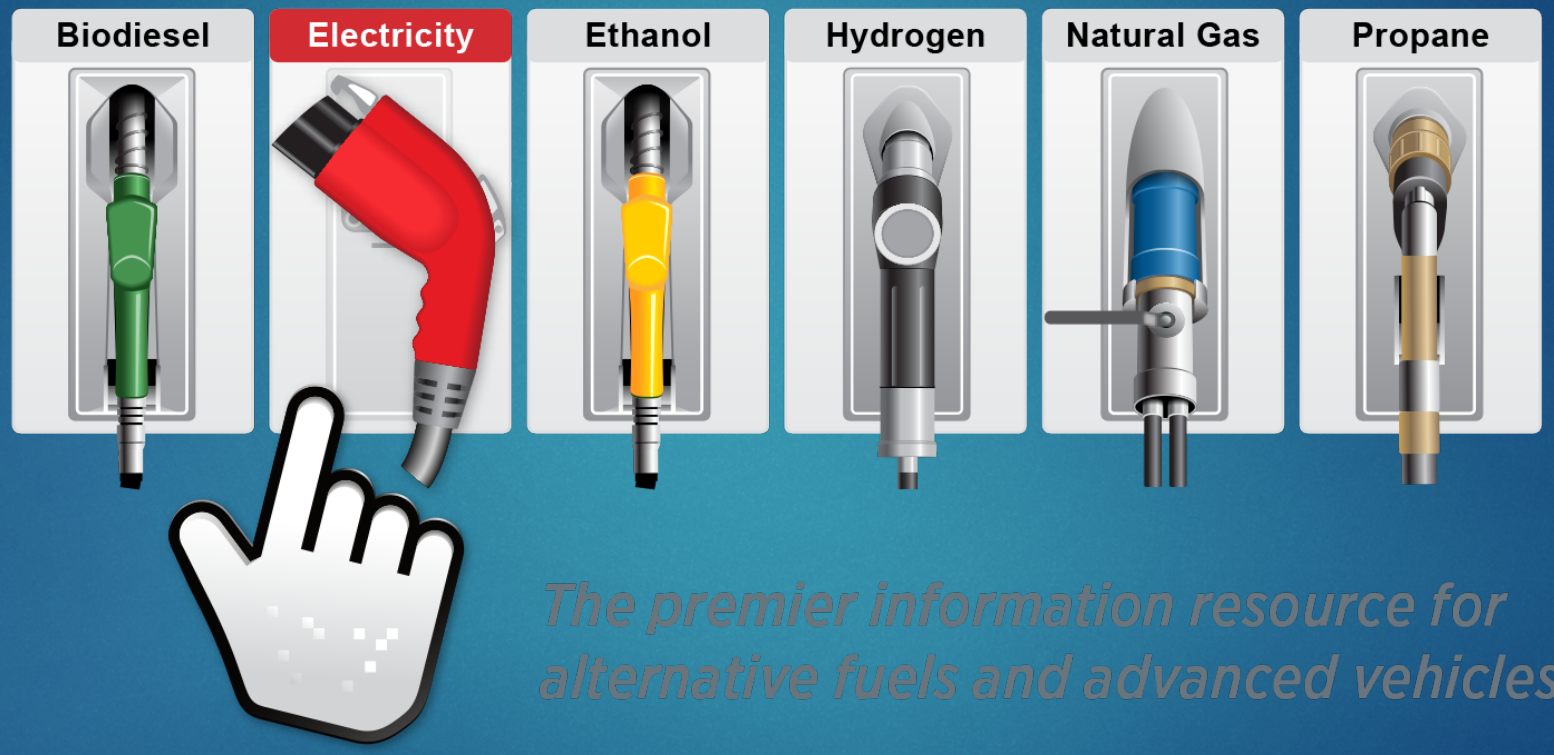
- The purpose is to help state and local agencies identify Interstate corridors that are potential candidates for designation or need additional facilities to change the designation from Corridor-Pending to Corridor-Ready.

- Representatives from states in the targeted region will be invited and multiple cross-state corridors will be discussed and analyzed for designation potential.

Regional Alternative Fuel Corridor Convening's

- Midwest – June 12 (St. Paul, MN)
- Southeast – Sept. 25 (Charleston, SC)
- REV West States – Spring/Summer 2019
- NE/Mid-Atlantic – Spring/Summer 2019
- Texas and surrounding states - 2019

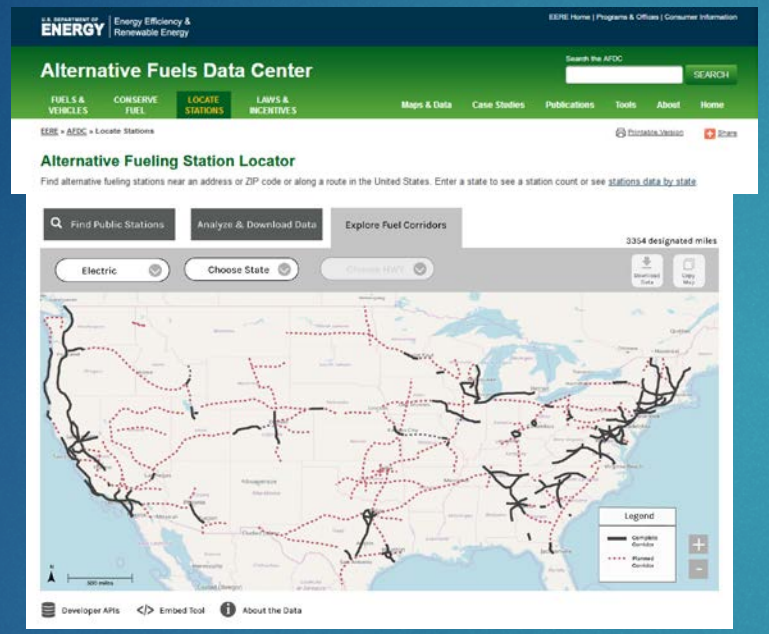
Alternative Fuels Data Center

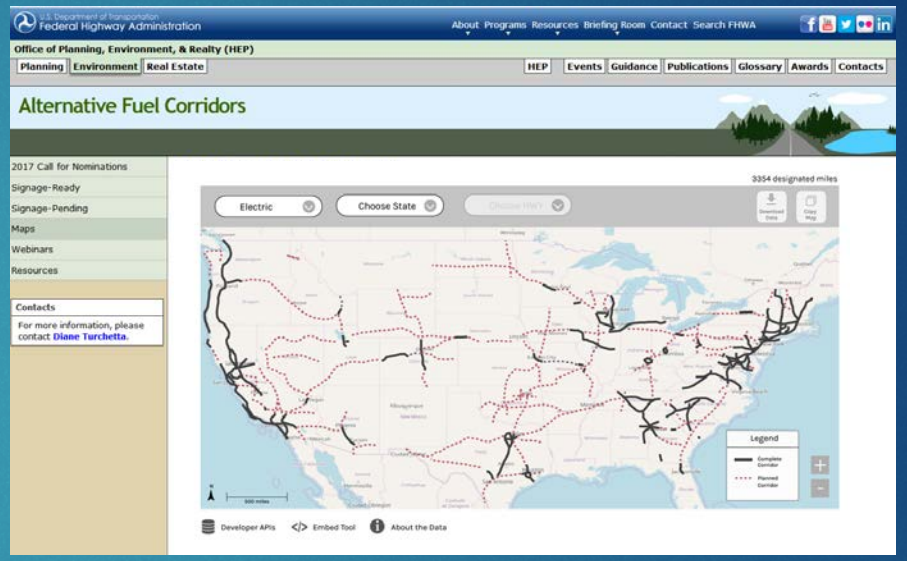


The premier information resource for alternative fuels and advanced vehicles

afdc.energy.gov

Embeddable Application





1 **Alternative Fuels Data Center**

The corridor mapping tool will be available as a third tab on the Alternative Fueling Station Locator.

2 **Federal Highway Administration**

The corridor mapping tool can be embedded as a standalone application on the FHWA website or any other website.

Future of AFC Program

- Request for Nominations on an annual basis under life of FAST Act
- Possible inclusion in the next transportation reauthorization bill
- Enhanced coordination efforts with Clean Cities Program/NREL
- Enhanced collaboration with stakeholders including industry

For More Information

DOT Alternative Fuel Corridor Team Contact Information

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U.S. Department of Transportation
Volpe Center
617-494-3852
stephen.costa@dot.gov

Resources

FHWA Alternative Fuel Corridor website:
http://www.fhwa.dot.gov/environment/alternative_fuel_corridors/

MUTCD Memorandum – Signing for Designated Alternative Fuel Corridors:
https://mutcd.fhwa.dot.gov/resources/policy/alt_fuel_corridors/index.htm

DOE/NREL Alternative Fueling Station Locator:
https://www.afdc.energy.gov/locator/stations/

Regional Clean Vehicle Corridor Planning in the Northeast & Mid-Atlantic

Transportation Research Board

October 2018

Matthew Goetz

Electric Vehicle Program Manager

Georgetown Climate Center

GEORGETOWN CLIMATE CENTER

A Leading Resource for State and Federal Policy

Presentation Agenda

- Introduction to Georgetown Climate Center and the Transportation & Climate Initiative
- Regional engagement with Alternative Fuels Corridor program
- Electric Vehicle corridor analysis and regional planning
- Next steps and opportunities for coordination

Georgetown Climate Center:

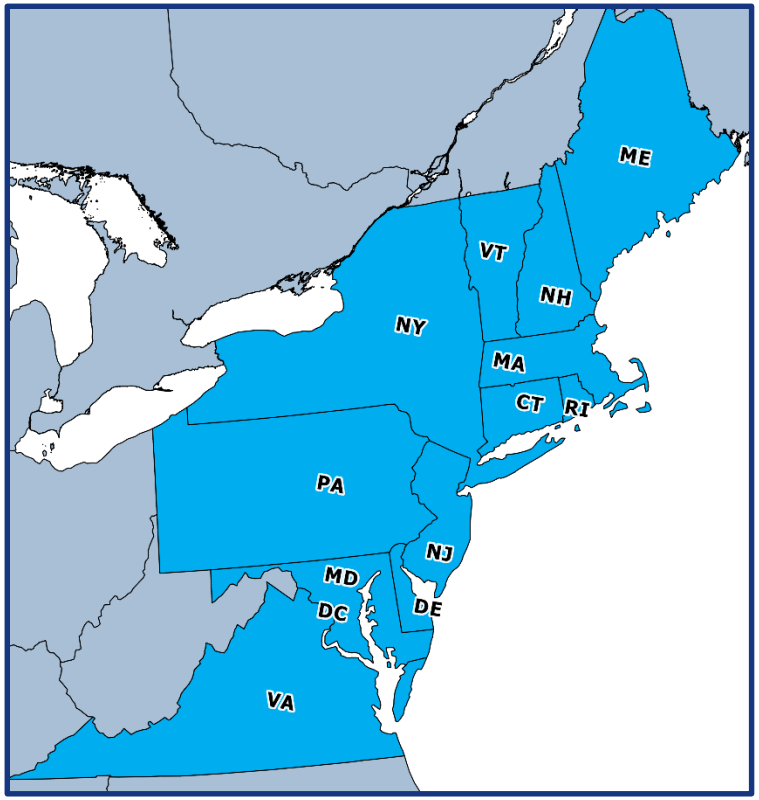
A Resource for State and Federal Climate Policy

- Launched in 2009 as a resource to states
- Works at the nexus of federal-state policies
- Supports states and other stakeholders through research, facilitation and convening

TRANSPORTATION & CLIMATE INITIATIVE

Of the Northeast and Mid-Atlantic States

- 12 Northeast and mid-Atlantic states and D.C.
- State energy, environment, and transportation agencies
- Clean vehicles & fuels, regional emissions transportation policies, sustainable communities, freight, and resilience



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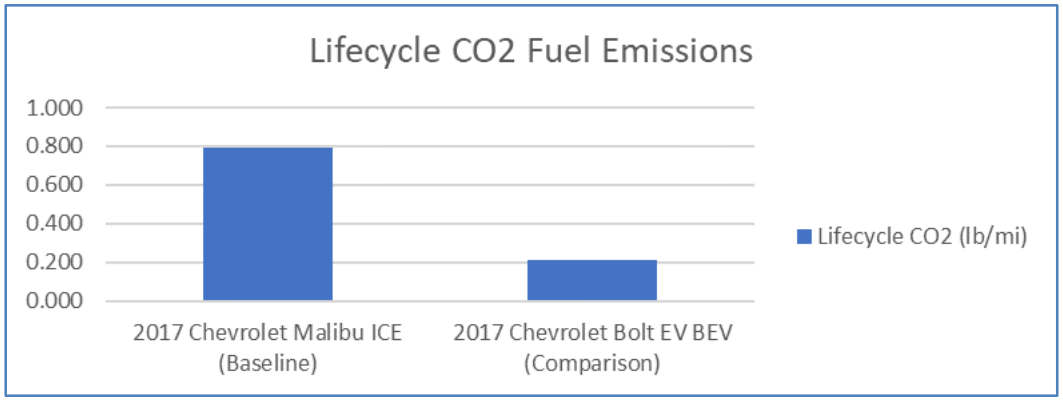
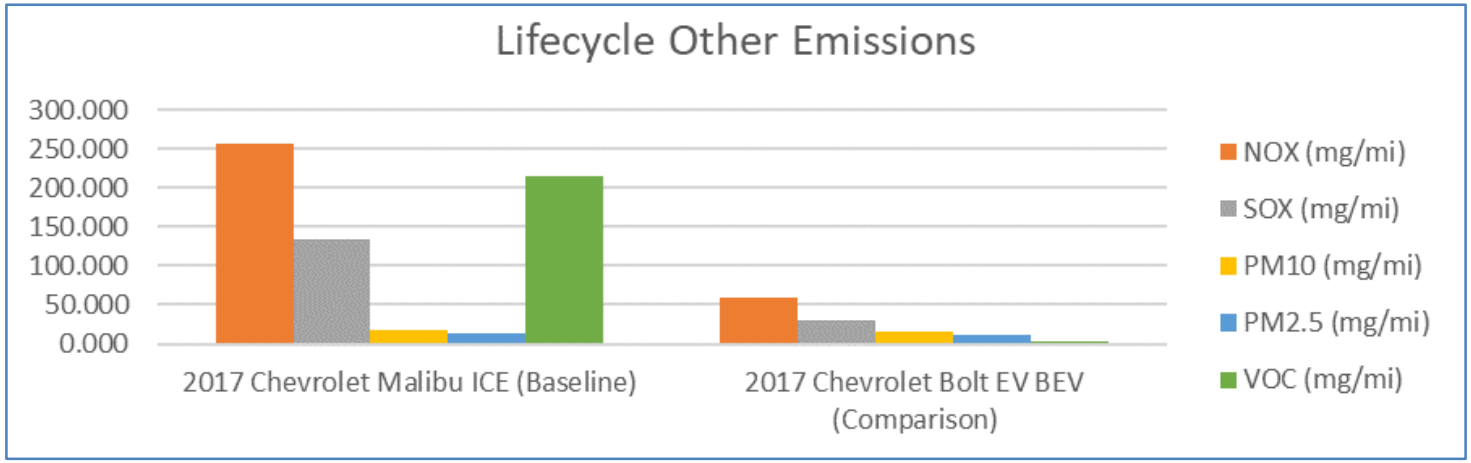
Electric Vehicles Provide Opportunity to Reduce Air Pollutants and GHG Emissions

Carbon emissions and air pollution comparison (Providence, RI):

- Chevy Malibu
- Chevy Bolt (electric)





Data Source (electricity): U.S. Environmental Protection Agency, eGrid
Data Source (gasoline): Argonne National Laboratory, GREET

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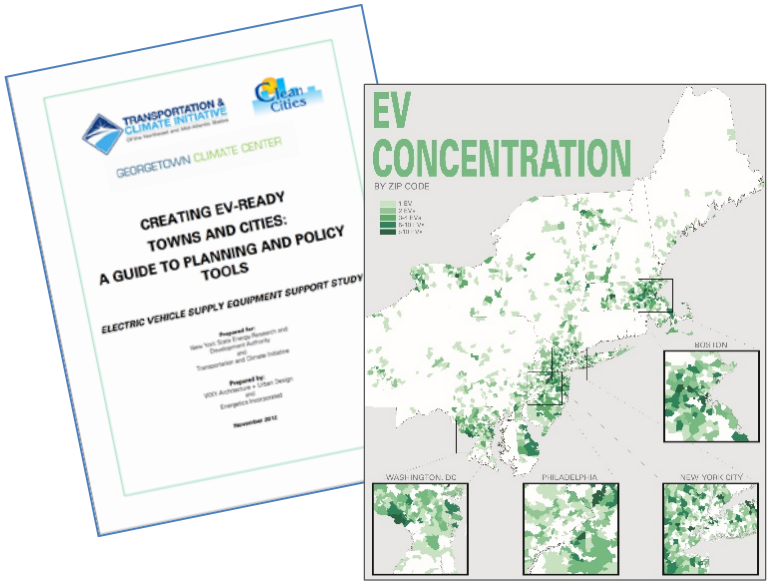
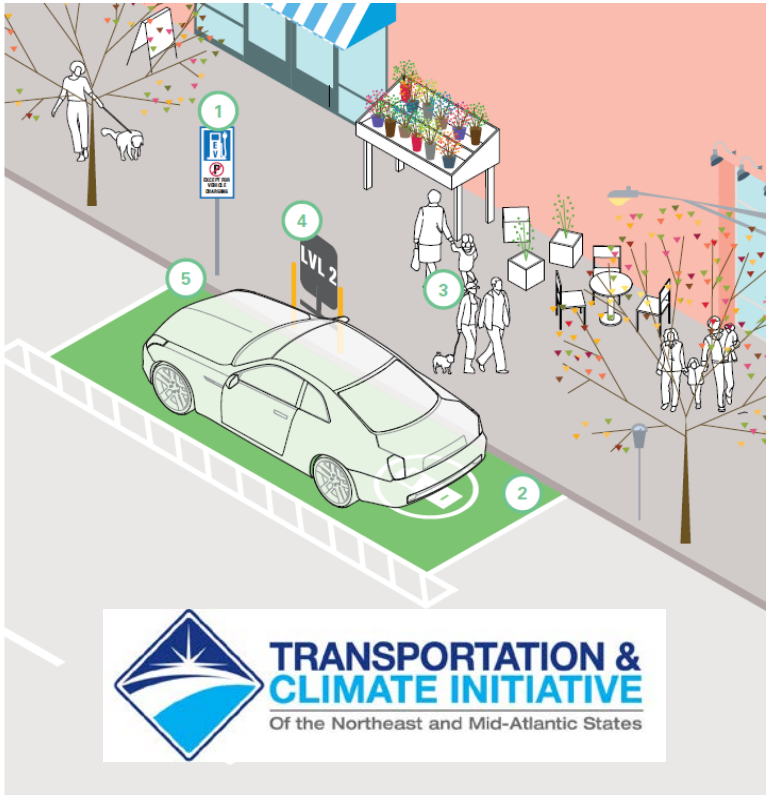
Regional Coordination on Electric Vehicle Charging Infrastructure





NORTHEAST ELECTRIC VEHICLE NETWORK

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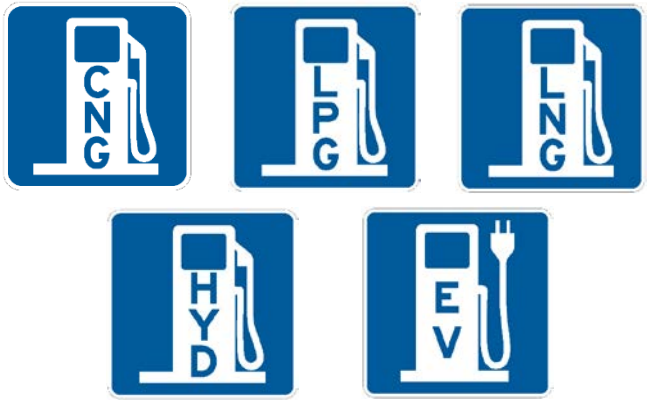
FAST Act Alternative Fuels Corridor Program

U.S. Department of Transportation
Federal Highway Administration



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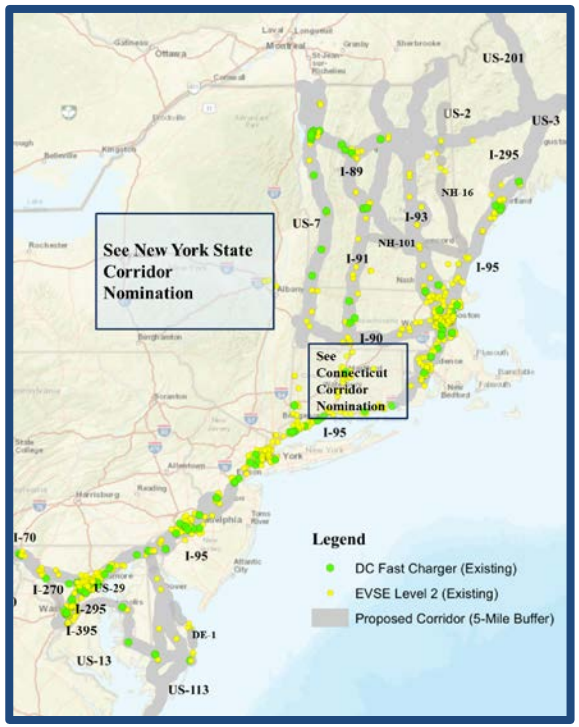
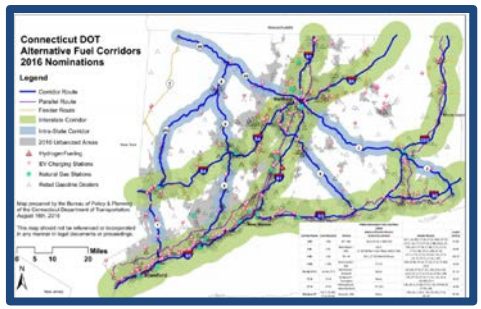
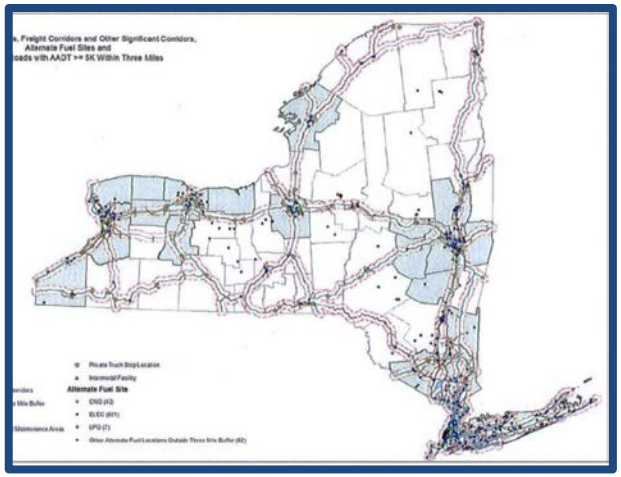
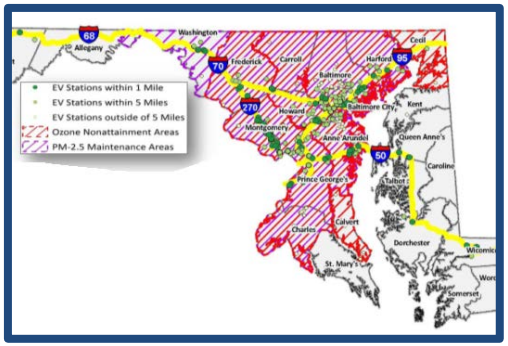
TCI Region Corridor Nominations



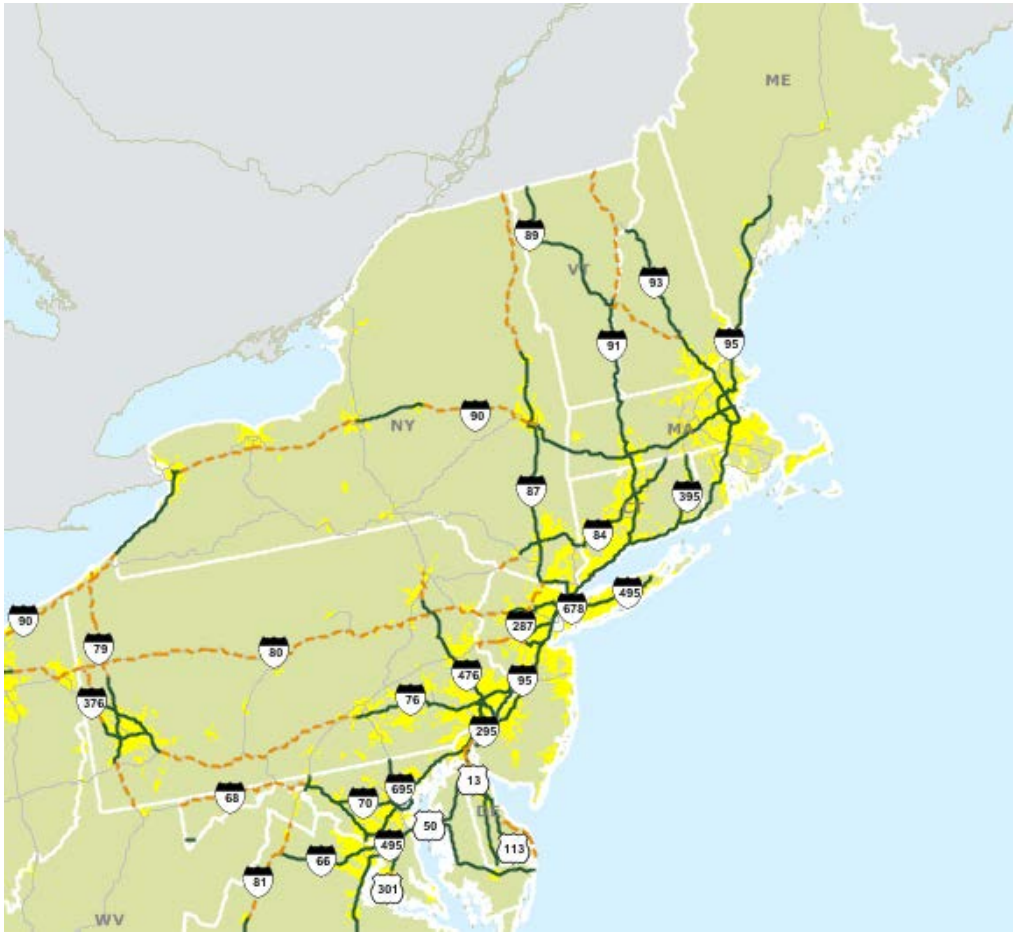
- All TCI jurisdictions nominated corridors
- Regional letter of support endorsed by all 12 TCI jurisdictions







Federal Alternative Fuels Corridor Designations



Electric Vehicle Corridors

Signage-Ready

- Fast Charging Stations
- At least every 50 mi.
- <5 miles from highway
- Public stations

Signage-Pending

- Additional infrastructure needed to meet criteria

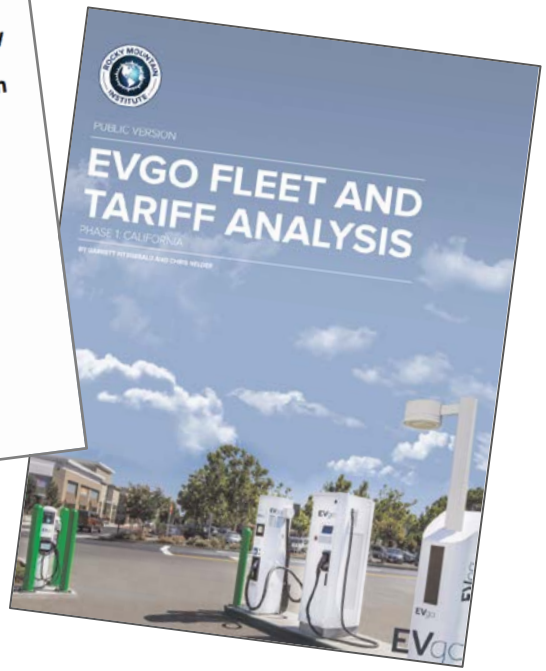
Opportunity for Corridor Charging to Accelerate Widespread EV Deployment

- New, longer range electric vehicles
- Fast charging technology makes long-distance travel more convenient

Image credit: ArsTechnica
Image credit: General Motors

Challenges of EV Corridor Development

- Significant additional fast charging infrastructure investment is needed
- Poor business case for private investment in DC Fast Charging
- Utility/grid infrastructure and rate design challenges



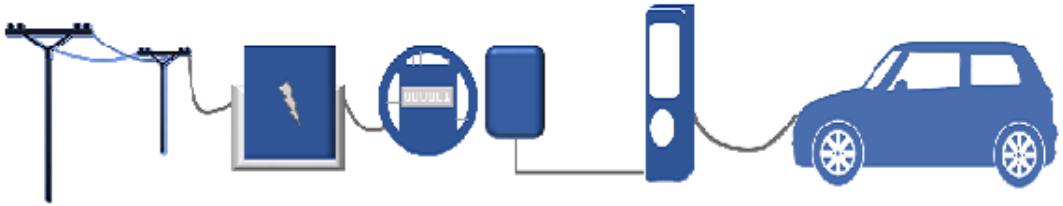
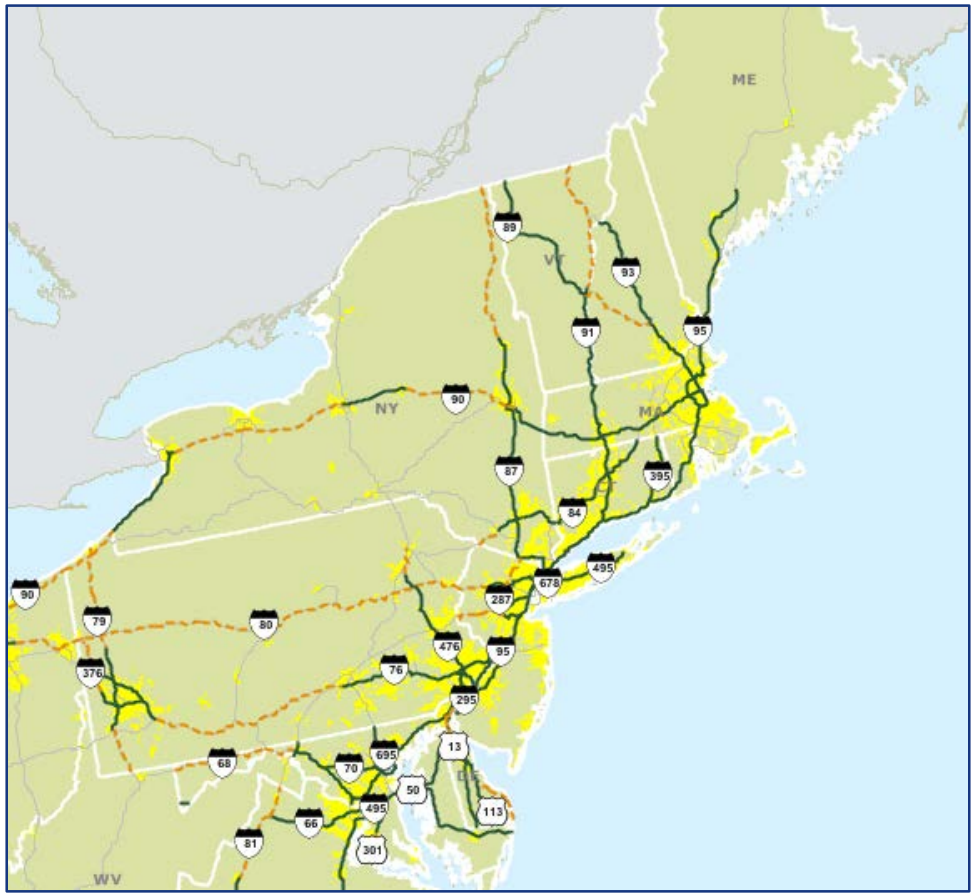


Image credit: Idaho National Laboratory
Image credit: Rocky Mountain Institute

Opportunity for Regional Coordination

- Potential inflection point for vehicle and charging station technology
- Public- and private-sector investments in charging stations
- Increased consumer awareness and driver convenience from highway signs



Investments by EV Charging Providers, Automakers, and Businesses

Image credit: AutoWeek
Image credit: New Haven Register
Image credit: Electrek

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Volkswagen Settlement
EV Infrastructure Investment

Environmental Mitigation Trust (Appendix D)

$2.9 billion, state administered

NOx reductions

Up to 15% can be spent on EV infrastructure

Electrify America
National ZEV Investment (cycle 1)

$190 million – Highway fast charging

$40 million – Community charging

Virginia Gov. Northam announcing award of VW Settlement funding to eVgo to develop EV fast charging network in Virginia

Image credit: EVgo

Volkswagen Settlement
Electrify America Corridor Investment

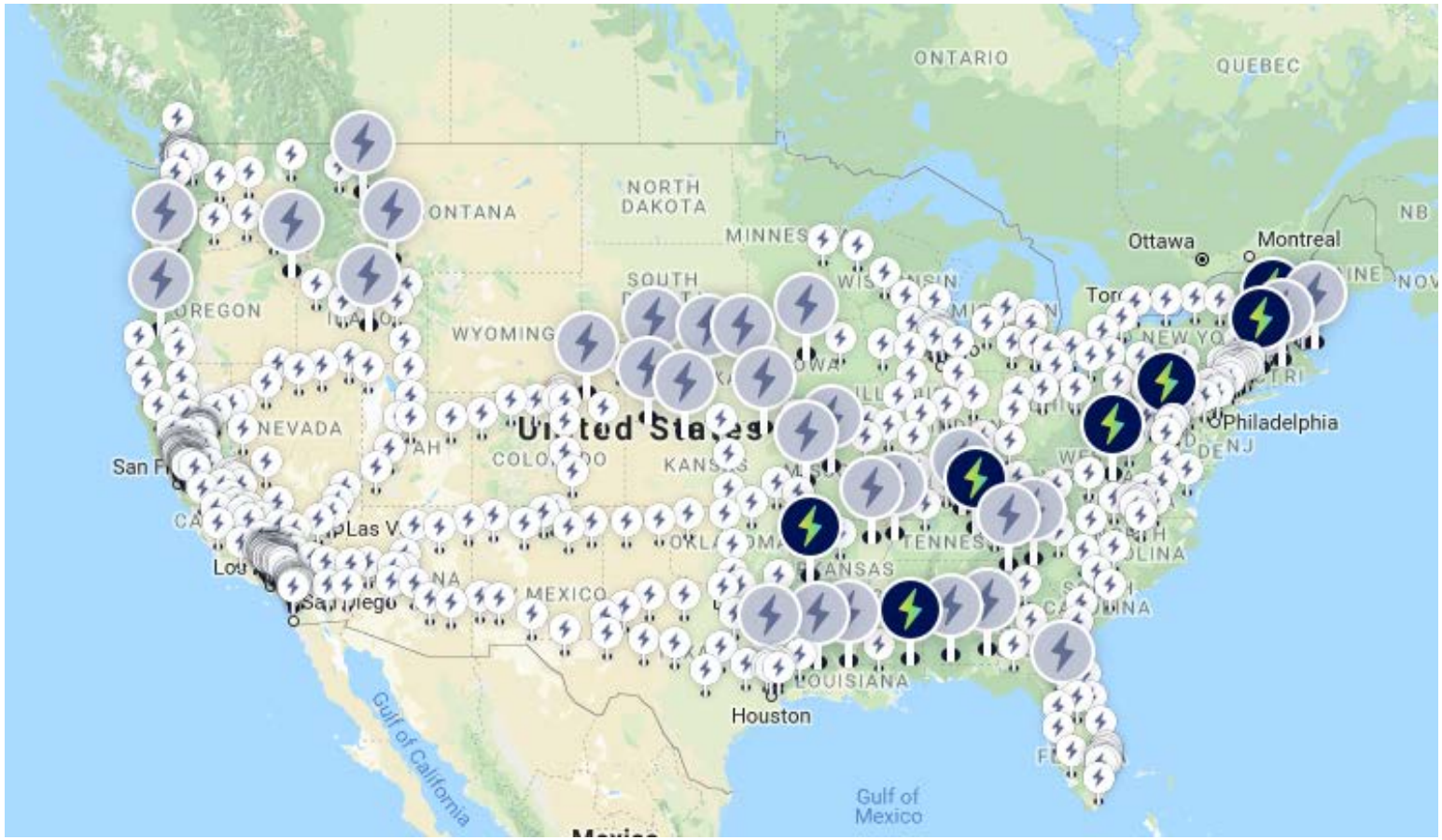

Image credit: Electrify America

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Utility Investment in EV Charging Infrastructure

EVERSOURCE

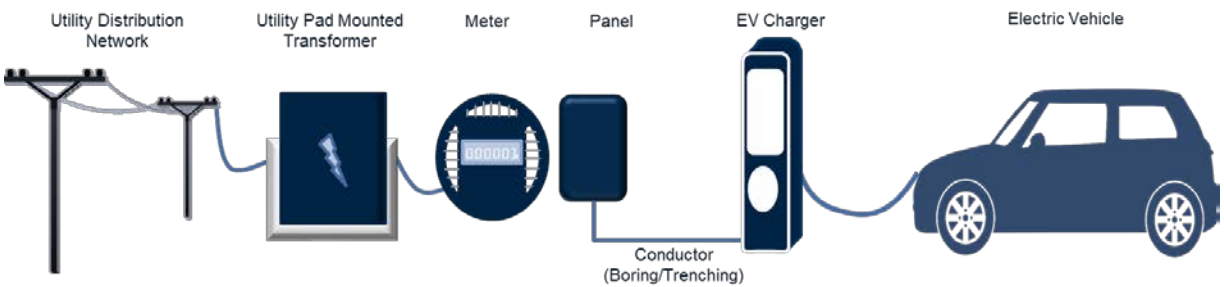
BGE

pepco
An Exelon Company

nationalgrid

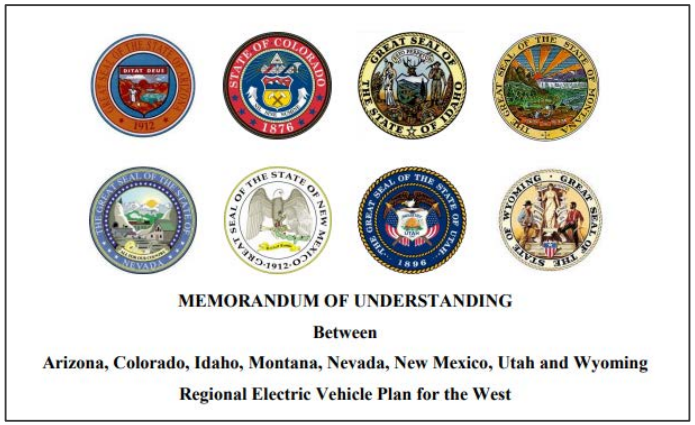
PSEG

NY Power Authority



Multi-state Collaboration on Regional EV Corridor Planning

TRANSPORTATION & CLIMATE INITIATIVE
Of the Northeast and Mid-Atlantic States


MEMORANDUM OF UNDERSTANDING
Between
Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming
Regional Electric Vehicle Plan for the West

WEST COAST ELECTRIC HIGHWAY

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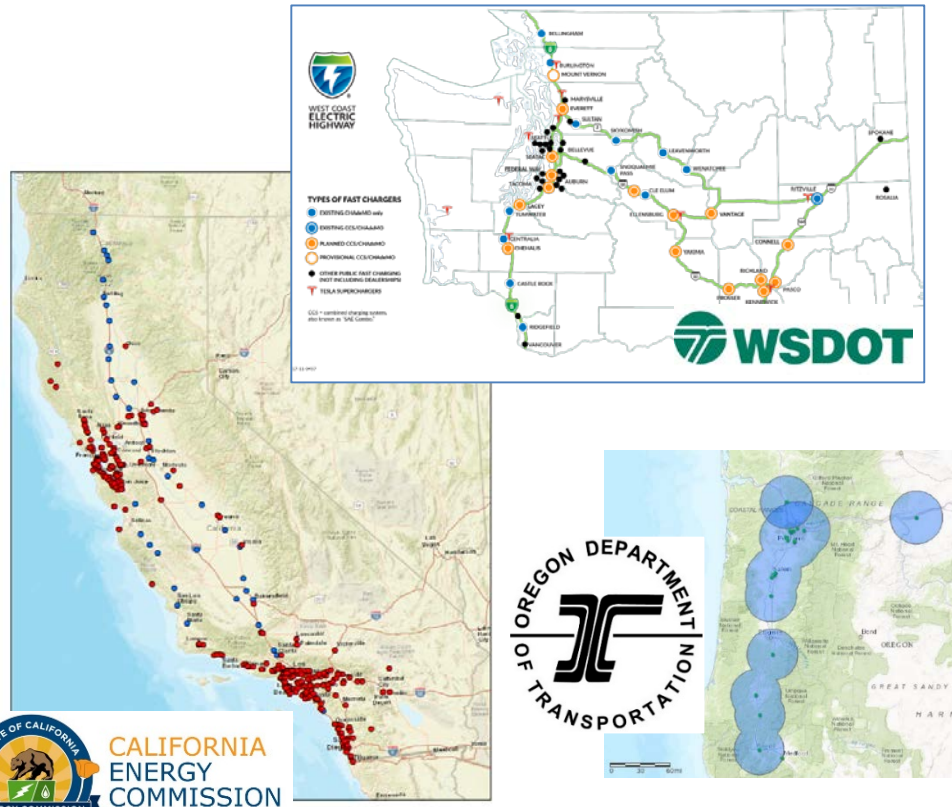
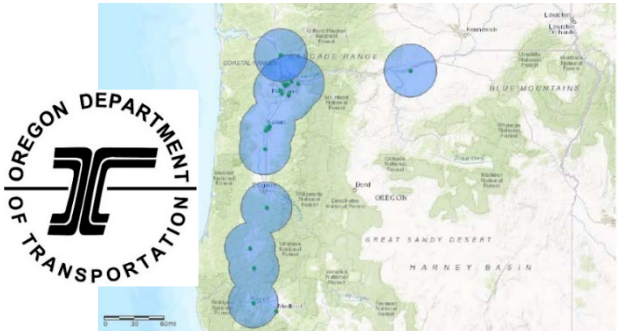
Regional Corridor Planning: West Coast Electric Highway





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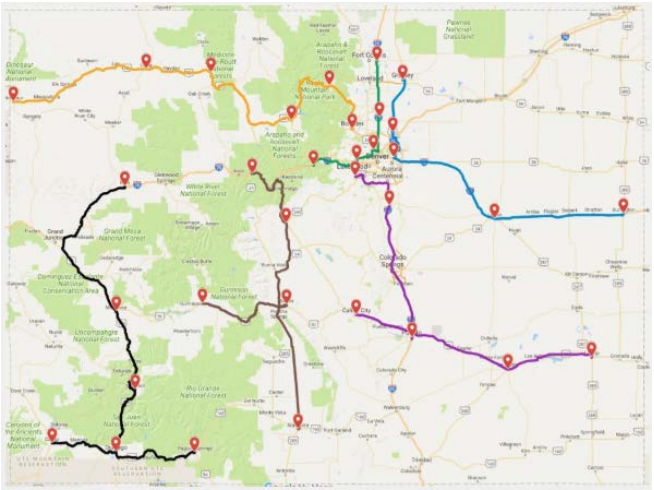

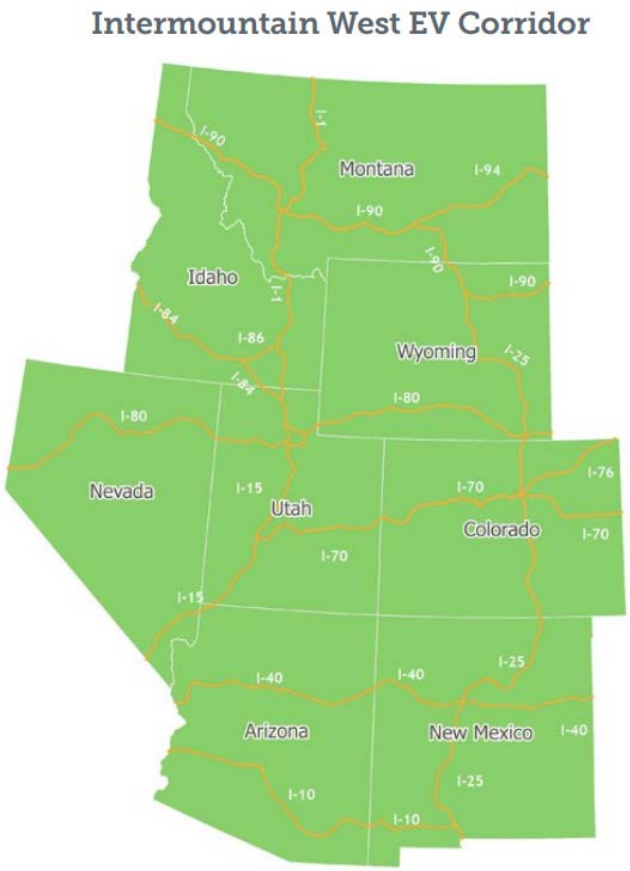

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Transportation and Climate Initiative Regional EV Corridor Planning & Analysis

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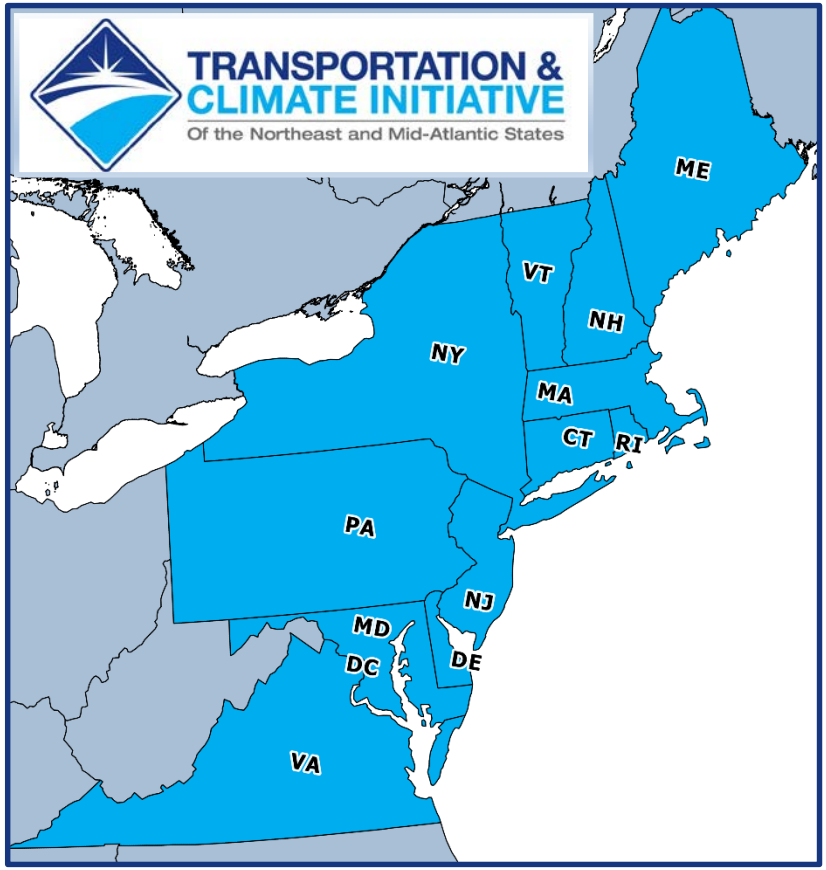

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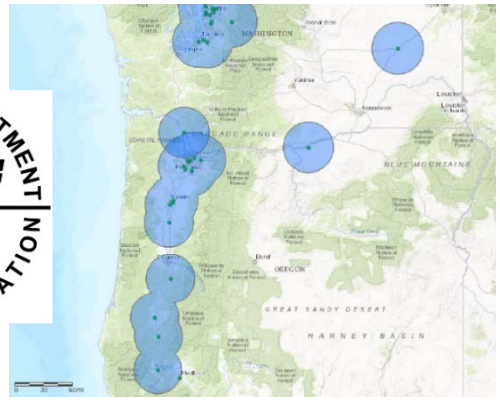
Existing Analyses of EV Charging Infrastructure & EV Corridors

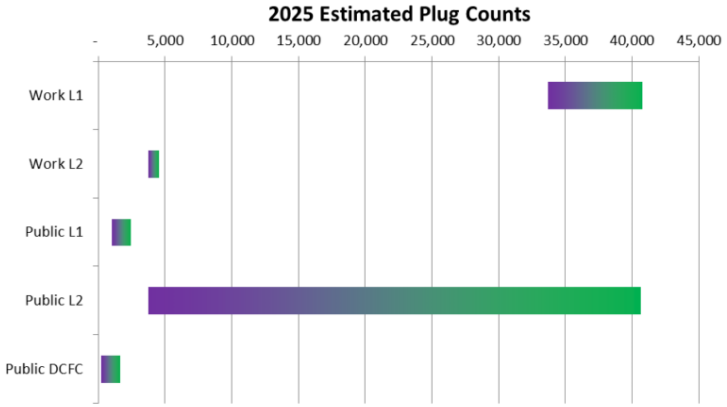
Online Interactive Map of Potential DCFC Site Hosts

- Interactive Map shows 14,416 sites in the top 300 ranked bubbles based on highest future unmet charging demand and high traffic corridor locations (no user inputs)
- Interactive Map provides raw inputs (14,416 site characteristics) to the Micro-Siting Tool, which allows DCFC developers to identify sites based on priorities

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

OREGON DEPARTMENT OF TRANSPORTATION





TCI Regional EV Corridor Analysis

MJB & A

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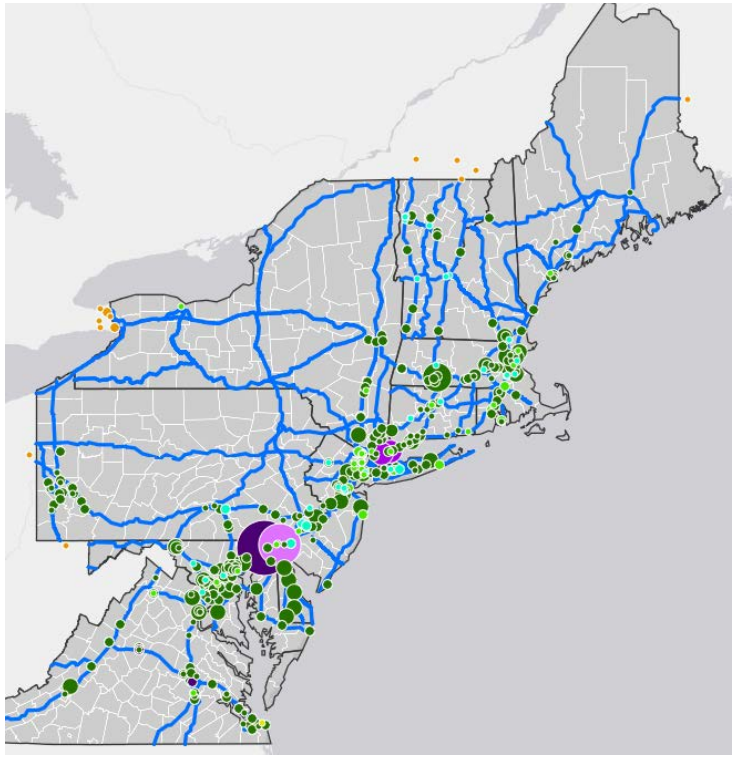
TCI Regional EV Corridor Analysis

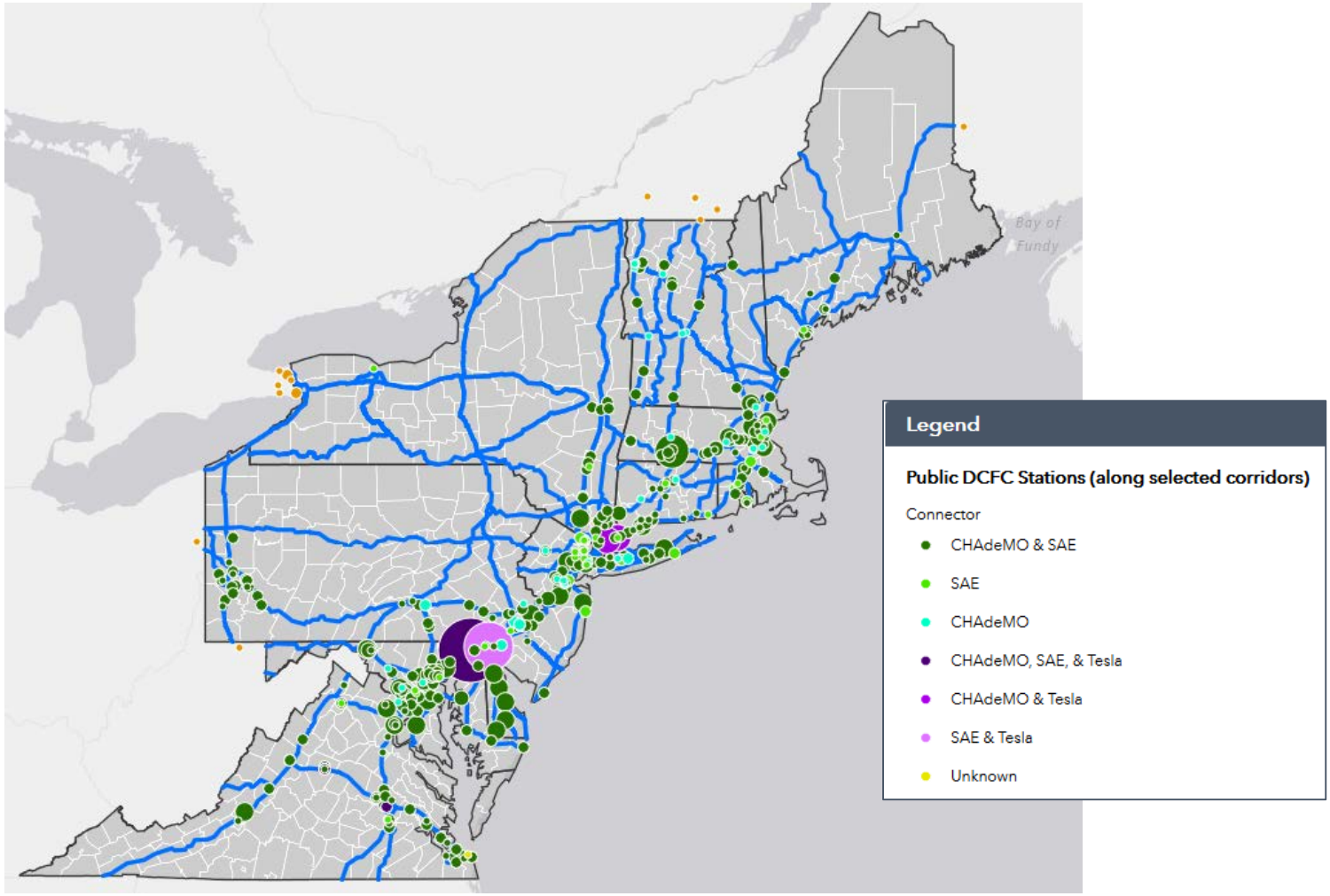
- **Scope of analysis**:
  DC Fast Charging (DCFC) along designated federal corridors plus additional state priority corridors

- **Charging Stations:**
  Public, non-proprietary fast chargers within 5 miles of freeway corridors

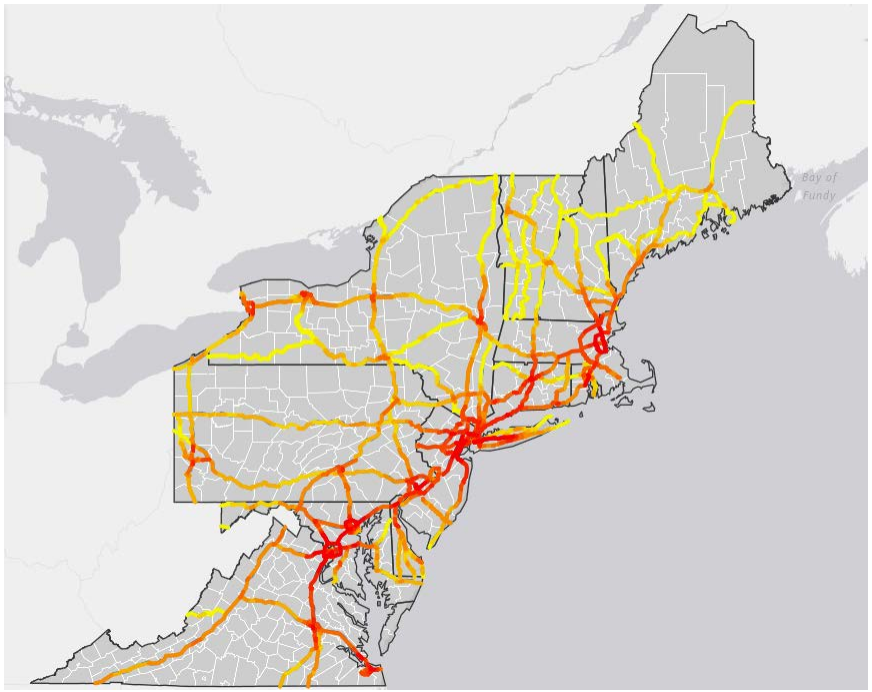
- **Interstate Exits:**
  Focused on interstate exits and other key intersections as potential sites for corridor fast charging



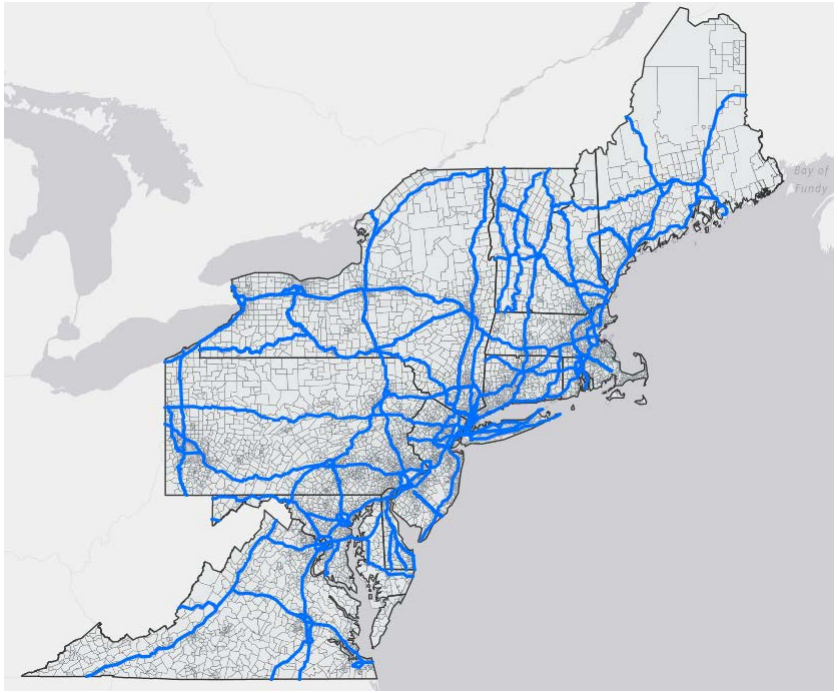
Existing Public Fast Charging Along Corridors



TCI Regional EV Corridor Analysis Metrics



Traffic Volume (AADT)



Population Density (census tract)

MJB & A

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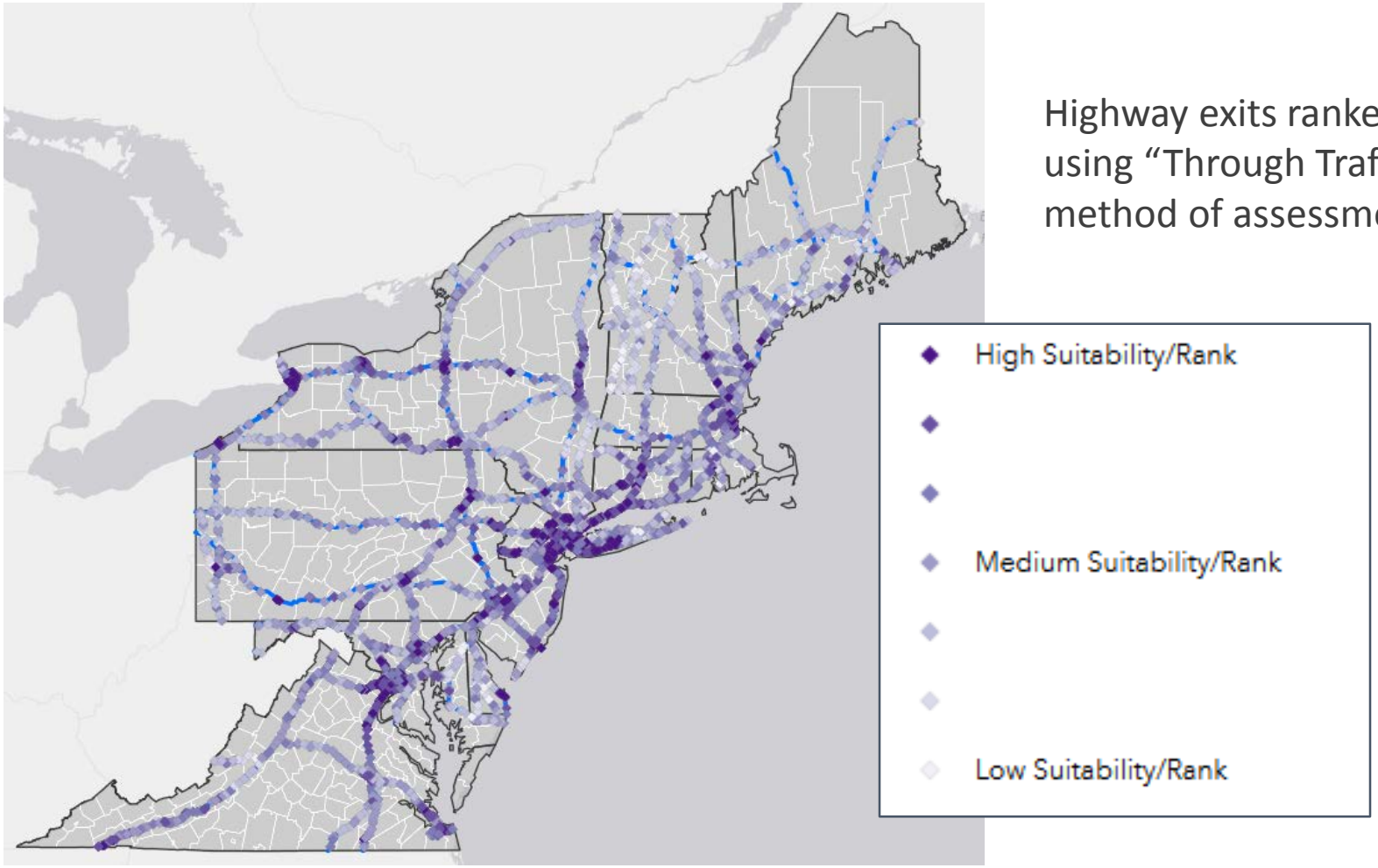
TCI Corridor Analysis Results – Demand



Highway exits ranked using "Through Traffic" method of assessment

MJB & A

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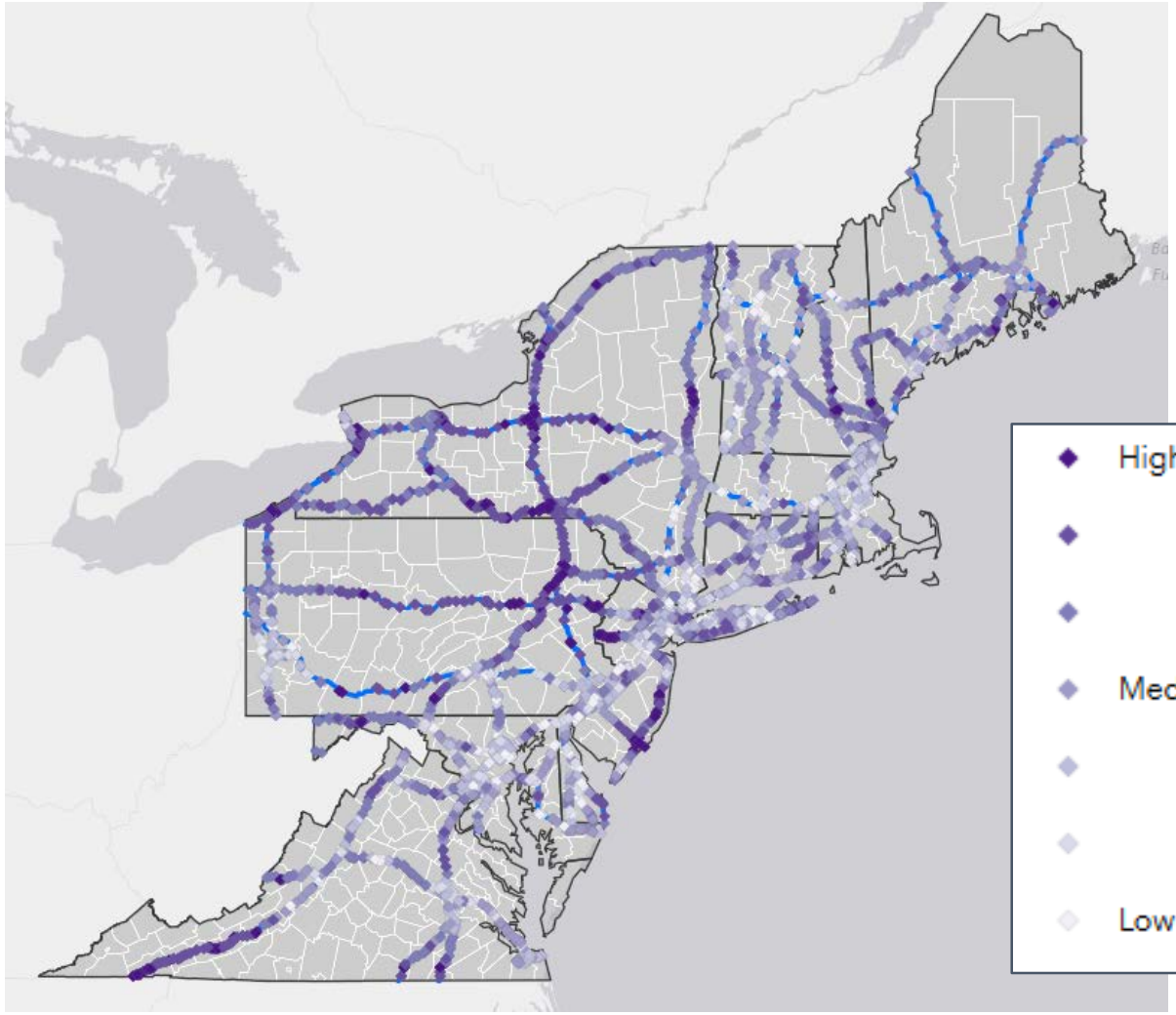
TCI Corridor Analysis Results – 'Gaps'



Highway exits ranked using "Fill Gaps" method of assessment

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TCI EV Corridor Analysis Availability

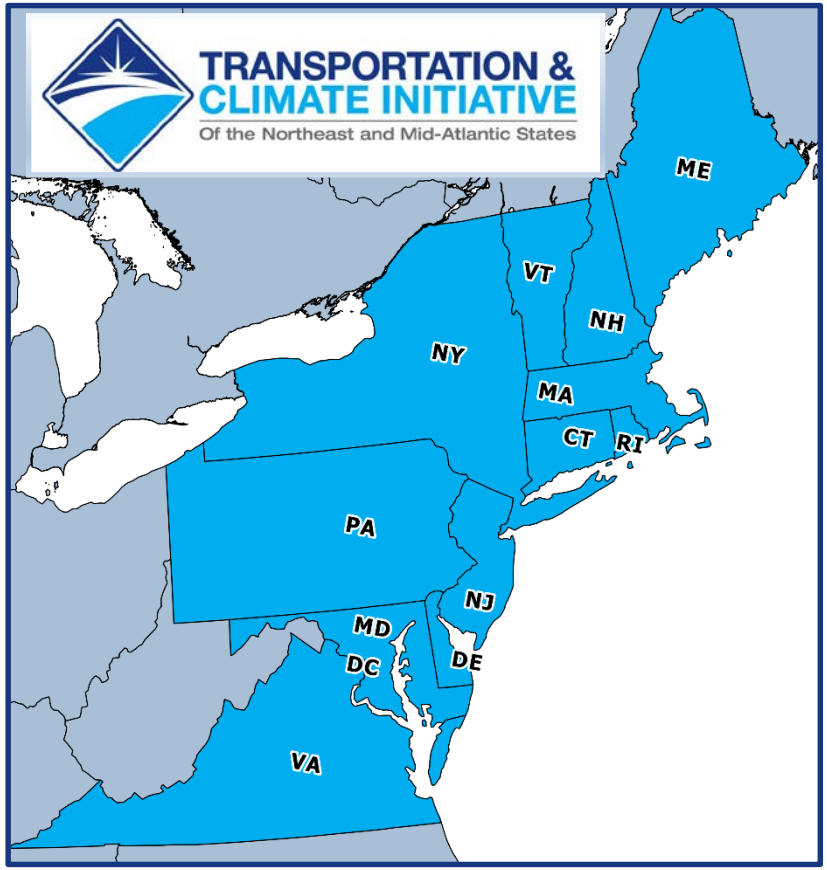
Tools are available for free from M.J. Bradley & Associates and Georgetown Climate Center websites

www.mjbradley.com

www.georgetownclimate.org

Next Steps for Regional EV Corridor Planning

- Continued engagement with EV charging providers, electric utilities, state and local agencies
- Additional analysis and coordination to inform infrastructure planning
- Coordination on corridor signing



Questions and Contact Information

Please reach out with any questions or to discuss opportunities to engage with regional EV corridor discussions

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Georgetown Climate Center

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Photo Credit: Drive Electric Minnesota

I-94 Alternative Fuel Corridor in Minnesota

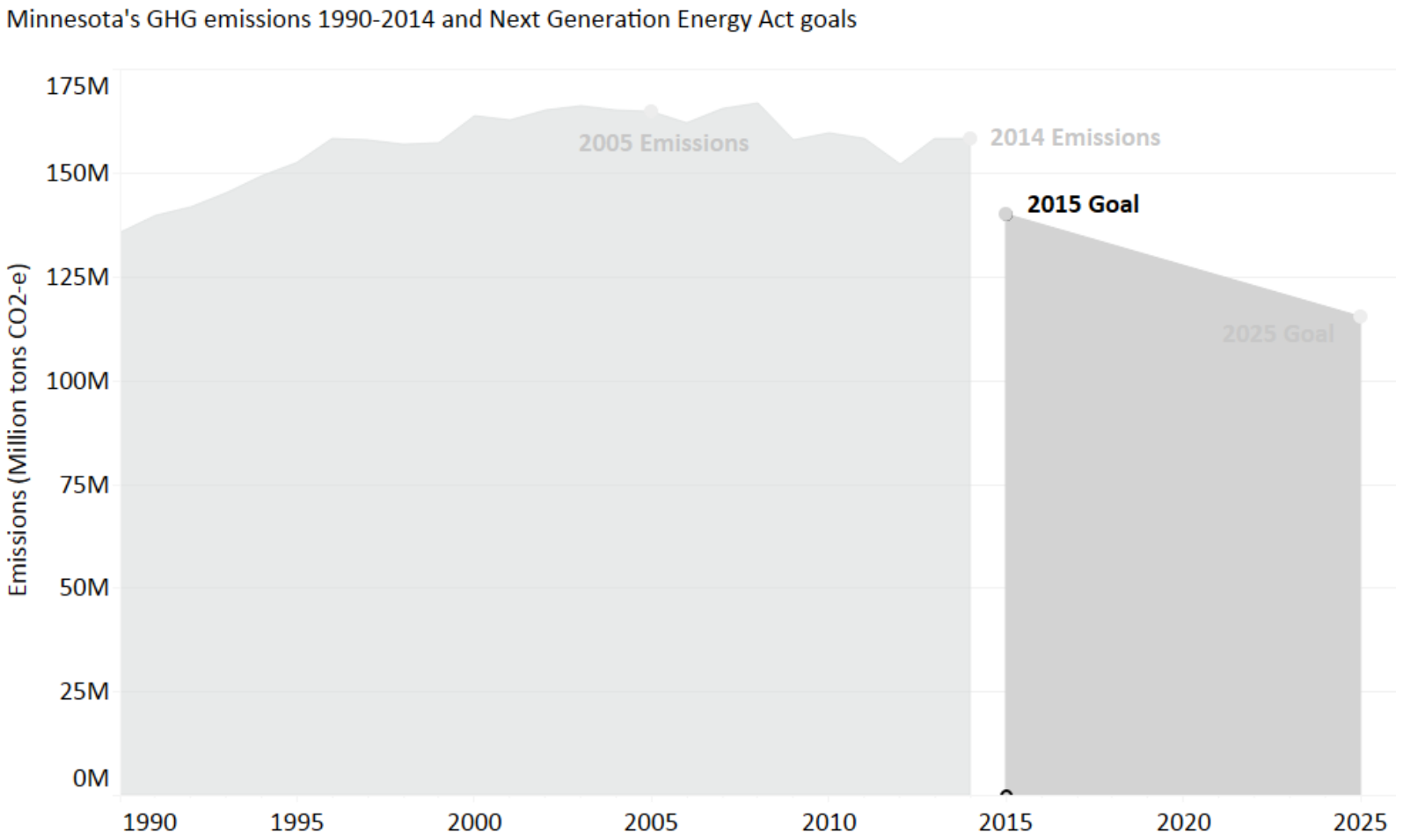
Tim Sexton
TRB Webinar
Recorded on October 5, 2018

DEPARTMENT OF TRANSPORTATION

Why this matters to MN

Next Generation Energy Act --- reduce GHG emissions from 2005

- 15% by 2015
- 30% by 2025
- 80% by 2050



★ 2050 Goal

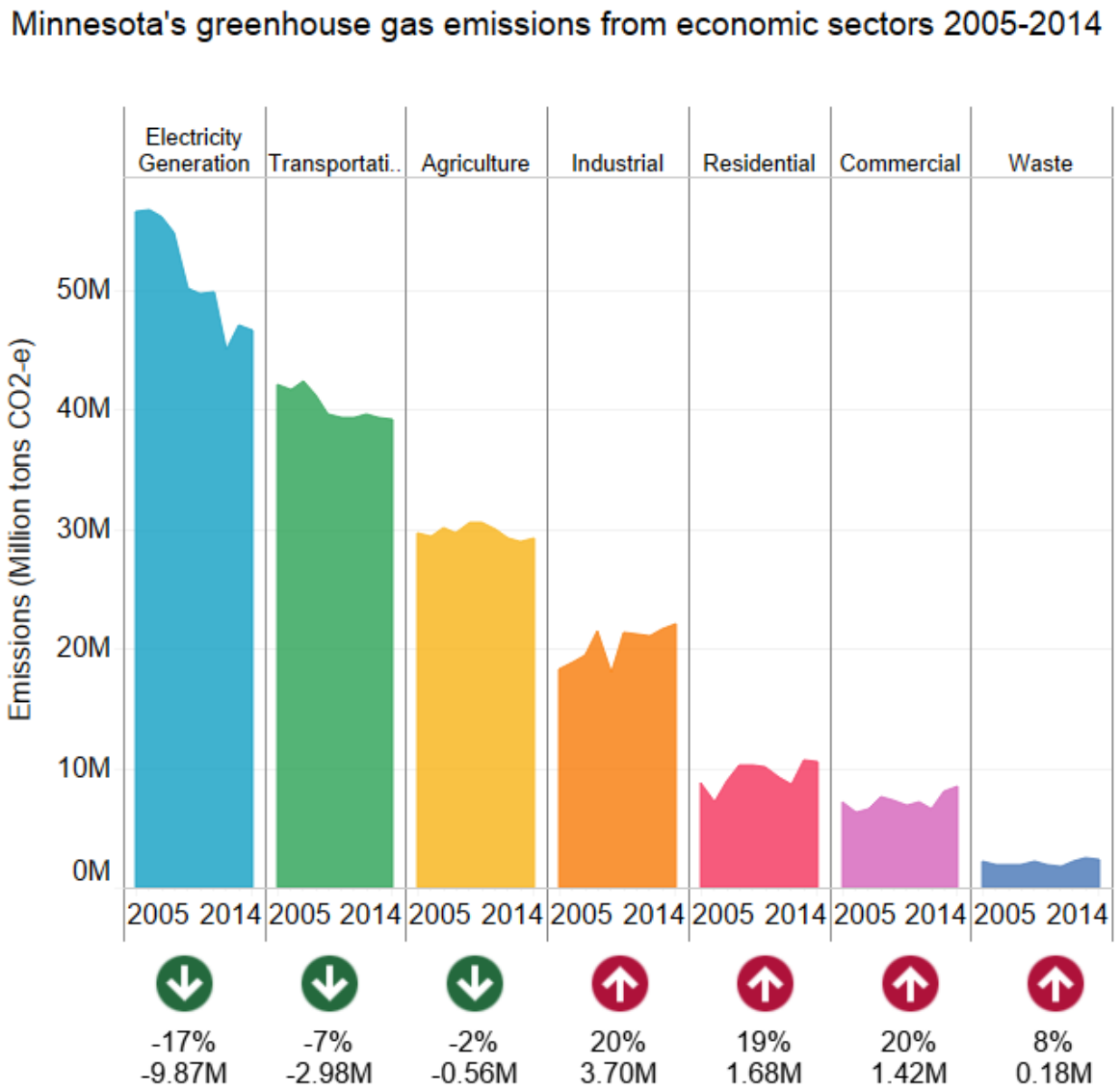
Why this matters to MN

MnDOT GHG goals

- applied Next Generation Energy Act targets to the transportation sector

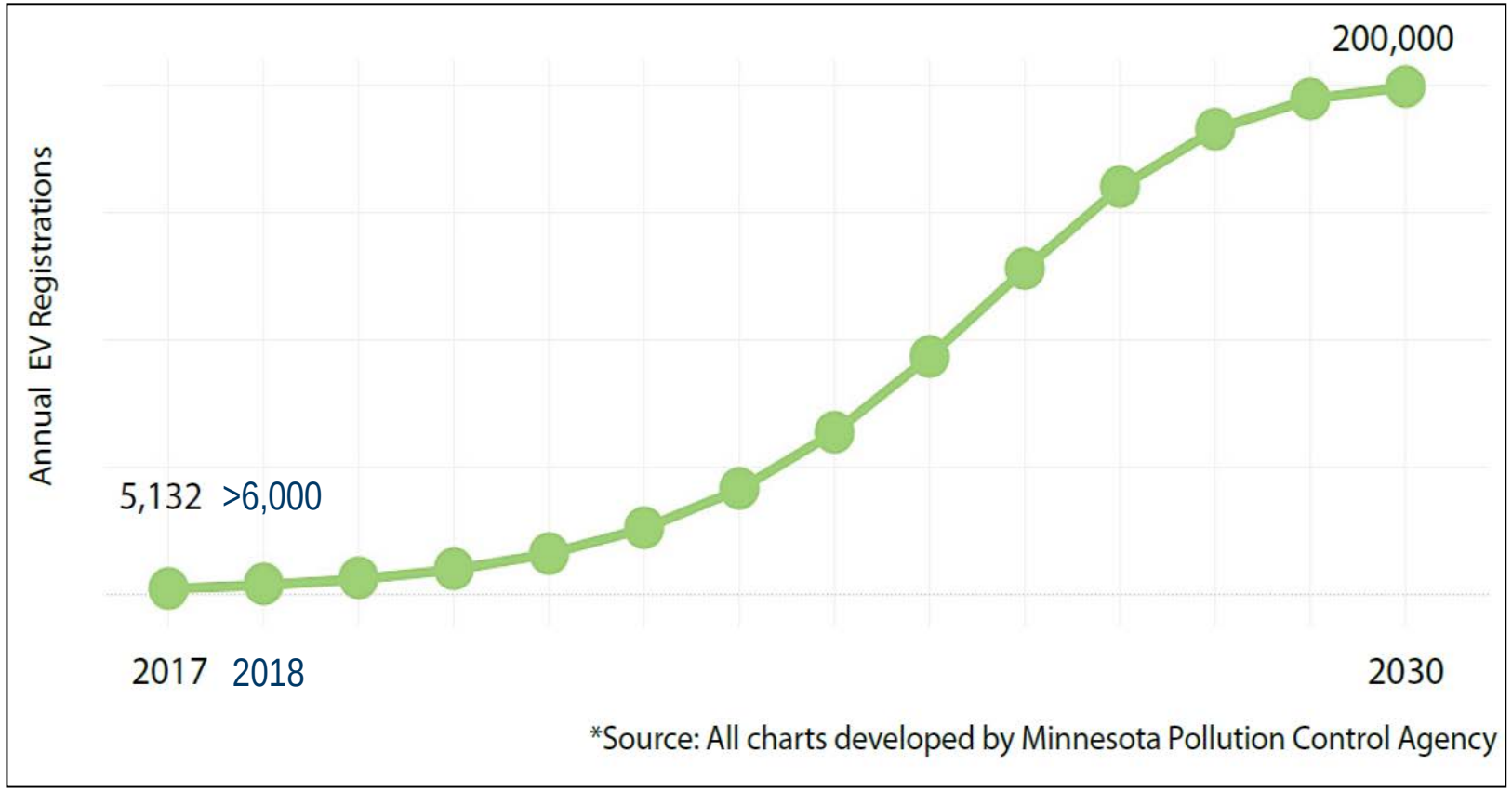
2025 target = 29,500,000 tons CO_2e

2016 emissions = 40,300,000 tons CO_2e



Increased EV uptake is one strategy

- State goal for 20% of fleet to be EV by year 2030



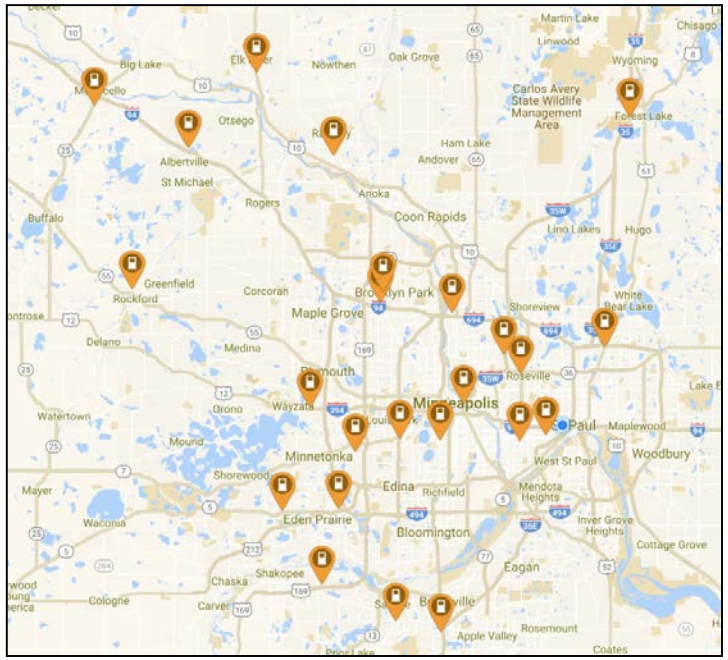
I-94 Great Lakes Corridor

1. Minnesota
2. Wisconsin
3. Illinois
4. Indiana
5. Michigan
6. City of Detroit

Tech Support - NREL and Argonne

Other support/partners – Clean Cities, OEMs, others…

Public DCFC Charging Stations in MN



As of October 4, 2018 Source: www.plugshare.com

Signage

Installed

- 4 locations installed, both directions
- 4 more planned
- Internal fabrication and install ($700 – $1,000 per sign)

Supplemental guidance in TEM

- beginning and end of the corridor
- confirmatory assemblies at 30 to 60 miles spacing.
- Consider rural/urban environments and bypasses when spacing signs

Supplemental Signing

Facility Type	Sign Design Sign #'s refer to designation in the MnDOT Standard Signs Summary	# of Miles from an Intersection or Interchange N/E = Not Eligible		Roadway Type	Sign Program and Facility-Specific Criteria Unless otherwise indicated, the General Criteria apply for all facilities. See MnDOT's Traffic Engineering Manual for placement of signs.
		Urban	Rural		
Electric Vehicle (EV) Charging	• D9-X6  	N/E	2	• Freeway • Expressway	EV charging stations must meet the following requirements: 1. High powered charging station. 2. Located within 2 miles of the interchange. 3. Available to the public 12 hours per day 7 days per week. 4. The route leading to the EV charging station and the charging station itself should be clearly identified with EV charging station signs. 5. Parking spaces identified with regulatory signs for electric vehicle charging only. 6. The EV charging station and parking facilities are lit. 7. Installation and maintenance of trailblazing signs beyond the exit ramp and on site facility signing will be the responsibility of the local road authority and requester. 8. Trailblazing signs located on local roads may use either white legend on blue background or the D9-11b (alternate) symbol.

Questions?

Tim Sexton

Chief Sustainability Officer

Timothy.sexton@state.mn.us

651-366-3622

Commissioner Charles Zelle with AFC sign