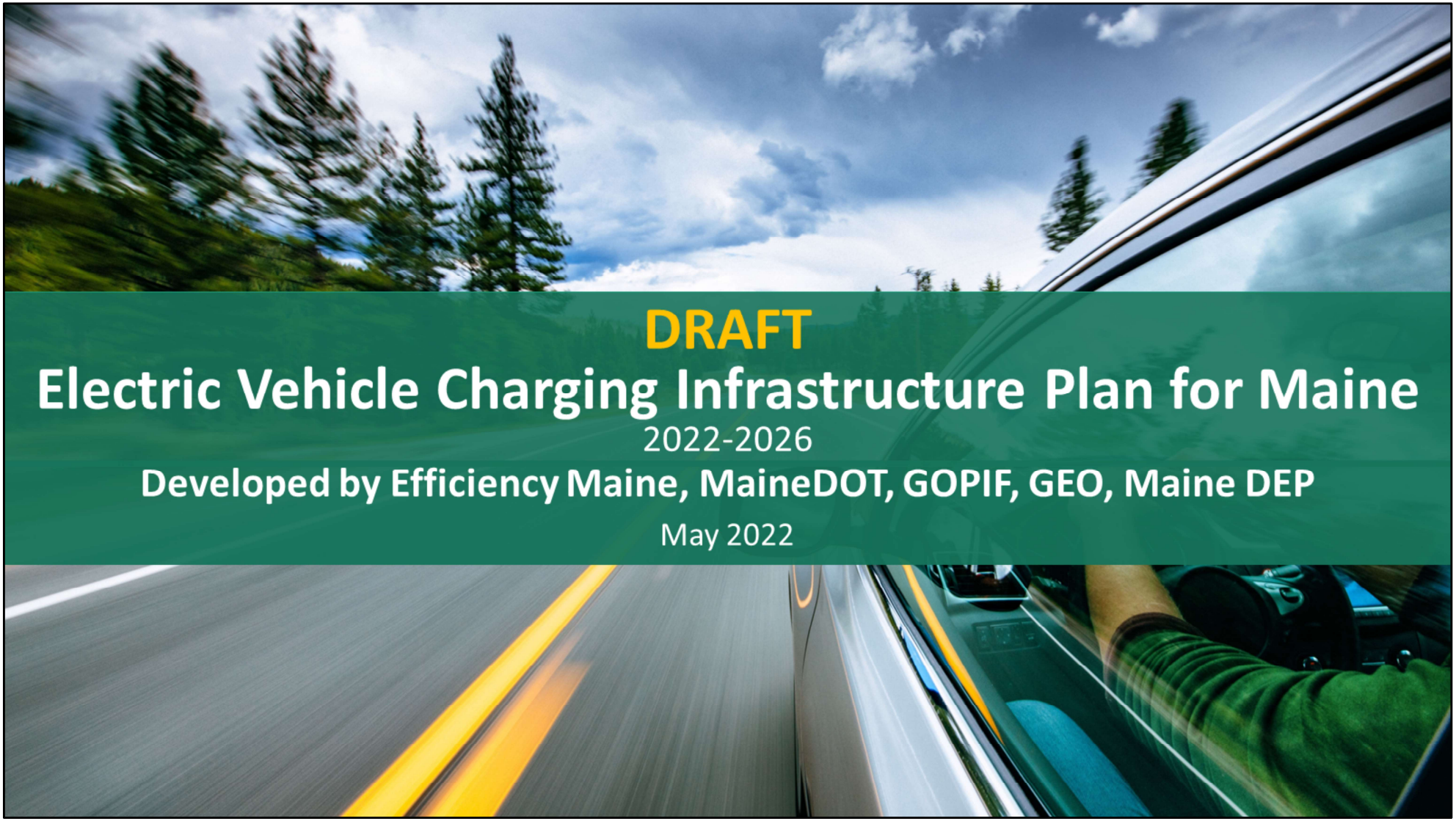


This presentation outlines Maine's Electric Vehicle Charging Infrastructure Plan, which will form the basis of the written Plan for Electric Vehicle Infrastructure Deployment (PEVID) that will be submitted to the US DOT/DOE Joint Office for approval in order to receive National EV Infrastructure Program (NEVI) formula funds. It was developed by Efficiency Maine, MaineDOT, GOPIF, GEO and Maine DEP. This plan guides the investment of federal and other funding sources for EV charging over the next five years.

CONTEXT

Types of EVs that Will Need EV Charging

1. Light-Duty Vehicles (LDV)
2. Public Transportation
3. School Buses
4. Other Medium & Heavy-duty Vehicles (MHDV)

3

Several types of vehicles will need EV charging in the coming years. This plan focuses on light-duty vehicles (LDV) because they are the most numerous and represent the most urgent need for charging infrastructure. Other potential funding sources have been identified for buses, public transit, and other medium and heavy duty vehicles, but are not covered in this plan.

LDV EV Charging Activities to Date in Maine

1. 2018 - 2022 VW and NECEC-Funded Initiative
   a. $3.15 M administered by Efficiency Maine
   b. DC Fast Charging (DCFC/L3)
      i. 14 plugs installed @ 7 sites (6 more plugs to be added in 2022)
      ii. 14 plugs awarded @ 7 sites, under construction
      iii. +/- 10 plugs @5 sites TBA (2022)
   c. Level 2 (L2)
      i. 154 plugs installed at 53 locations incl. business, municipality, and state government
2. PUC Pilot
   a. Efficiency Maine - 62 L2 plugs
   b. CMP - 60 L2 plugs
3. Private or Other Investments
   a. 92 Tesla Supercharger plugs (L3)
   b. 8 Electrify America plugs (L3)
   c. 346 Independently funded L2 plugs
   d. 3 DCFC and 9 L2 plugs - CMP/Avangrid Foundation grants

4

For more information about Efficiency Maine's past and ongoing EV Initiatives, please visit https://www.efficiencymaine.com/at-work/electric-vehicle-supply-equipment-initiative/

Budgets Looking Forward

- EVSE Plan Estimated Budget
  - $ 35,150,000 Incentives
  - $ 1,850,000 Admin & Delivery (5%)
- Assumed Revenues
  - $1 million NECEC (Received)
  - $8 million ARPA
  - $18 million NEVI Formula Funds
  - $10 million IIJA Discretionary Grant – Contingent on Successful Grant Request
  - ***$37 million*** ***Sub-total***
- Other Potential Revenues
  - $TBD Federal DOT Budget
  - $TBD School Buses (IIJA Sec. 71101)
  - $TBD Energy Efficiency Improvements at Public Schools (IIJA Sec. 40541)
  - $TBD Grants for Buses and Bus Facilities (IIJA Sec. 30018)
  - $TBD Electric or Low-Emitting Ferry Pilot Program (IIJA Sec. 71102)
  - $TBD Port Infrastructure/Reduction of Port Emissions (Sec. 11402, Title VIII)
  - $TBD State Energy Program - Electrification of state fleets (Sec. 40109)
  - $8M NECEC Settlement (Suspended)

5

This plan outlines Maine's plan to invest funds from several sources: the National EV Infrastructure (NEVI) program, the American Rescue Plan Act (ARPA), the New England Clean Energy Connect (NECEC) settlement, and the discretionary grant program established through the Infrastructure Investment and Jobs Act (IIJA). Note that any discretionary grant funds are contingent on submitting a successful grant request. Maine plans to pursue one or more discretionary grants to cover some of the investments outlined in this plan.

In addition to funding for LDVs, there are other potential revenues that can be used for EV charging, including for buses, public transit, and port electrification. Some of those potential sources are identified here.

Public Engagement

Types of Engagement

- Public comment period
- Webinar
- Small group meeting
- 1:1 Discussion

Constituencies Engaged

- General public
- Disadvantaged communities
- Governmental entities
- Private sector/industry
- Car dealerships
- Other stakeholders

Timeline (Tentative, subject to change)

- May 23 – June 10: EV Charging Infrastructure Plan for Maine available for public comment via Maine DOT Virtual Public Involvement website (www.maine.gov/mdot/vpi/)
- July 1: Maine Plan for EV Infrastructure Deployment (PEVID) submitted to US DOT/DOE
- September 2022: Maine PEVID approved by FHWA

6

Maine's PEVID is being developed in consultation with stakeholders through public comment, small group meetings, larger meetings, and one on one discussions. It will be updated on a yearly basis.

Plans for Charging for LDV
(Administered by Efficiency Maine)

Goals

- Strengthen the Maine economy by reducing Maine drivers' energy costs for transportation and by promoting tourism from neighboring provinces and states;
- Advance Maine's progress toward reducing emissions of carbon dioxide from vehicles traveling Maine roads.

8

The following slides outline Maine's goals, objectives, and targets for the deployment of EV charging infrastructure during the period covered by this plan.

Objectives

1. Facilitate market transformation that will, consistent with the targets of the State climate action plan, increase the use of vehicles operating on electricity and displacement of higher-carbon fuels;

2. Expand the network of DC Fast chargers available to serving EV drivers who require expedited charging while away from their home or place of business;

3. Promote deployment of Level 2 chargers to serve overnight or extended duration charging;

4. Assure equitable access to EV charging across geographic areas, sectors of the economy, and household income levels;

5. Attract and complement funding from federal, corporate, or national initiatives.

9

For more information about the different types of EV charging, please visit https://www.efficiencymaine.com/ev/

Targets

DC Fast Charging Network

1. Serve EV drivers who require expedited charging while away from their home or place of business;
2. Enable EV travel from north to south and east to west, across all significant routes, and to all major destinations; and
3. Reduce distance between chargers to 50 miles or less.

Level 2 Charging Network

1. Serve EV drivers who can accommodate extended (2-12 hour) charge times such as overnight; and
2. Deploy lower-cost charging solutions, where practical, for EV travel throughout the state and to/from all major destinations.

Consumer Satisfaction and Sustainability

1. Deliver consumer satisfaction through capacity, reliability, availability, safety and convenience; and
2. Encourage sustainable charger operations through appropriate use of competitive bidding, market-based solutions, public-private partnerships, and public funding.

Equity Considerations

DCFC

To address limited overnight charging (e.g., urban areas)

- Prioritize concentrations of MUDs, esp. near affordable housing

To extend network to rural, less trafficked areas and complement overnight charging

- Prioritize rural service centers (accessible to max. traffic in rural areas)

Level 2

To provide overnight/extended charging

- Prioritize LMI/affordable housing MUDs

To complement overnight charging

- Prioritize workplaces, esp. with hourly workforce and retail

11

Throughout the plan, you will notice a focus on equity across geographic areas, sectors of the economy, and household income levels. This slide shows how the plan will advance equity by prioritizing regions and specific locations that are likely to serve individuals who face larger barriers to EV adoption such as low income individuals, rural residents, and apartment-dwellers.

Investment in Disadvantaged Communities (DAC)

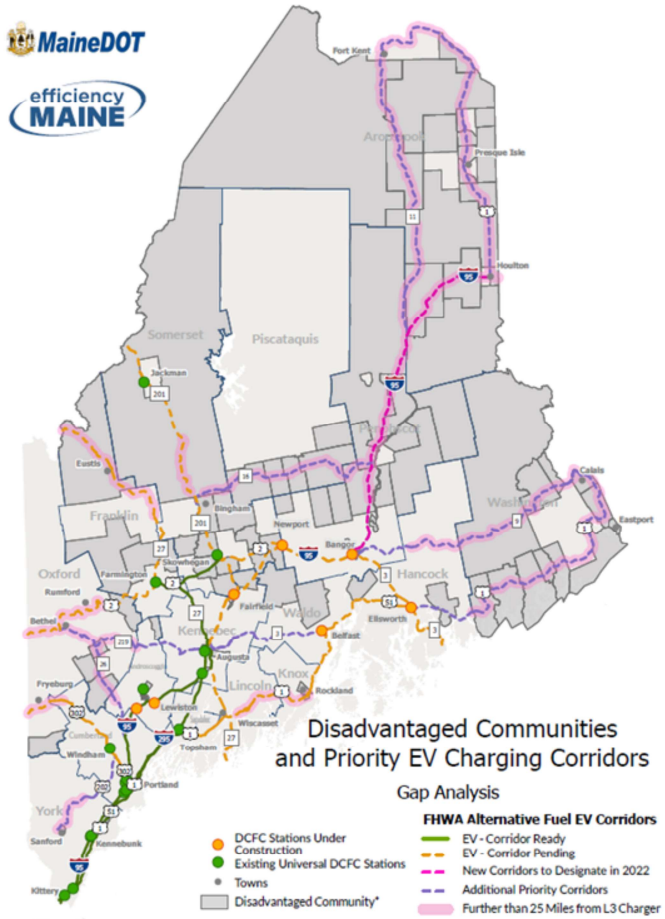


Fig. 1

- Consistent with NEVI Formula Program guidance, this Plan aims to deliver at least 40% of EV charging investments in DACs
- DACs are identified using the Council on Environmental Quality (CEQ) screening tool: https://screeningtool.geoplatform.gov/
  - Considers income, environmental, and other socio-economic and demographic factors

	Estimated DCFC Investment	% of Estimated Investment	Plugs	% of Total Plugs
In DAC	$16,894,300	58%	82	57%
Not in DAC	$12,487,400	43%	60	42%
Total	$29,381,700	100%	142	100%

12

The NEVI formula program guidance directs states to deliver at least 40% of EV charging investments in disadvantaged communities (DAC). DACs are those census tracts highlighted in gray in Figure 1. You can learn more about how DACs are defined at https://screeningtool.geoplatform.gov/. This slide shows an estimate of the amount of DCFC investment that will be directed to DACs vs. other areas.

Budget allocation – DCFC vs Level 2

- Allocation of Assumed Revenues to LDV Charging
  - $38 million NEVI, IIJA Competitive Grants, ARPA, NECEC
  - 80% for DCFC and 20% for Level 2
  - Approx. $29 million for DCFC and $7.2 million for L2
- Reasoning:
  - DCFCs fill the biggest, most urgent need for increasing EV use in Maine
    - critical complement to home/overnight charging to address range anxiety/needs
    - face biggest barriers (most expensive/financial risk, most technical hurdles)
  - Public L2 charging is an important supplement to DCFC but requires less public funding
    - 1/10th the cost of DCFC, lower operating costs
    - better match (than DCFC) between costs and benefits to host site as an amenity or attraction for property owners or tenants (e.g., restaurant, hotel, large employer)

13

Approximately 80% of funding under this plan will be allocated to DCFC and 20% will be allocated to Level 2 charging. DCFCs have a far higher cost and fill the most urgent need for expanding EV charging access. Level 2 charging is an important supplement to DCFC but comes at a fraction of the cost.

Existing Public Charging Infrastructure

Fig. 2

14

Figure 2 shows the existing network of universal (non-Tesla) public chargers in Maine. The open circles represent DCFC under construction.

FHWA Alternative Fuel EV Corridors (AFC)

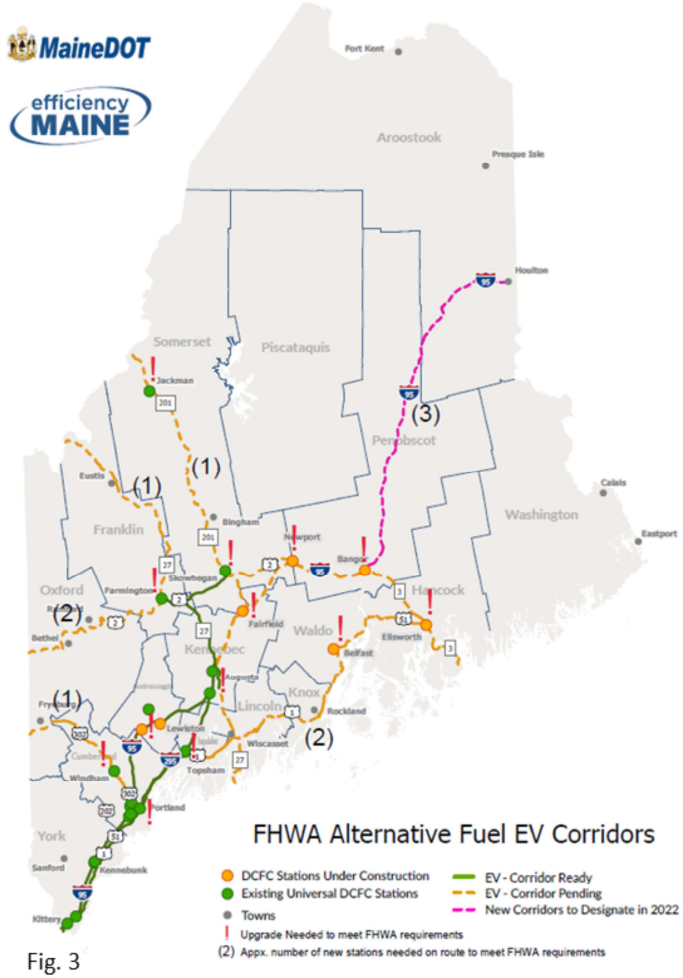


Fig. 3

- 7 – Estimated new sites needed to complete existing pending corridors
- 13 – Estimated existing sites on Pending and Ready corridors that must be upgraded to meet FHWA requirements
- **20 – Total new sites and upgrades needed**
- New corridor to designate in 2022:
  - I-95 from Bangor to Houlton (3 charging sites)

15

The Federal Highway Administration (FHWA) designates “Alternative Fuel Corridors” in each state (https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/). Maine has eight Alternative Fuel EV corridors: I-95 (Kittery to Bangor), I-295, Rt. 1 (Kittery to Ellsworth), Rt. 2 (Newport to NH border), Rt. 27, Rt. 201 (Fairfield to Canada border), Rt. 302 (Portland to NH border), and Rt. 3 (Bangor to Bar Harbor). Corridors can be either “Ready”, meaning they have DCFC stations spaced no more than 50 miles apart along the length of the corridor, or “Pending”, meaning there is a plan in place to install DCFC every 50 miles but the stations are not yet in place. Figure 3 shows the Ready and Pending corridors in Maine. Maine is currently in the process of nominating the remaining section of I-95 from Bangor to Houlton as a new Pending corridor.

The NEVI program requires that all stations on Alternative Fuel Corridors meet certain minimum requirements before the corridor is considered “fully built out”. Fully building out Maine’s Alternative Fuel Corridors will require building new stations and, in some cases, upgrading existing stations. Figure 1 shows the approximate number of new stations that will be needed along each corridor, as well as existing stations that do not currently meet the requirements and could be upgraded.

Estimated Number of Plugs Needed to Support LDV EV Projections

Total NEW Plugs Needed 2021-2025	L2	DCFC
Maine Won't Wait	1,546	504
ACCII	1,072	357
AEO 2021 Ref Case	182	83
EMT Triennial Plan V	1,285-1,655	187-327

- Does not include plugs for MUD or med/heavy duty vehicles

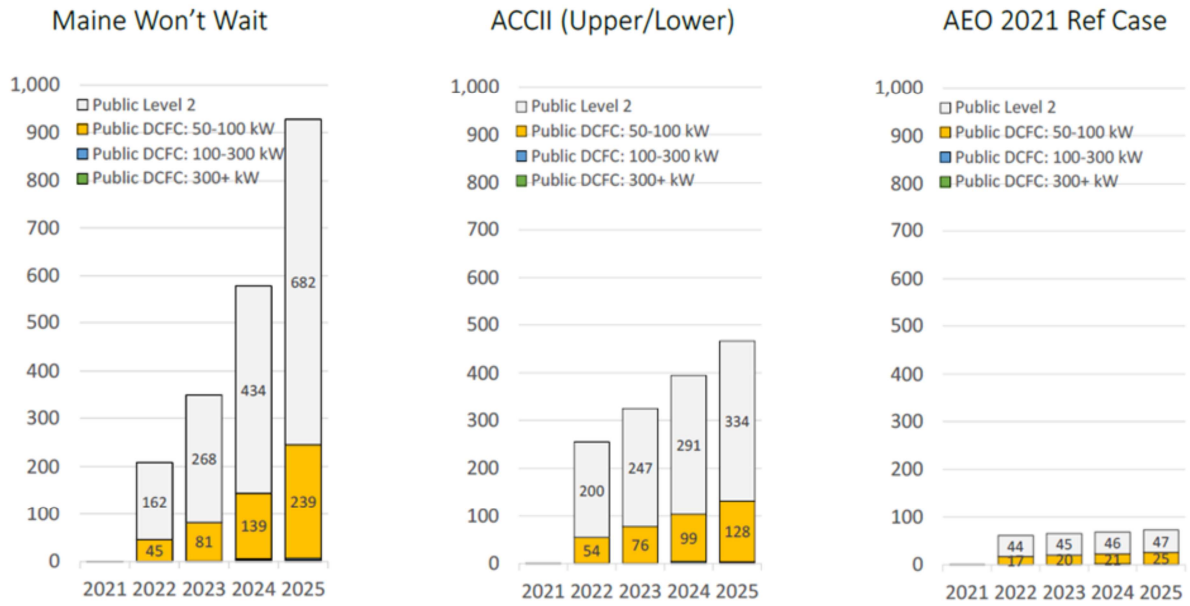


Figure 14. New Plugs Needed to Support Given EV Population

Source: Maine's Clean Transportation Roadmap

16

Maine's Clean Transportation Roadmap and Efficiency Maine's Triennial Plan V outlined several projections for the number of EVs that will be on the road by 2025 and the number of charging plugs that will be needed to support those projected numbers of vehicles. The table on the left shows the estimated number of L2 and DCFC plugs needed under each scenario.

LDV EVSE PRIORITY CATEGORIES (not sequential)

Category 1: Extending Lines and Filling Gaps w/High-Speed Charging (DCFC)	Category 2: On-Street/Lot Parking	Category 3: Destination Charging
Serving drivers needing expedited charging while away from their home or place of business, providing full coverage across the state	Serving tenants, condos, & others lacking off-street parking	Serving day-trippers, overnight visitors, tourists either off the main roads or where extra capacity is needed.
A. Alternative Fuel Corridors	A. DCFC – where overnight charging is not practical, esp. providing access for LMI residents	A. DCFC - very highly trafficked, short stay, or day-trippers
B. Other priority corridors	B. L2 - for overnight charging, esp. LMI residents	B. L2 - longer stay or overnight
C. Adding capacity in high-traffic areas	C. L2 - for workplace charging	

17

Maine is choosing to group charging infrastructure investments into three broad priority categories. The following slides and maps illustrate each of these priority categories, estimated number of plugs and estimated budgets. Note that the categories are not sequential- investments in multiple categories could be made at the same time.

I. Extending Lines and Filling Gaps

- DCFC Plugs: 114 L2 Plugs: 0 Budget: $22.3M
- Objective: Establish DC Fast charging at intervals of 30 to 50 miles along the full length of Alternative Fuel Corridors and other key routes.
- Add or upgrade existing stations on Alternative Fuel Corridors to meet new FHWA guidelines

CANDIDATE ROUTE SEGMENTS

- Bangor to Fort Kent (I-95, Rt 1)
- Bangor/Ellsworth to Calais/Eastport (Rt 9, Rt 1)
- Howland to Bingham (Rt 6, Rt 16)
- Brunswick to Ellsworth (Rt 1)
- Brunswick to Portland (Rt 1, I-295)
- South Portland to Kittery (Rt 1, I-95)
- Augusta to Belfast (Rt 3)
- Augusta to Bethel (Rt 202, Rt 219)
- Augusta/W Gardiner to Bethel (Rt 133, Rt 219)
- Gray/Lewiston to Bethel (Rt 26)
- Windham to Sanford (Rt 202)
- Windham to Fryeburg (Rt 302)
- Farmington to Bethel (Rt 2)
- Farmington to Eustis (Rt 27)
- Sherman to Ft. Kent (Rt 11)
- Skowhegan to Jackman (Rt 201)

18

The first category aims to establish DC Fast charging at intervals of 30 to 50 miles along the full length of Alternative Fuel Corridors and other key routes. Priority I includes both new stations and upgrades along Alternative Fuel Corridors. In addition to the FHWA Alternative Fuel Corridors, Maine has identified other priority corridors where DC fast charging will be needed.

I. Extending Lines and Filling Gaps

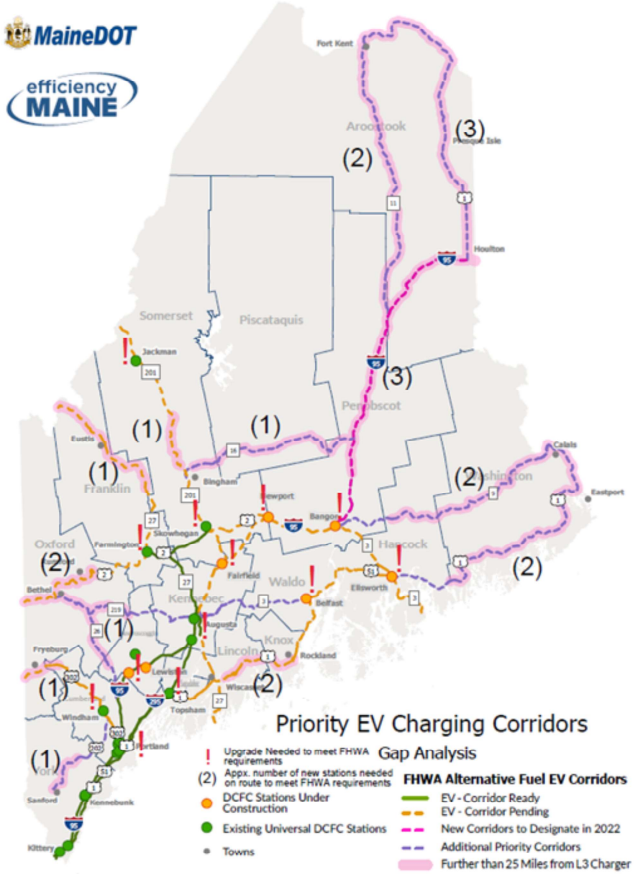
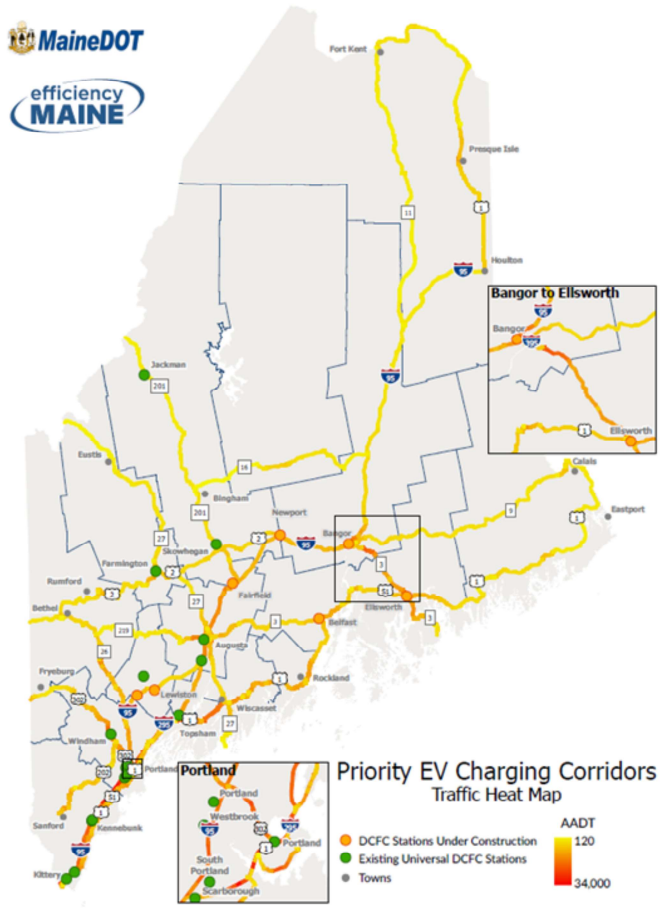


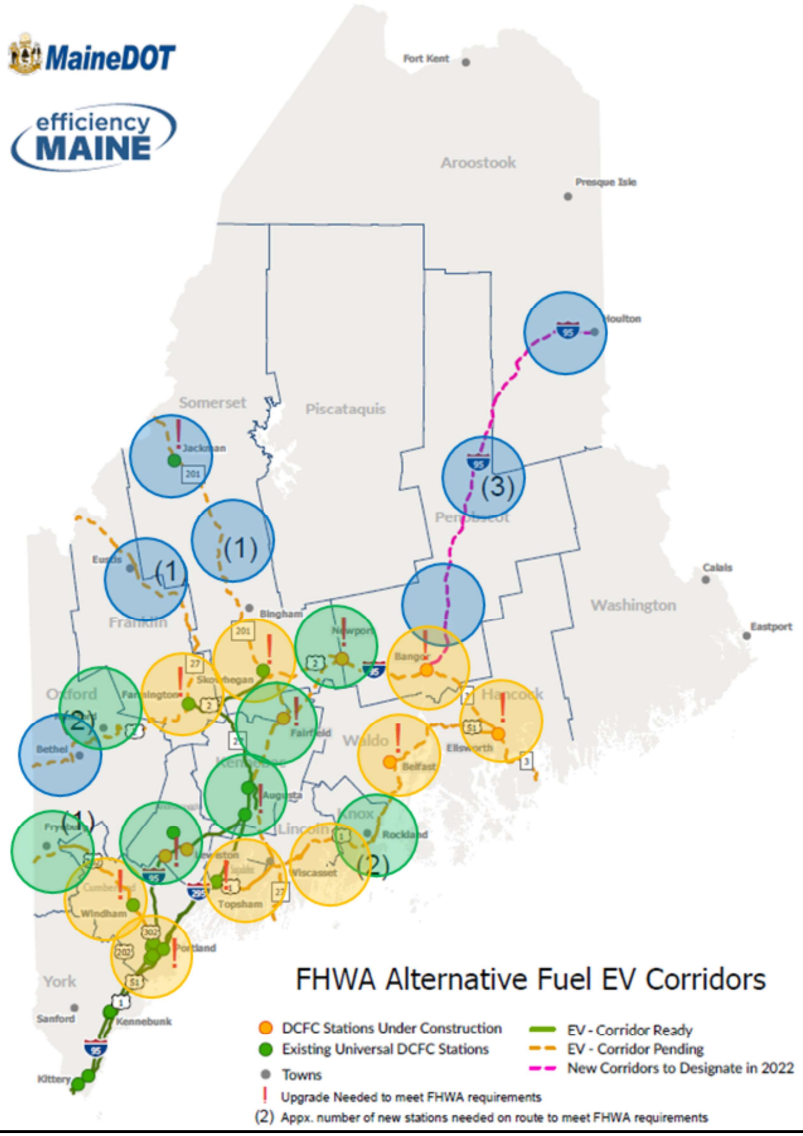
Fig. 4 EV Charging Gap Analysis, existing chargers, and new chargers and upgrades needed to meet FHWA requirements



19

Fig. 5 Average Annual Daily Traffic on Alt. Fuel Corridors and other priority routes

Figure 4 shows the expected buildout of stations under Priority I. Some of these will be new stations (indicated by numbers in parentheses) and some may be upgrades to existing stations (shown by red exclamation marks) OR new stations. Pink highlights indicate sections of highway that lack the desired 50-mile spacing of DCFC. Note that actual charging locations have not been identified and will be selected by competitive solicitations.



Initial Buildout of AFC

Stage 1: Years 1-5 (NEVI Period)

Low traffic sites

Medium traffic sites

High traffic sites

Fig. 6 In the initial stage, DCFC sites are sized based on the amount of traffic they receive. High traffic sites are built to the full NEVI scope in the beginning while lower traffic sites are initially built with a smaller number of plugs and/or with power sharing to allow for a lower maximum kW per site. In all cases, the electrical service is sized to accommodate an upgrade to the full NEVI scope (min. 600kW per site) in the later stages of buildout.

20

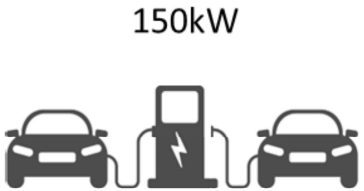
Fig. 6

In the initial stage of buildout, DCFC sites are sized based on the amount of traffic they receive. High traffic sites are built to the full NEVI scope in the beginning while lower traffic sites are initially built with a smaller number of plugs and/or with power sharing to allow for a lower maximum kW per site. In all cases, the electrical service is sized to accommodate an upgrade to the full NEVI scope (min. 600kW per site) in the later stages of buildout.

Initial Buildout of AFC Based on Traffic Volume

Low Traffic Sites

- AADT < 7,500
- 1 x 150kW shared between 2 plugs
- Can deliver 150kW to a single vehicle or 75kW each when shared
- Electrical service capable of 600kW per site (1600A)

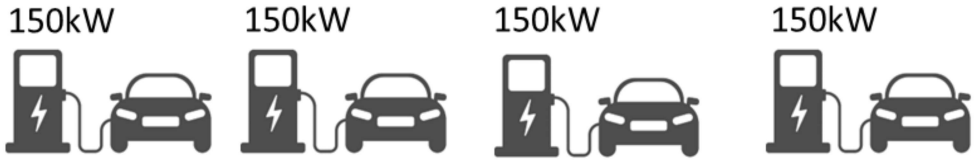


Medium Traffic Sites

- AADT between 7,500 and 17,500
- 2 x 150kW shared between 2 plugs
- Can deliver 150kW to 2 vehicles or 75kW to 4 vehicles
- Electrical service capable of 600kW per site (1600A)

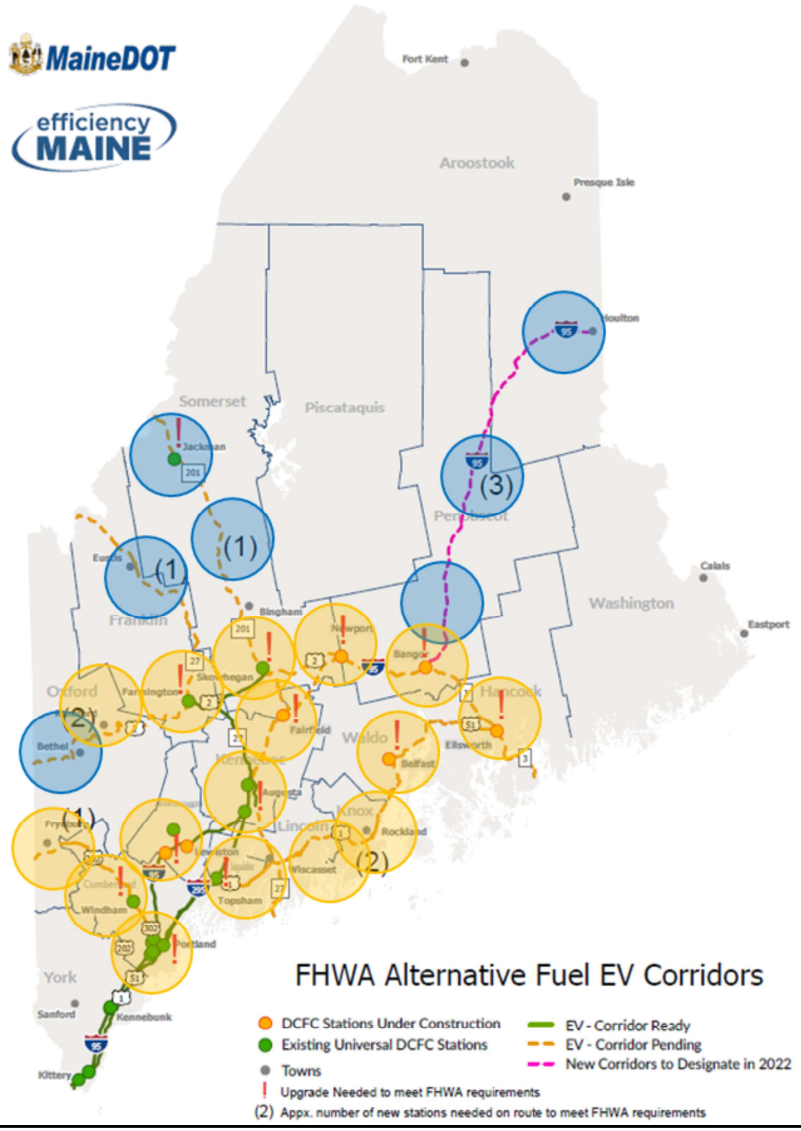
High Traffic Sites

- Annual Average Daily Traffic (AADT) > 17,500
- 4 x 150kW plugs
- Can deliver 150kW to 4 vehicles simultaneously
- Electrical service capable of 600kW per site (1600A)



21

In the initial stage of buildout, proposed configurations range from 2 to 4 plugs per site and may share power output between two plugs (low and medium traffic sites) or be capable of dispensing 150kW to four vehicles simultaneously (high traffic sites). Each configuration will be “future-proofed” so the electrical service can accommodate an upgrade to the full NEVI scope of 4 x 150 kW plugs in the future.



Interim Buildout of AFC

Stage 2

Low traffic sites

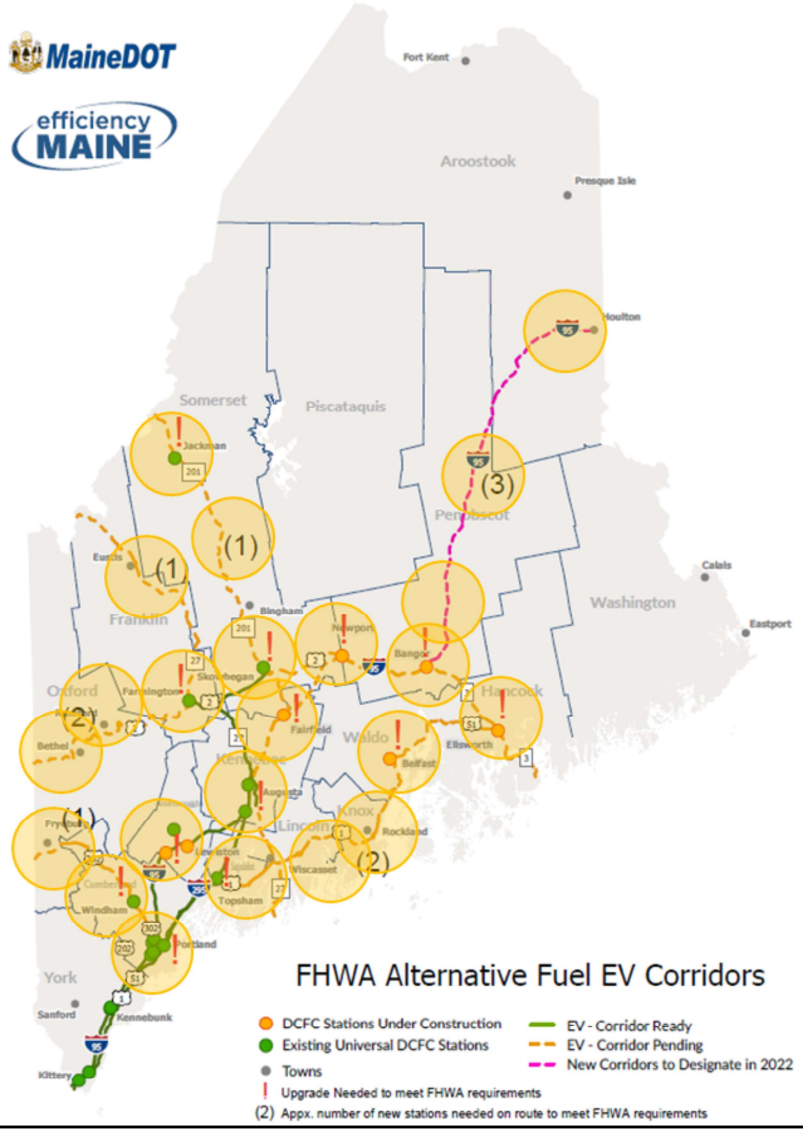
Medium and high traffic sites: Full buildout

Fig. 7 In the interim stage of buildout, medium traffic sites are upgraded to full NEVI standards, while low traffic sites remain at partial buildout. Data on DCFC use will dictate how soon sites are upgraded to the full NEVI standard. Maine will continue to monitor charging investments by private entities to determine whether public investment is still needed.

22

Fig. 7

In the interim stage of buildout, medium traffic sites are upgraded to full NEVI standards, while low traffic sites remain at partial buildout. Data on DCFC use will dictate how soon sites are upgraded to the full NEVI standard. Maine will continue to monitor charging investments by private entities to determine where public investment is still needed.



Full NEVI Buildout

Stage 3

All sites

Fig. 8 In the final stage, all sites along Alternative Fuel Corridors are built to the full NEVI standard with 4 x 150kW plugs and a total power capability per site of no less than 600kW.

23

Fig. 8

In the final stage, all sites along Alternative Fuel Corridors are built to the full NEVI standard with 4 x 150kW plugs and a total power capability per site of no less than 600kW.

II. On-Street/Lot Parking

- DCFC Plugs: 30 L2 Plugs: 600 Budget: $7.5M
- Objective: Deploy L2 and DCFC to serve the needs of apartment dwellers, particularly low and moderate income (LMI) households and adding capacity in major pop. areas
  - DCFC - to serve apartments/condos and others, esp. LMI, where overnight charging is not practical
  - L2 - for overnight charging, esp. LMI
  - L2 - for workplace charging

24

Category II aims to serve apartment-dwellers who do not have access to home charging, particularly low and moderate income (LMI) households. This category may include DCFC located near high concentrations of multi-unit dwellings (MUD), Level 2 chargers at MUDs, and Level 2 chargers at workplaces.

II. On-Street/Lot Parking

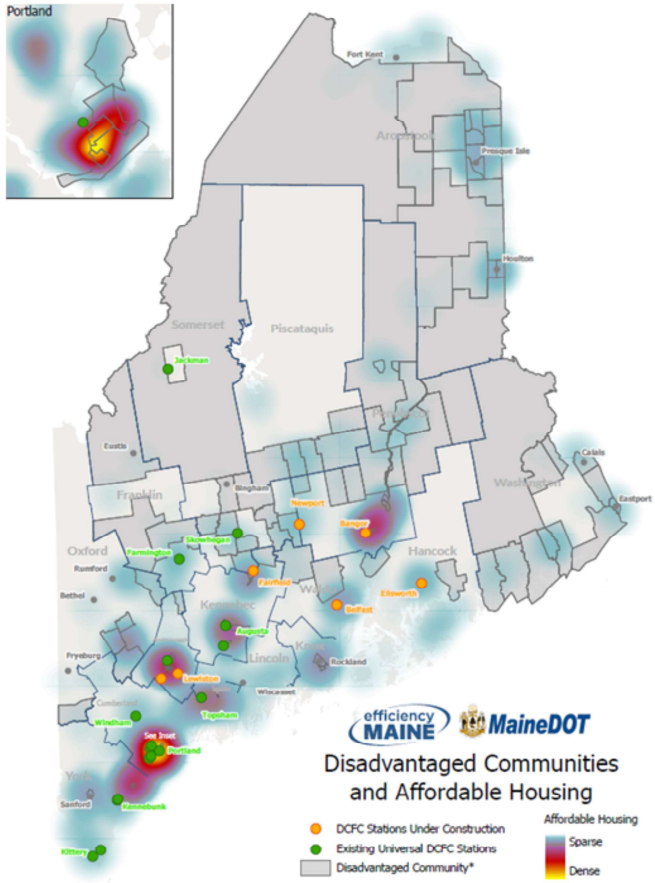


Fig. 9 Density of affordable housing developments and disadvantaged communities (DACs) shaded in gray.

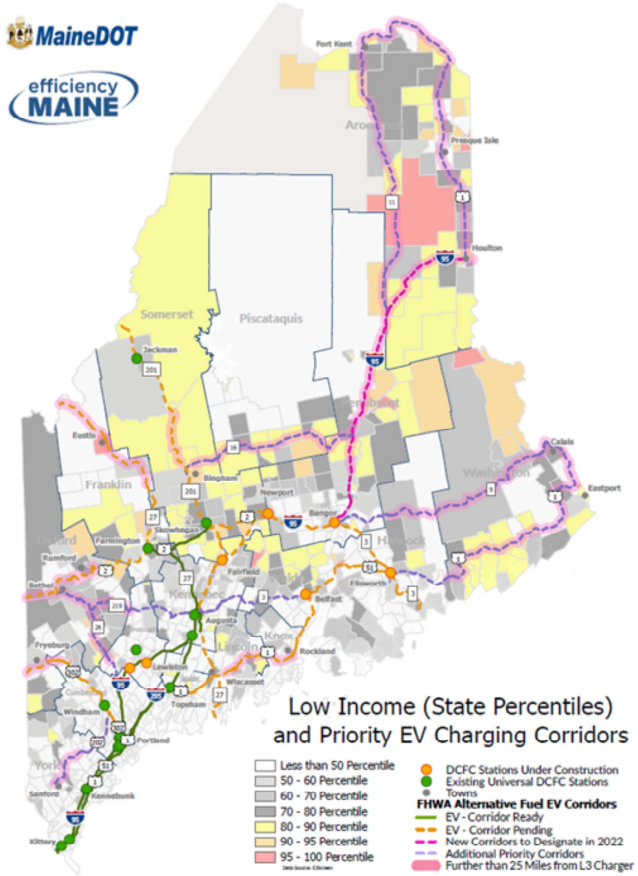


Fig. 10 Charging gap analysis and low income state percentiles. Census tracts in red and orange have a higher percentage of low income residents relative to other tracts.

25

Concentration of affordable housing developments, disadvantaged community (DAC) status, and percentage of low income residents may be used to identify priority towns and neighborhoods for investment under Category II.

III. Destination Charging

- DCFC Plugs: 18 L2 Plugs: 500 Budget: $5.6M
- Objective: Install chargers at destinations that are remote from major thoroughfares or are in highly trafficked destinations. Deploy DCFC at major destinations, especially those subject to day-trippers.
- Consider if sites already served by other DCFCs

CANDIDATE DESTINATIONS for DCFC:

○ Rangeley	○ Greenville/Moosehead
○ Millinocket	○ Boothbay
○ Bar Harbor/Acadia	○ Gorham/Standish
○ Old Orchard Beach	○ Wells/Ogunquit

26

Category III targets major destinations that will not be served by the other two categories. These destinations are either located away from priority charging corridors or will need additional capacity to serve a high volume of visitors. Some candidate destinations for DCFC are listed on this slide.

III. Destination Charging

Fig. 9 Areas marked by gray circles represent top travel destinations not served by existing fast charging infrastructure AND either located away from priority routes OR will need additional fast charging infrastructure to meet tourism demand.

Data Sources: Arrivalist and Maine Office of Tourism.

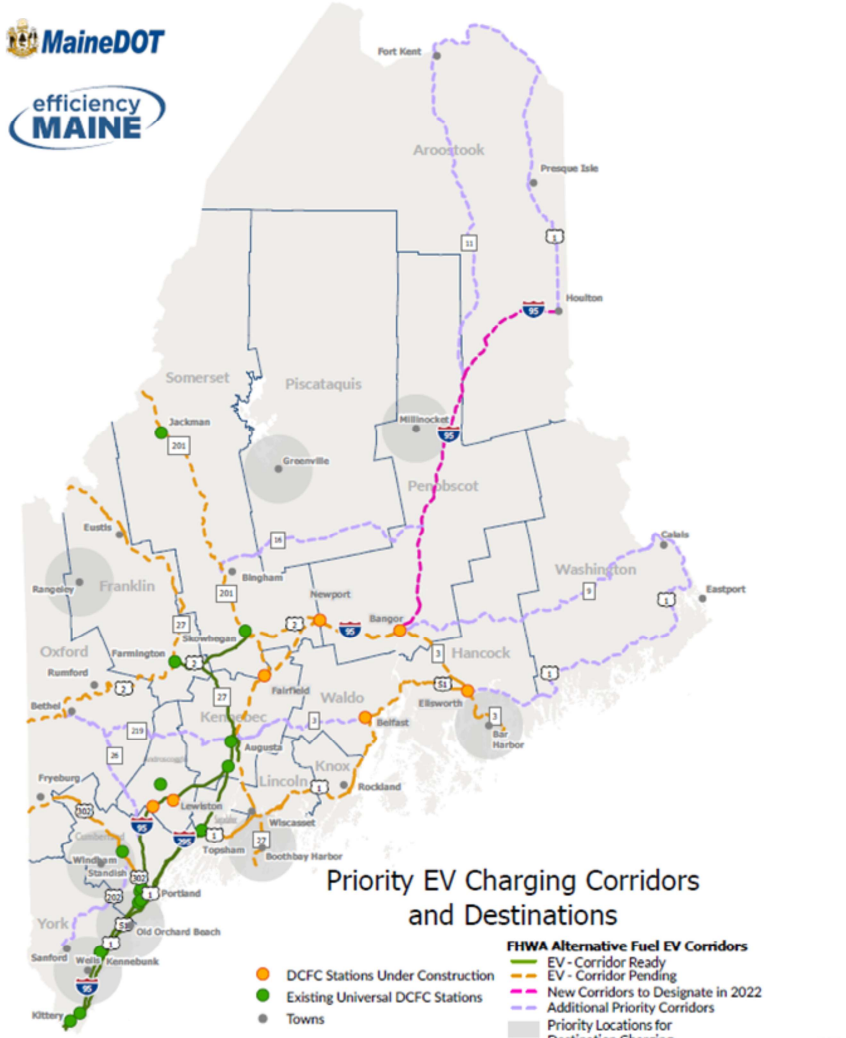


Fig. 11

Areas marked by gray circles represent top travel destinations not served by existing fast charging infrastructure AND either located away from priority routes OR will need additional fast charging infrastructure to meet tourism demand.

Proposed Incentive Design

	DCFC	Level 2
Incentive Type	• Grant	• Grant • Rebate
Application	• Competitive RFP	• Competitive RFP • Rebate application with pre-approval
Targeting	• Priority Corridor Segments • Priority Towns • NOT specific host sites • May bundle multiple locations together in one RFP ***or*** take bids for individual sites	• Priority Regions • Priority Sectors (e.g. tourism or multifamily) • NOT specific host sites
SAMPLE Incentive Amounts	• 80% Capital Incentive* • Some operating costs may be covered	• Fixed incentive per plug up to 80% of project cost* • Incentives may vary by region/sector
Contracting	• Efficiency Maine to contract with successful bidders	• Efficiency Maine to contract with successful bidders

**Incentive amounts are subject to change*

28

For DC fast chargers, Efficiency Maine will use competitive solicitations to select sites. For Level 2 chargers, Efficiency Maine may use competitive bidding or non-competitive rebates.