FEMP ZEV Planning Resources

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The ZEV Ready Solution

Framework to **simplify and guide fleets through the process** to electrify each fleet location
15 Steps to Electrification

- The three-part framework is organized into 15 steps designed to simplify the site-level planning for electrification

https://www.energy.gov/femp/federal-fleet-zev-ready-center
Stakeholder Engagement

- ZEV Ready outlines the steps where each key stakeholder should be involved.
- The process is organized into 4 planning component areas to track completion.
Fleet Tools for ZEV Ready Analysis

Planning
- Step 1: Identify and coordinate team
- Step 2: Review training materials
- Step 3: Review requirements, goals, and data
- Step 4: Align headquarters strategy with site planning

Design
- Step 5: Identify ZEV opportunities
- Step 6: Identify EVSE opportunities
- Step 7: Coordinate site financial planning with headquarters
- Step 8: Engage with key electrification stakeholders at site
- Step 9: Coordinate with local utility service
- Step 10: Complete site assessment and design EVSE
- Step 11: Identify EVSE at non-agency locations
- Step 12: Work with leadership to secure EVSE funding

ZEV Active
- Step 13: Acquire ZEVs and EVSE
- Step 14: Install and activate EVSE
- Step 15: Support drivers in using ZEVs and EVSE

Initial Scoping

Technical Design

Vehicle Management

https://www.energy.gov/femp/federal-fleet-zev-ready-center
FEMP Tools and Resources

Tools/resources developed by FEMP and referenced throughout ZEV Ready

- **Technical Training**
  - EV Champion Training, Short Video Series, Worksheets, Review Materials

- **EVI-LOCATE**
  - Automated tool to support virtual site assessments and EVSE cost estimates

- **Case Studies**
  - Short summaries of electrification solutions currently in use by the federal fleet

- **Reports and Program Guides**
  - Detailed summary reports from various projects and program guide documents

- **FleetDASH, ZPAC, and much more!**

FEMP Technical Training

● EV Champion Training
  ○ 4-part webinar series on fleet electrification basics
  ○ Supplementary worksheets
  ○ Short review videos on YouTube

● Regular meetings on new and upcoming resources
  ○ INTERFUEL (quarterly)
  ○ FEVAR (monthly)

Automated tool for virtual site assessments

1. Drag and drop tool > Users select EVSE location
2. Siting algorithm estimates trenching distances
3. National Electrical Code drives electrical upgrades
4. Calculator estimates material, labor, and soft costs

For NREL Parking Garage (Annie - Denver - Colorado)
New Resources Coming Soon!

- New and Improved Tools
  - ZPAC and FleetDASH Updates
  - EVI-LOCATE Dashboard and DCFC
  - EVI-Ratio Development

- Training/Resources
  - EV Champion Training 2.0
  - ZEV Ready Updates
  - EVI-LOCATE Videos
  - HTW EV Program Guide
FleetDASH and ZPAC for ZEV Planning

FleetDASH and ZPAC provide ZEV fleet evaluation frameworks based on agency data.

**FleetDASH:**
- Web application
- Track detailed fleet fueling behavior
- Target ZEV acquisitions

https://federalfleets.energy.gov/FleetDASH

**ZEV Planning and Charging Tool (ZPAC):**
- Excel based tool
- Sitewide or fleetwide ZEV planning
- Plan ZEV acquisitions and EVSE installs
FleetDASH Fleet Mandate Support

1. Use alternative fuel including electricity

2. Acquire alternative fuel vehicles (AFVs) & zero emission vehicles (ZEVs)

**Legislative Mandates**

**EPAct 1992:** 75% LD vehicles AFVs

**EPAct 2005, section 701:** Alt fuel in dual-fuel vehicles

**EISA 2007, section 142:**
- Increase alt fuel use
- Decrease petroleum use

**EISA 2007, section 246:** Install renewable fuel pump

**Executive Order 14057**

**Section 205 (ii):**
- 100% ZEV LDV acquisitions by FY 2027
- 100% ZEV acquisitions by FY 2035
- Annual Zero-Emission Fleet Strategic Plan

https://www.energy.gov/femp/federal-fleet-requirements-resource-center
FleetDASH Data Sources

**Fuel transaction data**
- Date of transaction
- Address of fuel purchase
- Vehicle fuel type
- Fuel type purchased
- Fuel quantity purchased

**Fleet inventory data**
- Organization
- Make, model, year
- Vehicle type
- Law enforcement/ emergency response
- Mileage

**Transaction Summary:**
- January 12, 2021
- 15065 W Colfax Ave Golden, CO 80401
- E85 capable vehicle
- Gasoline purchase
- 13 gallons
25 agencies have data in FleetDASH.

Primarily GSA leased vehicle data (3 agencies w/ agency-owned data).

Transaction and inventory data is loaded monthly.

Fleet hierarchies developed with agency leadership based on GSA BOAC codes.

Most agencies require approval from national fleet manager for account approval.
EPAct 2005 Section 701:
“Dual-fueled vehicles … shall be operated on alternative fuels unless … qualifies for a waiver…”

FleetDASH automates the waiver request requirement for vehicles in FleetDASH.

Transactions beyond 3 miles of available alternative fuel are waived.

More on Section 701:
Plug-in hybrid electric vehicles (PHEVs) are covered dual-fueled vehicles under section 701.

- Assumed to have garage location charging available.
- Charging data is limited.
- FAST is the primary source for PHEV performance tracking.

ChargePoint RFID card for tracking charging at public stations:
- GSA Fleet Services Card at public charging stations
How many vehicles have a ZEV replacement of the same vehicle segment?

Updated with FY23 fuel consumption and FY24 AFV availability.
What are the petroleum and cost saving opportunities for switching to a ZEV?
FleetDASH AFV Screening Tool

Are there public fast charging stations where the vehicle operates?
ZPAC Overview

ZPAC is an optional tool.

Email mark.singer@nrel.gov for your FY 23 fleet-specific copy.
FY 24 ZPAC is planned to be available in late April 2024.
ZPAC Inputs and Overview

Provides a holistic framework for targeting ZEVs and EVSE.
Annual FAST submission provides your agency’s complete inventory.
FleetDASH provides additional attributes, analysis, and mapping capability.
GSA AFV guide provides ZEV vehicle type availability.
User-provided vehicle locations are based on available inventory fields.
Supports ZEV Strategic Plans and Quarterly EVSE Deployment reporting.
Goals for Planned FY 24 ZPAC Update

Simplify user steps and provide defaults where possible.

Remove the need for any macros.

Support multi-year summary outputs.

Align outputs with E.O. 14057 ZEV Strategic Plans
ZPAC Process

Step 1: Define Fleet Site Locations

Step 2: Evaluate Vehicles and Plan ZEV Acquisitions

Step 3: Evaluate EVSE Needs for ZEV Acquisitions

Step 4: Evaluate High Level Plan
Identify ZEV Sites

Fleets begin by identifying specific parking locations where ZEVs will be parked and require charging infrastructure.
Which vehicles to electrify?

Fleets review vehicle evaluation and determine which vehicles will be planned for ZEV replacement and estimate a replacement year.

**CONCEPT DEVELOPMENT**

**BEV Considerations**

<table>
<thead>
<tr>
<th>BEV SIN Availability</th>
<th>Modeled BEV Range Concerns*</th>
<th>Reported BEV Range Concerns (Dropdown)</th>
<th>BEV GHG Emission Reduction Potential</th>
<th>Quality of BEV Candidate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 - Similar BEV</td>
<td>3 - Unknown</td>
<td>1 - Very High</td>
<td>2 - Good</td>
<td></td>
</tr>
<tr>
<td>2 - Similar BEV</td>
<td>2 - Some Public Charging</td>
<td>1 - Very High</td>
<td>2 - Good</td>
<td></td>
</tr>
<tr>
<td>ZEV replacement available?</td>
<td>Nightly charging sufficient? Limit mission disruption</td>
<td>Fuel, cost, and emissions benefits?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 - Similar BEV</td>
<td>Minimal Public Charging</td>
<td>1 - Very High</td>
<td>2 - Good</td>
<td></td>
</tr>
<tr>
<td>2 - Similar BEV</td>
<td>Frequent Public Charging</td>
<td>1 - Very High</td>
<td>3 - Mediocre</td>
<td></td>
</tr>
<tr>
<td>2 - Similar BEV</td>
<td>Very Frequent Public Charging Likely</td>
<td>1 - Very High</td>
<td>4 - Challenging</td>
<td></td>
</tr>
</tbody>
</table>

**Decision Point**

<table>
<thead>
<tr>
<th>ZEV Preference</th>
<th>Plan Year of Acquisition</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEV</td>
<td>2024</td>
</tr>
<tr>
<td>BEV</td>
<td>2025</td>
</tr>
<tr>
<td>BEV</td>
<td>2027</td>
</tr>
<tr>
<td>PHEV</td>
<td>2024</td>
</tr>
<tr>
<td>BEV</td>
<td>2025</td>
</tr>
<tr>
<td>BEV</td>
<td>2030</td>
</tr>
</tbody>
</table>
| Eliminate      | 2025                     | 24
ZEV plans are summarized by defined sites to support evaluation of charging port requirements.

<table>
<thead>
<tr>
<th>Priority EVSE Deployment</th>
<th>Site Information</th>
<th>BEVs - Level 2 Charging Ports</th>
<th>PHEVs - Level 1 Charging Ports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agency</td>
<td>Site Name</td>
<td>ZIP</td>
</tr>
<tr>
<td>Yes</td>
<td>Federal Agency</td>
<td>Site 1</td>
<td>ZIP 1</td>
</tr>
</tbody>
</table>

Vehicle Location Summary

Size EVSE for specific locations and ZEV targets
Evaluate Summary Plan

How will annual acquisition decisions affect E.O. goal attainment?

How will ZEV fleet grow in near and long term?
Evaluate Summary Plan

Track progress of electrification plans.

Will port plans align with ZEV acquisition goals?

ZEV and EVSE Site Plan (20 Vehicles)

- Existing L2
- Existing ZEVs
- Planned L2 Additions
- Planned Additional ZEVs

CONCEPT DEVELOPMENT
Goals for Planned FY 24 FleetDASH Update

Align FleetDASH with ZPAC ZEV evaluation framework.

Identify top opportunities for ZEV replacement.

Track growth in fleet ZEV inventory.

Support ZEV charging behavior tracking.

Continue to provide fleet drilldown capability to individual vehicles.
## FY 24 Planned FleetDASH Updates

Align FleetDASH with ZPAC ZEV evaluation framework.

<table>
<thead>
<tr>
<th>VIN</th>
<th>Vehicle Weight Class</th>
<th>Vehicle Type</th>
<th>Previous 12 months GGEs</th>
<th>GHG Emission Reduction Potential</th>
<th>BEV Availability</th>
<th>Estimated Days Above 250 Miles?</th>
<th>% Near Public Fast Charging?</th>
<th>Quality of ZEV Candidate</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXXXXXXX1</td>
<td>LD</td>
<td>Sedan/St Wgn Compact</td>
<td>3,000</td>
<td>Very High</td>
<td>Identical BEV</td>
<td>2</td>
<td>10%</td>
<td>GREAT</td>
</tr>
<tr>
<td>XXXXXXXX2</td>
<td>LD</td>
<td>LD Minivan 4x2</td>
<td>300</td>
<td>Moderate</td>
<td>Consider PHEV</td>
<td>1</td>
<td>75%</td>
<td>GREAT</td>
</tr>
<tr>
<td>XXXXXXXX3</td>
<td>LD</td>
<td>LD SUV 4x4</td>
<td>2,000</td>
<td>Very High</td>
<td>Identical BEV</td>
<td>15</td>
<td>40%</td>
<td>MEDIocre</td>
</tr>
<tr>
<td>XXXXXXXX4</td>
<td>LD</td>
<td>LD SUV 4x4</td>
<td>700</td>
<td>High</td>
<td>Identical BEV</td>
<td>5</td>
<td>20%</td>
<td>GREAT</td>
</tr>
<tr>
<td>XXXXXXXX5</td>
<td>MD</td>
<td>MD Pickup</td>
<td>2,500</td>
<td>Very High</td>
<td>Similar BEV</td>
<td>25</td>
<td>10%</td>
<td>CHALLENGING</td>
</tr>
<tr>
<td>XXXXXXXX6</td>
<td>MD</td>
<td>MD Pickup</td>
<td>250</td>
<td>Moderate</td>
<td>Similar BEV</td>
<td>2</td>
<td>10%</td>
<td>GREAT</td>
</tr>
<tr>
<td>XXXXXXXX7</td>
<td>HD</td>
<td>HD Bus</td>
<td>4,000</td>
<td>Very High</td>
<td>Similar BEV</td>
<td>30</td>
<td>40%</td>
<td>CHALLENGING</td>
</tr>
</tbody>
</table>
FY 24 Planned FleetDASH Updates

Track growth in ZEV inventory and identify challenging vehicles to electrify.
FY 24 Planned FleetDASH Updates


Continue to include charging data as it is available.

Develop views highlighting ZEV charging and DCFC station growth.
Thank you!

Mark Singer, NREL