Federal Fleet Composition and Operation
FedFleet Conference 2017
Washington Auto Show

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Bentley Energy Consulting

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AGENDA

Federal Fleet Requirements and Goals

FedFleet Performance and Trends

Strategies for Reducing GHG Emission Reductions
Executive Order 13693

Planning for Federal Sustainability in the Next Decade

• Signed on March 19, 2015

• “Maintain Federal leadership in sustainability and greenhouse gas emission reductions”

• “Expanded and updated Federal environmental performance goals”

• “Continue to drive national greenhouse gas reductions and support preparations for the impacts of climate change”
The overarching Federal fleet goal is to reduce GHG emissions [and increase efficiency] across Federal operations.

E.O. 13693 Federal fleet metric: fleet-wide per mile GHG emissions

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**Reduce GHG Emissions**

**Reduce Fleet-wide Per Mile GHG Emissions**

- **Create Agency Strategic Plan**
  - E.O. 13693

- **Establish VAM to Right-size Fleets**
  - E.O. 13693

- **Increase Fleet Fuel Efficiency**

- **Acquire AFVs and Use Alternative Fuel**
  - E.O. 13693

- **Acquire ZEVs and PHEVs**
  - EISA Sec. 141

- **Acquire Low Emitting GHG Vehicles**
  - E.O. 13693

- **Deploy Telematics and Manage Asset-Level Data**
  - E.O. 13693

- **Acquire AFVs**
  - EPAct 1992

- **Use Alternative Fuel in AFVs**
  - EPAct 2005 Sec. 701

- **Install Renewable Fuel Pumps**
  - EISA Sec. 246
## E.O. 13693
### Flexibility in Reducing GHG Emissions

<table>
<thead>
<tr>
<th>Overarching Objective</th>
<th>Old E.O.s 13423 &amp; 13514</th>
<th>E.O. 13693</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reduce overall annual fleet GHG emissions as part of agency-established reduction target for FY 2008 to FY 2025</strong></td>
<td></td>
<td><strong>Same with updated agency targets</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Primary fleet performance metric(s)</th>
<th><strong>Petroleum Reduction</strong></th>
<th><strong>Per-Mile GHG Emissions Reduction</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires 2 percent annual reduction from FY 2005 to FY 2020</td>
<td><strong>Alternative Fuel Use</strong></td>
<td>FY 17: 4 percent reduction</td>
</tr>
<tr>
<td>Requires 10 percent annual increase starting from FY 2005 baseline through FY 2015</td>
<td></td>
<td>FY 21: 15 percent reduction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FY 25: 30 percent reduction</td>
</tr>
</tbody>
</table>

“allows agencies to continue to meet their mission requirements while also achieving significant GHG reductions”

Federal Energy Management Program
## Overview of Federal Fleet Sustainability Requirements

<table>
<thead>
<tr>
<th>Fleet Requirement</th>
<th>Statute or Executive Order</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GHG</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Reduce per Mile GHG emissions           | E.O. 13693 Sec. 3(g)(ii)  | • 4% reduction by FY17  
• 15% by FY21  
• 30% by FY25                                             |
| Reduce overall GHG emissions            | E.O. 13693 Sec. 2         | Reduce fleet GHG emissions as part of agency-established reduction target for FY 2008 to FY 2025 |
| Optimum fleet inventory, right-size fleets | E.O. 13693 Sec. 3(g)(iv) | Establish a structured VAM to determine the appropriate size and number of motor vehicles         |
| Acquisition of ZEVs and PHEVs           | E.O. 13693 Sec. 3(g)(v)   | • 20% of new passenger vehicle acquisitions by FY20  
• 50% of new passenger vehicle acquisitions by FY25                                     |
| **Vehicle Acquisition**                 |                           |                                                                                                |
| Acquisition of AFVs                     | EPAct 1992                | At least 75 percent of LDVs acquired in MSAs/CMSAs must be AFVs                                 |
| Acquisition of low GHG-emitting vehicles | EISA § 141                | Prohibits agencies from acquiring vehicles that are not low-GHG-emitting vehicles               |
| **AF Use**                              |                           |                                                                                                |
| Alternative fuel use in AFVs            | EPAct 2005 § 701          | All dual-fueled vehicles must use alternative fuel if reasonably available (i.e., unless waived) |
| Alternative fuel infrastructure         | EISA § 246                | Every federal fleet fueling center must install a renewable fuel pump                           |
Federal Fleet Requirements and Goals

FedFleet Performance and Trends

Strategies for Reducing GHG Emission Reductions
### FY 2016 Federal Fleet Compliance Summary

<table>
<thead>
<tr>
<th>Requirement</th>
<th>FY 16 Performance</th>
</tr>
</thead>
</table>
| **EO 13693 Per-mile GHG Emissions** | Reduce fleet-wide per-mile GHG emissions by 2% relative to FY 2014 baseline (for FY16) | **1.1 percent**  
24 of 32 covered agencies achieved compliance |
| **EPAAct 92 AFV Acquisitions** | 75% of “covered” Light-Duty Vehicle acquisitions must be AFVs | **203 percent**  
29 of 31 covered agencies achieved compliance |
| **EPAAct 2005 §701 Alternative Fuel Use in AFVs** | All dual-fueled AFVs must use alternative fuel if available (i.e., unless waived) | **90 GGE** of alternative fuel use per non-waivered dual-fuel AFV (preliminary estimate) |
Federal fleets have consistently exceeded EPAct 1992 AFV acquisition requirements.
Transformation of the fleet from conventional vehicles to AFVs (FY05-FY16)

- **E85 FFVs**: 14% → 33%
- **Hybrid**: 0% → 4%
- **Diesel**: 11% → 11%
- **Gasoline**: 73% → 52%

Data Summary:
- FY05: 12,135
  - Gasoline: 428,737
  - Diesel: 409,133
- FY06: 10,769
  - Gasoline: 418,892
  - Diesel: 409,133
- FY07: 9,286
  - Gasoline: 394,016
  - Diesel: 384,273
- FY08: 8,197
  - Gasoline: 384,273
  - Diesel: 374,105
- FY09: 6,474
  - Gasoline: 374,105
  - Diesel: 354,797
- FY10: 5,659
  - Gasoline: 354,797
  - Diesel: 339,857
- FY11: 5,092
  - Gasoline: 339,857
  - Diesel: 325,694
- FY12: 1,666
  - Gasoline: 325,694
  - Diesel: 320,014
- FY13: 1,437
  - Gasoline: 320,014
  - Diesel: 312,583
- FY14: 1,317
  - Gasoline: 312,583
  - Diesel: 323,983
- FY15: 1,207
  - Gasoline: 323,983
  - Diesel: 323,983
- FY16: 1,062
  - Gasoline: 323,983
  - Diesel: 323,983

Federal Energy Management Program
femp.energy.gov
E85 comprises majority of fleet alternative fuel use and increase from FY05 to FY16

Alternative Fuel Consumption by Federal Agencies

- 88% E85
- 3% CNG
- 7% Biodiesel
EPAct 2005 §701: Large opportunity to increase E85 and alternative fuel use

Federal fleets have steadily increased the number of dual-fueled AFVs subject to EPAct 2005 §701…

… but the alternative fuel use per non-waivered AFV has been decreasing since FY12
AGENDA

Federal Fleet Requirements and Goals
FedFleet Performance and Trends
Strategies for Reducing GHG Emission Reductions
The Core Principles of GHG Emission Reduction

Right-size fleets and vehicles to mission
- Completing VAM to identify and dispose of inefficient vehicles, and replace them with lower GHG emitting vehicles
- Reducing vehicle miles travelled

Replacing existing vehicles with higher fuel economy vehicles
- Right-sizing vehicles
  - Includes HEVs, PHEVs, and LSEVs

Operational changes
- Improved maintenance
- Driving more efficiently
- Avoiding Idling

Maximize displacement of conventional fuels w/ alternative fuels
- ZEVs & PHEVs and charging infrastructure
- E85, CNG, etc. that require infrastructure and AFVs
- B20 that requires infrastructure
## Principle 1: Right-size fleets to mission

**Requirement: VAM study and reports**

<table>
<thead>
<tr>
<th>Generate a fleet profile</th>
<th>Develop minimum utilization criteria</th>
<th>Compare existing fleet to actual mission requirements</th>
<th>Develop acquisition plan</th>
<th>Review and Update VAM</th>
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### Utilization study, vehicle inventory and mission requirements

- **Utilization study**, vehicle inventory and mission requirements
- Validate vehicle need based on mission needs, define baseline of required fleet
- Dispose or reassign vehicles as needed
- Evaluate alternatives where possible
- Create a multi-year acquisition plan, recommend vehicle type and size by location, and place AFVs where fuel is available
- Update VAM at least every five years (VAM reports)
Reduce Vehicle Miles Traveled

Low /No-Cost Solutions for All Vehicle Types

- **Consolidate trips**
  - Eliminate trip duplication
  - Car pooling

- **Eliminate trips**
  - Video and Web conferencing tools
  - Transportation on demand (TOD)

- **Improve scheduling and routing**
  - Optimize travel distance using GPS technology

- **Use mass transportation**
  - Use mass transportation alternatives to eliminate fleet vehicle transportation needs

- **Use agency shuttles**
  - Provide a shuttle service for high-use routes to consolidate trips
Possible opportunities to pool vehicles to eliminate fleet vehicles and reduce costs

- Federal fleet annual average of **6,835 miles per vehicle** is much lower than the national average of **11,700 miles**

- Low miles per vehicle suggest some opportunities to create vehicle pools
Principle 2: Increase Fleet Fuel Efficiency

• Acquire higher fuel economy vehicles
  – Downsize vehicles
  – Use VAM to determine the optimal types based on mission need

• Acquire hybrid electric vehicles (HEVs) and plug-in hybrid electric vehicles (PHEVs)
  – Can reduce petroleum and GHG emissions by 30% or more
  – Focus deployment of HEVs in areas lacking access to alternative fuel

• Maintain vehicles to improve fuel economy
  – Perform regularly scheduled and preventative maintenance

• Drive more efficiently
  – Use cruise control, avoid fast starts, remove excess weight, etc.

• Avoid excessive idling
  – Turn off engines when vehicles are stopped or parked
  – Use idling reduction technologies for essential heating, cooling, and other auxiliary loads (e.g., APUs)
## Example per-mile GHG emissions

Reduce per mile GHG emissions by acquiring more efficient vehicles:

- Right-sizing vehicles to mission
- Replacing older less efficient vehicles
- Acquiring HEVs

Source: fueleconomy.gov
## Example per-mile GHG emissions

<table>
<thead>
<tr>
<th>Category</th>
<th>Vehicle</th>
<th>Emissions (g/mile)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact sedan</td>
<td>2012 Ford Focus</td>
<td>287 g/mile</td>
</tr>
<tr>
<td>Midsize sedan</td>
<td>2012 Chevy Malibu</td>
<td>342 g/mile</td>
</tr>
<tr>
<td></td>
<td>2012 Ford Fusion Hybrid</td>
<td>228 g/mile</td>
</tr>
<tr>
<td>Large sedan</td>
<td>2012 Ford Taurus</td>
<td>423 g/mile</td>
</tr>
<tr>
<td>Passenger Van</td>
<td>2012 Chevrolet Express 1500 8-cyl.</td>
<td>635 g/mile</td>
</tr>
<tr>
<td>Minivan</td>
<td>2012 Chrysler Town &amp; Country</td>
<td>444 g/mile</td>
</tr>
<tr>
<td>Small SUV</td>
<td>2012 Ford Escape</td>
<td>355 g/mile</td>
</tr>
<tr>
<td>Large SUV</td>
<td>2012 Chevy Tahoe 1500 4x4</td>
<td>523 g/mile</td>
</tr>
<tr>
<td>Light-duty Truck 4x2</td>
<td>2012 Ford F150</td>
<td>523 g/mile</td>
</tr>
<tr>
<td>Light-duty Truck 4x4</td>
<td>2012 Chevrolet Silverado K15 4WD</td>
<td>592 g/mile</td>
</tr>
</tbody>
</table>

Source: fueleconomy.gov
Focus on Increasing the Fuel Efficiency of the Least Efficient Vehicles

**Federal fleet average:**
12 mpg

<table>
<thead>
<tr>
<th>Current mpg</th>
<th>Current fuel use (gallons)</th>
<th>Replacement mpg</th>
<th>Replacement fuel use (gallons)</th>
<th>Percent improvement in fuel economy</th>
<th>Fuel reduction (gallons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2,000</td>
<td>10 mpg</td>
<td>1,000</td>
<td>100%</td>
<td>1,000</td>
</tr>
<tr>
<td>5</td>
<td>2,000</td>
<td>6.25 mpg</td>
<td>1,600</td>
<td>25%</td>
<td>400</td>
</tr>
<tr>
<td>20</td>
<td>500</td>
<td>40 mpg</td>
<td>250</td>
<td>100%</td>
<td>250</td>
</tr>
<tr>
<td>20</td>
<td>500</td>
<td>25 mpg</td>
<td>400</td>
<td>25%</td>
<td>100</td>
</tr>
</tbody>
</table>

*Assumes 10,000 miles per year*
Principle 3: Use Alternative Fuels, Including Electricity

Alternative fuels include but are not limited to:

- Electricity
- E85
- Compressed natural gas (CNG)
- Liquefied natural gas (LNG)
- Liquefied petroleum gas or propane (LPG)
- Neat (100%) biodiesel (B100) or biodiesel blends

Dual-fueled AFVs **MUST** use alternative fuel if available (*EPA*Act 2005, Section 701):

- E85 FFVs,
- Bi-fuel CNG or LNG vehicles, and
- Bi-fuel LPG vehicles
Alternative Fuels – GHG emission reductions

- Diesel: (16%)
- Gas: (20%)
- LPG: (25-28%)
- B20: (25-28%)
- CNG: (33%)
- LNG: (85%)
- HEV: (86%)
- E85: (100% Reduction)
- PHEV
- B100
- BEV
- Hydrogen

Right-size fleets and vehicles to mission
Increase fleet fuel efficiency
Use alternative fuels, including electricity
Large opportunity to increase alternative fuel use in dual-fueled AFVs

EPAct 2005 §701: FY 2016 preliminary estimate of 90 GGE of alternative fuel use per non-waivered dual-fuel AFV

- **FLEETDASH**: Monitor fuel transaction data
- **Lock-out** dual-fueled AFVs from using gasoline pumps
- **Provide locations** and driving directions to alternative fuel stations
  - Tools available at AFDC (www.afdc.energy.gov)
- **Policies and training** for local fleet managers and drivers
- Consider alternative fuel use metrics in **performance reviews and job descriptions**
Vehicle Acquisition

Balance vehicle acquisition to support strategies with Federal fleet requirements

<table>
<thead>
<tr>
<th>GHG Emission Reduction Strategy</th>
<th>Vehicle Acquisition Strategy</th>
<th>Regulatory Constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right-size fleets and vehicles to mission</td>
<td><strong>Dispose or reduce acquisitions</strong> to ensure fleet and vehicles are right-sized to mission</td>
<td><strong>VAM</strong> (EO 13693)</td>
</tr>
<tr>
<td>Increase fleet fuel efficiency</td>
<td><strong>Acquire HEVs and higher fuel economy vehicles</strong> to reduce GHG emissions per mile</td>
<td><strong>Low GHG-emitting vehicles</strong> (EISA §141)</td>
</tr>
<tr>
<td>Use alternative fuels, including electricity</td>
<td><strong>Acquire EVs, AFVs, or diesel vehicles</strong> to support AF, biodiesel, or EV strategies</td>
<td><strong>AFV acquisitions</strong> (EPAct 92) <strong>ZEVs &amp; PHEVs</strong> (EO 13693)</td>
</tr>
</tbody>
</table>
E.O. 13693 Fleet Guidance Framework: Two Documents
Fleet guidance is organized around a cyclical fleet management framework—**plan, collect, strategize, and implement**

- **1. Plan**
  - Develop an agency-wide fleet sustainability plan

- **2. Collect**
  - Gather fleet data
  - Create a fleet profile
  - Right-size fleet to agency mission

- **3. Strategize**
  - Select strategies for reducing GHG emissions per mile for each fleet

- **4. Implement**
  - Acquire and locate vehicles appropriately
  - Develop infrastructure

**E.O. 13693 Guidance Document**
- Focuses on E.O. requirements
- 20 pages
- Updated infrequently

**Comprehensive Federal Fleet Management Handbook**
- Guides fleet managers from requirements to implementation
- 100+ pages
- Can be updated regularly
# FEMP Federal Fleet Program Resources

## FEMP Fleet Guidance

[federalfleets.energy.gov](federalfleets.energy.gov)
- Guidance and Handbook Documents

## FEMP Fleet Training

[federalfleets.energy.gov/information_resources](federalfleets.energy.gov/information_resources)
- Federal Fleet Management 101 (FEMP First Thursday)
- Electric Vehicles (FEMP First Thursday)
- EPAct 2005 Section 701
- EISA Section 141

## Fleet Tools

[federalfleets.energy.gov/FleetDASH/](federalfleets.energy.gov/FleetDASH/)
- Fleet Sustainability Dashboard (FleetDASH)

[www.afdc.energy.gov](www.afdc.energy.gov)
- Alternative Fuel Station Locator
- TransAtlas
- Petroleum Reduction Planning Tool

## Other resources

[www.fueleconomy.gov](www.fueleconomy.gov)
- GHG emissions per mile
- Fuel economy information and tips

[www.epa.gov/greenvehicles](www.epa.gov/greenvehicles)
- Vehicle ratings based on GHG emissions/fuel economy
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Questions