

Executive Order 13514 *Federal Leadership in Environmental, Energy, and Economic Performance*

Comprehensive Federal Fleet
Management Handbook

July 2011

Visit femp.energy.gov/pdfs/eo13514_fleethandbook.pdf
for the latest version of this Handbook.



Contacts

Mark Reichhardt
Federal Energy Management Program (FEMP)
U.S. Department of Energy (DOE)
202-586-4788
federal_fleets@ee.doe.gov

FEMP General Contact Information
EE-2L
1000 Independence Avenue, SW
Washington, DC 20585-0121
202-586-5772

DOE's Office of Energy Efficiency and Renewable Energy (EERE)
Information Center
877-337-3463
www.eere.energy.gov/informationcenter/

Acknowledgements

This document was prepared by Julian Bentley of LMI in McLean, Virginia, and Ryan Daley of the National Renewable Energy Laboratory (NREL) in Golden, Colorado, on behalf of DOE's FEMP.

FEMP acknowledges the following organizations for supporting the development of this document:

- U.S. General Services Administration (GSA)
- Office of the Federal Environmental Executive (OFEE)
- Office of Management and Budget (OMB)
- NREL
- Idaho National Laboratory (INL)

This document would not be possible without the valuable input received from throughout the Federal Government, including:

- U.S. Department of Agriculture (USDA)
- U.S. Department of Defense (DOD), including: Office of the Secretary of Defense (OSD), Acquisition, Technology & Logistics (AT&L); Department of the Air Force; Defense Energy Support Center (DESC); and Department of the Navy
- U.S. Environmental Protection Agency (EPA)
- U.S. Department of Transportation (DOT), including the Federal Aviation Administration (FAA)
- National Aeronautics and Space Administration (NASA)
- U.S. Postal Service (USPS)
- Agency members of the Interagency Committee on Alternative Fuels and Low Emission Vehicles (INTERFUEL) working group

Executive Summary

On April 5, 2010, DOE issued “Guidance for Federal Agencies on E.O. 13514 Section 12—Federal Fleet Management” [referred to here as “the Guidance”], fulfilling the Section 12 requirement of Executive Order (E.O.) 13514 for DOE to issue comprehensive guidance on Federal fleet management.

How does this Handbook relate to the Guidance and Interactive Training?

This Comprehensive Federal Fleet Management Handbook [referred to here as “the Handbook”] supplements the Guidance. It helps headquarters and site location Federal fleet managers identify and decide how to meet and exceed the Federal fleet requirements outlined in the Guidance. The Interactive Training walks you through the contents of this Handbook and the Guidance so that you can return here for more in-depth reading and for reference.

DOE has developed **this Handbook as a supplement to the Guidance to help fleet managers:**

- Select optimal greenhouse gas (GHG) and petroleum reduction strategies for each fleet location
- Meet or exceed Federal fleet GHG and petroleum reduction requirements outlined in the Guidance
- Acquire vehicles to support these strategies while minimizing fleet size and vehicle miles traveled (VMT)
- Refine strategies based on agency performance.

The Guidance and Handbook are organized around a cyclical fleet management framework—**plan, collect, strategize, and implement** (see Figure ES-1). The Guidance focuses on the first stage of this process—planning. **The Handbook emphasizes the collect, strategize, and implement process stages.** This process framework is provided as a tool for **agency fleet managers to select optimal petroleum reduction strategies for each fleet location**, based on an evaluation of site-specific characteristics, including availability of alternative fuel, fleet size, and fleet vehicle composition.

Figure ES-1. Annual Strategic Planning and Implementation Process Framework for Agencies

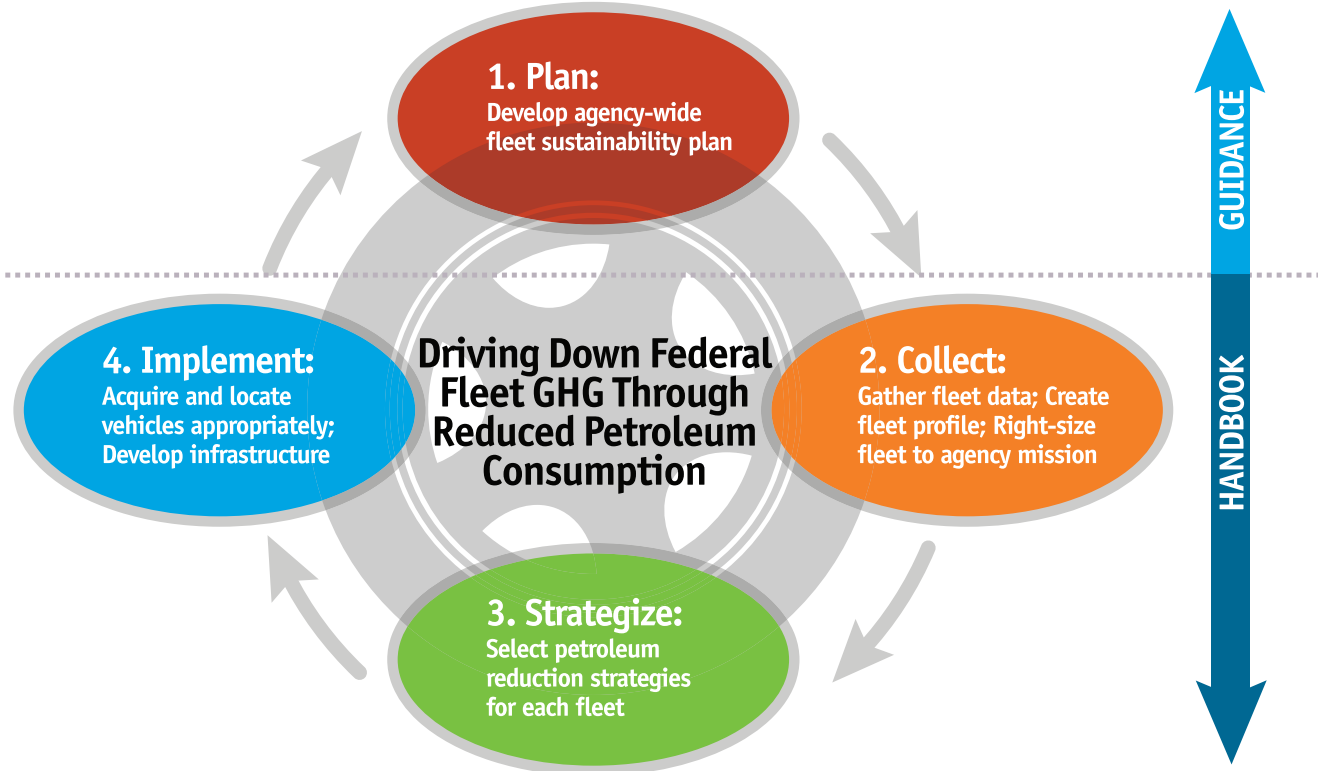


Table of Contents

Chapter 1	Introduction	1
1.1	Executive Order 13514: Leading by Example	1
1.2	Federal Fleet Management Toolkit	1
1.3	Federal Fleet Management Toolkit Target Audiences	2
1.4	Summary of Federal Fleet Requirements	2
1.5	Driving Principles of Petroleum Reduction	3
1.6	Handbook Organization	4
Chapter 2	PLAN: Creating an Agency-Specific Fleet Greenhouse Gas and Petroleum Reduction Plan	6
2.1	Overview of Fleet Plan Requirements (EISA Section 142 and E.O. 13514)	6
2.2	Required Plan Components	6
2.3	Integrating Fleet Plans into Agencies' Strategic Planning and Budget Process	9
2.4	Developing and Submitting Fleet Plans	10
Chapter 3	COLLECT: Developing an Agency Fleet Profile and Optimizing Fleets to the Agency Mission	11
3.1	Federal Fleet Data Requirements	11
3.2	Right-Sizing Fleets with a VAM	14
3.3	Optimizing Fleets to the Agency Mission	18
Chapter 4	STRATEGIZE: Reducing Vehicle Miles Traveled	19
4.1	Overview of Strategies to Reduce VMT	19
4.2	Consolidating Trips	19
4.3	Eliminating Trips	20
4.4	Using Mass Transportation	20
4.5	Using Agency Shuttles	20
4.6	Improving Scheduling and Routing	20
Chapter 5	STRATEGIZE: Increasing Fleet Fuel Efficiency	21
5.1	Acquisition of Higher Fuel Economy Vehicles	21
5.2	Acquisition of Hybrid Electric Vehicles	23
5.3	Maintaining Vehicles To Improve Vehicle Fuel Economy	24
5.4	Driving More Efficiently	24
5.5	Avoiding Excessive Idling	25

Chapter 6	STRATEGIZE: Implementing Alternative Fuel, Biodiesel Blend, and Electric Vehicle Strategies	26
6.1	Overview of Requirements	27
6.2	Framework: Identifying Optimal Alternative Fuel and Biodiesel Blend Strategies	28
6.3	Framework: Identifying Optimal Electric Vehicle Strategies	30
6.4	Summary of Alternative Fuel, Biodiesel, and Electric Vehicle Requirements	32
6.5	Alternative Fuel Use Increase Requirements (E.O. 13423 and EISA Section 142)	32
6.6	Alternative Fuel Use in Dual-Fueled AFVs (Section 701 of EPOA 2005)	34
6.7	Renewable Fuel Infrastructure Requirements (EISA Section 246)	38
6.8	Developing Alternative Fuel, Biodiesel, and Electricity Infrastructure	41
6.9	Putting it All Together	43
Chapter 7	IMPLEMENT: Acquiring Vehicles	44
7.1	Overview of Requirements	46
7.2	Framework for Identifying Optimal Vehicle Acquisition Strategies	47
7.3	AFV Acquisition Requirements (EPOA 1992, ECRA 1998, NDAA 2008)	48
7.4	Low GHG-Emitting Vehicle Acquisition Requirements (EISA Section 141)	52
7.5	Plug-In Hybrid Electric Vehicle Acquisition Requirements (E.O. 13423)	54
7.6	Implementing Vehicle Acquisition Strategies	54
Chapter 8	IMPLEMENT: Reporting and Monitoring Progress	60
8.1	Annual Federal Fleet Reporting Requirements	61
8.2	Reducing Your Reporting Workload	65
Chapter 9	IMPLEMENT: Refining Strategies Based on Performance	66
9.1	Evaluating the Effectiveness of Petroleum Reduction Strategies	66
9.2	Refining Your Petroleum Reduction Strategies	67
Chapter 10	Complementary Resources	68
Appendices		
Appendix A.	Glossary	71
Appendix B.	Definitions	72
Appendix C.	Acronyms and Abbreviations	74
Appendix D.	CO₂ Emissions Factors by Fuel Type	75
Appendix E.	CH₄ and N₂O Emissions Factors by Fuel Type	75
Appendix F.	Agencies Covered by EPOA 1992 (as of FY 2011)	76

Figures

Figure 1-1. Federal Fleet Requirements	3
Figure 1-2. The Driving Principles of GHG and Petroleum Reduction	4
Figure 2-1. Scope 1, 2, and 3 Federal GHG Emissions	8
Figure 3-1. Vehicle Management Information System Data Fields Checklist	13
Figure 5-1. Annual Fuel Use by Fuel Economy	22
Figure 6-1. Determining Alternative Fuel and Biodiesel Strategies	28
Figure 6-2. Determining the FY 2005 Alternative Fuel Baseline for an Agency	34
Figure 6-3. Determining Federal Fleet Fueling Centers Subject to the EISA Section 246 Requirements	40
Figure 6-4. Level 1 plug-in hybrid electric vehicle charging port	42
Figure 6-5. Spc. Dean Kalogris from Headquarters Company, Fort Bliss, Texas, charges the installation's command sergeant major's electric car using Level 1 charging equipment	42
Figure 6-6. EVSE Level 2 charging equipment with a SAE 1772J connector	42
Figure 6-7. EVSE Level 2 charging station	42
Figure 7-1. Determining Compliance with EPA 1992 AFV Acquisition Requirements	51
Figure 8-1. Annual Federal Fleet Reporting Requirements Timeline	61

Tables

Table 1-1. Target Audiences for E.O. 13514 Section 12 Federal Fleet Management Toolkit	2
Table 1-2. GHG and Petroleum Reduction Strategies and Fleet Requirements in this Document	5
Table 2-1. Steps to Calculate Projected Scope 1 GHG Emissions From Federal Fleet Vehicles	9
Table 2-2. Required Procedures for Developing and Submitting Fleet Plans	10
Table 3-1. Federal Fleet Data Requirements	12
Table 3-2. General Vehicle Allocation Methodology Process	15
Table 5-1. Example Annual Fuel Reductions from Improving Fuel Economy	23
Table 5-2. Estimated GHG and Petroleum Reduction for Hybrid Version of 2011 Ford Fusion	23
Table 6-1. Alternative Fuel, Biodiesel Blend, and Electric Vehicle Federal Fleet Requirements	27
Table 6-2. Descriptions of Alternative Fuel and Biodiesel Strategies	29
Table 6-3. Recommended Framework for Identifying Optimal Electric Vehicle Strategies	31
Table 6-4. Potential Electric Vehicle Strategies Based on Fleet Location and Characteristics	32
Table 6-5. Methodology for Establishing the FY 2005 Alternative Fuel Baseline	33
Table 6-6. Example Alternative Fuel Baseline Calculations (GGEs)	33
Table 6-7. Process for Appealing Denied Section 701 Waiver Requests	37
Table 7-1. Vehicle Acquisition Strategy Considerations	45
Table 7-2. Federal Fleet Vehicle Acquisition Requirements	46
Table 7-3. Framework for Identifying Optimal Vehicle Acquisition Strategies	47
Table 7-4. Vehicles Exempt from the EPA 1992 AFV Acquisition Requirements	49
Table 7-5. Current Vehicles Defined as AFVs in the Federal Fleet	50
Table 7-6. Vehicles Not Subject to the Low GHG-Emitting Vehicle Acquisition Requirements	53
Table 8-1. Annual Federal Fleet Reporting Requirements	60

Chapter 1 Introduction

Purpose of this chapter	<ul style="list-style-type: none">• Introduce Executive Order 13514 and its impact on Federal fleet management• Explain how this Handbook is organized and how the following chapters can help Federal fleet managers address Executive Order 13514 Section 12 requirements
Target audience	Agency headquarters fleet managers and fleet location managers

This Handbook builds upon the “Guidance for Federal Agencies on E.O. 13514 Section 12 – Federal Fleet Management”¹ [referred to here as “the Guidance”] by providing additional detail to help fleet managers implement the Guidance. It supplements the Guidance to help Federal agencies select optimal greenhouse gas (GHG) and petroleum reduction strategies for each fleet location, meeting or exceeding related fleet requirements, acquiring vehicles to support these strategies while minimizing fleet size and vehicle miles traveled (VMT), and refining strategies based on agency performance. The Handbook serves as one component of the U.S. Department of Energy’s (DOE) Executive Order (E.O.) 13514 Section 12 fleet management toolkit, which also includes the Guidance and supporting resources, such as an NREL Optimal Vehicle Acquisition (NOVA) Analysis.

1.1 Executive Order 13514: Leading by Example

E.O. 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, signed on October 5, 2009, establishes “an integrated strategy towards sustainability in the Federal Government and makes **reduction of greenhouse gas emissions a priority for Federal agencies.**”

The Vision

Federal fleets will lead by example to help “create a clean energy economy that will increase our Nation’s prosperity, promote energy security, protect the interests of taxpayers, and safeguard the health of our environment.”

Federal fleets will reach this vision by reducing fleet GHG emissions through reduced petroleum consumption.

1.2 Federal Fleet Management Toolkit

DOE’s Federal Energy Management Program (FEMP) has constructed a toolkit to assist Federal agencies in implementing the Guidance. The four components of this toolkit are:

- **E.O. 13514 Section 12 Guidance Document.** This document helps agencies develop an overall fleet GHG emission and petroleum reduction strategy (and executable plan). It focuses on the first stage of the cyclical fleet management framework: planning.
- **E.O. 13514 Comprehensive Fleet Management Handbook.** The Handbook complements the E.O. 13514 Guidance by helping fleet managers select and implement appropriate GHG and petroleum reduction strategies for each fleet location. It focuses on the collect, strategize, and implement stages of the cyclical fleet management framework.
- **Interactive Federal Fleet Management Training.** DOE’s FEMP has developed an interactive version of the Guidance and Handbook, which is available online at http://apps1.eere.energy.gov/femp/training/course_detail_ondemand.cfm/CourseId=65.
- **Federal Fleet Management Supporting Resources.** DOE’s FEMP provides many helpful resources to assist Federal fleet managers in reducing GHG emissions and petroleum use and increasing the use of alternative fuels. Many of these resources can be found online at FEMP’s Fleet Management website (www.femp.energy.gov/program/fedfleet_management.html) and the Alternative Fuels and Advanced Vehicles Data Center (AFDC) website (www.afdc.energy.gov).

¹ Available at www.femp.energy.gov/pdfs/fleetguidance_13514.pdf

1.3 Federal Fleet Management Toolkit Target Audiences

The three primary audiences for the E.O. 13514 Section 12 Federal fleet management toolkit are agency senior sustainability officers, agency headquarters fleet managers, and agency fleet location managers. Table 1-4 of the Guidance outlines the general responsibilities for the target audiences related to implementation of E.O. 13514 Section 12. Table 1-1 below will help you determine which portions of the Federal fleet management toolkit are most applicable to you.

Table 1-1. Target Audiences for E.O. 13514 Section 12 Federal Fleet Management Toolkit

Federal Fleet Management Toolkit Component	Agency Senior Sustainability Officer	Agency Headquarters Fleet Manager	Agency Fleet Location Manager
Section 12 Guidance Document	✓ (chapters 1 and 2)	✓	✓ (chapter 1)
Fleet Management Handbook		✓	✓
Interactive CD	✓	✓	✓
Supporting Resources		✓	✓

1.4 Summary of Federal Fleet Requirements

Federal fleets must reduce GHG emissions while meeting mission-critical needs and complying with all Federal goals and mandates. Congress and the White House have established Federal fleet regulatory requirements through the following statutes and executive orders:

- **E.O. 13514**, *Federal Leadership in Environmental, Energy, and Economic Performance*
- **E.O. 13423**, *Strengthening Federal Environmental, Energy, and Transportation Management*
- **Energy Policy Act (EPAct) of 1992**, as amended by the *Energy Conservation Reauthorization Act (ECRA) of 1998*, and *Section 2862 of National Defense Authorization Act (NDAA) of 2008*
- **EPAct 2005 Section 701**
- **Energy Independence and Security Act (EISA) of 2007 Sections 141, 142, and 246**

“Petroleum reduction is a familiar goal to Federal fleet managers, as are the strategies to achieve petroleum reduction: increasing the fleet’s economy, reducing VMT, and using alternative fuels in place of petroleum.”

— Section 12 Guidance

Figure 1-1. Federal Fleet Requirements

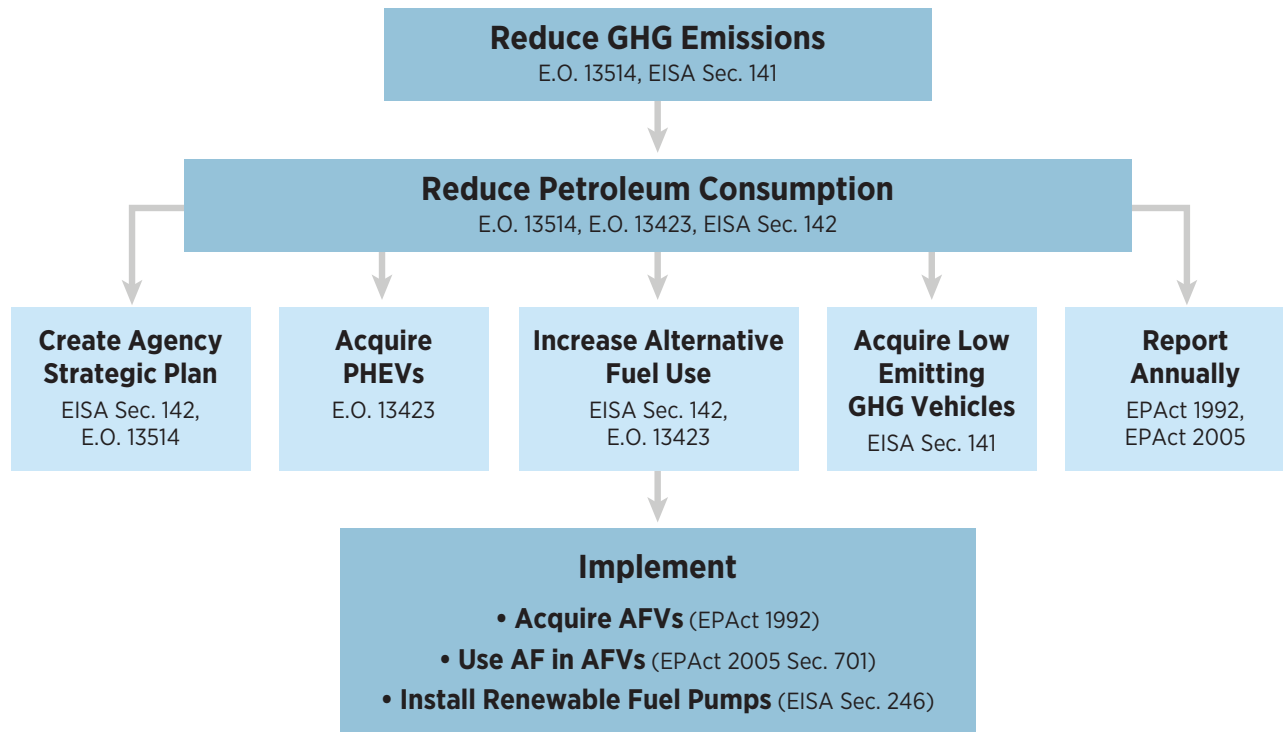
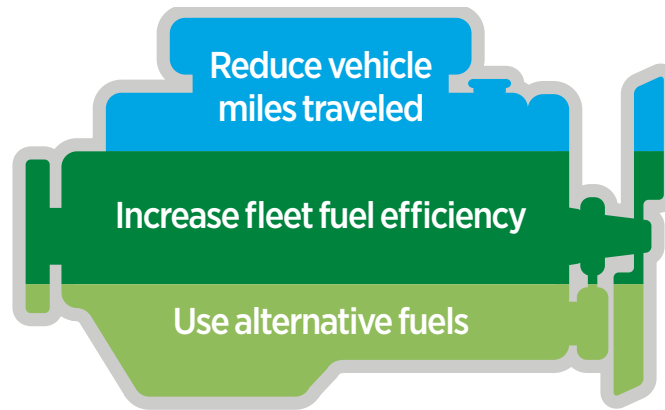


Table 1-2 and figure 1-2 in the Guidance summarize the Federal fleet management, alternative fuel use, and petroleum reduction requirements and provide a flowchart to help Federal agencies determine which of these requirements apply to their fleet.

1.5 Driving Principles of Petroleum Reduction

In order to achieve the vision of E.O. 13514, meet mission-critical needs, and comply with all Federal goals and mandates, an agency must reduce its GHG emissions and petroleum consumption through the appropriate combination of the three driving principles, which were introduced in the Guidance and are summarized below. This Handbook will provide greater detail on the driving principles to help agency fleet managers develop a strategic plan that can be specifically tailored to match the agency’s fleet profile and meet its mission. Agency fleet managers should evaluate petroleum reduction strategies and tactics for each fleet location, based on an evaluation of site-specific characteristics, including availability of alternative fuel, fleet size, and fleet vehicle composition.

Figure 1-2. The Driving Principles of GHG and Petroleum Reduction



The three driving principles of GHG emission and petroleum reduction are:

- **Reducing VMT.** Further discussion on strategies to reduce VMT is provided in chapter 4 of this Handbook.
- **Increasing fleet fuel economy.** Strategies to increase fleet fuel economy are discussed in more detail in chapter 5 of this Handbook.
- **Increasing alternative fuel use.** More detail on implementing strategies to increase alternative fuel use is provided in chapter 6 of this Handbook.

1.6 Handbook Organization

Table 1-2 shows where the chapters of the Guidance and Handbook fit into the framework, how GHG and petroleum reduction strategies fit into each chapter, and how each chapter and the Guidance relate to Federal fleet requirements. Relevant regulatory requirements are explained in each chapter, helping an agency determine whether the requirements are applicable to its fleet and, if so, how to measure, reach, and exceed performance goals.

Table 1-2. GHG and Petroleum Reduction Strategies and Fleet Requirements in this Document

Petroleum and GHG reduction plan or strategy	Chapter	Fleet requirement	Statute or Executive Order	Requirement
Plan				
Develop an agency-wide fleet management plan	2 and Guidance	Agency plan to achieve GHG emission targets	E.O. 13514	Develop an integrated Sustainability Plan that includes achieving the E.O. GHG emission and petroleum reduction targets
		Agency plan to meet petroleum and alternative fuel targets	EISA §142	Develop an agency plan to meet the required petroleum reduction and alternative fuel use increase goals
Reduce fleet GHG emissions	Guidance	Reduction in annual fleet GHG emissions	E.O. 13514	Reduce fleet GHG emissions by agency-established reduction target FY 2008-FY 2020
Reduce fleet petroleum consumption	Guidance	Reduction in annual fleet petroleum use	E.O. 13514	2% annual reduction FY 2005-FY 2020
			E.O. 13423	2% annual reduction FY 2005-FY 2015
			EISA §142	20% total reduction FY 2005-FY 2015
Increase fleet alternative fuel consumption	6 and Guidance	Increase in annual fleet alternative fuel use	E.O. 13423	10% annual increase (from previous year) FY 2005-FY 2015
			EISA §142	10% total increase FY 2005-FY 2015
Collect				
Develop agency profile and right-size fleets	3	Vehicle Allocation Methodology (VAM)	GSA FMR §102-34.50 and May 24, 2011, Presidential Memorandum on Federal Fleet Performance	Establish a structured VAM to determine the appropriate size and number of motor vehicles
Strategize				
Reduce vehicle miles traveled	4	Reduction in annual fleet petroleum use	See E.O. 13514, E.O. 13423, and EISA §142 petroleum reduction requirements above	
Increase fleet fuel economy	5			
Acquire alternative fuel vehicles (AFV) and use alternative fuel	6	Increase in annual fleet alternative fuel use	See E.O. 13423 and EISA §142 alternative fuel use increase requirements above	
Use biodiesel blends in diesel vehicles		Alternative fuel use in AFVs	EPAct 2005 §701	All dual-fueled AFVs must use alternative fuel unless waived
Acquire electric vehicles		Alternative fuel infrastructure	EISA §246	Every Federal fueling center must install a renewable fuel pump
Implement				
Vehicle acquisition	7	Acquisition of AFVs	EPAct 1992	75% of light-duty vehicles (LDV) acquired in metropolitan statistical areas (MSA) must be AFVs
		Acquisition of PHEVs	E.O. 13423	Use plug-in hybrid electric vehicles (PHEV) when commercially available at a cost reasonably comparable to non-PHEVs
		Acquisition of low GHG-emitting vehicles	EISA §141	Prohibits agencies from acquiring vehicles that are not low-GHG emitting vehicles
Monitoring fleet performance	8	Annual agency compliance report	EPAct 1992, ECRA 1998	Each agency must report to Congress annually on compliance with the Federal fleet requirements
Reevaluate strategies	9	Agency plans	See E.O. 13514 and EISA §142 fleet plan requirements above	

Chapter 2 PLAN: Creating an Agency-Specific Fleet Greenhouse Gas and Petroleum Reduction Plan

Purpose of this chapter	<ul style="list-style-type: none">• Present the strategies available to fleet managers to reduce fleet GHG emissions and petroleum consumption• Provide a framework to assist fleet managers in meeting E.O. 13514 and other Federal fleet requirements
Target audience	<ul style="list-style-type: none">• Agency headquarters fleet managers

2.1 Overview of Fleet Plan Requirements (EISA Section 142 and E.O. 13514)

Chapter 2 of the Guidance introduced the fleet management plans required by EISA Section 142 and E.O. 13514. This Handbook explains in greater detail what a model plan should contain, including the steps agencies can take to produce an effective plan that meets both requirements. Agency fleets have two planning requirements related to GHG and petroleum reduction:

- **EISA Section 142** requires each agency to develop a plan to meet required petroleum reduction levels and alternative fuel consumption increases. The plan must identify the measures the agency will use and quantify projections for petroleum and alternative fuel consumption in future years.
- **Section 8 of E.O. 13514** requires agencies to develop and annually update a Sustainability Plan. The plan must explain how the agency will achieve the sustainability goals and GHG reduction targets (including fleet GHG reduction targets) established under Section 2 of E.O. 13514, and prioritize agency actions based on life-cycle return on investment. It is important to note that fleets represent only one component of the Sustainability Plan—agencies must include an explanation of how their fleet will achieve the GHG emissions reduction goals within the Sustainability Plan, including a schedule, milestones, and approaches for achieving results. More information on agency Sustainability Plan requirements is available from the Council on Environmental Quality (CEQ), Office of the Federal Environmental Executive (OFEE) at www.whitehouse.gov/administration/eop/ceq/sustainability.

The fleet component of an agency’s Sustainability Plan can satisfy the EISA Section 142 planning requirement, provided the fleet portion of the agency Sustainability Plan satisfies the Section 142 plan requirements.

2.2 Required Plan Components

Under EISA Section 142 and Section 8 of E.O. 13514, each Federal agency subject to the fleet planning requirements (see section 1.5 of the Guidance) must develop a written plan, including implementation dates, to meet the required GHG emission reduction, petroleum reduction, and alternative fuel increase levels. This section describes the plan components needed to satisfy both fleet planning requirements in a single annual plan (or contained within the agency’s annual Sustainability Plan as discussed above in section 2.1).

The agency must quantify the reductions in GHG emissions and petroleum consumption and increases in alternative fuel consumption projected to be achieved by each specific measure used to meet the fleet requirements and interim milestones. Required plan components are outlined below and explained in greater detail later in this chapter.

- 1. Fleet Inventory Projections.** Projections should illustrate how the agency will reach or maintain a “right-sized” fleet. In other words, agencies should identify and create a plan for reaching the appropriate number of fuel-efficient vehicles required to meet the agency’s mission. Federal agencies should identify opportunities to reduce fleet size by reducing VMT and utilize their Vehicle Allocation Methodology (VAM)² to: (1) ensure that AFVs are acquired and located where alternative fuel is available; (2) increase overall fleet fuel economy through the acquisition of smaller-sized vehicles and/or hybrid, electric, or other advanced technology vehicles; and (3) ensure that the most fuel-efficient vehicle is used for the required task. Chapter 3 of this Handbook provides more detailed guidance on how to right-size fleets to agency mission. Chapters 4 and 5 discuss strategies to reduce VMT and increase fleet fuel economy, respectively.

² VAM is described in chapter 3 and required by GSA. In addition, see the May 24, 2011, Presidential Memorandum on Federal Fleet Performance at www.whitehouse.gov/the-press-office/2011/05/24/presidential-memorandum-federal-fleet-performance

2. **Petroleum Reduction Projections.** Agencies should use the Guidance and this Handbook to select optimal petroleum reduction strategies for each fleet location. Agencies' fleet plans must identify these specific petroleum reduction measures and include projections of the amount by which they expect each measure to reduce their petroleum consumption each year. Three driving principles of petroleum reduction—reducing VMT, increasing fleet fuel efficiency, and increasing alternative fuel use—are introduced in section 2.5 of the Guidance and detailed in chapters 4, 5, and 6, respectively, of this Handbook.
3. **Alternative Fuel Use Increase Projections.** Within their fleet plans, agencies must identify the specific measures they will implement to increase alternative fuel use and project the amount by which they expect each measure to increase their alternative fuel use each year. Chapter 6 of this Handbook is designed to assist agencies in evaluating and selecting strategies to increase alternative fuel use and meet or exceed regulatory requirements. Agencies should use this analysis to: (1) create and describe their alternative fueling infrastructure development plans and actions, including collaboration with other Federal, state, and local agencies and other entities; and, (2) address actions to reduce the deployment of AFVs in locations where the appropriate alternative fuel is not available.
4. **GHG Emissions Reduction Projections.** The petroleum reduction and alternative fuel use increase projections above will help agencies project and reduce the GHG emissions associated with their fleets. Guidance to assist Federal agencies in calculating and reporting GHG emissions associated with fleet operations is provided in the *Federal Greenhouse Gas Accounting and Reporting Guidance* (Section 9 of E.O. 13514) and summarized below in this section.

Fleet plans must also illustrate the agency's process for effective implementation of the fleet goals. This includes the following fleet-specific Sustainability Plan requirements:

1. **Leadership and Accountability.** Agency plans should identify the agency lead(s) for meeting fleet goals, with responsibility for fleet implementation and oversight.
2. **Implementation Methods.** Agencies should identify and describe the method for implementation of the cost, schedule, and performance toward achieving the fleet goals. This should include a discussion of implementation in both the central office and in the field, including how workforce training and education will be used to implement the plan.

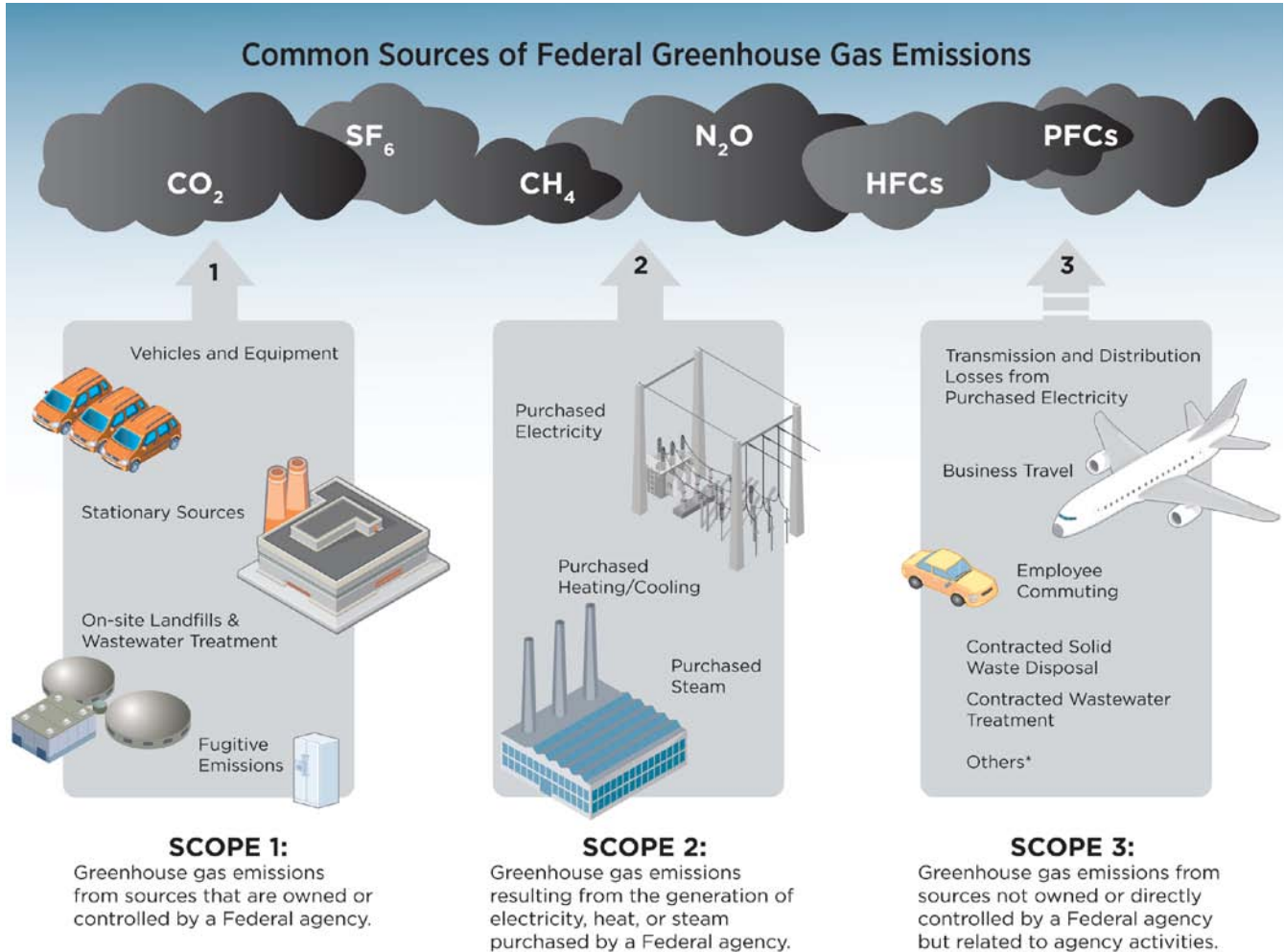
All data used in an agency's fleet plan must match the data reported in the Federal Automotive Statistical Tool (FAST) fleet data system (<https://fastweb.inl.gov>). **If DOE is unable to confirm data used in an annual report through FAST, the EISA Section 142 portion of the plan will be returned to the agency for resubmission.** Each Federal agency plan must be approved by senior agency management, clearly assign responsibility for implementation, put forth assumptions made in developing projections, and address resource requirements necessary for success. CEQ may issue additional instructions for agencies' Sustainability Plans, and fleet managers should seek and refer to any CEQ guidance on E.O. 13514 Sustainability Plans.

GHG Emissions Scopes

E.O. 13514 identifies the following six GHGs: carbon dioxide (CO₂); methane (CH₄); nitrous oxide (N₂O); sulfur hexafluoride (SF₆); hydrofluorocarbons (HFCs); and perfluorocarbons (PFCs). Sources of these GHG emissions in Federal facilities are categorized by one of three scopes as presented in Figure 2-1.

- **Scope 1** includes GHG emissions from sources that are owned or controlled by a Federal agency, including vehicles and equipment.
- **Scope 2** includes GHG emissions resulting from the generation of electricity, heat, or steam purchased by a Federal agency.
- **Scope 3** includes GHG emissions from sources not owned or directly controlled by a Federal agency but as a result of agency activities, such as business travel and employee commuting.

Figure 2-1. Scope 1, 2, and 3 Federal GHG Emissions



*Additional, significant Scope 3 emission sources exist beyond the examples provided. *Illustration by NREL.*

GHG Emissions Reduction Projections

Guidance to assist Federal agencies in calculating and reporting GHG emissions associated with fleet operations was released in October 2010 in the *Guidance on Federal Greenhouse Gas Accounting and Reporting*³ (Section 9 of E.O. 13514). This guidance is accompanied by a *Technical Support Document*,⁴ which provides detailed information on inventory reporting requirements and calculation methodologies.

As discussed above, reducing petroleum consumption is the principal means to reduce GHG emissions from Federal fleets, because this consumption generates scope 1 GHG emissions—a key component of an agency’s fleet GHG footprint. Therefore, the strategies and executable actions the agency will include in the fleet plan to reduce GHG emissions are the same as those to achieve or exceed the required annual reductions in petroleum consumption.

³ www.whitehouse.gov/sites/default/files/microsites/ceq/ghg_guidance_document_0.pdf

⁴ www.whitehouse.gov/sites/default/files/microsites/ceq/technical_support_document_1.pdf

The recommended methodology for calculating scope 1 GHG emissions, which include emissions of carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) for the Federal fleet, is based on the amount and type of fuel burned in Federal fleet vehicles. The methodology to calculate projected scope 1 CO₂, CH₄, and N₂O GHG emissions from the combustion of fuels in Federal fleet vehicles is summarized below:

Table 2-1. Steps to Calculate Projected Scope 1 GHG Emissions From Federal Fleet Vehicles

Step	Action	Recommendations
1	Project the total amount of fuel consumed by type	<ul style="list-style-type: none"> Use annual projections of petroleum and alternative fuel in gasoline gallon equivalent (GGE) by each fuel type reported in FAST Include only fuels subject to E.O. 13514 requirement (e.g., exclude law enforcement and emergency vehicle fuel use)
2	Determine the appropriate CO ₂ emission factors for each fuel type	<ul style="list-style-type: none"> Appendix D provides the kg/GGE CO₂ emission factors for each fuel type reported in FAST
3	Determine the appropriate CH ₄ and N ₂ O emission factors for each fuel type	<ul style="list-style-type: none"> Appendix E provides the kg/GGE CH₄ and N₂O emission factors for each fuel type reported in FAST
4	Calculate the total CO ₂ emissions and convert them to metric tons	<ul style="list-style-type: none"> Multiply the annual fuel use (in GGE) for each fuel type by the corresponding kg/GGE CO₂ emission factors Calculate metric tons by multiplying [kg] by [0.001]
5	Calculate the total CH ₄ and N ₂ O emissions and convert them to metric tons	<ul style="list-style-type: none"> Multiply the annual fuel use (in GGE) for each fuel type by the corresponding kg/GGE CH₄ and kg/GGE N₂O emission factors Calculate metric tons by multiplying [kg] by [0.001]
6	Convert CH ₄ and N ₂ O emissions to metric tons carbon dioxide equivalents (CO ₂ e) and determine the total CO ₂ e	<ul style="list-style-type: none"> Appendix E provides the factors to convert metric tons of CH₄ and N₂O to CO₂ equivalents Calculate total scope 1 GHG emissions as the sum of metric tons of CO₂ emissions and metric tons of CO₂ equivalent emissions

2.3 Integrating Fleet Plans into Agencies' Strategic Planning and Budget Process

Section 8 of E.O. 13514 requires that Sustainability Plans be integrated with the agency's strategic planning and budget process. Agencies must address the budget requirements necessary to meet the fleet GHG emission reduction, petroleum reduction, and alternative fuel use increase targets. This includes estimating the actual and projected investment required to meet E.O. 13514 fleet management goals. Agencies should distinguish additional funding required to meet E.O. 13514 goals from existing budget lines. It is only necessary to include cost projections for the current fiscal year and the next 2 years within the Sustainability Plan.

Projects, initiatives, and efforts should be prioritized based on the life-cycle return on investment to the agency while taking into account economic, environmental, social, and mission related costs and benefits. Agencies should describe how they take into account both monetary and non-monetary factors when prioritizing projects and initiatives. This should include a discussion on specific challenges associated with consideration of life-cycle costs, return on investment (ROI), and how the agency accounts for economic, environmental, social, and mission factors in the planning and budgeting process. Details on Sustainability Plan requirements are available from CEQ.

2.4 Developing and Submitting Fleet Plans

Table 2-2 provides the required procedures for developing and submitting fleet plans. Agencies subject to the fleet planning requirements (see section 1.5 of the Guidance) are required to develop an initial plan and update and resubmit plans as necessary each year, as outlined below.

Table 2-2. Required Procedures for Developing and Submitting Fleet Plans

<p>Federal agencies subject to the E.O. 13514 Sustainability Plan requirements must:</p> <ul style="list-style-type: none"> • Update and resubmit the Sustainability Plan to CEQ each year • Include in the plan how the agency will achieve the sustainability goals and GHG reduction targets (including fleet GHG reduction targets) established under Section 2 of E.O. 13514 and prioritize agency actions based on life-cycle return on investment 	<p>Due Date: June 30 each year</p>
<p>Federal agencies subject to the EISA Section 142 fleet planning requirements must:</p> <ul style="list-style-type: none"> • Develop and submit to DOE a fleet plan by December 31, 2011 • Revise and resubmit fleet plans to DOE when the agency failed to meet an interim petroleum reduction or alternative fuel use milestone 	<p>Due Date: December 31, 2011</p> <p>Due Date: August 15 of the FY after missing interim milestone</p>

Updates to the Fleet Plan

E.O. 13514 requires Federal agencies to update and resubmit the Sustainability Plans by June 30 of each year. EISA Section 142, however, only requires agencies to revise and resubmit fleet plans when the agency failed to meet an interim petroleum reduction or alternative fuel use milestone (as established under EISA Section 142). If applicable, **revised EISA Section 142 fleet plans must be resubmitted** within 180 days of submission of the end of fiscal year annual report, or by **August 15** of the fiscal year following the missed milestone.

Again, agencies may resubmit to DOE a single plan in the form of the Sustainability Plan if the fleet portion of this plan fulfills the EISA Section 142 plan requirements. In updated fleet plans, the agency should identify the specific and quantifiable means by which they will remedy the current shortfall and “catch-up” to meet the next year’s milestone.

Plans shall be sent to the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Federal Energy Management Program (EE-2L), 1000 Independence Avenue, S.W., Washington, D.C. 20585, or such other address as DOE may provide by notice in the Federal Register.

Chapter 3 COLLECT: Developing an Agency Fleet Profile and Optimizing Fleets to the Agency Mission

Purpose of this chapter	<ul style="list-style-type: none">• Provide an overview of Federal fleet data management requirements• Assist agencies in developing a baseline fleet profile• Provide guidance for using a VAM to ensure that the fleet is optimized to the agency's mission
Target audience	<ul style="list-style-type: none">• Agency headquarters fleet managers and agency fleet location managers

This chapter provides:

- An overview of Federal Fleet data management and reporting requirements. The collection, management, and analysis of comprehensive fleet data will enable agencies to optimize fleet decision making.
- Guidance to assist agencies in employing a VAM as required by the GSA Federal Management Regulation (FMR) and the May 24, 2011, Presidential Memorandum on Federal Fleet Performance, including:
 - Developing a fleet baseline profile to identify current vehicle assets and how they match with agency mission needs.
 - Ensuring that future agency vehicle fleets are not over-costly, are correctly sized in terms of numbers, and are of the appropriate type for accomplishing agency missions.

3.1 Federal Fleet Data Requirements

Collecting and managing high-quality data are critical to effective fleet management and to developing strategies to meet the numerous requirements for which Federal fleets are responsible. However, collecting comprehensive and accurate database information can be time-consuming, and the manpower burden that this can create is a very real constraint for many agencies.

Still, the importance of comprehensive and accurate data collection cannot be overstated. **Top-down support for data collection and management is vital to communicate the importance of quality data through all levels of an organization.** Accordingly, the following sections of this chapter provide guidance on actions that can be taken to improve data collection and management.

Federal Automotive Statistical Tool

Federal agencies are required to enter fleet data into FAST (<https://fastweb.inl.gov>), which was developed to assist fleets in meeting the data reporting requirements of E.O.13514, E.O.13423, EPLA 1992 and 2005, EISA, GSA's SF82 "Agency Report of Motor Vehicle Data," and the Office of Management and Budget's Circular A-11 "Preparation, Submission and Execution of the Budget." Data collected through FAST will satisfy all of these requirements. Fleet data reporting requirements are summarized in table 3-1.

Table 3-1. Federal Fleet Data Requirements

Data Requirement	Database Source	Federal Fleet Requirement	Due Date
Vehicle inventory, acquisition, and disposal data	FAST (Section I)	EPA Act 1992: Evaluate compliance with AFV acquisition requirements EISA Section 141: Report on compliance with acquisition of low GHG-emitting vehicles OMB Circular A-11: Development of Annual Motor Vehicle Fleet Report (AMVFR)	December 15 each year
Vehicle cost and mileage data by vehicle type	FAST (Section II)	OMB Circular A-11: AMVFR	December 15 each year
Actual fuel cost and consumption by fuel type	FAST (Section III)	EPA Act 2005 Section 701: Evaluate compliance with alternative fuel use in dual-fueled AFVs E.O. 13514, E.O. 13423, and EISA Section 142: Evaluate compliance with petroleum reduction requirements E.O. 13423 and EISA Section 142: Evaluate compliance with alternative fuel use requirements OMB Circular A-11: Development of AMVFR	December 15 each year
EPA Act 2005 Section 701 waiver requests	FAST	EPA Act 2005 Section 701: Request waivers for individual vehicles from requirement to use alternative fuel in dual-fueled AFVs	June 30 each year
Federal fleet fueling centers	FAST	EISA Section 246: Federal fleet fueling center throughput and renewable fuel pump data; evaluate compliance with requirement to install renewable fuel pumps	June 30 each year

For detailed instructions on FAST data entry, please refer to the *FAST Guidelines for Entering Fleet Data*, available at https://fastweb.inel.gov/joint/FY2009_FAST_Guidelines_for_Entering_Data.pdf.

Vehicle Management Information System

A comprehensive Vehicle Management Information System (VMIS) is a fundamental tool for fleet management. A VMIS serves as a centralized system to identify, collect, and analyze vehicle data with respect to a particular fleet's capabilities and enables agencies to easily report all costs incurred for the operation, maintenance, acquisition, and disposal of its vehicles. GSA's Office of Governmentwide Policy can offer guidance and suggestions for developing and implementing a VMIS. In fact, their FMR Bulletin B-15⁵ provides key recommendations. Many agencies have employed such a system that manages some combination of their agency-owned, commercially leased, and GSA leased vehicles. For agencies with only GSA leased vehicles, the GSA Fleet Drive-Thru⁶ is an innovative mileage reporting and fleet analysis tool that provides important applications, including reports for inventory, fuel use, mileage data, and accidents.

For many agencies, the primary barrier to implementing a VMIS is cost. DOE recommends that each agency articulate their particular data collection and management needs prior to initializing an extensive data call. By internally defining your agency's needs at the outset, you can control costs and avoid an outside entity framing these needs for you. The precise fields of data to be collected will differ for each agency (see example checklist in Figure 3-1); however, agencies are encouraged to use GSA's Reports Carryout and Fuel Use Reports as a guide. Using the same data fields as are available in the GSA database will allow for a smooth integration of the two inventories and easier data management for the entire fleet. With an initial investment cost, agencies can make notable ROI with a VMIS by improving the process of data collection and reporting.

⁵ www.gsa.gov/graphics/ogp/GSAFMRBulletinB15_92107.doc

⁶ www.gsa.gov/fleetdrivethru

Figure 3-1. Vehicle Management Information System Data Fields Checklist

<p>Data: Vehicle Identification and Configuration</p> <ul style="list-style-type: none"> <input type="checkbox"/> Vehicle Identification Number (VIN) <input type="checkbox"/> Year <input type="checkbox"/> Make <input type="checkbox"/> Model <input type="checkbox"/> Color <input type="checkbox"/> Engine configuration (dedicated, flex-fuel, bi-fuel) <input type="checkbox"/> Fuel type(s) <input type="checkbox"/> Gross Vehicle Weight Rating (GVWR) <input type="checkbox"/> License plate number(s) <input type="checkbox"/> FAST vehicle type (may be derived from other attributes) <input type="checkbox"/> Fuel economy rating(s) <input type="checkbox"/> GHG score(s) <input type="checkbox"/> Vehicle drive train type (2WD/4WD/Other) <input type="checkbox"/> Armor level <input type="checkbox"/> Vehicle mission/purpose/role <p>Data: Vehicle Utilization</p> <ul style="list-style-type: none"> <input type="checkbox"/> Fleet/motor pool assignment <input type="checkbox"/> Vehicle Point of Contact (POC) information <input type="checkbox"/> Location (latitude/longitude or detailed street address) <input type="checkbox"/> Assignment status (assigned, unassigned, awaiting maintenance, awaiting disposal) <input type="checkbox"/> Vehicle mileage <input type="checkbox"/> Fuel consumption (date, cost, quantity, type, location) <p>Data: Vehicle Compliance Attributes</p> <ul style="list-style-type: none"> <input type="checkbox"/> EPA Act Law Enforcement vehicle designation <input type="checkbox"/> EPA Act Emergency/Emergency Response vehicle designation <input type="checkbox"/> EPA Act non-MSA operation designation <input type="checkbox"/> EPA Act Sec 701 waiver and reason <input type="checkbox"/> EISA Sec 141 designation at time of acquisition <p>Data: Vehicle Acquisition and Disposal</p> <ul style="list-style-type: none"> <input type="checkbox"/> Acquisition date <input type="checkbox"/> Acquisition method/source, relevant details (e.g., lease type) <input type="checkbox"/> Acquisition costs <input type="checkbox"/> Vehicle age at acquisition <input type="checkbox"/> Planned disposal date 	<ul style="list-style-type: none"> <input type="checkbox"/> Disposal date <input type="checkbox"/> Disposal method <input type="checkbox"/> Disposal costs <input type="checkbox"/> Disposal proceeds <input type="checkbox"/> Fair market value at time of disposal (primarily owned vehicles) <p>Data: Vehicle Repairs and Servicing</p> <ul style="list-style-type: none"> <input type="checkbox"/> Repair history <input type="checkbox"/> Maintenance history (unscheduled repairs, preventive maintenance, accident repairs) <input type="checkbox"/> Out-of-service dates <input type="checkbox"/> Schedule/notification of preventive maintenance <p>Data: Vehicle Accident Reporting</p> <ul style="list-style-type: none"> <input type="checkbox"/> Accident date/time <input type="checkbox"/> Vehicles involved <input type="checkbox"/> Operator <input type="checkbox"/> Third-party information <input type="checkbox"/> Vehicle downtime <input type="checkbox"/> Cost and nature of vehicle repairs <p>Data: Vehicle Cost Data (Direct Costs)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Capitalized value <input type="checkbox"/> Depreciation <input type="checkbox"/> Amortization <input type="checkbox"/> Disposal proceeds <input type="checkbox"/> Vehicle modifications and accessory equipment <input type="checkbox"/> Fuel cost and consumption (date, quantity, fuel type, location of purchase) <input type="checkbox"/> Repair and unscheduled maintenance costs <input type="checkbox"/> Preventive maintenance costs <input type="checkbox"/> Commercial or GSA Fleet lease costs <p>Data: Organizational Cost Data (Indirect Costs)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Facility costs (e.g., building purchase/lease, utilities, maintenance) <input type="checkbox"/> Equipment costs (e.g., office and shop equipment, tools) <input type="checkbox"/> Staffing costs (e.g., headquarters, field and shop personnel) <input type="checkbox"/> Staffing overhead costs (e.g., training, staff support offices) <input type="checkbox"/> Administrative costs 	<p>Capabilities:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Automated interface to GSA Automotive Division system(s) for vehicle ordering, and tracking vehicles through ordering process <input type="checkbox"/> Ability to review vehicle repair history prior to authorizing repair <input type="checkbox"/> Ability to schedule and notify vehicle POCs/users of preventive maintenance services <input type="checkbox"/> Facilitate preparation of accident tracking and frequency reports <input type="checkbox"/> Ability to generate exception reports to identify vehicles and/or operators deemed to be requiring attention <input type="checkbox"/> Retain complete vehicle records for minimum of one year following disposal <input type="checkbox"/> Ability to generate monthly, quarterly, annual financial reports <input type="checkbox"/> Ability to generate cost/financial reports to identify costs outside of industry norms <input type="checkbox"/> Analytic tools and query capabilities to support data analysis <input type="checkbox"/> Ability to automate reporting to FAST <input type="checkbox"/> Automated interface to GSA Fleet systems, as appropriate, for leased vehicle inventory and leased vehicle operational data (e.g., costs, mileage, fuel consumption) <input type="checkbox"/> Automated interface to GSA FMVRS as part of vehicle acquisition and license plate management processes <input type="checkbox"/> Automated interface to other GSA Automotive Division systems, as appropriate <input type="checkbox"/> Capable of interfacing with internal agency information systems (e.g., property management/accountability systems, financial systems) <input type="checkbox"/> Ability to automate or facilitate EPA Act Sec 701 waiver request process <input type="checkbox"/> Ability to facilitate management/assignment of approved EPA Act Sec 701 waivers <input type="checkbox"/> Ability to review current year-to-date progress relative to legislative and E.O. compliance benchmarks <input type="checkbox"/> Ability to review vehicle utilization data and identify vehicles outside of fleet and industry norms
---	---	--

Additionally, an integrated and comprehensive vehicle inventory may make it possible to streamline the annual FAST data call and improve the quality of data imported. The FAST development team is currently assessing how to allow agencies to upload their VIMS directly into FAST, therefore eliminating the need for multiple data entries.

3.2 Right-Sizing Fleets with a VAM

Right-sizing is a critical element of good fleet management that helps agencies reduce fleet fuel use and operating costs. To right-size its fleet an agency must (1) compile its vehicle inventory and understand how its vehicles are used (e.g., mileage, purpose, etc.) and (2) analyze the fleets' operational (or mission) needs, while identifying opportunities to reduce VMT. This includes identifying vehicles without a demonstrated mission need that are therefore candidates for reassignment or disposal.

Right-sizing means matching an agency's vehicle needs to its mission requirements.

Section 102-34.50 of the GSA FMR—and the May 24, 2011, Presidential Memorandum on Federal Fleet Performance—requires all Federal executive agencies operating domestic fleets to establish and document a structured VAM to determine the appropriate size and number of motor vehicles (i.e., optimize fleets to agency mission).

A VAM provides a framework for right-sizing an agency's fleet. It is not only required by Section 102-34.50 of the GSA FMR—and the May 24, 2011, Presidential Memorandum on Federal Fleet Performance—but will also help your agency develop a vehicle acquisition and management plan that supports petroleum reduction through the acquisition and appropriate placement of higher efficiency and alternative fuel vehicles. This plan should be a component of the overall fleet plan and should include fleet inventory size (by vehicle class and fuel type), such that fleet size corresponds with agency mission requirements. **A VAM helps ensure that agency vehicle fleets are not over-costly, are correctly sized in terms of numbers, and are of the appropriate type for accomplishing agency missions.**

Characteristics of a VAM

GSA Bulletin FMR B-9 provides guidance to assist agencies in establishing and documenting a structured VAM. Development of a VAM provides agency fleet managers with a standard way to document the objective characteristics of a vehicle fleet for (1) a specific bureau or department and/or (2) a generic (where there are common characteristics) office/facility, program, occupational group, or other entity within an agency.

Objective characteristics should include, but are not limited to:

- Number of vehicle users at a given site
- User to vehicle ratios (where applicable)
- Per vehicle mileage
- Trips per vehicle
- Vehicle mission
- Terrain and climate
- Fleet condition and down time.

Sections 2 and 3 of the May 24, 2011, Presidential Memo set requirements for optimum fleet size and fleet management. GSA shall develop and distribute a VAM to agencies. Agencies shall determine their optimal fleet inventory using the VAM, and shall post their optimal fleet inventory targets on agency websites. At the same time, agencies shall submit to the Administrator of General Services (Administrator) fleet management plans to achieve these targets no later than December 31, 2015.

The data for the VAM is typically obtained by surveys and/or in-person interviews of stakeholders. However, much of this data could be collected and maintained while an agency is collecting vehicle inventory data for their annual data submission requirements.

Please refer to GSA Bulletin FMR B-9 (www.gsa.gov/graphics/ogp/FMR_Bulletin-B-9_R24T4F_OZ5RDZ-i34K-pR.doc), the presentation *Right-Sizing Your Fleet: Vehicle Allocation Methodology* (www.govenergy.com/2008/pdfs/transportation/AaronTransport3.pdf), and the May 24, 2011, Presidential Memorandum on Federal Fleet Performance (www.whitehouse.gov/the-press-office/2011/05/24/presidential-memorandum-federal-fleet-performance) for additional information.

Overview of VAM Process

Typically, the first step in implementing a VAM is completing a detailed vehicle utilization study, which allows each agency to establish a baseline fleet profile. Agency fleet managers can then use the results of the baseline fleet profile to create a list of vehicles approved for each organization that meets the agency mission and establish policies and procedures for the allocation of fleet vehicles. Ultimately, the VAM will guide the agency's vehicle acquisition and replacement plan to ensure the fleet is correctly sized and mission appropriate. **GSA Fleet can help your agency throughout this process and should be consulted when assessing the need for GSA leased vehicles.** Table 3-2 outlines the general VAM process and the sections that follow describe each step in detail.

Table 3-2. General Vehicle Allocation Methodology Process

Step	Summary	Actions	Purpose
1	Create baseline fleet profile	<ul style="list-style-type: none"> Identify agency mission tasks and vehicle assets assigned to those tasks Complete an annual review of each fleet vehicle and collect data on utilization, down-time, age, maintenance, acquisition cost, number of users, per vehicle mileage, trips per vehicle, mission, terrain, climate, fleet condition, number of passengers, and cargo capacity. 	Perform a fleet utilization study to identify current vehicle assets and how they match with agency mission needs
2	Develop minimum vehicle utilization criteria	<ul style="list-style-type: none"> Determine vehicle assets required to complete necessary mission tasks Establish minimum utilization criteria to be used in validating the need for vehicles based on their missions, such as mileage requirements, hours used, utilization (daily percent), passengers carried, number of trips, and user/vehicle ratio. 	Establish a baseline of fleet assets required to complete necessary mission tasks
3	Compare existing fleet composition to mission task needs	<ul style="list-style-type: none"> Determine if vehicles meet minimum requirements needed to accomplish mission tasks Evaluate alternatives, including mass transportation or contract shuttle services Determine vehicles that are mission essential Identify vehicles below minimum utilization or mileage requirements and dispose or reassign as needed. 	Complete gap analysis of current vehicle assets and required mission needs and eliminate or replace vehicles that do not meet required mission needs
4	Develop vehicle acquisition plan to support VAM results	<ul style="list-style-type: none"> Create a 5-year vehicle acquisition and replacement plan, with recommended vehicles (type and size) for each mission as determined by the VAM Create a list of vehicles approved for each organization that meets the agency mission. 	Establish clearly defined policy to ensure fleet is correctly sized and appropriate for the agency mission
5	Review and update VAM	<ul style="list-style-type: none"> GSA recommends reviewing and updating the agency VAM at least every 5 years or if agency mission changes 	Revise VAM based on changes in vehicle solutions or agency mission needs

Creating a Baseline Fleet Profile

Prior to determining agency-specific petroleum reduction strategies, **agency fleet managers should work with their regional and local fleet managers to create a baseline fleet profile.** Typically a fleet profile begins with a detailed fleet utilization study, which entails identifying agency mission tasks and vehicle assets assigned to those tasks. A complete utilization study should include an annual review of each fleet vehicle and annual collection of data on utilization, down-time, age, maintenance, acquisition cost, number of users, per vehicle mileage, trips per vehicle, mission, terrain, climate, fleet condition, number of passengers, and cargo capacity.

Next, agency fleet managers should compile the detailed fleet utilization study data to establish and document a full description of an agency's fleet composition together with its unique mission requirements. This profile, preferably managed in a database, provides a snapshot of each vehicle asset in the fleet. Typical data captured include vehicle category, fuel type, model, condition (e.g., age and total mileage), functionality, capacity, ownership, replacement status, operation (e.g., utilization rate and annual mileage), and mission need. The ultimate goals of this profile are to (1) assist the fleet manager in evaluating whether the characteristics and utilization of each vehicle is best aligned with the agency mission requirements, and (2) determine opportunities for optimizing the utilization of each vehicle, including replacement, acquisition, or disposal based on mission needs.

The basic framework for this fleet profile should identify the following components on a site-by-site basis, and should be supported by average utilization rates: **mission requirements, the right-size vehicles for the tasks at hand, and fuel use needs.** Utilization rates change regularly and fleet profiles should be updated on an ongoing basis to reflect changes in mission requirements and the regulatory climate, as well as vehicle and fuel availability.

Developing Minimum Vehicle Utilization Criteria

As previously mentioned, quality data collection and management is critical to effective fleet management; the process to establish vehicle utilization criteria is no different. The objective of this step is to **determine the minimum vehicle requirements required to complete each mission task.** These requirements, or minimum vehicle utilization criteria, may be expressed in per vehicle mileage, hours in service, user/vehicle ratios, trips per vehicle, utilization (daily percent), or passengers carried.

Vehicle utilization is most easily measured in terms of mileage or hours in service, although which utilization criteria you choose will depend on your agency fleet needs:

- **Mileage is most typically used to measure utilization of passenger or cargo transportation vehicles** where the vehicle's primary purpose involves travel. Mileage can be collected manually from the odometer or automatically through on-board vehicle monitoring systems. Odometer readings can be included with the driver's report (if used), input when refueling (this option is available for GSA leased vehicles and may also be available through your fuel card provider), or collected as a separate task. However mileage data is collected, it should be done at regular intervals over a long period of time to be most effective in determining vehicle utilization. The collection of mileage data over time should also allow agencies to identify slower and busier periods of usage as well as time needed for maintenance and repairs. For passenger or cargo transportation vehicles it may also be useful to collect data on passengers or cargo transported.
- **Hours in service is most typically used to measure utilization of vehicles for tradesmen, utility repair, or emergency response** where the vehicle supports a mission while remaining mostly stationary (such as plumbers, electricians, high voltage linemen, and fire fighters). Utilization should be measured by the hours the vehicle is in service supporting the mission, which can be determined from the driver's labor reports (where used), dispatch records, and automatically from on-board vehicle monitoring systems. Utilization of fire apparatus and other vehicles that stand by waiting for an emergency response are considered to be in service whenever they are available for use. For example, a plumber's vehicle is in service from the time the plumber has left the shop to perform mission work until returning to the shop, while a fire truck in a fire station is in service whenever it is manned and ready for dispatch. Spare vehicles are not in service.

Once an accurate measure of vehicle utilization has been made for all vehicles in the fleet, vehicles doing similar missions should be compared and an average utilization calculated. Vehicles falling far below average should be examined to determine the reason(s) for underutilization. In time, the lowest acceptable utilization rate for vehicles completing a particular mission will become apparent, but even this baseline should be continuously reviewed and

steps should be taken to move the utilization rate higher. **Vehicles with the lowest average utilization rate should be considered for disposal as appropriate.** Short-term leases, while more expensive than other options, may be cost effective replacements for vehicles needed only during certain portions of the year.

Comparing Existing Fleet Composition to Mission Task Needs

Once an agency has completed a utilization study, created a baseline fleet profile, and established minimum vehicle utilization criteria, it should compare its existing fleet composition to its mission task needs. The point of this step in the VAM process is to **determine which vehicles in the current fleet are well suited to their current assignment**, and which ones are not, as a precursor to the vehicle acquisition, disposal, and reassignment process. Some of the questions that should be asked during this process include:

- Is the vehicle mission essential?
- Does the vehicle meet the minimum requirements needed to accomplish mission tasks?
- Can an existing asset fulfill new mission requirements?
- Is the vehicle utilization below the minimum baseline?
- Can an alternative form of transportation such as mass transportation or shuttle services be used instead?
- What vehicles can be disposed or reassigned (work with GSA Fleet for GSA leased vehicles)?

The fleet manager's challenge is to determine the correct vehicle for each mission. The following pointers may be helpful in this process:

- **Employee transportation.** Vehicles used to transport a single person should be the smallest possible size sedan. Pickup trucks and sport utility vehicles (SUV) are not the most cost-effective means to transport a single passenger from point to point, but might be needed for working in rough terrain. Agencies should also consider the use of existing public transportation or the consolidation of transportation requirements with other agencies to form a single cost-saving solution.
- **Cargo vehicles.** The transportation of cargo should also use the smallest possible vehicle to accomplish the mission, especially where the existing vehicle is never operated at full capacity. Acquiring a single larger vehicle when it could replace several smaller vehicles may also increase vehicle efficiency.
- **Seasonal vehicles.** For vehicles used seasonally (snow removal equipment, brush-fire-fighting vehicles, etc.) and for vehicles with a single purpose that is not also a regular need (trucks with a mounted crane, water distributors, equipment transporters, etc.), the use of multipurpose vehicles, vehicles equipped with quick change bodies, short-term leased vehicles, vehicles used jointly by more than one agency—or even contracting out the service—could provide savings while still meeting mission needs.
- **Spare vehicles.** Some of the most expensive, least fuel-efficient and most unsuitable vehicles for the mission can be “free” vehicles picked up as surplus and maintained as “spares.” Spare vehicles significantly increase maintenance cost, redirecting maintenance that should be invested in first line vehicles, and often do not perform well when needed. A well maintained fleet will have few requirements for spares that cannot be met through redistribution of existing assets or a short term rental. Fleets with large numbers of spares should be avoided.
- **Law enforcement and emergency response vehicles.** Though these vehicles are largely exempt from the statutory and executive order requirements detailed in the Guidance and this Handbook, agencies should make every effort to ensure that the most efficient vehicles are used to meet their law enforcement and emergency response needs. Perhaps the easiest way to improve the efficiency of these vehicles without compromising their mission is to replace older vehicles with newer vehicles, which tend to be more efficient.

Maximize vehicle utilization by pooling vehicles or assigning multiple drivers per vehicle where possible.

- **Vehicle assignment.** Each driver has vacation, sick, and other days off the job equal to 1 month or more per year, meaning that vehicles assigned to a single driver will sit idle at least 1 month per year. Avoiding the assignment of a single driver to a vehicle whenever possible will improve fleet vehicle utilization, reduce costs, and decrease vehicle requirements. Pooling vehicles or using assigned vehicles for other uses when the driver is absent will increase utilization and reduce the total number of vehicles needed to accomplish the same mission. Very effective vehicle pooling can be accomplished using dispatching/reservation software or a car sharing service provider.

Develop a Vehicle Acquisition Plan to Support the VAM

The point of these VAM steps is to develop a standardized methodology by which an agency's fleet is evaluated each year. As a result, agencies should establish clearly defined policies and procedures to ensure that the entire fleet is correctly sized and each vehicle is appropriately assigned based on mission needs. This may include creating a list of vehicles that are approved for each organization within an agency and are critical to meeting that organization's mission. **At the end of the VAM process, agencies should create a 5-year vehicle acquisition and replacement plan⁷ with recommended vehicles (type and size) for each mission as determined by the VAM.** This plan should be clearly communicated through all levels of the agency. GSA recommends reviewing and updating the agency VAM at least every 5 years or if the agency mission changes. For more detail on vehicle acquisitions, see chapter 7.

3.3 Optimizing Fleets to the Agency Mission

A recurring theme of E.O. 13514 fleet management is to align (or optimize) the composition of an agencies' fleet with its mission. In the end, this means far more than simply right-sizing a fleet or selecting a set of petroleum reduction strategies. In the planning phase of the fleet management cycle, agencies should have developed a clear set of goals and objectives for the management of their fleet.

The goal for agencies in optimizing their fleet is to ensure every vehicle is (1) as fuel efficient and cost effective as possible, (2) meets the mission to which it is assigned, and (3) allows the agency to meet regulatory requirements and achieve its overarching fleet management goals. Evolving missions, vehicle funding shortfalls, and better automotive technology make this an ever-changing target, which means that every possible cost-/fuel-saving solution must remain on the table for consideration whenever that solution could meet actual mission needs. The challenge for the fleet manager is to regularly compare the existing fleet to the optimal fleet and ensure that the agency is working to acquire and utilize the best possible vehicles.

⁷ This acquisition and replacement plan should be part of the fleet portion of your agency's Sustainability Plan and your agency's EISA Section 142 fleet plan, as well as acquisition plans reported in FAST.

Chapter 4 STRATEGIZE: Reducing Vehicle Miles Traveled

Purpose of this chapter	<ul style="list-style-type: none">• Provide guidance to assist agencies in evaluating opportunities to reduce VMT along with fleet GHG emissions and petroleum use
Target audience	<ul style="list-style-type: none">• Agency headquarters fleet managers and agency fleet location managers

The initial step in developing an agency-wide GHG emissions and petroleum reduction strategy is to evaluate opportunities to reduce the miles your fleet travels. Taking actions that result in driving fewer miles can substantially reduce your fleet's consumption of conventional petroleum fuel. Reducing VMT has other benefits as well, including reduced vehicle operational and maintenance costs and longer vehicle life before replacement. Reducing VMT can also enable a reduction in the number of vehicles required to accomplish the fleet's mission, and therefore is directly related to actions taken to right-size fleets, which is covered in chapter 3. Whenever possible, fleet managers should first minimize VMT—a no-cost solution—and then proceed to increasing fleet efficiency and alternative fuel use.

There are no specific mandates to reduce VMT. However, success in doing so contributes to achieving GHG emission and petroleum reduction goals mandated by legislation and executive orders, as discussed in the Guidance. The significant benefit of this approach, relative to other GHG emissions and petroleum reduction strategies, is the opportunity for immediate and sustained reduction of total fleet management costs.

4.1 Overview of Strategies to Reduce VMT

The strategies to reduce VMT discussed in this chapter should be applied to all fleet vehicles, regardless of vehicle type (light-duty, medium-duty, or heavy-duty) or vehicle fuel type (AFV, electric vehicle, or conventional-fueled vehicle). A variety of options for VMT reduction are available for consideration and implementation. Some of these measures can be implemented independently by fleet managers while others may require collaborating with other facility or agency management. Measures to reduce VMT include:

- **Consolidating trips.** Consolidate routes to eliminate duplication of trips and car pooling.
- **Eliminating trips.** Use video and Web conferencing tools for meetings and transportation on demand (TOD)—changing a fixed route, fixed schedule shuttle to a demand-responsive system.
- **Using mass transportation.** Use mass transportation alternatives to eliminate fleet vehicle transportation needs.
- **Using agency shuttles.** Provide a shuttle service for high-use routes to consolidate trips.
- **Improving scheduling and routing.** Optimize travel time and distance for delivery of services by using global positioning system (GPS) technology to improve routing and efficiency of fleet vehicles.

4.2 Consolidating Trips

Fleet managers can reduce trips and therefore VMT by consolidating trips. This may be accomplished by either: (1) combining multiple trips into a single trip and/or (2) carpooling.

Fleet managers can combine trips by identifying regular or occasional trips that involve similar routes. They may accomplish this by evaluating trip scheduling and by seeking fleet operators' input and collaboration. Fleet managers and operators should determine if trips on multiple days or times can be consolidated into a single day or time.

Carpooling is similar to combining trips as discussed above, but instead of evaluating similar routes, fleet managers and operators should evaluate opportunities for staff with similar destinations and schedules to share fleet vehicles and combine their individual trips into a single vehicle trip. This may be accomplished through formalized ride share boards (physical or virtual) or through informal networking. Trip consolidation and scheduling can significantly decrease the number of trips and associated fuel consumption.

4.3 Eliminating Trips

Fleet managers may need to collaborate with agency leadership, facility management, or site personnel to eliminate trips. There are two primary methods agencies can use to eliminate trips:

- **Use video and Web conferencing tools for meetings.** By using video and Web conferencing tools, agencies can eliminate the need for personnel to travel for meetings, thereby reducing VMT.
- **Use TOD.** TOD involves transporting passengers or goods at the request of users. Agency personnel make individual transportation requests, which are then aggregated and filled by a pool of vehicles. TOD is an effective means to reduce VMT by eliminating and consolidating trips.

4.4 Using Mass Transportation

Federal agencies should investigate the availability, suitability, and cost of public transportation before acquiring vehicles from any other source. In many urban and suburban areas, use of mass transportation is an effective method to eliminate fleet vehicle trips as well as, in most cases, reduce cost and time associated with fleet vehicle use. Agencies can encourage employee use of public transportation by subsidizing the cost of bus or subway passes, perhaps using the savings realized through eliminated fleet vehicle trips.

4.5 Using Agency Shuttles

Agency-run shuttles are routinely used for interoffice transportation of employees during the workday. When agencies have multiple locations or buildings within relatively close proximity to one another, agency shuttles can be an effective and efficient way to reduce VMT and fuel consumption.

In providing shuttle services, Federal agencies should use AFVs whenever possible and coordinate with other Federal agencies to share, and otherwise avoid duplication of, shuttle services. In accordance with Section 11 of E.O. 13514, GSA has reviewed and provided recommendations to CEQ on Federal shuttle policies, shuttle routes supported by multiple Federal agencies, and use of AFVs in Federal shuttle bus fleets.

4.6 Improving Scheduling and Routing

Efficient fleet operation is an integral part of fleet management that can save time and taxpayer dollars. Agencies are encouraged to explore both internal and external options to track and manage vehicle usage through scheduling and standardized routing. Numerous private companies offer software and consulting services to help government entities with route and scheduling assets. By monitoring driver schedules and vehicle activity, agencies can:

- Create and maintain optimized master schedules for recurring tasks
- Reduce expensive fuel costs by eliminating unnecessary travel and lost time
- Increase driver/worker productivity
- Eliminate unauthorized use of vehicles, routes, or stops
- Manage employee schedules by better anticipating departure and arrival times
- Respond to emergencies with accuracy and efficiency
- Schedule preventive maintenance during low-usage days
- Provide documentation of department activity
- Do more work with the same or fewer resources.

Chapter 5 STRATEGIZE: Increasing Fleet Fuel Efficiency

Purpose of this chapter	Identify opportunities for agencies to increase fleet fuel efficiency and reduce fleet GHG emissions and petroleum use
Target audience	Agency headquarters fleet managers and agency fleet location managers

In this chapter, we examine measures to increase fleet fuel economy, which is the second of the three driving principles to reduce petroleum consumption. There are no specific mandates to achieve higher fuel economy; however, this strategy can usually reduce petroleum at a lower cost, in less time, and with fewer steps than other strategies.

The strategies discussed in this chapter should be implemented throughout the agency fleet, regardless of vehicle size or vehicle fuel type. Fleet managers can increase vehicle fuel economy by acquiring higher fuel economy vehicles and hybrid electric vehicles (HEV), improving maintenance, and modifying driving behaviors, among other measures. It is important to note that while improving fuel economy is essential to achieving petroleum reduction goals, this strategy alone will not enable compliance with alternative fuel use mandates (described in chapter 6 of this document). This chapter provides an overview of the following five tactics Federal fleet managers can employ to increase fleet fuel efficiency:

- **Acquiring higher fuel economy vehicles.** Replace vehicles with smaller or more fuel-efficient ones, consistent with a continued ability to accomplish the fleet's mission.
- **Acquiring HEVs.** Acquire vehicles, such as those with hybrid electric drive trains, which have higher fuel economy than the vehicles they replace, and locate them in areas lacking access to alternative fuel and with drive cycles best suited for hybrid technology (often urban driving, but this may vary by vehicle).
- **Maintaining vehicles to improve fuel economy.** Improve maintenance by implementing best practices such as maintaining recommended tire pressure and regularly scheduled preventive maintenance.
- **Driving more efficiently.** Drive sensibly, observe the speed limit, remove excess weight, and use cruise control.
- **Avoiding excessive idling.** Turn off engines when vehicles are idle to eliminate unnecessary fuel use.

In August 2008, GSA issued bulletin FMR B-19 that recommended strategies to assist agency fleet managers in increasing fuel efficiency in their vehicle fleet. The strategies detailed in this chapter are similar to those included in GSA FMR B-19.

5.1 Acquisition of Higher Fuel Economy Vehicles

Using a VAM to Ensure that Fleet Vehicles are Right-Sized to the Agency's Mission

One of the key components in reducing Federal fleet GHG emissions and petroleum consumption is to ensure that the fleet vehicles are right-sized for their intended mission. Fleet managers can accomplish this goal by employing a VAM, as discussed in chapter 3, which helps ensure that agency vehicle fleets are not more costly than necessary, are correctly sized in terms of numbers, and are of the appropriate type for accomplishing agency missions. If used, the VAM will drive the agency's vehicle acquisition and replacement plan, and will ensure the fleet is correctly sized and appropriate for its mission.

The VAM process provides a structured approach to decisions on the types and models of vehicles required. Evaluating whether mission requirements can be met with smaller, more fuel-efficient vehicles is built into the process. Fleet managers are encouraged to specifically consider the fuel economy ramifications of their decisions related to fleet vehicle mix, and to factor vehicle fuel economy into their implementation of the VAM process.

The May 24, 2011, Presidential Memorandum on Federal Fleet Performance not only requires Federal fleets to employ a VAM, but also requires them to achieve maximum fuel efficiency; be limited in motor vehicle body size, engine size, and optional equipment to what is essential to meet the agency mission; and be midsize or smaller sedans, except where larger sedans are essential to the agency mission. In addition, any fleet vehicles that are larger than a midsize sedan or do not comply with alternative fueled vehicle requirements must be disclosed on agency websites.

Selecting Higher Fuel Economy Vehicles in Fleet Replacement Plans

Chapter 7 of this Handbook guides agencies through the Federal vehicle acquisition process. Fuel economy together with mission support, eligibility for replacement, life-cycle cost, safety, alternative fuel capability, and GHG emissions are the key components for agencies to evaluate in developing replacement plans for fleet vehicles. When ordering vehicles, agencies should ensure they answer the following questions:

- Will a smaller vehicle get the job done?
- Is there a more fuel-efficient vehicle that would meet my needs?
- Do I have access to alternative fuels?

Federal fleet managers should use GSA's online ordering system, AutoChoice (www.gsa.gov/autochoice), to help choose the most fuel-efficient vehicle when ordering through GSA. AutoChoice lets you compare miles per gallon fuel ratings and GHG emission scores; configure vehicles and choose equipment and color options; and view side-by-side comparisons of vehicle models from manufacturers that let you make the most efficient selection.

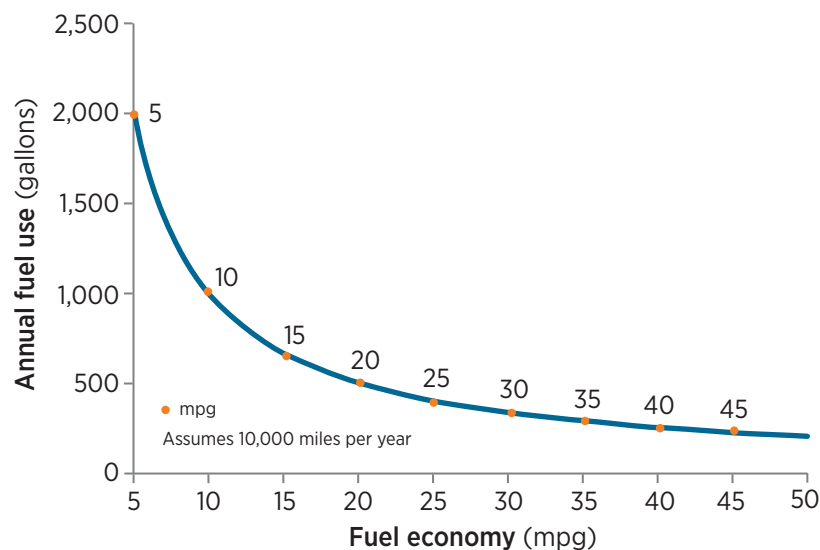
The *Green Vehicle Guide*, produced by the U.S. Environmental Protection Agency (EPA), is an interactive resource that rates cars and trucks based on emissions and fuel efficiency. The Green Vehicle Guide can help you choose the cleanest, most fuel-efficient vehicle that meets your needs. The guide is available online at www.epa.gov/greenvehicles. Fleet managers can search the guide's comprehensive database and compare the environmental performance and fuel economy of most light-duty models and types, including cars, SUVs, pick-up trucks, and vans. The guide compares vehicle emissions using air pollution and GHG scores. The scores are used to rate the amount of smog-producing pollutants and carbon dioxide emissions, respectively, on a scale of 0-10, with 10 representing the lowest emission vehicle in each case.

The U.S. Department of Transportation has recently increased the Corporate Average Fuel Economy⁸ (CAFE) standards for cars and light trucks starting with model year 2011, meaning new, efficient vehicles will be available to Federal fleet managers. As the bar gets raised, fleet managers should continue to seek the highest efficiency vehicles that will meet their agency's needs.

Focusing on Increasing the Fuel Economy of the Least Efficient Vehicles

As shown in figure 5-1, lower fuel economy vehicles use far more fuel than high fuel economy vehicles (for similar missions and annual mileage). Potential petroleum reductions from improving fleet vehicle fuel economy increase exponentially as the gas mileage (MPG) of the replaced vehicle decreases. Therefore, agencies should focus on opportunities to improve the fuel efficiency of the lowest fuel economy vehicles in their fleets.

Figure 5-1. Annual Fuel Use by Fuel Economy



⁸ www.nhtsa.gov/fuel-economy

Table 5-1 provides an example that illustrates the benefits of focusing on improving the fuel efficiency of the lowest fuel economy vehicles. This is clearly demonstrated by the four-fold increase in fuel reduction by replacing a 5 mpg vehicle with a 6.25 mpg vehicle (25% increase in fuel economy) compared to replacing an existing 20 mpg vehicle with a 25 mpg vehicle (25% increase in fuel economy).

Table 5-1. Example Annual Fuel Reductions from Improving Fuel Economy

Current mpg	Current fuel use (gallons)	Replacement mpg	Replacement fuel use (gallons)	Percent improvement in fuel economy	Fuel reduction (gallons)
5 mpg	2,000	10 mpg	1,000	100%	1,000
5 mpg	2,000	6.25 mpg	1,600	25%	400
20 mpg	500	40 mpg	250	100%	250
20 mpg	500	25 mpg	400	25%	100

5.2 Acquisition of Hybrid Electric Vehicles

Vehicles That Meet the Definition of a Hybrid Electric Vehicle

HEVs are defined in section 30B(d)(3) of the Internal Revenue Code of 1986 (26 U.S.C. 30B(d)(3)) as vehicles that draw propulsion energy from onboard sources of stored energy, which are both an internal combustion engine using consumable fuel and a rechargeable energy storage system.

HEVs typically combine the internal combustion engine of a conventional vehicle with the battery and electric motor of an electric vehicle. The combination offers increased fuel economy and low emissions with the power, range, and convenient fueling of conventional vehicles. HEV batteries are recharged by the internal combustion engine and recovery of energy ordinarily lost while braking; they are not recharged by plugging into an external source of electricity (such vehicles are referred to as PHEVs). While their efficiency gains can contribute to petroleum reduction requirements, their electricity use cannot be counted toward alternative fuel use requirements.

GHG Emissions and Petroleum Reduction Benefits of Hybrid Electric Vehicles

Acquisition of an HEV to replace a conventional-fueled vehicle is expected to provide a reduction of more than 30% in petroleum consumption and GHG emissions. Efficiency gains from HEVs also depend upon the type of driving (drive cycle) done by the vehicle. Typically, HEVs are best used in urban environments, driving cycles with many starts/stops, or when driven on hilly or mountainous roads. Fuel reduction benefits of HEVs are typically much less when used mostly for driving on highways. A low GHG-emitting vehicle with a standard engine may be a more cost effective option for replacing a vehicle that does primarily highway driving.

Example: 2011 Ford Fusion Hybrid (a compact sedan available for lease through GSA)

Table 5-2. Estimated GHG and Petroleum Reduction for Hybrid Version of 2011 Ford Fusion

	Fuel economy (miles per gallon)	GHG emissions (tons/year of CO ₂)
2011 Ford Fusion Base	26	7.2
2011 Ford Fusion Hybrid	39	4.8
Percent improvement	50%	33%

Locations Suited for Hybrid Electric Vehicles

Acquiring HEVs is an effective measure to reduce petroleum consumption and GHG emissions in **locations where alternative fuel is unavailable**. Since Federal agencies receive AFV acquisition credits for HEVs, acquiring HEVs in these fleet locations may also help agencies reduce the number of waivers submitted under EPCRA 2005 Section 701.⁹ However, in fleet locations with reasonable and affordable access to alternative fuel, acquisition of AFVs will provide greater petroleum reduction opportunities—an AFV operating on alternative fuel displaces much more petroleum than a petroleum-fueled HEV.

Hybrid Electric Vehicles Receive Credits Toward EPCRA 1992 AFV Acquisition Requirements

The NDAA of 2008 expanded the definition of an AFV to include qualified hybrid electric, lean burn technology, and fuel cell vehicles, as well as any other type of vehicle that can reduce petroleum consumption as demonstrated by the EPA to the Secretary of Energy.

Beginning in FY 2009, **agencies receive one EPCRA 1992 AFV acquisition credit for each qualifying HEV acquired** regardless of weight class (see section 7.3 for more information on EPCRA 1992 AFV acquisition requirements and credits). Federal agencies are responsible for ensuring that acquired HEVs meet the definitions and requirements contained in section 30B(d)(3) of the Internal Revenue Code of 1986 in order to obtain EPCRA 1992 AFV acquisition credit.

5.3 Maintaining Vehicles To Improve Vehicle Fuel Economy

In addition to choosing fuel-efficient vehicles, fleet managers and drivers can keep fleet vehicles properly maintained to improve fuel economy. GSA FMR B-19 encourages agency fleet managers to incorporate the following recommendations into preventive maintenance programs and driver inspections:

- **Keep your vehicle engines properly tuned.** Always check the vehicle owner’s manual for proper maintenance and follow your agency’s internal procedures for obtaining services on your vehicle. According to EPA, fixing a serious maintenance problem, such as a faulty oxygen sensor, can improve your mileage by as much as 40 percent.¹⁰
- **Keep tires properly inflated to the recommended tire pressure.** Under-inflated tires increase rolling resistance, reduce fuel economy, and cause tires to wear more rapidly.
- **Check and replace air filters regularly.** Replacing a clogged air filter protects the engine and may increase your fuel economy.
- **Use the recommended grade of motor oil for your vehicle to increase fuel economy.** Also, look for motor oil that says “Energy Conserving” on the American Petroleum Institute (API) performance symbol to be sure it contains friction-reducing additives.

5.4 Driving More Efficiently

Federal fleet vehicle drivers can help improve fuel economy and reduce petroleum consumption and GHG emissions by driving more efficiently. GSA FMR B-19 recommends that agency fleet managers “develop and implement a communication plan to ensure that strategies for improving fleet fuel efficiencies are disseminated agency-wide and that all drivers are aware of fuel efficiencies gained by driving more efficiently.” The communication plan should include the following:

- **Drive at speeds that conserve fuel.** EPA estimates a 7%–23% improvement in fuel economy by keeping your speed less than 60 miles per hour (mph).
- **Use cruise control, when appropriate, on the highway to maintain a constant speed.** Cruise control should not be used in mountainous terrains as it increases fuel usage.

⁹ EPCRA 2005 requires Federal agencies to use alternative fuel in all of their dual fueled vehicles except where the vehicles have received a waiver from DOE. The percentage of annual waiver reductions is one of the metrics that the Office of Management and Budget (OMB) uses on its Transportation Scorecard, which is used to evaluate Federal agency progress in meeting transportation-related vehicle and fuel-use requirements.

¹⁰ U.S. EPA, www.fueleconomy.gov/feg/maintain.shtml, March 2011

- **Drive safely and responsibly.** Accelerating smoothly from a stop and braking softly helps conserve fuel. Fast starts and hard braking waste fuel. This type of driving also wears out car components, such as brakes and tires. Drivers should maintain a safe distance between vehicles to allow more time to brake and accelerate gradually.
- **Remove excess weight such as unnecessary items in the trunk.** Carrying extra weight makes the engine work harder thus consuming more fuel. DOE estimates that an extra 100 pounds in the trunk reduces a typical car's fuel economy by 1%–2%.

5.5 Avoiding Excessive Idling

When idling, vehicles typically burn from a quarter to 1 gallon of fuel per hour.¹¹ Unnecessary idling pollutes the air, wastes fuel, and causes excess engine wear. Reducing idle time is a simple policy to implement and saves fuel, engine wear, and money while reducing emissions and noise.

Idle reduction is typically used to describe technologies and practices that reduce the amount of time heavy-duty trucks idle their engines. However, light-duty vehicles (LDV) and medium-duty vehicles (MDV) can benefit from idle reduction strategies as well. Typically the following actions can help reduce unnecessary vehicle idling:

- Turn off your engine when you are parked or stopped (except in traffic) for more than 1 minute
- Avoid using a remote vehicle starter, which encourages unnecessary idling
- Avoid drive-throughs; walk inside instead.

For heavy-duty vehicles (HDV), a variety of technologies are available to reduce idling. Onboard equipment such as automatic engine stop-start controls and auxiliary power units can be used anywhere. Truck stop electrification enables trucks to hook up to stations that provide power and other amenities.

For LDVs and MDVs, three types of idle reduction technologies are available to keep vehicles warm: coolant heaters, air heaters, and energy recovery systems. Coolant heaters keep the engine warm by using fuel from the vehicle to pump heated coolant through the engine, radiator, and heater box. To provide passenger compartment warmth, air heaters are separate, self-contained units that directly blow hot air into the vehicle interior using fuel from the vehicle. Energy recovery systems use electric pumps connected to the water line to keep the car's cooling system and heater operating after the engine is turned off, using engine heat that would otherwise dissipate.

EPA has evaluated the fuel saving benefits of various idling reduction technologies through grants, cooperative agreements, emissions and fuel economy testing, demonstration projects, and technical literature review. More information can be found at www.epa.gov/smartway/transport/what-smartway/verified-technologies.htm.

Many states and localities have passed legislation limiting idling, which often apply to different vehicle types (i.e., weight classes) depending on the location. According to the American Transportation Research Institute (ATRI), some type of idling restriction had been enacted in all or parts of 25 states as of July 2008 (ATRI 2008). The AFDC maintains a list of current incentives and laws related to idle reduction, which can be found on the AFDC website at www.afdc.energy.gov/afdc/laws/.

¹¹ Argonne National Laboratory, Center for Transportation Research, Paper No. 06-2567, January 2006.

Chapter 6 STRATEGIZE: Implementing Alternative Fuel, Biodiesel Blend, and Electric Vehicle Strategies

<p>Purpose of this chapter</p>	<ul style="list-style-type: none"> • Help agencies evaluate opportunities to reduce GHG emissions by displacing petroleum use with alternative fuels, including biodiesel blends and electricity • Discuss the Federal fleet requirements to: <ul style="list-style-type: none"> – Increase alternative fuel use (E.O. 13423 and EISA Section 142) – Use alternative fuels in dual-fueled AFVs (EPA Act 2005 Section 701) – Install renewable fuel pumps at Federal fleet fueling centers (EISA Section 246) • Help agencies evaluate applicability, meet requirements, determine compliance, and implement chosen strategies
<p>Target audience</p>	<ul style="list-style-type: none"> • Agency headquarters fleet managers and agency fleet location managers

One effective strategy to reduce petroleum consumption is to displace petroleum use with alternative fuels, including electricity or biodiesel blends.¹² Each GGE of alternative fuel used in agency vehicles provides the equivalent GGE reduction in petroleum use. Agencies should use low carbon alternative fuels whenever possible and should decide on the type of alternative fuel vehicle and infrastructure based on the fleet location characteristics.

Alternative fuels include but are not limited to: E85 (a blend of 85% ethanol and 15% gasoline), neat (100%) biodiesel¹³ (B100), compressed natural gas, liquefied natural gas, liquefied petroleum gas or propane, and electricity.

- **E85, CNG, LNG, and LPG.** The use of these alternative fuels requires both dedicated infrastructure and alternative fuel vehicles. These alternative fuels are best used at fleet locations where alternative fuel is currently available or expected to become available (i.e., emerging markets) or at high-use locations where alternative fuel sites are planned in the near-term.
- **Neat Biodiesel and Biodiesel Blends.** Neat biodiesel and biodiesel blends require dedicated infrastructure but can be used in conventional diesel vehicles.¹⁴ Biodiesel strategies are ideal for locations with high diesel fuel use.
- **Electricity.** Electricity use requires both electric vehicles (EV), which include battery electric vehicles (BEV), low-speed electric vehicles (LSEV), and PHEVs, and dedicated charging infrastructure. Electricity strategies are best suited for locations without access to other alternative fuels.

To maximize alternative fuel use, petroleum reduction, and GHG reductions, agencies should support strategies to increase alternative fuel use by:

- **Acquiring AFVs**, including PHEVs, and placing near areas with existing or planned alternative refueling sites; and running dual-fueled vehicles on alternative fuel
- **Installing alternative fuel infrastructure** in areas with the highest AFV concentrations
- **Communicating and coordinating with nearby fleets** (both regulated and private sector) to aggregate demand for alternative fuel.

¹² For the Guidance and Handbook, biodiesel blends refer to blends of greater than 20% biodiesel with diesel (e.g., B20).

¹³ Biodiesel blends are not alternative fuels. However, the neat biodiesel component of biodiesel blends greater than 20% are counted toward alternative fuel goals.

¹⁴ Using biodiesel in conventional diesel vehicles may void the vehicle's warranty.

6.1 Overview of Requirements

As outlined in table 6-1, three statutes and one executive order prescribe the alternative fuel use requirements for the Federal fleet. It is important to note that biodiesel blends do not meet the definition of an alternative fuel. However, the **pure biodiesel contained in biodiesel blends equal to or greater than 20% counts toward meeting alternative fuel use targets**. This means that in B20 blends, 20% of the fuel by volume can be counted toward alternative fuel while the other 80% must be counted toward petroleum consumption. In blends lower than B20, such as B10, B5, and B2, all fuel use counts toward petroleum consumption and no portion can be counted toward alternative fuel use. Regardless, many sites find it helpful to begin using biodiesel at lower blends and transition to B20.

Additionally, fueling infrastructure providing biodiesel blends greater than 20% also meets the definition of renewable fuel pumps under EISA Section 246. Requirements to acquire AFVs that support alternative fuel, biodiesel blend, and electric vehicle strategies are discussed in more detail in chapter 7 of this Handbook.

Table 6-1. Alternative Fuel, Biodiesel Blend, and Electric Vehicle Federal Fleet Requirements

Fleet requirement	Statute or Executive Order	Summary of requirement	Section of this chapter
Increase in annual fleet alternative fuel use	E.O. 13423	10% annual increase (from previous year) FY 2005–FY 2015	6.5
	EISA §142	10% total increase from FY 2005–FY 2015	
Alternative fuel use in dual-fueled AFVs	EPAAct 2005 §701	All dual-fueled AFVs must use alternative fuel unless waived	6.6
Alternative fuel infrastructure	EISA §246	Every Federal fueling center must install a renewable fuel pump	6.7

Fuels Classified as Alternative Fuels

Alternative fuels are defined by Section 301 of EPAAct 1992, and may be modified by the Secretary of Energy by rule. The following fuels are currently defined or designated as alternative fuels:

- Pure methanol, denatured ethanol, and other alcohols
- Blends of 85% or more of methanol, denatured ethanol, and other alcohols with gasoline or other fuels (including E85 and M85)
- Natural gas and liquid fuels domestically produced from natural gas (including CNG and LNG)
- Liquefied petroleum gas (including LPG or propane)
- Coal-derived liquid fuels
- Electricity
- Biodiesel (B100)
- Fuels (other than alcohol) derived from biological materials
- Hydrogen
- P-Series fuels¹⁵

¹⁵ Clear liquid fuels, between 89 and 93 octane, designed for use in flexible fuel vehicles and containing 35% natural gas liquids, 45% ethanol, and 25% biomass-derived.

6.2 Framework: Identifying Optimal Alternative Fuel and Biodiesel Blend Strategies

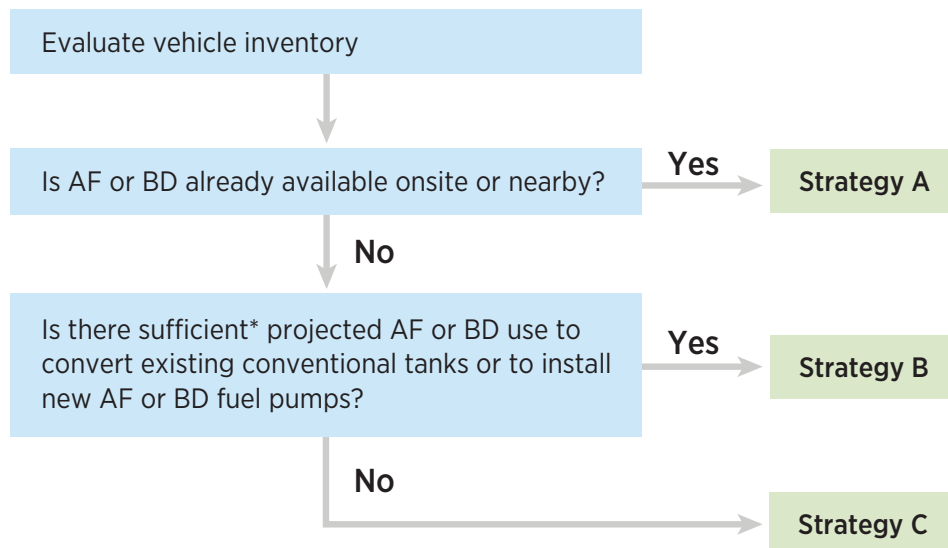
Alternative fuel and biodiesel blend strategies are ideally implemented at fleet locations with existing access to alternative fuel or high-use¹⁶ locations where alternative fuel or biodiesel blends are not currently available. At smaller use facilities without access to alternative fuel or biodiesel, fleets should focus on other petroleum reduction strategies such as acquisition of EVs (as discussed in section 6.3) or, if favorable, facilitate conversion of conventional gasoline tanks and/or development of alternative fuel or biodiesel infrastructure at local commercial or private fleet stations.

Fleet managers can identify the optimal alternative fuel and biodiesel blend strategies for each fleet location by using the flow chart in Figure 6-1 and alternative fuel and biodiesel blend strategy descriptions in Table 6-2. To start, fleet managers should evaluate their existing and projected vehicle inventory as well as identify available fueling options at each fleet location. The AFDC has various tools available to provide locations of alternative fuel pumps, including FleetAtlas,¹⁷ TransAtlas,¹⁸ and the Alternative Fueling Station Locator.¹⁹ See Chapter 10 for more details.

Having determined the availability of alternative fuels, including biodiesel blends, fleet managers should next determine which alternative fuels could be used at the location and to what extent. Fleet managers should first consider what flexible fuel vehicles (FFV) are already located at the site, including E85 FFVs and biodiesel-capable diesel vehicles and should then consider planned vehicle acquisitions. Fleet managers can then estimate the maximum alternative fuel use for the fleet location using the following methodology:

- **Inventory of vehicles.** Use the most recent VAM list, by type and size, at the fleet location.
- **Potential maximum number of AFVs.** Estimate the potential number of AFVs and biodiesel-capable diesel vehicles, by fuel type at the fleet location for each of the next 3 fiscal years. First, project the number of vehicles by size required at the fleet location for each of the next 3 fiscal years. Then, determine how many of these vehicles can be AFVs or biodiesel-capable diesel vehicles, assuming maximum replacement of gasoline vehicles with AFVs and accelerated replacement, if possible.
- **Theoretical maximum alternative fuel use.** For each fuel type, multiply the potential maximum number of vehicles capable of using that fuel (AFVs or biodiesel-capable diesel vehicles) by the average fuel use of that vehicle type at the fleet location.

Figure 6-1. Determining Alternative Fuel and Biodiesel Strategies



* The recommended usage threshold for a fuel center to warrant:
 Conversion of gasoline tank to E85 = >50k gallons
 Conversion of diesel tank to B20 = >50k gallons
 Installation of new E85 or B20 tank = >100k gallons

¹⁶ High-use refers to locations with an annual fuel turnover rate of 100,000 gallons or greater of one conventional fuel type (i.e., gasoline or diesel).

¹⁷ <http://maps.nrel.gov/fleetatlas>

¹⁸ <http://maps.nrel.gov/transatlas>

¹⁹ www.afdc.energy.gov/afdc/locator/stations/

Success in implementing alternative fuel and biodiesel blend strategies depends not only on fuel availability, but also on vehicles that can use the fuels and drivers who consistently refuel with alternative fuel. Fleet managers should maximize the number of vehicles capable of using alternative fuel or biodiesel blends (AFVs and diesel vehicles) at those locations that have existing alternative fuel or biodiesel infrastructure, or are candidates for new infrastructure. Fleet managers at both headquarters and fleet location levels should work with GSA and GSA Fleet Service Representatives (FSR) to ensure that vehicle acquisition plans support alternative fuel and biodiesel blend strategies.

Table 6-2. Descriptions of Alternative Fuel and Biodiesel Strategies

Alternative Fuel and Biodiesel Strategy	Summary	Infrastructure Strategy	Vehicle Acquisition Strategy	Fuel Use Strategy
A	<ul style="list-style-type: none"> • Optimize use of existing onsite infrastructure • Optimize use of nearby retail station(s) • Obtain access to nearby private fleet fueling center 	<ul style="list-style-type: none"> • Maximize use of existing onsite/ nearby alternative fuel or biodiesel infrastructure • Use AFDC to locate options 	Focus on acquisition of vehicles capable of using the existing alternative fuel or biodiesel infrastructure	Implement measures such as operator training to locate existing AF and BD pumps and monitoring to limit conventional fuel use by dual-fuel AFVs or diesel vehicles
B	<ul style="list-style-type: none"> • Convert conventional fuel tank to E85 or biodiesel • Install new alternative fuel or biodiesel infrastructure 	<ul style="list-style-type: none"> • Convert existing gasoline fueling system to E85 or diesel fueling system to biodiesel • Install new ethanol, biodiesel, or CNG pumps 	Focus on acquisition of E85 FFVs (for E85) and diesel vehicles (for biodiesel)	Implement measures such as operator training to locate existing AF and BD pumps and monitoring to limit conventional fuel use by dual-fuel AFVs or diesel vehicles
C	<ul style="list-style-type: none"> • Promote development of local alternative fuel or biodiesel infrastructure 	Work with local retail stations, the Clean Cities program, and other fleets to install alternative fuel or biodiesel infrastructure	Acquire AFVs or diesel vehicles if alternative fuel or biodiesel infrastructure is conveniently available	Ensure AFVs or diesel vehicles use new retail or private stations through operator training and monitoring

6.3 Framework: Identifying Optimal Electric Vehicle Strategies

Replacing gasoline vehicles with EVs is another effective strategy to reduce petroleum consumption. Each GGE of electricity used in EVs provides the equivalent GGE reduction in petroleum use.

Vehicles Classified as Electric Vehicles

EVs are vehicles that use electric motors powered by onboard sources of stored energy for propulsion. This definition includes the following general types of EVs:

- **Battery-electric vehicles (BEV).** BEVs²⁰ are powered primarily by an electric motor drawing current from rechargeable batteries, fuel cells, or other portable sources of electrical current. Commercial availability of light-, medium-, or heavy-duty BEVs is expected to increase in coming model years.
- **Low-speed electric vehicles (LSEV).** BEVs in widespread use today are LSEVs, which are **electric-powered low-speed vehicles (LSV²¹)**. LSEVs are also referred to as **neighborhood electric vehicles (NEV)**. LSEVs are four-wheeled vehicles weighing less than 3,000 pounds with top speeds of 20 to 25 miles per hour. It is important to note that LSEVs are not classified as light-, medium-, or heavy-duty “motor vehicles” for purposes of the EPA’s 1992 AFV acquisition requirements.
- **Plug-in hybrid electric vehicles (PHEV).** PHEVs are propelled by both an internal combustion and heat engine and to a significant extent by an electric motor that draws electricity from a battery that can be recharged from the grid.²² PHEVs are not yet available in large numbers; however, a few PHEV models are entering the marketplace in model years 2011 and 2012. Section 2(g)(iii) of E.O. 13423 requires Federal agencies operating fleets of at least 20 vehicles to ensure the use of PHEVs when they become commercially available and at a cost reasonably comparable, on the basis of life-cycle cost, to non-PHEVs.

HEVs,²³ which draw propulsion energy from onboard sources of stored energy that are both an internal combustion and heat engine using consumable fuel and a rechargeable energy storage system, often a chemical battery, are also classified as EVs. However, these vehicles differ from the other EVs in that they do NOT consume electricity to displace petroleum use. **Acquisition of HEVs increases fleet economy, which is a component of the second principle of petroleum reduction—increase fleet fuel efficiency—as discussed in chapter 5 of this Handbook.**

GHG and Petroleum Reduction Opportunities from Electric Vehicles

EVs typically have a higher upfront acquisition cost, but have the potential to significantly reduce an agency’s petroleum consumption, GHG emissions, and operating costs. The primary benefits for each type of EV are as follows:

- **BEVs.** Replacing a conventional-fueled vehicle with a BEV provides a 100% reduction in that vehicle’s use of petroleum. BEVs also reduce fleet operating costs, since electricity and maintenance²⁴ costs are typically far less than for comparable conventional-fueled vehicles.
- **LSEVs.** LSEVs have the potential to significantly reduce an agency’s GHG emissions, petroleum consumption, and fleet operating costs where fleet vehicles are used primarily to support campus-type operations, have low daily VMT, and have daily (or overnight) access to electricity for recharging.
- **PHEVs.** Acquisition of a PHEV to replace a conventional fuel vehicle is expected to provide substantial reductions in GHG emissions and petroleum use. PHEVs also provide ranges similar to those of conventional fuel vehicles.

Agencies should evaluate these potential EV benefits together with their potential disadvantages to determine when use of EVs makes sense for reducing fleet petroleum use. Potential disadvantages of EVs compared to conventional fuel vehicles include higher incremental acquisition costs, longer refueling time (charge time), range constraints (primarily for BEVs and LSEVs), lower GHG emission reductions if coal-based electricity is used, and, for LSEVs, limitation to campus use.

²⁰ Defined in section 30(c)(1)(a) of the Internal Revenue Code of 1986 (26 U.S.C. 30(c)(1)(a)).

²¹ Defined in 49 CFR Section 571.3.

²² Defined in section 30D(d)(1) of the Internal Revenue Code of 1986 (26 U.S.C. 30D(d)(1)).

²³ Defined in section 30B(d)(3) of the Internal Revenue Code of 1986 (26 U.S.C. 30B(d)(3)).

²⁴ In the long term, BEVs are expected to have reduced maintenance costs; however, initial vehicle models traditionally have slightly elevated maintenance costs.

Framework for Identifying Optimal Electric Vehicle Acquisition Strategies

Unlike alternative fuel and biodiesel strategies, strategies to acquire electric vehicles to displace petroleum use can be **effective at any fleet location, regardless of number of vehicles or alternative fuel availability**. However, electric vehicle strategies are typically most effective at smaller fuel use²⁵ locations **without access to alternative fuel or biodiesel blends**, while alternative fuel and biodiesel strategies are most effective at higher use locations.

Tables 6-3 and 6-4 provide Federal fleet managers a recommended framework for identifying optimal electric vehicle strategies at each fleet location based on fleet characteristics.

Table 6-3. Recommended Framework for Identifying Optimal Electric Vehicle Strategies

Step	Summary	Actions	Purpose
1	Identify conventional-fueled vehicles that are not candidates to be replaced with AFVs or use biodiesel	<ul style="list-style-type: none"> Determine if the fleet location will have accessibility to alternative fuel or biodiesel Evaluate vehicles that are not candidates to be replaced with AFVs or diesel vehicles 	At locations that have or will have access to alternative fuel or biodiesel, fleet managers should prioritize acquisition of vehicles capable of using the alternative fuel or biodiesel
2	Identify optimal electric vehicle strategies based on fleet location characteristics	<ul style="list-style-type: none"> Find out if the fleet location is a large campus-type setting, and if there are security, monitoring, or other vehicles that operate solely within the campus Use table 6-4 to determine optimal electric vehicle strategies based on location and fleet characteristics 	Select optimal electric vehicle strategies
3	Evaluate availability of EVs to replace conventional-fueled vehicles	<ul style="list-style-type: none"> Determine availability of BEVs, LSEVs, or PHEVs to replace conventional-fueled vehicles that are not candidates to be replaced with AFVs or use biodiesel Ensure that EVs meet minimum requirements needed to accomplish mission tasks 	Identify EVs available to complete necessary mission tasks
4	Evaluate life-cycle costs for acquisition of EVs	<ul style="list-style-type: none"> Determine whether electric vehicles that match fleet requirements can be acquired at a reasonable and competitive life-cycle costs relative to competing vehicles If not cost competitive, investigate whether funds can be made available based on compliance with fleet petroleum reduction mandates 	Ensure that acquisition of electric vehicles aligns with fleet resources

²⁵“Smaller use” refers to locations with an annual fuel turnover rate of less than 100,000 gallons of both conventional fuel types (i.e., gasoline or diesel).

Table 6-4. Potential Electric Vehicle Strategies Based on Fleet Location and Characteristics

	Electric Vehicle Acquisition Strategy	Electric Infrastructure Strategy
Campus-type setting	Replace LDVs that operate solely within campus with LSEVs	<ul style="list-style-type: none"> • Install electric vehicle charging infrastructure required to support electric vehicles • Meter, monitor, and report electricity used in electric vehicles separately
Gasoline vehicles not candidates to be replaced with AFVs or diesel vehicles	Replace gasoline vehicles with BEVs or PHEVs (when available) that meet functional and mission needs	

6.4 Summary of Alternative Fuel, Biodiesel, and Electric Vehicle Requirements

As discussed earlier in this chapter, three statutes and one executive order prescribe the following alternative fuel use requirements for the Federal fleet. These requirements focus on addressing the third driving principle of GHG emission and petroleum reduction (as outlined in figure 1-1), increasing alternative fuel use, as follows:

- **Increase annual alternative fuel use in fleets.** Each agency (subject to the alternative fuel use requirements) must increase its alternative fuel consumption by a minimum of 10% compounded annually, starting from the FY 2005 baseline through the end of FY 2015 (see table 5-1 of the Guidance). See chapter 5 of the Guidance and section 6.5 of this chapter for detailed guidance.
- **Use alternative fuel in dual-fueled AFVs.** Section 701 of EPCA 2005 requires agencies to use alternative fuel in all dual-fueled AFVs, except in vehicles for which the agency received a waiver from DOE. Waivers are granted due to the unavailability of alternative fuel or if the fuel is unreasonably more expensive than gasoline. See section 6.6 of this chapter for detailed guidance.
- **Increase alternative fuel infrastructure.** Section 246 of EISA requires Federal agencies to install at least one renewable fuel pump at each Federal fleet fueling center by January 1, 2010. Renewable fuel pumps include E85, biodiesel blends equal to or greater than 20%, and electricity derived from a renewable source of energy. See section 6.7 of this chapter for detailed guidance.

6.5 Alternative Fuel Use Increase Requirements (E.O. 13423 and EISA Section 142)

Chapter 5 of the Guidance details the Federal fleet alternative fuel use increase requirements established by E.O. 13423 and EISA Section 142, and assists agencies in evaluating applicability (section 1.5 of the Guidance), meeting requirements, determining compliance, and implementing a plan. This section assists Federal agencies in determining their FY 2005 alternative fuel consumption baseline, which neither the Guidance, E.O. 13423 Instructions, nor the CEQ Instructions discuss.

Determining an Agency's Alternative Fuel Consumption Baseline

For most agencies, the FY 2005 alternative fuel baseline is simply the value submitted through FAST for FY 2005. As with the petroleum value, if this number is found to be incorrect, the concerned Federal agency should contact DOE.

Federal agencies with extremely low alternative fuel use (less than 5% of the agency's total fuel consumption in FY 2005) **should use a minimum alternative fuel baseline.** The minimum baseline is the lesser of (1) 5% of total subject fuel (petroleum and alternative fuel) consumption or (2) the greater of 500,000 GGE or the amount of alternative fuel consumed in FY 2005.

Each agency must review its FY 2005 alternative fuel consumption figures currently in FAST for accuracy and work with DOE to determine its appropriate baseline.

The FY 2005 alternative fuel baseline for agencies with FY 2005 alternative fuel usage greater than the minimum baseline will be the FY 2005 level (see table 6-5). This approach is being taken to encourage those Federal agencies that have not been aggressive in substituting alternative fuel for petroleum to begin doing so, and to bring these agencies up to levels similar to other subject Federal agencies.

Table 6-5. Methodology for Establishing the FY 2005 Alternative Fuel Baseline

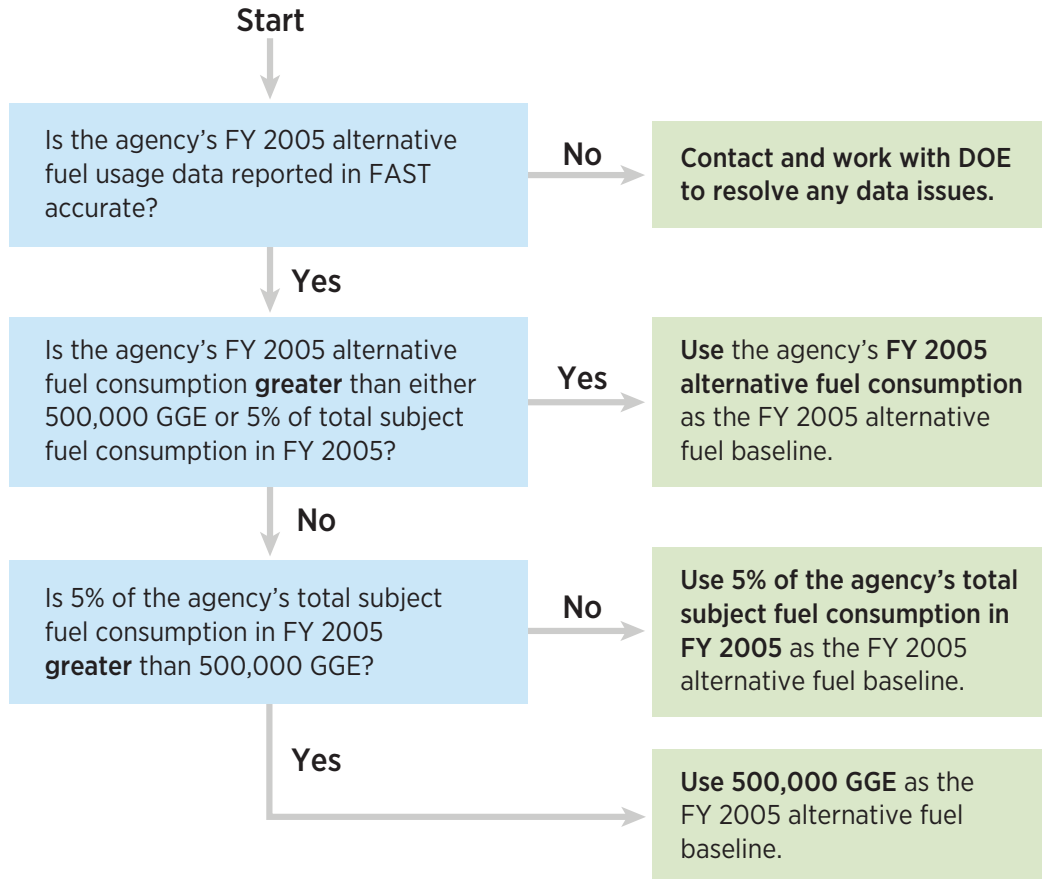
- The alternative fuel baseline will be the actual FY 2005 alternative fuel consumption **if** it exceeds the minimum alternative fuel baseline.
- If not, the minimum alternative fuel baseline will be the baseline.
- The minimum alternative fuel baseline is the lesser of:
 - 5% of total subject fuel use (subject petroleum and alternative fuel usage)
 - 500,000 GGE or the FY 2005 alternative fuel usage (whichever is greater)

Table 6-6 presents some example alternative fuel baseline calculations to assist agencies in determining their FY 2005 alternative fuel baseline.

Table 6-6. Example Alternative Fuel Baseline Calculations (GGEs)

Total Subject Fuel Use	5% of Total Subject Fuel Use	Minimum GGE Level (lesser of 5% or 500,000 GGE)	Actual FY 2005 Alternative Fuel Consumption	Resulting FY 2005 Alternative Fuel Baseline	Method of Resulting
18,000,000	900,000	500,000	800,000	800,000	FY 2005 alternative fuel consumption
16,250,000	812,500	500,000	400,000	500,000	Minimum GGE level
18,000,000	900,000	500,000	4,500,000	4,500,000	FY 2005 alternative fuel consumption
5,000,000	250,000	250,000	100,000	250,000	5% of total subject fuel consumption
5,000,000	250,000	250,000	400,000	400,000	FY 2005 alternative fuel consumption

Figure 6-2. Determining the FY 2005 Alternative Fuel Baseline for an Agency



6.6 Alternative Fuel Use in Dual-Fueled AFVs (Section 701 of EPAct 2005)

The vast majority of AFVs currently in the Federal fleet are dual-fueled AFVs—AFVs capable of operating on gasoline, alternative fuel, or a mixture of both. As a result, the primary driver of alternative fuel consumption by the Federal fleet is the frequency with which these dual-fueled AFVs use alternative fuel rather than gasoline. In order to promote increased alternative fuel consumption by the Federal fleet, Congress enacted Section 701 of EPAct 2005, which requires Federal agencies to use only alternative fuel in all of its dual-fueled vehicles, except where the vehicles have received a waiver from DOE due to the local unavailability of alternative fuel or if the fuel is unreasonably more expensive than gasoline.

Below are guidelines to help agencies understand the requirements of Section 701 of EPAct 2005 and how to apply for waivers from DOE. This Guidance describes the process through which DOE’s FEMP will evaluate requests for alternative fuel use waivers by Federal agencies. It also describes information DOE will require from agencies applying for waivers.

Applicability

Agency Fleets Subject to EPAct 2005 Section 701 Requirements

The EPAct 2005 Section 701 requirement applies to **all agencies with fleets that are considered “covered” by EPAct 1992**. More detailed discussion of the fleets covered by EPAct 1992 is presented in section 7.4 of this Handbook.

Vehicles Subject to EPAct 2005 Section 701 Requirements

All dual-fueled AFVs in an agency’s fleet (*except those exempted as discussed below*), including Federal LDVs, MDVs, and HDVs (including GSA or agency owned or leased vehicles). Vehicles include government-owned, contractor-operated (GOCO) vehicles as well as certain contractor- or subcontractor-owned vehicles.

Dual-fueled AFVs include:²⁶

- **E85 FFVs.** Vehicles capable of running on gasoline and/or ethanol
- **Bi-fuel CNG or LNG vehicles.** Bi-fuel vehicles capable of running on gasoline and/or natural gas (compressed and liquefied)
- **Bi-fuel LPG vehicles.** Bi-fuel vehicles capable of running on gasoline and/or liquefied petroleum gas (LPG).

Vehicles Exempted From EPC Act 2005 Section 701 Requirements

Vehicles considered exempt from the EPC Act 2005 Section 701 requirements are the same as the vehicles exempted from the petroleum reduction requirements (such as emergency, law enforcement, and military tactical vehicles), which are listed in tables 1-3 and 1-4 in section 1.5 of the Guidance.

Determining Your Agency's Requirements

Agencies subject to the EPC Act 2005 Section 701 requirements must:

- Use only alternative fuel in all of its dual-fueled AFVs
- Exceptions are granted only if the vehicles have received a waiver from DOE.

Waivers from the Section 701 Requirement

Generally, for the purpose of the Section 701 requirement,²⁷ vehicles may qualify for a waiver by DOE if:

1. **Alternative fuel is not reasonably available.** Not reasonably available means that alternative fuel cannot be obtained within a 15-minute drive or within 5 miles (one way) from the vehicle's garaged location. Waivers will be granted for vehicles that have a drive longer than 15 minutes even if a station is within the 5-mile barrier. Dual-fueled vehicles that have access to alternative fuel along the vehicle's usual travel route are expected to use that fuel, even if that infrastructure is more than 5 miles away from the vehicle's garaged location.
2. **Alternative fuel is unreasonably expensive.** Unreasonably expensive means that alternative fuel costs more per gallon than gasoline at the same station.

Determining Whether Your Vehicle Qualifies for a Waiver Request

Agencies subject to the EPC Act 2005 Section 701 requirement can use DOE's Alternative Fueling Station Locator (www.eere.energy.gov/afdc/fuels/stations.html) and/or contact the Defense Energy Support Center (DESC) to determine the availability of E85 at their fleet locations prior to applying to DOE for a Section 701 waiver for E85 FFVs. DESC assists military and civilian agencies in contracting for E85 in many fleet locations in the United States. DESC contracts include standards to ensure the quality of the delivered fuel. Through its large purchase volume, DESC is typically able to provide these fuels to agencies at a reasonable cost.

Covered agencies should determine which (if any) of its vehicles may qualify for a waiver under the two criteria—availability and expense—discussed above. If the agency determines that vehicles are eligible for a waiver, the agency should first determine if there may be other means to obtain alternative fuel for the vehicles at that location before submitting a waiver request. DOE requires that data supporting waiver requests be submitted using FAST, available at <https://fastweb.inel.gov>.

Waiver based on fuel not reasonably available. In the spring of each year, DOE will either (1) provide agencies with a tool that will allow them to easily determine proximity of alternative fuel infrastructure to dual-fueled vehicle locations, or (2) offer to conduct this analysis using fleet vehicle data submitted to DOE by the agency. **It is important that agencies provide vehicles' garaged addresses** when conducting this analysis, since more exact location data (as opposed to just ZIP code location) improves an agency's ability to justify waiver requests based on availability of alternative fuel.

²⁶ Although flex-fuel gasoline/methanol vehicles are considered dual fueled AFVs, these vehicles are being phased out due to concerns with the M85 fuel. Therefore, DOE does not expect waiver requests for the use of M85 (blends of 85% or more of methanol with gasoline) in M85 FFVs. Given that Section 701 places waiver consideration, in part, in terms of comparison to gasoline, DOE will only consider waivers for dual fueled vehicles for which gasoline is the conventional fuel. Further, alternative fuels that are not used in dual fueled AFVs are not covered by this provision. This includes biodiesel, coal-derived liquid fuels, hydrogen, electricity, P-series fuels, and fuels (other than alcohol) derived from biological materials.

²⁷ 42 U.S.C. 6374(a)(3)(E)(i)(I) and (II).

For each dual-fueled vehicle or group of dual-fueled vehicles, agencies are required to enter the following information into FAST:

- Vehicle type
- Fuel type
- Average miles per gallon
- Model year
- Vehicle location (ZIP code suffices until further notice; however address and/or latitude and longitude coordinates would improve waiver determination accuracy and may be required in the future)
- Number of vehicles
- Waiver reason
- Expected miles driven
- Expected alternative fuel use (percent).

Waiver based on unreasonably expensive fuel. Waivers based on the unreasonable cost of alternative fuel will be evaluated based on its price compared with gasoline at stations providing alternative fuel. If the fuel is more expensive per gallon than gasoline at the same station, the agency may apply for a Section 701 waiver based on unreasonably expensive alternative fuel. For each vehicle (or group of vehicles with proximity to relevant fueling station) the agency must submit to DOE the following information:

- AFVs (number, by fuel type)
- AFV location (street address, city, state, and ZIP code)
- Local fleet point of contact
- Station name, location (street address, city, state, and ZIP code), and phone number
- Fuel price data (documentation of gasoline and alternative fuel prices collected approximately once a week for at least 5 weeks).

This information should be submitted to DOE and the National Renewable Energy Laboratory (NREL) at federal_fleets@ee.doe.gov and federal_fleets@nrel.gov. Also, agencies must enter the date of the e-mail submission in the appropriate comment section in the Section 701 portion of FAST.

Reporting

Frequency and scope of waiver requests

One consolidated waiver request per covered agency per fiscal year will be considered by DOE.

Due date for requesting waivers

Waivers are due to DOE by June 30 of the fiscal year prior to that for which the waiver is requested. Waiver requests must be submitted to and reviewed by DOE before a waiver is granted.

DOE approval or denial of waiver requests

DOE may approve the waiver request for all, some, or none of the local fleets included in an agency's petition. All documentation supporting an agency's waiver request under this provision may be audited by DOE. The purpose of the audit will be to confirm the lack of available alternative fuel and/or the unreasonable price of the alternative fuel, as reflected in the waiver request.

Submitting a Waiver Request

Covered agencies shall submit the request via the FAST system (<https://fastweb.inel.gov>) by June 30 of the prior fiscal year for which they are requesting waivers. FAST automatically summarizes local fleet submissions into one report for review and approval by the agency. Once approved by the agency in FAST, the list of vehicles is sent through FAST to DOE for approval.

In addition to submitting the AFVs included in the waiver request through FAST, each agency is required to submit to DOE a plan for addressing the need for waivers (alternative fuel availability and/or cost issues), including plans for reducing needed waivers, and a cover letter signed by the appropriate agency representative. The cover letter should include:

- Total number of AFVs in the agency’s fleet
- Number of AFV waiver requests by waiver type (alternative fuel unavailable and/or unreasonably expensive)
- Short narrative indicating that a plan to reduce the number of future waiver requests is being provided under separate cover.

Note that compliance with Section 701 will be reported to the OMB. DOE recommends copying an agency’s Senior Transportation Official or Senior Sustainability Official on this letter. Agencies should send the agency’s plan and cover letter to DOE electronically at federal_fleets@ee.doe.gov, and a courtesy copy to federal_fleets@nrel.gov. Hard copies are not required.

Appealing a Waiver Request

Agencies that disagree with DOE’s determination may appeal the decision using the process outlined in table 6-7 below. Waiver appeals fall into four general categories described below. Agencies should provide a list of the dual-fueled vehicles included in any appeal, including the number by dual-fueled vehicle location and fuel type.

Table 6-7. Process for Appealing Denied Section 701 Waiver Requests

Appeal Category	Potential Reason for Appeal	Appeals Process
Alternative fuel is greater than 5 miles away from a garaged fleet.	Although DOE’s ZIP code analysis indicates that the fuel is available close by, the actual garage location of the vehicle is further than 5 miles from the fuel.	For each vehicle (or group of vehicles) affected, provide street address and ZIP code of the vehicle(s) garage location and location of nearest infrastructure.
Alternative fuel is less than 5 miles away from the vehicle(s)’ location, but the Federal fleet does not have access to the fuel.	Privately owned alternative fuel stations may restrict access to the Federal fleet.	For each vehicle(s) affected, provide documentation of attempts to approach alternative fuel supplier for access.
Alternative fuel is less than 5 miles away from the vehicle(s)’ garaged location, but fleet vehicles frequently operate away from their garaged location.	Fleet vehicles often operate away from the garaged location and alternative fuels are not available in these areas.	For each fleet requesting an appeal, provide an approximate percentage of the time vehicles are away from the garaged location for extended periods of time.* Provide documentation that there is no alternative fuel available in (or en route to) those areas away from the garaged location.
Other exceptions		Provide a justification (with supporting documentation) of why the waiver is warranted.

*Note that vehicles operating away from fleet headquarters during the day but returning to headquarters in the evening could use alternative fuel by fueling in the morning or evening, prior to or after returning from field work.

Waiver appeal requests shall be submitted by e-mail to DOE at federal_fleets@ee.doe.gov with a copy to federal_fleets@nrel.gov. DOE FEMP will analyze agency waiver submissions and provide waiver determination results to agencies as soon as practicable.

Integrating EAct 2005 Section 701 and EAct 1992 AFV Acquisition Requirements

Vehicles that are excluded from the requirements of EAct 1992 (such as emergency, law enforcement, and military tactical vehicles) are also excluded from the Section 701 alternative fuel use requirement. To ensure consistency with Section 701, **agencies do not receive EAct AFV acquisition credit for exempted emergency and law enforcement vehicles.** See section 7.3 for more detail on EAct 1992 AFV acquisition requirements and credits.

However, it is important to note that alternative fuel used in exempted emergency and law enforcement AFVs is counted as part of the Federal agency's "alternative fuel consumption" reported under E.O. 13423 and EISA Section 142. Not only is this approach consistent with the existing approach under E.O. 13423 and EISA Section 142, but DOE believes such a definition provides a strong incentive for Federal agencies to use alternative fuel to the maximum extent possible. Additionally, existing data systems do not currently allow for this data to be separated.

Additional Guidance

Each agency is responsible for ensuring alternative fuel is used in its dual-fueled vehicles except in those vehicles for which waivers have been approved.

Waivers should not be submitted for dual-fueled vehicles that may occasionally use conventional fuel due to unforeseen or unplanned circumstances (e.g., an on-site FFV with access to E85 that was taken on a long distance trip and could not obtain E85 throughout the trip). Fleets should maximize alternative fuel use and not submit waivers for occasional conventional fuel use (such as once every 10 fill-ups).

Waiver requests should not be considered approved until DOE provides approval in writing (typically via e-mail). DOE may reject a waiver request, approve a waiver request, or approve a waiver request in part and reject in part.

6.7 Renewable Fuel Infrastructure Requirements (EISA Section 246)

On December 19, 2007, the Energy Independence and Security Act of 2007 (EISA) was signed into law as Public Law 110-140. Section 246(a) of EISA directs Federal agencies to install at least one renewable fuel pump at each Federal fleet fueling center under their jurisdiction by January 1, 2010 (42 U.S.C. 17503(a)). Section 246(b) requires the President to submit an annual report to Congress on Federal agency progress in meeting this renewable fuel pump installation mandate (42 U.S.C. 17503(b)).

General Guidance

Section 246 of EISA requires the installation of renewable fuel pumps, providing access to renewable fuel at Federal fleet fueling centers. As such, if a Federal fleet fueling center does not currently have a renewable fuel pump, or a renewable fuel pump is not readily accessible to a Federal fleet that uses an existing Federal fleet fueling center,²⁸ a renewable fuel pump must be installed by January 1, 2010.

Federal Fleet Fueling Centers Subject to EISA Section 246 Requirements

EISA Section 246 applies to the same agencies and fleets that are currently subject to the AFV acquisition requirements of EAct 1992. More detailed discussion of the fleets covered by EAct 1992 is presented in section 7.4 of this Handbook.

EISA Section 246 requirements only apply to Federal fueling centers located in the United States that meet all of the following criteria:

- **Provides central refueling of Federal fleets.** EISA Section 246 only applies to existing Federally owned or contracted refueling sites located in a MSA or consolidated metropolitan statistical area (CMSA) where Federal fleets of 20 or more LDVs are centrally refueled. Fueling centers not located in a covered MSA or CMSA are exempt from these requirements. Vehicles heavier than 8,500 pounds gross vehicle weight rating (GVWR) and law enforcement, emergency, and military tactical vehicles are not counted in the size of the fleet served by the fueling center.
- **Achieves 100,000 gallons or greater annual fuel turnover rate.** EISA Section 246 specifies that renewable fuel pump installation requirements do not apply to any DOD refueling center with a "fuel turnover rate of less than 100,000 gallons of fuel per year." DOE has excluded from the definition of Federal fleet fueling center, any center with

²⁸ Agencies are not required to install renewable fuel pumps at Federal fleet fueling centers where fleets already have access to renewable fuel, including access through publically available infrastructure. Requiring duplicative renewable fuel pumps would not increase the number of AFVs having access to alternative fuel, and is therefore not cost effective. Additionally, excluding consideration of publically available infrastructure would be counterproductive to other ongoing efforts encouraging the private sector to develop renewable fuel infrastructure near Federal fleets that do not have access to renewable fuel.

a fuel turn-over rate of less than 100,000 gallons of each conventional fuel type (i.e. gasoline or diesel) per year. DOE has determined that this minimum threshold should apply to all Federal agencies because at levels below this threshold:

- Installation of renewable fuel infrastructure is not cost effective and cannot justify a private sector investment
- Cost-effective procurement of alternative fuel cannot be ensured
- Product quality deteriorates
- Seasonal fuel specification changes cannot be met.

For these reasons, EISA Section 246 applies only to existing Federally owned or contracted refueling sites with an annual fuel turnover rate of 100,000 gallons or greater of one conventional fuel type (i.e., gasoline or diesel).

- **Lacks an existing renewable fuel pump on site.** Federal fleet fueling centers with existing renew-able pumps already meet the EISA Section 246 requirements.
- **Lacks a local renewable fueling source.** Agencies are not required to install a renewable pump at Federal fleet fueling centers in locations where renewable fuel is reasonably available at a nearby retail station (or other accessible fueling center). The criteria for availability of renewable fuel are the same as applicable to Section 701 of EAct 2005—alternative fuel is reasonably available if it can be obtained within a 15-minute drive or within 5 miles (one way) from the Federal fleet fueling center.²⁹

At Federal fleet fueling centers that are not subject to EISA Section 246 requirements, Federal agencies are encouraged to install renewable fuel infrastructure when practical and/or cost effective. For example, converting existing gasoline or diesel infrastructure to renewable fuels may be more cost effective than installing new renewable fuel infrastructure. Additionally, skid-mounted turnkey fueling stations are available that can cost-effectively refuel smaller fleets.

Renewable Fuel Pump Installation Requirements

By January 1, 2010, Federal agencies must have installed at least one renewable fuel pump at each Federal fleet fueling center under their jurisdiction subject to the EISA Section 246 requirement. At these fueling centers, agencies must install either an **E85 refueling pump, biodiesel (B20 or greater) refueling pump, or electric charging station.**

Electricity as a Renewable Fuel

Agencies may satisfy EISA 246 requirements by installing an electric recharging station at Federal fleet fueling centers, provided the following:

1. The electricity used to charge the vehicle(s) is from a renewable source (wind- or solar-generated, for example), or agencies have purchased renewable energy credits (RECs) equal to or greater than the amount of electricity used to charge the vehicles at the fueling center. Agencies must certify the purchase of RECs in their annual EISA Section 246 data supplied to DOE, and the RECs must be purchased specifically for meeting EISA Section 246 renewable fuel pump installation requirements. In other words, there can be no double-counting of REC purchases—the REC purchases that cover the electricity used to charge vehicles can be counted as meeting EISA Section 246 requirements only if they are not counted toward meeting other mandates as well. REC purchases that exceed vehicle electricity use may be counted toward meeting other mandates.
2. The electric charging station and/or the vehicles being charged have a metering device that measures the amount of electricity used to charge the vehicles, and this data is recorded and maintained by the agency and provided to DOE as part of the annual EISA Section 246 submission process.

Annual Reporting Requirements

Not later than June 30 of each calendar year or by a date established and promulgated by DOE, Federal agencies subject to EISA Section 246 requirements are to submit data on Federal fleet fueling centers that are within their jurisdiction via FAST. Agencies must complete all fields, including the Federal fleet fueling center name, its location, and amounts of fuels dispensed by type (see the template below). **Note that Federal agencies must report fuel use at all Federal fleet fueling centers regardless of the volume of fuel used annually,** but are only required to install renewable fuel pumps at fueling centers meeting the above criteria. Each year, DOE will compile this information on the status of agency performance in complying with the renewable fuel pump installation requirements.

²⁹ For more information please refer to Section 6.6 of the Handbook.

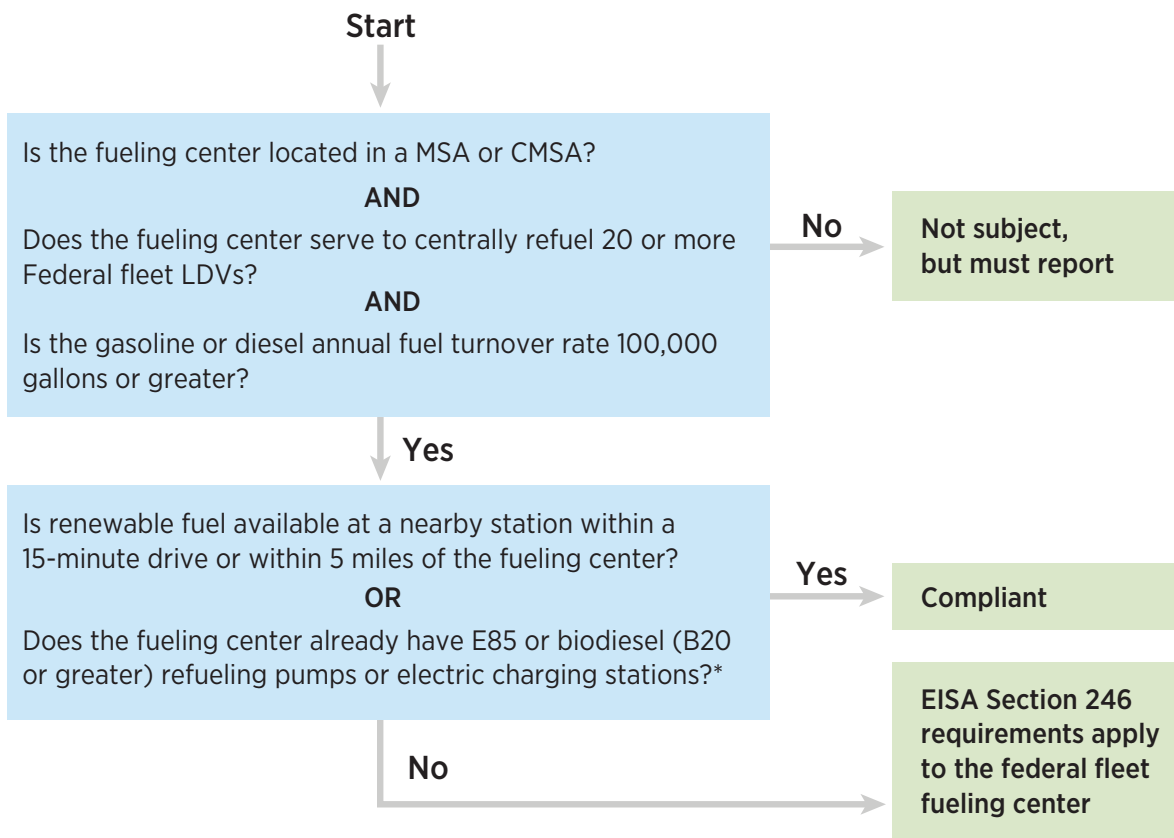
Implementation

First, each Federal agency should identify the locations of all fueling centers that meet the definition of Federal fleet fueling centers under their jurisdiction. These fueling centers will be required to install at least one renewable fuel pump by January 1, 2010, consistent with this guidance. Note that new infrastructure installed to meet this requirement need not be collocated with existing fueling centers, but must be accessible to those vehicles that would have otherwise accessed the original fueling station.

Install Renewable Fuel Pumps

- **Determine renewable fuel pump requirements for each site.** Agencies should determine the most appropriate renewable fuel type for each Federal fleet fueling center lacking a renewable fuel pump, or lacking access to a renewable fuel pump. This determination should be made based upon existing and planned fleet characteristics, including those contained in agencies' EISA Section 142 plans.
- **Consider and address installation and operation issues.** After selecting the renewable fuel type(s), the agency should assess the equipment, supply, storage, operational, and maintenance requirements to ensure operation of installation. Agencies should evaluate the compatibility of existing refueling infrastructure for the renewable fuel, and determine whether new infrastructure is required. For example, many metal and fiberglass tanks that meet U.S. Environmental Protection Agency (EPA) code (December 1998) may be compatible with E85 once cleaned.
- **Procure renewable fuel.** Federal agencies should consider procuring renewable fuel either through the Defense Logistics Agency (DLA) Energy or directly from ethanol or biodiesel suppliers. By consolidating requirements for DOD and other Federal agencies, DLA Energy often may be the lowest cost provider of renewable fuel. For renewable electricity, agencies must either ensure electricity is generated solely from a renewable source, or purchase RECs equal to or greater than the amount of electricity used to charge the vehicles at the fueling center.

Figure 6-3. Determining Federal Fleet Fueling Centers Subject to the EISA Section 246 Requirements



* Electricity must either be derived from a renewable source of energy or RECs purchased equal or greater to the electricity used.

6.8 Developing Alternative Fuel, Biodiesel, and Electricity Infrastructure

This section provides guidance to assist Federal agencies in installing the following infrastructure to support the primary alternative fuel, biodiesel blend, and electric vehicle strategies and requirements discussed in this chapter:

- **E85.** Conversion of existing tank system to E85 or installation of a new E85 system.
- **Biodiesel Blends.** Conversion of existing tank system to B20 or installation of a new B20 system.
- **EV Charging.** Installation of new EV charging infrastructure.

E85 Infrastructure

Certain materials commonly used with gasoline are totally incompatible with alcohols. When these materials (such as aluminum) come in contact with ethanol, they may dissolve in the fuel, which may damage engine parts and result in poor vehicle performance. Therefore, use of E85 requires fueling infrastructure that includes only E85-compatible materials.

Federal agencies wishing to install E85 fueling infrastructure can either convert an existing tank system or install a new tank system. Each choice has its own costs and benefits as described in the following sections. More detail to assist Federal fleet managers in evaluating E85 refueling installation requirements at Federal fleet refueling centers is provided in the Handbook for Handling, Storing, and Dispensing E85 produced by DOE Clean Cities (available at www.e85fuel.com/pdf/storing-handling-e85.pdf)

Converting existing fueling systems to E85

At refueling sites with more than one available gasoline or diesel tank, Federal agencies can convert one of the tank systems to E85. This typically costs much less than installing a new tank system. The conversion process includes cleaning the tank and lines, ensuring fuel lines and dispenser components are compatible with E85, and calibrating the fuel metering system.

Most metal underground storage tanks that meet EPA December 1998 codes can be used to store E85. Many underground fiberglass tanks that meet EPA standards may also be used to store E85. However, fiberglass storage tanks manufactured prior to 1992 **may not** be able to handle E85.

Installing new E85 fueling systems

At Federal fleet refueling centers without tanks that can be converted to E85, Federal agencies must install a new E85 tank. Typically this is the most costly alternative, involving installation of a new storage tank and associated equipment, as well as related excavation, concrete, and electrical work, if necessary. Options available include installing a new underground storage tank, a new aboveground storage tank, or an aboveground “turnkey” E85 refueling system.

Biodiesel and Biodiesel Blend Infrastructure

Most refueling systems designed to handle diesel fuel will also handle biodiesel and biodiesel blends with no problem. B20 or lower blends minimize most issues associated with materials compatibility. Experiences over the last 10 years indicate compatibility with all elastomers in diesel fuel systems, even those, such as nitrile rubber, that are sensitive to higher blends.

The alternatives available to Federal agencies for developing new B20 infrastructure at Federal fleet refueling centers include the following:

- **Convert an existing tank system to B20.** At refueling sites with more than one available diesel tank, Federal agencies can convert one of the tank systems to B20. Similar to conversion of E85 refueling infrastructure, the costs for this alternative are typically much less than installing a new tank system. Conversion of existing tank systems typically only includes cleaning the tank and lines.
- **Install a new tank system.** At Federal fleet refueling centers without tanks that can be converted to B20, Federal agencies must install a new B20 tank. Typically this is the most costly alternative, involving installation of a new storage tank and associated equipment, as well as related excavation, concrete, and electrical work, if necessary. The process for installing a new B20 refueling system is similar to the process for E85 discussed above.

More detail to assist Federal fleet managers in evaluating biodiesel refueling installation requirements at Federal fleet refueling centers is provided in NREL’s *Biodiesel Handling and Use Guide, Fourth Edition* (Report NREL/TP-540-43672, December 2009, available at www.nrel.gov/vehiclesandfuels/npcf/pdfs/43672.pdf).

Electric Vehicle Charging Infrastructure³⁰

All BEVs, PHEVs, and LSEVs require charging stations, referred to as electric vehicle supply equipment (EVSE), in order to operate. The primary EVSE for refueling EVs should be located at the fleet facility where the vehicle is garaged. Additional EVSE may be available locally at commercial or other Federal fleet locations.

Types of Charging Systems

Three charging levels were defined by the Electric Power Research Institute (EPRI) and codified in the National Electric Code (NEC), along with corresponding functionality requirements and safety systems. The three basic charge levels (Level 1, Level 2, and Level 3) are explained below.

Level 1

The Level 1 method uses a standard 120VAC, 15 amp (12 amp useable) or 20 amp (16 amp useable) branch circuit that is the lowest common voltage level found in both residential and commercial buildings in the United States. Because Level 1 only provides a small amount of power (maximum of 1.44 kW) and can result in prolonged charge times, it is not recommended for primary charging stations. When installing Level 1 charging, a new, dedicated circuit is recommended to prevent the charging station from overloading an existing circuit and tripping the circuit breaker. Level 1 charging equipment is typically installed on the vehicle and the 120VAC is brought to the vehicle through a plug and cord set.



Figure 6-4. Level 1 plug-in hybrid electric vehicle charging port.
Photo by Ted Sears,
NREL/PIX 17342

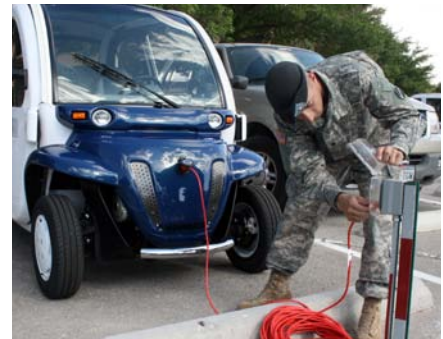


Figure 6-5. Spc. Dean Kalogris from Headquarters Company, Fort Bliss, Texas, charges the installation's command sergeant major's electric car using Level 1 charging equipment.
Photo from Major Deanna Bague, U.S. Army, NREL/PIX 18634

Level 2

Level 2 is recommended for Federal fleets installing new vehicle charging infrastructure. It uses a 240VAC, single-phase, 40 amp branch circuit. The Level 2 method employs special equipment to provide a higher level of safety required by the NEC. Historically, there have been two types of Level 2 equipment: conductive and inductive. Conductive equipment uses a “butt-type” or “pin and sleeve” connection and is typically referred to as the EVSE or power control station. The inductive system has no metal-to-metal contact and inductively transfers energy to the vehicle. It is not expected that inductive charging will be used for PHEV charging. Additionally, due to the small battery size (typically less than 10 kWh), Level 2 charging in many instances will be limited to 15 amp, providing a maximum charge power of 3.3 kW.

Level 3

The Level 3 method or “fast charging” is for commercial and public applications and is intended to perform similar to a commercial gasoline service station. Level 3 typically uses an offboard charge system serviced by a 480VAC, three-phase circuit. The intent of Level 3 charging is to achieve a 50% charge in 10 to 15 minutes.

Electric Vehicle Charging System Design

Siting

Federal fleet EVSE will typically have a single utility service entrance, with power distributed to several subpanels throughout the building. The simplest installation occurs when the charger location (parking lot) is adjacent to the main distribution panel or a subdistribution panel. An alternative approach is to establish a new meter service and



Figure 6-6. EVSE Level 2 charging equipment with a SAE 1772J connector.
Photo by Angela Costanzo,
NREL/PIX 18723



Figure 6-7. EVSE Level 2 charging station.
Photo by Mike Simpson,
NREL/PIX 18870

³⁰ This section summarizes: Idaho National Laboratory (INL), *Plug-in Hybrid Electric Vehicle Charging Infrastructure Review*, Report INL/EXT-08-15058, November 2008, <http://avt.inel.gov/pdf/phev/pevinfrastructureReport08.pdf>.

account with the power company. The disadvantage of this approach is that the utility will incorporate costs of connecting the new meter and paying a separate bill for the additional meter and account fees.

Metering

All Federal fleet EVSE should have a separate meter to accurately track vehicle electricity use by EVs. As discussed above, optimally this meter should be installed by the facility rather than supplied by the utility provider.

Access Control and Support

In order to collect accurate electricity use by EVs, Federal fleet EVSE should include an access control system, which not only restricts access to EV operators, but also tracks data related to who, when, and where people are using these stations.

Lighting and Shelter

Adequate lighting is recommended for safety and convenience. Shelter is not typically required when outdoor Underwriters Laboratories (UL)–approved charging equipment is used (i.e., personnel protection is built into the equipment). For geographic locations that have significant rainfall or snow, providing shelter over the charging equipment may provide added incentive for EV users.

Signage

Information signage is recommended, including “Parking for Electric Vehicle” or “PHEV Charging Only.”

Installing Electric Vehicle Charging Systems at Federal Facilities

Installation of the electric vehicle charging supply in a commercial facility typically consists of installing new dedicated branch circuits from the central meter distribution panel to an EVSE (operating at 120VAC, 40 amp) for Level 2 charging. The tasks typically required for this process are:

- **Review potential site locations.** Consider proximity to available AC power supply, personnel safety, potential nearby hazards and vandalism considerations, and future expansion needs.
- **Determine source of electrical supply.** Will the EVSE be sourced from on-site generation or require new or existing electricity supply?
- **Develop site plan.** Determine station layout including curbs, wheel stops/bollards and setbacks, electrical requirements, any lighting, shelter, access control or customer phone service requirement, ground striping and signage, and prepare drawings for permit application.
- **Obtain building permit.**
- **Hire contractor.**
- **Perform installation and final inspection.**

6.9 Putting it All Together

Sections 6.2 and 6.3 provide a **recommended framework** for agency fleet managers to determine **which alternative fuel, biodiesel blend, and/or electric vehicle strategies make sense at each fleet location.**

Using this framework to select and implement these strategies will ensure your fleet:

- **Installs renewable fuel infrastructure** at high-use Federal fleet fueling centers and/or **installs (renewable) electric charging infrastructure** at locations that are candidates for replacing gasoline vehicles with EVs to help meet the EISA Section 246 renewable infrastructure installation requirements (see sections 6.7 and 6.8 for further guidance)
- **Optimizes acquisition of AFVs, EVs, and diesel vehicles to support use of alternative fuel, biodiesel blends, and electric vehicles to meet EAct 1992 AFV acquisition requirements** (see section 7.3)
- **Maximizes use of alternative fuels in dual-fuel AFVs to help meet the EAct Section 701 requirements** (see section 6.6).

ULTIMATELY, implementing all of these measures should ensure that your agency:

- Meets the E.O. 13423 and EISA Section 142 alternative fuel use increase requirements.
- Reduces the agency’s GHG emissions and petroleum consumption.

Chapter 7 IMPLEMENT: Acquiring Vehicles

<p>Purpose of this chapter</p>	<ul style="list-style-type: none"> • Provide guidance to assist agencies in selecting and implementing vehicle acquisition strategies to support GHG emission and petroleum reduction strategies • Discuss the Federal fleet requirements to: <ul style="list-style-type: none"> – Acquire AFVs (EPAAct 1992) – Acquire low GHG-emitting vehicles (EISA Section 141) – Acquire PHEVs (E.O. 13423) • Provide guidance in evaluating applicability, meeting requirements, determining compliance, and implementing a plan
<p>Target audience</p>	<ul style="list-style-type: none"> • Agency headquarters fleet managers and agency fleet location managers

In chapter 3, we discussed how Federal fleet managers can develop a fleet profile and right-size their fleet to the agency’s mission by employing a VAM. This VAM helps make sure that agency vehicle fleets are not over-costly, are correctly sized in terms of numbers, and are the appropriate type for accomplishing agency missions.

In this chapter, we discuss how Federal fleet managers can use vehicle acquisition (as identified in the VAM) to implement the agency’s optimal GHG emission and petroleum reduction strategy. Agencies should acquire:

- **Vehicles right-sized to the mission** by employing the most fuel-efficient vehicle for the required task
- **AFVs** for locations with access to alternative fuel
- **Diesel vehicles** for locations with access to biodiesel blends
- **Electric vehicles** to replace gasoline vehicles, particularly for vehicles with low daily mileage or those operated within a campus or urban environment.

EISA Section 141 also requires all of an agency’s LDV and MDV acquisitions to be low GHG-emitting vehicles. **Vehicle acquisition supports the key strategies to achieve GHG emission and petroleum reduction targets as follows:**

- **Increasing fleet fuel efficiency.** Integral to reducing GHG emissions and petroleum under this strategy, as discussed in chapter 5, is the acquisition of higher fuel economy vehicles. In most cases, a successful implementation of this strategy can be achieved through acquisition of low GHG-emitting vehicles, which are fundamentally the most fuel-efficient vehicles in their class, and acquisition of devices that improve vehicle fuel economy, such as idling-reduction devices.
- **Implementing alternative fuel and biodiesel strategies.** Success in achieving and exceeding alternative fuel use mandates, which are described in chapter 6, depends not only on fuel availability but also on vehicles that can use the fuels. **Implementing electric vehicle strategies.** At the core of this GHG emissions and petroleum reduction strategy is the acquisition of BEVs, LSEVs, and PHEVs.

Table 7-1 outlines the various considerations fleet managers must make when developing a vehicle acquisition strategy. To develop such a strategy, look broadly at the costs and benefits of different vehicle types, including the driving environment for which they are best suited.

Diesel vehicles have inherently slightly higher fuel economy than gasoline vehicles (in part because diesel is a more energy-dense fuel). Biodiesel vehicles have the same efficiency as diesel vehicles, and cost about the same as gasoline vehicles to operate. Because they require dedicated infrastructure, they are ideal for either centrally refueled vehicles, or ones with set routes that pass by a biodiesel station. Biodiesel is a good alternative fuel to use for any diesel vehicle that meets these criteria.

E-85 vehicles generally have a lower fuel economy than gasoline vehicles, because E-85 is less energy-dense than gasoline. E-85 vehicles are appropriate for nearly any drive cycle as long as they are either centrally refueled or have a set route that passes by an E-85 station. E-85 is a good acquisition strategy wherever the fuel exists or can be developed.

Hybrid electric vehicles generally have higher fuel economy than conventional gasoline vehicles and typically work best in a stop and go environment, such as cities. They are a good choice for a fleet with no current or anticipated alternative fueling stations as well as for smaller fleets that cannot aggregate demand for alternative fuel.

Plug-in hybrid electric vehicles are a new technology that can substantially increase fuel economy in a fleet and have a much lower operating cost, but come with a higher initial price tag. These vehicles are good options for fleets that lack access to traditional alternative fuels and require vehicles for high mileage routes, but can accommodate multiple-hour charging times.

Electric vehicles, or battery electric vehicles, are efficient and inexpensive to operate, but come with an even higher upfront cost than plug-in hybrids and fully depend upon charging infrastructure, which can be costly. These vehicles are ideal for fleets with set routes of under 100 miles a day.

Table 7-1. Vehicle Acquisition Strategy Considerations

Vehicle Type	Fuel Economy	Operating Costs	Driving Environment
Gasoline	30 mpg	13.5 cents a mile	Any drive cycle, set route or central refueling
Biodiesel	33 mpg	13.5 cents a mile	Any drive cycle, set route or central refueling
E-85	22 mpg	15.3 cents a mile	Any drive cycle, set route or central refueling
Hybrid	+ 30%	9 cents a mile	- Stop and go environments - Locations without alternative fueling stations
Plug-in Hybrid	+ 210%	<6 cents a mile	High annual use; longer driving distances (more than 100 miles a day)
Electric Vehicle	+ 230%	3 cents a mile	High annual use; shorter driving distances (less than 100 miles a day)

7.1 Overview of Requirements

As outlined in table 7-2, four statutes and one executive order address the vehicle acquisition requirements for a Federal fleet.

Table 7-2. Federal Fleet Vehicle Acquisition Requirements

Fleet Requirement	Statute or Executive Order	Summary of Requirement	Section of this Chapter
Acquisition of AFVs	EPA 1992	75% of LDVs acquired in MSAs must be AFVs	7.3
	ECRA 1998	For every 450 gallons of B100, agency fleets receive a credit equal to the acquisition of an alternative fuel vehicle	
	NDAA 2008	Adds new vehicles to the definition of an AFV (as that definition applies to Federal fleets) including hybrid electric, fuel cell, and lean burn technology vehicles, and any other type of vehicle that EPA demonstrates to DOE would achieve a significant reduction in petroleum consumption	
Acquisition of low GHG-emitting vehicles	EISA §141	Prohibits agencies from acquiring vehicles that are not low-GHG-emitting vehicles	7.4
Acquisition of PHEVs	E.O. 13423	Use PHEVs when commercially available at a cost reasonably comparable to non-PHEVs	7.5

7.2 Framework for Identifying Optimal Vehicle Acquisition Strategies

The following steps can assist in **identifying optimal vehicle acquisition strategies to support the GHG emission and petroleum reduction strategies** selected for each fleet location.

Table 7-3. Framework for Identifying Optimal Vehicle Acquisition Strategies

Step	Summary	Purpose
PLAN and COLLECT		
1	Determine vehicle acquisition requirements	<ul style="list-style-type: none"> Establish a structured VAM to determine the numbers and types of vehicles required to accomplish your fleet’s mission (see chapter 3) Cross-reference AFV inventory with existing fueling locations to determine opportunities to transfer vehicle locations Estimate vehicle acquisition requirements to replace, add, and dispose of fleet vehicles
2	Incorporate impacts of VMT reduction at each fleet location	<ul style="list-style-type: none"> Refine the numbers of vehicles required to accomplish your fleet’s mission at each fleet location based on opportunities to reduce VMT (see chapter 4)
STRATEGIZE		
3	Establish vehicle acquisition strategies	<ul style="list-style-type: none"> Identify low GHG-emitting vehicles available for each type of vehicle required to accomplish your fleet’s mission at each fleet location³¹ Identify the most fuel-efficient vehicle to accomplish your mission, including HEVs Identify available AFVs that meet agency mission needs, qualify as low GHG-emitting vehicles, and provide the highest fuel economy Ensure proper fueling infrastructure is conveniently available for any acquired AFVs
IMPLEMENT		
4	Acquire vehicles through GSA	<ul style="list-style-type: none"> Incorporate low GHG-emitting vehicle, fuel-efficient vehicle, AFV, diesel vehicle, and EV acquisition plans—as well as car-sharing options—for each fleet location For leased vehicles, work with GSA Fleet and its FSRs to finalize vehicle acquisition plans
5	Monitor performance	<ul style="list-style-type: none"> Determine compliance with the EPCRA 1992 AFV acquisition and EISA Section 141 low GHG-emitting vehicle acquisition requirements
6	Refine vehicle acquisition plans to meet compliance requirements	<ul style="list-style-type: none"> If EPCRA AFV acquisition requirements cannot be met, determine what actions are needed to obtain compliance

³¹ If low GHG-emitting vehicles are not available to meet mission needs, agency may qualify for a functional needs exemption from EISA Section 141 requirements (see Section 7.5).

7.3 AFV Acquisition Requirements (EPA 1992, ECRA 1998, NDA 2008)

Federal law requires that the Federal Government acquire AFVs to the maximum extent practical.³² EPA 1992 further requires that the number of AFVs acquired represent at least 75% of Federal LDV acquisitions in the metropolitan areas.³³ EPA 1992 requirements apply to fleets of 20 or more LDVs that are centrally fueled or capable of being centrally fueled and are primarily operated in an MSA/CMSA. Covered vehicles do not include those heavier than 8,500 pounds GVWR (i.e., MDVs or HDVs), not located or operated primarily in an MSA or CMSA, or classified as a law enforcement, emergency, and military tactical vehicle.

To measure compliance with the EPA 1992 requirements, agencies receive credits for each light-, medium-, or heavy-duty AFV they acquire each year and for every 450 gallons of pure biodiesel (equivalent to 2,250 gallons of B20) used in fleet vehicles. If an agency's total AFV credits divided by the number of covered LDV acquisitions in a fiscal year equals 75% or greater, the agency is considered to be in compliance with the EPA 1992 AFV requirements.

EPA 1992 Vehicle Classifications

Light-duty vehicles (LDV) include both passenger cars and light duty trucks at or under 8,500 pounds (lbs) GVWR.

Medium-duty vehicles (MDV) include all vehicles between 8,500 lbs and 10,000 lbs GVWR.

Heavy-duty vehicles (HDV) include all vehicles over 10,000 lbs GVWR.

Applicability

Agency Fleets Covered by the EPA 1992 AFV Acquisition Requirements

What is a Federal agency?

Under the EPA 1992 AFV acquisition requirements, "Federal agency" means any Federal executive department, military department, Government corporation, independent establishment, executive agency, the United States Postal Service, the Congress, the courts of the United States, or the Executive Office of the President.

How does a Federal agency determine if it is covered by the EPA 1992 AFV acquisition requirements?

Please refer to figure 1-1 in the Guidance. **A list of the 21 Federal agencies covered by EPA 1992** (as of FY 2011) is included in **Appendix F** of this Handbook.

Vehicles Covered by the EPA 1992 AFV Acquisition Requirements

LDVs acquired each year by an agency's fleet (including GSA or agency owned or leased vehicles) **that are:**

- NOT on the list of **exempted vehicles** (exempt vehicles are discussed below)

AND

- Used primarily **within any 1980 MSA or CMSA**

AND

- Are **centrally fueled or capable of being centrally fueled.**

Contractor vehicles. Agencies must ensure that all GOCO vehicles and facilities comply with the AFV acquisition requirements. Each agency shall ensure contracts entered into for contractor operation of government-owned facilities or vehicles require the contractor to comply with the AFV acquisition requirements with respect to such facilities or vehicles to the same extent as the agency would be required to comply if the agency operated the facilities or vehicles.

³² The maximum number practicable of the vehicles acquired annually for use by the Federal Government shall be AFVs (42 U.S.C. 6374(a)(1)).

³³ Of the total number of vehicles acquired by a Federal fleet, at least 75% in fiscal year 1999 and thereafter shall be alternative fueled vehicles (Public Law 102-486, 42 U.S.C. 13212). Federal fleet means 20 or more LDVs that are centrally fueled and operated in an MSA/CMSA.

Vehicles Exempted from EAct 1992 AFV Acquisition Requirements

Table 7-4 lists the vehicles exempted from the AFV acquisition requirements.

Table 7-4. Vehicles Exempt from the EAct 1992 AFV Acquisition Requirements

Law enforcement and emergency vehicles ³⁴
Military tactical vehicles ³⁵
Non-road vehicles, including farm and construction vehicles
Motor vehicles held for lease or rental to the general public
Motor vehicles held for sale by motor vehicle dealers, including demonstration motor vehicles
Motor vehicles used for motor vehicle manufacturer product evaluations or tests
Motor vehicles that, under normal operations, are garaged at personal residences at night
Vehicles operated outside of the U.S.

Determining Your Agency's Compliance

EAct 1992 AFV Definition

AFVs are any **dedicated vehicle or dual-fueled vehicle designed to run on at least one alternative fuel**.³⁶ Section 2862 of NDAA 2008 amended the EAct 1992 by adding the following new vehicles to the definition of AFV (as that definition applied to Federal fleets):³⁷

- A new qualified fuel cell motor vehicle
- A new advanced lean burn technology motor vehicle
- A new qualified hybrid motor vehicle
- Any other type of vehicle that the Administrator of the EPA demonstrates to the Secretary of Energy would achieve a significant reduction in petroleum consumption.³⁸

Measuring Compliance with EAct 1992 AFV Acquisition Requirements

AFV acquisition credits are used to determine if Federal agencies meet the EAct 1992 75% annual AFV acquisition requirement. These credits are granted based on the number of AFVs acquired and the quantity of biodiesel fuel used. Agencies must accumulate **75 credits per 100 covered vehicles acquired within each fiscal year** to comply. Table 7-5 lists the current vehicles defined as AFVs in the Federal Fleet that can earn EAct 1992 AFV acquisition credits.

³⁴ Vehicles that are used in an emergency capacity, by the agency, greater than 75% of the year. This includes vehicles directly used in the emergency repair of transmission lines and in the restoration of electricity service following power outages, as determined by the Secretary of Energy.

³⁵ Motor vehicles acquired and used for military purposes that the Secretary of Defense has certified to DOE must be exempt for national security reasons.

³⁶ A full list of definitions is at U.S. Code Title 49, Subtitle VI, Part C, Chapter 329, Section 32901 entitled Definitions, available at www.law.cornell.edu/uscode/49/uscode_sec_49_00032901----000-.html.

³⁷ Section 30.B of the Internal Revenue Service (IRS) Code (U.S. Code Title 26, Subtitle A, Chapter 1, Subchapter A, Part IV, Subpart B, Section 30.B) provides definitions of each of these vehicles.

³⁸ As discussed in Section 7.3.2, EPA has made a demonstration to DOE that low GHG-emitting vehicles (acquired in lieu of a FFV that an agency reasonably determines qualifies for a fuel waiver under EAct 2005 Section 701) would achieve a significant reduction in petroleum consumption and are therefore defined as AFVs under EAct 1992.

Table 7-5. Current Vehicles Defined as AFVs in the Federal Fleet

Vehicle Type
E85 flexible fuel vehicles (FFV)
Compressed natural gas (CNG) vehicles
Liquefied natural gas (LNG) vehicles
Liquefied petroleum gas (LPG) or propane vehicles
Battery electric vehicles (BEV) ³⁹
Plug-in hybrid electric vehicles (PHEV)
Hybrid electric vehicles (HEV)
Hydrogen vehicles
Fuel cell vehicles
Lean burn technology vehicles
Low GHG-emitting vehicles (only in locations that would qualify for a fuel waiver under EAct 2005 Section 701—see section 7.4)
Other vehicles achieving significant reduction in petroleum consumption

Note that Federal agencies **do not** receive EAct 1992 AFV acquisition credits for LSEVs, and they are responsible for ensuring that acquired HEVs and PHEVs meet the definitions and requirements contained in section 30B(b)(3) of the Internal Revenue Code of 1986 in order to obtain EAct 1992 AFV acquisition credit.

EPAct 1992 AFV Acquisition Credits for Low GHG-Emitting Vehicles

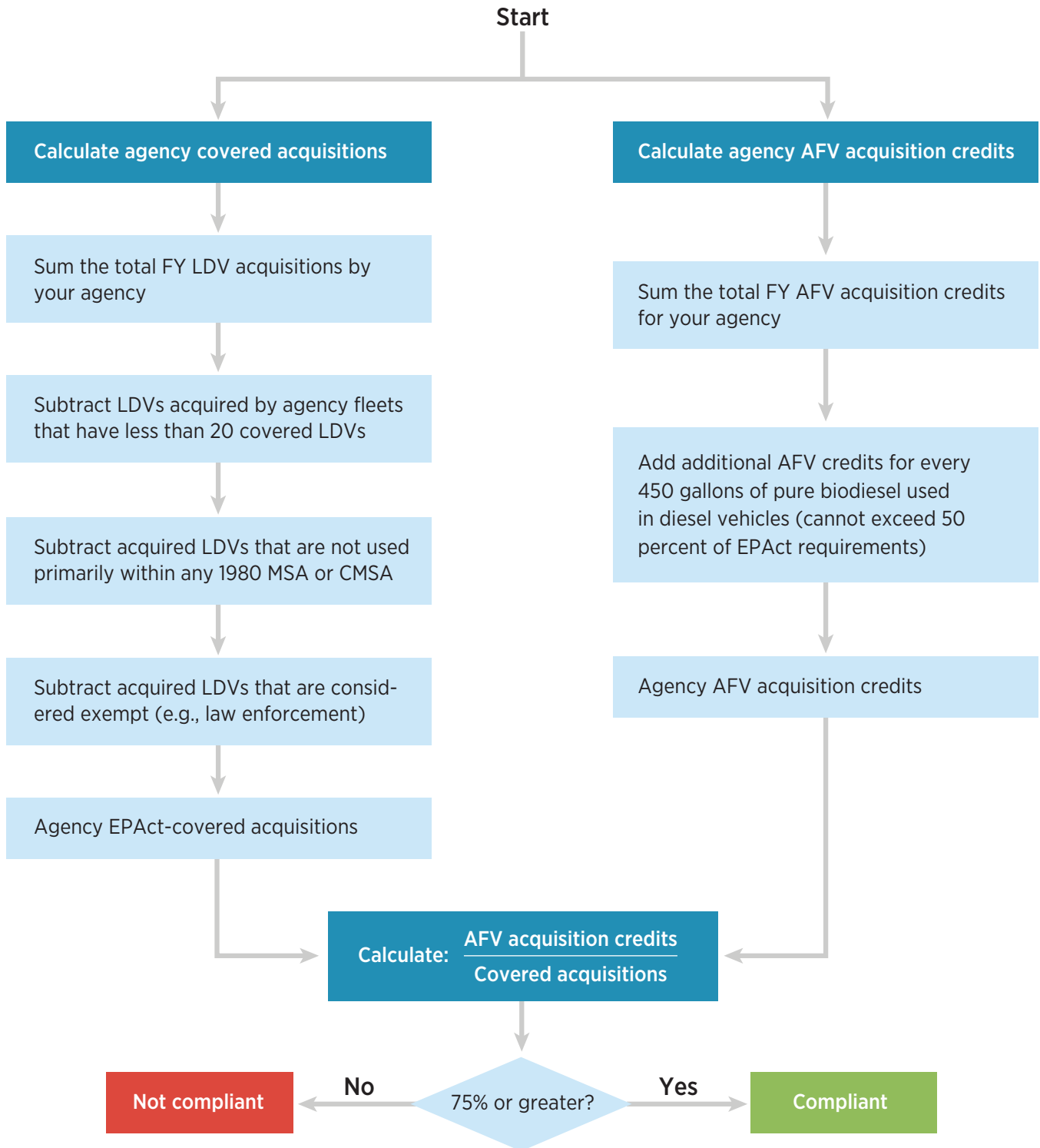
In accordance with Section 2862 of NDAA 2008, EPA demonstrated to DOE that operating a low GHG-emitting vehicle, as defined in EPA’s Section 141 guidance document,⁴⁰ would achieve a significant reduction in petroleum consumption similar to or greater than the other newly defined AFVs that are commercially available (i.e., advanced lean burn and hybrid vehicles), and a significant reduction in petroleum consumption compared to existing FFVs operating on gasoline.

Based on the demonstration EPA made to DOE and the objectives of EAct 1992, **any low GHG-emitting vehicle acquired in a location that would qualify for a EAct 2005 Section 701 fuel waiver is now included in the expanded definition of an AFV and can count toward an Agency’s EAct 1992 AFV acquisition credits.** Each agency head, or his or her designee(s), determines if the agency’s FFVs at that location would qualify for a fuel waiver based on the criteria established by DOE. Unless an exception to EISA Section 141 is utilized (as described in section 7.4 of this Handbook), all FFVs acquired must be low GHG-emitting vehicles.

³⁹ LSEVs are not considered motor vehicles under EAct 1992, and therefore are not defined as AFVs.

⁴⁰ www.epa.gov/greenvehicles/download/EISA_141_Guidance_draft_distributed%20v2%2012.17.08.pdf

Figure 7-1. Determining Compliance with EPOA 1992 AFV Acquisition Requirements



7.4 Low GHG-Emitting Vehicle Acquisition Requirements (EISA Section 141)

EPA’s “Guidance for Implementing Section 141 of the Energy Independence and Security Act of 2007” (available at www.afdc.energy.gov/afdc/pdfs/eisa_sec141_guidance.pdf) explains the criteria EPA uses to identify low GHG-emitting vehicles and provides the necessary information and resources for Federal agencies to implement EISA Section 141. This section provides an overview of the EISA Section 141 requirement, which ultimately supports the goal of reducing Federal fleet GHG emissions.

Section 141 of EISA amends the Federal fleet vehicle acquisition requirements of EPAAct1992 by **prohibiting Federal agencies from acquiring LDVs and MDVs that are not low GHG-emitting vehicles**. EISA Section 141 allows for two exceptions to the prohibition, which are further described in the “Exceptions to the EISA Sec. 141 Acquisition Requirement” section on the next page.

Section 141 of EISA also directs EPA to define what a low GHG-emitting vehicle is and to identify annually the makes and models of such vehicles. GSA has incorporated EPA’s GHG scores into the AutoChoice vehicle ordering system. EPA has also added features to its existing Green Vehicle Guide (www.epa.gov/greenvehicles/Federalfleet.do) to allow agencies to generate an up-to-date list of all low GHG-emitting vehicles.

Applicability

Agency Fleets Subject to the Low GHG-Emitting Vehicle Acquisition Requirements

Under the EISA Section 141 low GHG-emitting vehicle acquisition requirements, “Federal agency” includes offices of the judicial branch and executive branch including executive departments, independent establishments, government corporations, and the U.S. House of Representatives when vehicles are acquired using a Member’s Representational Allowance; however, it does **not** include other offices of the legislative branch.

Any agency meeting the definition of “Federal agency” under EISA Section 141 is subject to the EISA Section 141 low GHG-emitting vehicle acquisition requirements. For a list of Federal agencies please use The United States Government Manual (2008/2009), which can be found at www.gpoaccess.gov/gmanual/browse-gm-09.html.

Vehicles Subject to the Low GHG-Emitting Vehicle Acquisition Requirements

Vehicles subject to low GHG-emitting vehicle acquisition requirements include **all LDVs and MDPVs** within an agency’s fleet (including GSA or agency owned or leased vehicles) that are:

- **Acquired** by a Federal agency
- AND**
- **Manufactured for sale in the U.S.**, including territories and possessions of the U.S., including those shipped overseas for operation.

LDVs include passenger cars, pickup trucks, minivans, passenger vans, and sport-utility vehicles with a GVWR less than 8,500 pounds.

MDPVs include vehicles with a GVWR between 8,500 pounds and 10,000 pounds designed to transport primarily persons.

Agencies must also ensure that all GOCO vehicles and facilities comply with the low GHG-emitting vehicle acquisition requirements. Each agency shall ensure contracts entered into for contractor operation of Federal Government owned facilities or vehicles require the contractor to comply with the low GHG-emitting vehicle acquisition requirements with respect to such facilities or vehicles to the same extent as the agency would be required to comply if the agency operated the facilities or vehicles.

Vehicles Not Subject to the Low GHG-Emitting Vehicle Acquisition Requirements

Table 7-6 lists the vehicles not subject to the EISA Section 141 low GHG-emitting vehicle acquisition reduction requirements.

Table 7-6. Vehicles Not Subject to the Low GHG-Emitting Vehicle Acquisition Requirements

All motor vehicles with a GVWR greater than 10,000 lbs
Pickup trucks and non-passenger vans over 8,500 lbs GVWR
Contractor- or subcontractor-owned vehicles
Low-speed vehicles, including neighborhood electric vehicles
Vehicles manufactured for sale outside the U.S.

Exceptions to the EISA Section 141 Acquisition Requirement

Section 141 of EISA allows for two exceptions to the prohibition:

- **Functional needs exception.** Exempts individual vehicles from the requirements to purchase low GHG-emitting vehicles if no low GHG-emitting vehicle is available to meet the functional needs of the agency. These vehicles may include law enforcement motor vehicles, emergency motor vehicles, motor vehicles acquired for military purposes, and vehicles used for protective services provided no low GHG-emitting vehicle is available that meets those functions.
- **Alternative measures exception.** Allows an agency to acquire vehicles that are not low GHG-emitting provided the agency implements measures to offset the incremental increase in GHG emissions. A range of offsetting reduction strategies are available to agency fleet managers, such as reducing VMT, reducing the number of vehicles owned and operated, or acquiring LSEVs to replace conventional vehicles. To use this exception an agency must meet or exceed its EISA GHG emissions limit. This limit is calculated as the total agency GHG emissions if all vehicles acquired met the minimum low GHG-emitting vehicle standards.

Reporting

When an agency utilizes an exception, EISA Section 141 requires that the head of the agency certify in writing that either a specific functional need cannot be met by a low GHG-emitting vehicle or that the agency has implemented cost-effective alternative measures that result in an equivalent amount of petroleum consumption and GHG emission reductions.

EPA recommends that each Federal agency establish an agency-wide method for documenting its determinations and maintain records of such determinations for at least 5 years and/or in accordance with agency-specific recordkeeping requirements. It also recommends that each agency consolidate the responsibility for the EISA Section 141 certifications in one office to maintain consistency and facilitate program oversight and recordkeeping.

Federal Vehicle GHG Emissions Assessment Tool for Alternative Measures Exemption

To help Federal agencies quantify and verify the aggregate GHG emissions as required by the alternative measures exception, EPA developed the Assessment Tool, which can be downloaded from the Green Vehicle Guide's Federal Vehicle Acquisition website at www.epa.gov/greenvehicles/Federalfleet.do. The Assessment Tool is a spreadsheet-based calculator that helps Federal agencies track, quantify, and verify the GHG emissions associated with the vehicles they acquire or plan to acquire. To satisfy the EISA Section 141 certification requirement, the head of an agency, or his or her designee(s), should certify that the Assessment Tool properly and accurately accounts for all applicable motor vehicle acquisitions completed in a fiscal year or other acquisition cycle specified by the agency.

7.5 Plug-In Hybrid Electric Vehicle Acquisition Requirements (E.O. 13423)

E.O. 13423 requires Federal fleets to use PHEVs when commercially available at a cost reasonably comparable, on the basis of life-cycle cost, to non-PHEVs. PHEV models are available starting in model year 2011-2012. The determination of whether PHEVs are considered commercially available at a cost reasonably comparable, on the basis of life-cycle cost, to non-PHEVs, will be determined by GSA and communicated through issue of a fleet order.

Fleets subject to the E.O. 13423 PHEV acquisition requirements are detailed in section 1.5 of the Guidance. Federal agencies **not subject** are encouraged to comply with the requirements and they will be required to comply if their fleet reaches 20 or more domestic vehicles.

7.6 Implementing Vehicle Acquisition Strategies

Overall, agencies meet their employee surface transportation needs through:

- **Alternative transportation sources**, including the use of public transportation and reimbursement of Federal employees for use of their privately owned vehicle (POV, more appropriately phrased “personally provided vehicle,” because leasing is common)
- **Existing fleet vehicles**, including the transfer of excess, seized, or forfeited vehicles and use of existing vehicles in motor pools
- **Acquisition of Federal fleet vehicles**, including the purchase through GSA Automotive, GSA Fleet lease, commercial lease, or rental through a Federal Supply Schedule.

The primary consideration when selecting among these available options is to satisfy agency needs for transportation services at the least cost to the Federal Government while still supporting GHG emission and petroleum reduction strategies and meeting the mission requirements of the agency.

Having developed a fleet profile and VAM (as discussed in chapter 3), selected GHG emission and petroleum reduction strategies (as discussed in chapters 4 through 6) and having identified acquisition requirements, fleet managers can now begin the acquisition process.

Acquisition of Federal Fleet Vehicles

GSA is the mandatory source for Federal vehicle acquisition. This section provides an overview of how to acquire vehicles from GSA, including AFVs, electric vehicles, low GHG-emitting vehicles, and other vehicles that assist agencies in implementing GHG emission and petroleum reduction strategies.

Federal agencies acquire vehicles through one of three methods:

- **Purchase through GSA Automotive**
- **Lease through GSA Fleet**
- **Lease commercially or rent through a Federal Supply Schedule.**

Purchase through GSA Automotive

GSA is a mandatory source under FPMR 101-26.501 for purchases of new non-tactical vehicles for DOD, Federal executive agencies, and other eligible users. More information on eligible users is available at www.gsa.gov/eligibility-gsasource. GSA Automotive is the purchasing arm of GSA’s Office of Vehicle Acquisition and Leasing Services and makes vehicles and related products and services available for purchase by customer agencies.

Lease through GSA Fleet

GSA Fleet’s leasing program provides customers with vehicle management support for the life cycle of the vehicle. This support includes vehicle acquisition, asset management, maintenance and repair, fuel, accident management, and vehicle remarketing. Leasing vehicles from GSA Fleet may reduce your agency’s administrative, management, and functional burdens.

Agencies primarily order vehicles using GSA's online tool, AutoChoice. AutoChoice allows an agency to compare contractors, configure vehicles, choose equipment and color options, and view side-by-side comparisons of vehicle models from manufacturers. Agencies can also use AutoChoice to check on order status, get miles per gallon fuel ratings, select dealerships, run reports and more. Vehicle types offered by GSA Fleet include:

- Alternative fuel vehicles
- Ambulances
- Buses
- Light-duty trucks
- Light-duty trucks—vocational
- Medium- and heavy-duty trucks
- Sedans
- Wheelchair vans.

Agencies requiring something more customized or with more immediate needs can use GSA's Non-Standards Program, Express Desk, or Automotive Superstore Schedules. A description of these options can be found below; however, for more details, please contact GSA's CARS line at 703-605-CARS (2277).

Non-Standards Program

GSA Automotive can help agencies customize any non-tactical vehicle need and provides design/build services to include project planning, design, build, and project management through delivery of a customized vehicle. Contact GSA Automotive's Engineering Division for additional details.

Express Desk

Sometimes agencies have an urgent need for a vehicle solution. Express Desk can help agencies purchase off-the-lot vehicle solutions with the proper justifications.

Lease Commercially or Rent through a Federal Supply Schedule

Federal agencies may use GSA Schedule 751 to commercially lease sedans, SUVs, and light-duty trucks. GSA Schedule 751 includes current model year vehicles with 12, 18, 24, 30, and 36 month leases terms. Delivery is 90 to 120 days after receipt of order. Vehicle maintenance is not included on leases. All vehicles meet Federal Vehicle Standards 122 and 307.

Automotive Superstore

GSA has two Federal Supply Schedule solutions that can also fulfill agency vehicle needs. When using the schedules, agencies can access vendors directly to place an order for vehicles or accessories or contact GSA to place the order on their behalf.

Schedule 23V

This schedule offers a wide variety of specialty vehicles and accessories:

- Fire fighting apparatus and attachments
- Fire fighting vehicles and accessories
- Law enforcement vehicles and attachments
- Emergency communications vehicles
- Special vocational vehicles
- Construction and road maintenance equipment
- Aircraft ground support vehicles
- Unfitting services
- Medium- and heavy-duty trucks
- Low speed vehicles
- Trailers
- Tires
- Leasing of specialty vehicles
- Automotive services (coming soon).

Federal Acquisition Standards

Federal fleet managers must apply Federal standards in the acquisition process for new or replacement vehicles. The standards simplify competitive procurements, help achieve better acquisition prices and delivery dates, and provide a practical degree of standardization within the Federal automotive fleet.

Vehicle Standards

The standards establish classifications for various types and sizes of vehicles, general requirements, and the equipment authorized for Federal Government use. Standards for automobiles and light- and medium-duty trucks include:

- Federal Standards Number 122 (sedans and station wagons)
- Federal Standards Number 307 (light-duty truck 4x2)
- Federal Standards Number 794 (medium-duty truck)
- Federal Standards Number 807 (heavy-duty truck)
- Federal Standards Number 833 (buses).

FMR 102-34.30-80 provides that, except for exempted vehicles, all motor vehicles acquired for official purposes by executive agencies shall be selected to achieve maximum fuel efficiency and be limited to the minimum body size, engine size, and optional equipment necessary to meet the agencies' requirements.

Vehicle Replacement Standards

The FMR also establishes vehicle replacement standards. Keep in mind that when you acquire replacement vehicles you must follow the fuel-economy criteria. Steps in determining fleet vehicle replacements on a fiscal year basis include:

- Establishing and justifying requirements for all vehicle users
- Establishing a system for assigning relative priorities between competing requirements for replacement funding
- Assigning priorities
- Determining which priorities receive funding and fine-tuning as necessary.

Motor-vehicle replacement standards prescribed in FMR 102-34.280 are minimum requirements all agencies evaluating unit replacement should use. Agencies may replace owned vehicles more frequently as needed.

For vehicles leased through GSA Fleet, each vehicle is measured against GSA Fleet's motor-vehicle replacement standards (available at www.gsa.gov/graphics/fas/VehicleReplacementStandardsJune2011Redux.pdf). However, the ultimate decision to replace or retain any given GSA leased vehicle lies with the customer's local FSR. The FSR's decision is based on a variety of factors to include the vehicle's age, mileage, condition, and repair history. Unless the Fleet Center is informed otherwise, the eligible vehicle will be replaced with one of the same type. The customer's local FSR should be notified as soon as possible of any changes in requirements. If requesting an upgrade to a more expensive vehicle (for example, from a compact sedan to a sport utility vehicle), a written justification must be submitted to certify that the upgraded vehicle is mission essential.

Exceptions to Standards

Requisitions from agencies to sole-source vehicles or accessory equipment that the standards do not identify, as well as for identified items and options, require supporting justification. An agency that proposes changes or additions to a standard must provide a written request with supporting justification. Also, if a motor vehicle has been wrecked or damaged (including wear caused by abnormal operating conditions) beyond economical repair, an agency can replace the vehicle without regard to the replacement standards.

Life-Cycle Costing

Life-cycle costing is the method that fleet managers use to project actual fleet costs throughout the life of the vehicles under consideration. The first step in performing such an analysis is to determine its primary objectives; for example:

1. To improve accuracy in analyzing total projected costs of alternative vehicles, including new vehicle models, for the anticipated life of the vehicles
2. To obtain substantiated objectivity in vehicle selection decisions.

In addition, many fleet managers use life-cycle costing to reach a third objective:

3. To estimate the operating costs over the life of the vehicle in the fleet.

Life-cycle costing typically divides into three phases:

Phase One

Gather information about the vehicles targeted for comparison. A comparable analysis of vehicle costs should include the following:

- Depreciation
- Maintenance (including oil)
- Tires
- Fuel
- License and registration fees (and any taxes, if applicable)
- Finance costs (if applicable)
- Parking (if applicable)
- Storage (if applicable)
- Present value of money
- Fueling infrastructure installation costs (if applicable)
- Fueling infrastructure maintenance costs (if applicable).

Although most fleets share several common cost elements, fleet managers should prioritize or adjust the cost elements based on their fleet's individual circumstances.

Phase Two

Develop, acquire, or contract for a software model to use for the costing. The model should incorporate elements of the usage profile. The parameters are set within each category of vehicle to be tested and include:

- Location
- Territory descriptions
- Mileage
- Fuel grade and price
- Retention cycle.

Phase Three

After gathering cost data on each selected vehicle and developing an analytical model based on individual fleet circumstances, compare the results. During this phase, you should:

1. Analyze all relevant costs for each vehicle
2. Rank vehicles according to projected life-cycle costs
3. Establish potential savings for the life-cycle of each vehicle.

This comparison should identify vehicles that will ultimately cost the organization the least amount—not just in terms of capital investment, but also in operating costs.

Life-cycle costing helps Federal fleet managers identify when operating costs exceed replacement costs and is, therefore, a valuable tool for budget formulation and budget monitoring, as well as operating efficiently throughout the year.

For new vehicles, life-cycle costing helps to identify the true cost of ownership for lease/purchase decisions.

Federal Fleet Leasing Versus Purchasing

Lease/Purchases Analysis

Lease/purchase analysis is only appropriate after the agency has decided to acquire a vehicle. Completion of a lease/purchase analysis is a good business practice to identify whether leasing or purchasing is in the best interest of the Federal Government. Motor vehicles are capital assets. All leases of capital assets must be justified as preferable to direct Federal Government purchase and ownership per 41 CFR 101-25.501.

Federal Law, Regulation, and Policy

You will find guidance for performing lease versus purchase calculations in 41 CFR 101-25.5. The required analysis compares the present value of the life-cycle cost of leasing with the full cost of buying an identical asset.

According to 41 CFR 101.25.5, the lease/buy cost comparison approach described in OMB Circular A-104 is the preferred method. Note, however, that OMB released Circular A-94, “Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs,” dated October 29, 1992, replacing Circular A-104. Among other things, it advises that an appropriate discount rate should be used to discount costs and benefits (these rates are published in Appendix C). You may only use other lease/buy methods (life-cycle costing, break-even analysis, etc.) in accordance with normal agency procedures.

Leasing AFVs from GSA Fleet

The monthly lease rate of an AFV varies by vehicle type. For this reason, GSA Fleet publishes new AFV lease information at the beginning of each fiscal year. GSA Fleet’s current Product Guide, which provides pricing information, is available at www.gsa.gov/afv.

The AFV incremental cost is the amount of money that an AFV costs as compared to the low bid for a conventional vehicle in a like vehicle class.

Example:	AFV minivan =	\$12,000
	Lowest bid minivan =	<u>\$10,000</u>
	Incremental cost =	\$ 2,000

How GSA Fleet Charges Customers the AFV Incremental Cost

EPAct 2005 requires GSA Fleet to spread the incremental cost of AFVs across the entire fleet. Every agency that leases vehicles from GSA Fleet is assessed an AFV surcharge that is set at the headquarters level. All agencies are encouraged to meet with GSA Fleet Central Office to discuss their AFV goals and surcharge on an annual basis.

Agencies that are required to comply with EPAct 1992 AFV acquisition requirements are charged an individual surcharge set to cover at least 75% of AFV replacements. Agencies that are not required to comply with EPAct 1992 are charged a flat rate surcharge to cover the cost of the AFVs that are purchased. An agency may also choose to increase their surcharge to cover more than 75% of AFV replacements.

Timeline for Ordering New Vehicles for Lease from GSA⁴¹

<i>July–August</i>	GSA Fleet meets with agency fleet managers to gather vehicle policies and goals for the next fiscal year.
<i>September</i>	Vehicle contracts are awarded.
<i>October–February</i>	GSA Fleet submits orders to vehicle manufacturers.
<i>May</i>	LDV contracts close.
<i>April–July</i>	New vehicles are delivered.

Note that while purchases for new vehicles to lease follow the above schedule, agencies can purchase vehicles through GSA AutoChoice throughout the year. Organizations with the best fleet practices design their acquisition processes to balance fleet users' transportation and mobility needs with economies derived from:

- Volume purchasing
- Standardization of vehicle types
- Appropriate replacement cycles and life-cycle costing.

Disposal best practices ensure vehicle replacement at a point that minimizes life-cycle costs and in a manner that maximizes residual value. More detailed guidance on Federal fleet asset management can be found in GSA's *Guide to Federal Fleet Management*, located at www.gsa.gov/fleetguide.

⁴¹ Please note that this timeline is a guide and that exact dates will vary from year to year.

Chapter 8 IMPLEMENT: Reporting and Monitoring Progress

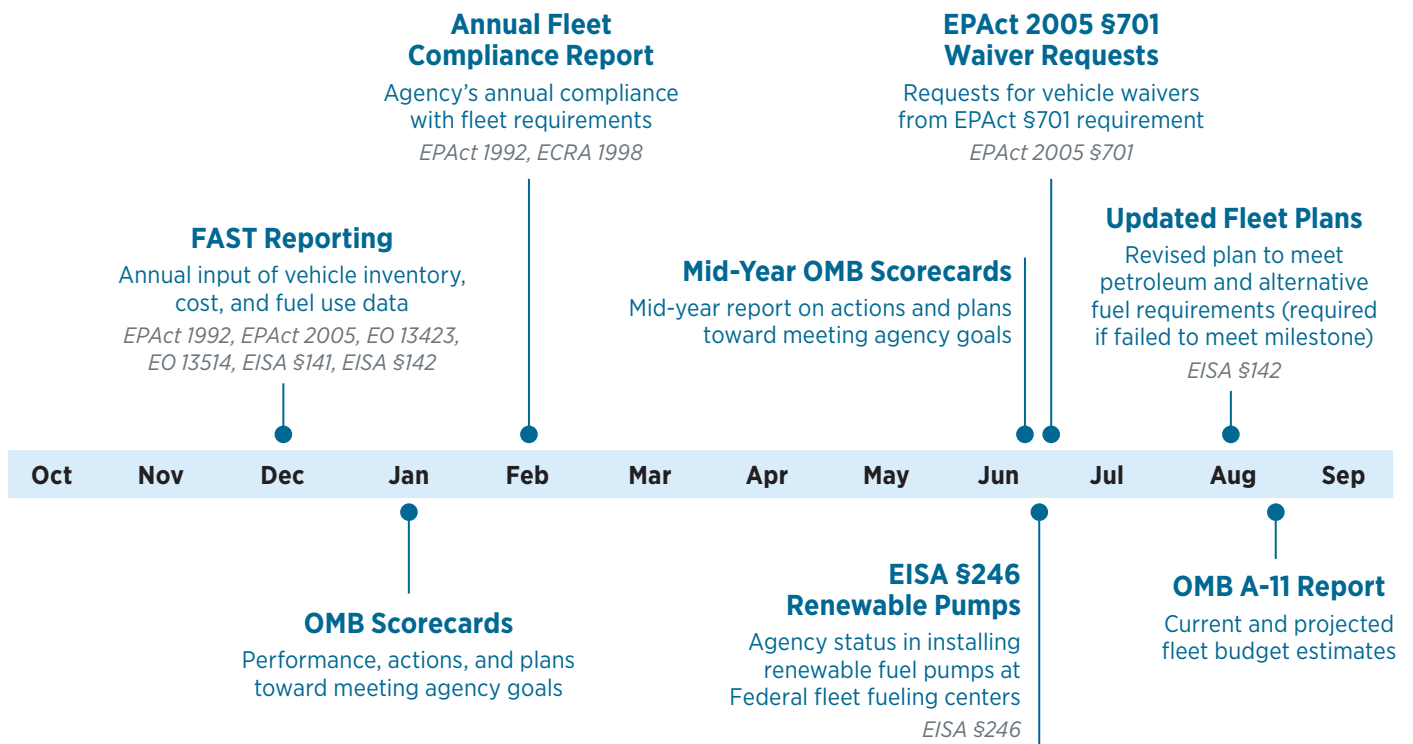
Purpose of this chapter	<ul style="list-style-type: none"> Present the reporting requirements that agencies are held to in order to monitor progress toward meeting their Federal Fleet mandates
Target audience	<ul style="list-style-type: none"> Agency headquarters fleet managers and fleet location managers

This chapter presents the various reporting requirements that agencies are held to in order to monitor progress toward meeting their Federal fleet mandates. Table 8-1 and figure 8-1 outline the annual reporting requirements for Federal fleets, in chronological order.

Table 8-1. Annual Federal Fleet Reporting Requirements

Time Frame	Report	Statute or Executive Order	Requirement
October-December	FAST Reporting	EPAAct 1992	Annual input of vehicle inventory, cost, and fuel use data
		EPAAct 2005	
		EO 13423	
		EISA §141	
January	OMB Scorecards	n/a	Narrative explaining progress toward agency goals and suggestions for new goals
February 15	Annual Fleet Compliance Report	EPAAct 1992	Report of the agency's compliance with fleet requirements
		ECRA 1998	
June	701 Waiver Requests	EPAAct 2005 §701	Federal agencies can apply for a waiver from the requirement to use alternative fuel in all agency dual-fuel vehicles
	Renewable Fuel Pumps at Federal Fueling Centers	EISA §246	Report summarizing agency compliance with EISA Section 246
	Midyear OMB Scorecards	n/a	Midyear report explaining progress toward agency goals and development of new goals
August 15	Updated Agency Fleet Plan	EISA §142	Revised plan to meet petroleum reduction and alternative fuel increase requirements (only required if failed to meet annual milestone)
August	OMB A-11 Report	n/a	Budget estimates of current fiscal year, as well as future fleet operating costs

Figure 8-1. Annual Federal Fleet Reporting Requirements Timeline



Roles and Responsibilities Associated with Reporting and Monitoring Progress

The roles and responsibilities of the **fleet manager at each agency fleet location** are to:

- Ensure complete and accurate record keeping
- Provide complete and accurate data throughout the year in support of the annual agency reporting requirements.

The role and responsibilities of the **agency headquarters fleet manager** are to:

- Ensure that all agency reports are complete, accurate, and on time
- Analyze the results of data collection and reporting for trends.

8.1 Annual Federal Fleet Reporting Requirements

This section details each annual Federal fleet reporting requirement. Many of the annual reporting requirements use the annual inventory, cost, and fuel use data that is entered into FAST at the beginning of each fiscal year.

October–December: Annual FAST Reporting

Annual input of vehicle acquisition, inventory, cost, and fuel use data begins each October and closes in mid-December. Data agencies input to FAST support the following reports: SF72 Vehicle Inventory Report; EPAAct 1992 AFV acquisitions; EPAAct 2005 alternative fuel use in dual-fueled AFVs; and, progress in meeting E.O. 13423 and EISA Section 142 alternative fuel increase and petroleum fuel reduction requirements.

There are three data entry sections that agencies must complete during this period:

- **Section I.** Vehicle inventory, acquisition (actual/planned/projected/forecast), and disposal (planned/projected/forecast) data
- **Section II.** Actual FY vehicle cost and mileage data by vehicle type
- **Section III.** Actual FY fuel cost and consumption data by fuel type.

This data also provides a baseline for next fiscal year's OMB A-11 report on cost of fleet operation. FAST data is used to complete the OMB Transportation Management Scorecard and is compiled in the annual GSA and DOE Federal fleet reports.

The FAST reporting opens on the first of October each year and closes on December 15 of each year. Before the beginning of the data call, agencies should ensure that their reporting hierarchy has been established and updated as necessary; any new users should be added and old users removed.

At the beginning of each data call agencies should consider setting their own internal Report Open/Report Close dates within the October 1 to December 15 timeframe. In particular, agencies should consider using the FAST interim end date to encourage fleet managers to enter their data well in advance of the December 15 deadline. This will allow agency headquarters personnel ample opportunity to review the data for completeness and accuracy prior to final submission.

For detailed guidance on the reporting data call, please refer to the *FAST Guidance for Agency HQ Administrators*, available at: https://fastweb.inel.gov/joint/FY2009_FAST_Guidance_for_Agency_HQ_Administrators.pdf.




For detailed instructions on FAST data entry, please refer to the *FAST Guidelines for Entering Fleet Data*, available at: https://fastweb.inel.gov/joint/FY2009_FAST_Guidelines_for_Entering_Data.pdf.

January: OMB Scorecards

OMB uses a scorecard system to track agencies' progress toward meeting their statutory mandates and E.O. requirements. Agencies are also responsible for documenting actions they intend to implement during the year to assist in meeting these mandates and requirements. OMB's goals for the scorecard system include:

- Monitor compliance with existing statutes, requirements, and reports
- Update agency progress bi-annually
- Focus on progress and results
- Hold agencies accountable.

Progress scores are based on specific milestones that the agencies set out in consultation with DOE, and then with OMB. OMB employs a simple stoplight grading system in the scorecards; the red, yellow, and green scores reflect how well the agencies did in meeting those milestones on a 6-month cycle:

-  **Red** – Unsatisfactory performance in at least one area of the scorecard
-  **Yellow** – Achieved intermediate levels of performance in all criteria
-  **Green** – Meets all standards for success

Scorecards are to be completed in consultation with FEMP. The final approved scorecards will be submitted to OMB by DOE near the end of each January.

February: Annual Fleet Compliance Report

By **February 15** of each year, agencies must report to Congress on their compliance with EAct 1992 acquisition requirements and with E.O. 13423. Agencies can generate this report using the data they submit to FAST at the beginning of each fiscal year. A copy of the report must be published on a publicly accessible website. Fleet managers should also send this website link to DOE for publication on the FEMP website (www.femp.energy.gov/regulations/fleet_reporting.html) by the **end of February** each year. If the website to which the annual report is to be posted has changed since the previous year, agencies are required to advertise the change in Federal Register.

June: Midyear OMB Scorecards, Section 701 Waivers, and Section 246 Report

OMB Scorecards—Midyear Report

In June of each year, agencies are required to submit to OMB a narrative explaining progress toward agency goals over the 6 months since the January scorecard goals and planned actions were developed. Agencies are also required to describe their planned actions for the next 6 months. Status on compliance with fuel use, AFV acquisition, and other statutory mandates and executive order requirements is repeated from the January report.

Midyear scorecards are also to be completed in consultation with FEMP. The final approved midyear scorecards will be submitted to OMB by DOE near the end of each June.

EAct 2005 Section 701 Waiver Requests

Under Section 701 of EAct 2005, Federal agencies can apply for a waiver from the requirement to use alternative fuel in all agency dual-fuel vehicles if alternative fuel is not available within 5 miles or 15 minutes of the vehicles' address or the alternative fuel costs more than gasoline on a per-gallon basis. See section 6.6 for detailed guidance on the EAct 2005 Section 701 requirement.

Waivers are requested in the FAST system. One consolidated waiver request per covered agency per fiscal year will be considered by DOE. Waivers must be filed by the agency's fleet manager and are **due to DOE by June 30 before the fiscal year for which the waiver is requested**. Detailed guidance on the documentation requirements for waiver requests can be found in section 6.6.

EISA Section 246 Annual Report

Not later than June 30 of each calendar year or by a date established and promulgated by DOE, Federal agencies subject to EISA Section 246 requirements are to provide DOE with a list of all Federal fleet fueling centers that are within their jurisdiction. Detailed guidance on the EISA Section 246 renewable fuel infrastructure requirements can be found in section 6.7.

Each year, agencies must enter data on the annual fuel usage (in GGE) at each fueling center for each fuel (gasoline, diesel, E85, biodiesel, CNG, LPG, electricity, etc.) consumed, as well as a brief description of the plans for renewable fuel infrastructure development at each facility. New stations must include the name of the Federal fleet fueling center, its location, and the types and amounts of fuels dispensed. Agencies should incorporate EISA 246 compliance into their strategic plans to meet petroleum reduction and alternative fuel increase goals.

For further instructions on FAST EISA Section 246 reporting, please refer to the FAST EISA Section 246 Infrastructure Reporting FAQ.⁴²

⁴² www.acsim.army.mil/installationservices/docs/FAT%20EISA%20Sec%20246%20FAQs_03-14-11.pdf

August: EISA Section 142 Plans and OMB Circular A-11 Report

EISA Section 142 Fleet Plans

EISA Section 142 requires each covered Federal agency to develop a written plan, including implementation dates, to meet its mandated 2% annual petroleum reduction and 10% annual alternative fuel consumption increase requirements.

Initial EISA Section 142 fleet plans were submitted on December 31, 2009. EISA Section 142 requires agencies to **revise and resubmit fleet plans when the agency fails to meet an interim petroleum reduction or alternative fuel use milestone** (as established under EISA Section 142). In updated fleet plans, the agency should identify the specific and quantifiable means by which they will remedy the current shortfall and catch-up to meet the next year's milestone.

Agencies must revise and resubmit fleet plans by when they failed to meet an interim petroleum reduction or alternative fuel use milestone.

If applicable, **revised EISA Section 142 fleet plans must be resubmitted** within 180 days of submission of the annual report, or by **August 15**. As discussed in chapter 2, agencies may submit to DOE the revised fleet plan in the form of the Sustainability Plan (due on June 30) if the fleet portion of this plan fulfills the EISA section 142 plan requirements.

Plans shall be sent to the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Federal Energy Management Program (EE-2L), 1000 Independence Avenue, S.W., Washington, D.C. 20585, or such other address as DOE may provide by notice in the Federal Register.

OMB Circular A-11 Annual Motor Vehicle Fleet Report

All executive branch agencies are required to submit fleet budget data using FAST at the end of August each year (please check the OMB website for the specific date). There is no minimum inventory or cost threshold, and there are no exclusions for any types, sources, or uses of vehicles. All vehicles owned or leased by the agency must be reported, including so-called "special purpose" vehicles and vehicles provided to contractors.

Although the submission of the Annual Motor Vehicle Fleet Report (AMVFR) is not required until late August, the closing of the FAST data call in mid-December has very important ramifications for the preparation of the OMB AMVFR. Actual (previous FY) inventory and cost data as well as planned, projected, and forecast vehicle acquisition and disposal data is captured and frozen during the mid-December annual FAST reporting. That same data serves as the baseline year data for the OMB AMVFR. Prior to the close of the FAST data call in mid-December, you **must** review the draft AMVFR(s) for your agency to ensure that the baseline inventory data, the baseline cost data, and the planned, projected, and forecast vehicle acquisition and disposal data are correct and complete.

Data entered during the annual FAST reporting in mid-December must be correct and complete—these data cannot be corrected during the August OMB Circular A-11 FAST data call.

Agencies must enter the following data in FAST during the FY 2011 OMB Circular A-11 AMVFR reporting period:

- **Section II.** Planned, projected, and forecast FY vehicle cost and mileage data by vehicle type
- **OMB Data Tab Screens.** Planned, projected, and forecast costs (agency wide) by vehicle ownership (agency-owned, GSA-leased, and commercially leased), annual motor vehicle budget summary, and report narrative.

Instructions for OMB-Circular A-11 Fleet Data Reporting in FAST can be found here: www.whitehouse.gov/omb/assets/a11_current_year/motorvehicles.pdf.

Please also refer to the OMB A-11 information page in FAST: <https://fastweb.inel.gov/index.cfm?FuseAction=OMBReporting13A11Docs>.

8.2 Reducing Your Reporting Workload

Many of the reporting requirements described in section 8.1 have overlapping content. DOE recommends that agencies capitalize on overlapping requirements by combining reporting requirements whenever possible. Doing so will reduce the workload associated with the completion of these reports.

This section details a number of strategies that can aid agencies in consolidating much of the workload required to facilitate on time, complete, and accurate reporting that meets all of the annual reporting requirements. The following examples illustrate what agencies can do to reduce their reporting burden and what DOE can do to assist in this process.

How Agencies Can Reduce Reporting Workloads

Coordinate Reporting Requirements

In addition to the fleet reporting requirements listed in section 8.1, E.O. 13514 requires agencies to develop and annually submit to CEQ a Sustainability Plan. As detailed in chapter 2, the fleet component of an agency's Sustainability Plan can satisfy the EISA Section 142 fleet planning requirement, provided the fleet portion of the agency Sustainability Plan satisfies the Section 142 plan requirements. Additionally, an agency's Annual Fleet Compliance Report and annual OMB scorecards should feed into their Sustainability Plan each year.

Reduce Reporting Workloads

Each agency and fleet is encouraged to evaluate their own internal systems and processes to identify opportunities to minimize the workload associated with compliance reporting. Opportunities could include reducing the number of people involved in the reporting process to a reasonable extent, based on factors such as organizational structure, responsibility, authority, and access to the data involved in reporting.

Where possible, agencies are encouraged to take advantage of vehicle management information systems (VMIS) to electronically transfer data between those systems and FAST. FAST supports data imports for most major input sections via Microsoft Excel. FAST also supports a comprehensive data import via XML. Both of these import capabilities have tremendous potential to eliminate manual data entry, reducing time and effort involved in reporting as well as eliminating data entry errors in retyping data into FAST. The XML import, as a unified data source, has the greater potential to minimize the reporting effort based on its relatively complete coverage of the Fall data call in a single import file. Agencies are encouraged to work with their VMIS vendors/support organizations to facilitate this automation; agencies may also contact the FAST management team for preliminary guidance as they evaluate such automation.

DOE continuously seeks opportunities to facilitate easier reporting. For example, in FY 2010, DOE integrated EISA Section 246 reporting into FAST, consolidating reporting mechanisms and automating many steps. This helped streamline agencies' annual reporting to updates and minor data entry on fuel consumption and renewable fuel infrastructure development plans. This same reporting process will continue to be tuned to better support delegation and importing of data from upstream systems in subsequent years and based upon agency feedback.

Agency input on efforts by FEMP and the FAST management team is vital, and DOE encourages feedback on the reporting process at any time. DOE will regularly update the agencies on the progress of FAST system enhancements through the INTERFUEL working group, the *Federal Fleet Files* monthly publication, and annual meetings such as the FedFleet conference.

Chapter 9 IMPLEMENT: Refining Strategies Based on Performance

Purpose of this chapter	<ul style="list-style-type: none">• Provide a framework to assist agency fleet managers in evaluating their fleet's progress and refining their petroleum reduction strategies based on past performance
Target audience	<ul style="list-style-type: none">• Agency headquarters fleet managers and agency fleet location managers

Roles and Responsibilities Associated with the Guidance in this Chapter

The roles and responsibilities of the *fleet manager at each agency fleet location* are to:

- Evaluate the effectiveness of petroleum reduction strategies at each fleet location
- Communicate best practices to agency fleet management
- Determine areas of weakness and opportunities for improvement
- Refine location-specific petroleum reduction strategies based on actual performance.

The role and responsibilities of the *agency headquarters fleet manager* are to:

- Evaluate agency-wide petroleum reduction strategies for effectiveness
- Communicate best practices to fleet managers at individual locations
- Determine areas of weakness and opportunities for improvement
- Refine agency-wide petroleum reduction strategies.

9.1 Evaluating the Effectiveness of Petroleum Reduction Strategies

Generally, effectiveness can be measured by whether or not an agency is in compliance with the various statutory mandates and executive order requirements for Federal fleets. On the other hand, each agency has very specific set of mission requirements and unique challenges to meet. Therefore, “effective” will be different for each agency, and very often different for each specific fleet location.

This section is designed to help agencies evaluate the effectiveness of their GHG emissions and petroleum reduction strategies using the data contained in the various reports described in chapter 8. While these reporting requirements were put in place to inform the White House and Congress, they should also be **used to either validate or refute the selection of particular petroleum reduction strategies**. Evaluating the effectiveness of petroleum reduction strategies is an ongoing process; however, agencies are required to revisit their selected strategies each year through EISA Section 142.

What Does Effectiveness Mean?

An effective strategy is one that allows an agency, or a specific fleet location, to meet its mandates in the face of any number of constraints. Constraints can be internally imposed by agency leadership (i.e., budgetary limitations or mission requirements) while others may be naturally imposed by a fleet's geographic location. An effective strategy will be specifically tailored to meet the unique needs of a specific fleet location. **Ultimately, results determine effectiveness.**

As discussed in the Guidance and chapter 1 of this Handbook, E.O. 13514 establishes reduction of fleet GHG emissions through reduced petroleum consumption as a primary Federal fleet management goal. **Exceeding Federal fleet requirements other than GHG emission and petroleum reduction is encouraged and applauded, but is not to be accomplished at the expense of an agency's ability to meet this overall vision.**

Remember that compliance with statutory and executive order requirements is measured agency-wide rather than for individual fleet locations. An agency's top down internal fleet management policy should not be so prescriptive that it handicaps individual fleet locations from implementing petroleum reduction strategies that are best suited to

their specific constraints. One of the benefits of strategic planning is that it can optimize resource allocation, targeting the most effective and efficient strategies. Such planning and implementation should set realistic site specific goals, which may be higher or lower than agencywide goals. To help in this regard, DOE FEMP has developed the NREL Optimal Vehicle Acquisition Analysis (NOVA) for agencies to effectively formulate a vehicle acquisition strategy that maximizes fleet efficiencies given the specific goals and demands of an agency's operations and budget.

As an example, many agencies have in the past encouraged the acquisition of E85 FFVs at all costs and at an equal rate at all sites. This policy has certainly led to the significant increases in alternative fuel use by the Federal fleet, but it has also led the Federal fleet to request waivers from the requirement to use alternative fuel in more than half of all E85 FFVs. In many instances FFVs are only available in larger engine configurations (V6 and V8) and may be larger than is needed for their mission; operating these vehicles with gasoline could lead to overall increases in petroleum consumption and GHG emissions over the use of smaller gasoline powered vehicles. In settings where alternative fuel is not available, a more effective petroleum reduction strategy may be to acquire HEVs rather than FFVs.

Ultimately, effective fleet management will result in significant reductions in petroleum consumption and GHG emissions. Each individual fleet will have to determine the most effective means by which to achieve this goal through continuous evaluation and refining.

9.2 Refining Your Petroleum Reduction Strategies

This section discusses the process through which agencies should review and refine their petroleum reduction strategies based on actual performance. Such a process may or may not include major changes depending on an agency's progress to date.

Numerous fleet mandates, agency-specific mission requirements, as well as a rapidly changing vehicle and fuel technology climate mean that fleet management is constantly evolving. What works one year for a fleet may not work the next year, as the opportunities to improve Federal fleet petroleum and GHG emissions reduction strategies increase with each new technology and expanding infrastructure. **This is the point at which the fleet management process comes full circle and the planning process begins anew.**

Management of a Federal fleet is a continuous process, one that requires constant planning, data collection, strategizing, and implementation.

Each year agencies should evaluate the effectiveness of their petroleum reduction strategies to determine what works, what does not, and what needs improvement. In turn, this evaluation should feed into the planning process for the development of future petroleum reduction strategies. At the beginning of each calendar year agencies are held to a number of reporting requirements documenting the progress of the previous fiscal year. In the development of these reports (OMB Scorecards, Sustainability Plan, EISA Section 142 fleet plan, and the Annual Fleet Compliance Report), agencies should be refining their petroleum reduction strategies.

The OMB scorecard process in particular provides an opportunity to review the successes and failures of the past 6 months and to develop strategies for the coming 6 months. This process allows agencies to strategize short-term actionable items, as opposed to the higher-level strategizing that is part of the Sustainability Plan and EISA Section 142 fleet plans. However, this process should take particular priority in the planning process as agencies will be held accountable for the actions listed in their scorecards. Because of this, it is important to use the evaluation process described above **to develop strategies and actions that are reasonable and attainable.** Using past performance as a guide in the process is vital because it illuminates what is possible and what is not, and may help an agency "get to green" on their scorecard.

Chapter 10 Complementary Resources

Purpose of this chapter	<ul style="list-style-type: none">• Provide additional resources to support agencies in developing GHG emissions and petroleum reduction strategies and meeting their Federal fleet requirements
Target audience	<ul style="list-style-type: none">• Agency headquarters fleet managers and agency fleet location managers

Numerous resources are available to help Federal agencies. This chapter outlines many of the resources available to support agencies in developing GHG emissions and petroleum reduction strategies and meeting their Federal fleet requirements, including:

- **FEMP resources.** FEMP information and resources to help Federal agencies manage vehicle fleets.
- **Other Federal Government online resources.** Information and resources provided by other Federal Government agencies to assist in petroleum reduction and enable the use of alternative fuels.
- **Locators, calculators, and interactive tools.** Online applications, tools, and locators to assist Federal agencies in developing GHG emissions and petroleum reduction strategies and increasing use of available alternative fuel infrastructure.
- **Vehicle acquisition resources.**
- **Resources** to assist Federal agencies in acquiring fuel-efficient and low GHG-emitting AFVs and other vehicles.
- **Federal fleet management newsletters.**




FEMP Resources

FEMP provides guidance and assistance to help implement Federal fleet legislative and regulatory requirements. FEMP's efforts include assisting agencies with implementing and managing energy-efficient and alternative fuel vehicles and facilitating a coordinated effort to reduce GHG emissions and petroleum consumption and increase alternative fuel use annually. Many of the FEMP resources below can be found online at FEMP's Fleet Management website: www.femp.energy.gov/program/fedfleet_management.html.

- **Federal requirements.** List of current Federal legislation and regulatory requirements for Federal fleets, including related FEMP guidance documents, executive order implementation instructions, and resources.
- **Technology resources.** Information on the latest alternative fuel and advanced vehicle technologies to help Federal agencies meet Federal fleet management requirements.
- **Infrastructure development.** Resources and event information to help Federal agencies locate and use alternative fueling stations, develop onsite fueling capabilities, and/or partner with other entities to leverage the development of retail fueling infrastructure.
- **Publications.** FEMP publications and newsletters to help Federal agencies manage vehicle fleets and increase the use of alternative fuels.
- **Information links.** Internet links to other Federal and private sites with related resources.
- **Education.** FEMP provides outreach through INTERFUEL and interagency task force meetings.
- **FEMP Federal fleet program contacts.** Expert contacts on vehicles, alternative fuels, and fleet management.



Other Government Online Resources

The following Federal Government websites provide a wide range of information and resources to assist Federal fleets in meeting their GHG emissions reduction, petroleum reduction, alternative fuel use, and AFV acquisition mandates:

- **GSA** offers a wide range of services for fleet managers including vehicle purchasing and full service fleet leasing. The GSA website contains information on alternative fuel vehicles, safe driving practices, vehicle rates, and fleet services cards. In addition, through GSA Fleet Drive Thru, customers are able to obtain information on their leased vehicles such as current inventory, fuel use, FAST data, and crash data. For more information from GSA on AFVs and other fleet issues, please see www.gsa.gov/afv.

- **The Alternative Fuels and Advanced Vehicles Data Center (AFDC)** provides a wide range of information and resources to enable the use of alternative fuels, in addition to other petroleum reduction options such as advanced vehicles, fuel blends, idle reduction, and fuel economy. Visit www.afdc.energy.gov/afdc/.

- **Clean Cities** has a network of almost 90 volunteer coalitions, which develop public/private partnerships to promote alternative fuels and advanced vehicles, fuel blends, fuel economy, hybrid vehicles, and idle reduction. Clean Cities coordinators in metropolitan areas throughout the country can help fleets partner with fuel providers and other public and private fleets to develop alternative fuel infrastructure. Visit www.cleancities.energy.gov.


Locators, Calculators, and Interactive Tools

Online applications, tools, and resources to assist Federal agencies in managing vehicle fleets, including reducing petroleum and increasing alternative fuel use, are provided by the AFDC and others. These tools include:

- **Alternative Fueling Station Locator.** The Alternative Fueling Station Locator displays public and private fueling stations, which have been independently verified by the AFDC. This tool searches the fueling station database and maps stations that sell a variety of non-petroleum fuels. Visit: www.afdc.energy.gov/afdc/locator/stations. A mobile version of the locator is available at www.afdc.energy.gov/afdc/locator/m/stations/.

- **Planning Your Route and Filling Up.** The Alternative Fueling Station Locator also provides the ability to plan your route to take advantage of alternative fueling stations along the way. Visit www.afdc.energy.gov/afdc/locator/stations/route.
- **TransAtlas.** The Transportation Atlas is an interactive map that displays the locations of existing and planned alternative fueling stations, alternative fuel production facilities, alternative fuel vehicle density, roads, and political boundaries. Users customize the information displayed simply by checking boxes for each element. Pan and zoom functions customize the display, and a print-ready version of the display can be generated. Visit: <http://maps.nrel.gov/transatlas>.

- **Petroleum Reduction Planning Tool.** This interactive tool helps fleets, consumers, and business owners create a strategy to reduce conventional fuel use in fleet and personal vehicles. Users can evaluate and calculate petroleum reductions achieved from various combinations of petroleum reduction methods. Visit: www.afdc.energy.gov/afdc/prep/index.php.
- **Alternative Fuel Retail Prices.** Retail prices for E85 and other alternative fuels can be found at www.e85prices.com and www.altfuelprices.com.

Vehicle Acquisition Resources

The following resources are provided by GSA, AFDC, FEMP, and EPA to assist Federal agencies in selecting and acquiring vehicles to support petroleum reduction and alternative fuel use increase strategies:

- **GSA Vehicle Buying.** Support for buying vehicles through GSA Automotive (available at www.gsa.gov/automotive and leasing vehicles at GSA Fleet (available at www.gsa.gov/vehicleleasing).
- **GSA Motor Vehicle Management Policy.** GSA provides information and resources to assist fleet managers in improving management and enhancing the performance of the motor vehicle fleets operated by Federal agencies. Visit: www.gsa.gov/HDR_3_Plcy_vehicle.
- **Alternative Fuel and Advanced Technology Vehicles Availability and Information.** AFDC provides a wealth of information on alternative fuel and advanced vehicles. The website contains detailed descriptions of vehicle types, and allows fleet managers to find light- and heavy-duty alternative fuel and advanced vehicles and compare their specifications. Visit www.afdc.energy.gov/afdc/vehicles/index.html.
- **NOVA Analysis.** The NREL Optimal Vehicle Acquisition Analysis helps maximize agency fleet efficiency. It utilizes a mathematical model with a variety of fleet-related data and constraints (e.g. budgets) to create an optimal vehicle acquisition strategy for a given goal, such as petroleum or GHG reductions. For more information, contact Ryan Daley at ryan.daley@nrel.gov.
- **EPA Green Vehicle Guide.** This guide (available at www.epa.gov/greenvehicles/Index.do) provides information about the environmental performance of vehicles, including fuel economy, air pollution, and GHG scores (rated from 0 [worst] to 10 [best]), and SmartWay and SmartWay Elite designations for best environmental performance. EPA also provides a Federal Acquisition search page (available at www.epa.gov/greenvehicles/Federalfleet.do), which allows users to search for available low GHG-emitting vehicles that meet the requirements of EISA Section 141.
- **FuelEconomy.gov.** This site helps fleet managers and consumers make informed fuel economy choices when purchasing a vehicle and achieve the best fuel economy possible. FuelEconomy.gov provides fuel economy estimates, energy impact ratings, GHG and air pollution ratings, fuel-saving tips, vehicles that can use alternative fuels, and other useful information.



Newsletters

The following newsletters update agencies on news and developments affecting management of their vehicle fleets, including reducing petroleum and increasing alternative fuel use:



- **Federal Fleet Files.** A monthly newsletter highlighting the latest news and developments affecting Federal fleets. Visit www.femp.energy.gov/program/fedfleet_resources.html#newsletters.
- **Wheels & Wings Newsletter.** A quarterly newsletter from GSA that addresses issues concerning motor vehicle and aircraft management policies. Visit www.gsa.gov/wheelsandwings.
- **Alternative Fuel Price Report.** A quarterly newsletter to keep you up to date on the regional average price of alternative fuels in the U.S. in relation to gasoline and diesel prices. Visit: www.afdc.energy.gov/afdc/price_report.html.
- **Clean Cities Now.** The official biannual publication of Clean Cities, an initiative of the U.S. Department of Energy's Vehicle Technologies Program. Visit www.cleancities.energy.gov/newsletter.html.
- **Ethanol Report.** Published by the Renewable Fuels Association about issues concerning the ethanol industry. Visit www.ethanolrfa.org/pages/ethanol-report-newsletter/.

Appendix A. Glossary⁴³

Advanced technology vehicle – A vehicle that combines new engine/power/drivetrain systems to significantly improve fuel economy. This includes hybrid power systems and fuel cells, as well as some specialized electric vehicles.

Alternative fuel (AF) – Methanol, denatured ethanol, and other alcohols; mixtures containing 85% or more by volume of methanol, denatured ethanol, and other alcohols with gasoline or other fuels; natural gas; liquefied petroleum gas; hydrogen; coal-derived liquid fuels; non-alcohol fuels (such as biodiesel) derived from biological material; and electricity. ‘P-Series’ fuels were added to this list since the original definition in EPA Act. See definitions for more details.

Alternative fuel vehicle (AFV) – As defined by the Energy Policy Act, any dedicated, flexible-fuel, or dual-fuel vehicle designed to operate on at least one alternative fuel. See definitions for more details.

Bi-fuel vehicle – A vehicle with two separate fuel systems designed to run on either an alternative fuel, or gasoline or diesel, using only one fuel at a time. Bi-fuel vehicles are sometimes referred to as dual-fueled vehicles, including in the Clean Air Act Amendments and Energy Policy Act.

Biodiesel – A biodegradable transportation fuel for use in diesel engines that is produced through transesterification of organically derived oils or fats. Biodiesel is used as a component of diesel fuel. See definitions for more details.

Compressed natural gas – Natural gas that has been compressed under high pressures, typically 2,000 to 3,600 psi, held in a container. The gas expands when used as a fuel.

Dual-fueled vehicle – Vehicle designed to operate on a combination of an alternative fuel and a conventional fuel. This includes (a) vehicles that use a mixture of gasoline or diesel and an alternative fuel in one fuel tank, commonly called flexible-fuel vehicles; and (b) vehicles capable of operating either on an alternative fuel, a conventional fuel, or both, simultaneously using two fuel systems. They are commonly called bi-fuel vehicles. See definitions for more details.

Electric vehicle – A vehicle powered by electricity, generally provided by batteries. EVs qualify in the zero emission vehicle (ZEV) category for emissions. See definitions for more details.

Ethanol – A fuel that can be produced chemically from ethylene or biologically from the fermentation of various sugars from carbohydrates found in agricultural crops and cellulosic residues from crops or wood.

Federal fleet fueling center – An existing Federally owned or contracted refueling site that is located on Federal property and primarily used to fuel Federal fleets—including those operating on appropriated or working capital funds—and that dispenses gasoline, diesel, and/or alternative fuels. See definitions for more details.

Flex-fuel (or flexible-fuel) vehicle (FFV) – A vehicle with a common fuel tank designed to run on varying blends of unleaded gasoline with either ethanol or methanol.

Fuel cell – An electrochemical engine with no moving parts that converts the chemical energy of a fuel, such as hydrogen, and an oxidant, such as oxygen, directly to electricity. The principal components of a fuel cell are catalytically activated electrodes for the fuel (anode) and the oxidant (cathode) and an electrolyte to conduct ions between the two electrodes. See definitions for more details.

Fuel economy – The average number of miles traveled by an automobile for each gallon of gasoline (or equivalent amount of other fuel) used.

Gasoline gallon equivalent (GGE) - A unit for measuring alternative fuels so that they can be compared with gasoline on an energy equivalent basis. This is required because the different fuels have different energy densities.

Greenhouse gas (GHG) – Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride

Gross vehicle weight rating (GVWR) – Maximum weight of a vehicle, including payload. See definitions for more details.

⁴³ Terms are defined for the purposes of this document. They are not intended to be comprehensive.

Heavy-duty vehicle (HDV) – Generally, a vehicle that a) is rated at more than 8,500 pounds gross vehicle weight; b) has a curb weight of more than 6,000 pounds; OR has a basic vehicle frontal area in excess of 45 square feet. Definitions vary by organization.

Hybrid electric vehicle (HEV) – A vehicle powered by two or more energy sources, one of which is electricity. HEVs may combine the engine and fuel of a conventional vehicle with the batteries and electric motor of an electric vehicle in a single drivetrain. See definitions for more details.

Light-duty vehicle (LDV) – Passenger cars and trucks with a gross vehicle weight rating of 8,500 or less. See definitions for more details.

Liquefied natural gas (LNG) – Compressed natural gas that is cryogenically stored in its liquid state.

Liquefied petroleum gas (LPG) – A mixture of hydrocarbons found in natural gas and produced from crude oil, used principally as a feedstock for the chemical industry, home heating fuel, and motor vehicle fuel. Also known by the principal constituent propane.

Medium-duty vehicle (MDV) – A motor vehicle of more than 8,500 lbs and less than or equal to 16,000 lbs GVWR. Definitions vary by organization.

Methanol – A liquid fuel formed by catalytically combining carbon monoxide (CO) with hydrogen in a 1 to 2 ratio under high temperature and pressure. Commercially, it is typically manufactured by steam reforming natural gas. Also formed in the destructive distillation of wood.

Metropolitan statistical area (MSA)/Consolidated metropolitan statistical area (CMSA) – According to the U.S. Census Bureau, an area qualifies for recognition as an MSA if it includes a city of at least 50,000 in population or an urbanized area of at least 50,000 with a total metropolitan area population of at least 100,000. Consolidated metropolitan statistical areas are defined similarly but have populations of 1 million or more and include within them separate metropolitan statistical areas. For purposes of EPA, covered MSA and CMSA areas include those that had a 1980 U.S. Census population figure of more than 250,000.

Neighborhood electric vehicle (NEV) – A four-wheeled motor vehicle that has a GVWR of less than 3,000 pounds (1,400 kg) and a top speed of between 20 to 25 mph. See definitions for more details.

Petroleum fuel – Gasoline or diesel fuel.

Renewable fuel – A fuel that is:

- At least 85% ethanol (E85)
- A mixture of biodiesel and diesel or renewable diesel fuel (as that term is defined under section 211(o) of the Clean Air Act), containing at least 20% biodiesel (B20) or renewable diesel
- Electricity derived from a renewable source of energy (e.g., solar or wind-generated electricity) or non-renewably generated electricity if renewable energy credits (RECs) equal to or greater than the electricity used are purchased.

Renewable fuel pump – A device that delivers renewable fuel (including electricity) to Federal vehicles.

Appendix B. Definitions

Alternative Fuel (AF) – Methanol, denatured ethanol, and other alcohols; mixtures containing 85 percent or more (or such other percentage, but not less than 70 percent, as determined by the Secretary, by rule, to provide for requirements relating to cold start, safety, or vehicle functions) by volume of methanol, denatured ethanol, and other alcohols with gasoline or other fuels; natural gas, including liquid fuels domestically produced from natural gas; liquefied petroleum gas; hydrogen; coal-derived liquid fuels; fuels (other than alcohol) derived from biological materials; electricity (including electricity from solar energy); and any other fuel the Secretary determines, by rule, is substantially not petroleum and would yield substantial energy security benefits and substantial environmental benefits.⁴⁴

⁴⁴ 42 U.S.C. 13211(2). : <http://uscode.house.gov/uscode-cgi/fastweb.exe?getdoc+uscview+t41t42+7883+0+++%28%29%20%20A>

Alternative Fuel Vehicle (AFV) – A vehicle that either operates solely on alternative fuel or that is capable of operating on both alternative fuel and gasoline or diesel fuel.⁴⁵ This includes: a new qualified fuel cell motor vehicle (as defined in U.S.C. section 30B(b)(3) of title 26); a new advanced lean burn technology motor vehicle (as defined in U.S.C. section 30B(c)(3) of title 26); a new qualified hybrid motor vehicle (as defined in U.S.C. section 30B(d)(3) of title 26); and any other type of vehicle that the EPA determines would achieve a significant reduction in petroleum consumption.⁴⁶

Biodiesel (BD) – A diesel fuel substitute produced from non-petroleum renewable resources that meets the registration requirements for fuels and fuel additives established by the EPA under section 7545 of U.S.C. Title 42 that includes biodiesel derived from animal wastes, including poultry fats and poultry wastes, and other waste materials; or municipal solid waste and sludges and oils derived from wastewater and the treatment of wastewater.⁴⁷

Dual Fuel Vehicle – A vehicle that is capable of operating on alternative fuel or a mixture of biodiesel and diesel fuel meeting the standard established by the American Society for Testing and Materials or under section 211(u) of the Clean Air Act (42 U.S.C. 7545 (u)) for fuel containing 20 percent biodiesel (commonly known as “B20”) and on gasoline or diesel fuel; and that provides equal or superior energy efficiency, as calculated for the applicable model year during fuel economy testing for the United States Government, when operating on alternative fuel as when operating on gasoline or diesel fuel. *49 U.S.C. §32901*

Electric (or Electric Motor) Vehicle (EV) – A vehicle primarily powered by an electric motor that draws current from rechargeable storage batteries, fuel cells, photovoltaic arrays, or other sources of electric current. *42 U.S.C. §13271*

Federal fleet fueling center – An existing Federally owned or contracted refueling site that is located on Federal property and primarily used to fuel Federal fleets—including those operating on appropriated or working capital funds—and that dispenses gasoline, diesel, and/or alternative fuels. Excluded from the definition of “Federal fleet fueling center” are refueling centers with a fuel turnover rate of less than 100,000 gallons per year of at least one fuel type. EISA Section 246 specifies that the renewable fuel pump installation requirements do not apply to any DOD refueling center with a fuel turnover rate of less than 100,000 gallons per year of at least one fuel type. The statute is silent as to whether a turnover rate threshold applies to fueling centers of other agencies. DOE interprets this minimum threshold definition of 100,000 gallons as applying to all Federal agencies, and not just DOD refueling centers.

Fuel cell – A device that directly converts the chemical energy of a fuel, which is supplied from an external source, and an oxidant into electricity by electrochemical processes occurring at separate electrodes in the device. *42 U.S.C. §16152*

Gross vehicle weight rating (GVWR) – The value specified by the manufacturer as the maximum design loaded weight of a single vehicle. *40 CFR Sec. 86.1803*

Hybrid Electric Vehicle (HEV) – Draws propulsion energy from onboard sources of stored energy which are both an internal combustion or heat engine using consumable fuel, and a rechargeable energy storage system – as defined in section 30B(d)(3) of the Internal Revenue Code of 1986 as cited in *EISA 2007*.

Light-duty vehicle (LDV) – Any motor vehicle with a gross motor vehicle weight rating (GVWR) of 8,500 pounds or less. *FMR §102-34.35*

Neighborhood electric vehicle (NEV) – A four-wheeled on-road or non-road vehicle that:

- Has a top attainable speed in 1 mile of more than 20 mph and not more than 25 mph on a paved level surface
- Is propelled by an electric motor and on-board, rechargeable energy storage system that is rechargeable using an off-board source of electricity. *Sec. 133, Energy Independence and Security Act of 2007*

⁴⁵ 42 U.S.C. 13211(2): <http://uscode.house.gov/uscode-cgi/fastweb.exe?getdoc+uscview+t41t42+7883+0++%28%29%20%20A>

⁴⁶ NDAA 2008.

⁴⁷ 42 U.S.C. 13220(f)(1): <http://uscode.house.gov/uscode-cgi/fastweb.exe?getdoc+uscview+t41t42+7892+0++%28%29%20%20AND%20%28%2842%29%20ADJ%20USC%29%3ACITE%20AND%20%28USC%20w%2F10%20%2813220%29%29%3ACITE%20%20%20%20%20%20%20%20%20%20>

Appendix C. Acronyms and Abbreviations

Term	Acronym
Advanced Vehicles Data Center, Alternative Fuels and Advanced Vehicles Data Center	AFDC
Alternative Fuel Vehicle	AFV
American Petroleum Institute	API
American Transportation Research Institute	ATRI
Annual Motor Vehicle Fleet Report	AMVFR
Battery Electric Vehicle	BEV
Central Intelligence Agency	CIA
Code of Federal Regulations	CFR
Compressed Natural Gas	CNG
Consolidated Metropolitan Statistical Area	CMSA
Corporate Average Fuel Economy	CAFE
Council on Environmental Quality	CEQ
Defense Energy Support Center	DESC
Electric Power Research Institute	EPRI
Electric Vehicle	EV
Electric Vehicle Supply Equipment	EVSE
Energy Conservation Reauthorization Act	ECRA
Energy Independence and Security Act	EISA
Energy Policy Act	EPAct
Electric Power Research Institute	EPRI
Executive Order	E.O.
Federal Automotive Statistical Tool	FAST
Federal Energy Management Program	FEMP
Federal Management Regulation	FMR
Fiscal Year	FY
Fleet Service Representative	FSR
Flex Fuel Vehicle	FFV
Fuel Use Report	FUR
Gas Mileage	MPG
Gasoline Gallon Equivalent	GGE
Global Positioning System	GPS
Government-Owned, Contractor-Owned	GOCO
Greenhouse Gas	GHG
Gross Vehicle Weight Rating	GVWR
Heavy-Duty Vehicle	HDV
Idaho National Laboratory	INL
Interagency Committee on Alternative Fuels and Low Emission Vehicles	INTERFUEL

Term	Acronym
Kilowatt-Hour	kWh
Flex Fuel Vehicle	FFV
Fuel Use Report	FUR
Gas Mileage	MPG
Gasoline Gallon Equivalent	GGE
Light-Duty Vehicle	LDV
Liquefied Natural Gas	LNG
Liquid Petroleum Gas	LPG
Low-Speed Electric Vehicle	LSEV
Low Speed Vehicle	LSV
Management and Integration	M&I
Management and Operating	M&O
Medium-Duty Vehicle	MDV
Metropolitan Statistical Area	MSA
Miles Per Hour	MPH
National Defense Authorization Act	NDAA
National Electric Code	NEC
National Renewable Energy Laboratory	NREL
Neighborhood Electric Vehicle	NEV
Notice of Proposed Rulemaking	NOPR
Office of the Federal Environmental Executive	OFEE
Office of Management and Budget	OMB
Privately Owned Vehicle	POV
Plug-in Hybrid Electric Vehicle	PHEV
Renewable Electricity Credit	REC
Return on Investment	ROI
Sport Utility Vehicle	SUV
Transportation on Demand	TOD
Underwriters Laboratories	UL
U.S. Department of Commerce	DOC
U.S. Department of Defense	DOD
U.S. Department of Energy	DOE
U.S. Department of the Interior	DOI
U.S. Environmental Protection Agency	EPA
U.S. General Services Administration	GSA
United States Code	U.S.C.
Vehicle Allocation Methodology	VAM
Vehicle Inventory Management System	VIMS
Vehicle Miles Traveled	VMT

Appendix D. CO₂ Emissions Factors by Fuel Type

Fuel	kg/GGE CO ₂ emission factors	Biogenic ^a kg/GGE CO ₂ emissions factors
B20	7.396 kg/GGE	1.85 kg/GGE
B100	0 kg/GGE	9.23 kg/GGE
CNG	6.628 kg/GGE	n/a
Diesel	9.245 kg/GGE	n/a
E85 ^a	1.317 kg/GGE	7.27 kg/GGE
Gasoline	8.778 kg/GGE	n/a
LNG	6.628 kg/GGE	n/a
LPG	7.873 kg/GGE	n/a

^a CO₂ emissions from the biofuels portion of the fuel are known as biogenic emissions, and must be reported within the appropriate scope in which they occur and must be categorized as biogenic. Agencies are not required to include these emissions in their reduction targets under E.O. 13514 at this time.

Appendix E. CH₄ and N₂O Emissions Factors by Fuel Type

Fuel	kg/GGE CH ₄ emissions factors	kg/GGE N ₂ O emissions factors
B20	3.92x10 ⁻⁵ kg/GGE	2.04x10 ⁻⁵ kg/GGE
B100	1.38x10 ⁻⁴ kg/GGE	1.38x10 ⁻⁵ kg/GGE
CNG	1.25x10 ⁻⁴ kg/GGE	1.25x10 ⁻⁵ kg/GGE
Diesel	1.47 x10 ⁻⁵ kg/GGE	2.20x10 ⁻⁵ kg/GGE
E85	1.53x10 ⁻⁴ kg/GGE	2.04x10 ⁻⁵ kg/GGE
Gasoline	2.40x10 ⁻⁴ kg/GGE	2.54 x10 ⁻⁴ kg/GGE
LNG	1.25x10 ⁻⁴ kg/GGE	1.25x10 ⁻⁵ kg/GGE
LPG	3.75x10 ⁻⁴ kg/GGE	7.50x10 ⁻⁵ kg/GGE

Conversion Factors to CO₂ equivalents (CO₂e)

kg/GGE CH₄ x 21 = kg/GGE CO₂e

kg/GGE N₂O x 310 = kg/GGE CO₂e

Appendix F. Agencies Covered by EAct 1992 (as of FY 2011)

Agency Name	References and Abbreviations
Court Services and Offender Supervision	CSOS
General Services Administration	GSA
National Aeronautics and Space Administration	NASA
Smithsonian Institute	Smithsonian
Social Security Administration	SSA
U.S. Department of Agriculture	Agriculture, USDA
U.S. Department of Commerce	Commerce, DOC
U.S. Department of Defense ⁴⁸	DOD
U.S. Department of Energy	DOE
U.S. Department of Health and Human Services	HHS
U.S. Department of Homeland Security	DHS
U.S. Department of Housing and Urban Development	HUD
U.S. Department of the Interior	Interior, DOI
U.S. Department of Justice	Justice, DOJ
U.S. Department of Labor	Labor, DOL
U.S. Department of State	State, DOS
U.S. Department of Transportation	Transportation, DOT
U.S. Department of Treasury	Treasury
U.S. Department of Veterans Affairs	VA
U.S. Environmental Protection Agency	EPA
U.S. Postal Service	USPS

⁴⁸ Department of Defense includes the United States Army Corps of Engineers, Department of Army, Department of Air Force, Department of Navy, United States Marines Corps, and Defense Agencies

EERE Information Center

1-877-EERE-INFO (1-877-337-3463)

www.eere.energy.gov/informationcenter

U.S. DEPARTMENT OF
ENERGY

Energy Efficiency &
Renewable Energy