



# Energy 101

1 | [www.femp.energy.gov/training](http://www.femp.energy.gov/training)

[eere.energy.gov](http://eere.energy.gov)

## Objectives

- Define key terms in energy management.
- Access relevant Federal legislation and Executive Orders.
- Explain a process diagram for performing energy management initiatives.
- Determine how you will establish baseline measurements in various energy management arenas.
- Discuss how to develop a Plan of Action.
- Discuss various financing options that can be considered.
- Access resources for greening your purchasing.

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# Energy 101

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## What is Energy Management?

Moving towards energy sustainability requires changes not only in the way energy is supplied, but in the way it is used, and reducing the amount of energy required to deliver various goods or services.



# What is Energy Management?

“New Energy for America is not an abstract idea.

It represents aggressive implementation of renewable projects that bring clean energy on line.

It exemplifies the innovation of people harnessing the cheapest, fastest, and cleanest energy source – energy efficiency.

It demonstrates the accelerated use of high-efficiency, high-performing vehicles and the increased use of alternative fuels produced right here at home.”



# What is Energy Management?

“It is the new energy of Federal workers who serve the nation each and every day, working to transform the ways we produce and use energy for the sake of our environment, our economy, and our security.”

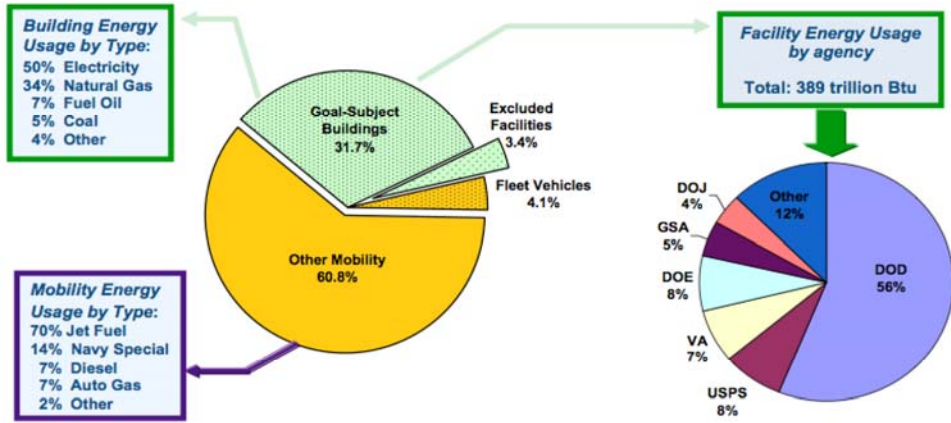
“The Federal Government is summoning the nation to face one of the great challenges of our time: confronting our dependence on foreign oil; addressing the moral, economic, and environmental challenge of global climate change; and building a clean energy future that benefits all Americans.”



# Federal Government Leadership

"As the largest consumer of energy in the U.S. economy, the Federal government can and should lead by example when it comes to creating innovative ways to reduce greenhouse gas emissions, increase energy efficiency, conserve water, reduce waste, and use environmentally-responsible products and technologies,"

Energy management is one of the most challenging tasks facing today's Federal facility manager..."



The Federal Government operates over 500,000 facilities (3 billion sq ft) and consumes 1.6% of the nation's total energy use, or \$24.5 billion in annual energy costs.

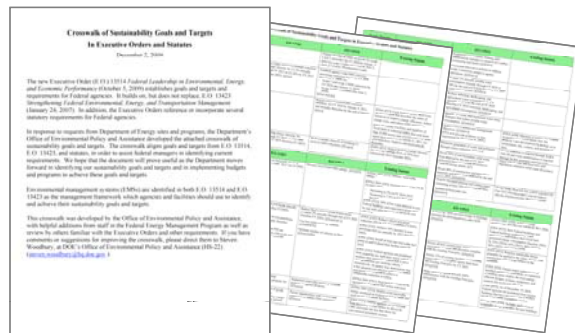
## Legislative Basis and Executive Orders

- Energy Policy Act of 2005
- Energy Policy and Security Act of 2007
- American Recovery and Reinvestment Act 2009
- Executive Order 13514
- Executive Order 13423

## Crosswalk EO 13514 with other EOs and Statutes

Resources can be accessed at:

<http://www1.eere.energy.gov/femp/docs/sustainabilitycrosswalk.doc>



## Crosswalk EO 13514 with other EOs and Statutes

Example:

Content Area	EO 13514	Existing Statutes
<i>Energy Efficiency in New Construction and Major Renovations</i>	Achieve by 2030 zero-net-energy in buildings entering the planning process after 2020. [ § 2(g)(i)]	EPAct 2005 § 109]: Achieve energy performance 30% beyond ASHRAE 90.1-2004. [EISA § 433]: New Federal buildings and Federal buildings undergoing major renovations shall reduce their fossil fuel-generated energy consumption (baseline 2003) by 55% (2010), 65% (2015), 80% (20202), 90% (2025), and 100% (2030).

## Crosswalk EO 13514 with other EOs and Statutes

Content	EO13423	EO13514	Statutes
<b>High Performance and Sustainable Buildings</b>	Ensure all new agency construction and renovation complies with the Guiding Principles. [ § 2(f)] Ensure 15% of existing Federal building inventory incorporate the Guiding Principles by 2015. [ § 2(f)]	Ensure all new construction, major renovation, or repair and alteration complies with the Guiding Principles. [ § 2(g)(ii)] Ensure 15% of existing facilities and building leases (above 5,000 gross square feet) meet the Guiding Principles by FY 2015. [ § 2(g)(iii)] Make annual progress towards 100% conformance with the Guiding Principles. [ § 2(g)(iii)]	[EISA § 433]: Requires sustainable design principles be applied to the siting, design, and construction of buildings subject to the standards. [EISA § 434]: Ensure major replacements of installed equipment, renovation, or expansion of existing space employ the most energy-efficient designs, systems, equipment, and controls life-cycle cost effective. [EISA § 435]: As of December 19, 2010, Federal agencies are prohibited from leasing buildings that have not earned the ENERGY STAR label (some exemptions apply). [EPAct 2005 § 109]: Includes application of sustainable design principles for new buildings

## Fundamental Components

- Energy Efficiency
- Renewable Energy
- Water Efficiency
- Sustainable Acquisition

## Many Dimensions, Many Terms

**Energy Efficiency**

**GREEN ENERGY**

Renewable

Bioenergy

**SUSTAINABLE PRACTICES**

*Carbon Emission Reduction*

**Clean Energy**

**WASTE MANAGEMENT**

**ALTERNATIVE ENERGY**

**ENERGY CONSERVATION**

**Water Efficiency**

**SUSTAINABLE ACQUISITION**

## Energy Efficiency

- **Energy conservation** is any behavior that results in the use of less energy. Turning the lights off when you leave the room and recycling aluminum cans are both ways of conserving energy.
- **Energy efficiency** is the use of technology that requires less energy to perform the same function. A compact fluorescent light bulb that uses less energy than an incandescent bulb to produce the same amount of light is an example of energy efficiency. However, the decision to replace an incandescent light bulb with a compact fluorescent is an act of energy conservation.

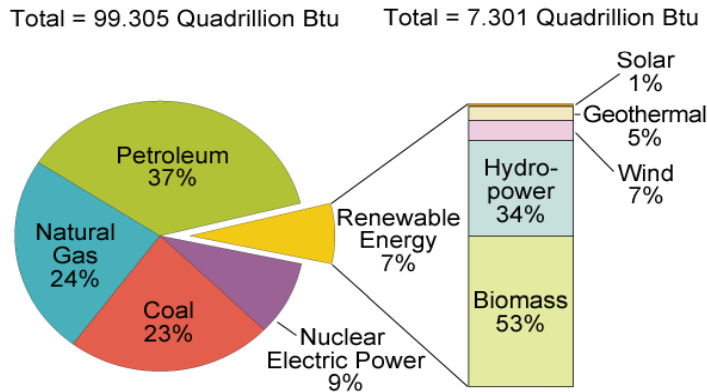
## Energy Efficiency

- Common energy efficiency measures include hundreds of technologies and processes, such as:
  - high efficiency appliances,
  - lighting,
  - heating and cooling systems,
  - improved insulation,
  - daylighting,
  - and advanced building controls.
- Energy efficiency is the most cost-effective energy resource available because we can access it immediately.

## Renewable Energy

- Unlike fossil fuels, which are exhaustible, renewable energy sources regenerate and can be sustained indefinitely
  - Hydropower
  - Biomass
  - Wind
  - Geothermal
  - Solar

## U.S. Energy Consumption by Energy Source, 2008



Note: Sum of components may not equal 100% due to independent rounding.  
Source: EIA, *Renewable Energy Consumption and Electricity Statistics*, Table 1: U.S. Energy Consumption by Energy Source, 2004-2008 (July 2009).

## Water Efficiency

- The protection, development, and efficient management of water resources for beneficial purposes.

## Water Efficiency

FEMP considers water efficiency to be an integral part of every comprehensive energy/resource management program. This is partly because water requires significant energy input for treatment, pumping, heating, and process uses.

# Getting Started

## Energy Management Process

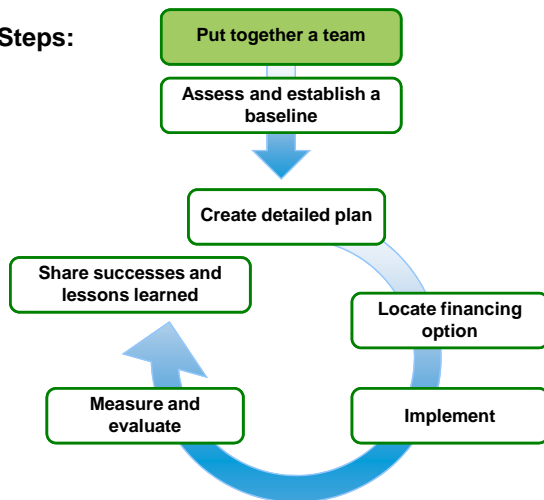
Steps:



# The Right Team

## Energy Management Process

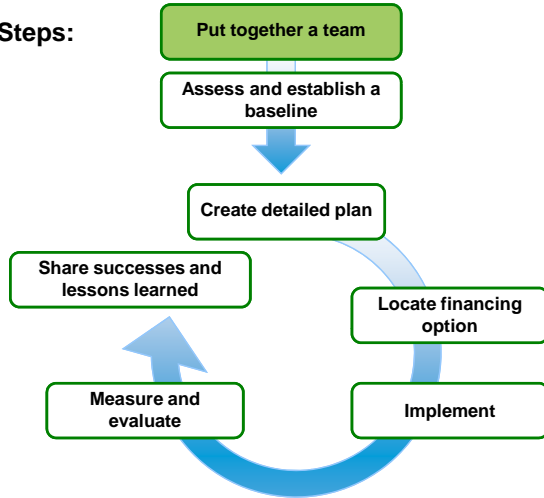
Steps:



- You can't do it alone
- Team needs a management champion to secure and maintain commitment

### Energy Management Process

Steps:

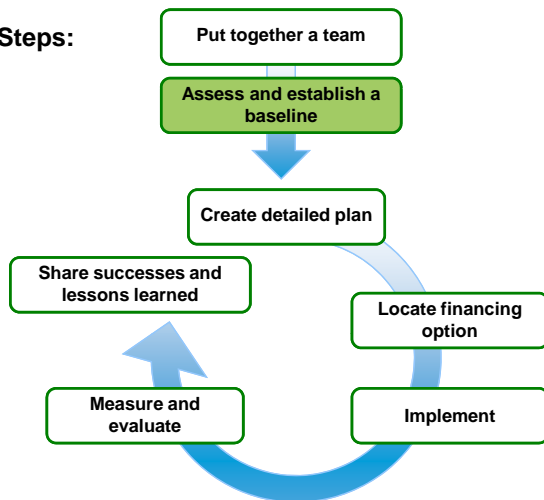


## The Right Team

- Find partners with expertise as needed
  - Engineering
  - Purchasing
  - Operations and Maintenance
  - Building/Facilities Management
  - Environmental Health and Safety
  - Real Estate and Leasing
  - Construction Management
  - Contractors and Suppliers
  - Utilities

### Energy Management Process

Steps:



## Assess Performance

- Understand current and past energy use to identify opportunities to improve energy performance and gain financial benefits.

### Energy Management Process

Steps:



## Establish Baseline

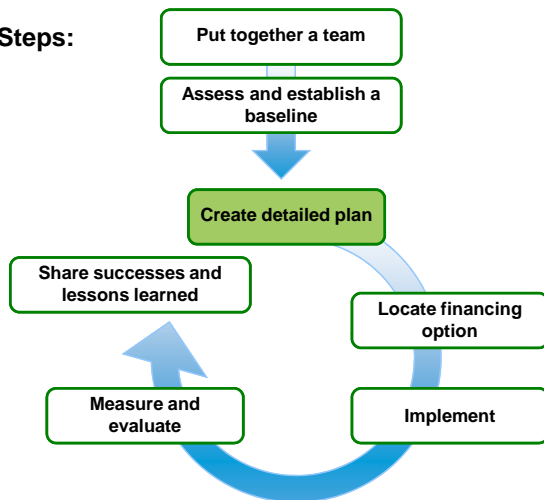
Establish base year – Establish a base year (weather-normalized) or an average of several historical years.

Identify metrics – Select units of measurements that express energy performance for your organization. (e.g. ENERGY STAR benchmark score, Btu/square foot, Btu/ product, total energy cost/square foot).

Publish results – Announce performance baselines to facilities, managers, and other key stakeholders in your organization.

### Energy Management Process

Steps:



## Develop Plan - Set Goals

- Use FEMP Crosswalk to establish goals based on statutes and executive orders as well as Agency guidance.
- Determine scope – Identify organizational and time parameters for goals.

### Energy Management Process

Steps:



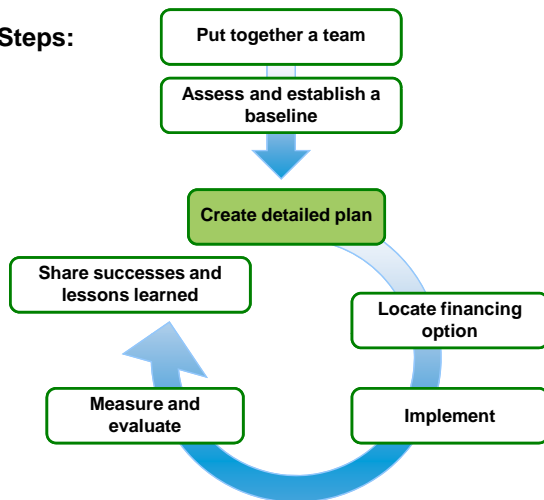
## Develop Plan - Set Goals

Estimate potential for improvement

- Review baselines
- Benchmark to determine the potential and order of upgrades
- Conduct technical assessments and audits

### Energy Management Process

Steps:



## Develop Plan - Set Goals

- Create and express clear, measurable goals
- Create target dates for the
  - organization
  - Facilities
  - and other units

### Energy Management Process

Steps:

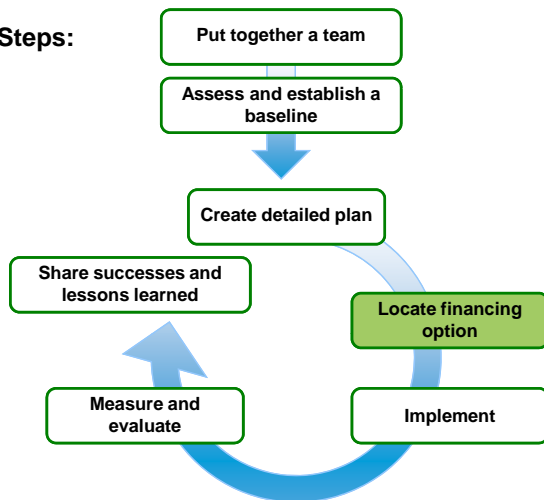


## Develop Plan - Set Goals

- Whole building life-cycle costs
- New technologies
- Consider
  - Energy efficiency
  - Renewables
  - Vehicles

### Energy Management Process

Steps:



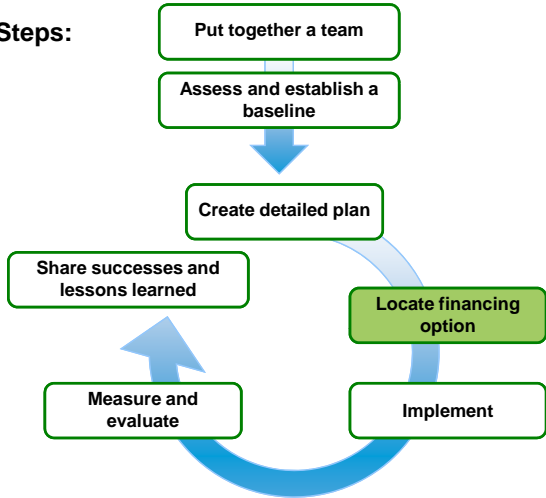
## Financing

### Financing options

- Direct appropriations
- Alternative financing:
  - Energy Savings Performance Contracts (ESPCs)
  - Utility Energy Service Contracts (UESCs)
  - Enhanced Use Leases (EULs)

Energy Management Process

Steps:



Alternative Financing

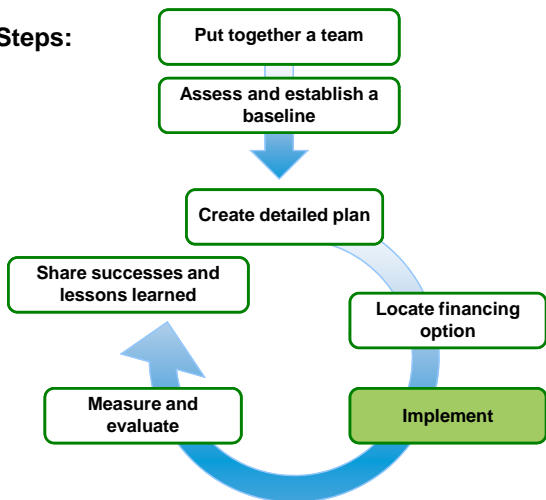
Energy Savings Performance Contracts (ESPCs)

Utility Energy Service Contracts (UESCs)

Enhanced Use Leases (EULs)

Energy Management Process

Steps:

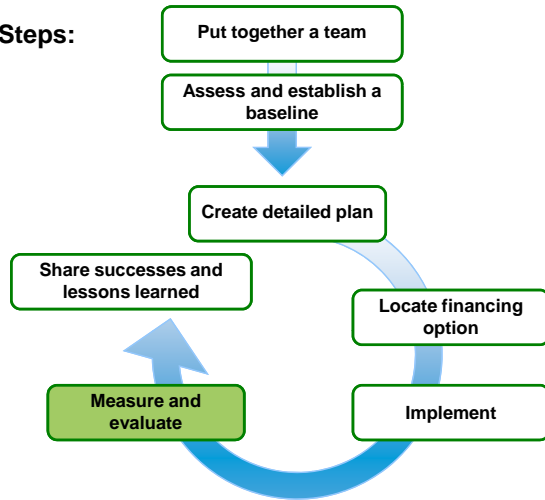


Implement Action Plan

- Conduct periodic reviews
- Identify necessary corrective actions
- Adjust plan as needed

**Energy Management Process**

Steps:

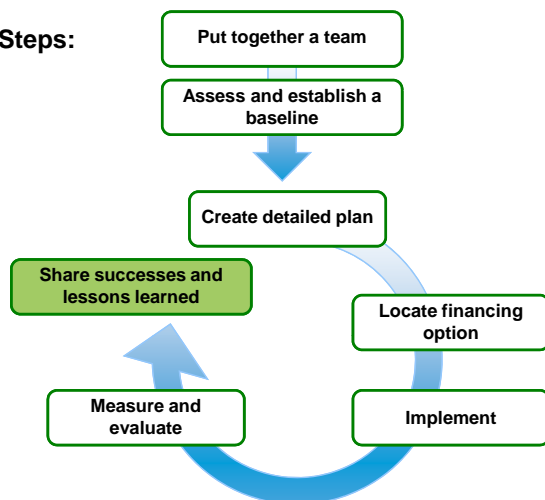


**Measure and Evaluate**

- Compare current performance to established goals
- Review action plan to determine lessons learned and best practices
- Adjust plan based on results

**Energy Management Process**

Steps:



**Share Success and Lessons Learned**

- Ensure partners get credit due.
- Share success with external parties such as the media.
- Share successes and lessons learned with other Energy Managers.
- Participate in Agency awards, FEMP awards, Presidential awards.

## Sustainable Acquisition

Sustainable acquisition is key  
to successful energy management  
implementation.

## Sustainable Acquisition in EO 13514

Ensure that 95% of all new contracts and contract modifications  
for products and services are:

- Energy efficient
- Water-efficient
- Biobased
- Environmentally preferable
- Non-ozone depleting
- Contain recycled content
- Non-toxic or less toxic alternatives

## Acquisition Mechanisms

- Purchase card/fleet card purchases
- Simplified acquisitions (<\$100,000)
- Larger (>\$100,000) purchases of supplies
- Support services contracts
- Detailed scopes of work or performance-based contracting
- Purchases from mandatory sources

## Energy Star and FEMP Designated Products and Low Standby Power Devices

- Requirement:
  - Reduce building energy use
  - Purchase ENERGY STAR and FEMP- designated products
  - Purchase products that use minimal standby power
  - Consider renewable energy
  - Purchase EPEAT-registered products

## What to Buy Green

- Electronic office products
  - Low standby power devices
  - **EPEAT**-registered products
- Building construction products
- Lighting
- Water-saving products
- Florescent lamps
- Air Conditioning
- Heating
- Refrigerators
- Freezers
- Ice Makers
- Illuminated Exit Signs



## Energy Star and Energy Efficient Products

Sample contract language:

### The Vendor Must:

Provide new and repaired computers, monitors, and integrated computer-monitor systems that earn the ENERGY STAR and are configured properly for automatic energy-saving features, as per current ENERGY STAR specifications. The vendor shall provide customer support with respect to power management features, such that these features remain properly enabled and repaired if a malfunction occurs. The vendor is encouraged to visit [www.energystar.gov](http://www.energystar.gov) for complete product specifications and an updated list of qualifying products.

## Buying EPEAT™ Registered Products

### When buying EPEAT Registered Products

- Update all contracts to reflect new requirements
- Specify in every task order
- Use [www.epeat.net](http://www.epeat.net)
- Buy from resellers
- Buy off Government Wide Acquisition Contracts (NASA SEWP IV, GSA).

## EPEAT Contract Language

- There are a number of mandates that require Federal procurement officials to assess and give preference to those products and services that are environmentally preferable, including:
  - Executive Order 13514,
  - the Energy Policy Act of 2005,
  - and the Federal Acquisition Regulations (FAR) subpart 23.703.

# Where to Buy Green

- GSA Advantage!
- DoD EMALL
- Energy Savings Performance Contracts
- Utility Energy Savings Contracts
- Commercial sources



**Advantage!**


# Other Resources to Get You Started

- FEMP Website <http://www1.eere.energy.gov/femp/>

Meet Energy Goals and Regulatory Requirements >



Design, Operate, and Maintain High-Performance Buildings >



Purchase Energy-Efficient Products >



Deploy Renewable Energy Technologies >



Manage Energy-Efficient and Alternative-Fuel Vehicle Fleets >



Finance and Contract Assistance for Energy Projects >



Cultivate Change to Embrace Energy Efficiency and Renewable Energy >



Inventory and Manage Greenhouse Gases >



## Other Resources

FEMP Designated

<http://eere.energy.gov/femp.procurement>

Energy Star

<http://www.energystar.gov/purchasing>

EPEAT

<http://www.epeat.net>

Energy Information Administration

<http://eia.doe.gov>

Office of the Federal Environmental Executive

<http://ofee.gov>

## Training Resources

FEMP Training Calendar

<http://www1.eere.energy.gov/femp/services/training.html>

GovEnergy 2010

<http://www.govenergy.gov>

Labs21 Annual Conference

<http://www.labs21.century.gov>

The Certified Energy Manager Certification

<http://www.aeecenter.org/>

United States Green Building Council LEED Green Building Standards

<http://www.usgbc.org>

Energy Star Training

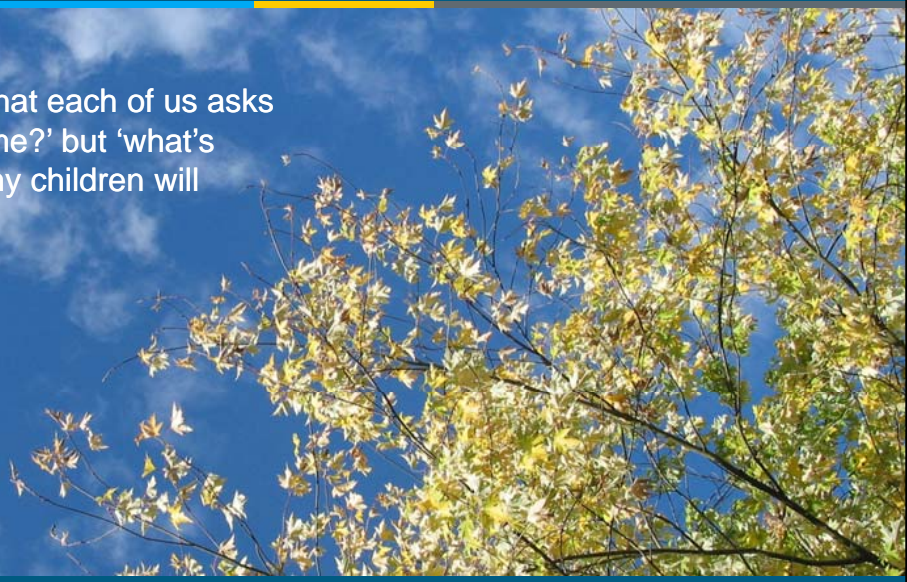
[http://www.energystar.gov/index.cfm?c=business.bus\\_internet\\_presentations](http://www.energystar.gov/index.cfm?c=business.bus_internet_presentations)

# Federal Scorecards

- Illustrates Status and Progress
- Scorecards for Each Agency
- Energy Scorecard
- Environmental Scorecard
- Presented at Senior Officials Meetings
- Posted on Web sites

TRANSPORTATION MANAGEMENT STANDARDS FOR SUCCESS		
●	●	●
<p>Agency:</p> <ul style="list-style-type: none"> <li>• Demonstrates that 75% of new vehicle acquisitions are alternative fuel vehicles (AFVs).</li> <li>• Documents that alternative fuels comprise 95% of fuel used in non-waivered AFVs.</li> <li>• Less than 50% of AFVs are waived and agency reduced percentage of waivers by 2%. OR more than 50% of AFVs are waived but agency reduced its waivers by 10% from the previous year.</li> <li>• Achieves a 6% reduction in petroleum used in its entire vehicle fleet compared to 2005 and/or is on track for 20% by 2015.</li> <li>• Demonstrates a 10% annual increase in the alternative fuel (AF) consumption as projected from the 2005 baseline AND more than 5% of its total fuel consumption is alternative fuels.</li> <li>• Incorporates successful implementation of Executive Order 13423 in the position description, performance evaluations (or equivalent) of Agency Senior Official and other relevant staff.</li> </ul>	<p>Agency:</p> <ul style="list-style-type: none"> <li>• Demonstrates that 60% of new vehicle acquisitions are AFVs.</li> <li>• Documents that alternative fuels comprise at least 51% of fuel used in non-waivered AFVs.</li> <li>• Less than 50% of AFVs are waived and agency reduced percentage of waivers by 1%. OR more than 50% of AFVs are waived but agency reduced its waivers by 5% from previous year.</li> <li>• Achieves at least 4% reduction in petroleum used in the entire vehicle fleet compared to 2005.</li> <li>• Demonstrates a 10% annual increase in AF consumption as projected from the 2005 baseline but less than 5% of its total fuel consumption is alternative fuels. OR demonstrates at least 5% increase in AF consumption AND more than 5% of its total fuel consumption is alternative fuels.</li> <li>• Incorporates successful implementation of Executive Order 13423 in position descriptions of Agency Senior Official and other relevant staff.</li> </ul>	<p>Agency:</p> <ul style="list-style-type: none"> <li>• Cannot demonstrate that at least 60% of new vehicle acquisitions are AFVs.</li> <li>• Cannot document that alternative fuels comprise at least 51% of fuel used in non-waivered AFVs.</li> <li>• More than 50% of AFVs are waived and agency has not reduced its waivers by at least 1% from previous year.</li> <li>• Has not achieved at least a 4% reduction annually in petroleum used in entire vehicle fleet compared to 2005.</li> <li>• Cannot demonstrate at least a 5% annual increase in total AF consumption AND 5% or more of total fuel consumption as alternative fuels.</li> <li>• Does not consider successful implementation of Executive Order 13423 in position descriptions or performance evaluations of Agency Senior Official or other relevant staff.</li> </ul>

“...the first question that each of us asks isn't 'what's good for me?' but 'what's good for the country my children will inherit?'”



# Energy 101 Seminar Evaluation and the Open Book Quiz

Almost done . . . .

The link below will take you to the brief open-book Quiz and Evaluation.

***Earn a Certificate of Completion for your records!***

<http://apps1.eere.energy.gov/femp/training/quiz/energy101.cfm>

## Webcast Presentation Links

**Click** on the paperclip icon button to go to the brief open-book Quiz and Evaluation directly from the Webcast.

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