





# Selling Energy Efficiency and Energy Efficient Products to the Federal Government

Session I: Grand Canyon Track



**GovEnergy**  
[www.govenergy.gov](http://www.govenergy.gov)



# Buying EE Products

- Sponsored by Federal Energy Management Program
- Since 1996
- Required and authorized by both Executive and Legislative Branches
- No additional funding required



# Federal Sector Statistics

- Annual purchase of products: ~\$4 billion
- Consumption
  - Annual energy consumption: ~400 trillion BTUs
  - Annual energy cost: ~\$5.6 billion
- Savings Potential Through Purchasing
  - Annual Energy Savings: ~15 trillion BTUs
  - Annual Energy Cost Savings: ~\$210 million



# Procurement Policies

- Energy Policy Act of 2005
- Energy Independence & Security Act of 2007
- Executive Order 13423
- Federal Acquisition Regulations Part 23



# Energy Policy Act of 2005

- Section 104
  - Procurement:
    - Agencies shall buy only ENERGY STAR®-qualified or FEMP-designated products
  - Procurement Planning:
    - Agencies shall incorporate ENERGY STAR® and FEMP performance criteria into:
      - Guide and project specifications
      - Construction, renovation, and services contracts
      - Evaluation of competitive offers



# Energy Policy Act of 2005

- Listing in Federal Catalogs:
  - GSA and DLA shall:
    - Supply only ENERGY STAR-qualified and FEMP-designated products
    - Clearly identify and prominently display ENERGY STAR and FEMP-designated products
  
- Exceptions:
  - Where agency head documents in writing that:
    - Product is not life-cycle cost-effective
    - No energy efficient product meeting functional requirements is “reasonably available”
    - Product/system is for combat or related missions



# Energy Independence & Security Act of 2007

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- Section 524
  - if an agency purchases an eligible product, the agency shall purchase —
    - (A) an eligible product that uses not more than 1 watt in the standby power consuming mode of the eligible product; or**
    - (B) if an eligible product described in subparagraph (A) is not available, the eligible product with the lowest available standby power wattage in the standby power consuming mode of the eligible product.**



# Executive Order 13423

## Section 2 - *Goals for Agencies.*

In implementing the policy set forth in section 1 of this order, the head of each agency shall:

(d) require in agency acquisition of goods and services (i) use of sustainable environmental practices, including acquisition of biobased, environmentally preferable, energy-efficient, water-efficient, and recycled-content products....



# Federal Acquisition Regulations

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- Part 23.203 - Energy-efficient products.
  - (a) If life-cycle cost-effective and available
    - (1) When acquiring energy-using products
      - (i) Agencies shall purchase ENERGY STAR® or other energy-efficient items listed on the Department of Energy's Federal Energy Management Program (FEMP) Product Energy Efficiency Recommendations product list....



# Federal Acquisition Regulations

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- Part 52

(b) The Contractor shall ensure that energy-consuming products are energy efficient products (*i.e.*, ENERGY STAR<sup>®</sup> products or FEMP-designated products) at the time of contract award, for products that are:

1. Delivered;
2. Acquired by the Contractor for use in performing services at a Federally-controlled facility;
3. Furnished by the Contractor for use by the Government; or
4. Specified in the design of a building or work, or incorporated during its construction, renovation, or maintenance.



# Current Product Types

- 69 product types in the following categories:
  - Lighting
  - Commercial & Industrial Equipment
  - Food Service Equipment
  - Office Equipment
  - Home Electronics
  - Residential Appliances & Equipment
  - Construction & Plumbing Products



# Guiding Principles

- Analyze the market for energy-consuming products:
  - Prevalence in federal sector
  - Variation in energy consumption among like products
- Identify top 25% of energy performance in each product category
  - Industry recognized test procedure
  - Efficiency achievable without proprietary technology
- Verify cost-effectiveness and market availability
  - DOE Discount Factor
  - Multiple manufacturers

# FEMP's Purchasing Specifications



Federal Energy Management Program

FEMP Designated Product:  
Commercial Boilers

Leading by example,  
saving energy and  
taxpayer dollars in  
federal facilities

Purchasing Specifications  
for Energy-Efficient Products



## Legal Authorities

The Energy Policy Act of 2005 (P.L. 109-58) and FAR section 23.203 require federal agencies to specify and buy ENERGY STAR® qualified products or, in categories with no ENERGY STAR label, FEMP-designated products that are among the highest 25 percent of equivalent products for energy efficiency.

Agencies must use ENERGY STAR and FEMP-designated efficiency specifications for all procurements of energy consuming products and systems, including guide specifications; project specifications; and construction, renovation, and services contracts; and in evaluating responses to a competitive solicitation.

Agencies can claim an exception to these requirements through a written finding that no ENERGY STAR qualified or FEMP designated product is available to meet functional requirements, or that no such product is cost-effective over its lifetime, for a specific application.

## Performance Requirement for Federal Purchases

Type <sup>a</sup>	Rated Capacity (Btu/h)	Thermal Efficiency <sup>b</sup>
Gas / Water	300,000 - 10,000,000	80% E
Gas / Steam	300,000 - 10,000,000	79% E
#2 Oil / Water	300,000 - 10,000,000	83% E
#2 Oil / Steam	300,000 - 10,000,000	83% E

a) This performance requirement covers low- and medium-pressure boilers used primarily in commercial space heating applications. It does not apply to high-pressure boilers used in industrial processing and cogeneration applications.  
b) Thermal efficiency (E), also known as "boiler efficiency" or "overall efficiency," is the boiler's energy output divided by energy input, as defined by ANSI Z39.13. In contrast to combustion efficiency ( $\eta_c$ ), thermal efficiency accounts for radiation and convection losses through the boiler's shell.

## Buying Energy-Efficient Boilers

Specify boilers with efficiency levels that meet this FEMP-Designated performance level. Select only boilers rated under the certification program run by the Hydronics Institute of the Gas Appliances Manufacturers Association (GAMA, see For More Information). The Hydronics Institute publishes a directory listing the combustion and thermal efficiencies for all commercial boilers.

## Sizing and Part Load Performance

A boiler system should be capable of meeting the building's peak heating demand and also operating efficiently at part-load conditions. Selecting the right system and properly sizing a boiler requires knowledge of both the peak demand and load profile. If building loads are highly variable, as is common in commercial buildings, designers should consider installing multiple, smaller (modular) boilers. Modular systems are more efficient because they allow each boiler to operate at or close to full rated load most of the time, with reduced standby losses. Other efficient options for handling variable loads are condensing boilers and modulating boilers (which can run at partial capacity instead of cycling on and off).

## FEMP Designated Product: Commercial Boilers



### For More Information:

FEMP Information Center  
1-877-FEISE-WE or 1-877-537-3463  
[www.ene.energy.gov/femp/procurement/](http://www.ene.energy.gov/femp/procurement/)

American Council for an Energy Efficient Economy (ACEE) publishes the Guide to Energy Efficient Commercial Equipment, which includes a chapter on BMS systems, as well as a listing of chiller models that meet this requirement. Phone: (202) 429-0863 [www.acee.org](http://www.acee.org)

GAMA's Hydronics Institute publishes the 1-1-1 Ratings for Boilers, Baseboard Radiation, and Finned Tube (Commercial) Radiation, a directory of commercial boilers with certified performance ratings. Phone: (703) 325-7800 [www.gama.net](http://www.gama.net)

ASHRAE publishes the Cooling and Heating Load Calculation Manual. Phone: (800) 527-4723 [www.ashrae.org](http://www.ashrae.org)

American Boiler Manufacturers Association (ABMA) publishes a directory of commercial and industrial boiler manufacturers that offer equipment and services for boilers. Phone: (703)366-7172 [www.abma.com](http://www.abma.com)

Boiler Efficiency Institute publishes maintenance and operating manuals on commercial and industrial boilers. Phone: (800) 669-6948 [www.boiler-tech.com](http://www.boiler-tech.com)

Lawrence Berkeley National Laboratory provides detailed research and life-cycle cost analysis in support of this energy efficiency purchasing requirement. Phone: (925) 642-7100



U.S. Department of Energy  
**Energy Efficiency  
and Renewable Energy**  
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable.  
**A Strong Energy Portfolio for a Strong America**

Energy efficiency and clean, renewable energy will mean a stronger economy, cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

Boiler Cost-Effectiveness Example (5,000,000 Btu/h Gas-fired Water Boiler)			
Performance	Base Model	Required Level	Best Available <sup>a</sup>
Thermal Efficiency (E)	78.0%	80.0%	86.5%
Annual Energy Use (therms)	96,200	93,700	86,700
Annual Energy Cost	\$57,700	\$56,200	\$52,000
Lifetime Energy Cost	\$887,000	\$884,000	\$800,000
Lifetime Energy Cost Savings	-	\$23,000	\$87,000

a) Does not include condensing boilers

### Buyer Tips

Both water and steam models are covered in this Recommendation. Water boilers and their distribution systems tend to have lower maintenance requirements.

There is a broad array of options in boiler equipment and controls that can enhance energy performance: stack gas heat recovery equipment, such as air preheaters and economizers; condensing heat exchangers, which also utilize stack gas waste heat; turbulators (fin enhancers) to improve heat transfer and balance of gas flows between tube banks; water recovery equipment, to reuse heat from blowdown and water return condensate; outdoor temperature controls, which control the system loop temperature according to outside temperatures; electronic ignition devices; increased boiler and piping insulation; and high performance (including power) burners.

### Maintenance and Operation Tips

Several diagnostic and preventive procedures are important to maintaining efficient operation. Flue gas temperature monitoring is useful in detecting efficiency and operation problems. Maintaining steady excess air levels (with an oxygen trim system) ensures that burners will mix air and fuel efficiently. The Boiler Efficiency Institute provides maintenance and operation manuals for boilers and boiler controls (see For More Information). Low water levels can damage boilers, so water levels must be checked frequently. Water treatment prolongs the life of a boiler as well as increasing its efficiency. Waterside and fireside surfaces should be cleaned annually. Sludge and sediment should be removed from steam boilers daily.

### Cost-Effectiveness Assumptions

Annual energy use in this example is based on 1,500 equivalent full-load hours per year. The assumed gas price is 60¢/therm, the federal average gas price in the US.

### Understanding the Cost-Effectiveness Table

In the example shown above, a 5,000,000 Btu/h gas-fired water boiler with a thermal efficiency of 80.0% is cost-effective if its purchase price is no more than \$23,000 above the price of the Base Model. The Best Available model, with an efficiency of 86.5%, is cost-effective if its price is no more than \$87,000 above the Base Model.

FEMP provides a Web-based cost calculator for boilers. Go to [http://www.eere.energy.gov/femp/technologies/cep\\_boilers\\_calc.cfm](http://www.eere.energy.gov/femp/technologies/cep_boilers_calc.cfm), input the data for your situation and click on calculate. The output section will contain results that better reflect your usage patterns and energy costs.



# ENERGY STAR



- Government backed symbol for energy efficiency
- Available from both federal supply and commercial sources
- Label on product, packaging or in owner's manual
- Product lists at:

[www.energystar.gov/products/](http://www.energystar.gov/products/)



# Available Tools

- Energy cost calculators
  - Access both FEMP and ENERGY STAR from:  
[http://www1.eere.energy.gov/femp/procurement/eep\\_eccalculators.html](http://www1.eere.energy.gov/femp/procurement/eep_eccalculators.html)
- Model contract language
- Additional information



# Model Procurement Language

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- Both ENERGY STAR and FEMP
- Word document format
- Cut and paste into contracts and solicitations
- Download from Web sites



# Sample Model Procurement Language – ENERGY STAR

## Scanners

The Vendor Must:

Provide scanners that earn the ENERGY STAR and meet the ENERGY STAR specifications for energy efficiency as outlined below. The vendor is encouraged to visit [www.energystar.gov](http://www.energystar.gov) for complete product specifications and an updated list of qualifying products.

Performance Characteristics	Current Criteria
Low Power Mode	12 watts or less
Low Power Mode Default Time	15 minutes or less



# Additional Information

- ENERGY STAR Program  
888-STAR-YES (888-782-7937)  
[www.energystar.gov/products/](http://www.energystar.gov/products/)
- Federal Energy Management Program  
800-363-3732  
[www.eere.energy.gov/femp/procurement/](http://www.eere.energy.gov/femp/procurement/)



# Ongoing Activities

- Maintaining current performance specifications
- Listening to federal buyers to provide relevant assistances and identify new opportunities
- Working with GSA and DLA to improve identification of products in federal supply system
- Issuing guidance on agency requirements under EPA Act '05 Sec. 104 and EO 13423



# Conclusion

- By using money already being spent, we can:
  - Meet federal purchasing requirements
  - Assist in meeting federal energy reduction goals
  - Reduce operating cost
  - Prevent pollution
  - Encourage the production of efficient products



# For More Information

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