Identifying Incentives and Barriers to Federal Agencies Achieving Energy Efficiency and Greenhouse Gas Reduction Targets

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Summary

This report identifies incentives for and barriers to federal agencies achieving the energy efficiency goals and greenhouse gas (GHG) reduction targets outlined in recent laws and executive orders.

The federal government is the single largest consumer of energy in the United States, but consumes only 1% of the total energy used. Federal energy spending represents upwards of 1% of its total budget (discretionary and mandatory spending). Since the 1970s, Congress has enacted various laws that reduce energy consumption in the federal sector by improving energy efficiency. The Energy Policy Act of 2005 (EPAct 2005) included measures to reduce energy and water in congressional buildings, install advanced meters to reduce electricity use in federal buildings, enact performance standards to improve federal buildings, and to reduce the federal government's electric energy consumption through renewable energy offsets (P.L. 109-58). The Energy Independence and Security Act of 2007 (EISA) mandated further energy savings measures in government operations, including energy upgrades to the Capitol complex, permanent authority to use "energy savings performance contracts," and federal procurement of energy efficient products and renewable fuels (P.L. 110-140).

Two recent executive orders guide federal agencies in reducing energy consumption and GHG emissions. In 2007, Executive Order 13423, *Strengthening Federal Environmental Energy, and Transportation Management* directed federal agencies to improve energy efficiency and reduce greenhouse gas emissions by reducing energy intensity. In 2009, Executive Order 13514, *Federal Leadership in Environmental, Energy, and Economic Performance* established GHG emissions reduction goals for federal agencies.

Federal agencies can take advantage of several financing mechanisms to make energy efficiency improvements without increasing their operating budgets. These include *Energy Savings Performance Contracts*, *Utility Energy Savings Contracts*, and *Power Purchase Agreements*. In some cases, agencies may share in the savings gained from reduced energy costs made through the improvements. New authority to combine appropriated funds with energy savings performance contracts could further energy efficiency improvements, but the lack of federal rules delays implementation. However, federal agencies may be reluctant to participate in this financing option if it reduces their opportunity to retain savings from the improvements.

The new GHG reduction goals come after three decades of effort to reduce energy consumption. GHG emissions associated with operating federal buildings result from consuming fossil fuels used in generating electricity and heating. Significant energy reduction resulted early from easily achievable, low-cost improvements that translate into GHG reductions. The opportunity for GHG reductions in the future may come through smaller, more difficult to achieve reductions in energy consumption based on high-tech solutions.

The prospect of reducing the federal budget by reducing energy consumption may be low. However, policy makers may wish to weigh direct monetary savings against the benefits of clean energy in terms of avoided emissions of regulated pollutants and greenhouse gases.

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Background

In FY2006, the federal government spent approximately $17.7 billion for 1.1 quads of site-delivered energy for buildings and fuel for vehicles. Buildings consumed roughly 40% of energy end-use, while vehicles consumed the remaining and most significant portion—63%. Overall, energy costs represented less than 1% of the total federal (discretionary and mandatory) spending for that year, roughly $2,655 billion (1.7 % if compared to discretionary spending only, some $1,017 billion). In the larger picture, federal energy consumption represented only 1.1% of the total United States energy use in 2006—99.61 quads. The federal government is the largest single purchaser of energy in the United States. Advocates for improving energy efficiency, achieving energy independence, and reducing greenhouse gas (GHG) emissions believe the federal government can show leadership by reducing its federal energy use.

Federal government initiatives to reduce energy consumption originated with the Federal Energy Management Program (FEMP) in 1973. The 1978 National Energy Conservation Policy Act (NECPA—P.L. 95-619) instituted the program of retrofitting federal buildings to improve energy efficiency. The 1985 Deficit Reduction Act (P.L. 99-272) amended NECPA by authorizing energy savings contracts of up to 25 years. NECPA also required that federal agencies report the energy consumed annually by their buildings, operations, and vehicles. FEMP compiles the consumption data and estimates related carbon emissions (excluding certain exempt facilities) in an annual report to Congress.

In 1988, the Federal Energy Management Improvement Act (P.L. 100-615) amended NECPA by requiring federal agencies to achieve a 10% reduction in energy consumption in federal buildings by FY1995 when measured against an FY1985 baseline in terms of British thermal units per gross square-foot (Btu/gsf) of building floor-space.

The 1992 Energy Policy Act (P.L. 102-486) further amended NECPA by adopting direct and indirect incentives to promote energy efficiency in federal buildings. It authorized and encouraged agencies to participate in utility-offered programs to increase energy efficiency, water conservation, and electricity demand. The act authorized agencies to accept any financial incentive, goods, or services that utilities offered to increase energy efficiency, conserve water, or manage electricity demand, and encouraged agencies to enter into negotiations addressing the unique needs of their facilities. A financial bonus program, established by the act, provided direct financial incentives to reward outstanding federal facility energy managers. Energy Savings Performance Contracts (ESPCs) authorized under the act, offered federal agencies indirect incentives to make energy efficiency improvements through private funding that agencies pay back with energy savings.

The Energy Policy Act of 2005 (EPAct 2005) included various provisions for reducing energy and water use in federal buildings. The Energy Independence and Security Act of 2007 (EISA) mandated further energy savings measures throughout government operations and facilities, and permanently reauthorized "energy savings performance contracts." Executive Order 13423 (Strengthening Federal Environmental Energy, and Transportation Management) directed federal agencies to reduce GHG emissions by reducing energy intensity. Executive Order 13514 (Federal leadership in Environmental, Energy, and Economic Performance) followed with GHG reduction goals for federal agencies. The relevant provisions in the two recent laws affecting federal energy use are available in the **Appendix** to this report along with summaries of the executive orders.

Federal Energy Management Program Incentives

The Federal Energy Management Program (FEMP) provides federal agencies with assistance in implementing energy management and investment practices. FEMP supports federal agencies in identifying, obtaining, and implementing alternative financing to fund energy projects. The following paragraphs describe several alternative financing mechanisms.

Energy Savings Performance Contracts

Through Energy Savings Performance Contracts (ESPC), federal agencies may use an energy service company (ESCO) to accomplish energy-efficiency improvement projects without incurring up-front capital cost or requiring special appropriations. An ESCO may provide a comprehensive energy audit of the federal facility, identify improvements to save energy, recommend and install the improvements, and arrange financing. The ESCO guarantees that the improvements will generate energy cost savings sufficient to pay for the project over the term of the contract (terms up to 25 years are allowed). After the contract ends, all additional cost savings accrue to the agency. FEMP-streamlined "Super ESPCs" allow agencies to undertake multiple energy projects under the same contract in order to bypass cumbersome procurement procedures.

The Congressional Budget Office (CBO) scores ESPCs as future financial obligations on the federal government. CBO began scoring ESPCs as mandatory spending when the 1990 Budget Enforcement Act (P.L. 101-508) pay-as-you-go (PAYGO) rules expired. The CBO scoring reflects how ESPCs create future commitments to appropriations, consistent with how appropriations-funded energy conservation improvement would be scored throughout the budget.

The Government Accountability Office (GAO) determined that federal agencies could achieve the benefits of ESPCs with lower financing costs by using upfront funds (that is, full funding in advance). As federal agencies generally did not receive sufficient funds upfront to make energy efficiency improvements, they had to rely on ESPCs in meeting their energy conservation goals. Agencies had previously indentified energy conservation improvements in their annual budget requests until the National Energy Policy Act 1992 allowed federal agencies to treat energy conservations measures as "energy costs to be incurred in operating and maintaining (O&M) agency facilities." EISA 2007 now permits federal agencies to use a combination of appropriated funds and private financing for ESPCs. DOE interprets this provision as explicitly authorizing the payments from one-time avoided costs that originate from authorized sources, including appropriations specifically for energy improvements. However, how agencies practicably apply appropriated O&M funds to ESPCs is unclear, as DOE has not yet promulgated rules on the new authority. The Office of Management and Budget (OMB) indicates in Circular No. A-11 (2009) that consistent with 42 U.S.C. 8255 agencies should identify funds requested for energy conservations measures in their budget justification.

Utility Energy Services Contracts

Through Utility Energy Service Contracts (UESCs), a utility arranges financing to cover the capital costs of energy improvement projects, which an agency then repays the utility over the contract term from cost savings generated by the energy efficiency measures. This arrangement allows an agency to implement energy improvements with no initial capital investment. The net

cost to the agency is minimal, and the agency saves time and resources by using the one-stop shopping provided by the utility.

Power Purchase Agreements

Power Purchase Agreements (PPAs) allow agencies to finance on-site renewable energy projects without incurring up-front capital costs. A private developer installs, operates, maintains, and owns the renewable equipment on an agency's property. The agency, in turn, agrees to purchase the power generated by the system and pay for the system over the life of the contract. A PPA offers the developer eligibility for tax incentives and accelerated depreciation. The agency benefits by avoiding the need for up-front capital.

Incentives for Achieving Energy Efficiency and GHG Reduction Goals

Executive Order (EO) 13423 mandated energy reduction and increased renewable energy goals, and EO 13514 places sustainability and GHG emission-reduction at the core of federal agency missions with a senior executive responsible for meeting the reduction goals. Earlier legislation provided incentives for meeting the goals. Provisions in the American Recovery and Reinvestment Act of 2009 (ARRA—P.L. 111-5) provide funds for facility energy improvements, energy efficient vehicles, and miscellaneous energy projects. The Energy Independence and Security Act of 2007 (EISA—P.L. 110-140) expanded energy improvement financing, and authorized further retention of energy savings. The following paragraphs summarize the key provisions affecting federal agencies.

Energy Independence and Security Act of 2007

Subtitle B, Energy Savings Performance Contracting

Energy Savings Performance Contracts (ESPCs), first authorized in 1992 amendments to the National Energy Conservation Policy Act, offer federal agencies a novel means of making energy-efficiency improvements to aging buildings and facilities without direct appropriation. A contractor privately finances and installs the energy conservation measures, and in return receives a specified share of the resulting energy cost savings. Agencies pay for the improvements through their annually appropriated operating funds. EISA included seven provisions that provided flexibility in funding ESPCS, increased their contract life and scope, and made their authorization permanent.

Section 512 (Financing Flexibility) increased ESPC funding flexibility by allowing a combination of appropriated funds and private financing.

Section 513 (Promoting Long-Term Energy Savings Performance Contracts and Verifying Savings) restricted federal agencies from limiting the duration of ESPCs to less than 25 years or limiting the total amount of obligations. Further, this section permits the criteria for savings verification to satisfy the requirement for energy audits. The section also directed federal agencies to modify existing ESPCs to conform to the requirements of this subtitle.

Section 514 (Permanent Reauthorization) permanently authorized ESPCs.

Section 515 (Definition of Energy Savings) extended the definition of energy savings reduction to include increased use of an existing energy source by cogeneration or heat recovery, use of excess electrical or thermal energy generated from onsite renewable sources or cogeneration, and increased energy-efficient use of water resources.

Section 516 (Retention of Savings) permitted agencies to retain the full amount of energy and water cost savings obtained from utility incentive programs.

Section 517 (Training Federal Contracts Officer to Negotiate Energy Efficiency Contracts) authorized $750,000 per year over five years for a program to train contract officers in negotiating ESPCs.

Section 518 (Study of Energy and Cost Savings in Nonbuilding Applications) directed the Department of Defense (DOD) and DOE to study the potential use of ESPCs in nonbuilding applications, defining them to include vehicles and federally owned equipment to generate electricity or transport water.

Subtitle C, Energy Efficiency in Federal Agencies

Section 521 (Installation of Photovoltaic System at Department of Energy Headquarters Building) directed the General Services Administration (GSA) to use up to $30 million—subject to appropriation—from FY2007 and prior years' unobligated balances of the Federal Buildings Fund to support the installation of a solar photovoltaic system for the DOE headquarters building in the District of Columbia.

American Recovery and Reinvestment Act of 2009

ARRA emphasized jobs, economic recovery, and assistance to those most impacted by the recession. It provided nearly $5 billion for "leadership by example" efforts to improve energy efficiency in federal buildings and facilities. The law puts the GSA at the forefront of this effort, with $4.5 billion for "high performance" federal facilities. For Department of Defense facilities, ARRA provided up to $3.7 billion for improvements that have a focus on energy efficiency. The Department of Transportation received $100 million for "reducing energy consumption or greenhouse gases." The Department of the Interior ($1 billion) and Department of Veterans Affairs ($1 billion) received multi-purpose funds that they can apply to "energy efficiency" or "energy projects."

Title III—Department of Defense (DOD), Facility Infrastructure Investments

DOD accounts for approximately 63% of the energy consumed by federal buildings and other facilities. The department's activities occupy more than 316,000 buildings and an additional 182,000 structures on 536 military installations worldwide. DOD's annual spending on facility energy use was more than $3.4 billion in FY2007. This makes DOD the single largest energy consumer in the nation, even though the agency consumption comprises only 1% of the national total for site-delivered energy.

Of the $4.24 billion that ARRA provides for DOD's Facilities Sustainment, Restoration, and Modernization (FSRM) account, ARRA directs that $3.69 billion be used "to invest in energy efficiency projects and to repair and modernize" DOD facilities. The FSRM account covers expenses associated with maintaining the physical plant at DOD posts, camps, and stations. The conference report directs that FSRM funding is available only for facilities in the United States and its territories.

Title III—Department of Defense (DOD), Near Term Energy Efficiency Technology Demonstrations and Research Program

ARRA provides $300 million for this program, encompassing $75 million each for Army, Air Force, Navy, and Defense-wide funding of research, development, test and evaluation projects, including pilot projects, demonstrations and energy-efficient manufacturing enhancements.

Title V—General Services Administration (GSA), High-Performance Green Buildings

EISA established the structure for an Office of Federal High-Performance Green Buildings in the General Services Administration (GSA). The office is responsible for developing a program to reduce total energy use in federal buildings 30% by 2015 relative to the 2005 level. Further, agencies must reduce fossil energy use in new federal buildings and major renovations by 55% by 2010 relative to the 2003 level and eliminate fossil energy use by 2030. EISA required GSA to establish an Office of Federal High-Performance Green Buildings to coordinate green building information and activities within GSA and with other federal agencies. The office must also develop standards for federal facilities, establish green practices, review budget and life-cycle costing issues, and promote demonstration of innovative technologies.

ARRA provided $5.5 billion for the Federal Buildings Fund, and designated that at least $4.5 billion apply to converting GSA facilities to high-performance green buildings. ARRA also provided $4 million to support the operations of GSA's Office of Green Buildings.

Title V—General Services Administration (GSA), High Fuel Economy Vehicles

Under the Energy Policy Act of 1992 (P.L. 102-486), 75% of the vehicles federal agencies purchase in a given fiscal year must be capable of running on alternative fuel, which may include hybrid and electric drive. ARRA appropriated $300 million for GSA to procure energy-efficient motor vehicles. Eligible vehicles include hybrids, plug-in hybrids, and pure electric vehicles.

Title X—Department of Veterans Affairs

ARRA provided $1 billion to the Department of Veterans Affairs for non-recurring maintenance of medical facilities that include energy projects. The funds remain available for obligation through the end of FY2010, however.

ARRA also provided an additional $50 million to the National Cemetery Administration for monument and memorial repairs "including energy projects."

Policy Considerations—Barriers to Achieving Energy Efficiency and GHG Reduction Goals

The GHG emission reduction goals of EO 13514 represent new initiatives that the federal government may only realize in the near term through incremental improvements in energy efficiency or reduced energy use. The new goals come at a time when the federal government may have already accomplished the easiest and most cost effective improvements.

EO 13123 had set goals for reducing GHG emissions associated with building energy-use. EO 13423, however, revoked the previous order and redefined GHG reduction in the context of reducing energy intensity but without quantitative GHG reduction goals. EO 13415 now directs federal agencies to set GHG reduction targets.

FEMP developed a method for estimating emissions of carbon dioxide, methane, and nitrous oxide from agency energy use based on the energy data provided by federal agencies. The largest component of GHG emissions from energy use is carbon dioxide. FEMP's 2008 report to Congress states that in FY2006, federal buildings reduced carbon dioxide by 7.4% compared to FY2003 (from 46.3 million metric tons to 42.8 million metric tons).

EISA set targets and dates to reduce energy use in existing federal buildings 30% by 2015 and for new federal buildings 100% by 2030. In its recent report on federal energy management, GAO concluded that agencies would likely face challenges meeting EISA energy-reduction goals. GAO views long-term funding and capital budgeting issues, specifically the requirements for recognizing capital costs up front in the federal budget, as key challenges to agencies' ability to meet all of EISA's high-performance federal building requirements.

In citing draft DOE data on federal energy intensity reduction for 2008, GAO notes that federal agencies rely on, and will continue to rely on, renewable energy credits (RECs), rather than site-generated renewable energy to meet EISA goals.[1] Generators usually sell RECs in one megawatt-hour units, and may sell them separately from the physical electricity with which they are associated. This provides customers the flexibility to offset a percentage of their annual energy use with RECs generated elsewhere (but not necessarily transmitted through the grid to them).

Wind-generated electricity currently accounts for most renewable energy purchased by the federal government, but offers agencies limited potential for site-generated energy. Consequently, agencies purchase wind RECs to take advantage of the source. Solar photovoltaic electricity does offer agencies the opportunity for site-generated renewable energy, primarily throughout the Southwestern regions of the United States and Hawaii. In cases where DOD installations may offer property to developers of photovoltaic farms (through enhanced use lease authority under 10 U.S.C. 2667), DOD may still have to purchase the generated electricity through the grid (i.e., as RECs). It is not clear whether an agency will be able to take advantage of the double-credit for site-generated renewable energy under EO 13423.

[1] U.S. Government Accountability Office, Federal Energy Management - Addressing Challenges through Better Plans and Clarifying the Greenhouse Gas Emission Measure Will Help Meet Long-term Goals for Buildings, GAO-08-977, September 2008, p. 4, http://www.gao.gov/new.items/d08977.pdf.

The Alliance to Save Energy concluded over a decade ago that dispersed decision-making among federal agency staff, and each agency's unique legal requirements and stakeholder demands, create barriers to increased energy efficiency.[2] The Alliance identified several specific barriers that remain relevant to varying degrees:

- Energy efficiency is not a core-mission of agency.
- Agencies lack personnel skilled in energy matters.
- Capital budgeting for energy improvements up front is difficult.
- Budget shortfalls.
- Too many decision makers.
- Lack of carrots and sticks to change institutional behavior.

Since the Alliance's report, agencies have taken advantage of energy manager training and incentives such as ESPCs. Capital budgeting still offers challenges, as discussed further below.

Finally, electricity represented only 1.06 quads or 17.6% of total federal energy-use in 2006. Buildings consumed the power almost exclusively. The federal government spent roughly $3.7 billion at an average cost of $78/megawatt-hour. Spending on electricity represented the equivalent of one-third of 1% of the federal discretionary budget. At that time, electricity rates ranged from 8.2¢/kilowatt-hour for industrial users to 12.0¢/kilowatt-hour for commercial users (or $82 to $120/megawatt-hours). EISA's 30% energy reduction goal for federal buildings could represent a $1.1 billion in savings if the reduction comes from reduced electricity use, assuming rates stayed constant. This would equate to roughly one-tenth of 1% of the 2006 discretionary budget.

In the case of ESPCs, agencies "locked-in" the pre-improvement budget for energy in order to pay for the energy improvement, which also allows the agencies to retain the balance of their energy savings. Under EISA, agencies may now combine appropriated funds with the contractor-financed portion of the improvement. DOE has not yet promulgated final rules on agencies' use of appropriated funds for this purpose. In the case of the Department of Defense, capital construction and operating budgets are separate appropriations. Under the EISA/ESPC provision, a DOD facility could feasibly benefit from improvements under both funding mechanisms. This may not be a clear-cut case for agencies with combined capital and operating budgets.

The federal government's prospect of seeing energy reduction translated into a budget reduction may be low. However, policy makers may want to weigh the direct monetary savings against the clean energy benefits of renewable energy in terms of avoided emissions of regulated pollutants and greenhouse gases to the environment.

When the federal government embarked on its energy efficiency mission (following NECPA), the highest payback came from low cost, easily achieved improvements; for example, replacing incandescent lights with fluorescent lights, adding insulation, and upgrading window glazing. Further energy reduction came from, and most likely will continue to depend on, improved technology; examples include *ENERGY STAR* products, and more-efficient heating-ventilation-

[2] Alliance to Save Energy, *Improving Energy Productivity in Federal Government Facilities*, 1998, http://ase.org/content/article/detail/885.

and-cooling (HVAC) equipment. Policy makers may wish to question whether further improvements may come in smaller increments at increasingly higher costs.

Appendix. Recent Laws and Executive Orders

Two recent laws have provisions aimed at improving energy efficiency in federal facilities: the Energy Policy Act of 2005 (EPAct 2005)[3] and the Energy Independence and Security Act of 2007 (EISA).[4] Two recent executive orders (EOs) complement the laws and provide federal agencies further guidance: EO 13423, *Strengthening Federal Environmental, Energy and Transportation Management*, and the more recent EO 13514, *Sustainability and Greenhouse Gas Emissions Reduction*. Summaries of the applicable law provisions and discussion of the executive orders follow below.

Energy Policy Act of 2005 (P.L. 109-58)

EPAct 2005 included three provisions to reduce energy consumption and improve energy efficiency in federal agencies: smart meters to monitor electricity use, efficiency standards to reduce energy consumption in new buildings, and increased renewable energy use.

- Section 103 (*Energy use measurement and accountability)* amended Section 543 of the NECPA by directing federal agencies to install advanced meters to monitor and thus reduce electricity use in federal buildings.[5] Agencies have until October 1, 2012, to complete their installation.
- Section 109 (*Federal building performance standards)* amended the Energy Conservation and Production Act[6] by adopting the 2004 International Energy Conservation Code. It also revised energy efficiency standards and mandated a 30% reduction in energy consumption of new federal buildings compared to previous standards.
- Section 203 (*Federal purchase requirement)* required the federal government to offset its electric energy consumption with an increasing percentage of "renewable energy" starting at 3% in 2005 to not less than 7.5% by 2013 and each fiscal year thereafter.[7] EPAct 2005 defines renewable energy as electrical energy generated from solar, wind, biomass, landfill gas, ocean (including tidal, wave, current, and thermal), geothermal, municipal solid waste, or new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project.

Energy Independence and Security Act of 2007 (P.L. 110-140)

Title IV, Subtitle C (High-Performance Federal Buildings) included six provisions to reduce energy consumption and improve energy efficiency in federal agencies: building energy

[3] See CRS Report RL33302, *Energy Policy Act of 2005: Summary and Analysis of Enacted Provisions*, by (name redacted) et al..

[4] See CRS Report RL34294, *Energy Independence and Security Act of 2007: A Summary of Major Provisions*, by (name redacted).

[5] See Department of Energy, *Guidelines for Electric Metering in Federal Buildings*, DOE/EE-0312, February 3, 2006.

[6] 42 U.S.C. § 6834.

[7] 42 U.S.C. § 15852(a).

reduction, agency energy managers, fossil energy elimination in new buildings, building equipment efficiency, leasing energy efficient buildings, and "green" building standards.

- Section 431 (*Energy reduction goals for federal buildings*) amended the National Energy Conservation Policy Act (NECPA) mandating a 30% reduction of energy use in federal buildings by 2015 relative to a 2005 baseline.[8]
- Section 432 (*Management of energy and water efficiency in federal buildings*) amended NECPA (42 U.S.C. 8253) by adding a new subsection titled "(f) Use of Energy and Water Efficiency Measures in Federal Buildings." It defines "commissioning, energy manager, facility, life cycle cost-effective, payback period, re-commissioning, and retro-commissioning." It requires that each federal agency designate an energy manager responsible for completing annual energy and water evaluations, implementing energy and water efficiency measures, and following up on implemented measures.
- Section 433 (*Federal building energy efficiency performance standards*) amended the Energy Conservation and Production Act (42 U.S.C. 68349(a)(3)) requiring a 55% reduction of fossil energy use in new federal buildings and major renovations by 2010 relative to a 2003 baseline, and a 100% reduction by 2030.
- Section 434 (*Management of federal building efficiency*) amended NECPA Section 543 (42 U.S.C. 8253) requiring that any large capital energy investment in an existing building to replace equipment (such as heating and cooling systems) or renovate, rehabilitate, expand, or remodel existing space, employ the most energy efficient designs, systems, equipment, and controls that are life-cycle cost effective.
- Section 435 (*Leasing*) prohibited federal agencies from leasing buildings that have not earned an EPA *ENERGY STAR* label.[9]
- Section 436 (*High performance green federal buildings*) directed the establishment of federal high-performance green building standards for all types of federal facilities,[10] and the establishment of green practices that can be used throughout the life of a federal facility.

Title V, Subtitle B (Energy Savings Performance Contracts) added five provisions that enhance and promote privately funded energy efficiency improvements.

- Section 512 (*Financing flexibility*) authorized federal agencies to use a combination of appropriated funds and private financing for Energy Savings Performance Contracts (ESPC).

[8] 42 U.S.C. § 8253(a) (1).

[9] In 1992, the U.S. Environmental Protection Agency (EPA) introduced ENERGY STAR as a voluntary labeling program designed to identify and promote energy-efficient products to reduce greenhouse gas emissions. Computers and monitors were the first labeled products. Through 1995, EPA expanded the label to additional office equipment products and residential heating and cooling equipment. In 1996, EPA collaborated with the U.S. Department of Energy for particular product categories. The *ENERGY STAR* label is now on major appliances, office equipment, lighting, home electronics, and more. EPA has also extended the label to cover new homes and commercial and industrial buildings. http://www.energystar.gov/index.cfm?c=about.ab_history.

[10] Consistent with the requirements of Section 305(a)(3)(D) of the Energy Conservation and Production Act (42 U.S.C. 6834(a)(3)(D)).

- Section 514 (*Permanent authorization*) enacted the permanent authorization of ESPCs, and restricted federal agencies from limiting the duration of ESPCs to less than 25 years or limiting the total amount of obligations.
- Section 515 (*Retention of savings*) amended the National Energy Conservation Policy Act, striking a provision that limited agencies to retaining 50% of any realized energy and water cost savings for spending on additional energy efficiency measures or employee incentive programs. (Agencies can now retain all savings beyond the cost of the energy improvement.)
- Section 518 (*Study of energy and cost savings in nonbuilding applications*) directed DOD to study the potential use of ESPCs in nonbuilding applications, including vehicles and federally owned equipment that generate electricity or transport water.
- Section 526 (*Procurement and acquisition of alternative fuels*) prohibited federal agencies from procuring alternative or synthetic fuels, unless contract provisions stipulate that life-cycle greenhouse gas emissions do not exceed equivalent conventional fuel emissions produced from conventional petroleum sources.[11]

Executive Order 13423—Strengthening Federal Environmental, Energy and Transportation Management

EO 13423 (2007) revoked five earlier executive orders affecting federal agency energy and environmental management.[12] Section 11 consolidated and strengthened the earlier five executive orders and two related memorandums-of-understanding (MOU). Further, it established new and updated goals, practices, and reporting requirements for environmental, energy, and transportation performance, and accountability.[13] In some cases, EO 13423 replaced energy and environmental efficiency goals for previous goals with new target dates.

EO 13423 expanded EPAct 2005 provisions by providing federal agencies with further guidance on energy and environmental management. EPAct 2005 (Title I, Part A) and EO 13423 jointly define the current energy efficiency objectives for federal agencies. EO 13423 directs all federal agencies to curb greenhouse gas emissions by reducing energy intensity relative to each agency's baseline energy use in FY2003 (3% annually through the end of FY2015, and 30% by the end of FY2015). Agencies score progress in reaching building energy-efficiency goals in terms of

[11] The provision was included to ensure that federal agencies are not spending taxpayer dollars on new fuel sources that will exacerbate global warming—a response to proposals under consideration by the Air Force to develop coal-to-liquid fuels. Letter of March 17, 2008, from Chairman, House Committee on Oversight and Government Reform to Chairman, Senate Committee on Energy and Natural Resources.

[12] The President, "Strengthening Federal Environmental, Energy, and Transportation Management," 72 *Federal Register* 3919-3923, January 26, 2007.

[13] Specifically, Section 11 of EO 13423 revokes the following prior executive orders: EO 13101 Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition (September 14, 1998), EO 13123 Greening the Government Through Efficient Energy Management (June 3, 1999), EO 13134 Developing and Promoting Bio-based Products and Bioenergy (August 12, 1999), EO 13148 Greening the Government Through Leadership in Environmental Management (April 21, 2000), and EO 13149 Greening the Government Through Federal Fleet and Transportation Efficiency (April 21, 2000). See "Fact Sheet, Executive Order 13423, Strengthening Federal Environmental, Energy and Transportation Management," Office of the Federal Environmental Executive at http://ofee.gov/eo/EO_13423FactSheet.pdf accessed (Accessed November 17, 2008).

reducing energy consumption versus gross building area (Btu/gsf). Agencies may exclude some inherently inefficient industrial buildings from this scoring.

EO 13423 mandates specific energy reduction targets for new construction and renovations.[14] Agencies must meet the objectives set in the Federal Leadership in High Performance and Sustainable Buildings Memorandum-of-Understanding.[15] The MOU calls for new buildings to be 30% more cost efficient than industry standards. Buildings undergoing major renovations must be 20% more cost efficient than a pre-renovation, 2003 baseline. The order also encourages federal agencies to incorporate sustainable practices into projects underway, and to sell or dispose of unneeded assets.[16]

EO 13123 (revoked) had directed improvements in building energy efficiency, promoted the use of renewable energy, and set goals for reduction of greenhouse gas (GHG) emissions associated with energy use in buildings, among other energy-related requirements. The revoked order had also served as the basis of DOD's instruction to the services on energy use. In contrast, the superseding EO 13423 had no specific GHG reduction target. However, Section 2a of the EO 13423 did include the general goal of cutting GHG emissions by federal agencies through reductions in the energy intensity of agency operations, but did not specify a GHG reduction target.

EPAct 2005, Section 203, required federal agencies to increase their purchase of renewable energy to a minimum of 7.5% of overall energy purchases by 2013. Agencies receive double-credit for renewable energy generated on their facility sites. EO 13423 required that at least one-half of the EPAct renewable energy requirement come from "new" (i.e., put in service after January 1, 1999) renewable energy sources, preferably sited on agency property for agency use. EO 13423 also allowed agencies to use new "non-electric" renewable energy sources to meet the requirement for new renewable energy. Examples of non-electric renewable energy include thermal energy from solar ventilation pre-heat systems, solar heating and cooling systems, solar water heating, ground source heat pumps, biomass-fueled heating and cooling, thermal uses of geothermal and ocean resources. However, these non-electric renewable energy sources cannot apply to meeting the EPAct renewable federal electricity purchase requirement (see **Table A-1**).[17] In 2010, an agency could use non-electric renewables equal to 2.5% of its electricity to satisfy EO 13423, and then use old renewable energy sources for 5% of its use to satisfy EPAct, for a total equivalent of 7.5% of its electricity use from renewable energy.

[14] Section 2f.

[15] Referred to as the "Sustainable Buildings MOU," it is available at http://www.fedcenter.gov/_kd/Items/actions.cfm?action=Show&item_id=4713&destination=ShowItem.

[16] Office of Management and Budget, *Instructions for Implementing Executive Order 13423*, March 29, 2007, p. 25, http://www.whitehouse.gov/omb/memoranda/2007.html.

[17] FEMP, *Renewable Energy Requirement Guidance for EPACT and Executive Order 13423*, January 28, 2008, p. 5, http://www1.eere.energy.gov/femp/pdfs/epact05_fedrenewenergyguid.pdf.

Table A-1. Meeting EPAct 2005 Renewable Energy Goals Through EO 13423

Renewable energy sources credited in meeting federal annual purchase requirements

	Source	Energy	2007 - 2009	2009 - 2012	2013 - out
EPAct '05		Electric	3.0%	5.0%	7.50%
EO 13423	Old	Electric	1.5%	2.5%	3.75%
Minimum Goal	New	Electric	1.5%	2.5%	3.75%
Total			3.0%	5.0%	7.50%
EO 13423	Old	Electric	3.0%	5.0%	7.50%
Full Goal	New	Non-Electric	1.5%	2.5%	3.75%
Total			4.5%	7.5%	11.25%

Source: FEMP, *Renewable Energy Requirement Guidance for EPACT and Executive Order 13423, 2008.*

Notes: Old renewable energy sources are those put into service prior to January 1, 1999. Between minimum and full goal, federal agencies can use any combination of new non-renewable electric and electric renewable energy sources to meet EO 13423 requirements. For purposes of EPAct 2005 and EO 13423, purchases of Renewable Energy Certificates (RECs) are treated the same as renewable energy purchases; however RECs from qualified renewable sources of non-electric energy can only be used to the EO 13423 requirement.

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

EO 13514 (2009) establishes an integrated strategy to advance "sustainability" in the federal government and a priority to reduce greenhouse gas (GHG) emissions for federal agencies. The order also requires federal agencies to set GHG emissions reduction targets, increase energy efficiency, reduce fleet petroleum consumption 30% by 2020, conserve water, reduce waste, support sustainable communities, and use federal purchasing power to promote environmentally responsible products and technologies. EO 13514 expands on EO 13423 by establishing new goals and extending some dates for compliance. Much of EO 13514 directs agencies to examine sustainability as a driver of the agency mission regarding environmental and social impacts, personnel, and logistical operations.

EO 13514 requires each federal agency to assess and measure its GHG footprint and submit reduction targets. The direction to evaluate the "economic and social benefits, and costs" of reducing emissions may require clarification as agencies may value benefits differently. New procurement practices will require environmentally sustainable products and services. Federal industrial, landscaping, and agricultural applications must reduce water use by at least 20% from 2010 levels. The order also increases the energy efficiency levels required of new building designs, and targets "zero net-energy" consumption in new federal buildings by 2030. **Table A-2** provides a side-by-side comparison of the EO 13423 and EO 13514. For further analysis of EO 13514 refer to CRS Report R40974, *Executive Order 13514: Sustainability and Greenhouse Gas Emissions Reduction*, by (name redacted) and (name redacted).

Table A-2. EO 13423 vs. EO 13514

Goals	EO 13423 (2007)	EO 13514 (2009)
Greenhouse Gas Emissions Reduction Goals	Reduce GHG through 30% reduction in energy intensity by 2015, relative to a FY2003 baseline (no specific GHG reduction targets). At least half of annual renewable energy purchases must come from new renewable energy sources, with projects located on agency property where feasible.	Establish a GHG percentage reduction target for FY2020 (relative to a FY2008 baseline), agency-wide for *Scope 1* sources (federal agency-owned or -controlled), and *Scope 2* sources (generated electricity, heat, or steam purchased by a federal agency). Establish a separate GHG percentage reduction target applies to *Scope 3* sources (vendor supply chains, delivery services, and employee travel and commuting).
Sustainability	Apply sustainable environmental practices, and implement sustainable practices for energy efficiency, GHG avoidance, and petroleum product reduction.	Agencies must develop a Strategic Sustainability Performance Plan (SSP) to prioritize agency actions based on a lifecycle return on investment.
Water Conservation	Reduce water consumption intensity 16% by 2015, relative to a FY2007 baseline through life-cycle cost-effective measures.	Expand EO 13423 water reduction goals to federal industrial, landscaping, and agricultural uses. Reduce potable water consumption intensity by 2% annually through FY2020 relative to a 2007 base year (for 26% total reduction). Reduce industrial, landscaping, and agricultural water consumption by 2% annually through FY2020 relative to a 2010 base year (for 20% total reduction). Add 5 years to the deadline for meeting the water efficiency target.
Pollution Prevention and Waste Elimination	Reduce toxic and hazardous chemicals and materials acquired, used, or disposed of by the agency, but set no specific quantitative reduction goals. Increase diversion of solid waste, and cost-effective waste prevention and recycling programs maintained in agency facilities as appropriate.	Reduce federal generation of waste and pollutants before they enter the waste stream. Divert at least 50% of non-hazardous solid waste and at least 50% of construction and demolition materials and debris from landfills to recycling or recovery operations, excluding diversion to a waste-to-energy facility.

Goals	EO 13423 (2007)	EO 13514 (2009)
High Performance Buildings	New federal buildings and major renovations of existing federal buildings must comply with "Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings."	Design all new federal buildings to achieve zero net-energy use by 2030. Minimize water and energy consumption with cost-effective, innovative strategies. Reduce existing federal buildings consumption of energy, water, and materials, Identify alternatives to renovation. Apply "best practices" and technologies to promote the long-term viability of rehabilitated federally owned historic buildings.
Sustainable Acquisition Practices	Acquire goods that use sustainable environmental practices, including biobased, environmentally preferable, energy-efficient, water-efficient, and recycled content goods.	Acquisition practices must ensure that 95% of new contracts for products and services are energy-efficient, water-efficient, bio-based, environmentally preferable, non-ozone depleting, contain recycled content, and use non-toxic/less-toxic alternatives. Includes all task and delivery orders but excludes weapons systems. Refers to *ENERGY STAR* products *Federal Energy Management Program (FEMP)* *Electronic Product Environmental Assessment Tool (EPEAT)*

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