Sustainable Federal Facilities: A Guide to Integrating Value Engineering, Life-Cycle Costing, and Sustainable Development

The Federal Facilities Council Ad Hoc Task Group on Integrating Sustainable Design, Life-Cycle Costing, and Value Engineering into Facilities Acquisition

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SUSTAINABLE FEDERAL FACILITIES

A Guide to Integrating Value Engineering, Life-Cycle Costing, and Sustainable Development

AUTHORED BY
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BACKGROUND

Sustainable development as an integrated concept for buildings seeks to reverse the trends in the architectural and engineering communities that focus on first costs and treat each discipline's contribution to the whole building as separate, independent efforts. Sustainable development integrates all of the design disciplines so that limited resources are efficiently directed toward the goal of meeting user needs without setting one program need against another. The precepts for sustainability are that all resources are limited and it is less expensive short and long term to build in harmony with the environment.

On June 3, 1999, Executive Order 13123, "Greening the Government Through Efficient Energy Management" was signed. Its preamble states that

> with more than 500,000 buildings, the Federal Government can lead the Nation in energy efficient building design, construction, and operation. As a major consumer that spends $200 billion annually on products and services, the Federal Government can promote energy efficiency, water conservation, and the use of renewable energy products, and help foster markets for emerging technologies.

Executive Order 13123 establishes goals for greenhouse gases reduction, energy efficiency improvement, industrial and laboratory facilities, renewable energy, petroleum, source energy, and water conservation. To achieve these goals, the executive order addresses Sustainable development, the development of Sustainable development principles, and states that agencies shall apply such principles to the siting, design, and construction of new facilities.

PROBLEM STATEMENT AND STUDY OBJECTIVE

The process for acquiring federal facilities is guided by a variety of laws, executive orders, policies, and regulations. This guidance is generally intended to provide

for an open, competitive process, to achieve best value or lowest cost, and to meet a variety of social and economic objectives. Because this guidance has been developed from a number of sources to meet a wide range of goals, conflicts among competing objectives can arise during the acquisition process, leading to tradeoffs that can compromise the design and consequently the energy and environmental performance of federal facilities.

In the late 1990s, several of the sponsor agencies of the Federal Facilities Council began developing and implementing initiatives and policies related to sustainable development. Guidance related to life-cycle costing and value engineering was recognized as being supportive of sustainable development, in particular when used in the conceptual planning and design phases of acquisition, where decisions are made that substantially effect the ultimate performance of a building over its life cycle. However, specific concerns were raised that when federal agencies apply value engineering in the final stages of design or during construction in response to cost overruns, design features that support sustainable development may be eliminated.

The primary objective of this study, therefore, was to develop a framework to show how federal agencies can use value engineering and life-cycle costing to support sustainable development for federal facilities and meet the objectives of Executive Order 13123.

FRAMEWORK FOR ACQUIRING SUSTAINABLE FACILITIES

Format

The framework contained in Chapter 3 represents a process that will ideally be used by federal agencies; none of the FFC sponsors currently uses such a process. The framework is organized by general facility acquisition phases and shown in Figure ES-1.

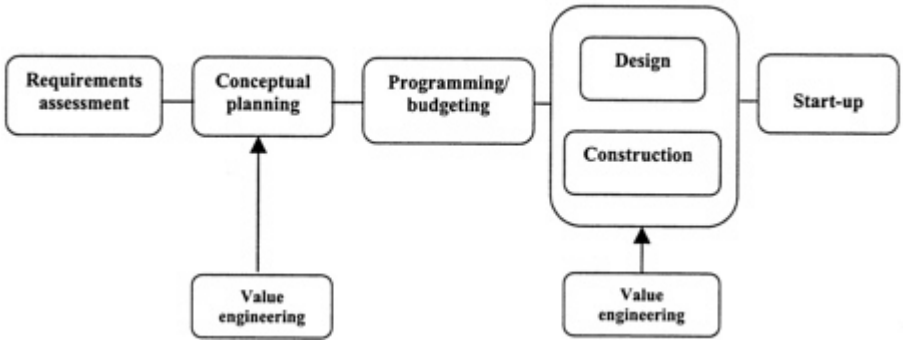

FIGURE ES-1 Framework format.

Decisions that need to be made in each phase are highlighted. To facilitate decision making, sustainable development considerations are posed as questions, moving from macro-level considerations, such as the relationship of the proposed facility to

agency mission, to more detailed considerations, such as the choice of building materials and systems to on-site construction methods.

Sustainable development considerations are further organized by the principles formulated to implement Executive Order 13123 related to siting, energy, materials, water, indoor environmental quality, and operation and maintenance practices. Examples of practical actions and strategies that can be employed to support the principles are highlighted.

To support sustainable development, value engineering and life cycle cost analyses to evaluate a range of sustainable development options are used in the conceptual planning, design and construction phases of acquisition. Using value engineering and life-cycle costing in the conceptual planning phase is not standard federal practice. However, it is during conceptual planning and design that the decisions having the greatest impact on cost and on the ultimate sustainability of a facility are made, including decisions affecting operations, maintenance, and disposal. If there are tradeoffs to be made, it is clear that the earlier in the process that value engineering is employed, the greater the potential benefits for sustainable development and cost savings.

Documenting Objectives, Decisions, and Assumptions

Because the federal acquisition process can take three to five years or longer, changes in leadership, in-house staff, and consultant staff are likely. Because team members will change, it is important those agency objectives, decisions, and assumptions for sustainable development be clearly and completely documented during each acquisition phase. Key aspects to be documented include the project philosophy (i.e., what is to be achieved by acquiring a facility), sustainable development objectives, design goals, choice of materials, technologies, and systems. The purpose of the documentation is to create an institutional record. The cumulative record of decisions relating to a project can be reviewed at each subsequent decision point or to help integrate new team members into the process.

Integrated Project Team Approach

Using an integrated project team approach from conceptual planning through start-up is essential to implement this framework effectively. The team should include the primary stakeholders (the facility owner, users, and operators) architects, engineers, planners, value engineers, environmental designers/engineers, interior designers, contracting officers, constructors, and facility managers responsible for operating and maintaining the facility. Using an integrated project team approach will better enable the primary stakeholders to establish objectives for sustainability, functionality and performance and make informed decisions about tradeoffs among resources, materials, mission objectives, and building performance for the short and long term. An integrated project team approach will also help to ensure that contract documents are written to support design, construction, and performance objectives and facilitate a better understanding of how the materials and systems being considered in the conceptual

planning and design phases will affect first costs and life-cycle costs, operations and maintenance practices, and the ultimate performance of a facility over its lifetime.

Performance Measures

Executive Order 13123 establishes goals for energy efficiency and sustainable facilities. At the beginning of the acquisition process, when agencies are setting goals and objectives for a facility's performance, it is important to establish measures and methods for determining how well those goals and objectives are being met. Establishing quantifiable and qualitative objectives and measures at the beginning of the acquisition process and measuring performance after occupancy is a key component of acquiring sustainable facilities.

ISSUES

During the course of this study, several issues related to implementation of sustainable development practices were identified. The issues relate to

- a fundamental conflict between federal acquisition policies that require life-cycle costing and the federal budget process that emphasizes the first costs of facilities.
- the need to review master specifications and guide books to determine where modifications are needed to support sustainable development.
- setting performance standards against which sustainable facilities will be measured.
- identifying environmentally preferable products.
- establishing lessons-learned programs.

ONLINE RESOURCES

Because sustainable development is a relatively new approach in the acquisition of federal facilities, and to share information, the task group presents in Chapter 5 a list of Web-based tools and resources related to sustainable development, and value engineering.

1

Introduction

Buildings and other constructed facilities represent a significant and on going investment of financial and natural resources. Nationally, in 1999, new construction and renovation of buildings was valued at $1.07 trillion or 12.3 percent of the gross domestic product. Annually, buildings account for nearly 40 percent of U.S. energy expenditures and produce more than 25% of greenhouse gas emissions (WBDG, 2000a). It has been estimated that construction debris accounts for more than half the volume of U.S. landfills (WBDG, 2000).

The federal government owns approximately 500,000 facilities and their associated infrastructure worldwide (NRC, 1998). This facilities inventory represents a significant capital asset portfolio valued at more than $300 billion. Upwards of $20 billion is spent annually on acquiring or substantially renovating federal facilities. In fiscal year (FY) 1998, the federal government used 349.4 trillion British thermal units (BTUs) for energy to power, heat, and cool its buildings at a cost of approximately $3.5 billion (FEMP, 2000a).[1] Federal agencies collectively spend more than $500 million annually for water and sewer (FEMP, 2000b).

Given the magnitude of the existing and ongoing facilities investment, identifying methods to build, manage, and operate buildings more effectively and efficiently can result in significant cost and resource savings for both public and private organizations.

On June 3, 1999, Executive Order 13123, "Greening the Government Through Efficient Energy Management," was signed (see Appendix A). Its preamble states that

> with more than 500,000 buildings, the Federal Government can lead the Nation in energy efficient building design, construction, and operation. As a major consumer that spends $200 billion annually on products and services, the Federal Government can promote energy efficiency, water conservation, and the use of renewable energy products, and help foster markets for emerging technologies.

Executive Order 13123 establishes goals for greenhouse gases reduction, energy efficiency improvement, industrial and laboratory facilities, renewable energy, petroleum, source energy, and water conservation. Section 401 instructs agencies to use

[1]Since 1985, federal agencies have reduced net energy consumption in buildings almost 26 percent, from 471.0 trillion BTUs. The cost of energy has also declined by more than 38 percent from 1985 when $5.6 billion (constant dollars) was spent for energy for federal buildings and facilities (FEMP, 2000a).

life-cycle cost[2] analysis in "making decisions about their investments in products, services, construction, and other projects to lower the Federal Government's costs and to reduce energy and water consumption."

In Section 403d, Executive Order 13123 addresses sustainable development and the development of sustainable development principles. It states that

> agencies shall apply such [sustainable development] principles to the siting, design, and construction of new facilities. Agencies shall optimize life-cycle costs, pollution, and other environmental and energy costs associated with the construction, life-cycle operation, and decommissioning of the facility.

A separate but related document is Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition," signed September 14, 1998 (see Appendix B). Executive Order 13101 states that "consistent with the demands of efficiency and cost effectiveness, the head of each agency shall incorporate waste prevention and recycling in the agency's daily operations and work to increase and expand markets for recovered materials through greater Federal Government preference demand for such products." Environmentally preferable is defined to mean products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose.

A third document is Executive Order 13148, "Greening the Government Through Leadership in Environmental Management", signed on April 21, 2000 (see Appendix C). The preamble states that

> the head of each Federal agency is responsible for ensuring that all necessary actions are taken to integrate environmental accountability into agency day-to-day decision-making and long-term planning processes, across all agency missions, activities, and functions. Consequently, environmental management considerations must be a fundamental and integral component of Federal Government policies, operations, planning, and management. The head of each Federal agency is responsible for meeting the goals and requirements of this order.

PROBLEM STATEMENT AND STUDY OBJECTIVE

The process for acquiring federal facilities is guided by a variety of laws, executive orders, policies, and regulations. This guidance is generally intended to provide for an open, competitive process, to achieve best value or lowest cost, and to meet a variety of social and economic objectives. Because this guidance has been developed from a variety of sources to meet a wide range of goals, conflicts among competing objectives can arise during the acquisition process, leading to tradeoffs that can

[2]Life-cycle cost is defined as the sum of the present values of investment costs, capital costs, installation costs, energy costs, operating costs, maintenance costs, and disposal costs, over the lifetime of the project, product, or measure.

compromise the design and, consequently, the energy and environmental performance of federal facilities.

Code of Federal Regulations (CFR), Title 10, Part 436, defines the analysis requirements, procedures, and rules to be used by federal agencies for life-cycle costing, for energy related projects and investments. Life-cycle costing is defined in the CFR as "the total cost of owning, operating, and maintaining a building over its useful life (including its fuel and water, energy, labor, and replacement components) determined on the basis of a systematic evaluation and comparison of alternative building systems, except that in the case of leased buildings, the life-cycle costs shall be calculated over the effective remaining term of the lease."

Since 1993, federal agencies and departments have been required to use value engineering "as a management tool, where appropriate, to ensure realistic budgets, identify and remove nonessential capital and operating costs, and improve and maintain optimum quality of program and acquisition functions." Value engineering is defined as an organized effort directed at analyzing the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life-cycle cost consistent with required performance, quality, reliability and safety.

In the late 1990s, several sponsoring agencies of the Federal Facilities Council[3] (FFC) began developing and implementing initiatives and policies related to sustainable development. Life-cycle costing and value engineering guidance were recognized as being supportive of sustainable development. Value engineering, in particular, can support sustainable development objectives when applied in the conceptual planning and design phases of the acquisition process. However, a specific concern was raised that in practice, value engineering is often applied in the later stages of design or construction when cost overruns occur. In looking for ways to reduce costs, a value engineering analysis may eliminate some of the technological features of the integrated facility design and compromise the sustainable development goals of the acquisition.

In response to these concerns, the FFC decided to develop a framework to show how federal agencies can use value engineering and life-cycle costing to support sustainable development for federal facilities and meet the objectives of Executive Order 13123.

STUDY PROCESS

This study was identified as a high-priority project for the calendar year 1999 FFC Technical Activities Program. An ad hoc task group of representatives from the FFC sponsor agencies was established to take the lead responsibility for conducting the study. The task group gathered and analyzed federal laws, executive orders, and policies and agency guidance related to sustainable development, life-cycle costing, and value

3 The Federal Facilities Council sponsor agencies are the U.S. Air Force, Air National Guard, U.S. Army, U.S. Department of Energy, U.S. Department of Interior, U.S. Navy, U.S. Department of State, U.S. Department of Veterans Affairs, Federal Bureau of Prisons, Food and Drug Administration, General Services Administration, Indian Health Service, Internal Revenue Service, National Aeronautics and Space Administration, National Institutes of Health, National Institute of Standards and Technology, National Science Foundation, Department of Defense, the Smithsonian Institution and the U.S. Postal Service. Additional information is available at http://www4.nationalacademies.org/cets/ffc.nsf.

engineering. The group met 14 times over a 19-month period to identify issues related to integration and implementation of these practices and to develop the framework described in Chapter 3. The task group also developed a list of tools and resources related to sustainable development, value engineering, and life-cycle costing. The draft report was reviewed by the senior representatives of the FFC sponsors and members of the FFC Standing Committees on Design and Construction and Environmental Engineering. The final report was also reviewed by Jonathan Barnett and Max Bond, members of the Board on Infrastructure and the Constructed Environment.

REPORT ORGANIZATION

The next section identifies government-wide legislation, executive orders, and policies related to sustainable development, value engineering, and life-cycle costing, and describes how life-cycle costing can be used with value engineering. Chapter 2 provides information on the life cycles of facilities and describes a generalized process for federal facility acquisition and provides context for the task group's framework. Chapter 3 presents a framework for using value engineering with life-cycle costing to acquire sustainable facilities. Chapter 4 identifies issues related to implementing sustainable development. Chapter 5 identifies online resources related to sustainable development, value engineering, performance measures, environmentally preferable products and lessons learned. The appendixes contain supporting materials.

GOVERNMENT-WIDE GUIDANCE

Sustainable Development

Defining Sustainable Development

An often cited definition of sustainable development is found in *Our Common Future,* a 1987 report produced by the United Nations World Commission on Environment and Development (UN, 1987). This commission, more commonly known as the Brundtland Commission, defined sustainable development as

> a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.

In the commission's words, "Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs."

Nearly a decade later, the President's Council on Sustainable Development contributed a national vision for sustainable development in a report entitled *Sustainable America: A New Consensus for Prosperity, Opportunity and a Healthy Environment for*

the Future (PCSD, 1996). The report noted that

> here sustainable development means…maintaining economic growth while producing the absolute minimum of pollution, repairing the environmental damages of the past, using far fewer non-renewable resources, producing much less waste, and extending the opportunity to live in a pleasant and healthy environment to the whole population.

A recent report *The Practice of Sustainable Development* (ULI, 2000) notes that "for builders and developers, moving toward sustainable development means designing projects and buildings that

- conserve energy and natural resources and protect air and water quality by minimizing the consumption of land, the use of other nonrenewable resources, and the production of waste, toxic emissions, and pollution;
- make cost-effective use of existing and renewable resources such as infrastructure systems, underused sites, and historic neighborhoods and structures;
- contribute to community identity, livability, social interaction, and sense of place;
- widen access to jobs, affordable housing, transportation choices, and recreational facilities; and
- expand diversity, synergism, and use of renewable resources in the operation and output of the local economy".

Laws and Executive Orders

Several laws and executive orders form the primary basis for implementing sustainable development in federal facilities.

- The National Environmental Policy Act of 1969 (42 U.S.C. 4321–4347) as amended. Its purposes are to declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality.
- The Pollution Prevention Act of 1990 (42 U.S.C. 13101–13109) declares it is the national policy of the United States that pollution should be prevented or reduced at the source whenever feasible; pollution that cannot be prevented should be recycled in an environmentally safe manner, whenever feasible; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner, whenever feasible; and disposal or other release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner.

- Executive Order 13101, "Greening the Government Through Waste Prevention, Recycling, and Federal Acquisition" (September 14, 1998) as set forth in Appendix B, states in its preamble that "consistent with the demands of efficiency and cost effectiveness, the head of each executive agency shall incorporate waste prevention and recycling in the agency's daily operations and work to increase and expand markets for recovered materials through greater Federal Government preference and demand for such products". Final guidance on environmentally preferable purchasing for executive agencies was published in the *Federal Register* on August 20, 1999 (Volume 64, Number 161).
- Executive Order 13123, "Greening the Government Through Efficient Energy Management" (June 3, 1999) as set forth in Appendix A seeks to meet several goals.

Greenhouse Gases Reduction. Through life-cycle cost-effective energy measures, each agency shall reduce its greenhouse gas emissions attributed to facility energy use by 30 percent by 2010 compared to such emissions levels in 1990.

Energy Efficiency Improvement. Through life-cycle cost-effective measures, each agency shall reduce energy consumption per gross square foot of its facilities, excluding facilities covered in section 203 of this order, by 30 percent by 2005 and 35 percent by 2010 relative to 1985. No facilities will be exempt from these goals unless they meet new criteria for exemptions, to be issued by the Department of Energy.

Industrial and Laboratory Facilities. Through life-cycle cost-effective measures, each agency shall reduce energy consumption per square foot, per unit of production, or per other unit as applicable by 20 percent by 2005 and 25 percent by 2010 relative to 1990. No facilities will be exempt from these goals unless they meet new criteria for exemptions, as issued by the DOE.

Renewable Energy. Each agency shall strive to expand the use of renewable energy within its facilities and in its activities by implementing renewable energy projects and by purchasing electricity from renewable energy sources. In support of the Million Solar Roofs initiative, the Federal Government shall strive to install 2,000 solar energy systems at Federal facilities by the end of 2000, and 20,000 solar energy systems at Federal facilities by 2010.

Petroleum. Through life-cycle cost-effective measures, each agency shall reduce the use of petroleum within its facilities. Agencies may accomplish this reduction by switching to a less greenhouse gas-intensive, nonpetroleum energy source, such as natural gas or renewable energy sources; by eliminating unnecessary fuel use; or by other appropriate methods. Where alternative fuels are not practical or life-cycle cost-effective, agencies shall strive to improve the efficiency of their facilities.

Source Energy. The Federal Government shall strive to reduce total energy use and associated greenhouse gas and other air emissions, as measured at the source. To that end, agencies shall undertake life-cycle cost-effective projects in which source energy decreases, even if site energy use increases. In such cases, agencies will receive credit toward energy reduction goals through guidelines developed by DOE.

Water Conservation. Through life-cycle cost-effective measures, agencies shall reduce water consumption and associated energy use in their facilities to reach the goals set under section 503(f)[4] of this order. Where possible, water cost savings and associated energy cost savings shall be included in Energy Savings-Performance Contracts and other financing mechanisms.

To implement Executive Order 13123, the Department of Defense and the General Services Administration were charged with developing sustainable design principles. To that end, the following principles have been formulated (WBDG, 2000c):

- Siting: *Optimize Site Potential*
- Energy: *Minimize Nonrenewable Energy Consumption*
- Materials: *Use Environmentally Preferable Products*
- Water: *Protect and Conserve Water*
- Indoor Environmental Quality: *Enhance Indoor Environmental Quality*
- Operations and Maintenance: *Optimize Operations and Maintenance Practices*
- Executive Order 13148, "Greening The Government Through Leadership In Environmental Management," (April 22, 2000), as set forth in Appendix C, establishes goals for environmental management, environmental compliance; right-to-know and pollution prevention; release reduction for toxic chemicals; use reduction for toxic chemicals, hazardous substances and other pollutants; reductions in ozone-depleting substances; and environmentally and economically beneficial landscaping. Sustainable development is affected by the requirement that, "by December 31, 2005, each agency shall implement an environmental management system at all appropriate agency facilities based on facility size, complexity, and the environmental aspects of facility operations. The facility environmental management system shall include measurable environmental goals, objectives, and targets that are reviewed and updated annually."

Value Engineering

The value engineering approach is a strategic thinking process that involves the systematic and objective assessment of project component alternatives. Federal

[4]Sec. 503. Within 1 year of this order, the Secretary of Energy, in collaboration with other agency heads, shall: (f) establish water conservation goals for Federal agencies.

departments and agencies are required to perform value engineering in accordance with Office of Management and Budget Circular A-131 (May 21, 1993), reprinted in Appendix D and Public Law 104–106, Section 4306, Value Engineering for Federal Agencies, reprinted in Appendix E. Circular A-131 establishes a policy that "Federal agencies shall use [value engineering] as a management tool, where appropriate, to ensure realistic budgets, identify and remove nonessential capital and operating costs, and improve and maintain optimum quality of program and acquisition functions." Value engineering (also referred to as value analysis, value management, and value control) is defined as "an organized effort directed at analyzing the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life-cycle cost consistent with required performance, quality, reliability, and safety."

OMB Circular A-131 notes that value engineering is a "management tool that can be used alone or with other management techniques and methodologies to improve operations and reduce costs." Referenced techniques and methodologies include life-cycle costing, design-to-cost approaches, and concurrent engineering. Value engineering can also contribute to overall management objectives of "streamlining operations, improving quality, reducing costs, and can result in the increased use of environmentally sound and energy-efficient practices and materials." The circular provides agencies with the authority to define opportunity criteria to apply value management; these opportunities exist in programs, projects, systems, products, and services.

Public Law 104–106, Section 4306, Value Engineering for Federal Agencies, states that each agency shall establish and maintain cost-effective value engineering procedures and processes.

The value engineering methodology emphasizes the return-on-investment aspect of decision making in terms of life-cycle costs to maintain or improve on desired levels of capability and performance during planning, acquisition, execution, and procurements. It can be used to identify alternative ideas and solutions at any phase of acquisition or any phase of a building's life cycle. A team of value engineers may examine alternatives for improving value in the following ways:

1. Raise productivity
2. Improve management
3. Simplify work
4. Eliminate overlap or duplication
5. Reduce process time
6. Conserve energy and water
7. Reduce paperwork
8. Install smart building systems
9. Reevaluate service contracts
10. Reorder cyclic and preventive maintenance

Additional benefits can result when value engineering is applied to a project plan and design, such as:

- Greater project team interaction

- Greater knowledge of costs and the resulting economic impact of various design decisions
- Increased monitoring and management of quality and cost throughout design

To maximize results value engineering should be applied as early as possible before commitment of funds or approval of systems, services, or designs. However, an owner is sometimes faced with unexpected levels of operation and maintenance costs when budgeting for the start-up of a new building, facility, or installation. The value engineering methodology can also be used to address changes that may be needed after a building has been constructed.

Life-Cycle Costing

Life-cycle costing is a methodology used for facility acquisitions that employs a comprehensive economic analysis of competing alternatives. The analysis compares initial investment options and identifies least-cost alternatives for a project or acquisition over its serviceable or useful life span. Life-cycle costing examines the associated ownership costs of competing alternatives by discounting both the positive and negative cash flows throughout the facility's service life.

Executive Order 13123 defines life-cycle costs as "the sum of the present values of investment costs, capital costs, installation costs, energy costs, operating costs, maintenance costs, and disposal costs, over the lifetime of the project, product, or measure." Section 401 states that "agencies shall use life-cycle cost analysis in making decisions about their investments in products, services, construction, and other projects to lower the Federal Government's costs and to reduce energy and water consumption. Where appropriate, agencies shall consider the life-cycle costs of combinations of projects, particularly to encourage bundling of energy efficiency projects with renewable energy projects. Agencies shall also retire inefficient equipment on an accelerated basis where replacement results in lower life-cycle costs."

Code of Federal Regulations (Title 10 CFR, Part 436) defines the analysis requirements, procedures, and rules to be used by federal agencies for life-cycle costing.

USING LIFE-CYCLE COSTING WITH VALUE ENGINEERING

The concept of economic analysis, which is used in life-cycle costing, requires that comparisons be made between things similar in nature. In value engineering all alternatives can be compared using life-cycle costing because the alternatives for each project component are defined to satisfy the same basic function or set of functions. When the alternatives all satisfy the required function, then the best value alternative can be identified by comparing the first costs and life-cycle costs of each alternative.

For many projects there is a viable sustainable development alternative or enhancement. Sustainable development may include more recycled material contents, require less energy or water usage, reduce construction waste, increase natural lighting, or include other opportunities that contribute to an optimal facility. The value engineering

methodology can provide for the identification of alternatives, sustainable or eco-efficient design features, and traditional design features, on an equal playing field for comparison. Comparison of alternatives, or the process for identifying the best value alternative, is accomplished using life-cycle costing along with first-cost estimates. Life-cycle costing will in most cases be able to accurately estimate the first-cost and the full life-cycle cost differentials of each alternative.

At this point tradeoffs and decisions can be made to balance environmental performance with total cost (i.e., initial, recurring, and nonrecurring) reliability, safety, and functionality. When all alternatives are compared equally (i.e., "apples to apples"), sustainable development technology and integration can then be fully evaluated for performance in the acquisition process.

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2

Facility Life Cycles and the Acquisition Process

To provide context for the task group's framework, it is important to understand the concept of facility life cycles and the acquisition process as it is generally practiced by federal agencies.

FACILITY LIFE CYCLES

Facilities pass through a number of stages during their lifetimes: planning, design, construction, start-up, operation and use, renewal or revitalization, and disposal (see Figure 2.1). Most facilities are designed to provide a minimum acceptable level of service of 30 years. With proper maintenance and management, facilities may perform adequately for 100 years or longer and may serve several different functions over that time. The actual service life is dependent upon such factors as quality of design; quality of construction; durability of construction materials and component systems; incorporated technology; location and local climate; use and intensity of use; type of operation and maintenance methods used; and damage caused by natural disasters and human error (NRC, 1998).

Figure 2–1 Facility life-cycle.

The total cost of facility ownership is the "total of all expenditures an owner will make over the course of the building's service lifetime" (NRC, 1990). These costs will include conceptual planning; design; construction; maintenance; repairs; replacements; alterations; and normal operations, such as heating, cooling, lighting, and disposal. Of the total ownership costs, design and construction expenditures, the so-called "first costs" of a facility, will account for 5–10 percent of the total life-cycle costs. In contrast, operation and maintenance costs will account for 60–85 percent of the total life-cycle costs, with land acquisition, conceptual planning, renewal or revitalization, and disposal accounting for the remaining 5–35 percent (NRC, 1998).[1]

FACILITY ACQUISITION

Executive Order 13123 defines acquisition as

> acquiring by contract supplies or services (including construction) by and for the use of the Federal Government through purchase or lease, whether the supplies or services are already in existence or must be created, developed, demonstrated, and evaluated. Acquisition begins at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts, contract financing, contract performance, contract administration, and those technical and management functions directly related to the process of fulfilling agency needs by contract.

The federal government has not established a government-wide process for acquiring facilities, although it has established broad guidance through legislation and regulations. Using this guidance federal agencies have tailored their processes to reflect mission, culture, and resources. Thus, although agencies follow similar procedures to acquire facilities, the steps in the procedure may not occur in exactly the same sequence in all agencies nor will the steps necessarily be called by the same names. With these caveats in mind, a general process for federal facilities acquisition is shown in Figure 2.2 and described below.

[1]The investment in facilities supports an even larger investment in human resources. Industry and government studies have shown that the salaries paid to the occupants of a commercial or institutional building annually are of the same order of magnitude as the total costs of designing and constructing the building (NRC, 1998).

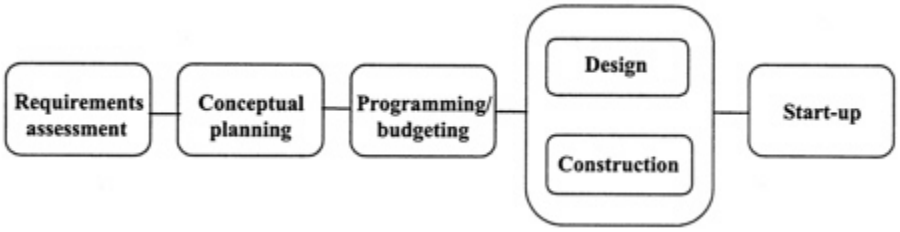

FIGURE 2–2 General facility acquisition process.

Note: The contracting method determines whether the design, equipment procurement, and construction phases occur in sequence or concurrently. The contracting method can also affect who is involved at each phase (architect, engineer, construction contractor, etc.). For example, if the design-bid-build contract method is used, the phases generally occur in sequence, with an architect-engineer entity involved in the design phase and a construction entity involved in the construction phase. If a design-build contract method is used, the same contractor is responsible for the design and construction phases; thus, some phases or activities occur concurrently.

Requirements Assessment

The federal budgeting process requires agencies to conform to a procedure of requirements setting and prioritization review (known variously as requirements assessment, project requirements, project assessment, and needs assessment) before agency budget requests are submitted to Congress. This phase begins when someone (e.g., facilities program manager, senior executive, elected official) identifies the need for a program or facility. The agency initiates a process to gather information and validate the need for the facility relative to a program and to the agency's mission.

The requirements phase generally determines the scope of the project required to accomplish the agency's mission. The requirements may be a function of the number of personnel and their grade and function. The Office of Management and Budget's *Capital Programming Guide* directs agency management at this point to answer the "three pesky questions" applicable to all major capital investments (OMB, 1997):

- Does the investment in a major capital asset support core/priority mission functions that need to be performed by the Federal Government?
- Does the investment need to be undertaken by the requesting agency because no alternative private sector or governmental source can better support the function?
- Does the investment support work processes that have been simplified or otherwise redesigned to reduce costs, improve effectiveness, and make maximum use of commercial, off-the-shelf technology?

The answer to any one of these questions can lead management to determine that the requirement can be met through management strategies and that a facility is not needed. For example, if the requirement is for additional power, it might be procured from a power provider and may preclude the need to build a new power plant. By applying the pollution prevention principles of "reduce, reuse, recycle" in this phase and

reducing facility requirements, natural resources, energy and water that otherwise would have been used in building and operating a facility can be saved.

When a facility requirement is validated, the process to fulfill the requirement begins with the conceptual planning phase.

Conceptual Planning

In conceptual planning (also called project preplanning, master planning, advance planning, concept development), alternatives are considered in their broadest sense. Decisions are made on how the requirement is to be met through the addition, alteration, or renovation of existing facilities or through new construction. An agency may review its entire facilities inventory and assess whether existing buildings and infrastructure can adequately support the agency's mission and program requirements or whether facilities need to be acquired, upgraded, or replaced. Various feasibility studies are conducted to define the scope or statement of work based on the agency's expectations for facility performance, quality, cost and schedule. Several alternative design solutions may be considered before the preferred approach is chosen. The preferred approach will be used to develop a project scope of work that will be the basis for future project decisions and for developing contract documents to procure design and construction services.

Studies by academics, the National Research Council, the Construction Industry Institute, The Business Roundtable, the Project Management Institute, and others point to the importance of the conceptual planning phase to the entire facility acquisition process. This phase of decision-making is critical, because it is at this point that the size, function, general character, location, and budget for a facility are established. Errors made in this phase will usually manifest in the completed facility in such forms as inappropriate space allocations or inadequate equipment capacity (NRC, 1989, 1999).

Programming and Budgeting

During this phase decisions are made on resources and priorities regarding which facilities to acquire and when to do so. Senior agency executives determine which projects are the most critical to agency mission needs and therefore warrant facility acquisition. When a project is included on the agency priority list, the agency then prepares a request for initial congressional approval to acquire the facility and for the appropriation of funds for design and construction. The documentation required for this phase varies but usually consists of materials to justify the facility in relation to mission requirements and the location and physical and functional requirements upon which preliminary cost estimates are based.

Design

The end of the conceptual planning phase and the beginning of the design phase varies among agencies and their programming and budgeting procedures. Generally, detailed design of a project begins once an agency is confident that funds will be

appropriated to complete the project. Based on the statement of work and preferred design approach, the design matures into final construction documents comprising the plans and specifications from which equipment procurement and construction bids can be solicited. (Complex facility projects may include an equipment procurement phase in order to expedite the purchase, manufacture, and delivery of long-lead-time equipment, such as unique process machinery, large electrical and mechanical equipment, and sophisticated architectural components. Equipment procurement may proceed in parallel with construction activities.)

Unless agencies have in-house design staff available, these activities are typically contracted out to organizations that have the appropriate expertise; either to other federal provider agencies (such as the General Services Administration, Naval Facilities Engineering Command, or Army Corps of Engineers) or private-sector architect-engineer firms. A 1990 NRC report found that the early stages of the design process are most critical for assuring successful design to budget because the design is still flexible and factors that determine cost are not fixed (NRC, 1990). In addition, the cost of operating, maintaining, repairing, and disposing of the facility will be affected by the following decisions during the requirements assessments, conceptual planning, programming, and design phases:

- Choice of materials and technologies
- Quality of design
- Quality of construction
- Building layout
- Types of systems

Construction

The majority of tasks associated with large-scale federal construction are contracted out to the private sector. Federal agencies typically undertake major construction with federal personnel only when these functions are central to the agency's mission or existence. The military services, for example, may retain control of facility construction that impacts mission readiness. The construction phase is considered complete when the owner agency accepts occupancy of the facility.

Start-up

The start-up phase begins when the user takes occupancy of the facility. Building components are tested individually and then in systems with other components to measure and compare their performance against the original design criteria. Facility operation and maintenance plans are implemented, tested, and refined as appropriate. Minor repairs and alterations can be made and users have the opportunity to learn about the facility (NRC, 1994).

Facility acquisition, a 2–5 year process, is followed by long-term management, operation, and maintenance of the facility, which may last for 30 years or longer, and

constitutes the majority of the facility life-cycle. Although the focus of this study is on the acquisition process, application of the sustainable development principle for operations and maintenance is discussed in the context of the framework outlined in Chapters.

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3

Framework for Acquiring Sustainable Facilities

Sustainable development as an integrated concept for buildings seeks to reverse the trends in the architectural and engineering communities that focus on first costs and treat each discipline's contribution to the whole building as separate and independent efforts. The precepts for sustainability are that all resources are limited and it is less expensive short and long term to build in harmony with the environment. The legacy of great architecture and building throughout the world is a history of design and construction performed in concert with the natural elements and geography.

Sustainable development principles can be applied to all phases of facilities acquisition and operation. Through an integrated approach, Sustainable development can achieve synergies that reduce resource requirements, increase energy efficiencies, and create a healthy environment—all at a lower life-cycle cost.

The primary objective of this study is to develop a framework to show how long-established requirements for value engineering and life-cycle costing can be used to support Sustainable development for federal facilities. In some cases, current federal agency practices may need to be adapted or modified. As agencies gain more experience with Sustainable development, additional strategies and best practices will emerge. Some may become standard practice over time. In the short term, however, because of the wide range of missions, programs, customers, and budget constraints, agency strategies to support Sustainable development will need to be determined case by case.

FORMAT

The framework is organized according to the facility acquisition phases outlined in Chapter 2:

- Requirements assessment
- Conceptual planning
- Programming/budgeting
- Design
- Construction
- Start-up

To facilitate the decision making required in each phase, Sustainable development considerations are posed as questions. In the initial phases Sustainable development issues

are considered at the macro level; as one moves through each phase, issues are considered at increasingly detailed levels.

Sustainable development considerations are further organized by the principles formulated to implement Executive Order 13123 related to siting, energy, materials, water, indoor environmental quality, and operation and maintenance practices. Examples of practical actions and strategies that can be employed to support the principles are highlighted. Examples of Sustainable operation and maintenance practices that can be used after the building is acquired are also provided.

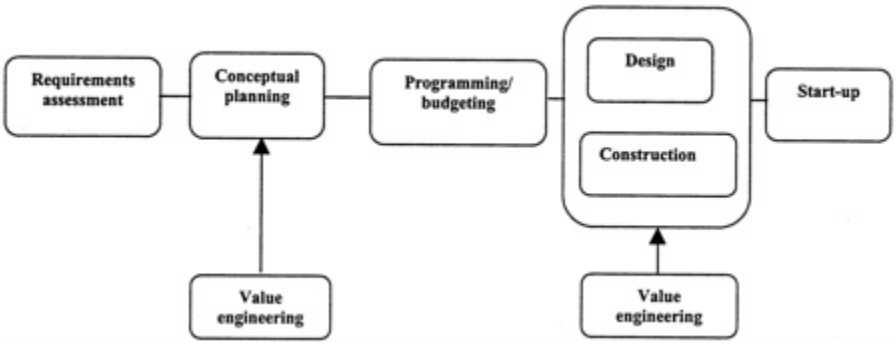


FIGURE 3–1 Framework format.

In the task group's framework, value engineering and life-cycle cost analyses to evaluate a range of Sustainable development opportunities are used in conceptual planning, design, and construction. Using value engineering and life-cycle costing in the conceptual planning phase is not standard federal practice. It, however, is during conceptual planning and design that the decisions having the greatest impact on cost and on the ultimate sustainability of a facility are made, including decisions affecting operations, maintenance, and disposal. Therefore, the task group believes that conducting a macro-level value engineering analysis as part of conceptual planning will be cost effective and will provide objective information for evaluating Sustainable strategies incorporated in alternative designs, systems, and materials. The task group also supports using value engineering and life-cycle costing in design and construction. If there are tradeoffs to be made, it is clear that the earlier in the process that value engineering is employed the greater the potential benefits for Sustainable development and cost savings.

DOCUMENTING OBJECTIVES, DECISIONS, AND ASSUMPTIONS

Because team members will change during the 3–5 years of the federal acquisition process, it is important that agency objectives, decisions, and assumptions for Sustainable development be clearly and completely documented during each phase of acquisition. Key aspects to be documented include the project philosophy, (i.e., what is to be achieved by acquiring a facility), Sustainable development objectives, design goals, choice of materials, technologies, and systems. For each aspect, the decisions made, the

assumptions underlying those decisions and specific alternatives considered and rejected need to be clearly and concisely documented. Standards and responsibilities for documentation should be agreed on and assigned at the beginning of each phase.

The purpose of the documentation is to create an institutional record that might otherwise not exist because of changes in leadership, staff turnover, project delays, budget cuts, and so forth. The cumulative record of decisions relating to a project can be reviewed at each subsequent decision point or to help integrate new team members into the process. Employing a macro-level value engineering analysis in the conceptual planning phase and a value engineering study at the design phase will support this process. If value engineering is applied only as a measure to mitigate project cost overruns, having a fully documented history of the project philosophy, objectives, and decisions will help to avoid tradeoffs that may compromise sustainable development's strategic advantages.

INTEGRATED PROJECT TEAM APPROACH

It is essential to use an integrated project team approach from conceptual planning through start-up to implement this framework effectively. An integrated project team should include the primary stakeholders (representatives of the facility owner, users, and operators) architects, engineers, interior designers, planners, value engineers, environmental designers and engineers, energy managers, contracting officers, constructors, and facility engineering staff. The level of team member involvement will vary depending upon the decisions to be made, the acquisition phase, and the contract method. Nevertheless, including the perspectives and expertise of the various team members throughout the process is important.

Using an integrated project team approach will better enable the owner, designers, constructors, managers, operators and users of a facility to

- establish objectives for sustainability, functionality and performance and ensure they are reflected in the acquired facility.
- make informed decisions about tradeoffs among resources, materials, mission objectives, and building performance for the short and long term.
- ensure that contract documents are written to support design, construction, and performance objectives.
- facilitate a better understanding of how the materials and systems being considered in the conceptual planning and design phases will affect first costs and life-cycle costs, operations and maintenance practices, and the ultimate performance of a facility over its lifetime.

The report *Adding Value to the Facility Acquisition Process: Best Practices for Reviewing Facility Designs* (FFC, 2000) identifies 18 best practices for design review. Six of the 18 relate to teamwork and collaboration; three relate to an integrated project

team approach, as follows:

Number 5. Ensure that all interested parties participate in design reviews from the planning and design phases, so that all perspectives are represented as the design evolves. Broad participation creates early project endorsement or "buy-in," reducing the potential of later disagreement or need for changes. At a minimum, involve representatives of the owner, the user, the A/E, construction management staff, maintenance and operations staff, and special staff, such as procurement, safety, and fire protection. Where possible and appropriate, include the construction contractor, permitting-agency staff, and independent specialists for value engineering and independent review. Err on the side of excess participation—it is cost-effective protection against unexpected and expensive fixes or oversights.

Number 6. Use the same A/E throughout the facility acquisition process to maximize continuity and allow participants to build and apply their experience baseline. Using the same A/E for conceptual planning, detailed design, construction support engineering services, and start-up takes advantage of the A/E's intimate understanding of both the owner and his project needs, and supports continuity of personnel involved.

Number 8. Participants should commit for the duration of the activity to ensure continuity. Changing participants from any of the organizations involved in reviewing the design can disrupt the work flow and threaten the stability of good teaming relationships.

Each of these best practices is implicit in the task group's support of an integrated project team approach for acquiring sustainable facilities.

PERFORMANCE MEASURES

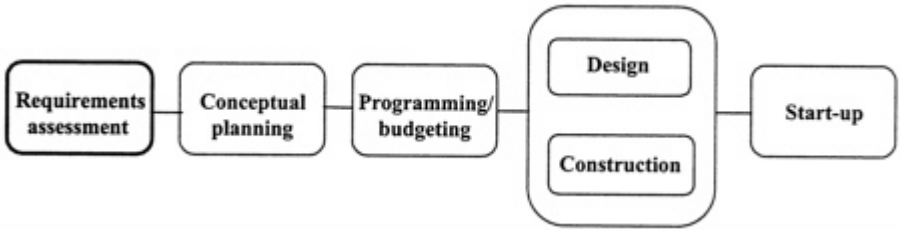
Executive Order 13123 establishes goals for energy efficiency and sustainable facilities. At the beginning of the acquisition process, when agencies are setting goals and objectives for a facility's performance, it is equally important to establish measures and methods for determining how well those goals and objectives are being met. For example, if an agency establishes a goal of reducing energy consumption by 30 percent in comparison to a traditional building, the agency must also establish the baseline against which energy consumption in the sustainable facility will be measured and the means for measuring, such as a metering or monitoring system. At the appropriate phase, the agency can ensure that the metering or monitoring system is purchased and installed.

Creating sustainable facilities through an integrated design approach is a relatively new practice. Both successes and failures will occur, so both good and bad performance should be documented through performance measurement. In this way, agencies can learn from and improve upon past experience. Establishing quantifiable and

qualitative objectives and measures at the beginning of the acquisition process and measuring performance after occupancy is a key component of acquiring sustainable facilities.[1]

FRAMEWORK

Requirements Assessment Phase



The key decisions to be made in the requirements assessment phase relate to meeting mission or program requirements.

- Determine whether the agency needs a facility to meet a requirement or whether it can employ other strategies.
- If a facility is required, determine the total scope needed.
- Determine the functions and number of personnel to be housed.
- Identify the geographic location.
- Ascertain whether the agency will own or lease the facility.

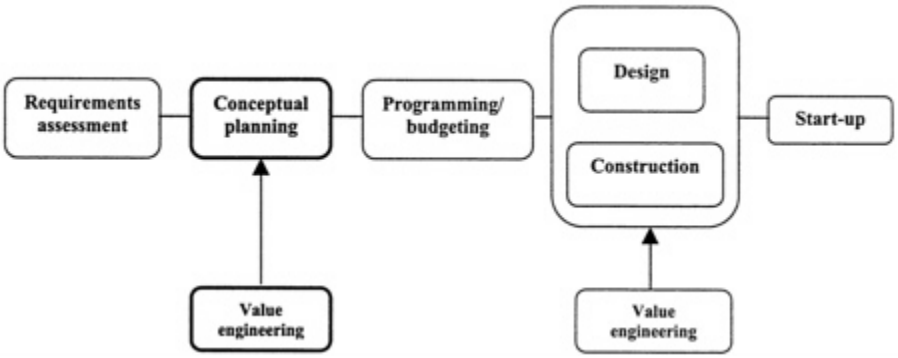
Decisions made in this phase will begin to establish the parameters for sustainable development. Issues to be addressed include the following:

- *Mission or program.* Is the mission or program a continuing one or of specific or indefinite duration?
- *Alternatives to facility acquisition.* Are there management strategies, such as redeployment of staff, telecommuting, or the use of alternative workplaces, that can be employed to meet the requirement? Are there other methods that can be used to acquire needed services?
- *Facility acquisition.* How will a facility support this mission or program over the short and long term (i.e., what is to be accomplished by acquiring a facility?). Can a facility acquired to meet the current mission be adapted and reused for other purposes if the mission or program changes?

[1]Executive Order 13123 identifies Energy Star™ as one such performance measure. Additional information regarding Energy Star™ is located in Chapter 5: Resources.

- *Program needs.* What are the primary drivers in identifying the need for the facility? Security, national defense, research and development, other? If these drivers are found to be unnecessarily restricting options for sustainable development, can they be challenged?
- *Scope.* How much space (gross square feet) is required to accommodate mission or program functions in both the short and long term? What are the minimum requirements? Is it appropriate to provide some increase in scope to accommodate possible future needs (e.g., mission change, environmental regulations)?
- *Siting factors.* Does the facility need to be located in a specific geographic location to serve the function? Is its location based on statutory or administrative requirements? Will the facility support a stand-alone function or does it need to be proximate to other functions and facilities?
- *Finance.* Based on the length of mission, space, and location needs, is it more cost effective to own or lease a facility?
- *Energy efficiency goals.* How will this facility contribute to meeting Executive Order 13123 goals for reducing greenhouse gases emissions, reducing energy usage, expanding the use of renewable energy, reducing the use of petroleum, and reducing water consumption?

Conceptual Planning Phase



The key decisions to be made in the conceptual planning phase are

- the site of the facility.
- whether to acquire a new facility or rehabilitate an existing one.
- the preferred approach for space and functional requirements.
- the agency's expectations for facility performance, quality, cost, and schedule and for meeting the goals of Executive Order 13123.
- the performance measures to be used to determine how well the agency's objectives are being met.

Sustainable development starts with matching the mission or program requirement to a site. The location of a facility affects a wide range of environmental factors, such as the energy consumed by workers for commuting, the impact on local ecosystems, and the extent to which existing structures and infrastructures are used. All other factors being relatively equal, reusing or renovating existing facilities will typically use fewer resources and thus be more Sustainable than constructing a new one. Similarly, facilities or sites located in areas already served by infrastructure will, in general, use fewer resources and disturb less natural habitat and thus be more Sustainable than sites that require the extension of water, sewer, roads, or utilities or involve the destruction of natural habitat. Sites or facilities served by public transportation will generally have less effect on nonrenewable energy sources, such as petroleum, because they offer commuters transportation options other than individual automobiles. However, there are always exceptions. For example, if an existing facility is a semi-permanent building with poor energy efficiency, demolishing and replacing it with a more permanent, energy-efficient facility may be more Sustainable in the long term. Thus, a case-by-case analysis is necessary.

Siting Considerations

- Can the mission requirement be met by an existing facility that is vacant, has sufficient excess capacity, or can be rehabilitated?
- Can any required functions be combined, simplified, or served elsewhere?
- Can functions be collocated or allow for multipurpose usage to decrease the amount of space required?
- What is the best, most appropriate use of a site?
- Are there ecologically sensitive areas, such as endangered species habitats, forests, meadows, wetlands, and waterfronts, that should be protected?
- Are there culturally sensitive areas, such as historical and archeological sites, that should be preserved?
- Is any portion of the site contaminated with hazardous materials or toxic substances that may restrict use or require cleanup prior to construction?

Actions that can be taken to *optimize site potential* include

- recognizing that some sites may not be suitable for new or additional development.
- minimizing development of open space by selecting already developed land or brownfields.
- taking advantage of passive and active energy opportunities by identifying the site's solar angle and radiant energy impacts.
- integrating the building into the natural setting.
- preserving natural attributes.

Energy Considerations

- Are existing buildings well served by infrastructure (i.e., water, sewer, and utilities)?
- Are vacant sites under consideration served by infrastructure?
- Can existing facilities and equipment be renovated to incorporate energy-efficient systems and equipment?
- Will a renovation be cost effective in the short or long term?

Actions that can be taken to *minimize nonrenewable energy consumption* include

- reducing the use of petroleum by commuters by choosing sites served by public transportation.
- choosing sites that can be served by alternative fuels for use by agency vehicles.
- using the natural attributes of a site for optimal lighting, ventilation, heating, cooling, and water conservation.
- integrating technologies, including solar energy, to further enhance energy conservation.

Materials Considerations

- Can existing facilities and equipment be renovated using recycled content and environmentally preferable materials?
- Will the use of such materials and equipment affect mission or program achievement?
- Will such a renovation be cost effective in the short or long term?
- How will the use of such materials affect the ultimate disposal of the building?

Actions that can be taken to *use environmentally preferable products* include

- using locally available materials when possible.
- identifying renewable products and components to ensure continuing use of sustainable products.
- avoiding endangered, nonrenewable products.
- establishing goals to maximize the use of environmentally preferable products in the building design.
- reviewing the life cycle assessment of products being considered.
- identifying environmentally preferable products by using life cycle assessment tools, such as the Building for Environmental and Economic Sustainability (BEES) software.

Water Considerations

- What are the water resource limitations of a site regarding the number and type of facilities that can be accommodated?
- If the facility has high water requirements, do the plans take this into consideration?
- What impacts will storm water and sediment runoff have during construction and operation?

Actions that can be taken to *protect and conserve water* include

- siting facilities to accommodate the watershed drainage.
- siting facilities to take advantage of the visual and thermal qualities of water in land use planning.
- providing for rainwater catchment and segregation of graywater from potable water systems and onsite waste-treatment or graywater distribution systems.
- developing strategies for mitigating runoff.

Indoor Environmental Quality Considerations

- What effects will materials and systems chosen for a new building or renovation of an existing building have on indoor environmental quality?
- What effects could the design of the facility have on human health or productivity?

Actions that can be taken to *enhance indoor environmental air quality* include

- using natural ventilation.
- establishing lighting and acoustic criteria for the facility design.
- establishing objectives for using materials that minimize noise pollution and toxic emissions.
- establishing objectives for maximizing daylighting.
- providing for sufficient replenishment of fresh air.

Operation and Maintenance Considerations

- Are existing buildings energy efficient?
- Can any deficiencies be addressed through repair or replacement of existing systems?
- What operations, maintenance, and repair procedures will be needed to optimize the use of specified materials and systems?

Actions that can be taken to *optimize operations and maintenance practices* include

- conducting continuous commissioning through real-time monitoring of building systems and maintaining performance through digital direct controls.
- assessing the indoor air quality and energy consumption of existing facilities.
- modifying procedures to mitigate the impact of unsustainable operational practices (e.g., poor housekeeping or maintaining full loads of heating, lighting, or air conditioning during nonoperational hours).
- ensuring delivery of a complete building operations manual (operations and maintenance support information documentation).

Value Engineering/Life-Cycle Cost Analysis

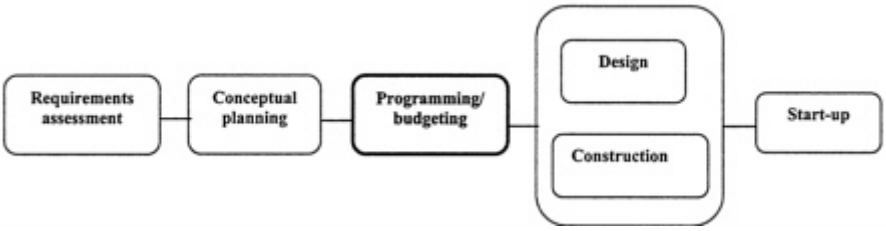
Once the project requirements have been established, the agency can bring together stakeholders to review the project scope. Value engineers should be included as part of the team to complete a limited life-cycle costing for the facility. Another approach could be a design charrette that uses a value engineering methodology or a value engineering study. In the conceptual planning phase, any value engineering effort will be at the macro-level, looking at such major project scope decisions as siting alternatives, utility needs, space requirements, preliminary budget estimates, and project alternatives.

The following questions can be addressed by a team of value engineers or a value engineering study:

- *Mission or program needs.* Will the accomplishment of the agency's mission or program be substantially affected by renovating an existing facility rather than acquiring a new one?
- *Facility functions.* Are all the building functional requirements well understood? Have they been listed (required and desired)? Are there any areas where the functional requirements have been exceeded? Have the space and general layout been optimized to meet program requirements and intentions, access, and circulation? Is the amount of space programmed adequate for short- and long-term mission needs?
- *Siting factors.* When analyzing the alternatives, have the costs associated with drainage, utility supply and distance, requirements for access, visual impacts, habitat disturbance, surface runoff, and excavation been considered?
- *Energy issues.* Are alternative energy sources available? Can energy use be reduced or optimized?
- *Water.* What are the relative costs and tradeoffs of the alternatives related to water and energy consumption and conservation, transportation impacts on energy use, water and air pollution, the reduction of hazardous, harmful or toxic substances?
- *Facility costs.* If a facility is needed, what are the first costs and life-cycle costs of acquiring a new facility instead of reusing or renovating an existing one? What is the economic driver for the project, first cost or life-cycle cost? Does the agency

have the budget flexibility to increase first costs as a means to decrease the project's life-cycle costs?

Programming/Budgeting Phase



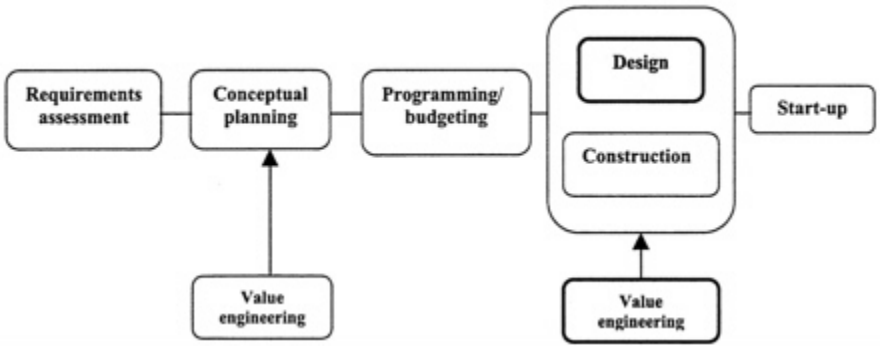
The key decisions to be made in this phase are

- which facilities to acquire and the timeframe for doing so.
- the amount of funds to be sought for design and construction.

Sustainable development considerations to be addressed during the programming and budgeting phase include

- clearly stating agency goals and objectives for Sustainable development in the program and budget documents.
- addressing first costs and life-cycle costs that justify any increase to first costs.
- considering potential benefits (e.g., productivity increases, employee retention).
- clearly stating objectives for meeting Executive Order 13123 requirements.

Design Phase



The key decisions to be made in this phase are

- selection of contractors to design and possibly to construct or renovate the facility.
- quality of design and construction expected.
- whether the agency will seek to meet a particular standard as guidance for integrating sustainable development.
- orientation of the building on the site with adjacent support facilities (access, roads, parking, utilities, and so forth).
- choice of systems and technologies.
- choice of materials.
- landscaping concepts.
- how to integrate the various systems, materials, siting choices to achieve the lowest life-cycle costs.

Typically, after funding has been approved, an agency identifies the strategy for selecting the entity that will prepare the detailed facility design. The first step may involve developing contract documents to solicit bids for design only (using a design-bid-build contract method) or possibly design and construction services (using a design-build contract) from private sector architectural and engineering firms and construction companies. Development of the contract documents will be facilitated if the agency has used an integrated project team that includes contract officers.

Decisions made about the selection of materials, technologies, and systems to be incorporated into a building will significantly affect its operation and maintenance, its overall sustainability and the ease and cost of disposal. For example, floor tile instead of carpet may result in lower maintenance costs and longer service life, and thus be more sustainable during the building's life. Building systems or materials containing or using toxic or hazardous materials will make it more difficult and costly to dismantle and dispose of the facility.

Contract Considerations

- What level of sustainability is to be achieved? For example, is the building to achieve a certified, silver, gold, or platinum level of sustainability under a "green building" rating system such as the U.S. Green Building Council's Leadership in Energy and Environment Design (LEED™, described in Chapters 4 and 5)? Is the building to meet Energy Star™ goals?
- What are the implications for sustainable development if the agency specifies design criteria? If the agency uses a performance-based contract?
- What contract method will best support the achievement of sustainable development objectives?
- What are the implications of the choice of project delivery method (i.e., design-bid-build, design-build, or other processes for sustainable development)? If design-build is the contract method, how will the requirements and incentives related to sustainable construction practices and features be enforced? If design-bid-build is

used how will the architects and engineers be compensated for any additional effort to find optimal solutions for achieving sustainable development goals?

- What are the implications of the choice of project delivery method for value engineering analyses? For example, the application of value engineering on design-build contracts may require special consideration. Value engineering should be used to evaluate the project requirements during the conceptual planning phase, which is normally done by the architectural and engineering firm prior to award of a design-build contract. It may be appropriate to use value engineering during design development with the design-build team; however, any design changes, either cost savings or increases, will need to be negotiated and balanced against sustainable goals.
- What are the implications of the contract selection procedure (e.g., lowest bid or best value) for meeting sustainable development objectives? If contractor selection is based on best value, life-cycle cost savings may be considered a primary evaluation factor. Contract options and value engineering proposals that reduce life-cycle costs may also be considered.
- What types of incentives and clauses should be added to contracts to promote sustainable features in the final design or construction? One example may be to include a requirement for a sustainable design consultant to ensure that sustainable features are incorporated and preserved throughout the design, construction, and start-up phases. Performance-based contracts can stipulate that the designer should maximize building energy efficiency and incorporate other resource-conserving, sustainable building features.
- Who will determine whether the incentive clauses have been met and how?
- What types of evaluations will be used to determine whether an architectural and engineering firm has the requisite experience to incorporate sustainable design features?
- What measures will be used to determine whether the design is sustainable?
- Will the construction contractor be responsible for sustainable construction practices, such as protection of trees on site and disposal of materials in an appropriate manner? Who will be responsible for monitoring and enforcing the implementation of such contract clauses?
- Will a team be established (e.g. architects, engineers, construction contractor, and operations and maintenance contractor) to be responsible for conducting a building start-up to ensure that all systems and equipment operate as intended?
- What level of commissioning is required? Who is liable for failures to meet these requirements? How will failures be remedied?
- Will the A-E firm or construction contractor be responsible for compiling a building operations manual containing the as-built conditions, defining maintenance schedules, predicting life-cycle repair and replacement, and so forth? If so, what documentation standards will be used?
- Who will approve such a manual? When will the manual be submitted?

Siting Considerations

- How can the building footprint, including associated access and parking facilities, be minimized on the site?
- Does the site design allow for flexibility to accommodate future requirements?
- Can facilities be located near public transportation or can a shuttle service be provided?
- Can alternative means of transportation be encouraged?

Actions that can be taken to *optimize site potential* include

- orienting the proposed structures to take advantage of climatic factors such as sun angle and wind direction, thereby using passive measures to reduce energy consumption.
- providing a central, public focus for a community of mixed-use facilities, using appropriate landscaping and providing amenities that promote social interaction and beneficial use of space in urban areas.
- providing pedestrian-friendly settings, thereby minimizing dependence on motor vehicles.
- minimizing distances between facilities.
- providing properly located sidewalks lighted for security and such traffic-calming measures as narrower roads with speed bumps.
- reducing heat islands using landscaping and building design methods.
- mitigating noise levels, both from the surroundings and from building operations.
- saving trees and vegetation.
- providing bicycle racks and shower facilities.

Energy Considerations

Energy usage is affected by several aspects of facility and site design including the building envelope; heating, ventilation, air conditioning equipment; and lighting systems. A well insulated facility that minimizes air infiltration, but allows controlled ventilation (operable windows), and uses materials and colors that allow predictable radiant heat gain and reflection, can facilitate energy conservation in lighting, provision of fresh air, heating and cooling of the facility.

- What utilities are available locally?
- How will this facility integrate into a campus-wide or urban utility system?
- Are thermal storage opportunities feasible?
- Are passive solar energy techniques or active systems such as hydro, fuel cell, photovoltaic, and wind generating equipment, suited to the climate? If so, can they be incorporated without adversely affecting program or mission?
- Can increasing the efficiency of the building envelope, the use of daylighting, or the application of passive techniques reduce heating and cooling requirements and lead to

downsizing or elimination of traditional heating, ventilation and air conditioning systems?
- What are the functional air requirements of the spaces being served?
- What are the energy goals?
- What energy design standard will be used?
- What level of individual temperature control is desired? What are the natural ventilation opportunities?
- Are all design assumptions embodied in current standards questioned in calculating heating and cooling loads and plug loads? Can the specification of energy-efficient equipment alter plug loads?
- What are the functional needs for light?
- How can energy-efficient lighting systems be used to support natural light sources?

Actions that can be taken to *minimize nonrenewable energy consumption* include

- using such renewable energy resources as solar power, particularly for facilities off the utility power grid and where peak use of commercial power can be reduced.
- allowing for adaptability of features (i.e., solar screening for summer, stone masonry during winter) to account for seasonal changes in solar radiant heat gain.
- using trees and other vegetation to redirect prevailing winds to the facility and to shade the structure.
- reducing the facility's surface-to-volume ratio while maintaining useable program efficiencies.
- using colors that reflect or absorb solar radiation.
- increasing absorption wall mass to enhance thermal storage (e.g., Trombe walls, where desirable).
- applying controllable natural ventilation, or airtight insulation exceeding code, to match the climactic conditions.
- placing and sizing openings appropriate to the solar angles.
- specifying efficient e- and R- values for windows, doors and wall insulation, and considering whether windows will be operable based on space functionality and coordination with ventilation system controls.
- incorporating structural measures including overhangs, light wells, photovoltaic cladding, ceiling height, and facility dimensions that will leverage increased energy efficiency of the integrated mechanical and electrical systems.
- optimizing the sizing of heating, ventilation and air conditioning equipment against reduced heating and cooling loads of lighting and the building envelope.
- optimizing cross-ventilation or use of ceiling fans where natural ventilation is feasible.
- selecting energy-efficient heating, ventilation, air conditioning, and humidity conditioning equipment, and high efficiency variable speed motors and fans.
- conditioning the humidity of the air to appropriate comfort levels as an integrated function of the system.
- complying with indoor air quality standards while minimizing energy required to

condition fresh intake air and using heat exchangers between intake and exhaust ducts.

- locating equipment for ease of maintenance, including easy access to filtration equipment for maintaining air quality.
- using on-demand water heaters where hot water use is minimal and using high-efficiency, solar-assisted water heaters.
- minimizing pipe lengths and insulating piping where central hot water storage is required.
- applying cogeneration to produce heat and hot water from a single power source (e.g., reuse the hot water or steam generated by fuel cells).
- specifying Energy Star™ office equipment and appliances (computers, copiers, printers, fax machines, refrigerators, microwaves, washers and dryers, etc.) and selecting energy efficient installed equipment, such as elevators and water heaters.
- using shared natural daylighting, (e.g., skylights, clerestories, light shelves, etc.) to reduce the need for artificial lighting.
- using area-specific lighting levels that will allow reduced ambient lighting levels and energy-efficient, low-heat-producing, electronically ballasted lamps and fixtures with automatic controls.

Materials Considerations

- What materials can be used that will result in less construction waste?
- What materials and products will minimize the costs and environmental impacts of disposing of the facility?

Actions that can be taken to support *using environmentally preferable products* include

- designing building dimensions to allow for use of resource-efficient systems (e.g., matching building dimensions to standard-size furniture and interior fittings to eliminate waste created through custom fitting).
- using demountable and reusable interior building components to accommodate program changes.
- specifying durable, low-maintenance materials or encouraging the use of recyclable assemblies and products that can be easily deconstructed at the end of their useful lives.
- specifying locally available materials with manufacturing processes that optimize energy expended on materials production and transportation and maximize benefits to local economies.
- specifying materials harvested on a sustained-yield basis, such as lumber from certified forests.
- eliminating the use of materials that pollute or are toxic during their manufacture, use, or reuse.
- identifying materials covered by the Recovered Materials Advisory Notices

issued by the Environmental Protection Agency under its comprehensive procurement guidelines.
- applying the Building for Environmental and Economic Sustainability (BEES) software developed by the National Institute for Standards and Technology to select materials with the desired combination of environmental benefits (see Chapter 5 for additional information about this software).

Water Considerations

- What measures can be taken to ensure water use is as efficient as possible?
- What opportunities are there for the presence of water to enhance optimization of mechanical and electrical systems?
- What measures can be taken to reduce, control, and treat surface runoff?
- Can rainwater collection cisterns and separate graywater systems for below-ground irrigation be incorporated to eliminate the use of potable water?

Actions that can be taken to *protect and conserve water* include

- installing water recovery systems and water-conserving cooling towers.
- planting indigenous plants that have adapted to natural water availability.
- using beneficial landscaping practices to minimize irrigation.
- using porous materials on paved surfaces to minimize runoff and pre-treating surface runoff.
- using pervious surfaces for low-traffic-volume roadways and parking areas and biofiltration swales and retention ponds to maximize infiltration and minimize runoff.
- installing an on-site biological waste treatment facility.
- using water efficiently through ultra-low-flow fixtures, water-conserving cooling towers, eliminating leaks, and other actions.
- eliminating lead-bearing products in potable water.
- recovering nonsewage and graywater for on-site use.

Indoor Environmental Quality Considerations

- Can interior and exterior environments be designed to protect occupant health and enhance worker productivity?

Actions that can be taken to *enhance indoor environmental quality* include:

- providing a well-designed interior environment that is visually and acoustically pleasing.
- providing thermal comfort with maximum personal control over temperature and humidity.

- assuring acoustic privacy and comfort through the use of sound-absorbing material and equipment isolation.
- controlling disturbing odors through contaminant isolation and providing proper ventilation.
- providing separate chemical storage areas with separate ventilation.
- complying with air quality standards with optimal energy use to condition fresh air and installing a permanent air-monitoring system to assure compliance.
- locating air intake ducts away from fume-producing areas, such as loading docks and driveways.
- using separate ventilation for interior work areas that produce noxious fumes.
- reducing or eliminating materials (paint, carpet, particleboard, adhesives) that contain toxic or hazardous substances, such as lead, asbestos, and volatile organic compounds, that affect human health.
- creating a high-performance luminous environment through integration of natural and artificial light sources.
- replacing ozone-depleting substances such as chlorinated fluorocarbons in refrigeration equipment and specifying PCB-free transformers and other electrical equipment.
- eliminating asbestos in existing and new buildings.
- providing radon infiltration barriers.

Operations and Maintenance Considerations

- Does the design accommodate the requirements of the facility operators through simplification of scheduled maintenance?
- What will be the format of the facility operating manual?
- Will the systems dictate additional training for staff to ensure proper operation and maintenance?

Actions that can be taken to *optimize operations and maintenance practices* include

- having the facility manager and building engineering staff on the integrated project team before and during design to ensure that maintainability considerations are incorporated into the design.
- specifying low-maintenance, durable, environmentally preferable materials and equipment.
- positioning equipment to allow for easy access for maintenance.
- adopting sustainability goals that reduce life-cycle operation and maintenance costs and reflecting those savings in budget documents.
- providing for electronic transfer of as-built drawings, product information, warranties, operation and maintenance instructions, and preventive maintenance schedules from the construction contractor to the facility owner's computer-aided facilities management system

- providing digital direct controls to allow real-time monitoring and operations control of building systems to maintain peak performance.

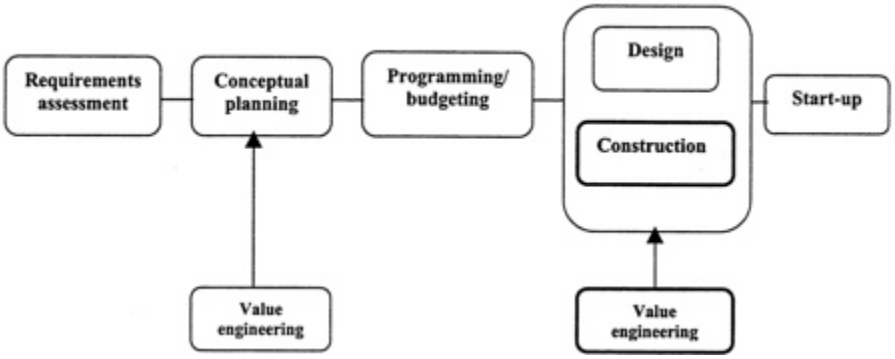
Value Engineering and Life-Cycle Costing Study

As the site and building design elements are identified, value engineering with life-cycle costing can be employed to analyze the functions of systems and materials, both individually and in relation to each other, for the purpose of achieving lowest life-cycle cost consistent with the required performance of the facility. A full value engineering study is appropriate at this point. All aspects of a facility's design—siting, structural, architectural, mechanical, electrical, and systems integration—can be reviewed for optimum functional balance across construction costs, user requirements, sustainability, and life-cycle costs. An independent team conducts the study, which is then reviewed by the responsible agents in the agency.

In the design phase the value engineering study can identify and provide alternatives for

- materials and equipment that are highly technical and will require additional training for operation and maintenance personnel to operate them appropriately.
- low-value, long-lead-time items.
- repetitive or similar items that appear in the design.
- designs that are pushing the state of the art or are of very recent origin, which may involve costs that outweigh the functions performed.
- complex items or processes with little or no value added to the facility.
- items that have remained unchanged for many years and lack technological improvements.

Construction Phase



The key decisions to be made in the construction phase are

- evaluation, analysis, and consideration of change orders that may affect facility sustainability.
- approval of value engineering change proposals.
- how to avoid compromising sustainable development strategies and objectives due to cost overruns.
- implementation of monitoring procedures.
- determining whether changes have been made that require additional training of operations and maintenance staff.

A significant challenge in the construction phase is managing changes resulting from such sources as scope of work changes by the owner, errors and omissions in the plans and specifications, and unknown or changed site conditions. The construction manager and the contractor may be inclined to deviate from the original design for a number of reasons. Making substitutions or changes in building design, components, or materials may affect the sustainability of the building. For example, cost overruns during construction may require scope reductions where high value, non-essential items are a tempting target. However, eliminating some high priced, high performance technologies (e.g., low e-value windows) may increase the first cost and life-cycle costs of other interdependent building system technologies, (e.g., heating, ventilation, air conditioning equipment) or otherwise result in unsatisfactory building performance. The design engineer can advise about the scope changes that can be accommodated without negatively affecting facility performance.

A similar circumstance may arise where standard construction practice deviates from the design drawings. Field changes, such as the placement of air ducts, may produce results that do not meet the sustainability objectives or goals. To preserve the benefits of sustainable development, it is essential to monitor the process to ensure that the contractor complies with the design drawings and specifications, including selecting materials and equipment with the specified performance characteristics.

Siting Considerations

- Can the environment of the construction site be preserved or restored?
- What effects will construction activity have on adjacent or nearby habitats, runoff to rivers and ponds, and dust distribution?

Actions that can be taken to *optimize site potential* include

- ensuring that trees and vegetation identified for preservation during design are saved.
- stockpiling and redistributing topsoil.
- replanting trees, particularly where benefit of shading on the facility envelope is cost effective.
- installing storm water retention ponds and filtration barriers to prevent siltation

and pollution of the watershed.
- designating parking, storage, work, and cleaning areas, (e.g., wash-down areas for concrete mixers) to minimize impact on the environment.
- planting vegetation (e.g., grass) to reduce runoff and mitigate dust.

Energy Considerations

- Are there methods that can be used to conserve energy during construction?
- Are there ways to ensure that energy conservation methods are not changed during construction?

Actions that can be taken to *minimize nonrenewable energy consumption* include

- consulting with the designer before modifying the design to reflect common construction industry practices, to ensure such modifications do not affect design performance.
- conserving energy to the degree possible during construction operations.
- constructing to the greatest extent possible in the factory and assembling on site in the largest practicable units.

Materials Considerations

- Does the contractor have a material recycling plan that calls for segregating materials for either reuse on the project or for sale to commercial recyclers?
- When submitting materials for approval for conformance to specifications, are judgments concerning which materials are environmentally preferable being reviewed prior to approval?

Actions that can be taken to *use environmentally preferable products* include

- recycling or salvaging construction waste and excess building materials through demolition planning and waste separation.
- reusing forms for concrete pours.
- ensuring conformance with specifications and calling for the use of environmentally preferable products.

Water Considerations

- Are water resources protected during construction?

Actions that can be taken to *protect and conserve water* include installing filtration barriers to prevent siltation and pollution thereby preserving the watershed.

Indoor Environmental Quality Considerations

- Can the production of harmful waste be reduced or eliminated?
- Can construction workers be protected from the hazards of such waste?

Actions that can be taken to *enhance indoor environmental quality* include

- flushing out the building of volatile organic compounds and other out-gases prior to sealing the building (although eliminating materials that produce these products is the preferred solution).
- implementing a commissioning plan to ensure proper operation and optimal performance of all energy-consuming equipment.

Operation and Maintenance Considerations

- Have measures been taken to ensure a smooth transfer of the completed building to the owner and operators and to familiarize the operator with the proper functioning and maintenance requirements of all building systems?

Actions that can be taken to *optimize operations and maintenance practices* include

- conducting building commissioning to ensure that all systems are working as specified and that the operator staff is familiar with the procedures for maintaining efficient performance.
- electronically transferring as-built drawings, product information, warranties, operation and maintenance instructions, and maintenance schedules from the construction contractor to the facility owner's computer-aided facilities management system.

Value Engineering and Life-Cycle Cost Analysis

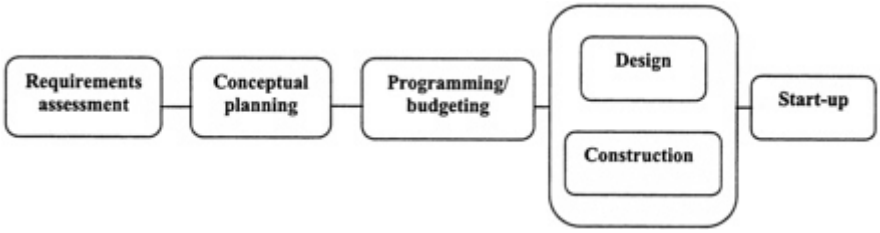
Value engineering can be successfully integrated into the project management/construction management (PM/CM) aspect of a project. When used for fast track, bid packaging, or increased project management application, value engineering as part of the manager's scope of work is an effective tool for preserving the sustainable qualities of facilities development. Since the PM/CM is responsible for cost, schedule, and quality control, value engineering is an effective tool that should be used.

The regulatory basis for the application of value engineering to design and construction projects is the Federal Acquisition Regulations, (Parts 48 and 52). It states that, as required by Section 36 of the Office of Federal Procurement Policy Act (41 U.S.C. 401, et seq.), "agencies shall establish and maintain cost-effective value

engineering procedures and processes" and that

> value engineering is the formal technique by which contractors may (1) voluntarily suggest methods for performing more economically and share in any resulting savings or (2) be required to establish a program to identify and submit to the Government methods for performing more economically. Value engineering attempts to eliminate, without impairing essential functions or characteristics, anything that increases acquisition, operation, or support costs.

Start-Up Phase



The key decisions to be made in the start-up phase are

- acceptance of the facility.
- the level of ongoing training to be provided to operations and maintenance staff and facility users.

During the start-up phase, systems and components are tested to ensure that all systems are working as specified and that the building operators are familiar with the procedures necessary to maintain the facility at optimum performance. It is also desirable to inform facility users about how their daily activities will affect energy performance and about the sustainable features of the facility.

Post-Start-Up: Operation and Maintenance of the Facility

If a facility's systems and equipment are not operated properly, sustainable development integration may not achieve the anticipated energy savings, indoor environmental quality standards, or expected service life.

Actions that can be taken to *optimize site potential* after the facility is occupied include

- promoting car pooling by giving priority parking and subsidizing public

transportation.
- minimizing travel by supporting telecommuting programs and enabling teleconferencing.
- providing securable bicycle racks in observable areas.

Actions that can be taken to *minimize nonremovable energy consumption* include

- operating and maintaining the facility in a manner that ensures optimal performance.
- consulting with the designer of heating, ventilation, and air conditioning systems when correcting deficiencies.
- properly training maintenance personnel.
- inviting occupants to bring performance issues to the attention of the facility manager.
- installing automated monitors and controls to measure energy, water, waste, temperature, moisture, and ventilation.
- monitoring building performance to document energy savings and to identify deviations from design targets.
- tuning the building systems as necessary.
- perform periodic recommissioning.

Actions that can be taken to *use environmentally preferable products* include

- using recycled content materials and high-efficiency equipment when replacing building components during routine maintenance.
- providing for collection of recyclable materials and placing containers where it is convenient for building occupants.
- establishing a recycling and waste management plan that seeks to eliminate disposal off site.

Actions that can be used to *protect and conserve water* include

- using environmentally beneficial landscaping practices and planting with native species to minimize the need for irrigation, fertilization, and pest control.
- reusing graywater from systems provided for in the design to irrigate, where necessary.

Actions that can be taken to *enhance indoor environmental quality* include

- using properly sealed vacuum cleaners to prevent airborne dust and using cleaning supplies with minimal air quality impact.
- cleaning heating, ventilation and air conditioning ducts and filters to eliminate airborne and waterborne bacteria, molds, dust mites, etc.
- monitoring air quality to ensure proper functioning of the ventilation system and detection of contaminants.

Actions that can be taken to *optimize operations and maintenance practices* include

- monitoring facility performance through a policy of scheduled recommissioning, metering, and annual reporting.
- training facility occupants, facilities managers, and maintenance crews in sustainable design concepts and requirements.
- using energy-efficient equipment for trimming and mowing to minimize air pollution.
- composting, mulching, and recycling organic materials.
- complying with the facility operations manual, operating the systems as intended, and maintaining the equipment at optimal performance.
- monitoring facility performance and documenting energy savings and deviations from design targets, tuning the systems as necessary.

REFERENCE

FFC (Federal Facilities Council). 2000. Adding Value to the Facility Acquisition Process: Best Practices for Reviewing Facility Designs. Washington, D.C.: National Academy Press.

4

Issues

As the task group developed its framework for acquiring sustainable federal facilities, it identified a number of issues related to implementation of the framework. These issues are summarized below.

FIRST COSTS, LIFE-CYCLE COSTS, AND SUSTAINABLE DEVELOPMENT

A fundamental conflict exists between federal acquisition policies and the federal budget process that will limit the benefits of sustainable development. Executive Order 13123 and other federal guidance related to facilities acquisition require life-cycle costing. Life-cycle costing implicitly recognizes that, in some circumstances, additional money invested in the design and construction of a facility can yield significant cost savings over the life of the facility, particularly during operation and maintenance. The federal budget process, in contrast, is structured to look at design and construction costs, the so-called first costs of facilities, not life-cycle costs.

The NRC report *Stewardship of Federal Facilities: A Proactive Strategy for Managing the Nation's Public Assets* (NRC, 1998), found that the "full life-cycle costs of new facilities are not considered in the current federal budget process. Instead, only the projected design and construction costs appear as a separate line item for congressional consideration." As a result, 60–85 percent of the total cost of the life cycle cost of a facility are not scrutinized as extensively as the first costs.

Agencies can, and have, been able to acquire facilities with sustainable development features at the same first cost as "traditional" facilities. On a case-by-case basis, agencies can present information to Congress and the Office of Management and Budget justifying higher first costs to achieve lower life-cycle costs. However, unless the federal budget process is modified to take into account life-cycle costs as a standard procedure, it will be difficult for agencies to realize the full range of benefits and cost savings possible from sustainable development.

MASTER SPECIFICATIONS AND GUIDEBOOKS

Although some federal agencies are shifting to commercial specifications for design and construction, others maintain master specifications and guide books. In both cases, it is likely that some existing specifications will be in conflict with or will not fully support sustainable development objectives simply because the specifications were based

on experience with traditional building standards, guidelines, and criteria. The General Services Administration, the State Department, and the Army have contracted with private-sector firms to review existing specifications and to suggest modifications to support sustainable development. As experience with sustainable development is gained, the master specifications will need to be reviewed and updated. Some agencies, including the Naval Facilities Engineering Command, are moving away from technical specifications towards performance-based specifications and in the process are incorporating sustainable development principles in the desired performance of a facility.

PERFORMANCE STANDARDS FOR SUSTAINABLE FACILITIES

Another issue that agencies must resolve is the performance standards against which sustainable facilities will be measured. The requirement for performance standards is established by Executive Order 13148, which states, "Within 18 months of the date of this order [signed April 21, 2000], each agency shall conduct an agency-level environmental management system self assessment based on the Code of Environmental Management Principles for Federal Agencies developed by the EPA (61 Fed. Reg. 54062) and/or another appropriate environmental management system framework." The Code of Environmental Management Principles requires agencies to make a management commitment to environmental programs through policy documents, conduct compliance assurance and pollution prevention assessments, and institute enabling systems to ensure performance and accountability through measurement. The only standard set in executive orders is in Executive Order 13123 which states "Agencies shall strive to meet the Energy Star (Registered Trademark) building criteria for energy performance and indoor environmental quality in their eligible facilities to the maximum extent practicable by the end of 2002."

Energy Star™, however, has limited use as a measurement for overall sustainable facility performance in that it addresses only the energy-related principles of sustainable development. The only nationally recognized sustainable facility performance standard is the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED™), a rating system that also rates siting, materials, water, indoor environmental quality, and operations and maintenance.

Under the LEED™ system, facilities can achieve a Certified, Certified Silver, Certified Gold, or Certified Platinum rating based on the use of sustainable design techniques and components. Credits are awarded in five categories: sustainable siting; water efficiency; energy and atmosphere; materials and resources; and indoor environmental quality. For sustainable siting, prerequisites include erosion and sedimentation control. Site selection points are based on avoidance of prime agricultural land, flood plains, and wetlands, habitat for threatened or endangered species, and public parkland. Points are also awarded for urban redevelopment; use of brownfields sites; provisions for alternative transportation facilities, reduced site disturbance of greenfields, storm water management, landscaping, and exterior design to reduce heat islands and light pollution. For water efficiency, points are awarded for water-use reduction measures including efficient landscaping and innovative technologies to reduce the amount of potable water required to convey sewage. For energy and atmosphere, prerequisites

include fundamental building commissioning, minimum energy performance based upon the American Society of Heating, Refrigerating and Air Conditioning Engineers and Illuminating Engineering Society of North America's Standard (ASHRAE/IESNA) 90–1– 1999 for energy consumption, and CFC reduction. Points are awarded for optimizing energy performance beyond the prerequisite level, employing renewable energy, providing additional building commissioning, elimination of CFCs and halons, measurement and verification using the Department of Energy's International Performance Measurement and Verification Protocol and the use of green power.

For materials and resources, prerequisites include storage and collection of recyclable materials. Points are awarded for building reuse, construction waste management, resource reuse, recycled content, use of local and regional materials, and rapidly renewable materials and certified wood.

For indoor environmental quality, prerequisites include minimum indoor air quality performance as defined by ASHRAE 62–1999 with no smoking in the building. Points are awarded for carbon dioxide monitoring, increased ventilation effectiveness based on ASHRAE 129–1997, a construction indoor air quality management plan, low-emitting materials, indoor air and pollutant source control, controllability of systems, thermal comfort, daylighting and views. Additional points are awarded for innovation leading to exceptional performance and the use of services by a LEED™-accredited professional.

A number of federal agencies, including the Department of State, the General Services Administration, and the Naval Facilities Engineering Command, have committed to using LEED™ as their performance measure for sustainable development. Additional information on Energy Star™ and the LEED™ rating system is contained in Chapter 5.

INDENTIFYING ENVIRONMENTALLY PREFERABLE PRODUCTS

The use of non-federal, third-party certifiers is encouraged by Executive Order 13101 "Greening the Government Through Waste Prevention, Recycling and Federal Acquisition," which states, "Agencies are encouraged to use all of the options available to them to determine the environmentally preferable attributes of products and services in their pilot and demonstration projects, including the use of technical expertise of nongovernmental entities such as labeling, certification, or standards-developing organizations, as well as using the expertise of the National Institute of Standards and Technology." The Executive Order directs the Environmental Protection Agency (EPA) to "develop guidance within 90 days from the date of this order to address environmentally preferable purchasing".

In response, the EPA issued the Final Guidance on Environmentally Preferable Purchasing for Federal Agencies in August 1999, which states:

> Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (NTTAA) (Pub. L. 104–113, §12 (d), 15 U.S.C. 272 note) and OMB Circular A-119 (63 FR8546, February 19, 1998) direct Federal agencies to use both domestic and international voluntary consensus standards in lieu of government-unique

standards in their procurement and regulatory activities, except where it would be inconsistent with applicable law or otherwise impractical. The Act's purpose is to reduce the cost of procurement and regulation by requiring a Federal agency to draw upon any suitable technical standard already used in commerce or industry rather than inventing a new standard. Some of those standards might relate to evaluating environmental performance and measuring the environmental attributes of products or services. In establishing Environmental Preferable Purchasing pilot projects or planning other environmentally sensitive activities, agencies should first determine whether there is an applicable voluntary consensus standard that would meet its needs.

LESSONS LEARNED

Designing, constructing, operating, and maintaining sustainable facilities is a new initiative for federal agencies. Because of the government-wide nature of this initiative, it is important to capture lessons learned about experience and to share experiences, both good and bad, within and among agencies. Such experiences can be related to the use of various project delivery systems, establishing objectives, the use of performance measures, and so forth.

Lessons learned can be shared through computerized data bases; publications; presentations at conferences, workshops, and other events; networking; and participation in professional societies. Several of the resources listed in Chapter 5 incorporate case studies and lessons learned for sustainable development.

REFERENCE

NRC (National Research Council). 1998. Stewardship of Federal Facilities: A Proactive Strategy for Managing the Nation's Public Assets. Washington, D.C.: National Academy Press.

5

Online Resources

Over the course of this study, the task group identified a wide range of online resources related to sustainable design and development, value engineering, performance measures, environmentally preferable products and lessons learned. This chapter contains a distillation of those resources, focussing primarily on federal agency resources and resources most directly related to this study. The list of Internet sites is organized into five general categories:

(1) Sustainable Development and Value Engineering; this category is subdivided into federal agency sites; government-wide guidance; and other sites.
(2) Performance Standards for Sustainable Facilities
(3) Environmentally Preferable Products
(4) Lessons Learned
(5) Index

SUSTAINABLE DEVELOPMENT AND VALUE ENGINEERING

Federal Agency Sites

Department of Agriculture
http://www.usda.gov:80/ocio/directives/SM/SM9500–6.html
Provides a copy of a 1996 Department of Agriculture memorandum that outlines the department's support for policies, programs, activities, and education in sustainable development.

Department of the Army
Information on Sustainable Design and Development
http://www.hqda.army.mil/acsimweb/fd/linksSDD.htm#document
Provides an index of documents, references, training materials, sustainable design and development success stories, and other sites that relate to the military.

Sustainable Design for Military Facilities
http://www.usace.army.mil/inet/usace-docs/eng-tech-ltrs/etl1110–3–491/entire.pdf
Provides information and guidance for incorporating sustainable design concepts in the design and construction of military facilities. The file is available for download in PDF-format.

Department of Defense

Defense Environmental Network & Information exchange

http://www.denix.osd.mil/denix/denix.html/

Provides access to environmental legislative, compliance, restoration, cleanup, and DoD guidance information. It is intended to serve as a central electronic "meeting place" where information can be exchanged among environmental professionals worldwide.

Department of Energy

Energy Efficiency and Renewable Energy Network

http://www.eren.doe.gov

Provides access to various DOE energy efficiency and renewable energy information resources, including:

Federal Energy Management Program Building Commissioning Guide

http://www.eren.doe.gov/femp/techassist/bldgcomgd.html

Provides links to the Federal Energy Management Program's *Building Commissioning Guide*. The guide was created by the Federal Energy Management Program, in cooperation with the General Services Administration, to address the requirements of Executive Order 12902, which state that each federal agency involved in the construction of a new facility must ensure that the facility is designed to minimize the life cycle cost of the facility by using energy efficiency, water conservation, or renewable energy technologies.

Federal Energy Management Program Greening Federal Facilities Guide

http://www.eren.doe.gov/femp/greenfed

Provides access to the Federal Energy Management Program's *Greening Federal Facilities,* a resource guide for federal facility managers to assist them in reducing energy consumption and costs, to help improve the working environment of the facilities they manage, and reduce the environmental impacts of their operations.

Office of Building Technology, State, and Community Programs Building Energy Software Tools

http://www.eren.doe.gov/buildings/tools_directory

Contains information on various energy-related software tools for buildings, which emphasize the use of renewable energy and energy efficiency and sustainability in buildings.

Guidelines for Sustainable Building Design: Recommendations from the Presidio of San Francisco Energy Efficiency Design Charrette

http://ateam.lbl.gov/PUBS/brownprs.pdf

Provides access to the proceedings from a design workshop held in 1994 that was organized to develop solutions for the energy-efficient redevelopment of buildings by the National Park Service (NPS) at the Presidio of San Francisco. This event brought together engineers, researchers, architects, government officials, and students in a

participatory environment to apply their experience to create guidelines for the sustainable redesign of Presidio buildings. The document draws on information developed in the charrette, combined with experience gained by the Lawrence Berkeley National Laboratory Applications Team in subsequent actual Presidio design assistance for the NPS. The emphasis on optimization and an interdisciplinary integrated-systems approach may be applicable to the creation of sustainable buildings in other settings.

Buildings Technology Center
Oak Ridge National Laboratory
http://www.ornl.gov/ORNL/BTC/

The Buildings Technology Center (BTC) at Oak Ridge National Laboratory is a research facility devoted to the development of technologies that improve the energy efficiency and environmental compatibility of residential and commercial buildings. Established by the U.S. Department of Energy's Office of Building Technology State and Community Programs, the BTC is a designated "National User Facility," which means that its facilities are available to manufacturers, universities, and other organizations for proprietary and nonproprietary research and development.

Environmental Restoration Applied Cost Engineering Team
http://www.em.doe.gov/aceteam/

Serves as the homepage for the Department of Energy's Environmental Restoration Applied Cost Engineering Team. The ACE team is part of DOE's Environmental Management program, and was established to promote continuous cost improvements through dissemination of cost engineering tools, methods, techniques, best practices, and lessons learned across the Environmental Management complex. The site outlines ACE team activities and lessons learned from the program.

Center of Excellence for Sustainable Development
http://www.sustainable.doe.gov

This Department of Energy site offers a menu of information and services on sustainable development strategies for local communities, including:

Sustainable Building Technical Manual

http://www.sustainable.doe.gov/articles/ptipub.htm

The Sustainable Building Technical Manual: Green Building Design, Construction, and Operations is designed to help architects, developers, building owners, government officials, and others implement sustainable development practices.

Department of the Interior
National Park Service
Greening the National Parks Through Environmental Leadership
http://www.nps.gov/renew/

Contains information on the National Park Service's environmental initiatives, including:

Guiding Principles of Sustainable Design

http://www.nps.gov/dsc/dsgncnstr/gpsd/toc.html

Provides links to the principles used by the National Park Service as a basis for achieving sustainability in facility planning and design.

Bureau of Reclamation—Value Program

http://www.usbr.gov/valuprog/

Provides information on the Department of the Interior's Bureau of Reclamation Value Program. Links to program studies and value engineering resources are provided.

Environmental Protection Agency

Office of Enforcement and Compliance Assurance

http://es.epa.gov/oeca/cemp/cemptoc.html

Provides access to *the Implementation Guide for the Code of Environmental Management Principles for Federal Agencies.* The site provides answers to such questions as: what is the code of environmental management principles; and, what is an environmental management system? The guide, and additional resources, are available on the site in Adobe Acrobat format.

Federal Highway Administration—Value Engineering

http://www.fhwa.dot.gov/ve/vehome.htm

Provides information on the regulations covering value engineering for the federal-aid highway program. Information provided includes the FHWA's value engineering policy; the value engineering process; the value engineering job plan; the rationale for performing value engineering reviews; a description of the value engineering workshop for training individuals in public transportation organizations; and year-end summary reports of state value engineering activity.

General Services Administration

Planet GSA

http://www.gsa.gov/planetgsa/

Provides information on the Planet GSA Program, the General Services Administration's homepage on "green" initiatives. It contains information on GSA's national building green initiative, and buying green, driving green, managing green, and saving green resources.

GSA Real Property Sustainable Development Guide

http://www.gsa.gov/realpropertypolicy

Provides access to the General Services Administration's Real Property Sustainable Development Guide, a 28-page guide highlighting principles of Sustainable development. Chapters include the sustainable workplace; implementing sustainability; ideas/case studies; and resources. The guide is available for download in PDF-format.

U.S. Air Force
Environmentally Responsible Facilities Guide, June 1998
Air Force Center for Environmental Excellence
http://www.afcee.brooks.af.mil/green/facilitiesguide/facguide.asp

Provides access to the U.S. Air Force Environmentally Responsible Facilities Guide. The guide provides an introduction to the environmental challenges faced in planning, programming, designing and constructing facilities. It addresses facility-and site-related issues and is intended to be a practical tool for implementing environmentally-responsible practices. It is available for download in PDF-format.

Green Base of the Future
http://www.3di.com/gbof/

Provides information on the Green Base of the Future project. The project is an outgrowth of the Texas Pollution Prevention Partnership that was formed between the Texas Natural Resource Conservation Commission and military installations in Texas in June 1996. Together with the Air Force Center for Environmental Excellence (AFCEE), the partnership conceived the Green Base of the Future initiative in order to integrate pollution prevention into everyday activities throughout military installations in Texas and, to further AFCEE's goals for resource conservation.

U.S. Army Corps of Engineers
http://www.cecer.army.mil/sustdesign/

Provides access to the Engineer Research and Development Center and the Construction Engineering Research Laboratory of the U.S. Army Corps of Engineers. The site provides information on sustainable design and development, actions the U.S. Army Corps of Engineers is taking in this area, and highlights of other federal agencies' sustainable design and development efforts.

U.S. Navy
Naval Facilities Engineering Command
Criteria Office and Engineering Innovation Division
http://www.efdlant.navfac.navy.mil/Lantops_15/home.htm

Contains information on, and links to, the Naval Facilities Engineering Command's planning and design policy statements on sustainable development.

Naval Facilities Engineering Service Center
Joint Service Pollution Prevention Technical Library
http://enviro.nfesc.navy.mil/p2library/

Provides access to the Joint Service Pollution Prevention Technical Library. The library deals with pollution prevention and compliance information and is comprised of the *Pollution Prevention Opportunity Handbook, Pollution Prevention Equipment Book, Environmental Products Catalog,* and technical documents.

Whole Building Design Guide
National Institute of Building Sciences
http://www.wbdg.org/

Provides access to the Whole Building Design Guide, which is sponsored by several federal agencies, through the National Institute of Building Sciences. The Whole Building Design Guide condenses data about building design and products into more usable, up-to-date information. Users will be able to access specific information through resource pages by way of three major categories: Building Types, Design Criteria, and Products and Systems. The resource pages are reductive summaries on particular topics written by industry experts, and provide links to both internal pages and external sites.

Government-wide Guidance

Code of Federal Regulations
http://www.access.gpo.gov/nara/cfr/cfr-table-search.html

Provides access to the general and permanent rules published in the *Federal Register* by the executive departments and agencies of the federal government.

Council on Environmental Quality
http://www.whitehouse.gov/CEQ/

Provides information on the Council on Environmental Quality. The Council coordinates federal environmental efforts and works closely with agencies and other White House offices in the development of environmental policies and initiatives.

Executive Orders
http://www.pub.whitehouse.gov/search/executive-orders.html

Allows the user to search for Executive Orders.

Office of Management and Budget Circulars
http://www.whitehouse.gov/OMB/circulars/index.html

Contains links to OMB circulars; circulars are arranged in numerical order.

Federal Acquisition Regulations
http://www.arnet.gov/far/

Provides access to current Federal Acquisition Regulations, Federal Acquisition Circulars, and other information related to Federal Acquisition Regulations.

National Town Meeting for a Sustainable America
http://www.sustainableusa.com/proceedings/

Contains the proceedings of the National Town Meeting for a Sustainable America held on May 2–5, 1999, in Detroit, Michigan, and other locations across America. The National Town Meeting was co-sponsored by the President's Council on Sustainable Development and the Global Environment and Technology Foundation.

Other Sites

American Planning Association

APA Policy Guide on Planning for Sustainability

http://www.planning.org/govt/sustdvpg.htm

Contains the American Planning Association's policy guide on planning for sustainability; adopted by Chapter Delegate Assembly, April 16, 2000 and ratified by Board of Directors, April 17, 2000.

Assessing Progress Toward Sustainability Project

International Development Research Centre and the World Conservation Union

http://www.iucn.org/themes/eval/english/index.htm

Provides information about the concepts, tools and case studies for monitoring, evaluating, and diagnosing processes for achieving sustainability.

Association for the Advancement of Cost Engineering

http://www.cost.org/

Provides access to the Association for the Advancement of Cost Engineering. The Association provides information and resources for cost managers and engineers, project managers, planners and schedulers, estimators and bidders, and value engineers.

California Department of Transportation

Value Analysis Guides

http://www.dot.ca.gov/hq/oppd/value

Provides access to the California DOT's guides on value engineering: Value Analysis Report Guide and Value Analysis Team Guide. Both files are available for download in pdf-format.

Canadian Society of Value Analysis

http://www.scav-csva.org/CSVA.htm

Provides information on the Canadian Society for Value Analysis. The Society promotes the value analysis methodology by producing publications and holding conferences.

City of Austin

The Green Building Program

http://www.ci.austin.tx.us/greenbuilder/

Provides information on the City of Austin's Green Building Program, which encourages construction professionals and consumers to incorporate sustainable building practices, systems, and materials into residential and commercial construction. The program presents specific and general recommendations for environmentally friendly homes that may also be relevant to other types of development.

City of New York
High Performance Building Guidelines
http://www.ci.nyc.ny.us/html/ddc/pdf/greentoc.pdf

Provides access to *High Performance Building Guidelines,* a set of guidelines designed to bring awareness of green design to New York City's building procurement process. The guidelines also serve as a resource for anyone working to incorporate environmental principles into commercial buildings.

National Center for Appropriate Technology
Center for Resourceful Building Technology
http://www.crbt.org

Provides information on the Center for Resourceful Building Technology, a project of the National Center for Appropriate Technology (www.ncat.org). The Center promotes environmentally responsible construction practices through research, education, and demonstration.

SAVE
Society of American Value Engineers
http://www.value-eng.org

Provides information on value engineering, including trends, upcoming events, links and resources.

University of Michigan
Sustainable Architecture Compendium
http://www.umich.edu/~nppcpub/resources/compendia/architecture.html

Provides access to the University of Michigan's *Sustainable Architecture Compendium*. The site contains resource lists, documents, and bibliographies related to Sustainable development. Documents are available for download in PDF-format.

PERFORMANCE STANDARDS FOR SUSTAINABLE FACILITIES

BREEAM
Building Research Establishment Ltd. of the United Kingdom
http://www.bre.co.uk/sustainable/service1.html

Provides access to the Building Research Establishment Environmental Assessment Method (BREEAM), a tool that allows owners, users, and designers of buildings to review and improve environmental performance throughout the life of a building. It sets a benchmark for environmental performance. It is based on construction and environmental research carried out at the Building Research Establishment together with the input of the construction and property industries and government and building regulators.

Environmental Protection Agency
Energy Star Buildings Program
http://www.epa.gov/buildings

Provides information on the Energy Star Buildings Program, a voluntary program in which building owners agree to install high-efficiency heating, cooling, ventilating and

lighting and control products. A central component of the program is the five-stage implementation strategy that takes advantage of building system interactions, enabling building owners to achieve additional energy savings while lowering capital expenditures. Also includes:

ENERGY STAR™

http://www.epa.gov/buildings/label

Provides an introduction to the Energy Star label for buildings. The EPA and the U.S. Department of Energy have established Energy Star criteria for commercial buildings based on energy consumption on a 0-to-100 scale. Buildings that are among the top 25 percent nationwide in terms of energy performance, equal to a benchmarking score of 75 or greater, and that maintain an indoor environment that conforms to industry standards can qualify for designation as Energy Star buildings.

Energy Star™ Buildings Upgrade Manual

http://www.epa.gov/buildings/esbhome/about/planning.pdf

Contains the Energy Star™ Buildings Upgrade Manual, a guide for Energy Star™ building partners to use in planning and implementing profitable energy-efficiency upgrades in their facilities. The manual can be used as a framework for an energy strategy, focusing on the Energy Star™ buildings five-stage approach:

Stage 1—Green lights

Stage 2—Building tune-up

Stage 3—Other load reductions

Stage 4—Fan system upgrades

Stage 5—Heating and cooling system upgrades

Leadership in Energy and Environmental Design Green Building Rating System Criteria (LEED)
U.S. Green Building Council
http://www.usgbc.org/programs/leed.htm

Provides information on the LEED Green Building Rating System™. LEED™ evaluates environmental performance from a "whole building" perspective over a building's life cycle, providing a definitive standard for what constitutes a "green building." LEED™ is a self-certifying system designed for rating new and existing commercial, institutional, and high-rise residential buildings. It is a feature-oriented system where credits are earned for satisfying each criterion. Different levels of green building certification are awarded based on the total credits earned.

U.S. Green Building Council
http://www.usgbc.org/

The homepage of the U.S. Green Building Council; its mission is to accelerate the adoption by industry and government of green building practices, technologies, policies, and standards.

ENVIRONMENTALLY PREFERABLE PRODUCTS

Architectural Record Green Products Guide
http://192.215.32.159/GREEN/GREEN.ASP

Created and maintained by *Architecturalrecord.com,* provides links to environmentally-friendly building materials resources.

Carnegie Mellon University
Economic Input-Output Life Cycle Assessment
http://www.eiolca.net

Provides access to the Carnegie Mellon University, Green Design Initiative, Economic Input-Output Life Cycle Assessment. This tool allows the user to estimate the overall environmental effects of producing a certain dollar amount of any of 500 commodities or services in the United States. It provides guidance on the relative impacts of different types of products, materials, services, and industries with respect to resource use and emissions.

Department of State
Office of the Procurement Executive
http://www.statebuy.gov/green.htm

Provides information, links, and resources on buying environmentally safe and recycled products for contracting and program activities worldwide.

Environmental Protection Agency
Environmentally Preferable Purchasing
http://www.epa.gov/oppt/epp/database.htm

Provides access to the Environmental Protection Agency's Environmentally Preferable Purchasing Database, as well as the Greening Uncle Sam (GUS) Purchasing Tool Site. Also includes:

Legislative References for Environmentally Preferable Products

http://www.epa.gov/opptintr/epp/resources.html

Contains documents and links, compiled by the Environmental Protection Agency, which provide information about environmentally preferable purchasing.

Environmental Products
Defense Logistics Agency
http://www.dscr.dla.mil/products/epa/eppcat.htm

Provides access to the Defense Logistics Agency supply catalog of environmental products.

King County, Washington, Map of Recycled-Content Buildings
http://dnr.metrokc.gov/market/encompass/index.htm

Contains examples of recycled content construction projects, and provides access to information and resources regarding sustainable building and recycled materials, recycled-content construction materials, and recycled construction.

National Institute of Standards and Technology
Building for Environmental and Economic Sustainability
http://www.bfrl.nist.gov/oae/bees.html

Contains information regarding the Building for Environmental and Economic Sustainability tool. BEES provides a technique for balancing the environmental and economic performance of building products. Developed by the National Institute of Standards and Technology Building and Fire Research Laboratory with support from the U.S. EPA Environmentally Preferable Purchasing Program and the White House-sponsored Partnership for Advancing Technology in Housing, the tool is based on consensus standards and designed to be practical, flexible, and transparent. Version 2.0 of the Windows™-based decision support software, aimed at designers, builders, and product manufacturers, includes actual environmental and economic performance data for 65 building products.

BEES measures the environmental performance of building products by using the environmental life-cycle assessment approach specified in ISO 14000 standards. All stages in the life of a product are analyzed: raw material acquisition, manufacture, transportation, installation, use, and recycling and waste management. Economic performance is measured using the American Society for Testing and Materials (ASTM) standard life-cycle cost method, which covers the costs of initial investment, replacement, operation, maintenance and repair, and disposal. Environmental and economic performance are combined into an overall performance measure using the ASTM standard for Multi-Attribute Decision Analysis. For the entire BEES analysis, building products are defined and classified according to the ASTM standard classification for building elements known as UNIFORMAT II. BEES is being further developed as a tool to assist the federal procurement community in carrying out Executive Order 13101.

State of Massachusetts
Environmentally Preferable Products Procurement Program
http://www.magnet.state.ma.us/osd/enviro/

The home page of the Environmentally Preferable Products (EPP) Procurement Program of the Commonwealth of Massachusetts. This site provides information about the Commonwealth's efforts to buy EPPs, State contracts for the purchase of recycled products and other EPPs, available guides and reports, upcoming events, and contacts. This web site is provided to address the environmentally preferred products information needs of a number of user groups, including federal environmental purchasing program managers.

LESSONS LEARNED

Audubon House
http://www.audubon.org/nas/ah/index.html

Highlights the Audubon House, headquarters of the National Audubon Society, which was renovated and designed to be a model of the energy-efficient, environmentally responsible workplace.

Design for Environment
http://www.pnl.gov/doesustainabledesign/

Provides access to the *Roadmap for Integrating Sustainable Design into Site-Level Operations.* This document was prepared by Pacific Northwest National Laboratory for the Department of Energy. It presents a roadmap for integrating Sustainable design at U.S. Department of Energy sites.

Montana State University EPICenter
http://www.montana.edu/epicenter/

Provides information on Montana State University's Green Building Project, the EPICenter, which utilized several new Sustainable building technologies.

Pennsylvania's First Green Building
http://www.gggc.state.pa.us/building/scrob.html

Provides an overview of the Pennsylvania Department of Environmental Protection South-central Regional Office Building, the State of Pennsylvania's first green building.

INDEX

World Wide Web Virtual Library—Sustainable Development
http://www.ulb.ac.be/ceese/meta/sustvl.html

Provides an extensive list of web-sites that focus on Sustainable development, including organizations, projects and activities, electronic journals, libraries, references and documents, databases, directories and meta-databases maintained by the Center for Economic and Social Studies on the Environment, at Université Libre de Bruxelles.

APPENDIX A

Executive Order 13123

THE WHITE HOUSE
Office of the Press Secretary
For Immediate Release June 3, 1999
EXECUTIVE ORDER 13123

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GREENING THE GOVERNMENT THROUGH EFFICIENT ENERGY MANAGEMENT

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the National Energy Conservation Policy Act (Public Law 95–619, 92 Stat. 3206, 42 U.S.C. 8252 et seq.), as amended by the Energy Policy Act of 1992 (EPACT) (Public Law 102–486, 106 Stat. 2776), and section 301 of title 3, United States Code, it is hereby ordered as follows:

PART 1—PREAMBLE

Section 101. Federal Leadership. The Federal Government, as the Nation's largest energy consumer, shall significantly improve its energy management in order to save taxpayer dollars and reduce emissions that contribute to air pollution and global climate change. With more than 500,000 buildings, the Federal Government can lead the Nation in energy efficient building design, construction, and operation. As a major consumer that spends $200 billion annually on products and services, the Federal Government can promote energy efficiency, water conservation, and the use of renewable energy products, and help foster markets for emerging technologies. In encouraging effective energy management in the Federal Government, this order builds on work begun under EPACT and previous Executive orders.

PART 2—GOALS

Sec. 201. Greenhouse Gases Reduction Goal. Through life-cycle cost-effective energy measures, each agency shall reduce its greenhouse gas emissions attributed to facility energy use by 30 percent by 2010 compared to such emissions levels in 1990. In order to encourage optimal investment in energy improvements, agencies can count greenhouse gas reductions from improvements in nonfacility energy use toward this goal to the extent that these reductions are approved by the Office of Management and Budget (OMB).

Sec. 202. Energy Efficiency Improvement Goals. Through life-cycle cost-effective measures, each agency shall reduce energy consumption per gross square foot of its facilities, excluding facilities covered in section 203 of this order, by 30 percent by 2005 and 35 percent by 2010 relative to 1985. No facilities will be exempt from these goals unless they meet new criteria for exemptions, to be issued by the Department of Energy (DOE).

Sec. 203. Industrial and Laboratory Facilities. Through life-cycle cost-effective measures, each agency shall reduce energy consumption per square foot, per unit of production, or per other unit as applicable by 20 percent by 2005 and 25 percent by 2010 relative to 1990. No facilities will be exempt from these goals unless they meet new criteria for exemptions, as issued by DOE.

Sec. 204. Renewable Energy. Each agency shall strive to expand the use of renewable energy within its facilities and in its activities by implementing renewable energy projects and by purchasing electricity from renewable energy sources. In support of the Million Solar Roofs initiative, the Federal Government shall strive to install 2,000 solar energy systems at Federal facilities by the end of 2000, and 20,000 solar energy systems at Federal facilities by 2010.

Sec. 205. Petroleum. Through life-cycle cost-effective measures, each agency shall reduce the use of petroleum within its facilities. Agencies may accomplish this reduction by switching to a less greenhouse gas-intensive, nonpetroleum energy source, such as natural gas or renewable energy sources; by eliminating unnecessary fuel use; or by other appropriate methods. Where alternative fuels are not practical or life- cycle cost-effective, agencies shall strive to improve the efficiency of their facilities.

Sec. 206. Source Energy. The Federal Government shall strive to reduce total energy use and associated greenhouse gas and other air emissions, as measured at the source. To that end, agencies shall undertake life-cycle cost-effective projects in which source energy decreases, even if site energy use increases. In such cases, agencies will receive credit toward energy reduction goals through guidelines developed by DOE.

Sec. 207. Water Conservation. Through life-cycle cost-effective measures, agencies shall reduce water consumption and associated energy use in their facilities to reach the goals set under section 503(f) of this order. Where possible, water cost savings and associated energy cost savings shall be included in Energy Savings-Performance Contracts and other financing mechanisms.

PART 3—ORGANIZATION AND ACCOUNTABILITY

Sec. 301. Annual Budget Submission. Each agency's budget submission to OMB shall specifically request funding necessary to achieve the goals of this order. Budget submissions shall include the costs associated with: encouraging the use of, administering, and fulfilling agency responsibilities under Energy-Savings Performance Contracts, utility energy-efficiency service contracts, and other contractual platforms for achieving conservation goals; implementing life-cycle cost-effective measures; procuring life-cycle cost-effective products; and constructing sustainably designed new buildings, among other energy costs. OMB shall issue guidelines to assist agencies in developing appropriate requests that support sound investments in energy improvements and energy-using products. OMB shall explore the feasibility of establishing a fund that agencies could draw on to finance exemplary energy management activities and investments with higher initial costs but lower life-cycle costs. Budget requests to OMB in support of this order must be within each agency's planning guidance level.

Sec. 302. Annual Implementation Plan. Each agency shall develop an annual implementation plan for fulfilling the requirements of this order. Such plans shall be included in the annual reports to the President under section 303 of this order.

Sec. 303. Annual Reports to the President, (a) Each agency shall measure and report its progress in meeting the goals and requirements of this order on an annual basis. Agencies shall follow reporting guidelines as developed under section 306(b) of this order. In order to minimize additional reporting requirements, the guidelines will clarify how the annual report to the President should build on each agency's annual Federal energy reports submitted to DOE and the Congress. Annual reports to the President are due on January 1 of each year beginning in the year 2000.

(b) Each agency's annual report to the President shall describe how the agency is using each of the strategies described in Part 4 of this order to help meet energy and greenhouse gas reduction goals. The annual report to the President shall explain why certain strategies, if any, have not been used. It shall also include a listing and explanation of exempt facilities.

Sec. 304. Designation of Senior Agency Official. Each agency shall designate a senior official, at the Assistant Secretary level or above, to be responsible for meeting the goals and requirements of this order, including preparing the annual report to the President. Such designation shall be reported by each Cabinet Secretary or agency head to the Deputy Director for Management of OMB within 30 days of the date of this order. Designated officials shall participate in the Interagency Energy Policy Committee, described in section 306 (d) of this order. The Committee shall communicate its activities to all designated officials to assure proper coordination and achievement of the goals and requirements of this order.

Sec. 305. Designation of Agency Energy Teams. Within 90 days of the date of this order, each agency shall form a technical support team consisting of appropriate

procurement, legal, budget, management, and technical representatives to expedite and encourage the agency's use of appropriations, Energy-Savings Performance Contracts, and other alternative financing mechanisms necessary to meet the goals and requirements of this order. Agency energy team activities shall be undertaken in collaboration with each agency's representative to the Interagency Energy Management Task Force, as described in section 306(e) of this order.

Sec. 306. Interagency Coordination, (a) Office of Management and Budget. The Deputy Director for Management of OMB, in consultation with DOE, shall be responsible for evaluating each agency's progress in improving energy management and for submitting agency energy scorecards to the President to report progress.

(1) OMB, in consultation with DOE and other agencies, shall develop the agency energy scorecards and scoring system to evaluate each agency's progress in meeting the goals of this order. The scoring criteria shall include the extent to which agencies are taking advantage of key tools to save energy and reduce greenhouse gas emissions, such as Energy Savings Performance Contracts, utility energy-efficiency service contracts, ENERGY STAR (Registered Trademark) and other energy efficient products, renewable energy technologies, electricity from renewable energy sources, and other strategies and requirements listed in Part 4 of this order, as well as overall efficiency and greenhouse gas metrics and use of other innovative energy efficiency practices. The scorecards shall be based on the annual energy reports submitted to the President under section 303 of this order.

(2) The Deputy Director for Management of OMB shall also select outstanding agency energy management team(s), from among candidates nominated by DOE, for a new annual Presidential award for energy efficiency.

(b) Federal Energy Management Program. The DOE's Federal Energy Management Program (FEMP) shall be responsible for working with the agencies to ensure that they meet the goals of this order and report their progress. FEMP, in consultation with OMB, shall develop and issue guidelines for agencies' preparation of their annual reports to the President on energy management, as required in section 303 of this order. FEMP shall also have primary responsibility for collecting and analyzing the data, and shall assist OMB in ensuring that agency reports are received in a timely manner.

(c) President's Management Council. The President's Management Council (PMC), chaired by the Deputy Director for Management of OMB and consisting of the Chief Operating Officers (usually the Deputy Secretary) of the largest Federal departments and agencies, will periodically discuss agencies' progress in improving Federal energy management.

(d) Interagency Energy Policy Committee. This Committee was established by the Department of Energy Organization Act. It consists of senior agency officials designated in accordance with section 304 of this order. The Committee is responsible for encouraging implementation of energy efficiency policies and practices. The major

energy-consuming agencies designated by DOE are required to participate in the Committee. The Committee shall communicate its activities to all designated senior agency officials to promote coordination and achievement of the goals of this order.

(e) Interagency Energy Management Task Force. The Task Force was established by the National Energy Conservation Policy Act. It consists of each agency's chief energy manager. The Committee shall continue to work toward improving agencies' use of energy management tools and sharing information on Federal energy management across agencies.

Sec. 307. Public/Private Advisory Committee. The Secretary of Energy will appoint an advisory committee consisting of representatives from Federal agencies, State governments, energy service companies, utility companies, equipment manufacturers, construction and architectural companies, environmental, energy and consumer groups, and other energy-related organizations. The committee will provide input on Federal energy management, including how to improve use of Energy-Savings Performance Contracts and utility energy-efficiency service contracts, improve procurement of ENERGY STAR (Registered Trademark) and other energy efficient products, improve building design, reduce process energy use, and enhance applications of efficient and renewable energy technologies at Federal facilities.

Sec. 308. Applicability. This order applies to all Federal departments and agencies. General Services Administration (GSA) is responsible for working with agencies to meet the requirements of this order for those facilities for which GSA has delegated operations and maintenance authority. The Department of Defense (DOD) is subject to this order to the extent that it does not impair or adversely affect military operations and training (including tactical aircraft, ships, weapons systems, combat training, and border security).

PART 4—PROMOTING FEDERAL LEADERSHIP IN ENERGY MANAGEMENT

Sec. 401. Life-Cycle Cost Analysis. Agencies shall use life-cycle cost analysis in making decisions about their investments in products, services, construction, and other projects to lower the Federal Government's costs and to reduce energy and water consumption. Where appropriate, agencies shall consider the life-cycle costs of combinations of projects, particularly to encourage bundling of energy efficiency projects with renewable energy projects. Agencies shall also retire inefficient equipment on an accelerated basis where replacement results in lower life-cycle costs. Agencies that minimize life- cycle costs with efficiency measures will be recognized in their scorecard evaluations.

Sec. 402. Facility Energy Audits. Agencies shall continue to conduct energy and water audits for approximately 10 percent of their facilities each year, either independently or through Energy-Savings Performance Contracts or utility energy-efficiency service contracts.

Sec. 403. Energy Management Strategies and Tools. Agencies shall use a variety of energy management strategies and tools, where life-cycle cost-effective, to meet the goals of this order. An agency's use of these strategies and tools shall be taken into account in assessing the agency's progress and formulating its score card.

(a) Financing Mechanisms. Agencies shall maximize their use of available alternative financing contracting mechanisms, including Energy-Savings Performance Contracts and utility energy-efficiency service contracts, when life-cycle cost-effective, to reduce energy use and cost in their facilities and operations. Energy-Savings Performance Contracts, which are authorized under the National Energy Conservation Policy Act, as modified by the Energy Policy Act of 1992, and utility energy-efficiency service contracts provide significant opportunities for making Federal facilities more energy efficient at no net cost to taxpayers.

(b) ENERGY STAR (Registered Trademark) and Other Energy Efficient Products.

(1) Agencies shall select, where life-cycle cost-effective, ENERGY STAR? and other energy efficient products when acquiring energy-using products. For product groups where ENERGY STAR (Registered Trademark) labels are not yet available, agencies shall select products that are in the upper 25 percent of energy efficiency as designated by FEMP. The Environmental Protection Agency (EPA) and DOE shall expedite the process of designating products as ENERGY STAR (Registered Trademark) and will merge their current efficiency rating procedures.

(2) GSA and the Defense Logistics Agency (DLA), with assistance from EPA and DOE, shall create clear catalogue listings that designate these products in both print and electronic formats. In addition, GSA and DLA shall undertake pilot projects from selected energy-using products to show a "second price tag", which means an accounting of the operating and purchase costs of the item, in both printed and electronic catalogues and assess the impact of providing this information on Federal purchasing decisions.

(3) Agencies shall incorporate energy efficient criteria consistent with ENERGY STAR (Registered Trademark) and other FEMP-designated energy efficiency levels into all guide specifications and project specifications developed for new construction and renovation, as well as into product specification language developed for Basic Ordering Agreements, Blanket Purchasing Agreements, Government Wide Acquisition Contracts, and all other purchasing procedures.

(4) DOE and OMB shall also explore the creation of financing agreements with private sector suppliers to provide private funding to offset higher up-front costs of efficient products. Within 9 months of the date of this order, DOE shall report back to the President's Management Council on the viability of such alternative financing options.

(c) ENERGY STAR (Registered Trademark) Buildings. Agencies shall strive to meet the ENERGY STAR (Registered Trademark) Building criteria for energy performance

and indoor environmental quality in their eligible facilities to the maximum extent practicable by the end of 2002. Agencies may use Energy-Savings Performance Contracts, utility energy-efficiency service contracts, or other means to conduct evaluations and make improvements to buildings in order to meet the criteria. Buildings that rank in the top 25 percent in energy efficiency relative to comparable commercial and Federal buildings will receive the ENERGY STAR (Registered Trademark) building label. Agencies shall integrate this building rating tool into their general facility audits.

(d) Sustainable Building Design. DOD and GSA, in consultation with DOE and EPA, shall develop sustainable design principles. Agencies shall apply such principles to the siting, design, and construction of new facilities. Agencies shall optimize life-cycle costs, pollution, and other environmental and energy costs associated with the construction, life-cycle operation, and decommissioning of the facility. Agencies shall consider using Energy-Savings Performance Contracts or utility energy-efficiency service contracts to aid them in constructing sustainably designed buildings.

(e) Model Lease Provisions. Agencies entering into leases, including the renegotiation or extension of existing leases, shall incorporate lease provisions that encourage energy and water efficiency wherever life-cycle cost-effective. Build-to-suit lease solicitations shall contain criteria encouraging sustainable design and development, energy efficiency, and verification of building performance. Agencies shall include a preference for buildings having the ENERGY STAR? Building label in their selection criteria for acquiring leased buildings. In addition, all agencies shall encourage lessors to apply for the ENERGY STAR (Registered Trademark) building label and to explore and implement projects that would reduce costs to the Federal Government, including projects carried out through the lessors' Energy-Savings Performance Contracts or utility energy-efficiency service contracts.

(f) Industrial Facility Efficiency Improvements. Agencies shall explore efficiency opportunities in industrial facilities for steam systems, boiler operation, air compressor systems, industrial processes, and fuel switching, including cogeneration and other efficiency and renewable energy technologies.

(g) Highly Efficient Systems. Agencies shall implement district energy systems, and other highly efficient systems, in new construction or retrofit projects when life-cycle cost-effective. Agencies shall consider combined cooling, heat, and power when upgrading and assessing facility power needs and shall use combined cooling, heat, and power systems when life-cycle cost-effective. Agencies shall survey local natural resources to optimize use of available biomass, bioenergy, geothermal, or other naturally occurring energy sources.

(h) Off-Grid Generation. Agencies shall use off-grid generation systems, including solar hot water, solar electric, solar outdoor lighting, small wind turbines, fuel cells, and other off-grid alternatives, where such systems are life-cycle cost-effective and offer benefits including energy efficiency, pollution prevention, source energy reductions, avoided infrastructure costs, or expedited service.

Sec. 404. Electricity Use. To advance the greenhouse gas and renewable energy goals of this order, and reduce source energy use, each agency shall strive to use electricity from clean, efficient, and renewable energy sources. An agency's efforts in purchasing electricity from efficient and renewable energy sources shall be taken into account in assessing the agency's progress and formulating its score card.

(a) Competitive Power. Agencies shall take advantage of competitive opportunities in the electricity and natural gas markets to reduce costs and enhance services. Agencies are encouraged to aggregate demand across facilities or agencies to maximize their economic advantage.

(b) Reduced Greenhouse Gas Intensity of Electric Power. When selecting electricity providers, agencies shall purchase electricity from sources that use high efficiency electric generating technologies when life-cycle cost-effective. Agencies shall consider the greenhouse gas intensity of the source of the electricity and strive to minimize the greenhouse gas intensity of purchased electricity.

(c) Purchasing Electricity from Renewable Energy Sources.

(1) Each agency shall evaluate its current use of electricity from renewable energy sources and report this level in its annual report to the President. Based on this review, each agency should adopt policies and pursue projects that increase the use of such electricity. Agencies should include provisions for the purchase of electricity from renewable energy sources as a component of their requests for bids whenever procuring electricity. Agencies may use savings from energy efficiency projects to pay additional incremental costs of electricity from renewable energy sources:

(2) In evaluating opportunities to comply with this section, agencies should consider: my Administration's goal of tripling nonhydroelectric renewable energy capacity in the United States by 2010; the renewable portfolio standard specified in the restructuring guidelines for the State in which the facility is located; GSA's efforts to make electricity from renewable energy sources available to Federal electricity purchasers; and EPA's guidelines on crediting renewable energy power in implementation of Clean Air Act standards.

Sec. 405. Mobile Equipment. Each agency shall seek to improve the design, construction, and operation of its mobile equipment, and shall implement all life-cycle cost-effective energy efficiency measures that result in cost savings while improving mission performance. To the extent that such measures are life-cycle cost-effective, agencies shall consider enhanced use of alternative or renewable-based fuels.

Sec. 406. Management and Government Performance. Agencies shall use the following management strategies in meeting the goals of this order.

(a) Awards. Agencies shall use employee incentive programs to reward exceptional performance in implementing this order.

(b) Performance Evaluations. Agencies shall include successful implementation of provisions of this order in areas such as Energy-Savings Performance Contracts, sustainable design, energy efficient procurement, energy efficiency, water conservation, and renewable energy projects in the position descriptions and performance evaluations of agency heads, members of the agency energy team, principal program managers, heads of field offices, facility managers, energy managers, and other appropriate employees.

(c) Retention of Savings and Rebates. Agencies granted statutory authority to retain a portion of savings generated from efficient energy and water management are encouraged to permit the retention of the savings at the facility or site where the savings occur to provide greater incentive for that facility and its site managers to undertake more energy management initiatives, invest in renewable energy systems, and purchase electricity from renewable energy sources.

(d) Training and Education. Agencies shall ensure that all appropriate personnel receive training for implementing this order.

(1) DOE, DOD, and GSA shall provide relevant training or training materials for those programs that they make available to all Federal agencies relating to the energy management strategies contained in this order.

(2) The Federal Acquisition Institute and the Defense Acquisition University shall incorporate into existing procurement courses information on Federal energy management tools, including Energy Savings Performance Contracts, utility energy-efficiency service contracts, ENERGY STAR (Registered Trademark) and other energy efficient products, and life-cycle cost analysis.

(3) All agencies are encouraged to develop outreach programs that include education, training, and promotion of ENERGY STAR (Registered Trademark) and other energy-efficient products for Federal purchase card users. These programs may include promotions with billing statements, user training, catalogue awareness, and exploration of vendor data collection of purchases.

(e) Showcase Facilities. Agencies shall designate exemplary new and existing facilities with significant public access and exposure as showcase facilities to highlight energy or water efficiency and renewable energy improvements.

PART 5—TECHNICAL ASSISTANCE

Sec. 501. Within 120 days of this order, the Director of OMB shall:

(a) develop and issue guidance to agency budget officers on preparation of annual funding requests associated with the implementation of the order for the FY 2001 budget;

(b) in collaboration with the Secretary of Energy, explain to agencies how to retain savings and reinvest in other energy and water management projects; and

(c) in collaboration with the Secretary of Energy through the Office of Federal Procurement Policy, periodically brief agency procurement executives on the use of Federal energy management tools, including Energy-Savings Performance Contracts, utility energy-efficiency service contracts, and procurement of energy efficient products and electricity from renewable energy sources.

Sec. 502. Within 180 days of this order, the Secretary of Energy, in collaboration with other agency heads, shall:

(a) issue guidelines to assist agencies in measuring energy per square foot, per unit of production, or other applicable unit in industrial, laboratory, research, and other energy-intensive facilities;

(b) establish criteria for determining which facilities are exempt from the order. In addition, DOE must provide guidance for agencies to report proposed exemptions;

(c) develop guidance to assist agencies in calculating appropriate energy baselines for previously exempt facilities and facilities occupied after 1990 in order to measure progress toward goals;

(d) issue guidance to clarify how agencies determine the life-cycle cost for investments required by the order, including how to compare different energy and fuel options and assess the current tools;

(e) issue guidance for providing credit toward energy efficiency goals for cost-effective projects where source energy use declines but site energy use increases; and

(f) provide guidance to assist each agency to determine a baseline of water consumption.

Sec. 503. Within 1 year of this order, the Secretary of Energy, in collaboration with other agency heads, shall:

(a) provide guidance for counting renewable and highly efficient energy projects and purchases of electricity from renewable and highly efficient energy sources toward agencies' progress in reaching greenhouse gas and energy reduction goals;

(b) develop goals for the amount of energy generated at Federal facilities from renewable energy technologies;

(c) support efforts to develop standards for the certification of low environmental impact hydropower facilities in order to facilitate the Federal purchase of such power;

(d) work with GSA and DLA to develop a plan for purchasing advanced energy products in bulk quantities for use in by multiple agencies;

(e) issue guidelines for agency use estimating the greenhouse gas emissions attributable to facility energy use. These guidelines shall include emissions associated with the production, transportation and use of energy consumed in Federal facilities; and

(f) establish water conservation goals for Federal agencies.

Sec. 504. Within 120 days of this order, the Secretary of Defense and the Administrator of GSA, in consultation with other agency heads, shall develop and issue sustainable design and development principles for the siting, design, and construction of new facilities.

Sec. 505. Within 180 days of this order, the Administrator of GSA, in collaboration with the Secretary of Defense, the Secretary of Energy, and other agency heads, shall:

(a) develop and issue guidance to assist agencies in ensuring that all project cost estimates, bids, and agency budget requests for design, construction, and renovation of facilities are based on life-cycle costs. Incentives for contractors involved in facility design and construction must be structured to encourage the contractors to design and build at the lowest life-cycle cost;

(b) make information available on opportunities to purchase electricity from renewable energy sources as defined by this order. This information should accommodate relevant State regulations and be updated periodically based on technological advances and market changes, at least every 2 years;

(c) develop Internet-based tools for both GSA and DLA customers to assist individual and agency purchasers in identifying and purchasing ENERGY STAR? and other energy efficient products for acquisition; and

(d) develop model lease provisions that incorporate energy efficiency and sustainable design.

PART 6—GENERAL PROVISIONS

Sec. 601. Compliance by Independent Agencies. Independent agencies are encouraged to comply with the provisions of this order.

Sec. 602. Waivers. If an agency determines that a provision in this order is inconsistent with its mission, the agency may ask DOE for a waiver of the provision. DOE will include a list of any waivers it grants in its Federal Energy Management Programs annual report to the Congress.

Sec. 603. Scope, (a) This order is intended only to improve the internal management of the Executive branch and is not intended to create any right, benefit, or trust responsibility, substantive or procedural, enforceable by law by a party against the United States, its agencies, its officers, or any other person.

(b) This order applies to agency facilities in any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, and any other territory or possession over which the United States has jurisdiction. Agencies with facilities outside of these areas, however, are encouraged to make best efforts to comply with the goals of this order for those facilities. In addition, agencies can report energy improvements made outside the United States in their annual report to the President; these improvements may be considered in agency scorecard evaluations.

Sec. 604. Revocations. Executive Order 12902 of March 9, 1994, Executive Order 12759 of April 17, 1991, and Executive Order 12845 of April 21, 1993, are revoked.

Sec. 605. Amendments to Federal Regulations. The Federal Acquisition Regulation and other Federal regulations shall be amended to reflect changes made by this order, including an amendment to facilitate agency purchases of electricity from renewable energy sources.

PART 7—DEFINITIONS

For the purposes of this order:

Sec. 701. "Acquisition" means acquiring by contract supplies or services (including construction) by and for the use of the Federal Government through purchase or lease, whether the supplies or services are already in existence or must be created, developed, demonstrated, and evaluated. Acquisition begins at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts, contract financing, contract performance, contract administration, and those technical and management functions directly related to the process of fulfilling agency needs by contract.

Sec. 702. "Agency" means an Executive agency as defined in 5 U.S.C. 105. For the purpose of this order, military departments, as defined in 5 U.S.C. 102, are covered under the auspices of DOD.

Sec. 703. "Energy-Savings Performance Contract" means a contract that provides for the performance of services for the design, acquisition, financing, installation, testing, operation, and where appropriate, maintenance and repair, of an identified energy or water conservation measure or series of measures at one or more locations. Such contracts shall provide that the contractor must incur costs of implementing energy savings measures, including at least the cost (if any) incurred in making energy audits, acquiring and installing equipment, and training personnel in exchange for a

predetermined share of the value of the energy savings directly resulting from implementation of such measures during the term of the contract. Payment to the contractor is contingent upon realizing a guaranteed stream of future energy and cost savings. All additional savings will accrue to the Federal Government.

Sec. 704. "Exempt facility" or "Exempt mobile equipment" means a facility or a piece of mobile equipment for which an agency uses DOE-established criteria to determine that compliance with the Energy Policy Act of 1992 or this order is not practical.

Sec. 705. "Facility" means any individual building or collection of buildings, grounds, or structure, as well as any fixture or part thereof, including the associated energy or water-consuming support systems, which is constructed, renovated, or purchased in whole or in part for use by the Federal Government. It includes leased facilities where the Federal Government has a purchase option or facilities planned for purchase. In any provision of this order, the term "facility" also includes any building 100 percent leased for use by the Federal Government where the Federal Government pays directly or indirectly for the utility costs associated with its leased space. The term also includes Government-owned contractor-operated facilities.

Sec. 706. "Industrial facility" means any fixed equipment, building, or complex for production, manufacturing, or other processes that uses large amounts of capital equipment in connection with, or as part of, any process or system, and within which the majority of energy use is not devoted to the heating, cooling, lighting, ventilation, or to service the water heating energy load requirements of the facility.

Sec. 707. "Life-cycle costs" means the sum of the present values of investment costs, capital costs, installation costs, energy costs, operating costs, maintenance costs, and disposal costs, over the lifetime of the project, product, or measure. Additional guidance on measuring life-cycle costs is specified in 10 C.F.R. 436.19.

Sec. 708. "Life-cycle cost-effective" means the life-cycle costs of a product, project, or measure are estimated to be equal to or less than the base case (i.e., current or standard practice or product). Additional guidance on measuring cost-effectiveness is specified in 10 C.F.R. 436.18 (a), (b), and (c), 436.20, and 436.21.

Sec. 709. "Mobile equipment" means all Federally owned ships, aircraft, and nonroad vehicles.

Sec. 710. "Renewable energy" means energy produced by solar, wind, geothermal, and biomass power.

Sec. 711. "Renewable energy technology" means technologies that use renewable energy to provide light, heat, cooling, or mechanical or electrical energy for use in facilities or other activities. The term also means the use of integrated whole-building designs that rely upon renewable energy resources, including passive solar design.

Sec. 712. “Source energy” means the energy that is used at a site and consumed in producing and in delivering energy to a site, including, but not limited to, power generation, transmission, and distribution losses, and that is used to perform a specific function, such as space conditioning, lighting or water heating.

Sec. 713. “Utility” means public agencies and privately owned companies that market, generate, and/or distribute energy or water, including electricity, natural gas, manufactured gas, steam, hot water, and chilled water as commodities for public use and that provide the service under Federal, State, or local regulated authority to all authorized customers. Utilities include: Federally owned non-profit producers; municipal organizations; and investor or privately owned producers regulated by a State and/or the Federal Government; cooperatives owned by members and providing services mostly to their members; and other nonprofit State and local government agencies serving in this capacity.

Sec. 714. “Utility energy-efficiency service” means demand side management services provided by a utility to improve the efficiency of use of the commodity (electricity, gas, etc.) being distributed. Services can include, but are not limited to, energy efficiency and renewable energy project auditing, financing, design, installation, operation, maintenance, and monitoring.

WILLIAM J.CLINTON
THE WHITE HOUSE,
June 3, 1999.
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APPENDIX B

Executive Order 13101

THE WHITE HOUSE
Office of the Press Secretary
(New York, New York)
For Immediate Release September 14, 1998

EXECUTIVE ORDER 13101

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GREENING THE GOVERNMENT THROUGH WASTE PREVENTION, RECYCLING, AND FEDERAL ACQUISITION

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the Solid Waste Disposal Act, Public Law 89–272, 79 Stat. 997, as amended by the Resource Conservation and Recovery Act (RCRA), Public Law 94–580, 90 Stat. 2795, as amended (42 U.S.C. 6901–6907), section 301 of title 3, United States Code, and in order to improve the Federal Government's use of recycled products and environmentally preferable products and services, it is hereby ordered as follows:

PART 1—PREAMBLE

Section 101. Consistent with the demands of efficiency and cost effectiveness, the head of each executive agency shall incorporate waste prevention and recycling in the agency's daily operations and work to increase and expand markets for recovered materials through greater Federal Government preference and demand for such products. It is the national policy to prefer pollution prevention, whenever feasible. Pollution that cannot be prevented should be recycled; pollution that cannot be prevented or recycled should be treated in an environmentally safe manner. Disposal should be employed only as a last resort.

Sec. 102. Consistent with policies established by the Office of Federal Procurement Policy (OFPP) Policy Letter 92–4, agencies shall comply with executive branch policies for the acquisition and use of environmentally preferable products and services and implement cost-effective procurement preference programs favoring the purchase of these products and services.

Sec. 103. This order creates a Steering Committee, a Federal Environmental Executive (FEE), and a Task Force, and establishes Agency Environmental Executive (AEE) positions within each agency, to be responsible for ensuring the implementation of this order. The FEE, AEEs, and members of the Steering Committee and Task Force shall be full-time Federal Government employees.

PART 2—DEFINITIONS

For purposes of this order:

Sec. 201. "Environmentally preferable" means products or services that have a lesser or reduced effect on human health and the environment when compared with competing products or services that serve the same purpose. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product or service.

Sec. 202. "Executive agency" or "agency" means an executive agency as defined in 5 U.S.C. 105. For the purpose of this order, military departments, as defined in 5 U.S.C. 102, are covered under the auspices of the Department of Defense.

Sec. 203. "Postconsumer material" means a material or finished product that has served its intended use and has been discarded for disposal or recovery, having completed its life as a consumer item. "Postconsumer material" is a part of the broader category of "recovered material."

Sec. 204. "Acquisition" means the acquiring by contract with appropriated funds for supplies or services (including construction) by and for the use of the Federal Government through purchase or lease, whether the supplies or services are already in existence or must be created, developed, demonstrated, and evaluated. Acquisition begins at the point when agency needs are established and includes the description of requirements to satisfy agency needs, solicitation and selection of sources, award of contracts, contract financing, contract performance, contract administration, and those technical and management functions directly related to the process of fulfilling agency needs by contract.

Sec. 205. "Recovered materials" means waste materials and by-products that have been recovered or diverted from solid waste, but such term does not include those materials and by-products generated from, and commonly reused within, an original manufacturing process (42 U.S.C. 6903 (19)).

Sec. 206. “Recyclability” means the ability of a product or material to be recovered from, or otherwise diverted from, the solid waste stream for the purpose of recycling.

Sec. 207. “Recycling” means the series of activities, including collection, separation, and processing, by which products or other materials are recovered from the solid waste stream for use in the form of raw materials in the manufacture of new products other than fuel for producing heat or power by combustion.

Sec. 208. “Waste prevention” means any change in the design, manufacturing, purchase, or use of materials or products (including packaging) to reduce their amount or toxicity before they are discarded. Waste prevention also refers to the reuse of products or materials.

Sec. 209. “Waste reduction” means preventing or decreasing the amount of waste being generated through waste prevention, recycling, or purchasing recycled and environmentally preferable products.

Sec. 210. “Life cycle cost” means the amortized annual cost of a product, including capital costs, installation costs, operating costs, maintenance costs, and disposal costs discounted over the lifetime of the product.

Sec. 211. “Life cycle assessment” means the comprehensive examination of a product’s environmental and economic aspects and potential impacts throughout its lifetime, including raw material extraction, transportation, manufacturing, use, and disposal.

Sec. 212. “Pollution prevention” means “source reduction” as defined in the Pollution Prevention Act of 1990 (42 U.S.C. 13102), and other practices that reduce or eliminate the creation of pollutants through: (a) increased efficiency in the use of raw materials, energy, water, or other resources; or (b) protection of natural resources by conservation.

Sec. 213. “Biobased product” means a commercial or industrial product (other than food or feed) that utilizes biological products or renewable domestic agricultural (plant, animal, and marine) or forestry materials.

Sec. 214. “Major procuring agencies” shall include any executive agency that procures over $50 million per year of goods and services.

PART 3—THE ROLES AND DUTIES OF THE STEERING COMMITTEE, FEDERAL ENVIRONMENTAL EXECUTIVE, TASK FORCE, AND AGENCY ENVIRONMENTAL EXECUTIVES

Sec. 301. Committees, Executives, and Task Force, (a) Steering Committee. There is hereby established a Steering Committee on Greening the Government through Waste Prevention and Recycling (“Steering Committee”). The Steering Committee shall be

composed of the Chair of the Council on Environmental Quality (CEQ), the Federal Environmental Executive (FEE), and the Administrator for Federal Procurement Policy (OFPP). The Steering Committee, which shall be chaired by the Chair of the CEQ, is directed to charter a Task Force to facilitate implementation of this order, and shall provide the Task Force with policy direction in such implementation.

(b) Federal Environmental Executive. A Federal Environmental Executive, Environmental Protection Agency, shall be designated by the President. The FEE shall chair the Task Force described in subsection (c), take all actions necessary to ensure that the agencies comply with the requirements of this order, and generate a biennial report to the President.

(c) Task Force. The Steering Committee shall charter a Task Force on Greening the Government through Waste Prevention and Recycling ("Task Force"), which shall be chaired by the FEE and composed of staff from the major procuring agencies. The Steering Committee, in consultation with the agencies, shall determine the necessary staffing and resources for the Task Force. The major procuring agencies shall provide, to the extent practicable and permitted by law, resources and support to the Task Force and the FEE, upon request from the Steering Committee. The Task Force shall have the duty of assisting the FEE and the agencies in implementing this order, subject to policy direction provided by the Steering Committee. The Task Force shall report through the FEE to the Chair of the Steering Committee.

(d) Agency Environmental Executives (AEEs). Within 90 days after the date of this order, the head of each major procuring agency shall designate an AEE from among his or her staff, who serves at a level no lower than the Assistant Secretary level or equivalent, and shall notify the Chair of CEQ and the FEE of such designation.

Sec. 302. Duties, (a) The Federal Environmental Executive. The FEE, working through the Task Force, and in consultation with the AEEs, shall:

(1) Develop a Government-wide Waste Prevention and Recycling Strategic Plan ("Strategic Plan") to further implement this order. The Strategic Plan should be initially developed within 180 days of the date of this order and revised as necessary thereafter. The Strategic Plan should include, but is not limited to, the following elements:

(a) direction and initiatives for acquisition of recycled and recyclable products and environmentally preferable products and services;

(b) development of affirmative procurement programs;

(c) review and revision of standards and product specifications;

(d) assessment and evaluation of compliance;

(e) reporting requirements;

(f) outreach programs to promote adoption of practices endorsed in this order; and

(g) development and implementation of new technologies that are of environmental significance.

(2) Prepare a biennial report to the President on the actions taken by the agencies to comply with this order. The report also may incorporate information from existing agency reports regarding Government-wide progress in implementing the following Executive Orders: 12843, Procurement Requirements and Policies for Federal Agencies for Ozone Depleting Substances; 13031, Federal Alternative Fueled Vehicle Leadership; 12845, Requiring Agencies to Purchase Energy Efficient Computer Equipment; 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements; 12902, Energy Efficiency and Water Conservation at Federal Facilities; and 12969, Federal Acquisition and Community Right-to-Know.

(3) In coordination with the Office of Federal Procurement Policy, the Environmental Protection Agency (EPA), the General Services Administration (GSA), and the Department of Agriculture (USDA), convene a group of acquisition/procurement managers and environmental State, and local government managers to work with State and local governments to improve the Federal, State, and local governments' use of recycled products and environmentally preferable products and services.

(4) Coordinate appropriate Government-wide education and training programs for agencies.

(5) Establish committees and work groups, as needed, to identify, assess, and recommend actions to be taken to fulfill the goals, responsibilities, and initiatives of the FEE. As these committees and work groups are created, agencies are requested to designate appropriate personnel in the areas of procurement and acquisition, standards and specifications, electronic commerce, facilities management, pollution prevention, waste prevention, recycling, and others as needed to staff and work on these initiatives. An initial group shall be established to develop recommendations for tracking and reporting requirements, taking into account the costs and benefits of such tracking and reporting. The Steering Committee shall consult with the AEEs before approving these recommendations.

(b) Agency Environmental Executives. The AEEs shall:

(1) translate the Government-wide Strategic Plan into specific agency and service plans;

(2) implement the specific agency and service plans;

(3) report to the FEE on the progress of plan implementation;

(4) work with the FEE and the Task Force in furthering implementation of this order; and

(5) track agencies' purchases of EPA-designated guideline items and report agencies' purchases of such guideline items to the FEE per the recommendations developed in subsection 302(a)(5) of this order. Agency acquisition and procurement personnel shall justify in writing to the file and to the AEE the rationale for not purchasing such items, above the micropurchase threshold (as set out in the Office of Federal Procurement Policy Act at 41 U.S.C. 428), and submit a plan and timetable for increasing agency purchases of the designated item(s).

(6) one year after a product is placed on the USDA Biobased Products List, estimate agencies' purchases of products on the list and report agencies' estimated purchases of such products to the Secretary of Agriculture.

PART 4—ACQUISITION PLANNING, AFFIRMATIVE PROCUREMENT PROGRAMS, AND FEDERAL FACILITY COMPLIANCE

Sec. 401. Acquisition Planning. In developing plans, drawings, work statements, specifications, or other product descriptions, agencies shall consider, as appropriate, a broad range of factors including: elimination of virgin material requirements; use of biobased products; use of recovered materials; reuse of product; life cycle cost; recyclability; use of environmentally preferable products; waste prevention (including toxicity reduction or elimination); and ultimate disposal. These factors should be considered in acquisition planning for all procurement and in the evaluation and award of contracts, as appropriate. Program and acquisition managers should take an active role in these activities.

Sec. 402. Affirmative Procurement Programs, (a) The head of each executive agency shall develop and implement affirmative procurement programs in accordance with section 6002 of RCRA (42 U.S.C. 6962) and this order and consider use of the procurement tools and methods described in 7 U.S.C. 5909. Agencies shall ensure that responsibilities for preparation, implementation, and monitoring of affirmative procurement programs are shared between the program personnel and acquisition and procurement personnel. For the purposes of all purchases made pursuant to this order, EPA, in consultation with such other executive agencies as appropriate, shall endeavor to maximize environmental benefits, consistent with price, performance, and availability considerations, and constraints imposed by law, and shall adjust solicitation guidelines as necessary in order to accomplish this goal.

(b) Agencies shall establish affirmative procurement programs for all EPA-designated guideline items purchased by their agency. For newly designated items, agencies shall revise their internal programs within 1 year from the date the EPA designated the new items.

(c) Exclusive of the biobased products described in section 504, for the EPA-designated guideline items, which are contained in 40 CFR part 247, and for all future designated guideline items, agencies shall ensure that their affirmative procurement programs require 100 percent of their purchases of products to meet or exceed the EPA guideline unless written justification is provided that a product is not available competitively within a reasonable time frame, does not meet appropriate performance standards, or is only available at an unreasonable price. Written justification is not required for purchases below the micropurchase threshold. For micropurchases, agencies shall provide guidance regarding purchase of EPA-designated guideline items. This guidance should encourage consideration of aggregating purchases when this method would promote economy and efficiency.

(d) Within 90 days after the date of this order, the head of each executive agency that has not implemented an affirmative procurement program shall ensure that the affirmative procurement program has been established and is being implemented to the maximum extent practicable.

Sec. 403. Federal Facility Compliance, (a) Within 6 months of the date of this order, the Administrator of the EPA shall, in consultation with the Federal Environmental Executive, prepare guidance for use in determining Federal facility compliance with section 6002 of RCRA and the related requirements of this order.

(b) EPA inspections of Federal facilities conducted pursuant to RCRA and the Federal Facility Compliance Act and EPA "multi-media" inspections carried out at Federal facilities will include, where appropriate, evaluation of facility compliance with section 6002 of RCRA and any implementing guidance.

(c) Where inspections of Federal facilities are carried out by authorized States pursuant to RCRA and the Federal Facility Compliance Act, the Administrator of the EPA will encourage those States to include evaluation of facility compliance with section 6002 of RCRA in light of EPA guidance prepared pursuant to subsection (a), where appropriate, similar to inspections performed by the EPA. The EPA may provide information and technical assistance to the States to enable them to include such considerations in their inspection.

(d) The EPA shall report annually to the Federal Environmental Executive on the results of inspections performed by the EPA to determine Federal facility compliance with section 6002 of RCRA not later than February 1st for those inspections conducted during the previous fiscal year.

PART 5—STANDARDS, SPECIFICATIONS, AND DESIGNATION OF ITEMS

Sec. 501. Specifications, Product Descriptions, and Standards. When developing, reviewing, or revising Federal and military specifications, product descriptions (including commercial item descriptions), and standards, executive agencies shall consider recovered materials and any environmentally preferable purchasing criteria developed by the EPA, and ensure the criteria are complied with in developing or revising standards. Agencies shall report annually to the FEE on their compliance with this section for incorporation into the biennial report to the President referred to in section 302(a)(2) of this order, (a) If an inconsistency with section 6002 of RCRA or this order is identified in a specification, standard, or product description, the FEE shall request that the Environmental Executive of the pertinent agency advise the FEE as to why the specification cannot be revised or submit a plan for revising it within 60 days.

(b) If an agency is able to revise an inconsistent specification but cannot do so within 60 days, it is the responsibility of that AEE to monitor and implement the plan for revising it.

Sec. 502. Designation of Items that Contain Recovered Materials. In order to expedite the process of designating items that are or can be made with recovered materials, the EPA shall use the following process for designating these items in accordance with section 6002(e) of RCRA. (a) The EPA shall designate items that are or can be made with recovered material, by promulgating amendments to the Comprehensive Procurement Guideline (CPG). The CPG shall be updated every 2 years or as appropriate after an opportunity for public comment.

(b) Concurrent with the issuance of the CPG, the EPA shall publish for comment in the Federal Register Recovered Materials Advisory Notices that present the range of recovered materials content levels within which the designated items are currently available. These levels shall be updated periodically, after opportunity for public comment, to reflect changes in market conditions.

(c) Once items containing recovered materials have been designated by the EPA in the CPG, agencies shall modify their affirmative procurement programs to require that, to the maximum extent practicable, their purchases of products meet or exceed the EPA guidelines unless written justification is provided that a product is not available competitively, not available within a reasonable time frame, does not meet appropriate performance standards, or is only available at an unreasonable price.

Sec. 503. Guidance on Acquisition of Environmentally Preferable Products and Services, (a) The EPA shall develop guidance within 90 days from the date of this order to address environmentally preferable purchasing. The guidance may be based on the EPA's September 1995 Proposed Guidance on the Acquisition of Environmentally Preferable Products and Services and comments received thereon. The guidance should be designed for Government-wide use and targeted towards products and services that have the most effect. The guidance may also address the issues of use of the technical expertise of non-governmental entities and tools such as life cycle assessment in

decisions on environmentally preferable purchasing. The EPA shall update this guidance every 2 years, or as appropriate.

(b) Agencies are encouraged to immediately test and evaluate the principles and concepts contained in the EPA's Guidance on the Acquisition of Environmentally Preferable Products and Services through pilot projects to provide practical information to the EPA for further updating of the guidance. Specifically:

(1) These pilot projects shall be focused around those product and service categories, including printing, that have wide use within the Federal Government. Priorities regarding which product and service categories to pilot shall be developed by the individual agencies and the EPA, in consultation with the OFPP, the FEE, and the appropriate agency procurement executives. Any policy disagreements shall be resolved by the Steering Committee.

(2) Agencies are encouraged to use all of the options available to them to determine the environmentally preferable attributes of products and services in their pilot and demonstration projects, including the use of technical expertise of nongovernmental entities such as labeling, certification, or standards-developing organizations, as well as using the expertise of the National Institute of Standards and Technology.

(3) Upon request and to the extent practicable, the EPA shall assist executive agencies in designing, implementing, and documenting the results of these pilot and demonstration projects.

(4) The EPA, in coordination with other executive agencies, shall develop a database of information about these projects, including, but not limited to, the number and status of pilot projects, examples of agencies' policy directives, revisions to specifications, solicitation procedures, and grant/contract policies that facilitate adoption of environmentally preferable purchasing practices, to be integrated on a commonly available electronic medium (e.g., Internet Web site). These data are to be reported to the FEE.

(c) Executive agencies shall use the principles and concepts in the EPA Guidance on Acquisition of Environmentally Preferable Products and Services, in addition to the lessons from the pilot and demonstration projects, to the maximum extent practicable, in identifying and purchasing environmentally preferable products and services and shall modify their procurement programs as appropriate.

Sec. 504. Designation of Biobased Items by the USDA. The USDA Biobased Products Coordination Council shall, in consultation with the FEE, issue a Biobased Products List, (a) The Biobased Products List shall be published in the Federal Register by the USDA within 180 days after the date of this order and shall be updated biannually after publication to include additional items.

(b) Once the Biobased Products List has been published, agencies are encouraged to modify their affirmative procurement program to give consideration to those products.

Sec. 505. Minimum Content Standard for Printing and Writing Paper. Executive agency heads shall ensure that their agencies meet or exceed the following minimum materials content standards when purchasing or causing the purchase of printing and writing paper: (a) For high speed copier paper, offset paper, forms bond, computer printout paper, carbonless paper, file folders, white wove envelopes, writing and office paper, book paper, cotton fiber paper, and cover stock, the minimum content standard shall be no less than 30 percent postconsumer materials beginning December 31, 1998. If paper containing 30 percent postconsumer material is not reasonably available, does not meet reasonable performance requirements, or is only available at an unreasonable price, then the agency shall purchase paper containing no less than 20 percent postconsumer material. The Steering Committee, in consultation with the AEEs, may revise these levels if necessary.

(b) As an alternative to meeting the standards in sections 505(a), for all printing and writing papers, the minimum content standard shall be no less than 50 percent recovered materials that are a waste material byproduct of a finished product other than a paper or textile product that would otherwise be disposed of in a landfill, as determined by the State in which the facility is located.

(c) Effective January 1, 1999, no executive branch agency shall purchase, sell, or arrange for the purchase of, printing and writing paper that fails to meet the minimum requirements of this section.

Sec. 506. Revision of Brightness Specifications and Standards. The GSA and other executive agencies are directed to identify, evaluate, and revise or eliminate any standards or specifications unrelated to performance that present barriers to the purchase of paper or paper products made by production processes that minimize emissions of harmful byproducts. This evaluation shall include a review of unnecessary brightness and stock clause provisions, such as lignin content and chemical pulp requirements. The GSA shall complete the review and revision of such specifications within 6 months after the date of this order, and shall consult closely with the Joint Committee on Printing during such process. The GSA shall also compile any information or market studies that may be necessary to accomplish the objectives of this provision.

Sec. 507. Procurement of Re-refined Lubricating Oil and Retread Tires, (a) Agencies shall implement the EPA procurement guidelines for re-refined lubricating oil and retread tires. Fleet and commodity managers shall take immediate steps, as appropriate, to procure these items in accordance with section 6002 of RCRA. This provision does not preclude the acquisition of biobased (e.g., vegetable) oils.

(b) The FEE shall work to educate executive agencies about the new Department of Defense Cooperative Tire Qualification Program, including the Cooperative Approval Tire List and Cooperative Plant Qualification Program, as they apply to retread tires.

PART 6—AGENCY GOALS AND REPORTING REQUIREMENTS

Sec. 601. Agency Goals. (a)(1) Each agency shall establish either a goal for solid waste prevention and a goal for recycling or a goal for solid waste diversion to be achieved by January 1, 2000. Each agency shall further ensure that the established goals include long-range goals to be achieved by the years 2005 and 2010. These goals shall be submitted to the FEE within 180 days after the date of this order. (2) In addition to white paper, mixed paper/cardboard, aluminum, plastic, and glass, agencies should incorporate into their recycling programs efforts to recycle, reuse, or refurbish pallets and collect toner cartridges for remanufacturing. Agencies should also include programs to reduce or recycle, as appropriate, batteries, scrap metal, and fluorescent lamps and ballasts.

(b) Agencies shall set goals to increase the procurement of products that are made with recovered materials, in order to maximize the number of recycled products purchased, relative to non-recycled alternatives.

(c) Each agency shall set a goal for increasing the use of environmentally preferable products and services for those products and services for which the agency has completed a pilot program.

(d) Agencies are encouraged to incorporate into their Government Performance Results Act annual performance plans the goals listed in subsections (a), (b), and (c) above, starting with the submittal to the Office of Management and Budget of the plan accompanying the FY 2001 budget.

(e) Progress on attaining these goals should be reported by the agencies to the FEE for the biennial report specified in section 302(a)(2) of this order.

PART 7—APPLICABILITY AND OTHER REQUIREMENTS

Sec. 701. Contractor Applicability. Contracts that provide for contractor operation of a Government-owned or -leased facility and/or contracts that provide for contractor or other support services at Government-owned or -operated facilities awarded by executive agencies after the date of this order, shall include provisions that obligate the contractor to comply with the requirements of this order within the scope of its operations.

Sec. 702. Real Property Acquisition and Management. Within 90 days after the date of this order, and to the extent permitted by law and where economically feasible, executive agencies shall ensure compliance with the provisions of this order in the acquisition and management of Federally owned and leased space. The GSA and other executive agencies shall also include environmental and recycling provisions in the acquisition and management of all leased space and in the construction of new Federal buildings.

Sec. 703. Retention of Funds, (a) The Administrator of General Services shall continue with the program that retains for the agencies the proceeds from the sale of materials recovered through recycling or waste prevention programs and specifying the eligibility requirements for the materials being recycled.

(b) Agencies in non-GSA managed facilities, to the extent permitted by law, should develop a plan to retain the proceeds from the sale of materials recovered through recycling or waste prevention programs.

Sec. 704. Model Facility Programs. Each executive agency shall establish a model demonstration program incorporating some or all of the following elements as appropriate. Agencies are encouraged to demonstrate and test new and innovative approaches such as incorporating environmentally preferable and bio-based products; increasing the quantity and types of products containing recovered materials; expanding collection programs; implementing source reduction programs; composting organic materials when feasible; and exploring public/ private partnerships to develop markets for recovered materials.

Sec. 705. Recycling Programs. (a)(1) Each executive agency that has not already done so shall initiate a program to promote cost-effective waste prevention and recycling of reusable materials in all of its facilities. The recycling programs implemented pursuant to this section must be compatible with applicable State and local recycling requirements.

(2) Agencies shall designate a recycling coordinator for each facility or installation. The recycling coordinator shall implement or maintain waste prevention and recycling programs in the agencies' action plans.

(b) Executive agencies shall also consider cooperative ventures with State and local governments to promote recycling and waste reduction in the community.

Sec. 706. Review of Implementation. The President's Council on Integrity and Efficiency shall request that the Inspectors General periodically review agencies' implementation of this order.

PART 8—AWARENESS

Sec. 801. Training, (a) Within 180 days of the date of this order, the FEE and OFPP should evaluate the training courses provided by the Federal Acquisition Institute and the Defense Acquisition University and recommend any appropriate curriculum changes to ensure that procurement officials are aware of the requirements of this order.

(b) Executive agencies shall provide training to program management and requesting activities as needed to ensure awareness of the requirements of this order.

Sec. 802. Internal Agency Awards Programs. Each agency shall develop an internal agency-wide awards program, as appropriate, to reward its most innovative environmental programs. Among others, winners of agency-wide awards will be eligible for the White House Awards Program.

Sec. 803. White House Awards Program. A Government-wide award will be presented annually by the White House to the best, most innovative programs implementing the objectives of this order to give greater visibility to these efforts so that they can be incorporated Government-wide. The White House Awards Program will be administered jointly by the FEE and the CEQ.

PART 9—REVOCATION, LIMITATION, AND IMPLEMENTATION

Sec. 901. Executive Order 12873 of October 20, 1993, is hereby revoked.

Sec. 902. This order is intended only to improve the internal management of the executive branch and is not intended to create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law by a party against the United States, its agencies, its officers, or any other person.

Sec. 903. The policies and direction expressed in the EPA guidance to be developed pursuant to section 503 of this order shall be implemented and incorporated in the Federal Acquisition Regulation within 180 days after issuance of the guidance.

WILLIAM J.CLINTON

THE WHITE HOUSE,

September 14, 1998.

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APPENDIX C

Executive Order 13148

THE WHITE HOUSE

Office of the Press Secretary

For Immediate Release April 22, 2000

EXECUTIVE ORDER 13148

GREENING THE GOVERNMENT THROUGH LEADERSHIP IN ENVIRONMENTAL MANAGEMENT

By the authority vested in me as President by the Constitution and the laws of the United States of America, including the Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11001–11050) (EPCRA), the Pollution Prevention Act of 1990 (42 U.S.C. 13101–13109) (PPA), the Clean Air Act (42 U.S.C. 7401–7671q) (CAA), and section 301 of title 3, United States Code, it is hereby ordered as follows:

PART 1—PREAMBLE

Section 101. Federal Environmental Leadership. The head of each Federal agency is responsible for ensuring that all necessary actions are taken to integrate environmental accountability into agency day-to-day decisionmaking and long-term planning processes, across all agency missions, activities, and functions. Consequently, environmental management considerations must be a fundamental and integral component of Federal Government policies, operations, planning, and management. The head of each Federal agency is responsible for meeting the goals and requirements of this order.

PART 2—GOALS

Sec. 201. Environmental Management. Through development and implementation of environmental management systems, each agency shall ensure that strategies are established to support environmental leadership programs, policies, and procedures and that agency senior level managers explicitly and actively endorse these strategies.

Sec. 202. Environmental Compliance. Each agency shall comply with environmental regulations by establishing and implementing environmental compliance audit programs and policies that emphasize pollution prevention as a means to both achieve and maintain environmental compliance.

Sec. 203. Right-to-Know and Pollution Prevention. Through timely planning and reporting under the EPCRA, Federal facilities shall be leaders and responsible members of their communities by informing the public and their workers of possible sources of pollution resulting from facility operations. Each agency shall strive to reduce or eliminate harm to human health and the environment from releases of pollutants to the environment. Each agency shall advance the national policy that, whenever feasible and cost-effective, pollution should be prevented or reduced at the source. Funding for regulatory compliance programs shall emphasize pollution prevention as a means to address environmental compliance.

Sec. 204. Release Reduction: Toxic Chemicals. Through innovative pollution prevention, effective facility management, and sound acquisition and procurement practices, each agency shall reduce its reported Toxic Release Inventory (TRI) releases and off-site transfers of toxic chemicals for treatment and disposal by 10 percent annually, or by 40 percent overall by December 31, 2006.

Sec. 205. Use Reduction: Toxic Chemicals and Hazardous Substances and Other Pollutants. Through identification of proven substitutes and established facility management practices, including pollution prevention, each agency shall reduce its use of selected toxic chemicals, hazardous substances, and pollutants, or its generation of hazardous and radioactive waste types at its facilities by 50 percent by December 31, 2006. If an agency is unable to reduce the use of selected chemicals, that agency will reduce the use of selected hazardous substances or its generation of other pollutants, such as hazardous and radioactive waste types, at its facilities by 50 percent by December 31, 2006.

Sec. 206. Reductions in Ozone-Depleting Substances. Through evaluating present and future uses of ozone-depleting substances and maximizing the purchase and the use of safe, cost effective, and environmentally preferable alternatives, each agency shall develop a plan to phase out the procurement of Class I ozone-depleting substances for all nonexcepted uses by December 31, 2010.

Sec. 207. Environmentally and Economically Beneficial Landscaping. Each agency shall strive to promote the sustainable management of Federal facility lands through the implementation of cost-effective, environmentally sound landscaping practices, and programs to reduce adverse impacts to the natural environment.

PART 3—PLANNING AND ACCOUNTABILITY

Sec. 301. Annual Budget Submission. Federal agencies shall place high priority on obtaining funding and resources needed for implementation of the Greening the Government Executive Orders, including funding to address findings and recommendations from environmental management system audits or facility compliance audits conducted under sections 401 and 402 of this order. Federal agencies shall make such requests as required in Office of Management and Budget (OMB) Circular A-11.

Sec. 302. Application of Life Cycle Assessment Concepts. Each agency with facilities shall establish a pilot program to apply life cycle assessment and environmental cost accounting principles. To the maximum extent feasible and cost-effective, agencies shall apply those principles elsewhere in the agency to meet the goals and requirements of this order. Such analysis shall be considered in the process established in the OMB Capital Programming Guide and OMB Circular A-11. The Environmental Protection Agency (EPA), in coordination with the Workgroup established in section 306 of this order, shall, to the extent feasible, assist agencies in identifying, applying, and developing tools that reflect life cycle assessment and environmental cost accounting principles and provide technical assistance to agencies in developing life cycle assessments and environmental cost accounting assessments under this Part.

Sec. 303. Pollution Prevention to Address Compliance. Each agency shall ensure that its environmental regulatory compliance funding policies promote the use of pollution prevention to achieve and maintain environmental compliance at the agency's facilities. Agencies shall adopt a policy to preferentially use pollution prevention projects and activities to correct and prevent noncompliance with environmental regulatoryrequirements. Agency funding requests for facility compliance with Federal, State, and local environmental regulatory requirements shall emphasize pollution prevention through source reduction as the means of first choice to ensure compliance, with reuse and recycling alternatives having second priority as a means of compliance.

Sec. 304. Pollution Prevention Return-on-Investment Programs. Each agency shall develop and implement a pollution prevention program at its facilities that compares the life cycle costs of treatment and/or disposal of waste and pollutant streams to the life cycle costs of alternatives that eliminate or reduce toxic chemicals or pollutants at the source. Each agency shall implement those projects that are life-cycle cost-effective, or otherwise offer substantial environmental or economic benefits.

Sec. 305. Policies, Strategies, and Plans.

(a) Within 12 months of the date of this order, each agency shall ensure that the goals and requirements of this order are incorporated into existing agency environmental directives, policies, and documents affected by the requirements and goals of this order. Where such directives and policies do not already exist, each agency shall, within 12 months of the date of this order, prepare and endorse a written agency environmental management strategy to achieve the requirements and goals of this order. Agency preparation of directives, policies, and documents shall reflect the nature, scale, and environmental impacts of the agency's activities, products, or services. Agencies are encouraged to include elements of relevant agency policies

or strategies developed under this part in agency planning documents prepared under the Government Performance and Results Act of 1993, Public Law 103–62.

(b) By March 31, 2002, each agency shall ensure that its facilities develop a written plan that sets forth the facility's contribution to the goals and requirements established in this order. The plan should reflect the size and complexity of the facility. Where pollution prevention plans or other formal environmental planning instruments have been prepared for agency facilities, an agency may elect to update those plans to meet the requirements and goals of this section.

(c) The Federal Acquisition Regulation (FAR) Council shall develop acquisition policies and procedures for contractors to supply agencies with all information necessary for compliance with this order. Once the appropriate FAR clauses have been published, agencies shall use them in all applicable contracts. In addition, to the extent that compliance with this order is made more difficult due to lack of information from existing contractors, or concessioners, each agency shall take practical steps to obtain the information needed to comply with this order from such contractors or concessioners.

Sec. 306. Interagency Environmental Leadership Workgroup. Within 4 months of the date of this order, EPA shall convene and chair an Interagency Environmental Leadership Workgroup (the Workgroup) with senior-level representatives from all executive agencies and other interested independent Government agencies affected by this order. The Workgroup shall develop policies and guidance required by this order and member agencies shall facilitate implementation of the requirements of this order in their respective agencies. Workgroup members shall coordinate with their Agency Environmental Executive (AEE) designated under section 301(d) of Executive Order 13101 and may request the assistance of their AEE in resolving issues that may arise among members in developing policies and guidance related to this order. If the AEEs are unable to resolve the issues, they may request the assistance of the Chair of the Council on Environmental Quality (CEQ).

Sec. 307. Annual Reports. Each agency shall submit an annual progress report to the Administrator on implementation of this order. The reports shall include a description of the progress that the agency has made in complying with all aspects of this order, including, but not limited to, progress in achieving the reduction goals in sections 502, 503, and 505 of this order. Each agency may prepare and submit the annual report in electronic format. A copy of the report shall be submitted to the Federal Environmental Executive (FEE) by EPA for use in the biennial Greening the Government Report to the President prepared in accordance with Executive Order 13101. Within 9 months of the date of this order, EPA, in coordination with the Workgroup established under section 306 of this order, shall prepare guidance regarding the information and timing for the annual report. The Workgroup shall coordinate with those agencies responsible for Federal agency reporting guidance under the Greening the Government Executive orders to streamline reporting requirements and reduce agency and facility-level reporting burdens. The first annual report shall cover calendar year 2000 activities.

PART 4—PROMOTING ENVIRONMENTAL MANAGEMENT AND LEADERSHIP

Sec. 401. Agency and Facility Environmental Management Systems. To attain the goals of section 201 of this order:

(a) Within 18 months of the date of this order, each agency shall conduct an agency-level environmental management system self assessment based on the Code of Environmental Management Principles for Federal Agencies developed by the EPA (61 Fed. Reg. 54062) and/or another appropriate environmental management system framework. Each assessment shall include a review of agency environmental leadership goals, objectives, and targets. Where appropriate, the assessments may be conducted at the service, bureau, or other comparable level.

(b) Within 24 months of the date of this order, each agency shall implement environmental management systems through pilot projects at selected agency facilities based on the Code of Environmental Management Principles for Federal Agencies and/or another appropriate environmental management system framework. By December 31, 2005, each agency shall implement an environmental management system at all appropriate agency facilities based on facility size, complexity, and the environmental aspects of facility operations. The facility environmental management system shall include measurable environmental goals, objectives, and targets that are reviewed and updated annually. Once established, environmental management system performance measures shall be incorporated in agency facility audit protocols.

Sec. 402. Facility Compliance Audits. To attain the goals of section 202 of this order:

(a) Within 12 months of the date of this order, each agency that does not have an established regulatory environmental compliance audit program shall develop and implement a program to conduct facility environmental compliance audits and begin auditing at its facilities within 6 months of the development of that program.

(b) An agency with an established regulatory environmental compliance audit program may elect to conduct environmental management system audits in lieu of regulatory environmental compliance audits at selected facilities.

(c) Facility environmental audits shall be conducted periodically. Each agency is encouraged to conduct audits not less than every 3 years from the date of the initial or previous audit. The scope and frequency of audits shall be based on facility size, complexity, and the environmental aspects of facility operations. As appropriate, each agency shall include tenant, contractor, and concessioner activities in facility audits.

(d) Each agency shall conduct internal reviews and audits and shall take such other steps, as may be necessary, to monitor its facilities' compliance with sections 501 and 504 of this order.

(e) Each agency shall consider findings from the assessments or audits conducted under Part 4 in program planning under section 301 of this order and in the preparation and revisions to facility plans prepared under section 305 of this order.

(f) Upon request and to the extent practicable, the EPA shall provide technical assistance in meeting the requirements of Part 4 by conducting environmental management reviews at Federal facilities and developing policies and guidance for conducting environmental compliance audits and implementing environmental management systems at Federal facilities.

Sec. 403. Environmental Leadership and Agency Awards Programs.

(a) Within 12 months of the date of this order, the Administrator shall establish a Federal Government environ-mental leadership program to promote and recognize outstanding environmental management performance in agencies and facilities.

(b) Each agency shall develop an internal agency-wide awards program to reward and highlight innovative programs and individuals showing outstanding environmental leadership in implementing this order. In addition, based upon criteria developed by the EPA in coordination with the Workgroup established in section 306 of this order, Federal employees who demonstrate outstanding leadership in implementation of this order may be considered for recognition under the White House awards program set forth in section 803 of Executive Order 13101 of September 14, 1998.

Sec. 404. Management Leadership and Performance Evaluations.

(a) To ensure awareness of and support for the environmental requirements of this order, each agency shall include training on the provisions of the Greening the Government Executive orders in standard senior level management training as well as training for program managers, contracting personnel, procurement and acquisition personnel, facility managers, contractors, concessioners, and other personnel as appropriate. In coordination with the Workgroup established under section 306 of this order, the EPA shall prepare guidance on implementation of this section.

(b) To recognize and reinforce the responsibilities of facility and senior headquarters program managers, regional environmental coordinators and officers, their superiors, and, to the extent practicable and appropriate, others vital to the implementation of this order, each agency shall include successfiil implementation of pollution prevention, community awareness, and environmental management into its position descriptions and performance evaluations for those positions.

Sec. 405. Compliance Assistance.

(a) Upon request and to the extent practicable, the EPA shall provide technical advice and assistance to agencies to foster full compliance with environmental regulations and all aspects of this order.

(b) Within 12 months of the date of this order, the EPA shall develop a compliance assistance center to provide technical assistance for Federal facility compliance with environmental regulations and all aspects of this order.

(c) To enhance landscaping options and awareness, the United States Department of Agriculture (USDA) shall provide information on the suitability, propagation, and the use of native plants for landscaping to all agencies and the general public by USDA in conjunction with the center under subsection (b) of this section. In implementing Part 6 of this order, agencies are encouraged to develop model demonstration programs in coordination with the USDA.

Sec. 406. Compliance Assurance.

(a) In consultation with other agencies, the EPA may conduct such reviews and inspections as may be necessary to monitor compliance with sections 501 and 504 of this order. Each agency is encouraged to cooperate fully with the efforts of the EPA to ensure compliance with those sections.

(b) Whenever the Administrator notifies an agency that it is not in compliance with section 501 or 504 of this order, the agency shall provide the EPA a detailed plan for achieving compliance as promptly as practicable.

(c) The Administrator shall report annually to the President and the public on agency compliance with the provisions of sections 501 and 504 of this order.

Sec. 407. Improving Environmental Management. To ensure that government-wide goals for pollution prevention are advanced, each agency is encouraged to incorporate its environmental leadership goals into its Strategic and Annual Performance Plans required by the Government Performance and Results Act of 1993, Public Law 103–62, starting with performance plans accompanying the FY 2002 budget.

PART 5—EMERGENCY PLANNING, COMMUNITY RIGHT-TO-KNOW, AND POLLUTION PREVENTION

Sec. 501. Toxics Release Inventory/Pollution Prevention Act Reporting. To attain the goals of section 203 of this order:

(a) Each agency shall comply with the provisions set forth in section 313 of EPCRA, section 6607 of PPA, all implementing regulations, and future amendments to these authorities, in light of applicable EPA guidance.

(b) Each agency shall comply with these provisions without regard to the Standard Industrial Classification (SIC) or North American Industrial Classification System (NAICS) delineations. Except as described in subsection (d) of this section, all other existing statutory or regulatory limitations or exemptions on the application of EPCRA section 313 to specific activities at specific agency facilities apply to the reporting requirements set forth in subsection (a) of this section.

(c) Each agency required to report under subsection (a) of this section shall do so using electronic reporting as provided in EPA's EPCRA section 313 guidance.

(d) Within 12 months of the date of this order, the Administrator shall review the impact on reporting of existing regulatory exemptions on the application of EPCRA section 313 at Federal facilities. Where feasible, this review shall include pilot studies at Federal facilities. If the review indicates that application of existing exemptions to Federal Government reporting under this section precludes public reporting of substantial amounts of toxic chemicals under subsection 501 (a), the EPA shall prepare guidance, in coordination with the Workgroup established under section 306 of this order, clarifying application of the exemptions at Federal facilities. In developing the guidance, the EPA should consider similar application of such regulatory limitations and exemptions by the private sector. To the extent feasible, the guidance developed by the EPA shall be consistent with the reasonable application of such regulatory limitations and exemptions in the private sector. The guidance shall ensure reporting consistent with the goal of public access to information under section 313 of EPCRA and section 6607 of PPA. The guidance shall be submitted to the AEEs established under section 301(d) of Executive Order 13101 for review and endorsement. Each agency shall apply any guidance to reporting at its facilities as soon as practicable but no later than for reporting for the next calendar year following release of the guidance.

(e) The EPA shall coordinate with other interested Federal agencies to carry out pilot projects to collect and disseminate information about the release and other waste management of chemicals associated with the environmental response and restoration at their facilities and sites. The pilot projects will focus on releases and other waste management of chemicals associated with environmental response and restoration at facilities and sites where the activities generating wastes do not otherwise meet EPCRA section 313 thresholds for manufacture, process, or other use. Each agency is encouraged to identify applicable facilities and voluntarily report under subsection (a) of this section the releases and other waste management of toxic chemicals managed during environmental response and restoration, regardless of whether the facility otherwise would report under subsection (a). The releases and other waste management of chemicals associated with environmental response and restoration voluntarily reported under this subsection will not be included in the accounting established under sections 503 (a) and (c) of this order.

Sec. 502. Release Reduction: Toxic Chemicals. To attain the goals of section 204 of this order:

(a) Beginning with reporting for calendar year 2001 activities, each agency reporting under section 501 of this order shall adopt a goal of reducing, where cost effective, the agency's total releases of toxic chemicals to the environment and off-site transfers of such chemicals for treatment and disposal by at least 10 percent annually, or by 40 percent overall by December 31, 2006. Beginning with activities for calendar year 2001, the baseline for measuring progress in meeting the reduction goal will be the aggregate of all such releases and off-site transfers of such chemicals for treatment and disposal as reported by all of the agency's facilities under section 501 of this order. The list of toxic chemicals applicable to this goal is the EPCRA section 313 list as of December 1, 2000. If an agency achieves the 40 percent reduction goal prior to December 31, 2006, that agency shall establish a new baseline and reduction goal based on agency priorities.

(b) Where an agency is unable to pursue the reduction goal established in subsection (a) for certain chemicals that are mission critical and/or needed to protect human health and the environment or where agency off-site transfer of toxic chemicals for treatment is directly associated with environmental restoration activities, that agency may request a waiver from the EPA for all or part of the requirement in subsection (a) of this section. As appropriate, waiver requests must provide: (1) an explanation of the mission critical use of the chemical; (2) an explanation of the nature of the need for the chemical to protect human health; (3) a description of efforts to identify a less harmful substitute chemical or alternative processes to reduce the release and transfer of the chemical in question; and (4) a description of the off-site transfers of toxic chemicals for treatment directly associated with environmental restoration activities. The EPA shall respond to the waiver request within 90 days and may grant such a waiver for no longer than 2 years. An agency may resubmit a request for waiver at the end of that period. The waiver under this section shall not alter requirements to report under section 501 of this order.

(c) Where a specific component (e.g., bureau, service, or command) within an agency achieves a 75 percent reduction in its 1999 reporting year publicly reported total releases of toxic chemicals to the environment and off-site transfers of such chemicals for treatment and disposal, based on the 1994 baseline established in Executive Order 12856, that agency may independently elect to establish a reduction goal for that component lower than the 40 percent target established in subsection (a) of this section. The agency shall formally notify the Workgroup established in section 306 of this order of the elected reduction target.

Sec. 503. Use Reduction: Toxic Chemicals, Hazardous Substances, and Other Pollutants. To attain the goals of section 205 of this order:

(a) Within 18 months of the date of this order, each agency with facilities shall develop and support goals to reduce the use at such agencies' facilities of the priority chemicals on the list under subsection (b) of this section for identified applications and purposes, or alternative chemicals and pollutants the agency identifies under subsection (c) of this section, by at least 50 percent by December 31, 2006.

(b) Within 9 months of the date of this order the Administrator, in coordination with the Workgroup established in section 306 of this order, shall develop a list of not less than 15 priority chemicals used by the Federal Government that may result in significant harm to human health or the environment and that have known, readily available, less harmful substitutes for identified applications and purposes. In addition to identifying the applications and purposes to which such reductions apply, the Administrator, in coordination with the Workgroup shall identify a usage threshold below which this section shall not apply. The chemicals will be selected from listed EPCRA section 313 toxic chemicals and, where appropriate, other regulated hazardous substances or pollutants. In developing the list, the Administrator, in coordination with the Workgroup shall consider: (1) environmental factors including toxicity, persistence, and bio-accumulation; (2) availability of known, less environmentally harmful substitute chemicals that can be used in place of the priority chemical for identified applications and purposes; (3) availability of known, less environmentally harmful processes that can be used in place of the priority chemical for identified applications and purposes; (4) relative costs of

alternative chemicals or processes; and (5) potential risk and environmental and human exposure based upon applications and uses of the chemicals by Federal agencies and facilities. In identifying alternatives, the Administrator should take into consideration the guidance issued under section 503 of Executive Order 13101.

(c) If an agency, which has facilities required to report under EPCRA, uses at its facilities less than five of the priority chemicals on the list developed in subsection (b) of this section for the identified applications and purposes, the agency shall develop, within 12 months of the date of this order, a list of not less than five chemicals that may include priority chemicals under subsection (b) of this section or other toxic chemicals, hazardous substances, and/or other pollutants the agency uses or generates, the release, transfer or waste management of which may result in significant harm to human health or the environment.

(d) In lieu of requirements under subsection (a) of this section, an agency may, upon concurrence with the Workgroup established under section 306 of this order, develop within 12 months of the date of this order, a list of not less than five priority hazardous or radioactive waste types generated by its facilities. Within 18 months of the date of this order, the agency shall develop and support goals to reduce the agency's generation of these wastes by at least 50 percent by December 31, 2006. To the maximum extent possible, such reductions shall be achieved by implementing source reduction practices.

(e) The baseline for measuring reductions for purposes of achieving the 50 percent reduction goal in subsections (a) and (d) of this section for each agency is the first calendar year following the development of the list of priority chemicals under subsection (b) of this section.

(f) Each agency shall undertake pilot projects at selected facilities to gather and make publicly available materials accounting data related to the toxic chemicals, hazardous substances, and/or other pollutants identified under subsections (b), (c), or (d) of this section.

(g) Within 12 months of the date of this order, the Administrator shall develop guidance on implementing this section in coordination with the Workgroup. The EPA shall develop technical assistance materials to assist agencies in meeting the 50 percent reduction goal of this section.

(h) Where an agency can demonstrate to the Workgroup that it has previously reduced the use of a priority chemical identified in subsection 503(b) by 50 percent, then the agency may elect to waive the 50 percent reduction goal for that chemical.

Sec. 504. Emergency Planning and Reporting Responsibilities. Each agency shall comply with the provisions set forth in sections 301 through 312 of the EPCRA, all implementing regulations, and any future amendments to these authorities, in light of any applicable guidance as provided by the EPA.

Sec. 505. Reductions in Ozone-Depleting Substances. To attain the goals of section 206 of this order:

(a) Each agency shall ensure that its facilities: (1) maximize the use of safe alternatives to ozone-depleting substances, as approved by the EPA's Significant New Alternatives Policy (SNAP) program; (2) consistent with subsection (b) of this section, evaluate the present and future uses of ozone-depleting substances, including making assessments of existing and future needs for such materials, and evaluate use of, and plans for recycling, refrigerants, and halons; and (3) exercise leadership, develop exemplary practices, and disseminate information on successful efforts in phasing out ozone-depleting substances.

(b) Within 12 months of the date of this order, each agency shall develop a plan to phase out the procurement of Class I ozone-depleting substances for all nonexcepted uses by December 31, 2010. Plans should target cost effective reduction of environmental risk by phasing out Class I ozone depleting substance applications as the equipment using those substances reaches its expected service life. Exceptions to this requirement include all exceptions found in current or future applicable law, treaty, regulation, or Executive order.

(c) Each agency shall amend its personal property management policies and procedures to preclude disposal of ozone depleting substances removed or reclaimed from its facilities or equipment, including disposal as part of a contract, trade, or donation, without prior coordination with the Department of Defense (DoD). Where the recovered ozone-depleting substance is a critical requirement for DoD missions, the agency shall transfer the materials to the DoD. The DoD will bear the costs of such transfer.

PART 6—LANDSCAPING MANAGEMENT PRACTICES

Sec. 601. Implementation.

(a) Within 12 months from the date of this order, each agency shall incorporate the Guidance for Presidential Memorandum on Environmentally and Economically Beneficial Landscape Practices on Federal Landscaped Grounds (60 Fed. Reg. 40837) developed by the FEE into landscaping programs, policies, and practices.

(b) Within 12 months of the date of this order, the FEE shall form a workgroup of appropriate Federal agency representatives to review and update the guidance in subsection (a) of this section, as appropriate.

(c) Each agency providing funding for nonfederal projects involving landscaping projects shall furnish funding recipients with information on environmentally and economically beneficial landscaping practices and work with the recipients to support and encourage application of such practices on Federally funded projects.

Sec. 602. Technical Assistance and Outreach. The EPA, the General Services Administration (GSA), and the USDA shall pro-vide technical assistance in accordance with their respective authorities on environmentally and economically beneficial landscaping practices to agencies and their facilities.

PART 7—ACQUISITION AND PROCUREMENT

Sec. 701. Limiting Procurement of Toxic Chemicals, Hazardous Substances, and Other Pollutants.

(a) Within 12 months of the date of this order, each agency shall implement training programs to ensure that agency procurement officials and acquisition program managers are aware of the requirements of this order and its applicability to those individuals.

(b) Within 24 months of the date of this order, each agency shall determine the feasibility of implementing centralized procurement and distribution (e.g., "pharmacy") programs at its facilities for tracking, distribution, and management of toxic or hazardous materials and, where appropriate, implement such programs.

(c) Under established schedules for review of standardized documents, DoD and GSA, and other agencies, as appropriate, shall review their standardized documents and identify opportunities to eliminate or reduce their use of chemicals included on the list of priority chemicals developed by the EPA under subsection 503(b) of this order, and make revisions as appropriate.

(d) Each agency shall follow the policies and procedures for toxic chemical release reporting in accordance with FAR section 23.9 effective as of the date of this order and policies and procedures on Federal compliance with right-to-know laws and pollution prevention requirements in accordance with FAR section 23.10 effective as of the date of this order.

Sec. 702. Environmentally Benign Adhesives. Within 12 months after environmentally benign pressure sensitive adhesives for paper products become commercially available, each agency shall revise its specifications for paper products using adhesives and direct the purchase of paper products using those adhesives, whenever technically practicable and cost effective. Each agency should consider products using the environmentally benign pressure sensitive adhesives approved by the U.S. Postal Service (USPS) and listed on the USPS Qualified Products List for pressure sensitive recyclable adhesives.

Sec. 703. Ozone-Depleting Substances. Each agency shall follow the policies and procedures for the acquisition of items that contain, use, or are manufactured with ozone-depleting substances in accordance with FAR section 23.8 and other applicable FAR provisions.

Sec. 704. Environmentally and Economically Beneficial Landscaping Practices.

(a) Within 18 months of the date of this order, each agency shall have in place acquisition and procurement practices, including provision of landscaping services that conform to the guidance referred to in section 601 of this order, for the use of environmentally and economically beneficial landscaping practices. At a minimum, such practices shall be consistent with the policies in the guidance referred to in section 601 of this order.

(b) In implementing landscaping policies, each agency shall purchase environmentally preferable and recycled content products, including EPA-designated items such as compost and mulch, that contribute to environmentally and economically beneficial practices.

PART 8—EXEMPTIONS

Sec. 801. National Security Exemptions. Subject to subsection 902(c) of this order and except as otherwise required by applicable law, in the interest of national security, the head of any agency may request from the President an exemption from complying with the provisions of any or all provisions of this order for particular agency facilities, provided that the procedures set forth in section 120(j)(1) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (42 U.S.C. 9620(j)(1)), are followed, with the following exceptions: (a) an exemption issued under this section will be for a specified period of time that may exceed 1 year; (b) notice of any exemption granted under this section for provisions not otherwise required by law is only required to the Director of OMB, the Chair of the CEQ, and the Director of the National Security Council; and (c) an exemption under this section may be issued due to lack of appropriations, provided that the head of the agency requesting the exemption shows that necessary funds were requested by the agency in its budget submission and agency plan under Executive Order 12088 of October 13, 1978, and were not contained in the President's budget request or the Congress failed to make available the requested appropriation. To the maximum extent practicable, and without compromising national security, each agency shall strive to comply with the purposes, goals, and implementation steps in this order. Nothing in this order affects limitations on the dissemination of classified information pursuant to law, regulation, or Executive order.

Sec. 802. Compliance. After January 1, 2002, OMB, in consultation with the Chair of the Workgroup established by section 306 of this order, may modify the compliance requirements for an agency under this order, if the agency is unable to comply with the requirements of the order. An agency requesting modification must show that it has made substantial good faith efforts to comply with the order. The cost-effectiveness of implementation of the order can be a factor in OMB's decision to modify the requirements for that agency's compliance with the order.

PART 9—GENERAL PROVISIONS

Sec. 901. Revocation. Executive Order 12843 of April 21, 1993, Executive Order 12856 of August 3, 1993, the Executive Memorandum on Environmentally Beneficial Landscaping of April 26, 1994, Executive Order 12969 of August 8, 1995, and section 1–4. "Pollution Control Plan" of Executive Order 12088 of October 13, 1978, are revoked.

Sec. 902. Limitations.

(a) This order is intended only to improve the internal management of the executive branch and is not intended to create any right, benefit, or trust responsibility, substantive or procedural, enforceable at law by a party against the United States, its agencies, its officers, or any other person.

(b) This order applies to Federal facilities in any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, and any other territory or possession over which the United States has jurisdiction. Each agency with facilities outside of these areas, however, is encouraged to make best efforts to comply with the goals of this order for those facilities.

(c) Nothing in this order alters the obligations under EPCRA, PPA, and CAA independent of this order for Government-owned, contractor-operated facilities and Government corporations owning or operating facilities or subjects such facilities to EPCRA , PPA, or CAA if they are otherwise excluded. However, each agency shall include the releases and other waste management of chemicals for all such facilities to meet the agency's reporting responsibilities under section 501 of this order.

(d) Nothing in this order shall be construed to make the provisions of CAA sections 304 and EPCRA sections 325 and 326 applicable to any agency or facility, except to the extent that an agency or facility would independently be subject to such provisions.

Sec. 903. Community Outreach. Each agency is encouraged to establish a process for local community advice and outreach for its facilities relevant to aspects of this and other related Greening the Government Executive orders. All strategies and plans developed under this order shall be made available to the public upon request.

PART 10—DEFINITIONS

For purposes of this order:

Sec. 1001. General. Terms that are not defined in this part but that are defined in Executive Orders 13101 and 13123 have the meaning given in those Executive orders. For the purposes of Part 5 of this order all definitions in EPCRA and PPA and implementing regulations at 40 CFR Parts 370 and 372 apply.

Sec. 1002. "Administrator" means the Administrator of the EPA.

Sec. 1003. "Environmental cost accounting" means the modification of cost attribution systems and financial analysis practices specifically to directly track environmental costs that are traditionally hidden in overhead accounts to the responsible products, processes, facilities or activities.

Sec. 1004. "Facility" means any building, installation, structure, land, and other property owned or operated by, or constructed or manufactured and leased to, the Federal Government, where the Federal Government is formally accountable for compliance under environmental regulation (e.g., permits, reports/records and/or planning requirements) with requirements pertaining to discharge, emission, release, spill, or management of any waste, contaminant, hazardous chemical, or pollutant. This term includes a group of facilities at a single location managed as an integrated operation, as well as government owned contractor operated facilities.

Sec. 1005. "Environmentally benign pressure sensitive adhesives" means adhesives for stamps, labels, and other paper products that can be easily treated and removed during the paper recycling process.

Sec. 1006. "Ozone-depleting substance" means any substance designated as a Class I or Class II substance by EPA in 40 CFR Part 82.

Sec. 1007. "Pollution prevention" means "source reduction," as defined in the PPA, and other practices that reduce or eliminate the creation of pollutants through: (a) increased efficiency in the use of raw materials, energy, water, or other resources; or (b) protection of natural resources by conservation.

Sec. 1008. "Greening the Government Executive orders" means this order and the series of orders on greening the government including Executive Order 13101 of September 14, 1998, Executive Order 13123 of June 3, 1999, Executive Order 13134 of August 12, 1999, and other future orders as appropriate.

Sec. 1009. "Environmental aspects" means the elements of an organization's activities, products, or services that can interact with the environment.

WILLIAM J.CLINTON

THE WHITE HOUSE,

April 21, 2000.

# # #

APPENDIX D

Office of Management and Budget Circular A-131

OMB Circular No. A-131
May 21, 1993
TO THE HEADS OF EXECUTIVE DEPARTMENTS AND ESTABLISHMENTS
SUBJECT: Value Engineering

1. Purpose. This Circular requires Federal Departments and Agencies to use value engineering (VE) as a management tool, where appropriate, to reduce program and acquisition costs.

2. Supersession Information. This Circular supersedes and cancels OMB Circular No. A-131, Value Engineering, dated January 26, 1988.

3. Authority. This Circular is issued pursuant to 31 U.S.C. [[section]]1111.

4. Background. For the purposes of this Circular, value analysis, value management, and value control are considered synonymous with VE. VE is an effective technique for reducing costs, increasing productivity, and improving quality. It can be applied to

hardware and software; development, production, and manufacturing; specifications, standards, contract requirements, and other acquisition program documentation; facilities design and construction. It may be successfully introduced at any point in the life-cycle of products, systems, or procedures. VE is a technique directed toward analyzing the functions of an item or process to determine "best value," or the best relationship between worth and cost. In other words, "best value" is represented by an item or process that consistently performs the required basic function and has the lowest total cost. In this context, the application of VE in facilities construction can yield a better value when construction is approached in a manner that incorporates environmentally-sound and energy-efficient practices and materials.

VE originated in the industrial community, and it has spread to the Federal Government due to its potential for yielding a large return on investment. VE has long been recognized as an effective technique to lower the Government's cost while maintaining necessary quality levels. Its most extensive use has been in Federal acquisition programs.

An August 1991 recent audit of VE in the Federal Government by the President's Council on Integrity and Efficiency concluded that more can and should be done by Federal agencies to realize the benefits of VE. Reports issued by the General Accounting Office and agency Inspectors General have also consistently concluded that greater use of this technique would result in additional savings to the Government.

5. Relationship to other management improvement processes. VE is a management tool that can be used alone or with other management techniques and methodologies to improve operations and reduce costs. For example, the total quality management process can include VE and other cost cutting-techniques, such as life-cycle costing, concurrent engineering, and design-to-cost, approaches, by using these techniques as analytical tools in process and product improvement.

VE contributes to the overall management objectives of streamlining operations, improving quality, reducing costs, and can result in the increased use of environmentally-sound and energy-efficient practices and materials. The complementary relationship between VE and other management techniques increases the likelihood that overall management objectives are achieved.

6. Definitions.

a. Agency. As used in this Circular, the term "agency" means an Executive department or an independent establishment within the meaning of sections 101 and 104(1), respectively, of Title 5, United States Code.

b. Life-cycle cost. The total cost of a system, building, or other product, computed over its useful life. It includes all relevant costs involved in acquiring, owning, operating, maintaining, and disposing of the system or product over a specified period of time, including environmental and energy costs.

c. Cost savings. A reduction in actual expenditures below the projected level of costs to achieve a specific objective.

d. Cost avoidance. An action taken in the immediate time frame that will decrease costs in the future. For example, an engineering improvement that increases the mean time between failures and thereby decreases operation and maintenance costs is a cost avoidance action.

e. In-house savings. Net life-cycle cost savings achieved by in-house agency staff using VE techniques.

f. Contracted savings. Net life-cycle cost savings realized by contracting for the performance of a VE study or by a Value Engineering Change Proposal submitted by a contractor.

g. Total Quality Management (TQM). A customer-based management philosophy for improving the quality of products and increasing customer satisfaction by restructuring traditional management practices. An integral part of TQM is continuous process improvement, which is achieved by using analytical techniques to determine the causes of problems. The goal is not just to fix problems but to improve processes so that the problems do not recur. Value engineering can be used as an analytical technique in the TQM process.

h. Value Engineering. An organized effort directed at analyzing the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life-cycle cost consistent with required performance, reliability, quality, and safety. These organized efforts can be performed by both in-house agency personnel and by contractor personnel.

i. Value Engineering Change Proposal (VECP). A proposal submitted by a contractor under the VE provisions of the Federal Acquisition Regulations (FAR) that, through a change in a project's plans, designs, or specifications as defined in the contract, would lower the project's life-cycle cost to the Government.

j. Value Engineering Proposal (VEP). An in-house agency-developed proposal, or a proposal developed by a contractor under contract to provide VE services, to provide VE studies for a Government project/program.

7. Policy. Federal agencies shall use VE as a management tool, where appropriate, to ensure realistic budgets, identify and remove nonessential capital and operating costs, and improve and maintain optimum quality of program and acquisition functions. Senior management will establish and maintain VE programs, procedures and processes to provide for the aggressive, systematic development and maintenance of the most effective, efficient, and economical and environmentally-sound arrangements for conducting the work of agencies, and to provide a sound basis for identifying and reporting accomplishments.

8. Agency responsibilities. To ensure that systemic VE improvements are achieved, agencies shall, at a minimum:

a. Designate a senior management official to monitor and coordinate agency VE efforts.

b. Develop criteria and guidelines for both in-house personnel and contractors to identify programs/projects with the most potential to yield savings from the application of VE techniques. The criteria and guidelines should recognize that the potential savings are greatest during the planning, design, and other early phases of project/ program/system/product development. Agency guidelines will include:

1. Measuring the net life-cycle cost savings from value engineering. The net life-cycle cost savings from value engineering is determined by subtracting the Government's cost of performing the value engineering function over the life of the program from the value of the total saving generated by the value engineering function.

2. Dollar amount thresholds for projects/programs requiring the application of VE. The minimum threshold for agency projects and programs which require the application of VE is $1 million. Lower thresholds may be established at agency discretion for projects having a major impact on agency operations.

3. Criteria for granting waivers to the requirement to conduct VE studies, in accordance with the FAR 48.201 (a).

4. Guidance to ensure that the application of VE to construction projects/programs and other projects/ programs, will include consideration of environmentally-sound and energy efficient considerations to arrive at environmentally-sound and energy efficient results.

c. Assign responsibility to the senior management official designated pursuant to [[section]]8a above, to grant waivers of the requirement to conduct VE studies on certain programs and projects. This responsibility may be delegated to other appropriate officials.

d. Provide training in VE techniques to agency staff responsible for coordinating and monitoring VE efforts and for staff responsible for developing, reviewing, analyzing, and carrying out VE proposals, change proposals, and evaluations.

e. Ensure that funds necessary for conducting agency VE efforts are included in annual budget requests to OMB.

f. Maintain files on projects/programs/systems/products that meet agency criteria for requiring the use of VE techniques. Documentation should include reasons for granting

waivers of VE studies on projects/programs which met agency criteria. Reasons for not implementing recommendations made in VE proposals should also be documented.

g. Adhere to the acquisition requirements of the FAR, including the use of VE clauses set forth in Parts 48 and 52.

h. Develop annual plans for using VE in the agency. At a minimum, the plans should identify both the in-house and contractor projects, programs, systems, products, etc., to which VE techniques will be applied in the next fiscal year, and the estimated costs of these projects. These projects should be listed by category, as required in the agency's annual report to OMB. VEP's and VECP's should be included under the appropriate category. Annual plans will be made available for OMB review upon request.

i. Report annually to OMB on VE activities, as outlined below.

9. Reports to OMB. Each agency shall report the Fiscal Year results of using VE annually to OMB, except those agencies whose total budget is under $10 million or whose total procurement obligations do not exceed $10 million in a given fiscal year. The reports are due to OMB by December 31st of the calendar year, and should include the current name, address, and telephone number of the agency's VE manager.

The report format is provided in the Attachment.

Part I of the report asks for net life-cycle cost savings achieved through VE. In addition, it requires agencies to show the project/program dollar amount thresholds the agency has established for requiring the use of VE if greater than $1 million. If thresholds vary by category, show the thresholds for all categories. Savings resulting from VE proposals and VE change proposals should be included under the appropriate categories.

Part II asks for a description of the top 20 fiscal year VE projects (or all projects if there are fewer than 20). List the projects by title and show the net life-cycle cost savings and quality improvements achieved through application of VE.

Part III requires agencies to submit a detailed schedule of year-by-year cost savings, cost avoidances and cost sharing with contractors for each program/project for which the agency is reporting cost savings or cost avoidances. The aggregate total of all schedules shall equal the totals reported in Part I.A. of the annual report.

10. Inspectors General audits. Two years after the issuance of this revised Circular, Agency Heads shall ask the Inspectors General (IGs) to audit agency value engineering programs to (1) validate the accuracy of agency reported value engineering savings and (2) assess the adequacy of agency value engineering policies, procedures and implementation of this revised Circular. Periodically thereafter, agency IGs shall audit agency reported VE savings as the need arises.

11. Related Guidance. In general, value engineering investments should have positive net present value when discounted with the appropriate interest rate, as described in OMB Circular No. A-94, section 8.c. For detailed guidance on value engineering, refer to the appropriate sections of the Federal Acquisition Regulations.

12. Effective date and Implementation. This Circular takes effect within 30 days of its publication in the Federal Register. Heads of departments and agencies are responsible for taking all necessary actions to assure effective implementation of these policies, such as disseminating this Circular to appropriate program and other staff, developing implementation strategies and initiating staff training. Since these policies must be implemented in the Federal Acquisition Regulation (FAR), agencies should not duplicate the development of implementing procurement regulations being undertaken by the Federal Acquisition Regulatory Councils. However, implementation of these policies in the FAR must be accomplished within the time period specified below, with inclusion in agency solicitations and resulting contracts, as appropriate, to occur immediately thereafter.

Pursuant to subsections 6(a) of the Office of Federal Procurement Policy Act, as amended, (41 U.S.C. 401 et seq.), the Federal Acquisition Regulatory Councils shall ensure that the policies established herein are incorporated in the FAR within 180 days from the date this Circular is published in final form in the Federal Register. Promulgation of final FAR regulations within that 180 day period shall be considered issuance in a "timely manner" as prescribed in 41 USC 405(b)."

13. Sunset review. The policies contained in this Circular will be reviewed by OMB five years from the date of issuance.

14. Inquiries. Further information about this Circular may be obtained from the Office of Management and Budget (OMB), 725 17th Street, NW, Washington, DC 20503, Telephone (202) 395–6803.

Leon Panetta
Director
Attachment

APPENDIX E

Public Law 104–106, Section 4306 Value Engineering for Federal Agencies

SEC. 4306. VALUE ENGINEERING FOR FEDERAL AGENCIES.

(a) Use of Value Engineering.—

The Office of Federal Procurement Policy Act (41 U.S.C. 401 et seq.), as amended by section 4203, is further amended by adding at the end the following new section:

"SEC. 36. <<NOTE: 41 USC 432.>> VALUE ENGINEERING."

(a) In General—Each executive agency shall establish and maintain cost-effective value engineering procedures and processes."

(b) Definition.—As used in this section, the term 'value engineering' means an analysis of the functions of a program, project, system, product, item of equipment, building, facility, service, or supply of an executive agency, performed by qualified agency or contractor personnel, directed at improving performance, reliability, quality, safety, and life cycle costs.". [[Page 110 STAT. 666]] (b) Clerical Amendment.—The table of contents for such Act, contained in section 1(b), is amended by adding at the end the following new item: "Sec. 36. Value engineering.".

APPENDIX F

Federal Acquisition Regulation Parts 48 and 52 Re: Value Engineering

48.000 Scope of part.

This part prescribes policies and procedures for using and administering value engineering techniques in contracts.

48.001 Definitions.

"Acquisition savings," as used in this part, means savings resulting from the application of a value engineering change proposal (VECP) to contracts awarded by the same contracting office or its successor for essentially the same unit. Acquisition savings include—

(a) Instant contract savings, which are the net cost reductions on the contract under which the VECP is submitted and accepted, and which are equal to the instant unit cost

reduction multiplied by the number of instant contract units affected by the VECP, less the contractor's allowable development and implementation costs;

(b) Concurrent contract savings, which are net reductions in the prices of other contracts that are definitized and ongoing at the time the VECP is accepted; and

(c) Future contract savings, which are the product of the future unit cost reduction multiplied by the number of future contract units in the sharing base. On an instant contract, future contract savings include savings on increases in quantities after VECP acceptance that are due to contract modifications, exercise of options, additional orders, and funding of subsequent year requirements on a multiyear contract.

"Collateral costs," as used in this part, means agency costs of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings," as used in this part, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contracting office," as used in this part, includes any contracting office that the acquisition is transferred to, such as another branch of the agency or another agency's office that is performing a joint acquisition action.

"Contractor's development and implementation costs," as used in this part, means those costs the contractor incurs on a VECP specifically in developing, testing, preparing, and submitting the VECP, as well as those costs the contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Future unit cost reduction," as used in this part, means the instant unit cost reduction adjusted as the contracting officer considers necessary for projected learning or changes in quantity during the sharing period. It is calculated at the time the VECP is accepted and applies either—

(a) Throughout the sharing period, unless the contracting officer decides that recalculation is necessary because conditions are significantly different from those previously anticipated, or

(b) To the calculation of a lump-sum payment, which cannot later be revised.

"Government costs," as used in this part, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistics support. The term does not include the normal administrative costs of processing the VECP or any increase in instant contract cost or price resulting from negative instant contract savings.

"Instant contract," as used in this part, means the contract under which the VECP is submitted. It does not include increases in quantities after acceptance of the VECP that are due to contract modifications, exercise of options, or additional orders. If the contract is a multiyear contract, the term does not include quantities funded after VECP acceptance. In a fixed-price contract with prospective price redetermination, the term refers to the period for which firm prices have been established.

"Instant unit cost reduction" means the amount of the decrease in unit cost of performance (without deducting any contractor's development or implementation costs) resulting from using the VECP on the instant contract. In service contracts, the instant unit cost reduction is normally equal to the number of hours per line-item task saved by using the VECP on the instant contract, multiplied by the appropriate contract labor rate.

"Negative instant contract savings" means the increase in the instant contract cost or price when the acceptance of a VECP results in an excess of the contractor's allowable development and implementation costs over the product of the instant unit cost reduction multiplied by the number of instant contract units affected.

"Net acquisition savings" means total acquisition savings, including instant, concurrent, and future contract savings, less Government costs.

"Sharing base," as used in this part, means the number of affected end items on contracts of the contracting office accepting the VECP.

"Sharing period," as used in this part, means the period beginning with acceptance of the first unit incorporating the VECP and ending at a calendar date or event determined by the contracting officer for each VECP.

"Unit," as used in this part, means the item or task to which the contracting officer and the contractor agree the VECP applies.

"Value engineering," as used in this part, means an analysis of the functions of a program, project, system, product, item of equipment, building, facility, service, or supply of an executive agency, performed by qualified agency or contractor personnel, directed at improving performance, reliability, quality, safety, and life-cycle costs (Section 36 of the Office of Federal Procurement Policy Act, 41 U.S.C. 401, et seq.).

"Value engineering change proposal (VECP)" means a proposal that—

(a) Requires a change to the instant contract to implement; and

(b) Results in reducing the overall projected cost to the agency without impairing essential functions or characteristics; provided, that it does not involve a change—

(1) In deliverable end item quantities only;

(2) In research and development (R&D) items or R&D test quantities that are due solely to results of previous testing under the instant contract; or

(3) To the contract type only.

"Value engineering proposal," as used in this part, means, in connection with an A-E contract, a change proposal developed by employees of the Federal Government or contractor value engineering personnel under contract to an agency to provide value engineering services for the contract or program.

Subpart 48.1—Policies and Procedures

48.101 General.

(a) Value engineering is the formal technique by which contractors may (1) voluntarily suggest methods for performing more economically and share in any resulting savings or

(2) be required to establish a program to identify and submit to the Government methods for performing more economically. Value engineering attempts to eliminate, without impairing essential functions or characteristics, anything that increases acquisition, operation, or support costs.

(b) There are two value engineering approaches:

(1) The first is an incentive approach in which contractor participation is voluntary and the contractor uses its own resources to develop and submit any value engineering change proposals (VECP's). The contract provides for sharing of savings and for payment of the contractor's allowable development and implementation costs only if a VECP is accepted. This voluntary approach should not in itself increase costs to the Government.

(2) The second approach is a mandatory program in which the Government requires and pays for a specific value engineering program effort. The contractor must perform value engineering of the scope and level of effort required by the Government's program plan and included as a separately priced item of work in the contract Schedule. No value engineering sharing is permitted in architect engineer contracts. All other contracts with a program clause share in savings on accepted VECP's, but at a lower percentage rate than under the voluntary approach. The objective of this value engineering program requirement is to ensure that the contractor's value engineering effort is applied to areas of the contract that offer opportunities for considerable savings consistent with the functional requirements of the end item of the contract.

48.102 Policies.

(a) As required by Section 36 of the Office of Federal Procurement Policy Act (41 U.S.C. 401, et seq.), agencies shall establish and maintain cost-effective value engineering procedures and processes. Agencies shall provide contractors a substantial financial incentive to develop and submit VECP's. Contracting activities will include value

engineering provisions in appropriate supply, service, architect-engineer and construction contracts as prescribed by 48.201 and 48.202 except where exemptions are granted on a case-by-case basis, or for specific classes of contracts, by the agency head.

(b) Agencies shall—

(1) Establish guidelines for processing VECPs,

(2) Process VECP's objectively and expeditiously, and

(3) Provide contractors a fair share of the savings on accepted VECP's.

(c) Agencies shall consider requiring incorporation of value engineering clauses in appropriate subcontracts.

(d)(1) Agencies other than the Department of Defense shall use the value engineering program requirement clause (52.248–1, Alternates I or II) in initial production contracts for major system programs (see definition of major system in 34.001) and for contracts for major systems research and development except where the contracting officer determines and documents the file to reflect that such use is not appropriate.

(2) In Department of Defense contracts, the VE program requirement clause (52.248–1, Alternates I or II), shall be placed in initial production solicitations and contracts (first and second production buys) for major system acquisition programs as defined in DoD Directive 5000.1, except as specified in subdivisions (d)(2)(i) and (ii) of this section. A program requirement clause may be included in initial production contracts for less than major systems acquisition programs if there is a potential for savings. The contracting officer is not required to include a program requirement clause in initial production contracts—

(i) Where, in the judgment of the contracting officer, the prime contractor has demonstrated an effective VE program during either earlier program phases, or during other recent comparable production contracts.

(ii) Which are awarded on the basis of competition.

(e) Value engineering incentive payments do not constitute profit or fee within the limitations imposed by 10 U.S.C. 2306(d) and 41 U.S.C. 254(b) (see 15.404–4(c)(4)(i)).

(f) Generally, profit or fee on the instant contract should not be adjusted downward as a result of acceptance of a VECP. Profit or fee shall be excluded when calculating instant or future contract savings.

(g) The contracting officer determines the sharing periods and sharing rates on a case-by-case basis using the guidelines in 48.104–1 and 48.104–2, respectively. In establishing a

sharing period and sharing rate, the contracting officer must consider the following, as appropriate, and must insert supporting rationale in the contract file:

(1) Extent of the change.

(2) Complexity of the change.

(3) Development risk (e.g., contractor's financial risk).

(4) Development cost.

(5) Performance and/or reliability impact.

(6) Production period remaining at the time of VECP acceptance.

(7) Number of units affected.

(h) Contracts for architect-engineer services must require a mandatory value engineering program to reduce total ownership cost in accordance with 48.101(b)(2). However, there must be no sharing of value engineering savings in contracts for architect-engineer services.

(i) Agencies shall establish procedures for funding and payment of the contractor's share of collateral savings and future contract savings.

48.103 Processing value engineering change proposals.

(a) Instructions to the contractor for preparing a VECP and submitting it to the Government are included in paragraphs (c) and (d) of the value engineering clauses prescribed in Subpart 48.2. Upon receiving a VECP, the contracting officer or other designated official shall promptly process and objectively evaluate the VECP in accordance with agency procedures and shall document the contract file with the rationale for accepting or rejecting the VECP.

(b) The contracting officer is responsible for accepting or rejecting the VECP within 45 days from its receipt by the Government. If the Government will need more time to evaluate the VECP, the contracting officer shall notify the contractor promptly in writing, giving the reasons and the anticipated decision date. The contractor may withdraw, in whole or in part, any VECP not accepted by the Government within the period specified in the VECP. Any VECP may be approved, in whole or in part, by a contract modification incorporating the VECP. Until the effective date of the contract modification, the contractor shall perform in accordance with the existing contract. If the Government accepts the VECP, but properly rejects units subsequently delivered or does not receive units on which a savings share was paid, the contractor shall reimburse the Government for the proportionate share of these payments. If the VECP is not accepted,

the contracting officer shall provide the contractor with prompt written notification, explaining the reasons for rejection.

(c) The following Government decisions are unilateral decisions made solely at the discretion of the Government:

(1) The decision to accept or reject a VECP.

(2) The determination of collateral costs or collateral savings.

(3) The decision as to which of the sharing rates applies when Alternate II of the clause at 52.248–1, Value Engineering, is used.

(4) The contracting officer's determination of the duration of the sharing period and the contractor's sharing rate.

48.104 Sharing arrangements.

48.104–1 Determining sharing period.

(a) Contracting officers must determine discrete sharing periods for each VECP. If more than one VECP is incorporated into a contract, the sharing period for each VECP need not be identical.

(b) The sharing period begins with acceptance of the first unit incorporating the VECP. Except as provided in paragraph (c) of this subsection, the end of the sharing period is a specific calendar date that is the later of—

(1) 36 to 60 consecutive months (set at the discretion of the contracting officer for each VECP) after the first unit affected by the VECP is accepted; or

(2) The last scheduled delivery date of an item affected by the VECP under the instant contract delivery schedule in effect at the time the VECP is accepted.

(c) For engineering-development contracts and contracts containing low-rate-initial-production or early production units, the end of the sharing period is based not on a calendar date, but on acceptance of a specified quantity of future contract units. This quantity is the number of units affected by the VECP that are scheduled to be delivered over a period of between 36 and 60 consecutive months (set at the discretion of the contracting officer for each VECP) that spans the highest planned production, based on planning and programming or production documentation at the time the VECP is accepted. The specified quantity begins with the first future contract unit affected by the VECP and continues over consecutive deliveries until the sharing period ends at acceptance of the last of the specified quantity of units.

(d) For contracts (other than those in paragraph (c) of this subsection) for items requiring a prolonged production schedule (e.g., ship construction, major system acquisition), the end of the sharing period is determined according to paragraph (b) of this subsection. Agencies may prescribe sharing of future contract savings on all future contract units to be delivered under contracts awarded within the sharing period for essentially the same item, even if the scheduled delivery date is outside the sharing period.

48.104–2 Sharing acquisition savings.

(a) Supply or service contracts. (1) The sharing base for acquisition savings is the number of affected end items on contracts of the contracting office accepting the VECP. The sharing rates (Government/contractor) for net acquisition savings for supplies and services are based on the type of contract, the value engineering clause or alternate used, and the type of savings, as follows:

(2) Acquisition savings may be realized on the instant contract, concurrent contracts, and future contracts. The contractor is entitled to a percentage share (see paragraph (a)(1)) of any net acquisition savings. Net acquisition savings result when the total of acquisition savings becomes greater than the total of Government costs and any negative instant contract savings. This may occur on the instant contract or it may not occur until reductions have been negotiated on concurrent contracts or until future contract savings are calculated, either through lump-sum payment or as each future contract is awarded.

(i) When the instant contract is not an incentive contract, the contractor's share of net acquisition savings is calculated and paid each time such savings are realized. This may occur once, several times, or, in rare cases, not at all.

(ii) When the instant contract is an incentive contract, the contractor shares in instant contract savings through the contract's incentive structure. In calculating acquisition savings under incentive contracts, the contracting officer shall add any negative instant contract savings to the target cost or to the target price and ceiling price and then offset these negative instant contract savings and any Government costs against concurrent and future contract savings.

(3) The contractor shares in the savings on all affected units scheduled for delivery during the sharing period. The contractor is responsible for maintaining, for 3 years after final payment on the contract under which the VECP was accepted, records adequate to identify the first delivered unit incorporating the applicable VECP.

(4) Contractor shares of savings are paid through the contract under which the VECP was accepted. On incentive contracts, the contractor's share of concurrent and future contract savings and of collateral savings shall be paid as a separate firm-fixed-price contract line item on the instant contract.

(5) Within 3 months after concurrent contracts have been modified to reflect price reductions attributable to use of the VECP, the contracting officer shall modify the instant contract to provide the contractor's share of savings.

(6) The contractor's share of future contract savings may be paid as subsequent contracts are awarded or in a lump-sum payment at the time the VECP is accepted. The lump-sum method may be used only if the contracting officer has established that this is the best way to proceed and the contractor agrees. The contracting officer ordinarily shall make calculations as future contracts are awarded and, within 3 months after award, modify the instant contract to provide the contractor's share of the savings. For future contract savings calculated under the optional lump-sum method, the sharing base is an estimate of the number of items that the contracting officer will purchase for delivery during the sharing period. In deciding whether or not to use the more convenient lump-sum method for an individual VECP, the contracting officer shall consider—

(i) The accuracy with which the number of items to be delivered during the sharing period can be estimated and the probability of actual production of the projected quantity;

(ii) The availability of funds for a lump-sum payment; and

(iii) The administrative expense of amending the instant contract as future contracts are awarded.

(b) Construction contracts. Sharing on construction contracts applies only to savings on the instant contract and to collateral savings. The Government's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by (1) 45 percent for fixed-price contracts or (2) 75 percent for cost-reimbursement contracts. Value engineering sharing does not apply to incentive construction contracts.

48.104–3 Sharing collateral savings.

(a) The Government shares collateral savings with the contractor, unless the head of the contracting activity has determined that the cost of calculating and tracking collateral savings will exceed the benefits to be derived (see 48.201(e)).

(b) The contractor's share of collateral savings may range from 20 to 100 percent of the estimated savings to be realized during a typical year of use but must not exceed the greater of—

(1) The contract's firm-fixed-price, target price, target cost, or estimated cost, at the time the VECP is accepted; or

(2) $100,000.

(c) The contracting officer must determine the sharing rate for each VECP.

(d) In determining collateral savings, the contracting officer must consider any degradation of performance, service life, or capability.

48.104–4 Sharing alternative—no-cost settlement method.

In selecting an appropriate mechanism for incorporating a VECP into a contract, the contracting officer shall analyze the different approaches available to determine which one would be in the Government's best interest. Contracting officers should balance the administrative costs of negotiating a settlement against the anticipated savings. A no-cost settlement may be used if, in the contracting officer's judgment, reliance on other VECP approaches likely would not be more cost-effective, and the no-cost settlement would provide adequate consideration to the Government. Under this method of settlement, the contractor would keep all of the savings on the instant contract, and all savings on its concurrent contracts only. The Government would keep all savings resulting from concurrent contracts placed with other sources, savings from all future contracts, and all collateral savings. Use of this method must be by mutual agreement of both parties for individual VECPs.

48.105 Relationship to other incentives.

Contractors should be offered the fullest possible range of motivation, yet the benefits of an accepted VECP should not be rewarded both as value engineering shares and under performance, design-to-cost, or similar incentives of the contract. To that end, when performance, design-to-cost, or similar targets are set and incentivized, the targets of such incentives affected by the VECP are not to be adjusted because of the acceptance of the VECP. Only those benefits of an accepted VECP not rewardable under other incentives are rewarded under a value engineering clause.

Subpart 48.2—Contract Clauses

48.201 Clauses for supply or service contracts.

(a) General. The contracting officer shall insert a value engineering clause in solicitations and contracts when the contract amount is expected to be $100,000 or more, except as specified in subparagraphs (a)(1) through (5) and in paragraph (f) below. A value engineering clause may be included in contracts of lesser value if the contracting officer sees a potential for significant savings. Unless the chief of the contracting office authorizes its inclusion, the contracting officer shall not include a value engineering clause in solicitations and contracts—

(1) For research and development other than full-scale development;

(2) For engineering services from not-for-profit or nonprofit organizations;

(3) For personal services (see Subpart 37.1);

(4) Providing for product or component improvement, unless the value engineering incentive application is restricted to areas not covered by provisions for product or component improvement;

(5) For commercial products (see Part 11) that do not involve packaging specifications or other special requirements or specifications; or

(6) When the agency head has exempted the contract (or a class of contracts) from the requirements of this Part 48.

(b) Value engineering incentive. To provide a value engineering incentive, the contracting officer shall insert the clause at 52.248–1, Value Engineering, in solicitations and contracts except as provided in paragraph (a) of this section (but see subparagraph (e)(1) below).

(c) Value engineering program requirement. (1) If a mandatory value engineering effort is appropriate (i.e., if the contracting officer considers that substantial savings to the Government may result from a sustained value engineering effort of a specified level), the contracting officer shall use the clause with its Alternate I (but see subparagraph (e)(2) below).

(2) The value engineering program requirement may be specified by the Government in the solicitation or, in the case of negotiated contracting, proposed by the contractor as part of its offer and included as a subject for negotiation. The program requirement shall be shown as a separately priced line item in the contract Schedule.

(d) Value engineering incentive and program requirement. (1) If both a value engineering incentive and a mandatory program requirement are appropriate, the contracting officer shall use the clause with its Alternate II (but see subparagraph (e)(3) below).

(2) The contract shall restrict the value engineering program requirement to well-defined areas of performance designated by line item in the contract Schedule. Alternate II applies a value engineering program to the specified areas and a value engineering incentive to the remaining areas of the contract.

(e) Collateral savings computation not cost-effective. If the head of the contracting activity determines for a contract or class of contracts that the cost of computing and tracking collateral savings will exceed the benefits to be derived, the contracting officer shall use the clause with its—

(1) Alternate III if a value engineering incentive is involved;

(2) Alternate III and Alternate I if a value engineering program requirement is involved; or

(3) Alternate III and Alternate II if both an incentive and a program requirement are involved.

(f) Architect-engineer contracts. The contracting officer shall insert the clause at 52.248– 2, Value Engineering Architect-Engineer, in solicitations and contracts whenever the Government requires and pays for a specific value engineering effort in architect-engineer contracts. The clause at 52.248–1, Value Engineering, shall not be used in solicitations and contracts for architect-engineer services.

(g) Engineering-development solicitations and contracts. For engineering-development solicitations and contracts, and solicitations and contracts containing low-rate-initial-production or early production units, the contracting officer must modify the clause at 52.248–1, Value Engineering, by—

(1) Revising paragraph (i)(3)(i) of the clause by substituting "a number equal to the quantity required to be delivered over a period of between 36 and 60 consecutive months (set at the discretion of the Contracting Officer for each VECP) that spans the highest planned production, based on planning and programming or production documentation at the time the VECP is accepted;" for "the number of future contract units scheduled for delivery during the sharing period;" and

(2) Revising the first sentence under paragraph (3) of the definition of "acquisition savings" by substituting "a number equal to the quantity to be delivered over a period of between 36 and 60 consecutive months (set at the discretion of the Contracting Officer for each VECP) that spans the highest planned production, based on planning and programming or production documentation at the time the VECP is accepted." for "the number of future contract units in the sharing base."

(h) Extended production period solicitations and contracts. In solicitations and contracts for items requiring an extended period for production (e.g., ship construction, major system acquisition), if agency procedures prescribe sharing of future contract savings on all units to be delivered under contracts awarded during the sharing period (see 48.104– 1(c)), the contracting officer must modify the clause at 52.248–1, Value Engineering, by revising paragraph (i)(3)(i) of the clause and the first sentence under paragraph (3) of the definition of "acquisition savings" by substituting "under contracts awarded during the sharing period" for "during the sharing period."

48.202 Clause for construction contracts.

The contracting officer shall insert the clause at 52.248–3, Value Engineering-Construction, in construction solicitations and contracts when the contract amount is estimated to be $100,000 or more, unless an incentive contract is contemplated. The contracting officer may include the clause in contracts of lesser value if the contracting officer sees a potential for significant savings. The contracting officer shall not include the clause in incentive-type construction contracts. If the head of the contracting activity determines that the cost of computing and tracking collateral savings for a contract will

exceed the benefits to be derived, the contracting officer shall use the clause with its Alternate I.

Government/Contractor Shares of Net Acquisition Savings

(Figures in Percent)

Contract Type	Sharing Arrangement	Incentive (voluntary)	Program Requirement (mandatory)
Fixed-price (includes fixed-price-award-fee; excludes other fixed-price incentive contracts)	Instant contract rate	*50/50	(**)
	Con- current and future rate	*50/50	***75/25
Incentive (fixed-price or cost) (other than award fee)			
Cost-reimbursement (includes cost-plus-award-fee; excludes other cost-type incentive contracts)			

*50/50

***75/25

Instant contract rate

75/25

(**)

85/15

Con- current and future contract rate

*75/25

75/25

85/15

*The Contracting Officer may increase the Contractor's sharing rate to as high as 75 percent for each VECP.
**Same sharing arrangement as the contract's profit or fee adjustment formula.
***The Contracting Officer may increase the Contractor's sharing rate to as high as 50 percent for each VECP.

52.248–2 Value Engineering—Architect-Engineer.

As prescribed in 48.201(f), insert the following clause:

Value Engineering—Architect-Engineer (Mar 1990)

(a) General. The Contractor shall (1) perform value engineering (VE) services and submit progress reports as specified in the Schedule; and (2) submit to the Contracting Officer any resulting value engineering proposals (VEP's). Value engineering activities shall be performed concurrently with, and without delay to, the schedule set forth in the contract. The services shall include VE evaluation and review and study of design documents immediately following completion of the 35 percent design state or at such stages as the Contracting Officer may direct. Each separately priced line item for VE services shall define specifically the scope of work to be accomplished and may include VE studies of items other than design documents. The Contractor shall be paid as the contract specifies for this effort, but shall not share in savings which may result from acceptance and use of VEP's by the Government.

(b) Definitions. "Life cycle cost," as used in this clause, is the sum of all costs over the useful life of a building, system or product. It includes the cost of design, construction, acquisition, operation, maintenance, and salvage (resale) value, if any.

"Value engineering," as used in this clause, means an organized effort to analyze the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions at the lowest life cycle cost consistent with required performance, reliability, quality, and safety.

"Value engineering proposal," as used in this clause, means, in connection with an A-E contract, a change proposal developed by employees of the Federal Government or contractor value engineering personnel under contract to an agency to provide value engineering services for the contract or program.

(c) Submissions. After award of an architect-engineering contract the contractor shall—

(1) Provide the Government with a fee breakdown schedule for the VE services (such as criteria review, task team review, and bid package review) included in the contract schedule;

(2) Submit, for approval by the Contracting Officer, a list of team members and their respective resumes representing the engineering disciplines required to complete the study effort, and evidence of the team leader's qualifications and engineering discipline. Subsequent changes or substitutions to the approved VE team shall be submitted in writing to the Contracting Officer for approval; and

(3) The team leader shall be responsible for pre-study work assembly and shall edit, reproduce, and sign the final report and each VEP. All VEP's, even if submitted earlier as an individual submission, shall be contained in the final report.

(d) VEP preparation. As a minimum, the contractor shall include the following information in each VEP:

(1) A description of the difference between the existing and proposed design, the comparative advantages and disadvantages of each, a justification when an item's function is being altered, the effect of the change on system or facility performance, and any pertinent objective test data.

(2) A list and analysis of design criteria or specifications that must be changed if the VEP is accepted.

(3) A separate detailed estimate of the impact on project cost of each VEP, if accepted and implemented by the Government.

(4) A description and estimate of costs the Government may incur in implementing the VEP, such as design change cost and test and evaluation cost.

(5) A prediction of any effects the proposed change may have on life cycle cost.

(6) The effect the VEP will have on design or construction schedules.

(e) VEP acceptance. Approved VEP's shall be implemented by bilateral modification to this contract.

(End of clause)

52.248–3 Value Engineering—Construction.

As prescribed in 48.202, insert the following clause:

Value Engineering—Construction (Feb 2000)

(a) General. The Contractor is encouraged to develop, prepare, and submit value engineering change proposals (VECP's) voluntarily. The Contractor shall share in any instant contract savings realized from accepted VECP's, in accordance with paragraph (f) of this clause.

(b) Definitions. "Collateral costs," as used in this clause, means agency costs of operation, maintenance, logistic support, or Government-furnished property.

"Collateral savings," as used in this clause, means those measurable net reductions resulting from a VECP in the agency's overall projected collateral costs, exclusive of acquisition savings, whether or not the acquisition cost changes.

"Contractor's development and implementation costs," as used in this clause, means those costs the Contractor incurs on a VECP specifically in developing, testing, preparing, and

submitting the VECP, as well as those costs the Contractor incurs to make the contractual changes required by Government acceptance of a VECP.

"Government costs," as used in this clause, means those agency costs that result directly from developing and implementing the VECP, such as any net increases in the cost of testing, operations, maintenance, and logistic support. The term does not include the normal administrative costs of processing the VECP.

"Instant contract savings," as used in this clause, means the estimated reduction in Contractor cost of performance resulting from acceptance of the VECP, minus allowable Contractor's development and implementation costs, including subcontractors' development and implementation costs (see paragraph (h) of this clause).

"Value engineering change proposal (VECP)" means a proposal that—

(1) Requires a change to this, the instant contract, to implement; and

(2) Results in reducing the contract price or estimated cost without impairing essential functions or characteristics; provided, that it does not involve a change—

(i) In deliverable end item quantities only; or

(ii) To the contract type only.

(c) VECP preparation. As a minimum, the Contractor shall include in each VECP the information described in paragraphs (c)(1) through (7) of this clause. If the proposed change is affected by contractually required configuration management or similar procedures, the instructions in those procedures relating to format, identification, and priority assignment shall govern VECP preparation. The VECP shall include the following:

(1) A description of the difference between the existing contract requirement and that proposed, the comparative advantages and disadvantages of each, a justification when an item's function or characteristics are being altered, and the effect of the change on the end item's performance.

(2) A list and analysis of the contract requirements that must be changed if the VECP is accepted, including any suggested specification revisions.

(3) A separate, detailed cost estimate for (i) the affected portions of the existing contract requirement and (ii) the VECP. The cost reduction associated with the VECP shall take into account the Contractor's allowable development and implementation costs, including any amount attributable to subcontracts under paragraph (h) of this clause.

(4) A description and estimate of costs the Government may incur in implementing the VECP, such as test and evaluation and operating and support costs.

(5) A prediction of any effects the proposed change would have on collateral costs to the agency.

(6) A statement of the time by which a contract modification accepting the VECP must be issued in order to achieve the maximum cost reduction, noting any effect on the contract completion time or delivery schedule.

(7) Identification of any previous submissions of the VECP, including the dates submitted, the agencies and contract numbers involved, and previous Government actions, if known.

(d) Submission. The Contractor shall submit VECP's to the Resident Engineer at the worksite, with a copy to the Contracting Officer.

(e) Government action. (1) The Contracting Officer will notify the Contractor of the status of the VECP within 45 calendar days after the contracting office receives it. If additional time is required, the Contracting Officer will notify the Contractor within the 45-day period and provide the reason for the delay and the expected date of the decision. The Government will process VECP's expeditiously; however, it will not be liable for any delay in acting upon a VECP.

(2) If the VECP is not accepted, the Contracting Officer will notify the Contractor in writing, explaining the reasons for rejection. The Contractor may withdraw any VECP, in whole or in part, at any time before it is accepted by the Government. The Contracting Officer may require that the Contractor provide written notification before undertaking significant expenditures for VECP effort.

(3) Any VECP may be accepted, in whole or in part, by the Contracting Officer's award of a modification to this contract citing this clause. The Contracting Officer may accept the VECP, even though an agreement on price reduction has not been reached, by issuing the Contractor a notice to proceed with the change. Until a notice to proceed is issued or a contract modification applies a VECP to this contract, the Contractor shall perform in accordance with the existing contract. The decision to accept or reject all or part of any VECP is a unilateral decision made solely at the discretion of the Contracting Officer.

(f) Sharing—(1) Rates. The Government's share of savings is determined by subtracting Government costs from instant contract savings and multiplying the result by—

(i) 45 percent for fixed-price contracts; or

(ii) 75 percent for cost-reimbursement contracts.

(2) Payment. Payment of any share due the Contractor for use of a VECP on this contract shall be authorized by a modification to this contract to—

(i) Accept the VECP;

(ii) Reduce the contract price or estimated cost by the amount of instant contract savings; and

(iii) Provide the Contractor's share of savings by adding the amount calculated to the contract price or fee.

(g) Collateral savings. If a VECP is accepted, the Contracting Officer will increase the instant contract amount by 20 percent of any projected collateral savings determined to be realized in a typical year of use after subtracting any Government costs not previously offset. However, the Contractor's share of collateral savings will not exceed the contract's firm-fixed-price or estimated cost, at the time the VECP is accepted, or $100,000, whichever is greater. The Contracting Officer is the sole determiner of the amount of collateral savings.

(h) Subcontracts. The Contractor shall include an appropriate value engineering clause in any subcontract of $50,000 or more and may include one in subcontracts of lesser value. In computing any adjustment in this contract's price under paragraph (f) of this clause, the Contractor's allowable development and implementation costs shall include any subcontractor's allowable development and implementation costs clearly resulting from a VECP accepted by the Government under this contract, but shall exclude any value engineering incentive payments to a subcontractor. The Contractor may choose any arrangement for subcontractor value engineering incentive payments; provided, that these payments shall not reduce the Government's share of the savings resulting from the VECP.

(i) Data. The Contractor may restrict the Government's right to use any part of a VECP or the supporting data by marking the following legend on the affected parts:

These data, furnished under the Value Engineering—Construction clause of contract _____ , shall not be disclosed outside the Government or duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate a value engineering change proposal submitted under the clause. This restriction does not limit the Government's right to use information contained in these data if it has been obtained or is otherwise available from the Contractor or from another source without limitations.

If a VECP is accepted, the Contractor hereby grants the Government unlimited rights in the VECP and supporting data, except that, with respect to data qualifying and submitted as limited rights technical data, the Government shall have the rights specified in the contract modification implementing the VECP and shall appropriately mark the data. (The terms "unlimited rights" and "limited rights" are defined in Part 27 of the Federal Acquisition Regulation.)

(End of clause)

Alternate I (Apr 1984). When the head of the contracting activity determines that the cost of calculating and tracking collateral savings will exceed the benefits to be derived in a construction contract, delete paragraph (g) from the basic clause and redesignate the remaining paragraphs accordingly.