



Federal Energy Management Program and Performance Contracting

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Mission

FEMP works to reduce the cost and environmental impact of government by advancing energy efficiency and water conservation, promoting the use of renewable energy, and improving utility management decisions at Federal sites.



Current Energy Context

- \$7.6 billion Federal annual energy bill
- Growing demand for Federal leadership in supply constrained areas



Legislative History/ Executive Directives

- Energy Policy and Conservation Act (1975)
- DOE Organization Act (1977)
- National Energy Conservation Policy Act (1978)
- Federal Energy Management Improvement Act (1988)
- Executive Order 12759 (1991)
- Energy Policy Act (1992)
- Executive Order 12902 (1994)
- Executive Order 13123 (1999)
- Presidential Directive (2001)
- Executive Order 13221 (2001)





Recent Presidential Directives

Presidential Directive, May 3, 2001

- Called on Federal agencies to reduce energy use, particularly during peak hours

Executive Order 13221, July 2001

- Calls on Federal agencies to purchase products with minimum backup power; less than 1 watt where available

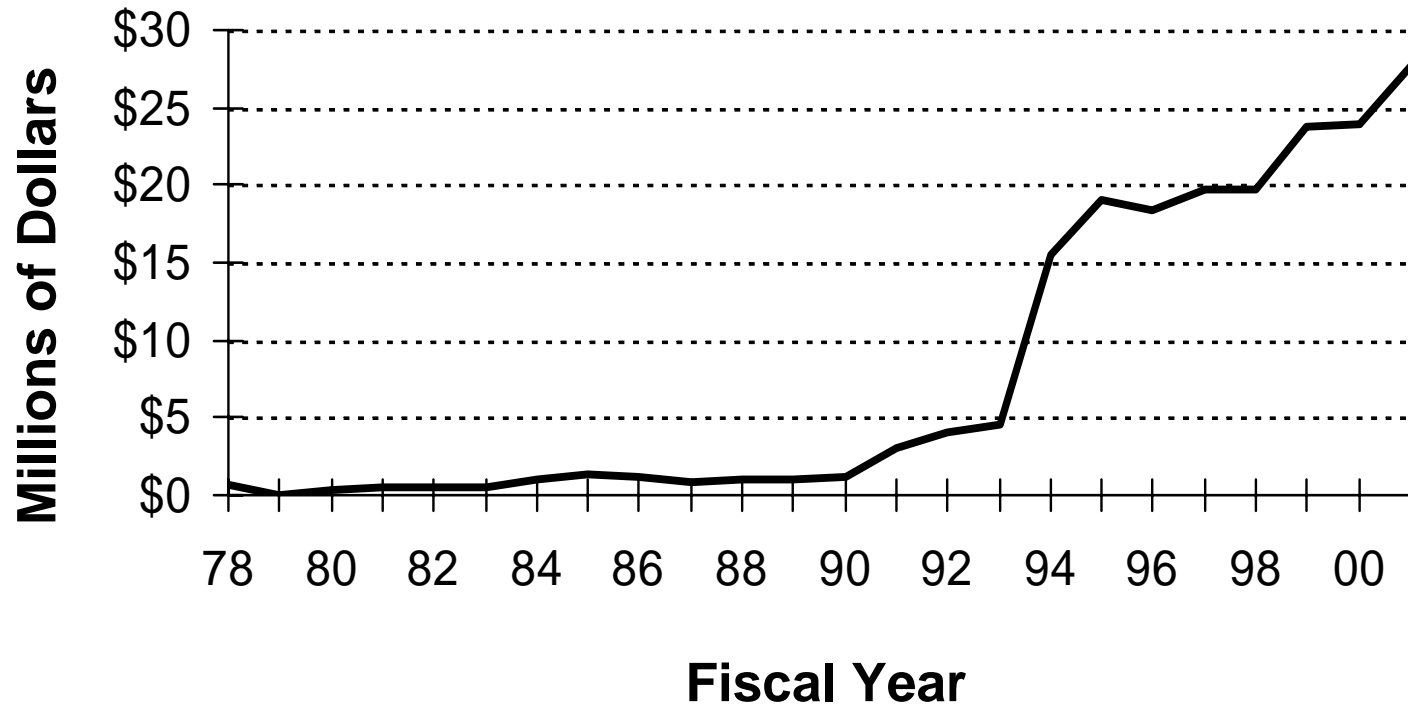


Benefits of Federal Energy Management

- Saves taxpayer dollars
- Renews Federal buildings, facilities, and infrastructure
- Helps prevent power outages by reducing demand in constrained areas
- Enhances energy supply through distributed energy resources
- Protects air quality and conserves water
- Demonstrates Federal leadership
- Educates Federal workers and the public about smart energy choices
- Frees up scarce sources for other agency needs
- Increases market demand for advanced energy technologies



FEMP Funding History: FY1978-FY2001





Federal Energy Management Goals

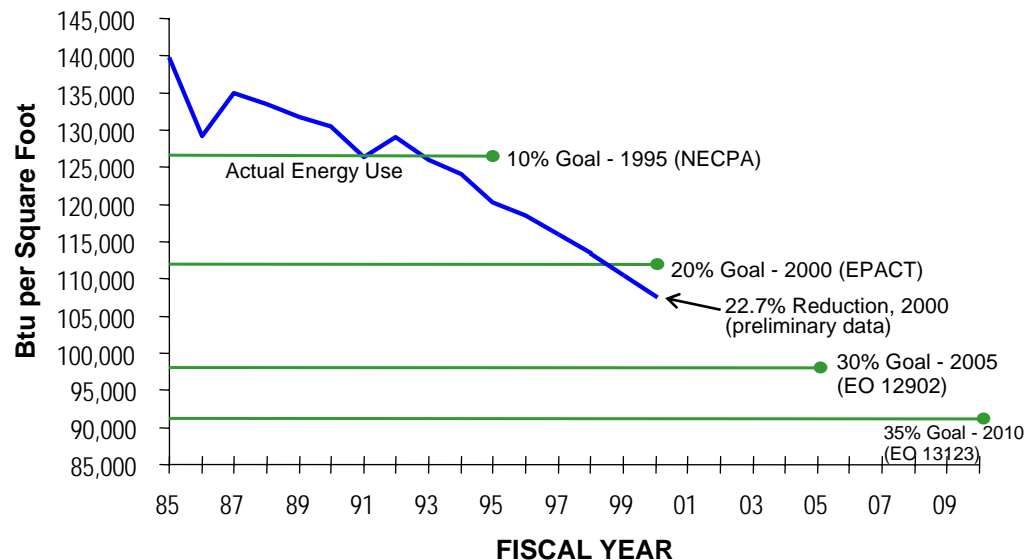
- Reduce energy consumption
 - Facility energy per square foot to be reduced by 30 percent in 2005 and 35 percent in 2010 relative to 1985
 - Industrial/laboratory energy to be reduced by 20 percent in 2005 and 25 percent in 2010 relative to 1990
- Expand use of renewable energy
 - 2.5% of Federal facility electricity consumption by 2005
 - 2,000 solar energy systems by 2000; 20,000 by 2010
- Implement best management practices for water conservation in 80% of Federal facilities by 2010
- Reduce greenhouse gas emissions 30 percent by 2010 compared to 1990



Progress To Date

- Preliminary FY 2000 data indicates the Federal Government exceeded the FY 2000 goal by 2.7%

Building Energy Reduction Goals



- In real dollars, the Government spent \$2.3 billion less for energy in its buildings in FY 2000 compared to FY 1985.
- Approximately half of these savings are from energy improvements.
- 22.7% reduction is based on a Btu/ft² basis.

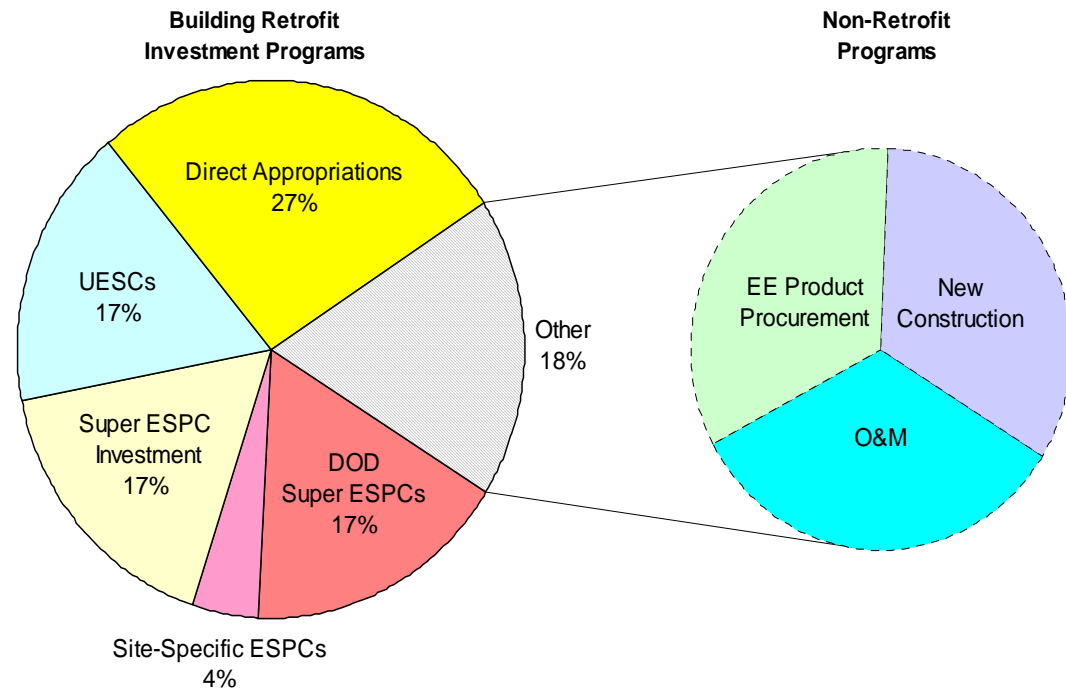


Achieving the 35% Reduction Goal by 2010

- Need to reduce energy consumption by 60 trillion Btu to meet 35 percent energy reduction goal

- Investment in retrofit projects will contribute the largest reduction in annual consumption
- Remaining reductions will be achieved through O&M improvements, procurement, and new construction

Estimated Contributions to 35% Goal





Approach

- Responsive to agency needs, national interests, policy drivers
- Targeted strategy
- Assist best projects
- Tailor assistance to agency's needs
- Collaborative approach leverages other resources and expertise
- Effective network of technical experts
- Deploy DOE developed technology and best practices

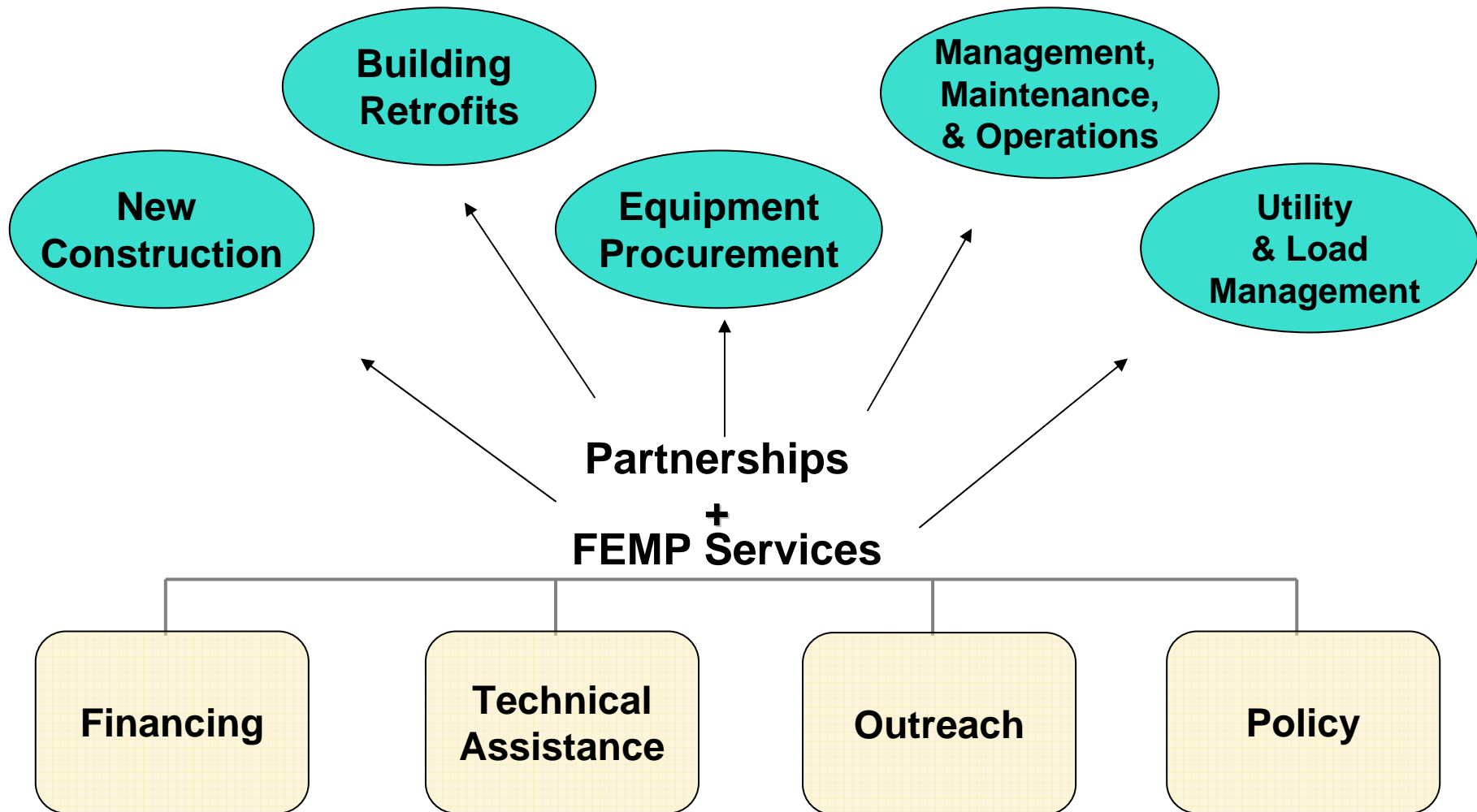


Approach (con't)

- Leverage resources
 - ESPCs and UESCs
 - Public Benefit Funds
 - Encourages cost-sharing for assisted projects
- Cradle to Success Approach
 - Provides resources and support from project inception to project completion
- Top Down and Bottom Up Approaches
 - From senior energy officials to facility managers
 - Outreach to both energy users and energy managers
 - Encourages responsible energy use and individual leadership
- Lead by example
 - Support, recognize, and promulgate the success of Federal energy leaders
 - Encourage later adopters to learn and follow
- Facilitate Networking
 - Variety of forums
 - Information sharing; lessons learned; innovative solutions



Targeting Key Opportunities





FEMP Program Areas

- Financing
- Design and Technical Assistance
- Technical Information
- Outreach and Communications
- Policy, Planning, and Analysis



Financing

- Energy Savings Performance Contracts (ESPCs)
- Utility Energy Savings Contracts (UESCs)
- Appropriations
- Public Benefits Funds



Federal agencies can use three basic funding mechanisms to install Energy Conservation Measures (ECMs) to meet energy savings goals.

Direct Appropriation
Description
<ul style="list-style-type: none">• ECMs are funded by budget appropriation based on prior, separately funded feasibility study• Completion of measures with paybacks <10 years is strongly encouraged• Design and installation are by standard procurement• Funds are limited and competition is high
Key Features
<ul style="list-style-type: none">• Immediate realization of savings once installed• No direct interest or savings maintenance fees

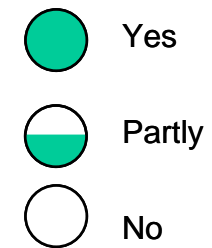
Energy Savings Performance Contract (ESPC)
Description
<ul style="list-style-type: none">• An Energy Services Company (ESCO) finances and installs a package or "bundle" of ECMs and guarantees that the resulting cost savings will repay debt and cover services over a fixed term• Contract terms may be up to 25 years to cover ECMs with long payback, although typical terms are 10 - 20 years
Key Features
<ul style="list-style-type: none">• Projects are "self-funded" - costs are offset by savings• Savings and long-term performance are guaranteed

Utility Company Energy Service Contract (UESC)
Description
<ul style="list-style-type: none">• ECMs are financed and installed under an Area-Wide Contract or Basic Ordering Agreement (BOA) in jurisdictions where such contracts exist• Financing is similar to ESPC, performance guarantees are negotiable, and terms are typically limited to 10 years
Key Features
<ul style="list-style-type: none">• Agency and utility have established relationship• Contract and payment mechanisms are simple



ESPCs offer several clear advantages over other energy project financing options.

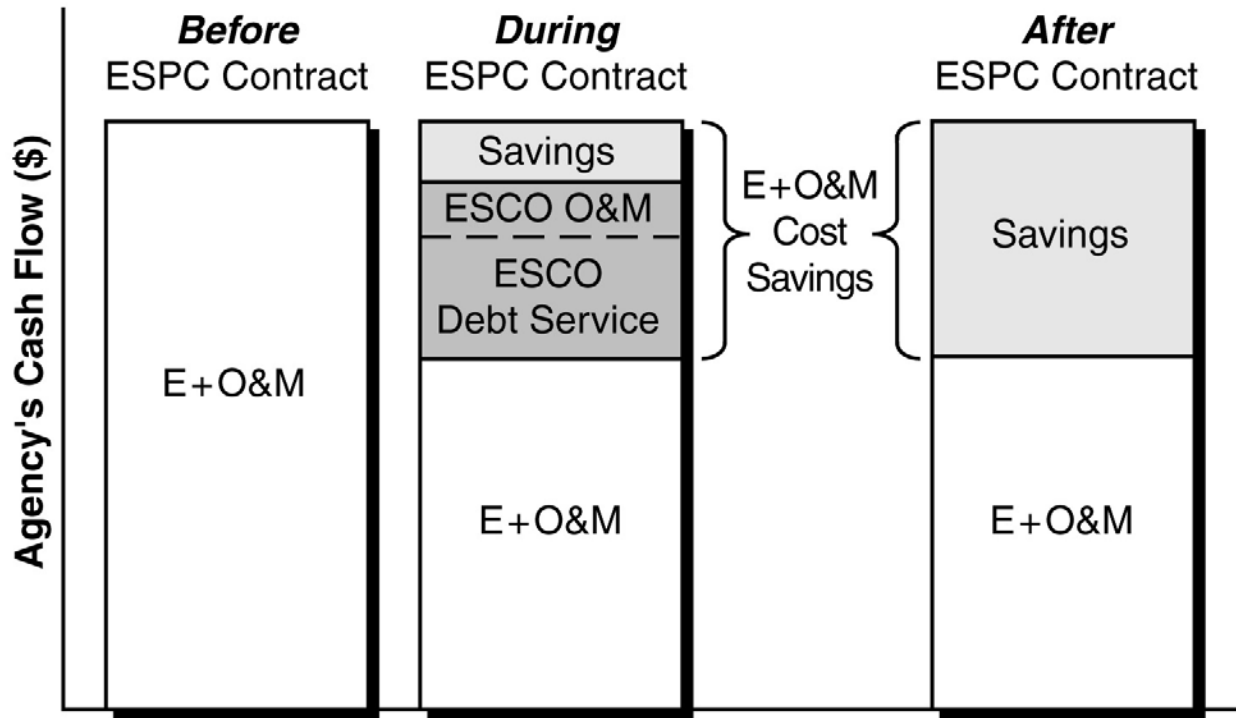
	Energy Project Funding Sources		
	Appropriation	ESPC	UESC
Available Capital			
Supportive of Innovative Solutions			
Simplified Design/Build Process			
Competitive Selection		*	
Guaranteed Savings & Performance			
Long-term Maintenance			
Minimal Transaction Cost (interest, performance monitoring)			
Savings Tracked to Cost			
Familiar Procedures			



* Competitively preselected by FEMP under Super ESPC program



ESPCs capture savings in existing annually appropriated operating budget streams and use them to fund new capital projects.



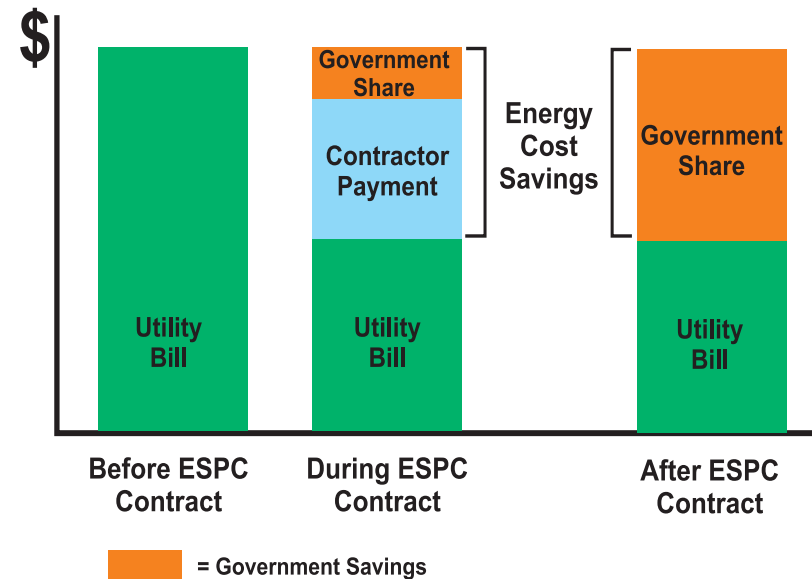
ORNL 99-06432/rra

After the ESPC term, all savings are retained by the facility.



Energy Savings Performance Contracts

- ESPCs reallocate the Government's utility bill
 - Pay a lower utility bill
 - Pay the contractor
 - Achieve cost savings for the government
- Benefits of ESPCs:
 - Sites reduce their energy use/\$
 - Improves the environment
 - Saves taxpayer dollars
 - Stimulates growth and research in the energy efficiency industry and generates local job growth
 - Non-energy related capital improvements through bundling





Financing: Accomplishments and Milestones

FY00 Accomplishments

- Almost \$400 million of investments government-wide in alternative financing
- Consolidated Super ESPC contracts to streamline process
- Program and process improvements to streamline administration and implementation

FY01 Milestones

- \$240 million in private sector investment
- Conduct financing workshops for agency personnel



Major Program Focus

- Super ESPC Delivery Order Goal: \$120 Million
 - Education and marketing of Energy Savings Performance Contracting and other Alternative Financing mechanisms
 - Assist agencies in identifying Super ESPC projects
 - Provide technical and financial analysis assistance to agencies leading to Delivery Order awards
 - Improve Super ESPC Tool (policy, regulatory, and legislative changes)



If you have persistent facility management problems that you cannot afford to fix, an ESPC may be your best solution.

1

If you could replace three facility management “nightmares” related to energy use or O&M, what would you replace?

2

What is the approximate cost to replace these systems?

3

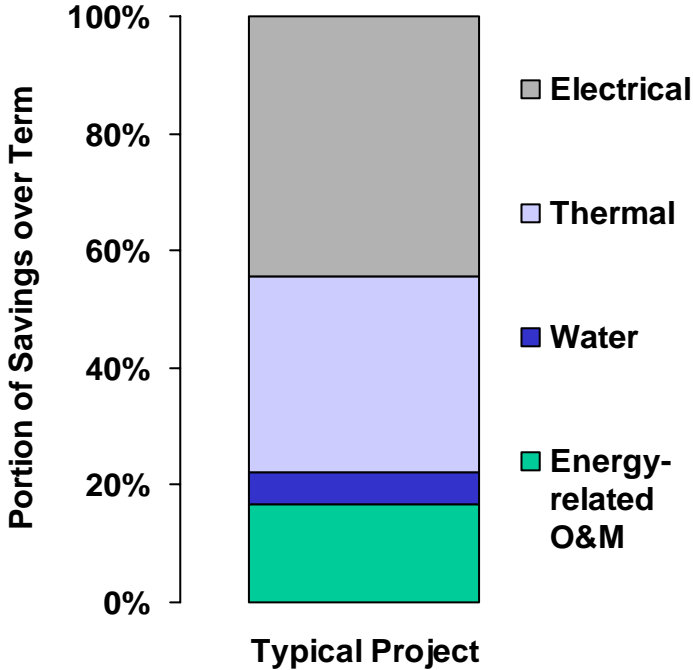
Will appropriated funds be available in the next 1-2 years to solve these problems?

If the answer to Question 3 is “no,” you may be a candidate for an ESPC.

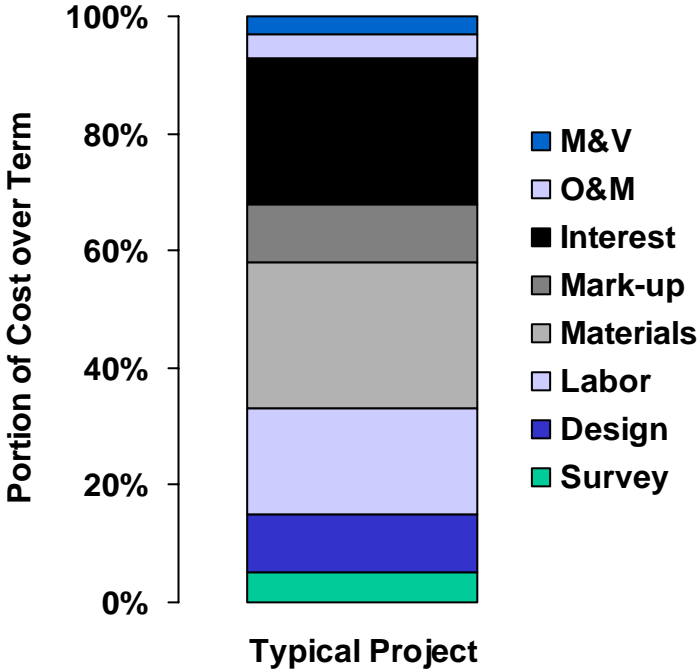


ESPCs are based on the ESCO's guarantee that energy and related O&M savings will repay costs over the term of an interest bearing loan.

Guaranteed Savings Elements



ESPC Cost Elements

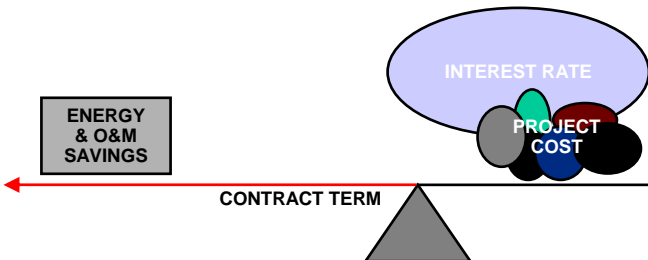
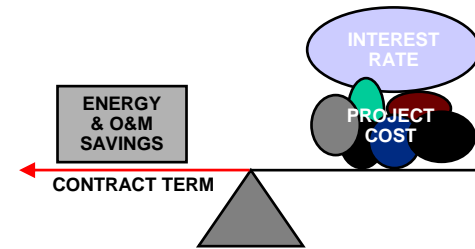


M&V - Measurement & Verification
O&M - Operation & Maintenance



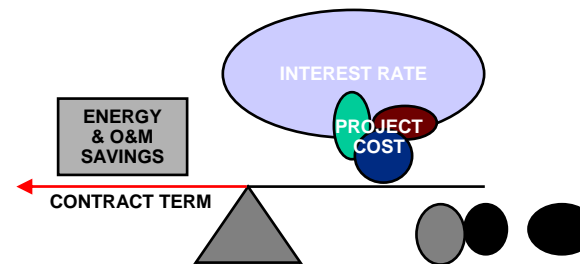
When ESCOs design an ESPC, their primary objective is to install as many ECMs as possible at no cost to the government.

ESCOs balance a complex mix of project costs and savings, interest rate, and contract term to achieve positive cash flow for the entire ESPC term.



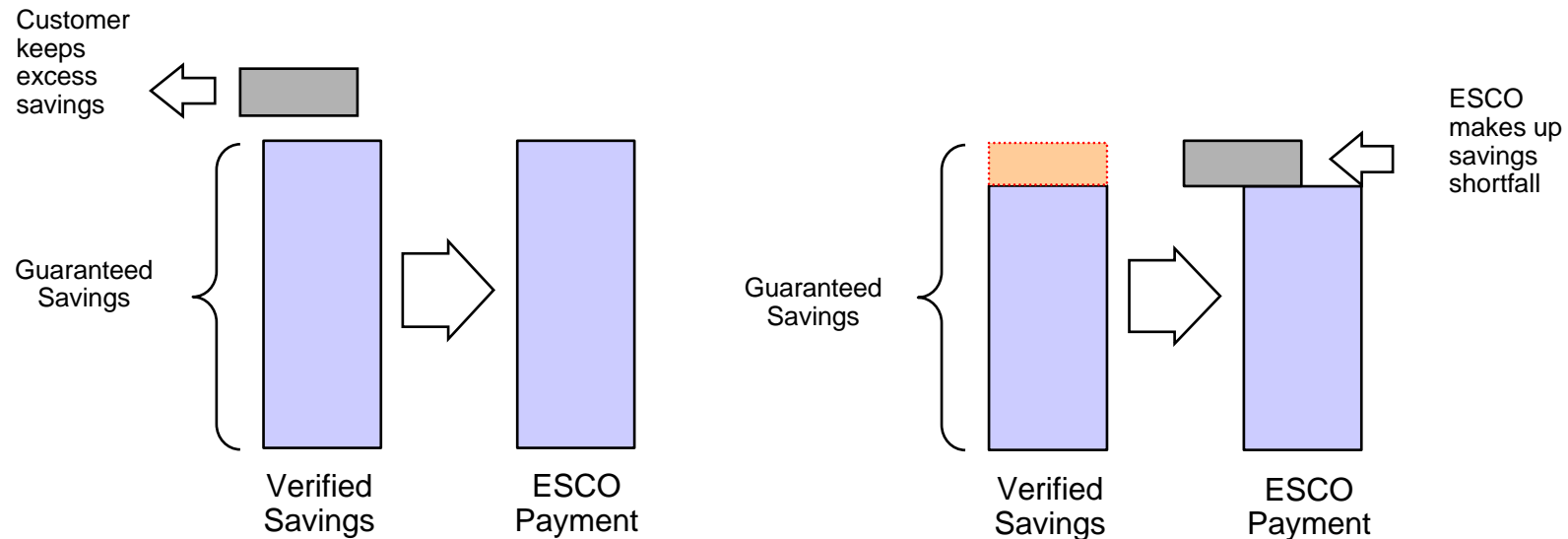
For example, when interest rates rise, positive cash flow can be maintained by increasing the contract term until payments fall below savings.

With preset term limits, ESCOs must jettison ECMs with longer paybacks to offset higher interest rates and maintain positive cash flow.





After installation, the ESCO is responsible for verifying that actual savings have been sufficient to cover loan payments and services, creating a strong link between ECM performance and installed cost.



Savings in excess of the guaranteed amount are retained by the customer.

Shortfalls below guaranteed savings are paid by the ESCO.



FEMP's Regional and Technology-Specific Super ESPC Programs were created to streamline the ESPC procurement process.

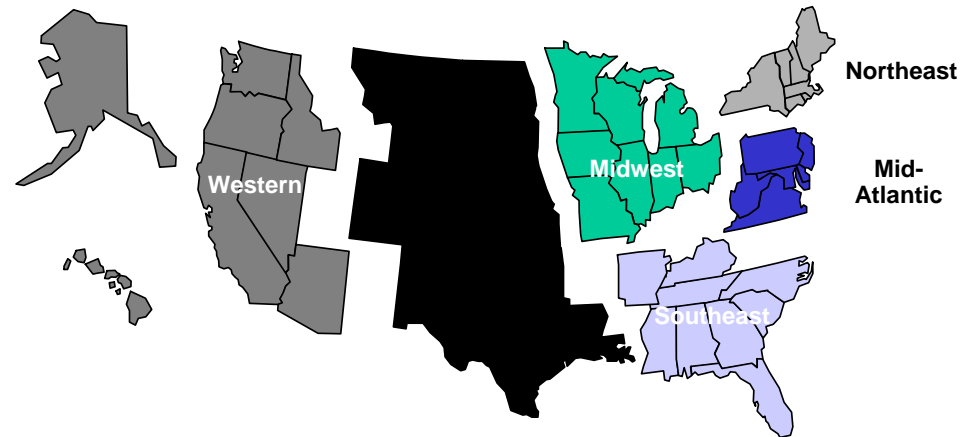
Regional Super ESPC

FEMP has awarded indefinite-delivery, indefinite-quantity (IDIQ) prime contracts to 5 to 7 ESCOs in each of the 6 DOE geographic regions. Federal agencies may negotiate delivery orders (DOs) with an approved ESCO without advertising and starting the contracting process from scratch. FEMP has also developed ESPC DO guidelines and workshops, and fielded technical and contract specialists to assist agency personnel step by step.

Technology-Specific Super ESPC

National IDIQ contracts for Technology-Specific Super ESPCs have been awarded to foster use of "proven but underutilized" technologies. Technology-Specific projects can be bundled with conventional ECMs to improve economics. FEMP provides the same technical and contract assistance as for Regional Super ESPCs.

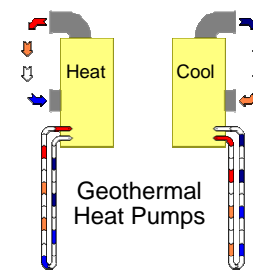
Super ESPC Regions



Example Technology IDIQ's



Solar and Photovoltaics



Geothermal Heat Pumps

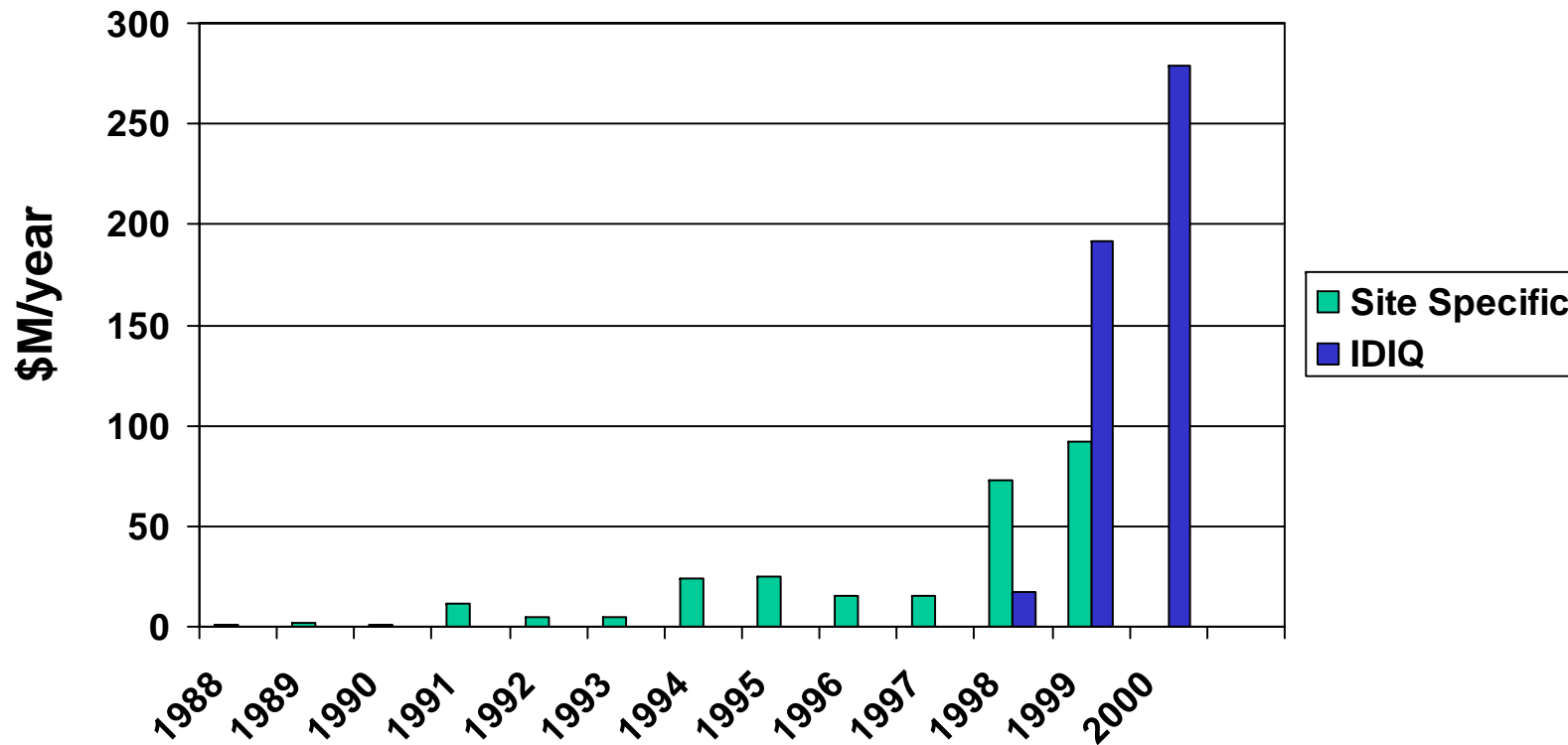


Biomass



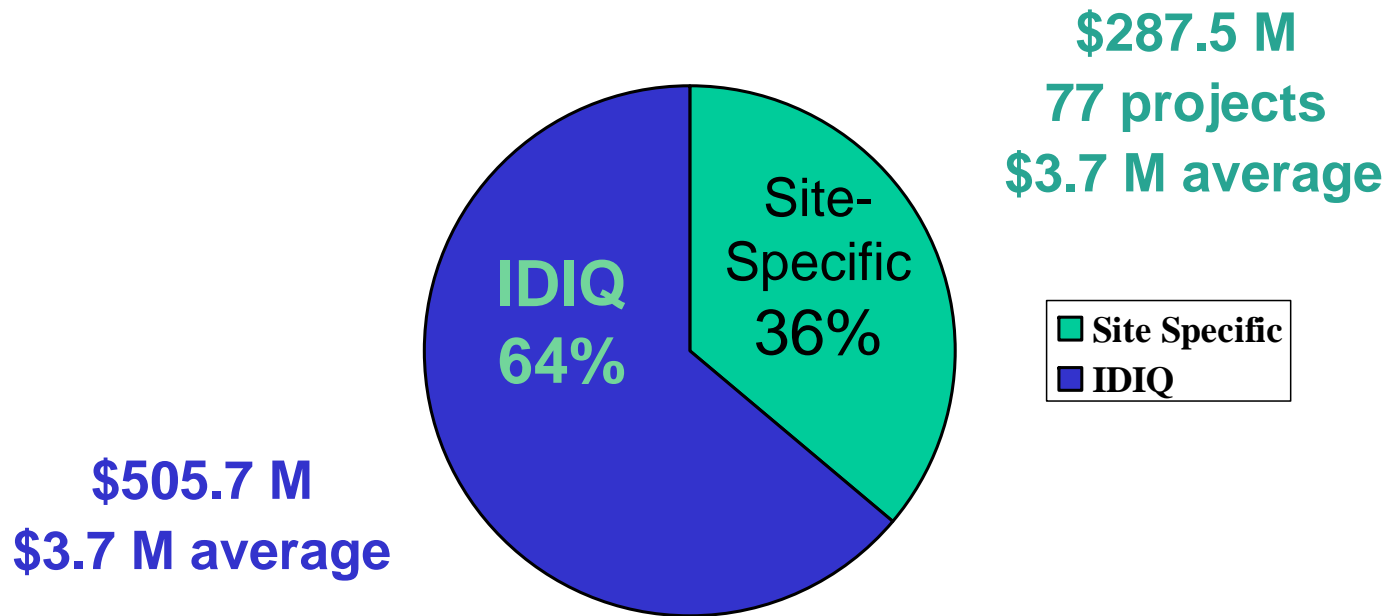
Umbrella Contracts Quicken the Pace

Indefinite-Delivery, Indefinite-Quantity (IDIQ) Contracts





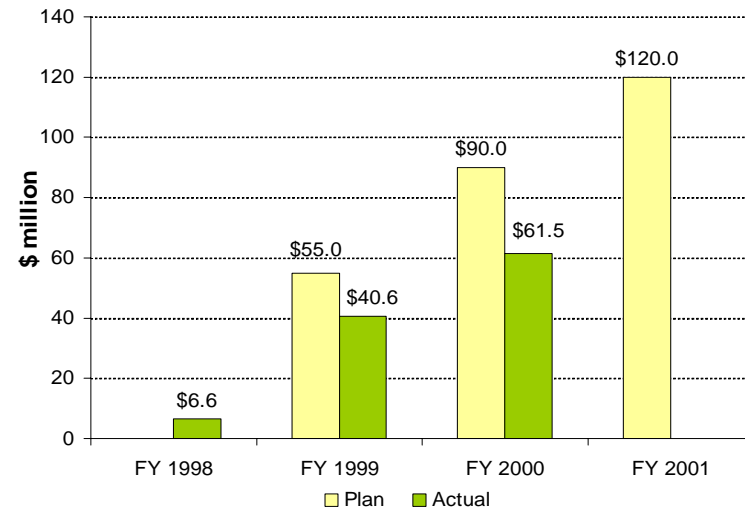
ESPC private investment through Q3FY2001: \$795.2 M





Super ESPC Program Progress to Date

- **57 delivery orders have been awarded to-date**
- **Total of \$148.6 million in private sector investment**
- **\$120 million in annual investment targeted**





ESCO Selection

- Qualified List of ESCOs
 - Past experience, financing
 - <http://www.eren.doe.gov/femp/financing/escolist.html>
- DOE IDIQ ESCOs
 - Prequalified by DOE
 - Rigorous evaluation of price and technical proposals
 - Extremely competitive

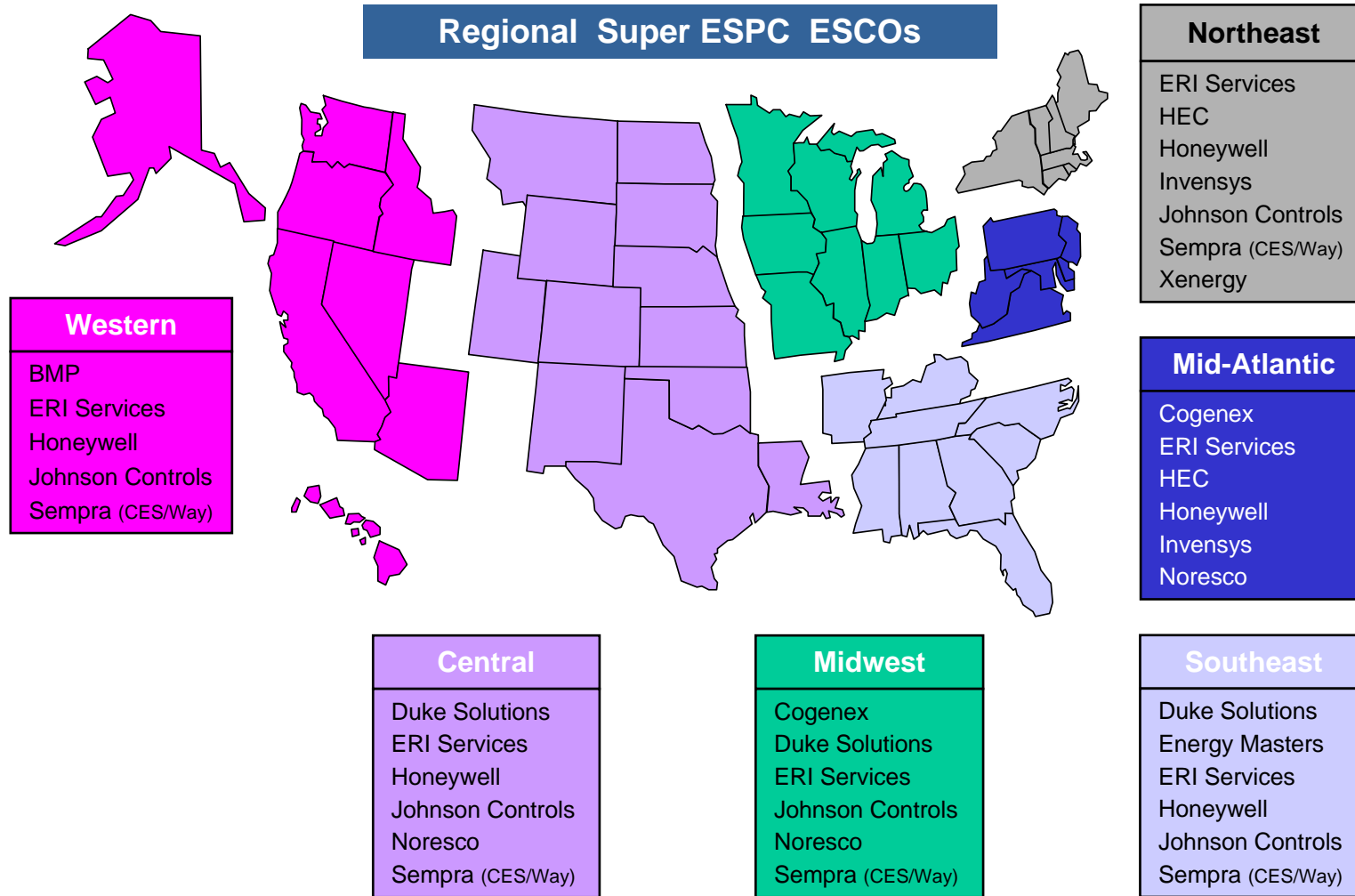


ESCO Partnership

- Not “business as usual!”
- DOE ESCO Steering Committee
 - Information sharing
 - Joint problem solving
- Regular publication of projects



FEMP Regional Super ESPC ESCOs





Contract Scope

General technology categories:

- ◆ Boiler and chiller improvements
- ◆ Building Automation & Energy Management Control Systems
- ◆ HVAC
- ◆ Lighting improvements
- ◆ Building envelope modifications
- ◆ Chilled/hot water & steam distribution systems
- ◆ Electric motors and drivers
- ◆ Refrigeration
- ◆ Electric & cogeneration systems
- ◆ Renewable energy systems
- ◆ Electric distribution systems
- ◆ Water & sewer conservation systems
- ◆ Rate reduction and audit systems (not in all regions)



Super ESPC projects vary widely in size, scope, and duration because they're tailored to meet each individual site's needs.

Agency	
<ul style="list-style-type: none"> • Energy efficient lighting • Compressed air systems • Water conservation • Lighting and HVAC controls 	
Investment	Term
\$20 million	23 years

Agency	
<ul style="list-style-type: none"> • Energy management system • Variable frequency drives • New boiler pumps • Air compressors • Air dryer 	
Investment	Term
\$500,000	12 years

Agency	
<ul style="list-style-type: none"> • Energy efficient lighting • Energy management and control system • Chiller replacements • Rooftop air handling units • Air source heat pumps • Solar water heaters • Domestic hot water temperature reset • Controls for preheat coils • Ozone laundry system 	
Investment	Term
\$4 million	17 years

Agency	
<ul style="list-style-type: none"> • Replace 6,000 tons of chiller capacity • Airflow reduction • HVAC upgrades • Variable speed drives 	
Investment	Term
\$7 million	20 years

Agency	
<ul style="list-style-type: none"> • Energy efficient lighting • Occupancy sensors • Boiler controls • Energy management system 	
Investment	Term
\$1 million	7 years



Typical Delivery Order

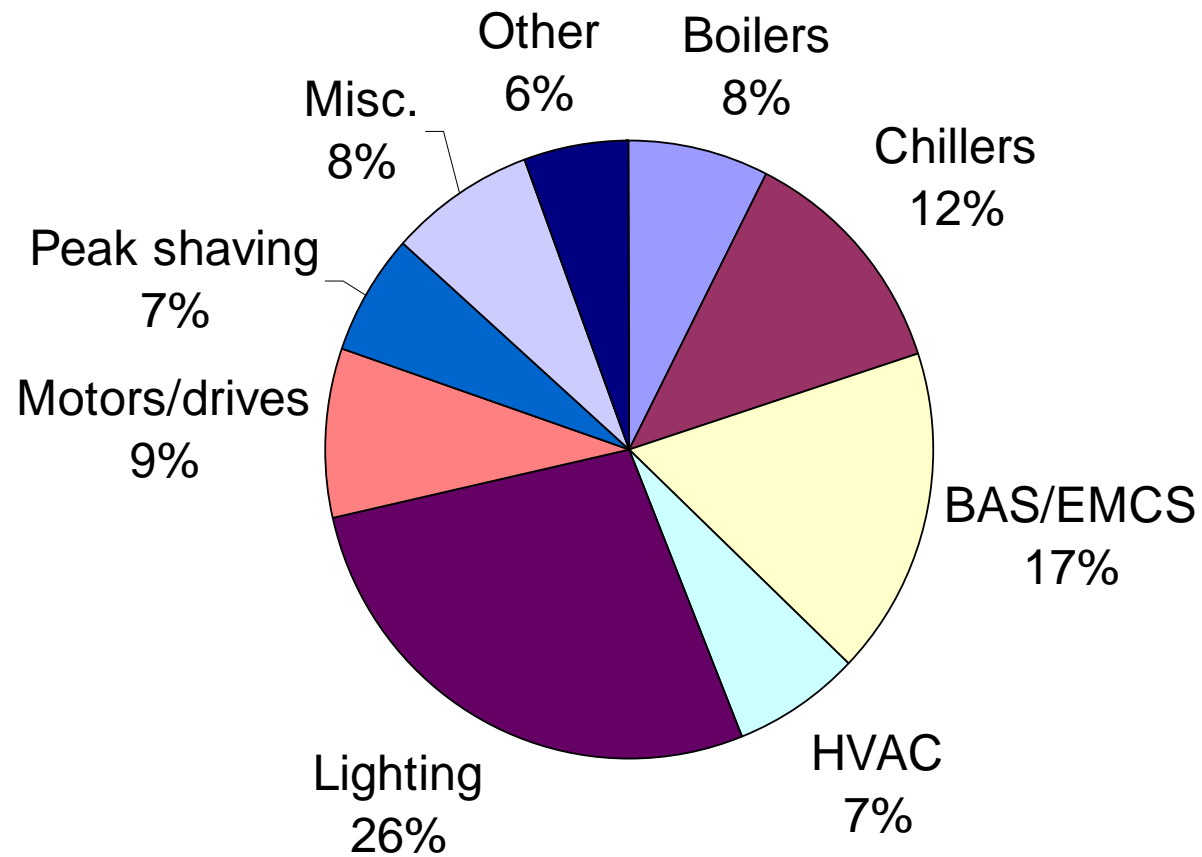
- Delivery orders awarded to-date have an average length of 15 years
- The typical delivery order results in more than \$2.6 million in capital improvement investment
- The typical delivery order project generates approximately 9,000 Btu in energy savings for each dollar invested

Characteristics of a Typical Super ESPC Delivery Order

Private Sector Investment per DO	\$2,627,960
Average Contract Price	\$5,529,738
Average Period of Performance (Years)	15
Guaranteed Average Annual Cost Savings	\$356,716
Cumulative Guaranteed Cost Savings	\$5,641,898
Project Estimated Annual Energy Savings (Million Btu)	23,838
Cumulative Projected Energy Savings (Million Btu)	386,251
Annual Btu Saved per Dollar Invested	9,071
Cumul. Btu Saved per Dollar Invested	146,978
Cost per Million Btu Saved	\$15.00



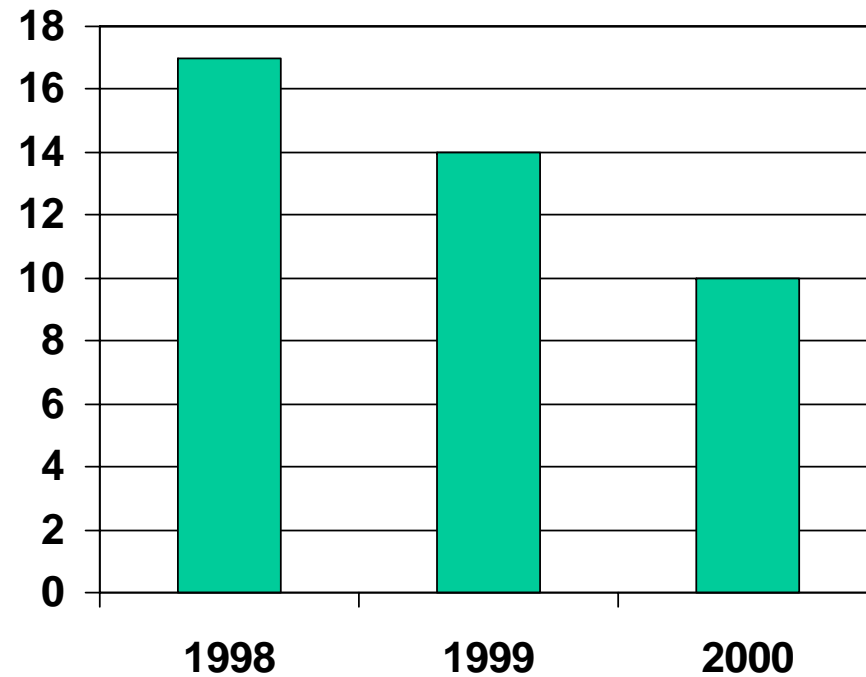
Investment Statistics Show that Comprehensive Projects are Being Done





Super ESPC Delivery Order Cycle Time is Improving

**Months from start to award
(all projects plotted in the start year)**





Past experience implementing Super ESPC projects offers three important lessons for future participants:

1. Plan the Job



Start with a clear plan and carry it out as consistently and expeditiously as possible.

A day of delay is a day of lost energy savings, and poor planning is the most frequent cause of indecision and delay. FEMP offers comprehensive ESPC implementation plans (see Appendix Implementation Process).

2. Get Buy-In



Get buy-in at all organizational levels, especially at the top.

Enthusiastic participants are less likely to get bogged down in second guessing. Vesting responsibility and authority at the highest levels possible will help overcome lower level obstacles.

3. Think Big



Don't "incrementalize."

Big projects cost as much to administer as small ones and can deliver significant economies of scale in purchase of materials and mobilization of labor. Pilot projects only demonstrate the folly of doing pilot projects.



The following additional implementation strategies can further maximize Super ESPC benefits.

Making the Case

- Leverage existing resources by bundling individual projects that could be funded using energy O&M budgets into a Super ESPC.
- Compare separate construction and long-term financing with use of escrowed long-term financing for construction draws.
- Remember that any effort to achieve financial improvement (lower price, lower interest rate, etc.) must be weighed against the loss of savings during the time required to make the change.

Setting Contract Terms

- Avoid setting arbitrary and/or restrictive term limits.
- Take title to avoid paying sales and property tax.

Applying Excess Funds

- Use excess funds to make early payments to reduce interest costs.



But, what if...Frequently Asked Questions

?

I am concerned about trusting an ESCO?

ANSWER: ESCO success is tied to verified savings, so they have a powerful incentive to deliver long-term performance. ESCOs also value their partnership with FEMP and want to maintain good standing to get additional work.

?

I've already given away my lighting project?

ANSWER: This may limit the number of ECMs you can bundle together, but your ESCO can tell you if it is worthwhile to proceed.

?

I think of a project after the ESPC is set up? Can I do ESPCs in phases?

ANSWER: Yes. ESCOs will work with you to incorporate additional ECMs into the contract, although it is best to include as many as possible in the original DO to minimize administration costs.

?

Some of my buildings close, or even my entire site closes before the contract expires?

ANSWER: For site closures, the value of the remaining contract can be included in the property transfer price, or the contract can be terminated and a settlement negotiated within the cancellation ceiling.



But, what if... (con't)

?

Energy prices rise or fall during the project term?

ANSWER: The energy prices and escalation/deflation rates that are used to determine savings are negotiated by the agency and ESCO and specified in the DO award. Guaranteed savings and payments to the ESCO are based on that agreement rather than on actual energy prices.

?

I don't have the resources to verify savings?

ANSWER: A well designed ESPC minimizes M&V costs and limits the agency's role by using procedures that are simple and easy to confirm.

?

I am faced with mandated privatization of DOD utilities?

ANSWER: This will not be a problem if the ECMs are in buildings not being privatized. If the buildings *are* being privatized, the value of the remaining contract can be included in the property transfer price.

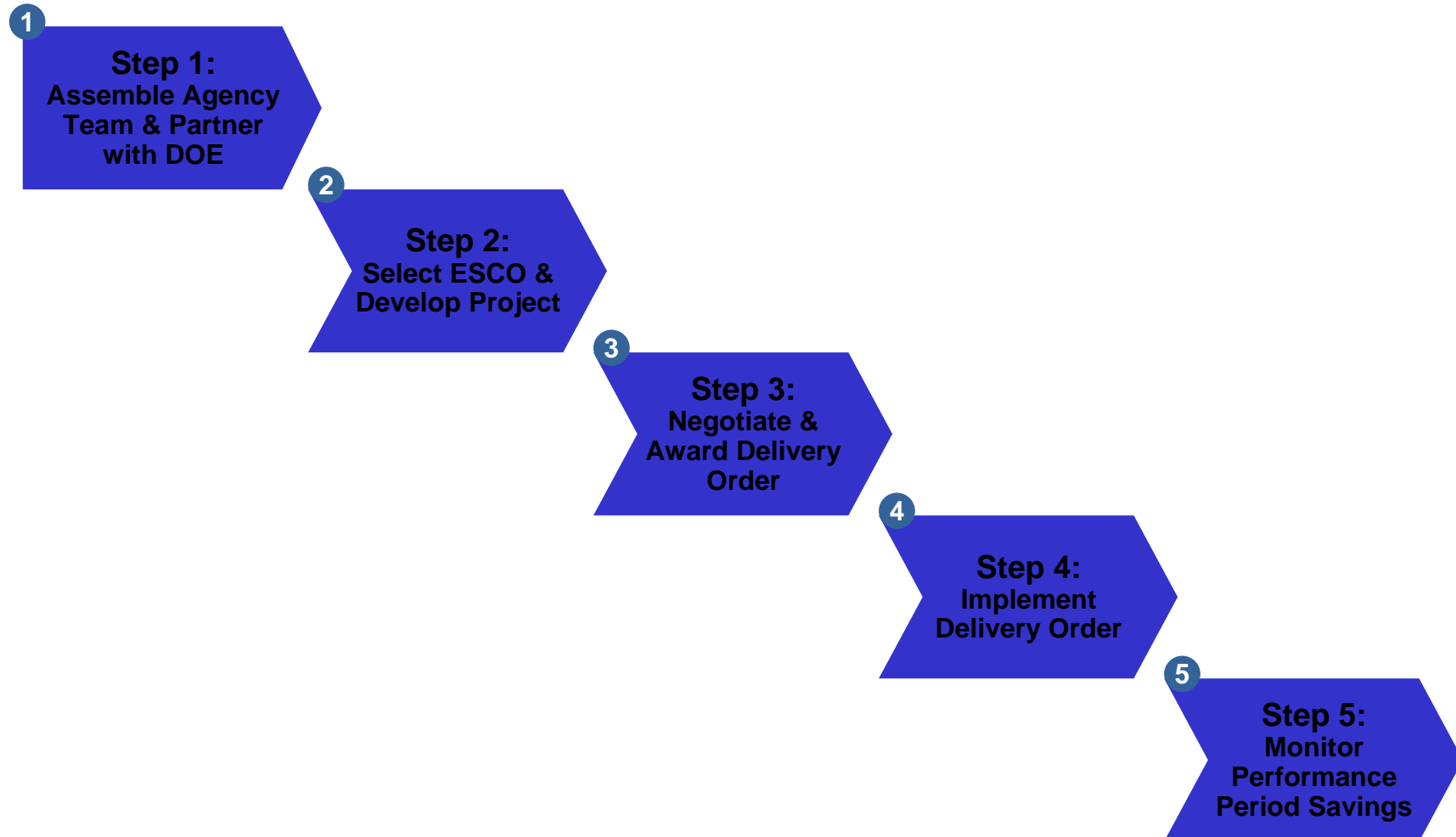
?

I have year-end money to spend?

ANSWER: Consider making early ESPC payments to reduce interest costs.

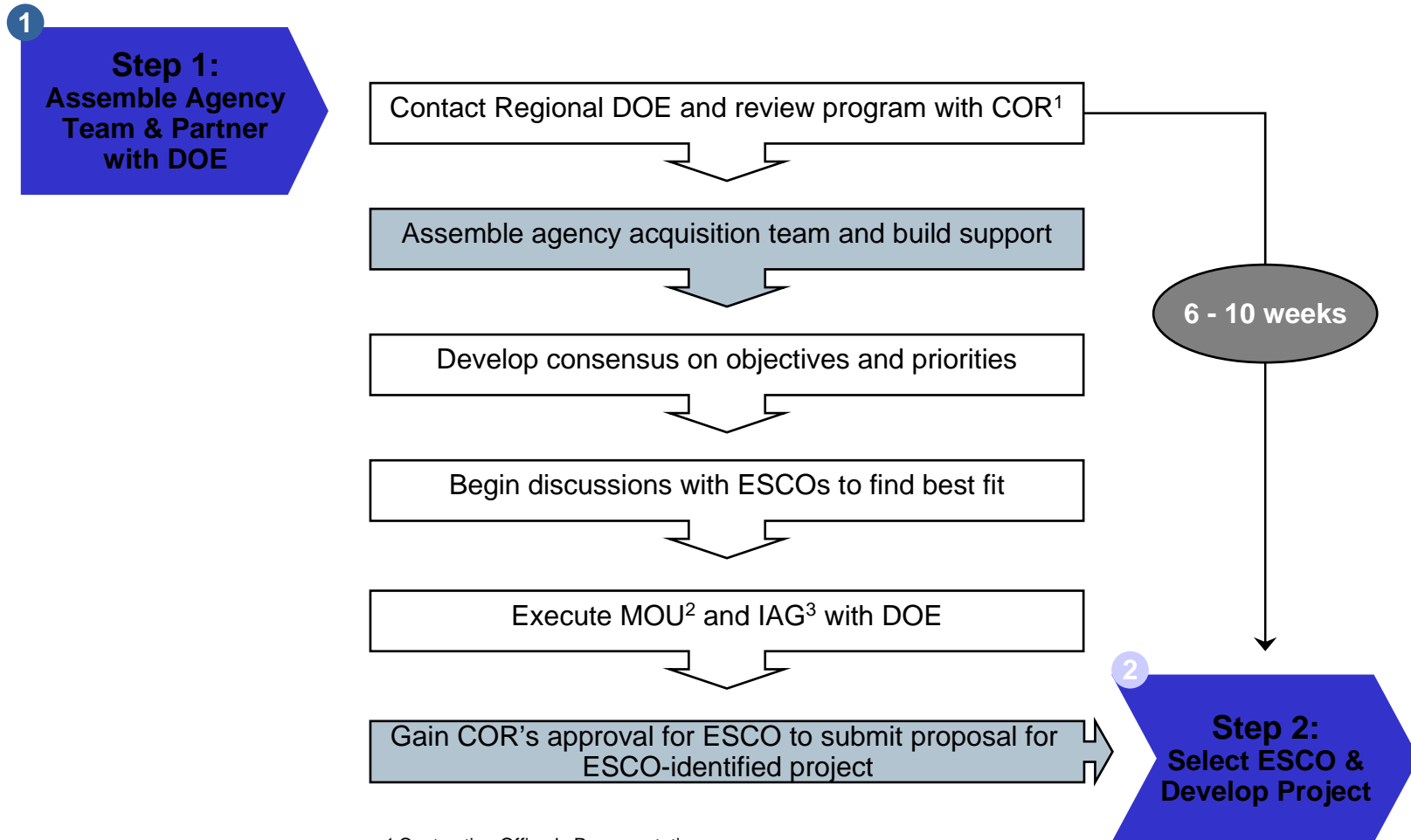


FEMP Super ESPCs are implemented in a five-step process.





The objectives of Step 1 are to organize the action team, to achieve consensus on goals, and to secure the commitment of all stakeholders.



¹ Contracting Officer's Representative

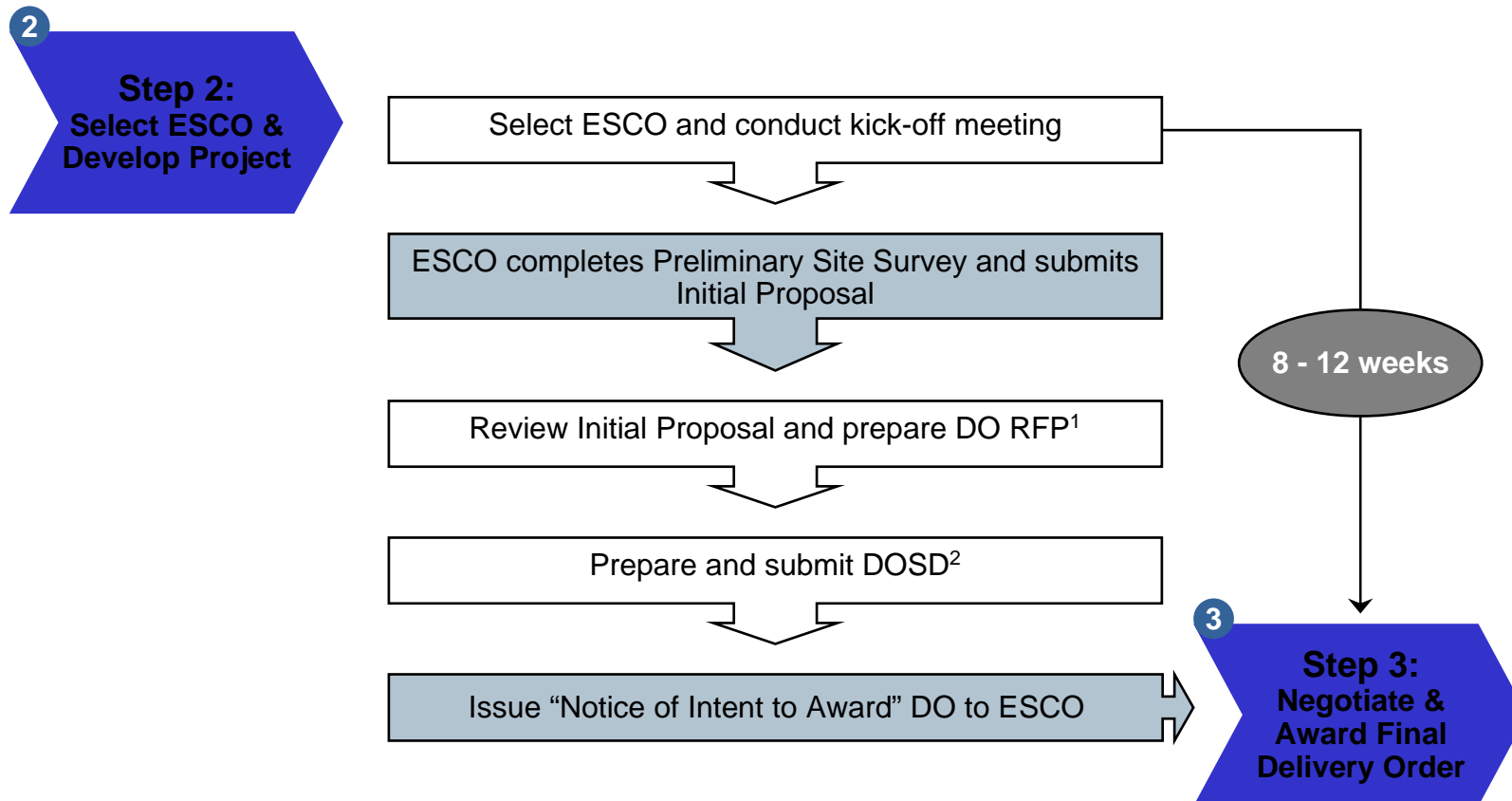
² Memorandum of Understanding

³ Interagency Agreement

○ = Milestone



To ensure long-term ESPC success, the Preliminary Site Survey should be undertaken as a cooperative effort of agency and ESCO staff.



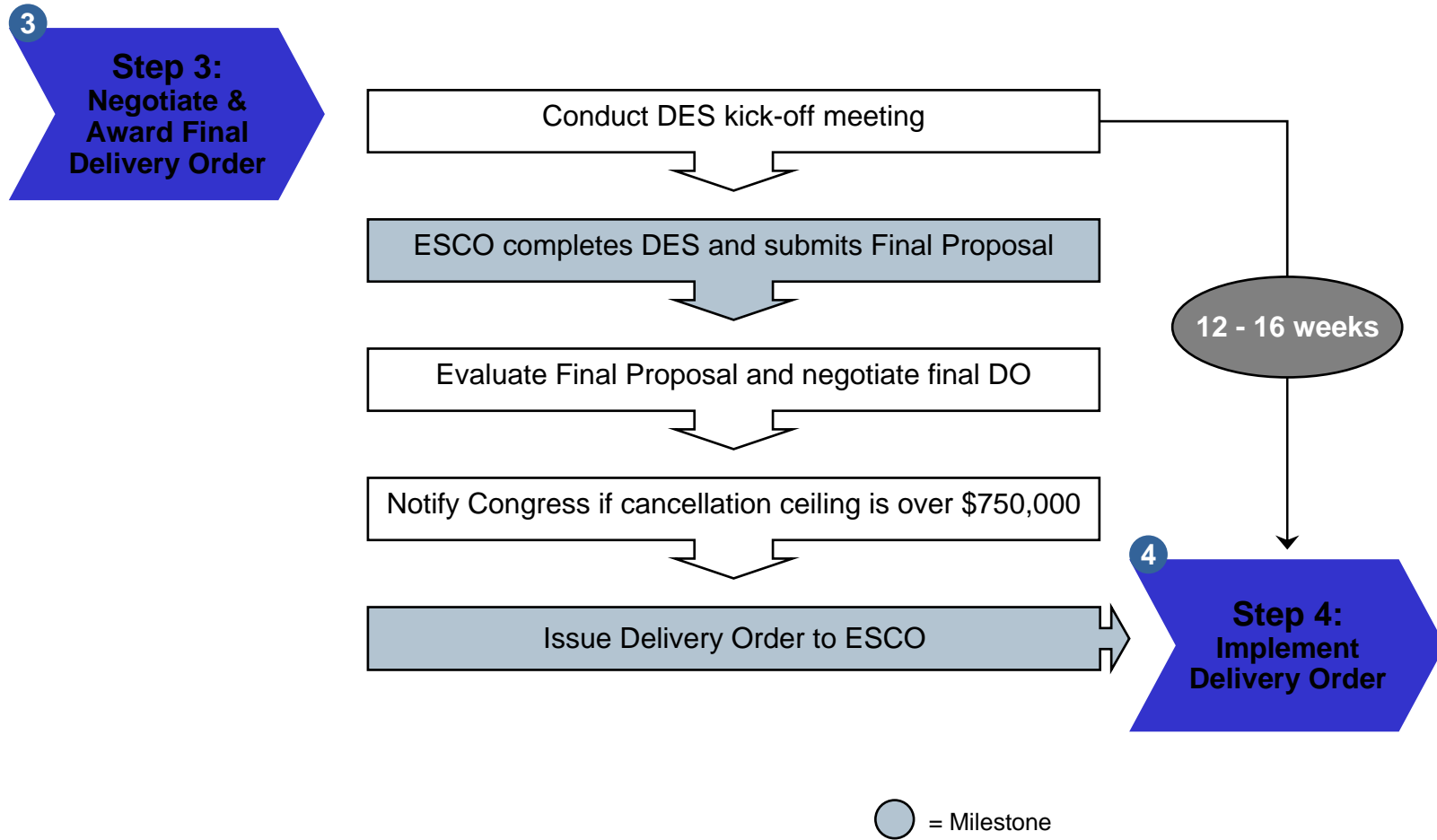
¹ Delivery Order Request for Proposal, which incorporates site-specific requirements into the delivery order

² Delivery Order Selection Document

○ = Milestone

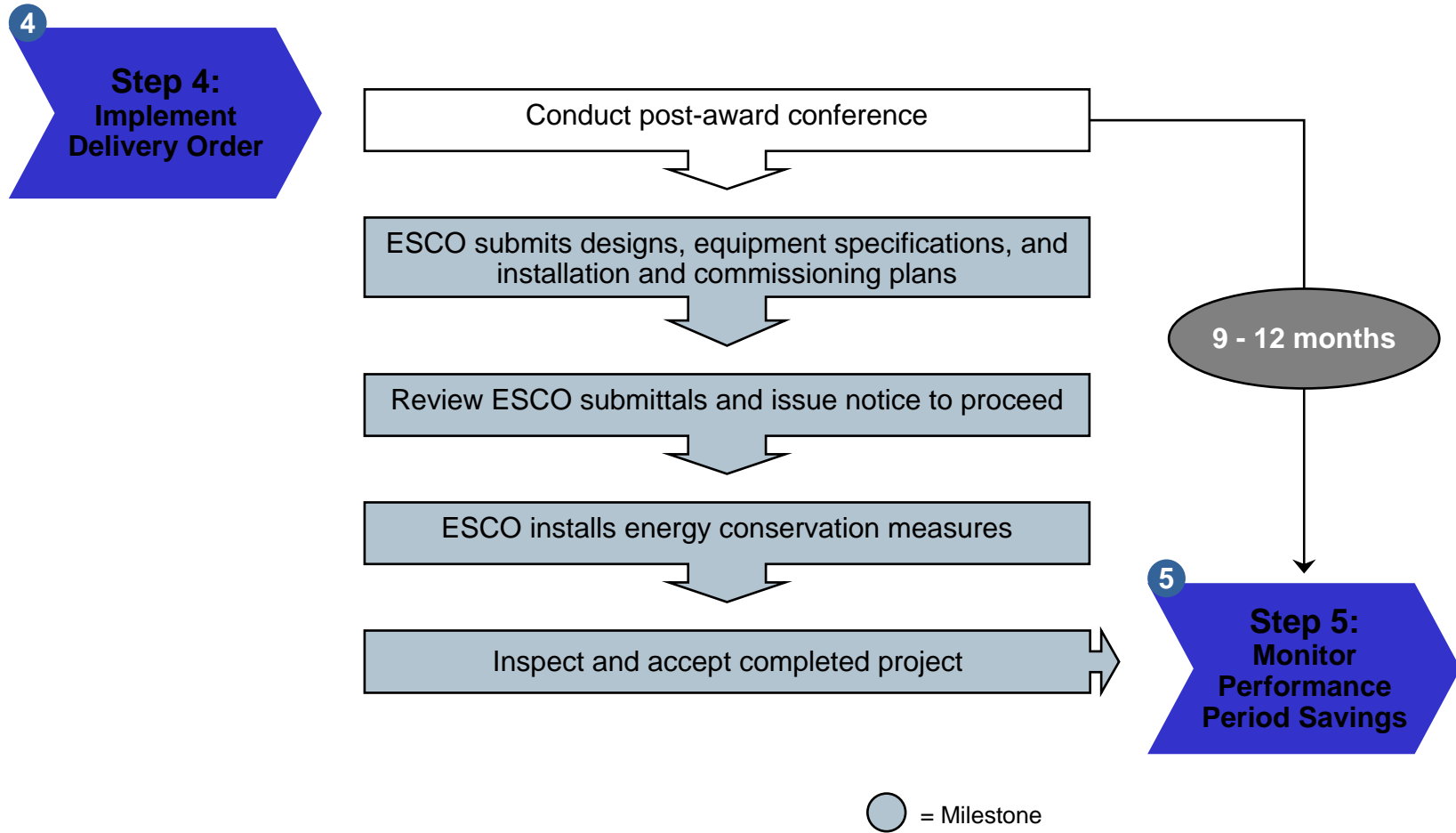


The heart of the ESPC process is completion of the investment grade Detailed Energy Survey (DES) and issuance of the Delivery Order (DO).





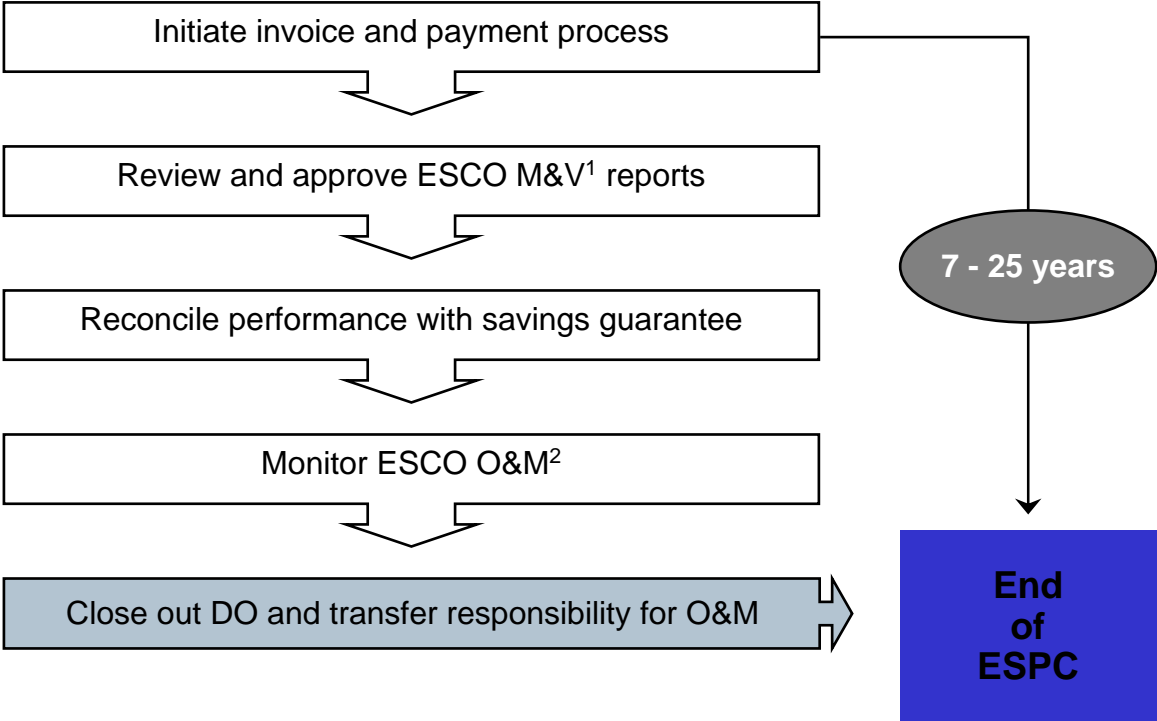
By expediting the design and construction process, ESPCs allow rapid installation of multiple ECMs under a single contract.





ESPC terms may be written for as long as 25 years, but most are closed out in 10 to 20 years.

5
**Step 5:
Monitor
Performance
Period Savings**



¹ Measurement and Verification

² Operation and Maintenance

○ = Milestone



Summary of Steps in a Performance Contract

- Identify Opportunity
- Energy Studies & Project Development
- Contracting With Owner
- Engineering and Financing
- Construction
- Operation and Service
- Close Out



Understanding the ESPC “Deal”

- The new improved consistent Super ESPC contracts include a risk/ responsibility matrix for summarizing the deal
 - How are risks allocated
 - Who is responsible for what
 - Who pays for what



The “deal” needs to be understood by both parties as early in the process as possible.

- Agency reviews the risk/responsibility matrix
- ESCO summarizes the options, pros/cons of each, and makes recommendations
- Agency selects options
- ESCO bases initial proposal on this mutual understanding of the “deal”



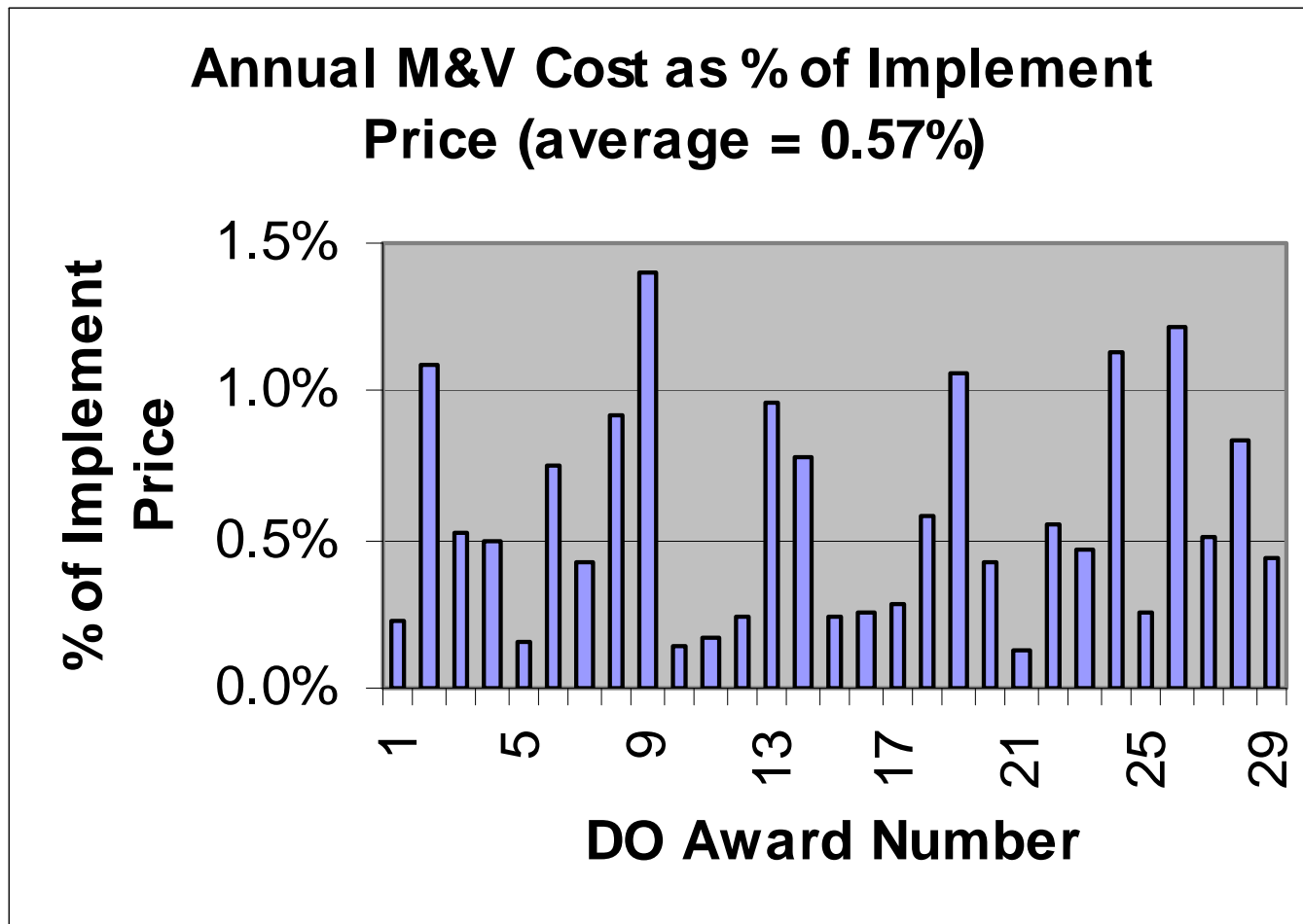
M&V Costs

- If a project has 10 ECMs, 3 of which account for 80% of the savings, you should focus on those 3 and stipulate the rest.
- The ESCO can control equipment performance, so generally the ESCO assumes responsibility for that and the M&V plan includes measurements.
- The agency can control things like hours of operation or ton-hour loads, so generally the agency assumes responsibility for those and allows them to be stipulated.



Are M&V costs excessive?

Annual M&V costs are less than 1% of implementation prices





Who Benefits from the Super ESPC Program?

- ◆ Federal sites
- ◆ ESCOs
- ◆ ESCO subcontractors and vendors
- ◆ Surrounding communities
- ◆ TAXPAYERS



Key Benefits of Super ESPC

- ◆ Non-energy related capital improvements through bundling
- ◆ Improves Federal energy efficiency
- ◆ Eliminates maintenance & repair costs of aging equipment
- ◆ Places O&M responsibilities with contractor
- ◆ Stimulates the economy
- ◆ Qualified ESCOs under contract
- ◆ All agencies may participate
- ◆ DOE FEMP support
- ◆ Increased private sector access to Federal markets



Key Challenges

- Institutional barriers
 - Perception: energy management is not mission critical
 - Agency staff turnover
 - Few agencies have energy leads and adequate number of qualified staff
 - Aging facilities
- Insufficient funds
 - Decisions often based on lowest first cost rather than lifecycle
 - New construction: energy improvements fall out as lower priority with limited budgets
- Imperfect information
 - Education needed on new technologies, performance contracting, financial
 - Many individual buildings are not metered
 - Product information still inadequate in listings
- Lack of incentives
 - No current legislative mandate
 - Personnel incentives; both carrots and sticks



Delays

- Both parties can cause delays, and delays can financially affect both parties.
- Proposals need to set forth a schedule and specify how delays will be handled.
- A common approach is “the party that creates a cost should bear that cost.”



Overcoming Barriers

- **Federal Acquisition Changes and Regulatory Process**
- **Partnerships**
- **Incentives**
- **ESPC and Utility Brokering**
- **Training**
- **Technology Deployment**
- **Technology-Based Support**
- **Congressional Changes**



Software applications for measurement and verification

Several types of software and hardware related to energy analysis are available. The tools are categorized as either: Building Energy Simulation, System Performance Simulation or Utility Cost Management.

Information on energy software tools is available at:

www.eren.doe.gov/buildings/tools_directory/ and

<http://eande.lbl.gov/CBS/eXroads/soft.html>



M&V Software Tools

- Building Energy Simulation Software
 - DOE-2 <http://gundog.lbl.gov>
- System Performance Simulation Software
 - QuickChill 1.0 www.epa.gov/buildings/esbhome/tools/software.html
- Utility Cost Management Tools
 - Energy Accounting Guide
www.energy.ca.gov/reports/efficiency_handbooks/index.html



FEMP Web Site

- Overview of ESPCs:
<http://www.eren.doe.gov/femp/financing/superespc.html#info>
- FEMP home page:
<http://www.eren.doe.gov/femp/>
- tatiana.strajnic@ee.doe.gov
– 202.586.9230



Practical Guide to Savings and Payments in Super ESPC Delivery Orders

- Structuring a legal, feasible, and best-value Super ESPC project
- Energy and cost savings — sources and examples
- http://www.eren.doe.gov/femp/financing/cost_savings.html



Suggestions for Promoting Performance Contracting

- Make decision to support performance contracting
 - High maintenance
- Make sure power reform laws in place
 - Legislation authorizing performance contracting
 - Top level support communicated to all levels
 - Education of government budget and accounting officials, financiers, facility managers
- Open business environment for ESCOs to compete with other energy service providers
- Level playing field for all participants