

Business models for deep energy retrofits in government buildings using private and public funding

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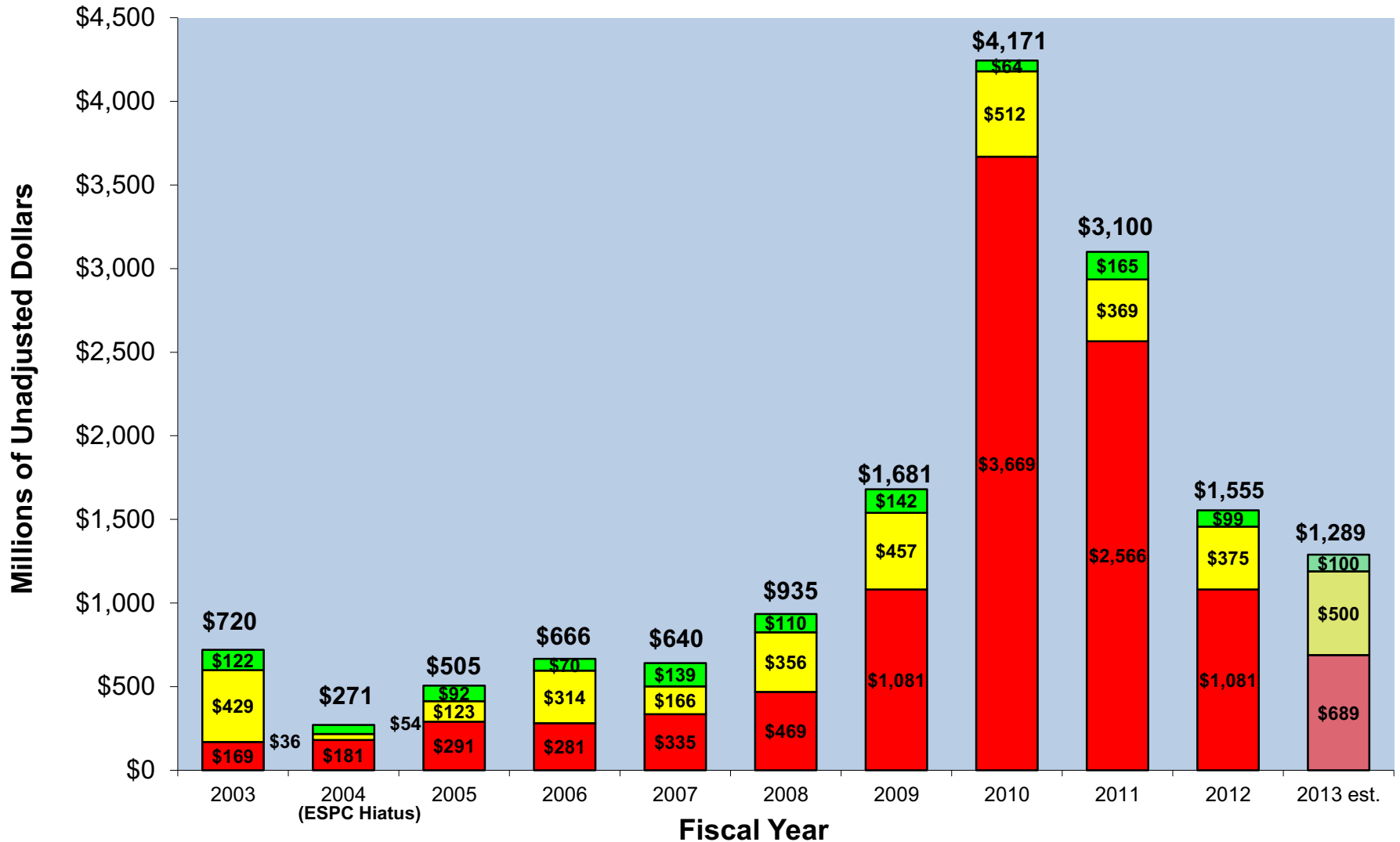
Energy management goals for US federal government

- **E.O. 13423/EISA:** Reduce energy intensity (Btu/GSF) by 21% compared to 2003; 30% reduction required in FY 2015.
- **EPACT 2005/E.O. 13423:** Use renewable electric energy equivalent to at least 5% of total electricity use; at least half of which must come from sources developed after January 1, 1999.
- **E.O. 13423/13514:** Reduce water consumption intensity (Gal/GSF) by 10% relative to 2007 baseline; 16% by the end of FY 2015; 26% by FY 2020.
- **E.O. 13514:** Reduce Government-wide scope 1 and 2 greenhouse gas emissions from targeted sources by 28% in FY 2020 compared to FY 2008
- **Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings:** At least 15% of new, existing, and leased buildings >5,000 square feet meet the Guiding Principles by 2015 (FY12 interim target = 9%)

Three main funding sources used to meet these goals

- Appropriations
 - Funded by taxpayers
 - Awarded by Congress to federal agencies
- Energy Savings Performance Contracts (ESPC)
 - Financed by private investors
 - Implemented by private companies (ESCOs)
 - Paid for by guaranteed savings in utility and maintenance bills
- UESC
 - Similar to ESPC, but implemented through utility providers

Breakdown of funding



Funding history

- From 2003-2008, breakdown had been approximately as follows:
 - 46% appropriations
 - 38% ESPC
 - 15% UESC
- American Recovery and Reinvestment Act of 2009 (ARRA) awarded about \$8 billion to federal agencies for comprehensive modernization projects including energy efficiency
- With ARRA winding down, private investment through ESPC and UESC is more important than ever
- President Obama challenged federal agencies to award \$2 billion in new ESPC and UESC contracts by December 2013

ESPC projects must pay for themselves from the savings they generate

- This favors conservation measures with short paybacks over those with long paybacks
- Consequently, ESPC projects rarely include envelope measures (wall insulation, efficient windows, cool/highly insulated roofs, etc.)
- Peak building space conditioning loads remain unchanged, and HVAC equipment is replaced with like-sized equipment
- As a result, the typical ESPC project results in about a 20% reduction in site energy use
- In general this is insufficient to meet 30% energy reduction goals

Two agencies of the US federal government are trying to change the dynamic

- General Services Administration (GSA): National Deep Energy Retrofit
- US Army: Deep Retrofit Program
- Two different approaches to the same problem

GSA's approach is one of increased emphasis on achieving deeper energy savings

- Assembled a group of buildings across the US for inclusion in a deep retrofit challenge
- Funding through ESPC with minimal appropriations
- Through design charrettes, challenged ESCOs to dig deeper and come up with higher energy savings than typically offered
- Average savings proposed are around 36%, considerably higher than previous average
- Projects use conventional conservation measures (lighting, controls, etc.) and envelope measures combined in unique ways

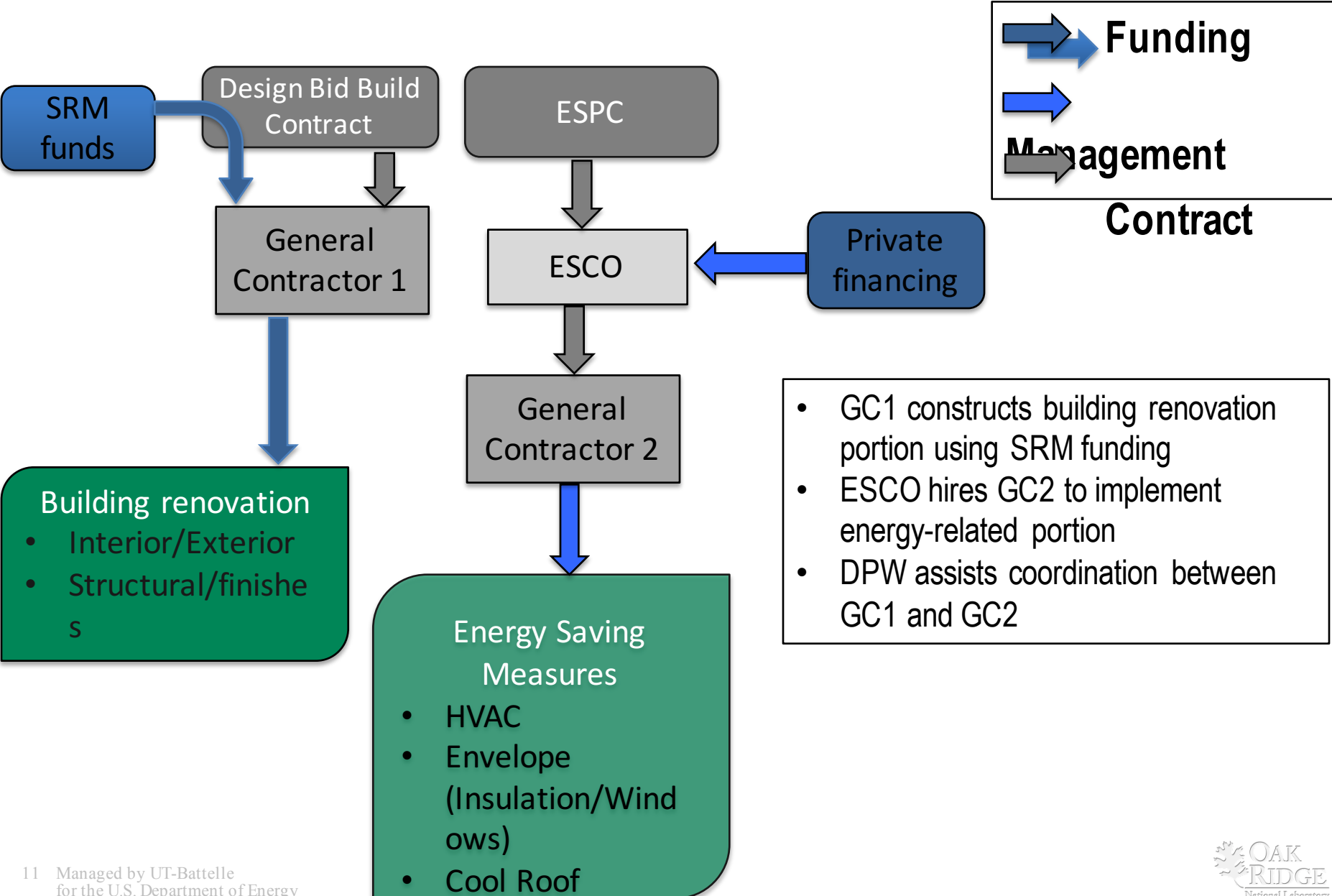
Army's approach is to combine building modernization with ESPC

- Envelope measures are rarely included in ESPC due to cost
- A building modernization project designed to replace wallboard, windows, etc. could offset some of this cost
- DOD's Sustainability, Restoration and Modernization (SRM) program is directed toward these types of projects
- Goal is to combine an SRM modernization project with energy efficiency project carried out through ESPC
 - SRM is similar to a “buydown” that permits envelope measures to be implemented more cost-effectively

Challenges with this approach

- According to legislation, ESPC projects can only install energy conservation measures
- Building modernization projects involve other activities such as carpeting, fire protection, locks, etc., which by law cannot be performed by the ESCO
- Thus the project must be implemented by two separate contractors: an ESCO and a General Contractor
- How to manage activities of these two contractors to achieve quality results
- Uncertainty of appropriations in today's fiscal environment

Two contracts, two GCs



- GC1 constructs building renovation portion using SRM funding
- ESCO hires GC2 to implement energy-related portion
- DPW assists coordination between GC1 and GC2

Pilot deep retrofit project

- Office building renovation in heating-dominated climate
- Objective is to reduce energy use by approximately 50%
- Disposition of appropriated funding is presently uncertain due to budgeting process
- Short term activities involve modeling (engineering and financial) and cost estimating to achieve greater “buy in” for the project

Conclusions

- GSA showing that higher energy savings can be achieved through ESPC alone, depending on state of building, energy prices, etc.
- Routinely achieving energy savings of 50% or higher may require a significant up front contribution from appropriations, but increases uncertainty

Questions?

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