



## Considering Energy Savings Performance Contracting For MUSH Projects

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Better Buildings ESPC Webinar Series  
Session 1 – Considering ESPC  
April 12, 2018

# Overview

- What is Energy Savings Performance Contracting (ESPC)?
- Why ESPC?
- A Look at the ESPC Market
- Overview of the ESPC Toolkit
- Spotlight: Tool of Your Choice

**POLL:**

**Which sector do you represent?**

**POLL:**

**Where are you in the ESPC decision-making process?**

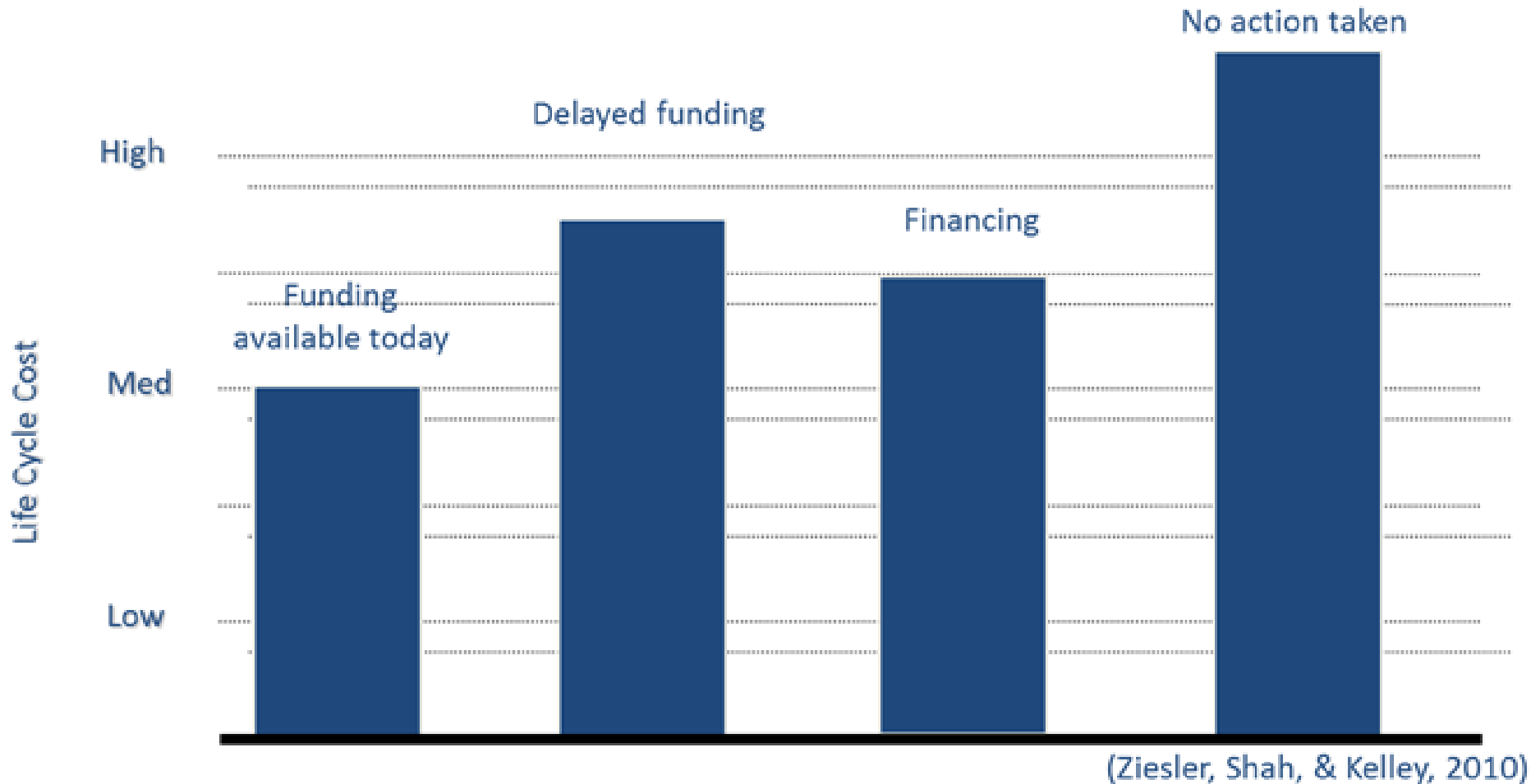
# What is ESPC?

# Definition

ESPC is

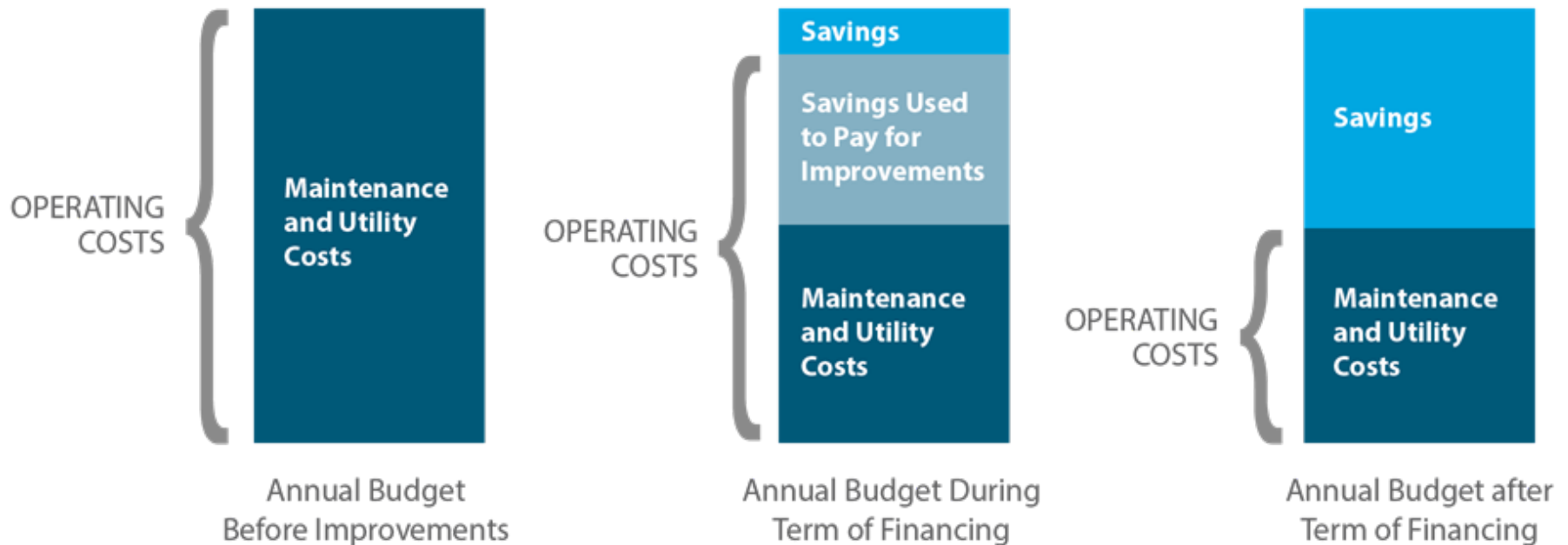
*A contracting and financing method that provides upfront financing for energy efficiency projects and repaid by the savings on utility bills resulting from the upgrades*

# The Cost of Doing Nothing



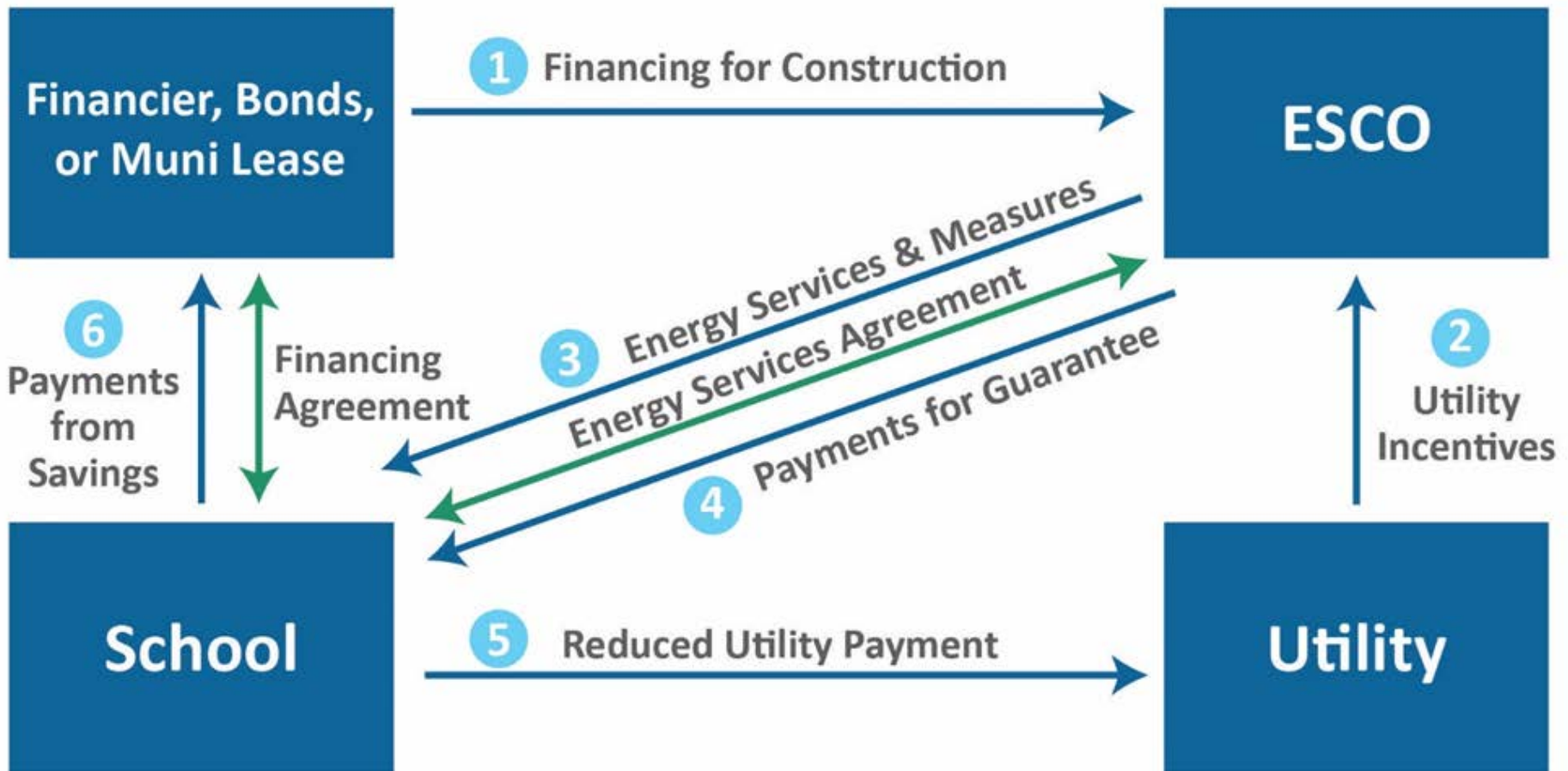
(Ziesler, Shah, & Kelley, 2010)

# How Does ESPC Work in Practice?

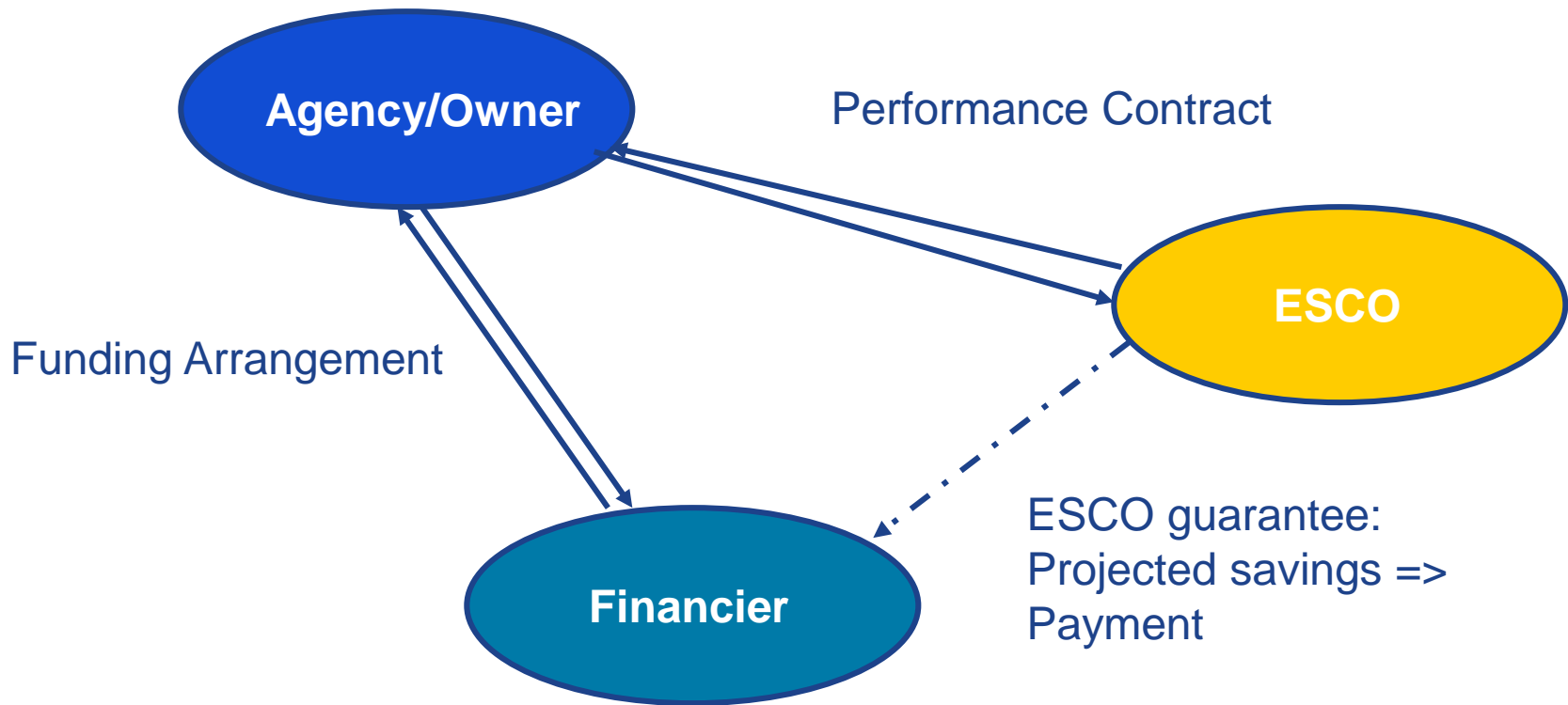




# ESPC Relationships



# ESPC Financing Options



# The Performance Guarantee

- Unique feature of ESPC

## The ESCO:

- Assumes financial, operating, and performance risk
- Guarantees project savings
- Measures and verifies savings (option of third-party verification)
- Provides reimbursement if guaranteed savings not met and/or fixes the problem at no additional cost

# Why ESPC?

# General ESPC Benefits

- No upfront costs needed
- ESCO accountable for project design, construction, and post-installation monitoring
- ESCO serves as single point of contact for project
- ESCO takes on project risks
- Guaranteed cost and energy savings
- Savings measured and verified as “real”

*“Every dollar that pays an unnecessarily high energy bill could be spent for a much better purpose: teaching children.”*

*- Loudoun County Public Schools  
Energy & Environment Team Motto  
(2013)*

# Opportunities for the MUSH Sector

- Accomplishing deferred maintenance
- Covering increasing operating costs despite tighter budgets
- Improving the indoor environment
- Including non-energy needs

# Accomplish Deferred Maintenance

## Issue

- Public facilities are some of the oldest in the country
- Public infrastructure regularly gets a grade of D+<sup>1</sup>

## Opportunity

- ESPC projects can accommodate critical maintenance and operational needs, whether energy-related or not
- A full 40% of K-12 schools pursuing ESPC during 2005-2008 included maintenance needs in their projects, such as roof replacement, asbestos abatement, parking lot repairs, safety/security systems<sup>2</sup>

<sup>1</sup> American Society of Civil Engineers. *2017 Infrastructure Report Card*. 2017. <http://www.infrastructurereportcard.org/>

<sup>2</sup> "Larsen, P.H., Goldman, C.A., and Satchwell, A. (2012). "Evolution of the U.S. Energy Service Company Industry: Market Size and Project Performance from 1995-2008." Lawrence Berkeley National Laboratory. LBNL-5447-E. Page. 15. <http://emp.lbl.gov/sites/all/files/lbnl-5447e.pdf>

<sup>3</sup> Annual Energy Outlook 2013." (2013). US Energy Information Administration. DOE/EIA-0383(2013). April 2013. Page 97-98. <http://www.eia.gov/outlooks/archive/aeo13/>



# Cover Increasing Energy Costs

## Issue

- 2000-2010 energy costs rose by ~80%<sup>3</sup> and are estimated to continue rising through 2040<sup>4</sup>
- State and local governments spend close to \$315B each year on energy alone<sup>5</sup>

## Opportunity

- ESPC projects can reduce utility bills & other operating costs
- All ESPC projects active in 2012 reduced total US commercial building energy consumption by about 1 percent or 224 MMBtu<sup>6</sup>

<sup>4</sup> "Annual Energy Review 2011." (2012). US Energy Information Administration. DOE/EIA-0384(2011). September 2012. Page 72.

<http://www.eia.gov/totalenergy/data/annual/pdf/aer.pdf>

<sup>5</sup> "Annual Energy Outlook 2013." (2013). US Energy Information Administration. DOE/EIA-0383(2013). April 2013. Page 97-98. <http://www.eia.gov/outlook/annual/aec13>

<sup>6</sup> US Department of Energy. State and Local Energy Data (SLED) and ACEEE State Government Lead by Example: <http://aceee.org/sector/state-policy/toolkit/lbe>

# Improve the Indoor Environment

## Issue

- Inadequate air quality, temperature, and lighting
- Indoor conditions compromise performance & health

## Opportunity

- Research has shown gains of 6-26% in “occupant performance” for students, employees, and consumers<sup>7</sup>
- Retrofits have reduced instances of respiratory conditions by 9-25% and of other health and discomfort by 20-50%<sup>8</sup>

<sup>7</sup> International Society of Sustainability Professionals (2010)

<sup>8</sup> US Green Building Council (2012)



Energy Technologies Area

Lawrence Berkeley National Laboratory

# A Look at the ESPC Market

Elizabeth Stuart

Lawrence Berkeley National Laboratory

April 21, 2018

# The Case for ESPC

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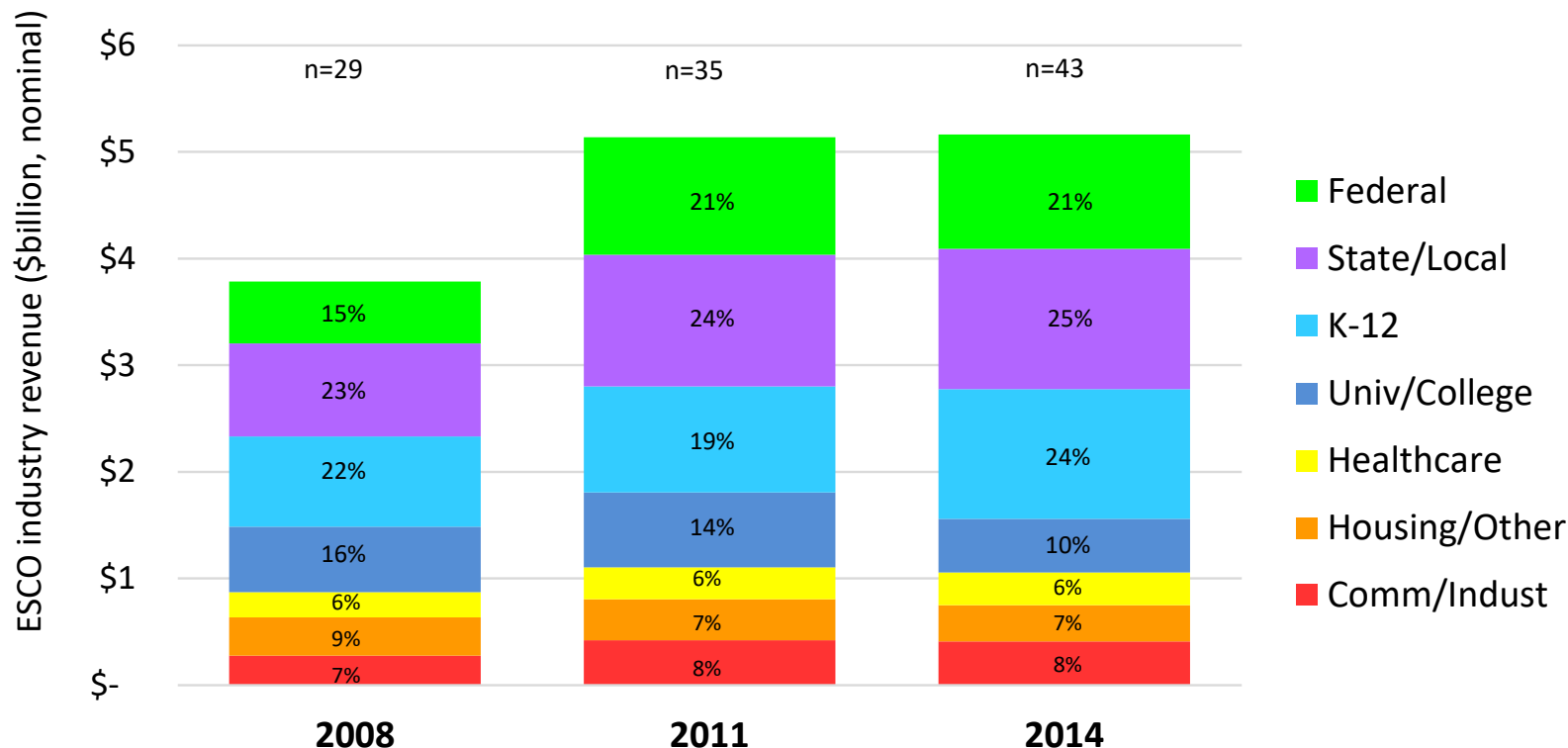
- Tight budgets for EE & other cost-saving improvements
- Strong energy savings track record
  - In 2012 ESCO projects saved 224 million MMBTu or approx. 1% of total U.S. commercial building energy consumption<sup>1</sup>
  - A typical MUSH ESPC project saves ~13% to 33% annually over baseline energy consumption<sup>2</sup>
- High market growth potential
  - 2014 investment in ESCO projects and services was \$5.3B; expected to grow 13% annually, to \$7.6B in 2017<sup>3</sup>
- Significant potential remains
  - Estimated remaining ESPC project investment opportunity in the MUSH market: \$51-86.8 billion<sup>4</sup>

<sup>1</sup> LBNL, 2015, Estimating Customer Electricity and Fuel Savings from Projects Installed by the U.S. ESCO Industry; <sup>2</sup> LBNL/NAESCO database of ESCO projects; <sup>3</sup> LBNL, 2016, U.S. Energy Service Company Industry: Recent Market Trends; <sup>4</sup> ibid

# ESPC Market Overview

- ESCOs primarily serve the public/institutional sectors
- ~70% (\$3.6B) of 2014 industry revenue came from MUSH sectors

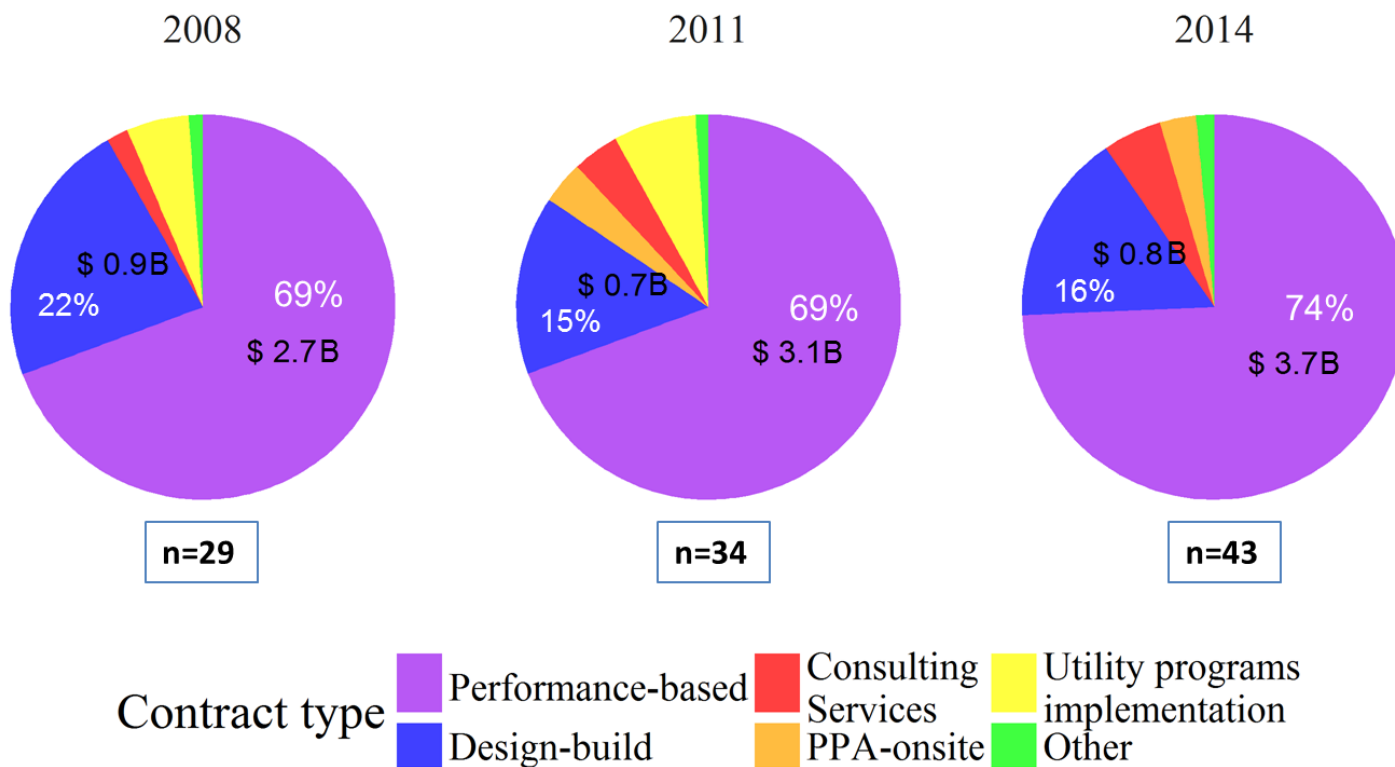
## ESCO Industry Revenue Share by Market



Source: Lawrence Berkeley National Laboratory (LBNL), 2016. U.S. Energy Service Company Industry: Recent Market Trends

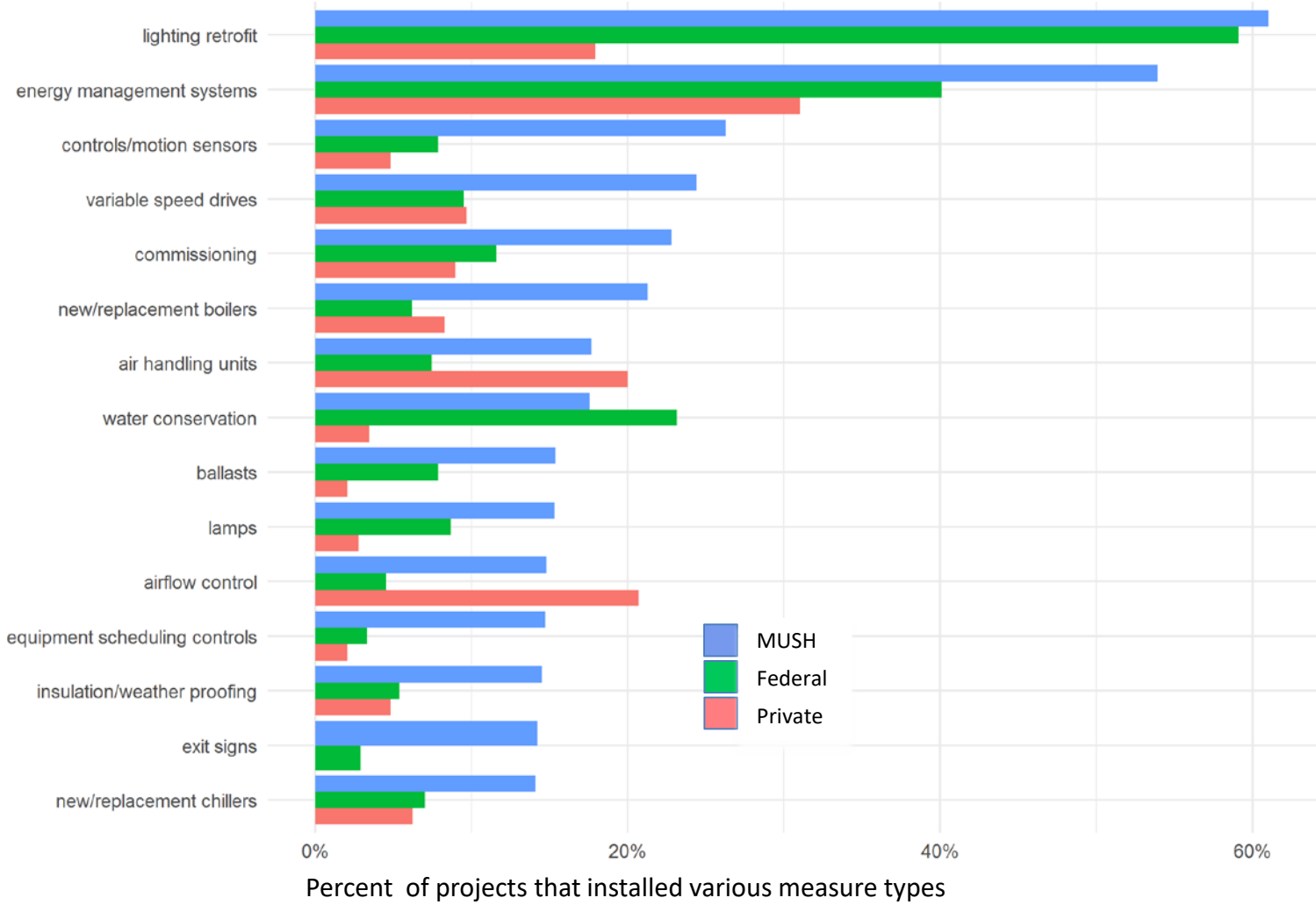
# ESPC Market Overview

- ESCO customers primarily choose ESPC
- ~75% of 2014 industry revenue was ESPC projects



Source: LBNL, 2016. U.S. Energy Service Company Industry: Recent Market Trends

# MUSH Market – Measures Installed



Source: LBNL/NAESCO ESCO project database, April 10, 2018



# MUSH Market ESPC Potential

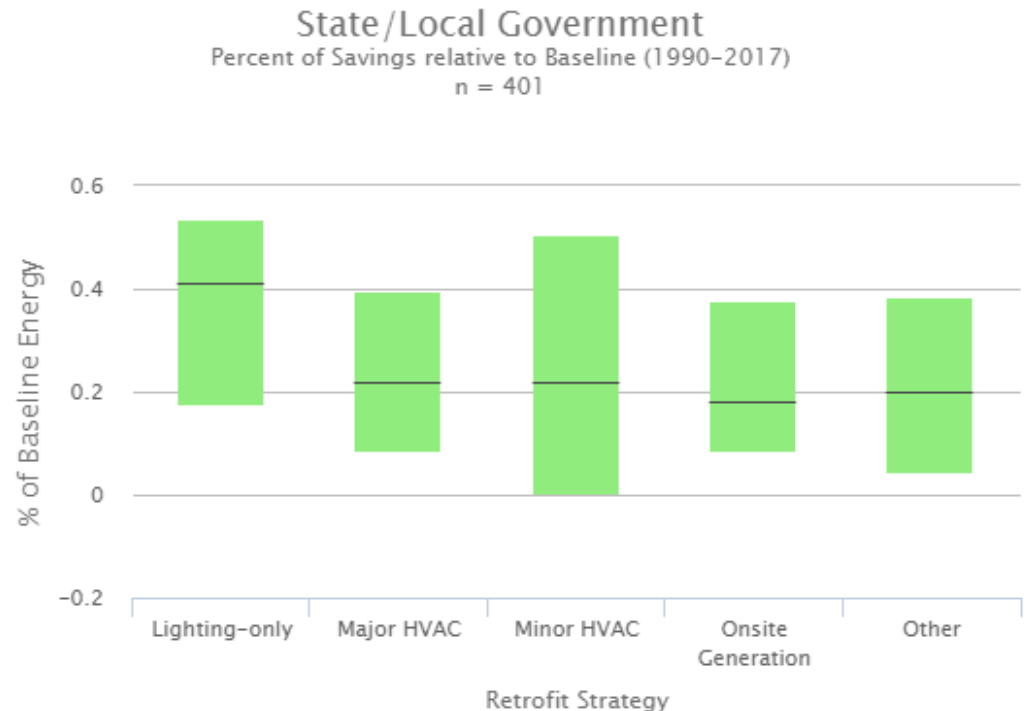
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- MUSH remaining potential<sup>4</sup>
  - Estimated unaddressed MUSH floor area: 8.4 billion square feet
  - Represents about 200 to 260 trillion Btu in energy savings
- LBNL methodology for estimating ESPC potential
  - Developed MUSH market floor area baselines for *buildings typically addressed by ESCOs* using CBECs and other data sources
  - Interviewed numerous ESCO executives and industry experts to get estimated % of floor area addressed by ESPC by market sector
  - Applied median estimates to determine remaining unaddressed area
  - Generated investment (\$) and savings per sq. ft. for each MUSH market from LBNL/NAESCO database of 6,500 projects; applied to remaining floor area to calculate remaining potential investment and \$ savings



# State/Local Sector Potential

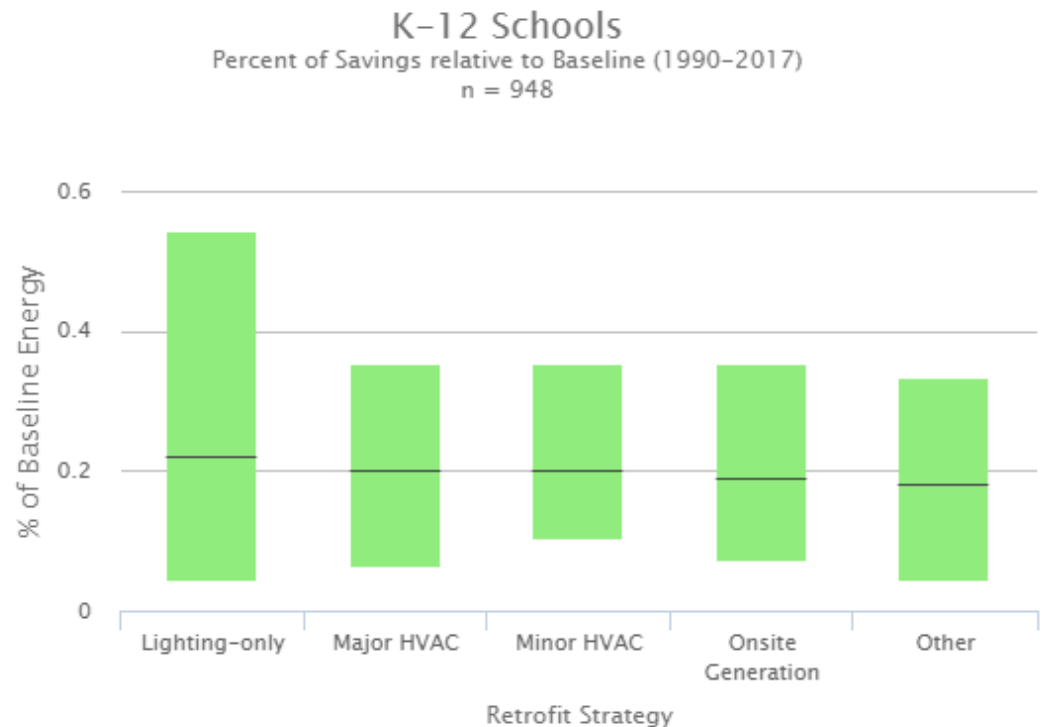
- About 70% (~2B ft<sup>2</sup>) of state/local buildings' floor area has not been addressed by ESPC
- The remaining state/local potential represents 39-55 trillion Btu in potential energy savings
- A typical state/local ESPC project saves 20% to 40% annually over baseline energy consumption<sup>5</sup>



Source: LBNL/NAESCO database, produced by eProject Builder benchmarking tool

# K-12 Sector Potential

- About 60% of K-12 school facilities floor area has not been addressed by ESPC
- The remaining K-12 potential represents 41-59 trillion kBtu in potential energy savings
- A typical K-12 ESPC project saves 13% to 34% annually over baseline energy consumption<sup>6</sup>

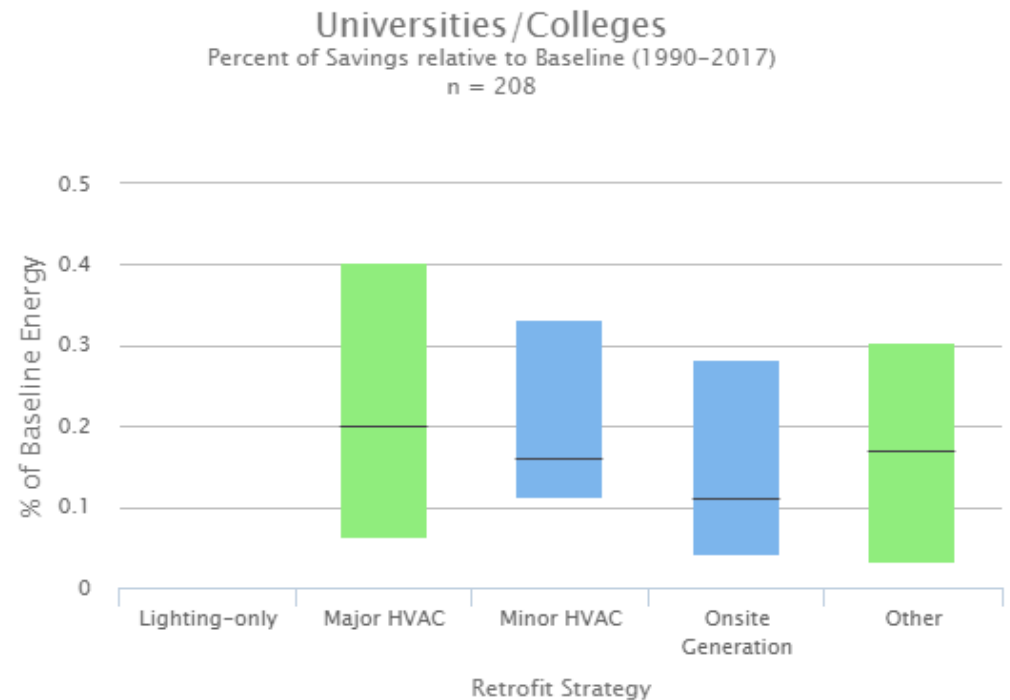


Source: eprojectbuilder.lbl.gov

Source: LBNL/NAESCO database, produced by eProject Builder benchmarking tool

# University/College Sector Potential

- About 75% of floor area for the university/college sector has not been addressed by ESPC
- The remaining potential in the university/college sector represents 19-29 trillion kBtu in potential energy savings
- A typical university/college ESPC project saves 13% to 32% annually over baseline energy consumption<sup>7</sup>



Source: LBNL/NAESCO database, produced by eProject Builder benchmarking tool



Energy Technologies Area

Lawrence Berkeley National Laboratory

**Thank you!**

Elizabeth Stuart: [estuart@lbl.gov](mailto:estuart@lbl.gov)

Lawrence Berkeley National Laboratory

# The ESPC Toolkit

# Accelerator Profile

## Timeframe

2014-2016

## Partners

25 partners (18 states, six cities, one school district)

## Purpose

Expand access to Energy Savings Performance Contracting (ESPC) as a promising option for financing energy efficiency retrofits in the public sector

## Outcome

More than \$2 billion invested in MUSH ESPC contracts

# Accelerator Activity Areas

## Area 1: Streamlining the ESPC Process

- Partners reviewed existing model ESPC documents

## Area 2: Empowering the Market

- Partners participated in ePB feedback & training

## Area 3: Resolving Individual ESPC Barriers

- Support successful, permanent, innovative, and replicable resolution of individual partner barriers

# The ESPC Toolkit

<https://betterbuildingsolutioncenter.energy.gov/energy-savings-performance-contracting-esp-toolkit>

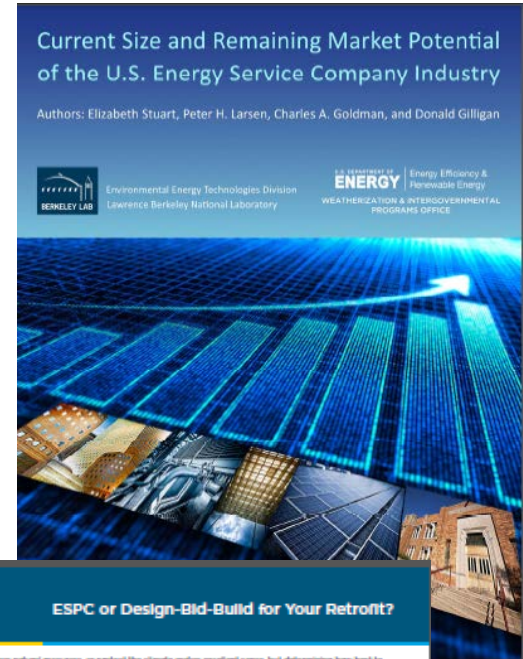
- Considering ESPC
- Implementing ESPC
- Establishing ESPC
- Expanding ESPC
- Assessing ESPC Results





# Considering ESPC

- Design-Bid-Build or ESPC?
- Diagnostic Questions
- LBNL Market Study (2013)
- Legislative Library



**Figure 6: Preliminary Self-Diagnosis to Prioritize Projects**

### Preliminary Self-Diagnosis

Does your facility have more than 50,000 square feet of floor area?  
 Do you spend more than \$60,000 each year on energy bills?  
 If so, an energy performance contract may work for you. It is likely to benefit you even more if you have:

- Aging buildings or equipment
- Recurring maintenance problems or high maintenance costs
- Comfort complaints
- Scarce budget resources
- Too little energy management expertise
- Too many demands on your maintenance personnel
- No recent upgrades of your lighting or controls systems
- Energy-using equipment that is ready for replacement

**ESPC or Design-Bid-Build for Your Retrofit?**

Design Process Selection	Financing	Project Implementation	Post-Acceptance Performance
<ul style="list-style-type: none"> <li>• Develop plans and specifications</li> <li>• Issue proposal</li> <li>• Award contract</li> </ul>	<ul style="list-style-type: none"> <li>• Projects must find their own financing</li> </ul>	<ul style="list-style-type: none"> <li>• Contractor completes project</li> <li>• Commissioning performed by commissioning agent if selected in contract</li> </ul>	<ul style="list-style-type: none"> <li>• None, unless arrangements are made for a third-party firm or internal team to perform ongoing commissioning / measurement and verification</li> </ul>
<ul style="list-style-type: none"> <li>• ESPCs that are registered municipal advisors in your state may facilitate financing. Otherwise, projects must find their own financing and ESPCs may provide instruction/education about how financing is generally managed</li> </ul>	<ul style="list-style-type: none"> <li>• ESPCs complete project</li> <li>• ESPCs perform commissioning</li> </ul>	<ul style="list-style-type: none"> <li>• ESPCs perform ongoing measurement and verification to validate performance</li> <li>• ESPCs provide reimbursement if guaranteed savings are not met and/or face the problem of no additional cost</li> </ul>	

**Advantages of ESPC**

- ESPC accountable for project evaluation, design, construction, and post-installation monitoring
- Single point of contact
- No upfront cost
- Guaranteed cost and energy savings
- ESPC may be able to facilitate financing

Office of Energy Efficiency and Renewable Energy | For more information about best practices and other resources visit: <http://www.energy.gov/>

**POLL:**

**Which resource would you like to hear about in more detail?**

# Tool: ESPC or Design-Bid-Build?

## Barrier

“Which approach is better suited for our planned retrofit?”

U.S. DEPARTMENT OF **ENERGY** | Energy Efficiency & Renewable Energy

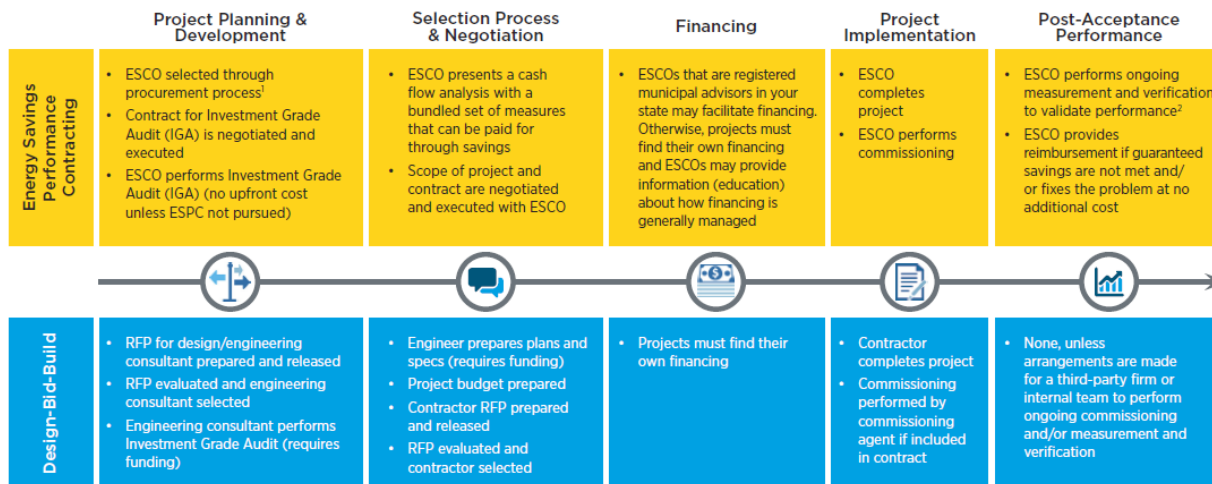
### ESPC or Design-Bid-Build for Your Retrofit?

Choosing to save energy, whether to cut costs, improve operational efficiency, develop energy infrastructure, conserve domestic energy resources, or protect public health makes excellent sense, but determining how best to approach an energy savings project can be a challenge.

One approach is to use an Energy Savings Performance Contract (ESPC). With an ESPC, an institution enters into a contract with an Energy Service Company (ESCO) which is responsible for developing and implementing an energy savings plan and installing energy efficiency upgrades. The resulting energy savings are then used to pay for the upgrades over time. The ESCO guarantees the projected energy savings and provides ongoing reports verifying the actual savings.

Another approach is to use the traditional design-bid-build process or “do-it-yourself” route where the organization itself performs or procures different aspects of an energy-saving project, like project evaluation, engineering, construction, and post-installation verification.

How can you determine which process is better suited for upgrading your facilities and achieving long-term cost savings?



<sup>1</sup>Some states offer lists of pre-qualified ESCOs to streamline ESCO procurement | <sup>2</sup>Some states require measurement and verification to be done by an independent third party in place of an ESCO

#### Advantages of ESPC

- ESCO accountable for project evaluation, design, construction, and post-installation monitoring
- ESCO is single point of contact
- No upfront cost
- Guaranteed cost and energy savings
- ESCO may be able to facilitate financing or provide education

#### Advantages of Design-Bid-Build

- Familiar or traditional procurement approach
- Can be cost effective for organizations with in-house technical expertise like those that have design capability and can perform their own Investment Grade Audits, commissioning, or measurement and verification

# Tool: Diagnostic Questions

## Question

“Is ESPC suited for my project?”

Figure 6: Preliminary Self-Diagnosis to Prioritize Projects

### Preliminary Self-Diagnosis

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# Tool: LBNL Market Study

- Published 2013
- Researched and authored by Lawrence Berkeley National Laboratory (LBNL)
- In-depth market analysis and statistics
- Multiple follow-up articles



# Tool: ESPC Legislation Library

- Updated July 2017
- Includes all 50 states, five territories, and DC
- Full text of key ESPC statutes in each jurisdiction

## ESPC Legislation Database

### *July 2017*

This is a 2017 update of the 2014 ESPC Legislation Database developed for U.S. Department of Energy.

The database contains legislation that supports energy savings performance contracting (ESPC) across 50 states and 5 territories. It includes full text of key statutes, arranged by market sector, with full citations to find subsequent updated statutes. This makes for easy state-to-state comparison of statute requirements. It also identifies key organizations that set guidelines for ESPC in the state such as state energy offices, along with resources they provide. Information for each state or territory is located on a separate tab (in alphabetical order by abbreviation).

***Prestented to:*** U.S. Department of Energy.

***Prepared by:*** Linda Smith, 9Kft Strategies in Energy, LLC. It is an update of the posted 2014 document prepared for U.S. DOE and was completed in support of work conducted for NAESCO, U .S. DOE and the Colorado Energy Office.

# Thank You!

## Questions?

For additional information, contact

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