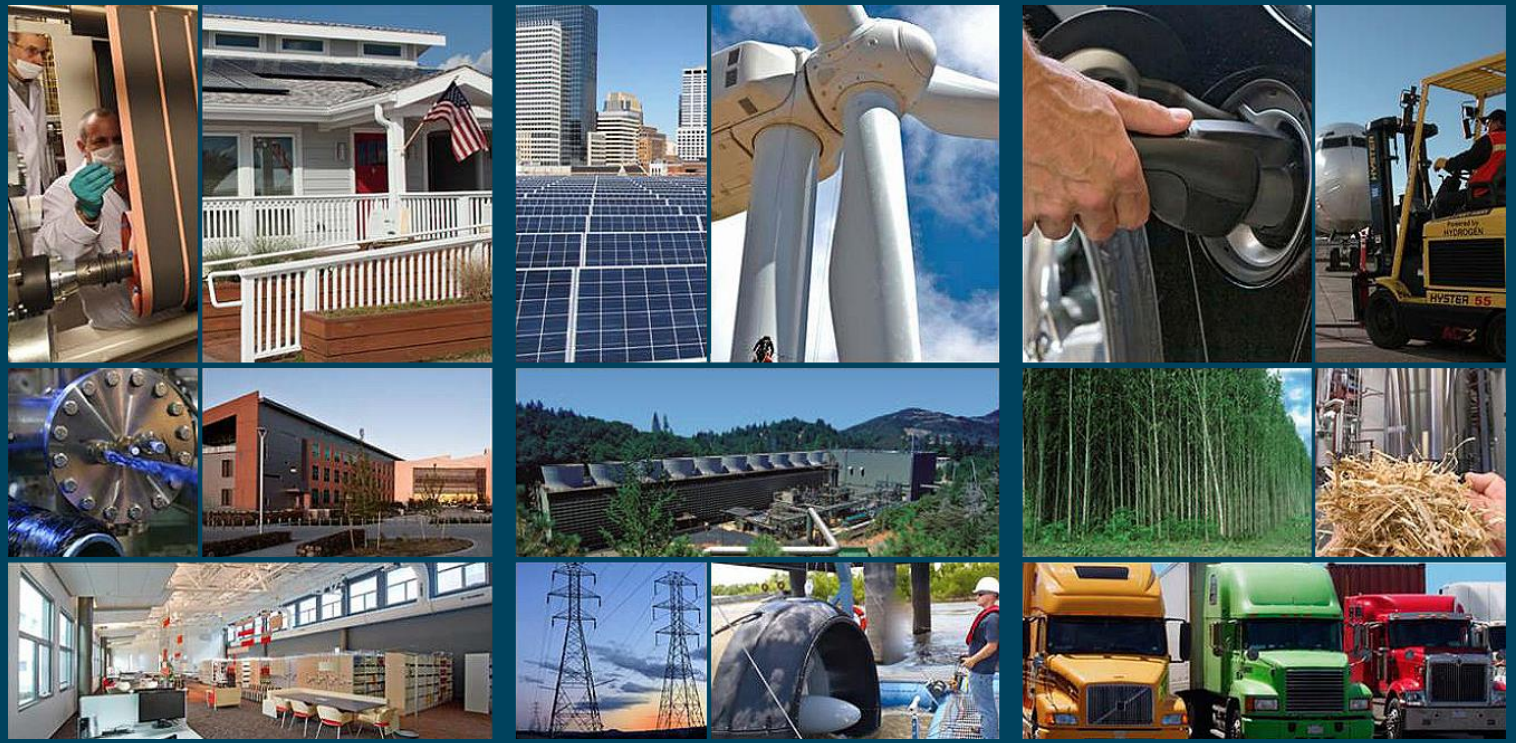
Washington Update

Timothy D. Unruh, PhD, PE, CEM



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

November 3, 2015

Agenda

- Executive Order 13693 Topics
- Better Buildings Challenge
- Capital Solar Challenge
- Presidential Performance Contracting Challenge (PPCC)
- M&V Guideline Update
- eProject Builder (ePB) Update
- DOE Indefinite Delivery, Indefinite Quantity (IDIQ)
- Energy Exchange 2015/2016

E.O. 13693 Topics

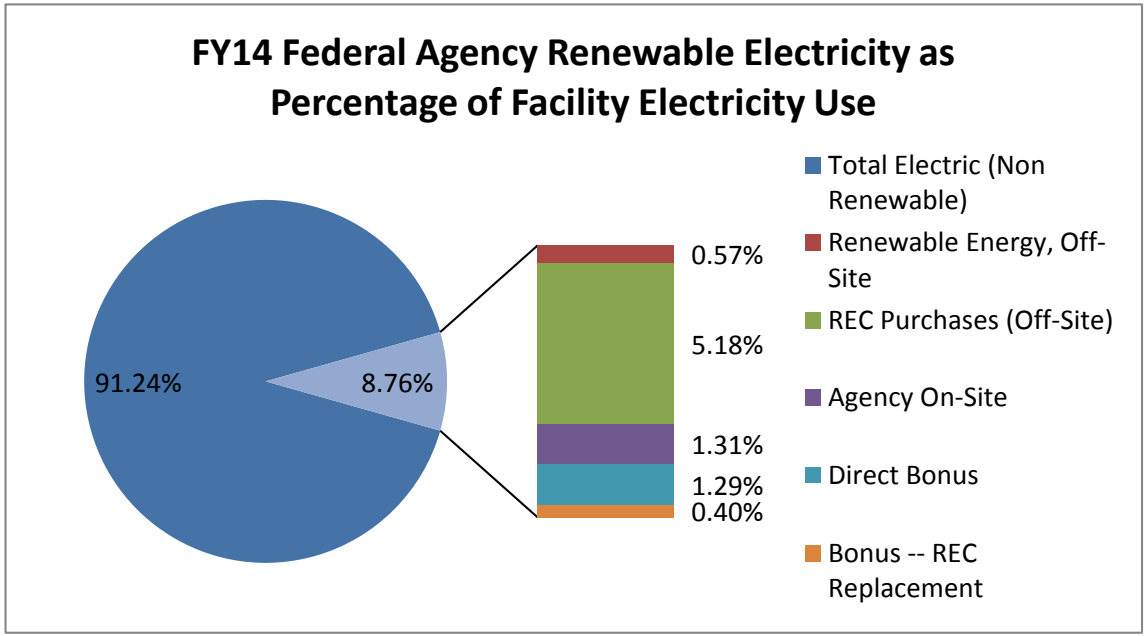
Executive Order 13693

- In March 2015, the Obama Administration issued Executive Order 13693, *Planning for Federal Sustainability in the Next Decade*
- In June 2015, CEQ provided clarifying instructions to federal agencies for implementing E.O. 13693
- Developed using a collaborative interagency process
- https://www.whitehouse.gov/sites/default/files/docs/eo_13693_implementing_instructions_june_10_2015.pdf

E.O. 13693 - Renewable Electricity Approach

- Agencies to use renewable energy based on following priorities:
  - Install agency-funded renewable energy on-site and retain renewable attributes, documented as Renewable Energy Certificates (RECs);
  - Contract for energy that includes the installation of a renewable energy project on-site or off-site from a federal facility and retains RECs;
  - Purchase electricity and corresponding RECs; and
  - Purchase RECs
- When purchasing RECs or energy and corresponding RECs (last two priorities) sources shall have been placed into service within 10 years prior to start of the fiscal year
- Agencies must still own RECs or have clear ownership of equivalent renewable and environmental attributes to meet renewable electric target and receive the benefit on the energy and GHG reduction goals

Renewable Electric Energy Use, FY 2014



	MWH
Total Electric	54,748,471
Total Electric (Non Renewable)	49,952,322
Renewable Energy, Off-Site	312,384
REC Purchases (Off-Site)	2,837,789
Agency On-Site	716,955
Direct Bonus	708,832
Bonus -- REC Replacement	220,189

Renewable Energy Accounting/Contributions

- Renewable Electricity Percentage Goal
  - Only renewable *electricity* project generation or purchases count toward the goal (not thermal)
  - Matching bonus for renewable electricity generated on federal/Indian land (counts twice) to incentivize on-site projects; bonus only counts toward renewable goal—not energy reduction or GHG goals
- Energy Intensity (Btu/Sqft) Reduction Goal
  - On-site renewable generation is considered an energy conservation measure under the energy intensity goal since it displaces fossil fuel use
    - Renewable attributes must be retained or covered by equivalent RECs
    - Purchased renewables without on-site project do not reduce energy under this goal

Renewable Energy Accounting/Contributions (Cont.)

- Greenhouse Gas Reduction Goal
  - Both on-site projects and purchases reduce GHG emissions
  - Purchased RECs displace emissions at the marginal generation rate in the region the RECs originate
  - CO2 from biomass combustion is considered “avoided” emissions (biogenic) under the goal, methane and nitrous oxide are not (anthropogenic)

E.O. 13693: Energy Intensity Goal Enhancements

- Facility energy intensity (Btu per square foot) reduction goals (25% by 2025 vs. 2015)
  - On-site generated renewable energy is not considered consumption under the Btu/GSF goal, whether in goal subject or goal excluded facilities
  - Agencies get a credit for measured and verified annual Btu saved in goal excluded facilities to incentivize projects in these facilities
  - Agencies may receive a weather-normalization adjustment in energy intensity for benchmarked buildings that release their data to CTS (if the adjustment is advantageous)
  - Agencies that achieved 30% or greater reduction in energy intensity during the 2003 to 2015 goal period may be assessed with alternative annual trend line of 47.5% Btu/Sqft reduction from 2003 to 2025

9

E.O. 13693: Clean Energy

By FY 2025, 25% of the total amount of **energy** consumed for facilities by each agency shall be clean energy:

- 10% in FY16 and FY17,
- 13% in FY18 and FY19,
- 16% in FY20 and FY21,
- 20% in FY22 and FY23,
- 22.5% in FY24,
- 25% in FY25 and thereafter.

$$Clean\ Energy = \frac{Renewable\ Electric\ Energy + Alternative\ Energy}{Total\ Facility\ Energy}$$

E.O. 13693: Clean Energy

- Includes all energy eligible for the renewable electricity targets, including bonuses for projects on federal or Indian land.
- **Renewable Electric Energy** includes:
  - solar
  - wind
  - biomass, including landfill gas, municipal solid waste
  - ocean (tidal, wave, current, and thermal)
  - geothermal / geothermal heat pumps
  - Microturbines (powered by renewable fuels) or
  - new hydroelectric generation capacity achieved from increased efficiency or additions of new capacity at an existing hydroelectric project

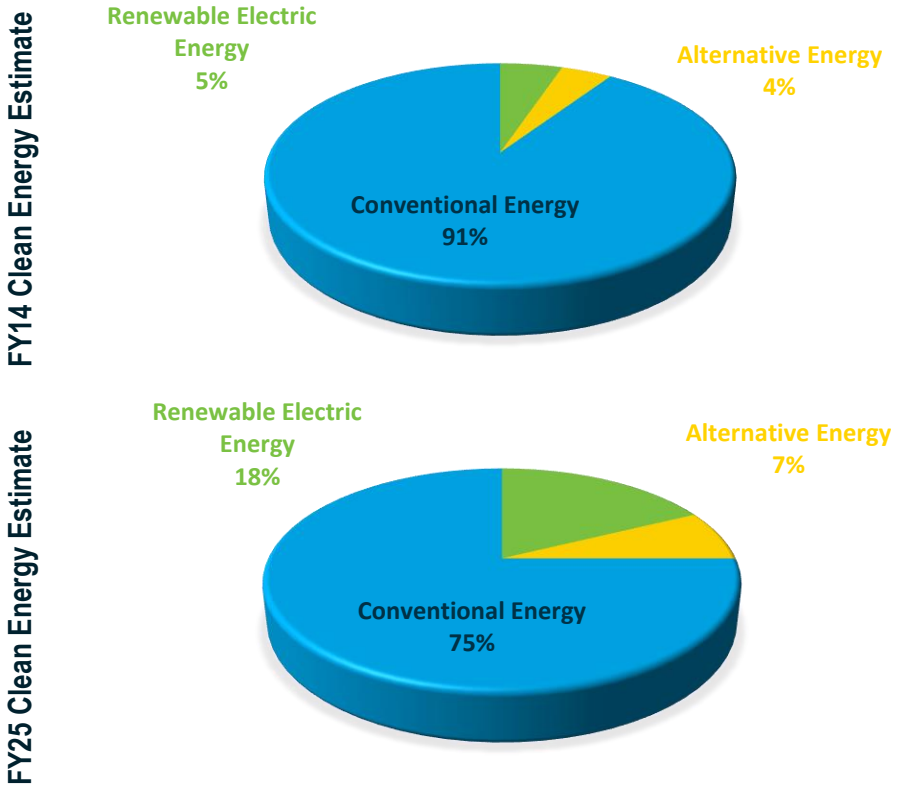
E.O. 13693: Clean Energy

- No longer includes hydrokinetic, does not allow hydroelectric energy added to an existing dam that has not been used for hydropower in the past
- **Alternative Energy** includes:
  - Thermal renewable energy (including from CHP and fuel cell systems)
  - Small modular nuclear reactor output
  - CHP and fuel cells powered by fossil fuels, but only the amount of output left after subtracting the amount of natural gas (thermal component) and/or electricity (eGRID factor) that would produce the same amount of BTUs/electricity

E.O. 13693 and Facility Energy Mix

Clean Energy Target: By FY 2025, 25% of the total amount of **energy** consumed for facilities by each agency shall be clean energy:

- 10% in FY16 and FY17,
- 13% in FY18 and FY19,
- 16% in FY20 and FY21,
- 20% in FY22 and FY23,
- 22.5% in FY24,
- 25% in FY25 and thereafter.



E.O. 13693: Federal Fleet Management

Fleet Requirement	*Description*	*Lead Agency*
Reduce per mile GHG emissions	4% reduction by FY17, 15% by FY21, 30% by FY25	**DOE**
Acquisition of ZEVs and PHEVs	20% of new passenger vehicle acquisitions by FY20, 50% by FY25	**DOE**
Optimum fleet inventory, right-size fleets	Establish a structured VAM to determine the appropriate size and number of motor vehicles	**GSA**
Deploy vehicle telematics	Use telematics to collect vehicle-level operational data for new light- and medium-duty vehicles (within 2 years)	**GSA**
Manage agency annual asset-level fleet data	Ensure fleet management systems support collection, management, and reporting using vehicle level data	**DOE/GSA**
Plan for charging infrastructure	Ensure charging stations are available through GSA with vehicle level data reporting capabilities	**GSA**

E.O. 13693: Charging Stations at Federal Facilities

Scope 1 & 2 GHG - E.O. requires acquisition of electric vehicles (EVs) and deployment of charging stations at federal facilities

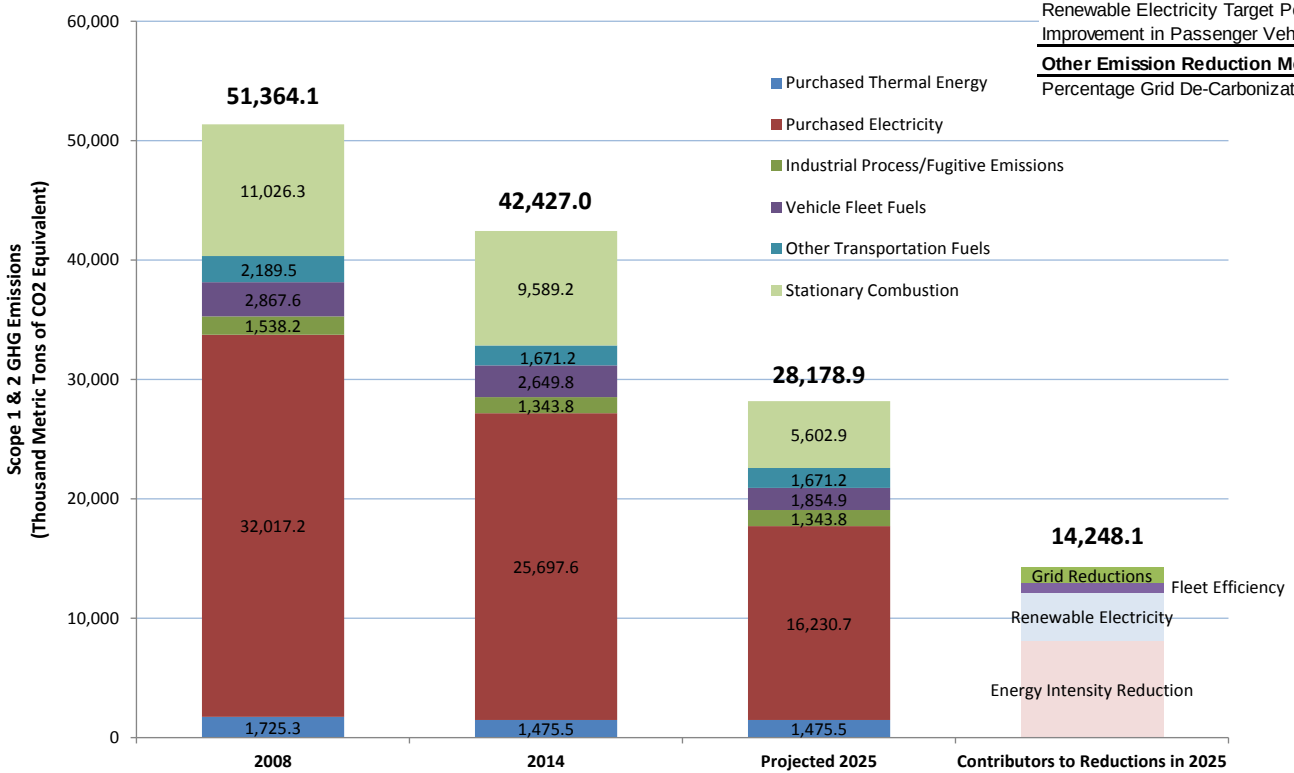
Scope 3 GHG - E.O. encourages employee use of federal fleet charging stations to promote sustainable commuting

Personal Vehicle Workplace Charging Policies

- E.O. requires Multimodal Access Plan (MAP) for Commuters by 2016 (in SSPP); included in MAP shall be workplace charging plan
- In cases where infrastructure is already installed, CEQ feels personal vehicle workplace charging may only be an incidental expense (i.e. allowable
- Where appropriate, parking concessionaires may bill for vehicle charging
- Agencies may have different positions with respect to legal authority, and should contact CEQ counsel with questions

Potential Reductions and Contributors for 2025 Scope 1&2 GHG Reduction Targets

Agency Targets	Target	Reductions (MTCO2e)
BTU per GSF Target Reduction Percentage	25%	8,082,983
Renewable Electricity Target Percentage	**30%**	4,056,491
Improvement in Passenger Vehicle Fleet Efficiency	30%	794,936
Other Emission Reduction Measures		
Percentage Grid De-Carbonization	17.4%	1,313,677



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Better Buildings Challenge

Data Center Energy Context

Data centers are energy intensive facilities

Data centers are an important opportunity

- In 2013, U.S. data centers consumed about 100 billion kWh
- If all data centers were more efficient, we could save about 20 billion kWh ($2 billion annually)

New Goal Associated with Data Centers

First, FEMP sought to create an opportunity to reduce energy intensity within data centers while leveraging non-federal efforts to help achieve federal goals

E.O. 13693 seeks to build upon this opportunity and have federal agencies improve data center energy efficiency

Data Center Energy Management Strategies Overview

Agencies directed by Executive Order 13693, Section 3(a)(ii):

- Ensure the agency chief information officer promotes data center energy optimization, efficiency, and performance
- Install and monitor advanced energy meters in all data centers by fiscal year 2018
- Establish a power usage effectiveness target of 1.2 to 1.4 for new data centers
- Establish a power usage effectiveness target of less than 1.5 for existing data centers

Data Center Energy Management Strategies Overview

Implementation Guidance for Executive Order 13693

- Agencies should adopt a cloud-first policy when developing new systems
- Agencies will evaluate existing data centers unable to achieve a PUE of 1.5 for alternative solutions
  - Assign a data center energy practioner to assess data centers
  - Use of shared service providers and contracted data center services
  - Consolidate into more efficient data centers
- Procurement preference for data centers with the lowest demonstrated PUE
- Encourages participation in the Better Buildings initiative

Data Center Partner of Better Buildings Challenge

- September 2014 – Better Buildings Challenge was expanded to include data centers. Partners commit to reduce the energy intensity of their portfolio (including data centers) by at least 20% within 10 years and share their results
- January 2015 – New Data Center Accelerator added, where partners commit to reducing the energy use of at least one data center (IT load ≥ 100 kW) by at least 25% within 5 years and share their results
- Federal government, public, and private sector leadership:
  - 29 partners, more than 150 MW committed
  - Stand-alone and embedded data centers
  - Small, medium, and large data centers
  - High Performance Computing
  - Hyperscale Cloud
  - Multi-Tenant
  - Corporate Enterprise
  - Server rooms/server closets

Focus on Infrastructure Improvements

- Infrastructure energy accounts for half or more of most target data centers (less for hyper scale data centers) and can be a more complex process to undertake than improving IT equipment, particularly in multi-use buildings
  - Metering and monitoring issues
  - Sizeable initial capital investment may be required

- Because IT equipment energy efficiency naturally improves with each new generation and refresh, the Better Buildings effort is focusing on infrastructure at this time
  - DOE is open to working with collaborators to explore additional methods or metrics to address IT efficiency as the program progresses

Data Center Challenge Partnership Benefits and Engagement

- Recognition for leadership
- Results profiled and promoted
- Best in class technical assistance
- Working with other leaders
- Capture value proposition

DOE Engagement:

- Provide technical expertise from DOE's Center of Expertise for Energy Efficiency in Data Centers, communications support, and a dedicated account manager
- Create networking opportunities to help Partners share best practices and innovative solutions
- Collaborate with Partners regularly
- Recognize Partners' progress and successes; highlight leadership

Better Buildings Challenge

Launched December 2011

Goals:

- Make commercial, industrial buildings & multifamily housing 20%+ more efficient in 10 years
- Save more than $80 billion+ for U.S. organizations
- Create American jobs; improve energy security
- Mitigate impacts of climate change

How:

- Leadership
- Results
- Transparency
- Best practice models
- Recognition
- Catalyzing action

Now 250+ Partners: *Commercial, Industrial, Public, Private*

Represent:

- 3.5+ billion square feet
- $2 billion private financing
- 600+ manufacturing plants
- $2 B federal commitment
- 150+ MW of data centers

Better Buildings Challenge

Better Buildings Challenge is a collaborative platform for sharing: information, lessons learned, and best practices across all sectors

125+ showcase projects

- Large and small buildings
- All sectors
- Specific building types such as schools, hospitals, hotels, grocery stores, universities, civic centers, libraries, offices and labs

75+ implementation models (playbooks)

- Overcome barriers: finance, data, energy management, staff training, community and customer outreach, and more
- Multi-faceted and applicable across sectors

Better Buildings Challenge Partners and Allies

Capital Solar Challenge

Capital Solar Challenge

- Launched in April 2014, the Challenge directs federal agencies to identify opportunities to deploy solar renewable energy at federal locations across the National Capital Region.
- DOE and GSA were charged to assist agencies in leading the Challenge, with the goal of developing solar renewable power on federal rooftops, covered parking, and appropriate open land.
- The projects will capitalize on innovative financing and procurement models like aggregated solar purchases, power purchase agreements, and energy performance contracts to help lower their cost of electricity.

Capital Solar Challenge

- Number of sites: 18 (GSA and 6 other agencies)
- Estimated system sizes: 3 MW
- GSA issued RFP on June 9

Event	Anticipated Date
Pre-Proposal Conference	September 28, 2015
Site Visits	September 29th and 30th and October 1st
RFI Submission Deadline	October 9, 2015
Proposal Due Date	October 23, 2015
Evaluations	October/November 2015
Contract Award	Mid to late November 2015
Kick-off Meeting	One week after award
PV Construction Complete	By November 30 2016, to ensure 30% ITC

Presidential Performance Contracting Challenge

Presidential Performance Contracting Challenge (PPCC)

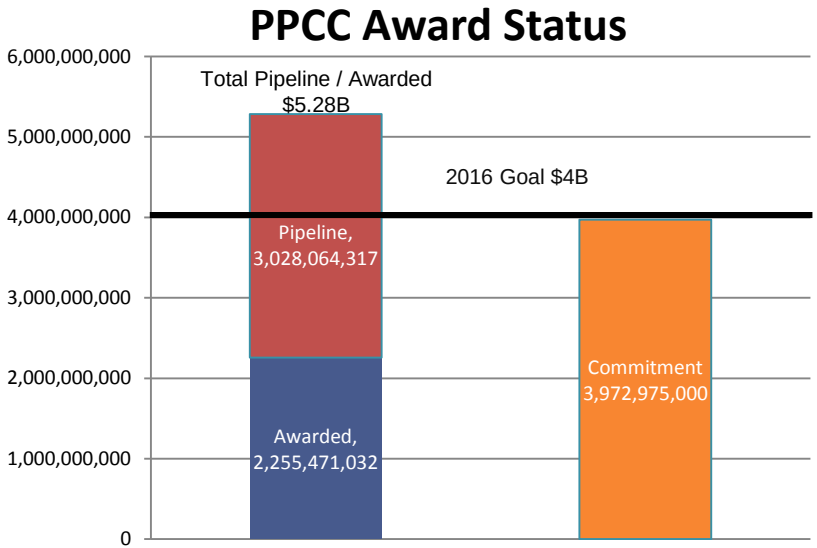
President Obama announced federal agencies will further expand their use of performance-based contracts through 2016 to upgrade the energy efficiency of federal buildings at no cost to taxpayers.

Goal: $4B by December 31, 2016

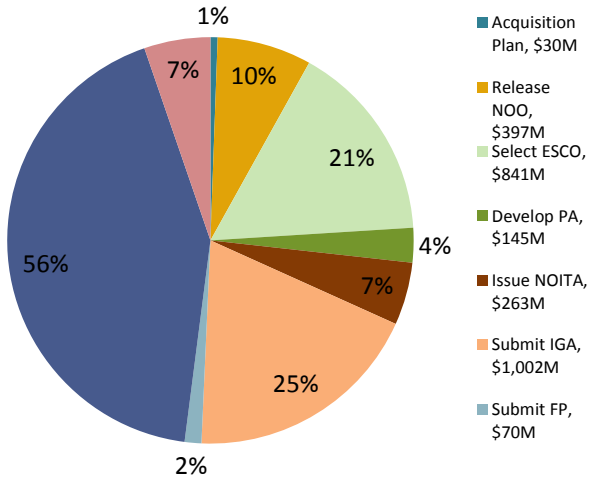
The extension of the PPCC will further drive:

- Federal investment in energy efficiency technologies
- Innovation and partnerships between the federal government and the private sector

Presidential Performance Contracting Challenge Status



As of September 15, 2015

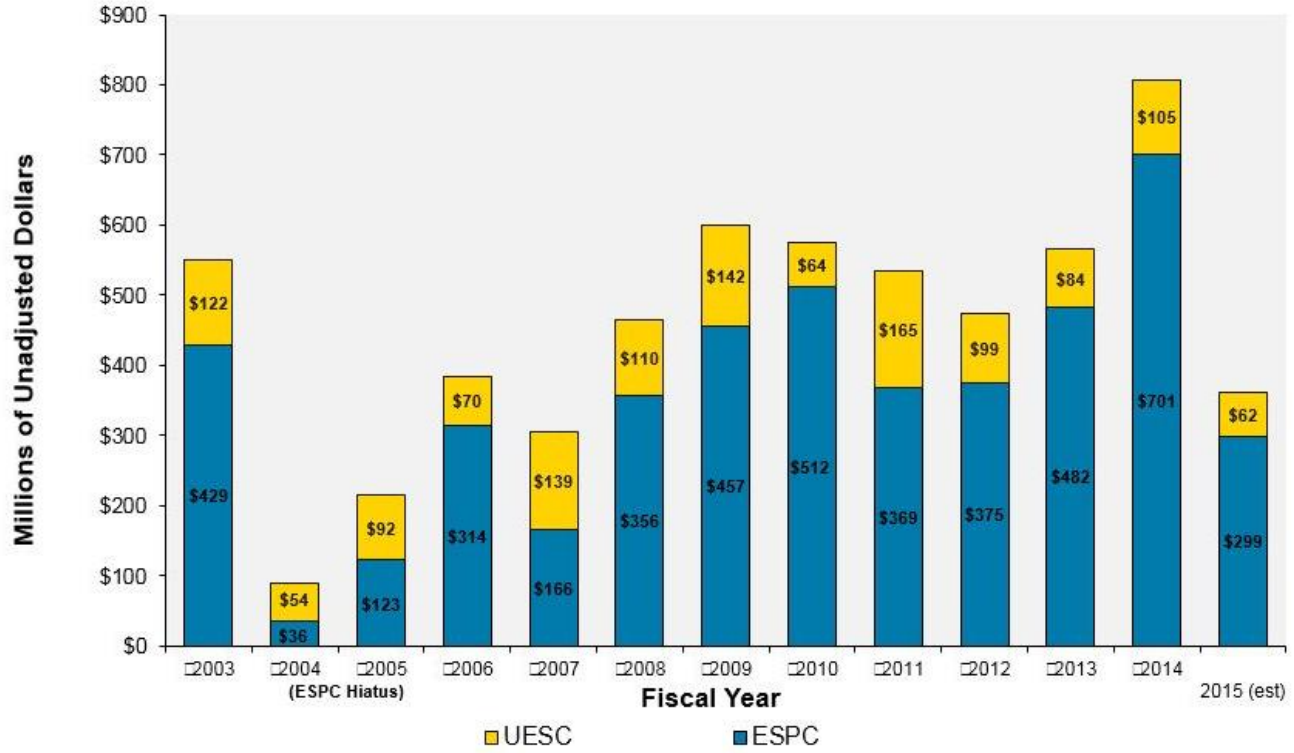


Pipeline: Amount of project costs in procurement process and expected to award.
Awarded: Amount of project costs awarded.
Agency Commitments: Amount in project costs committed to. Total of pipeline and awarded values may exceed commitment value due to additional projects beyond original agency baselines.

Note: Sum of percentages equals 133% due to agency pipeline development exceeding $4B PPCC goal.

Acquisition Plan: Development of agency's acquisition
Release NOO: Release of the Notice of Opportunity to perform a performance contract.
Select ESCO: Selection of the Energy Service Company that will perform the work.
Develop PA: Development of the Preliminary Assessment outlining the work to be done.
Issue NOITA: Issuance of the Notice of Intent to Award the contract
Submit IGA: Submission of the Investment Grade Audit and cost/savings proposal.
Submit FP: Submission of the Final Proposal
Award: Awarding of the contract to the energy service company

Financed Investment Level History



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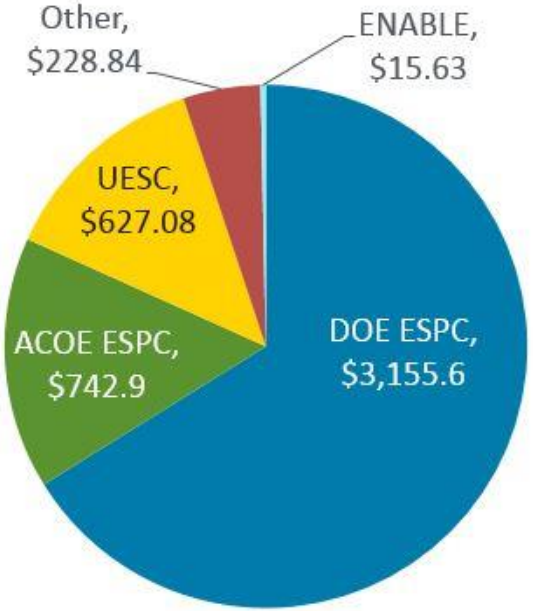
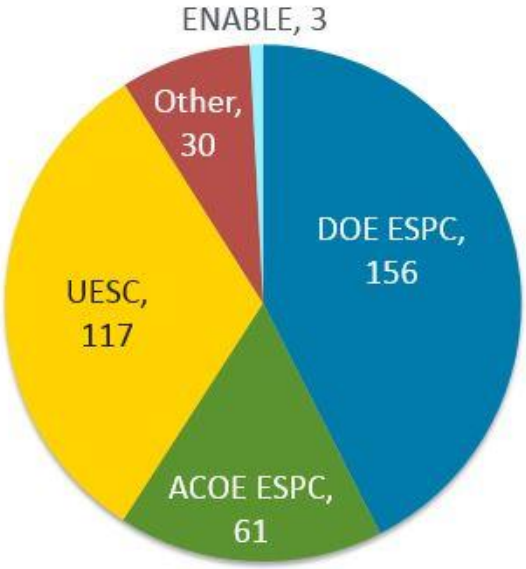
PPCC Investment & Number of Projects by Contract Vehicle

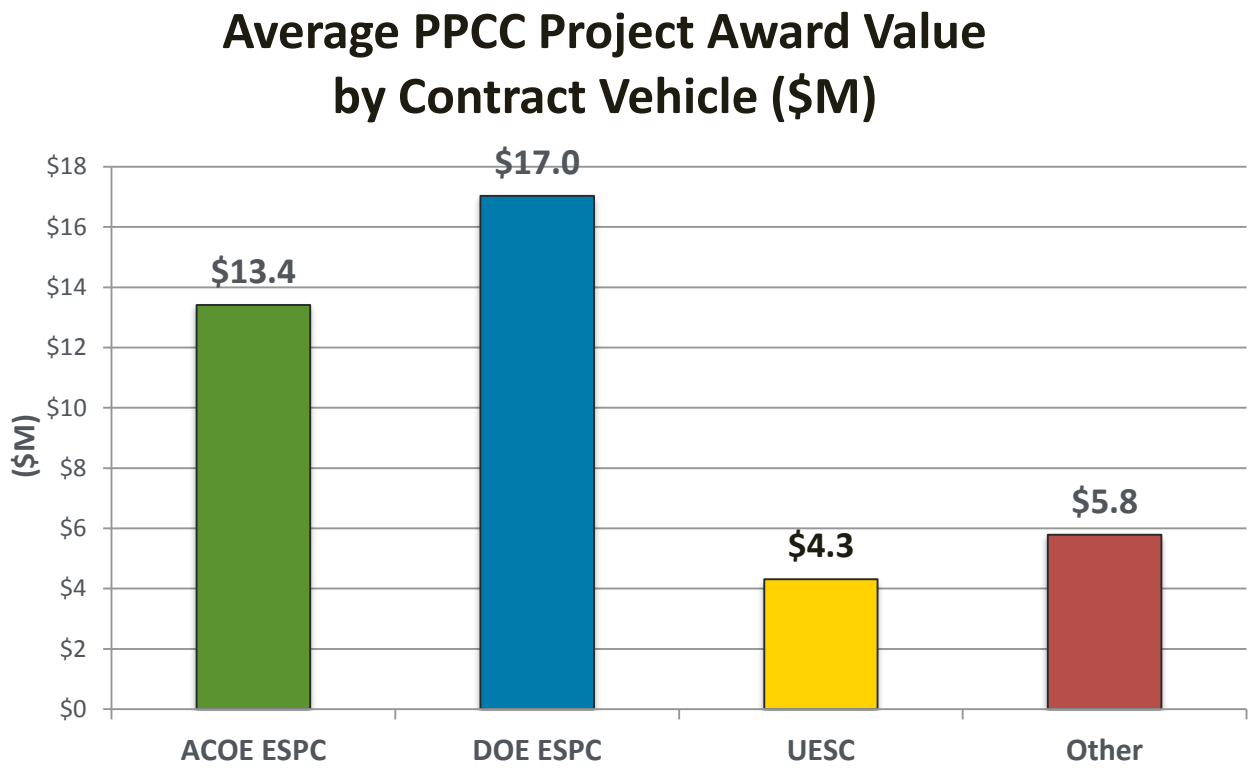
Investment Value by Contract Vehicle ($M) (Awards + Pipeline)



Number of Projects by Contract Vehicle (Awarded + Pipeline)



Average PPCC Project Award Value



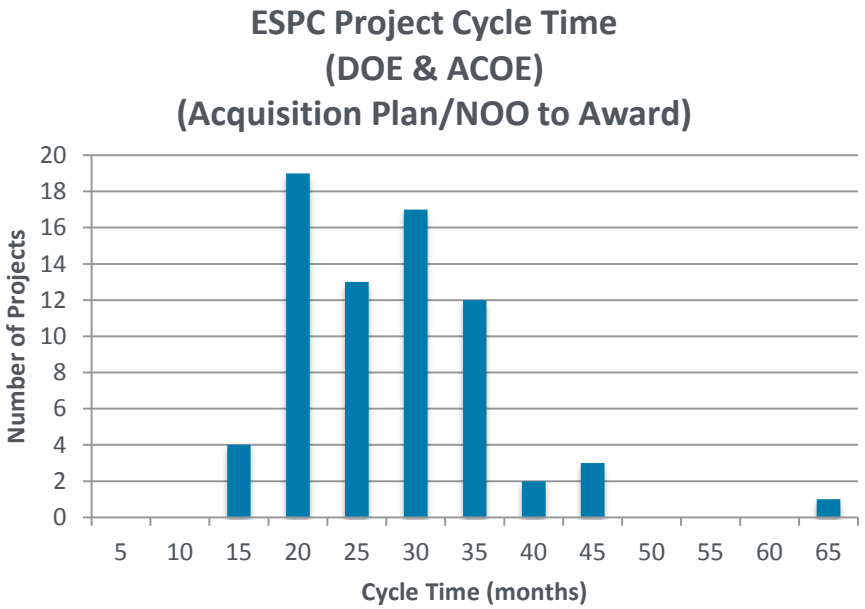
ECM Comparison (ESPC vs. UESC)

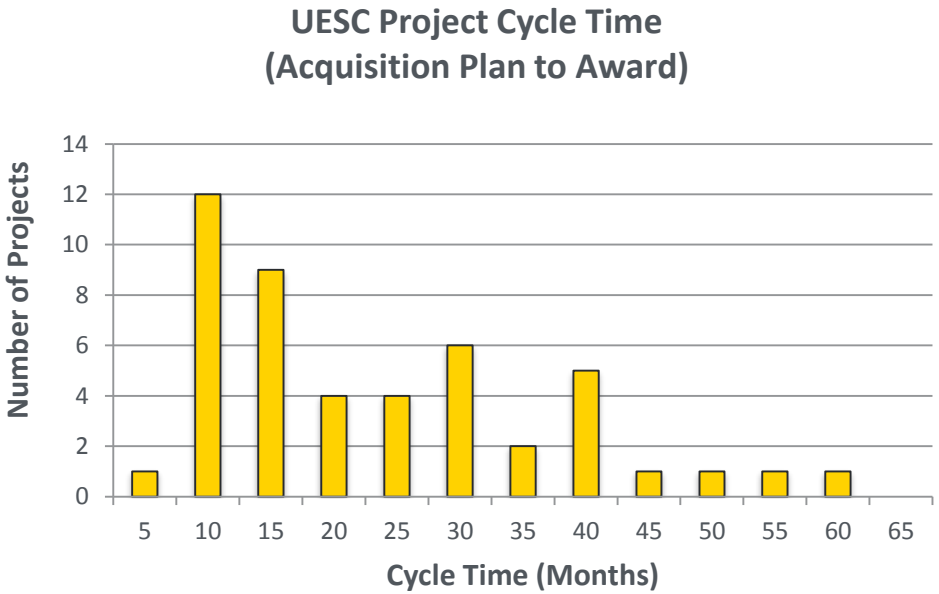
Need data on UESC ECMs

ESPC (DOE IDIQ)	
ECM	**% of $ Inv.**
Bldg. Controls	15%
Lighting	13%
HVAC	13%
Renewables	11%
Boiler	10%
Chiller	10%
Dist. Generation	9%

UESC	
ECM	**% of $ Inv.**
	%
	%
	%
	%
	%
	%
	%

Project Cycle Time (ESPC vs. UESC)



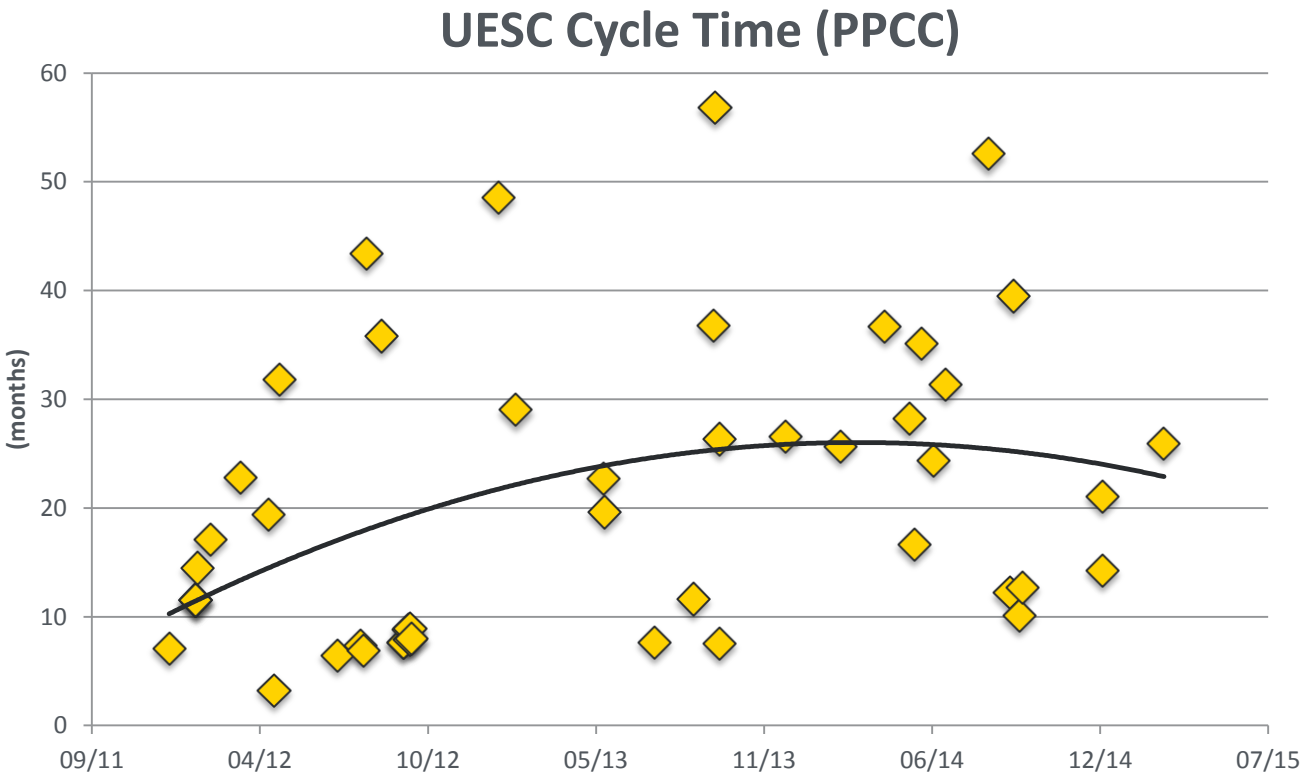


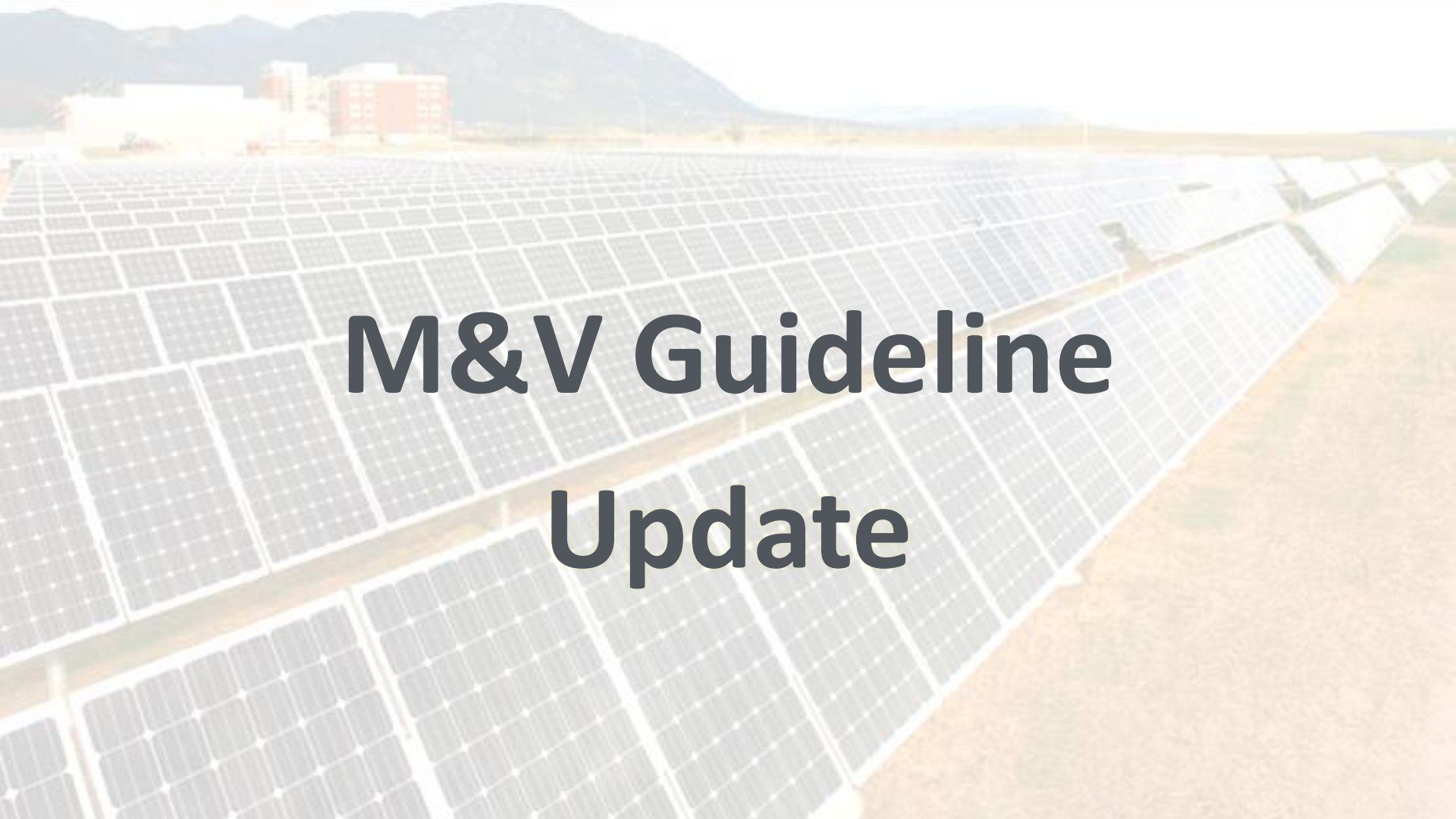
DOE IDIQ Avg. = 26 months
ACOE MATOC Avg. = 25 months

Note: 10 GSA Deep Retrofit projects awarded in 18-20 months

UESC Avg. = 21 months

UESC Cycle Time Trend Under PPCC





M&V Guideline Update

Changes in Draft M&V Guideline 4.0

- No longer specific to federal projects
  - Can be used by other government and non-governmental ESPC/UESC's
  - Now focused strictly on M&V, not as much detail on DOE's IDIQ contract
- Acknowledgement of EERE's Uniform Methods Project
- Strengthens Option A by defaulting to annual measurement of key parameters (recognizing that this may not be necessary for all ECMs)
- Refocuses Option C to stress short-term applicability
- Incorporates Operational Verification (element of IPMVP), when combined with corrective actions becomes a form of recommissioning

Changes in Draft M&V Guideline 4.0

- Provides recommended M&V approach for most ECMs
  - Now contains M&V guidance for 21 ECM examples
- Revises and condenses the document, moving many auxiliary sections to stand-alone documents available on the FEMP website
- Significant reduction in overall length
  - Reduced from 306 pages (v3.0) to 127 pages (v4.0)
  - Many of the original appendixes (e.g., Commissioning Guide) are now stand-alone, and available already on the FEMP website

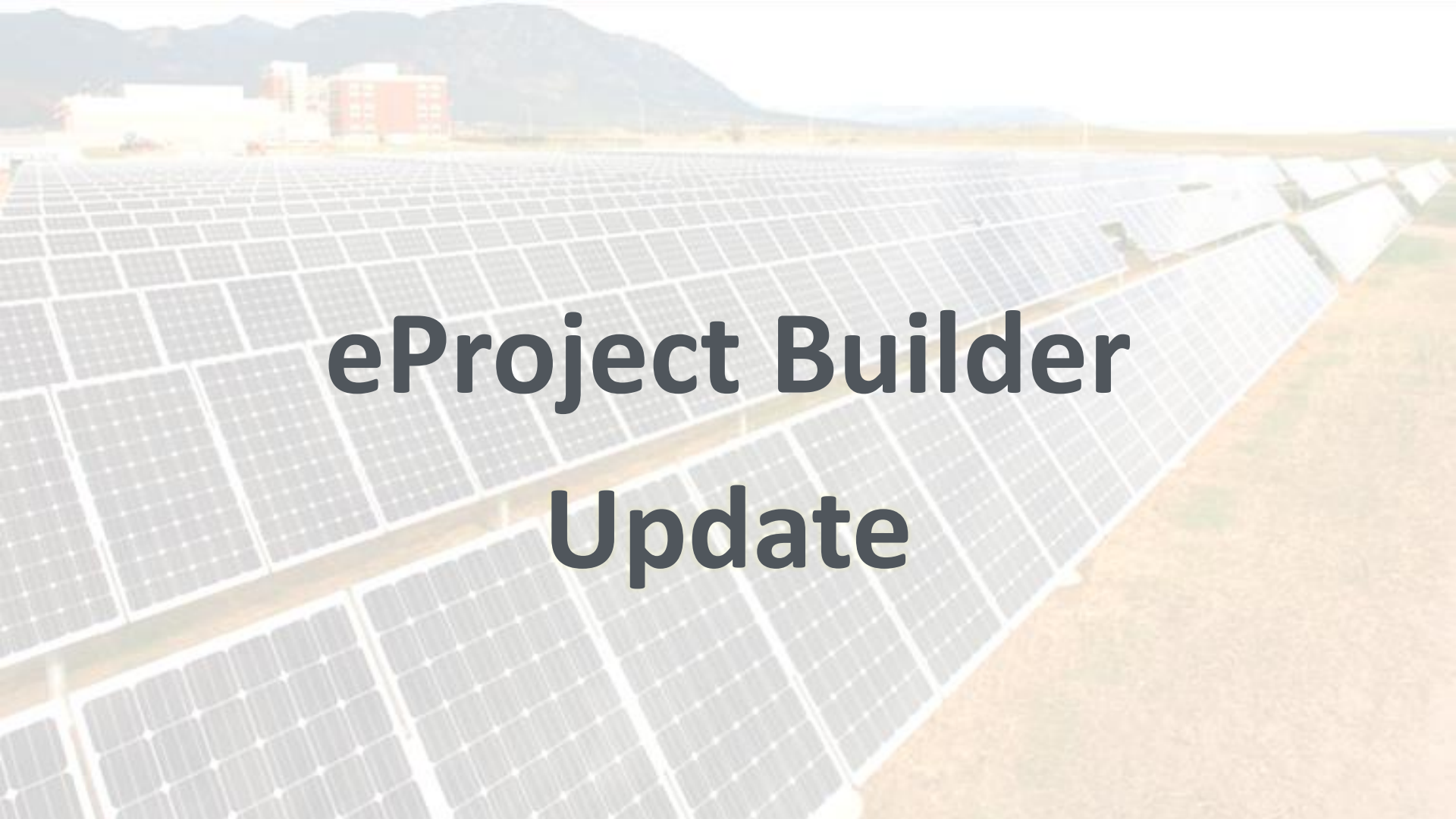
Examples of Public Feedback

The detailed M&V plans were removed. Can they be included in v4.0?

- **Background:** v3.0 contained two very detailed M&V plans for Lighting and Chillers. These ECMs make up just 30% of reported savings in the IDIQ program.
- **FEMP Position:** The intention of the new guideline is to provide more general guidance in the selection of an M&V option across more ECM examples. A new section within v4.0 contains M&V approaches for 20 ECM examples. FEMP will make the previous detailed M&V plans available in a stand-alone supplemental to the v4.0 guidance.

Sampling Guidelines were removed. Can these be included in v4.0?

- **Background:** v3.0 provides the statistical background, theory and formulas for proper sampling of data points.
- **FEMP Position:** The sampling guidelines, while perhaps helpful to the M&V practitioner, are likely more detail than most readers require. FEMP will consider adding this content to a stand-alone supplemental to the v4.0 guidance.



eProject Builder Update

eProject Builder (ePB) Refresher

ePB *standardizes* and *streamlines* ESPC and UESC documentation and data tracking, for the life of the contract, to promote efficient investment

- ***Standardizes*** data collection across federal, state and local projects
- ***Reduces*** ESPC transaction costs
- ***Improves*** customer confidence through transparency

ePB Update

- Named one of the “Top 14 ESPC and clean energy stories of 2014” by Energy Services Coalition
- Currently contains 362 projects (310 federal; 52 state/local), representing total project implementation costs of $3.2 billion and total cumulative guaranteed dollar savings of $7.9 billion
- U.S. Army Corps of Engineers projects to be uploaded into system
- 559 individuals have received training to use eProject Builder
- Annual EM&V tracking module to be released soon

ePB for UESCs

PG&E and VA are piloting ePB on a UESC project (VISN 21)

- Scope for includes VAMCs in San Francisco, Menlo Park, Fresno, Mather, McClellan, Livermore and Martinez, CA.
- IGA kick-off meeting was held 09/15/15
- Site surveys underway
- VA plans to pilot two other UESCs in ePB as well with the consent of each utility: VISN 8 UESC Miami with FPL and VISN 8 UESC Tampa with TECO People's Gas.

Future development plans

- Stakeholder engagement to prioritize future development activities
- Alignment of terminology between ESCO and UESC projects
- Evaluation of different cash flow models
- Benchmarking new UESC projects against historical data

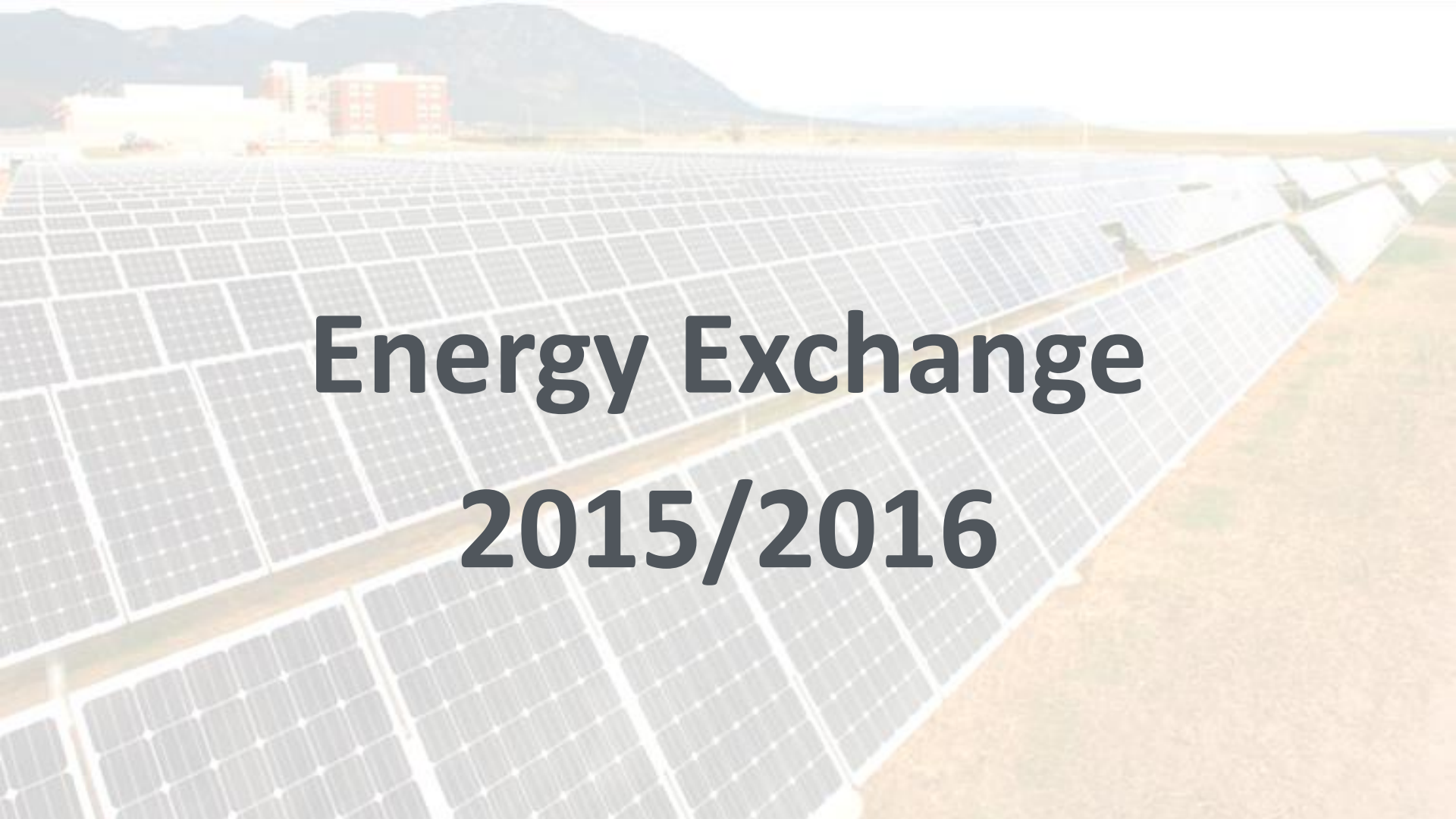
DOE ESPC IDIQ Update

DOE ESPC IDIQ Update

ESPC IDIQ Solicitation was issued by DOE in second quarter FY 2015. Anticipated award will be in the third quarter of FY 2016.

- The Department of Energy (DOE) is seeking multiple energy service companies (ESCO) to arrange for financing for and to develop and install energy, water conservation, and renewable energy projects at federally owned facilities
  - As part of these projects, the ESCO conducts a comprehensive energy audit and identifies improvements that will save energy and/or reduce utility bills at the facility
  - Competing companies must be on the DOE Qualified List, which consists of private industry firms that have submitted an application and have been qualified by a Qualification Review Board
- Please visit DOE Energy Acquisition Forecast site for more information:

  http://hqlnc.doe.gov/forecast



Energy Exchange 2015/2016

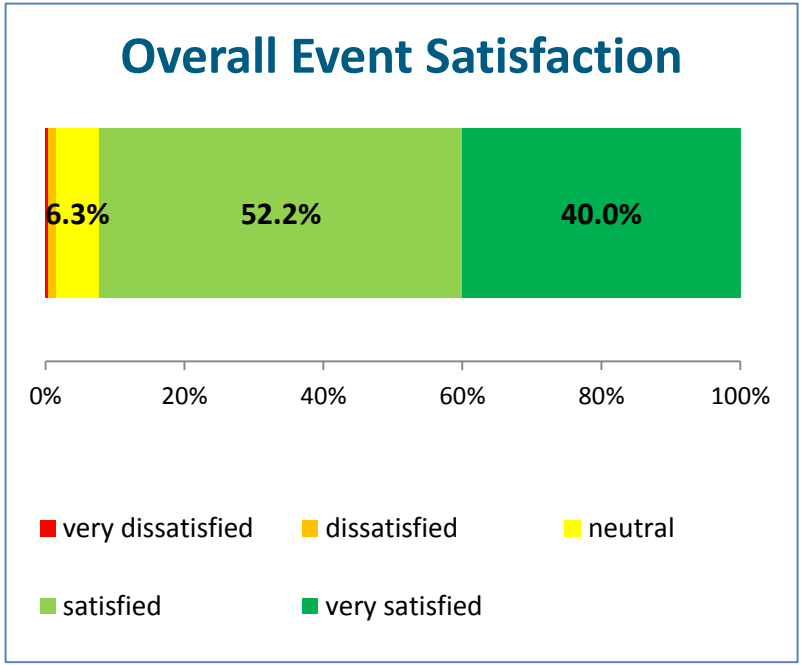
Energy Exchange 2015

Overall Registration		
Type	**Total**	**%**
Federal	855	52.6%
Non-federal	533	32.8%
Speaker	238	14.6%
Total	**1626**	**100%**

Overall Track Attendance		
Track	**Total**	**Average**
Integrated Energy	1280	142
Energy Technologies	1251	139
Agency Energy Manager	1062	118
Project Financing	884	98
Sustainability	873	97
Building Performance	826	92
Institutional Change	653	73
Innovation*	578	64
Energy Leadership*	534	59
Solution Showcase	495	55
Total	**8436**	**94**

Energy Exchange 2015

Top 10 Most Attended Sessions (Scanned)	
Session Name	**Total**
HVAC Technologies	254
Planning Large and Small Scale Microgrids and Smart Grids	230
Metering Strategies	215
An Introduction to Executive Order 13693: Planning for Federal Sustainability in the Next Decade	199
Low/No Cost Solutions through Building Automation System Control Technologies	193
The Next Generation of Facility Energy Auditing Tools	192
LED Lighting and Controls	188
The Art and Science of Energy Management	186
Renewable Energy Technologies	158
Energy Audits: Implementing Audits and Turning Audits into Projects	156



Energy Exchange 2016

Save the Date!

Energy Exchange 2016 will be held
August 9-11 in Providence, Rhode Island

Questions?

Contact Information:

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