



## The Benefits of Using Measurement & Verification to Tell Your Project Story

July 11, 2019

11:00am-12:30pm



# Agenda

- **Welcome and Introductions**
  - John Agan, Weatherization and Intergovernmental Programs Office, U.S. Department of Energy
- **Using Measurement and Verification to Tell Your Project Story**
  - Reid Conway, Department of Environmental Quality, State of North Carolina
- **Energy Performance Contracting for State Agencies & Public Bodies**
  - Nam Nguyen, Division of Energy, Commonwealth of Virginia

**John Agan**

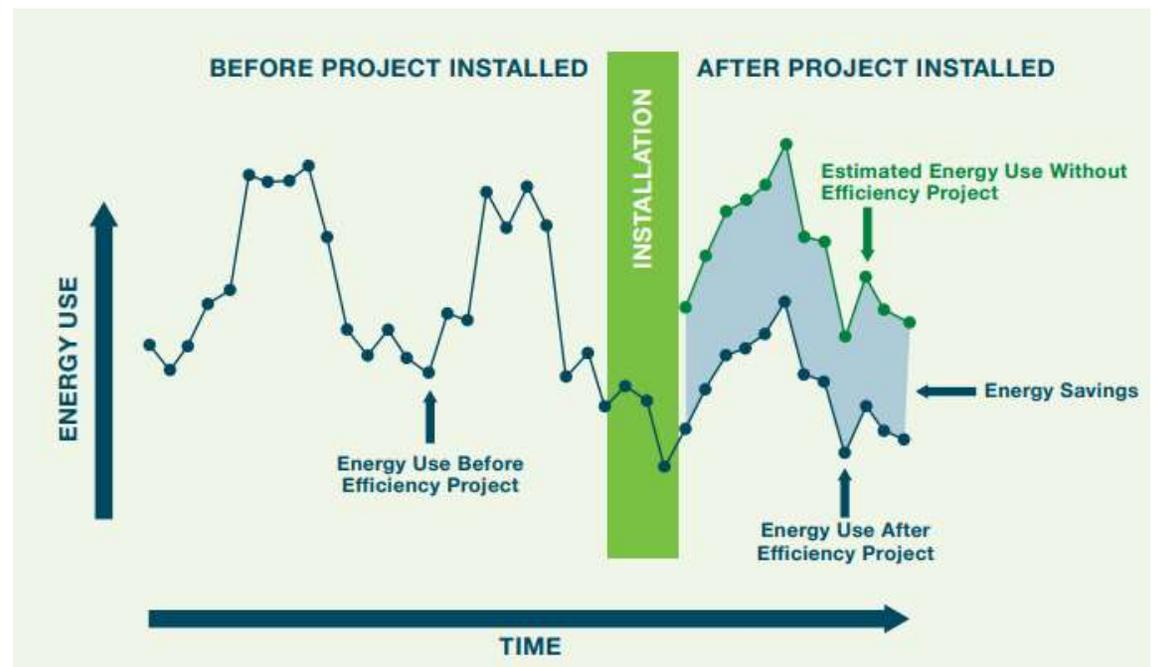
Weatherization and Intergovernmental Programs Office  
U.S. Department of Energy

U.S. DEPARTMENT OF  
**ENERGY**

# What do we mean by (E)M&V?

*The process of “determining and documenting energy and non-energy benefits resulting from end-use energy efficiency activities and programs.*

*Effective EM&V can confirm energy savings, verify cost-effectiveness, and guide future energy efficiency investment decisions.”*



## Resources on M&V

[SEE Action EM&V Resource Portal](#) – Industry-recognized resources for EE program administrators and project managers.

[DOE Uniform Methods Project](#) – provides detailed approaches to measuring and verifying savings from common energy efficiency measures.

[Guidebook for EE EM&V: A Resource for State, Local & Tribal Air and Energy Officials](#) – Resource focused on the range of EE activities that can be included in plans for achieving compliance with EPA National Ambient Air Quality Standards (NAAQS).

## M&V Resources (continued) – ESPC Focus

**NASEO-ESC-NAESCO State ESPC Program and Project Principles** - Describes shared principles for public sector ESPC programs and projects, including standardized M&V guidance

**The Business Case for Applying M&V in State and Local Government ESPC Projects** – Highlights the substantial, cost-effective benefits of incorporating well-documented M&V of savings in state and local ESPC projects

- In Federal projects, M&V averages about 2% of total costs, but projects with M&V achieve 107% of expected savings.

**ESPC for State and Local Governments: Strategies for Successful M&V** – Provides ESPC program administrators with a selection of tested strategies to support successful M&V for state and local ESPC projects.

**Understanding your ESPC Savings Guarantee** – Examines the savings guarantee in ESPC and provides a list of resources

More details at <https://betterbuildingsolutioncenter.energy.gov/evaluating-espc>

# Reid Conway

Department of Environmental Quality  
State of North Carolina



Better Building Summit  
Using Measurement and Verification to tell  
your Project Story

**Reid Conway, PEM**



## *Utility Savings Initiative*

### **North Carolina's Public Building Energy Efficiency Program**

- Program Purpose:
  - Assist all public sectors in managing utility consumption and costs
- Program Serves:
  - 14 State Agencies
  - 21 UNC Institutions
  - 58 Community Colleges
  - 115 K-12 Public School systems
  - 100 Counties
  - 548 Municipalities
  - Others as time permits



## *Utility Savings Initiative*

- Encompassing
  - All folks: faculty, staff, students, maintenance, financial, etc.
- Comprehensive program that focuses on
  - Utility accounting
  - Operations and maintenance
  - Facility assessments and audits
  - Identification of possible projects
  - Awareness, Education, outreach, and training
- Provides on-site assistance
- Provides oversight of Performance Contracting

## BBS Measurement and Verification

What are we trying to prove?

That the reduction in utility costs and O&M savings from the ESPC will

***PAY ALL ESPC COSTS OVER TIME***

## BBS Measurement and Verification

### What is the math?

At the end of the first guaranteed year

Current utility expenses plus debt retirement/annual expenses will be equal to or greater than Baseline utility expenses

**Current utility costs + debt retirement + annual expenses => Baseline utility costs**

## BBS Measurement and Verification

The Owner must budget properly. If the owner does not budget for these changes there will not be money in the utility account to pay current utility costs and the ESPC costs.

**ADJUSTED** Current Costs + Debt retirement + Annual expenses => Baseline costs

- Rate increases
- Change in hours of operation
- Change in occupancy
- Change in building use
- Construction
- Weather adjustments

# BBS Measurement and Verification

So in NC we look at simply

MEASURED BASELINE UTILITY DOLLARS MINUS MEASURED CURRENT UTILITY DOLLARS

EQUALS

ENERGY DOLLARS REDUCTION (SAVINGS)

## § 143-64.17. Definitions

"Energy savings" means a **measured reduction** in fuel costs, energy costs, water costs, storm water fees, other utility costs, or operating costs, including environmental discharge fees, water and sewer maintenance fees, and increased meter accuracy, created from the implementation of one or more energy conservation measures **when compared with an established baseline of previous costs**, including captured lost revenues, developed by the governmental unit.



## **BBS Measurement and Verification**

**So in NC we look at simply**

**Current Year Adjusted Actual Savings minus This year's Guaranteed Savings**

**Equals to or is greater than (Meaning no Shortfall)**

**or is less than (Meaning there is a Shortfall)**

Adjustments during the Guarantee Period are permitted to properly compare conditions during baseline development and current conditions. Adjustments may be made to current or baseline use.



# BBS Measurement and Verification

## So what is working and what is not

- NC allows no Escalation of Utility Rates unless the ESCO is assuming responsibility for the rate (Yes, the ESCO must guarantee the rate as well)
- NC allows for no baseline adjustments where additional capital is required by the owner to be included into the project as capital.
  - These adjustments become capital contributions to the project allowing an increase in the total cost and not covered by actual guaranteed savings.
- NC has created a **M and V Guideline Manual** for the ESCOs to follow showing minimum M and V requirements for each ECM
- By statute, ALL State ESPCs must have a 3<sup>rd</sup> Party perform annual M and V review of the annual ESCO reconciliation report
- SEO continues to set up all ESCO meetings to go over issues and changes to the program documents

## BBS Measurement and Verification

### So what is working and what is not

ESPC Reporting is not working in NC State Government

- State Statutes are not being followed
- Required 3<sup>rd</sup> party reviews are not being made per the contract and by statute
- State Agencies and the UNC System are not sending in proper documentation of annual reconciliation reports as required by statute
- There is no penalty for lack of reporting
- SEO does not have authority correct issues with reporting

**Last year NC was able to only verify 54% of the \$295 million dollars worth of state projects.**



## BBS Measurement and Verification

**So what is working and what is not**

**We classified all issues into these four categories:**

1. No 3rd Party Review performed (Qualified Reviewer) **6 Projects**
2. 3rd Party Reviewer (Qualified Reviewer) disagrees with ESCO's (Qualified Provider's) guaranteed savings Measurement & Verification Report. Under discussion by parties. **3 Projects**
3. Waiting on documents from State governmental unit. **3 Projects**
4. Expected savings have been realized based on independent review and verification. **7 Projects**

Note: Oldest project is in performance year 11 of 12.



## **BBS Measurement and Verification**

**Simple Project where M and V could be assumed as not a big deal**

### **Lighting Project**

**M and V for Lighting mostly consists of 3 parts**

- Agreed upon hours of operation (data logged sampling maybe)
- Current utility rate
- Reduction in wattage from the old fixture to the new fixture

**Basic Math from here out, Right??**

- But what if the operating hours are too high or too low
- What if the utility rate is not accurate

**What would a miscalculation do to my current utility budget that I am expecting to have available funds to be able to pay off the annual ESPC costs??**

**Do I hear the word  
STIPULATED??**



## BBS Measurement and Verification

**Sample Project where M and V could be assumed as not a big deal**

UNC System Lighting Only Project (JCI/CREE) 15 of 21 Affiliates participated

Total Project	\$29,208,802	
Year 3 of 7 Guaranteed Savings	\$4,085,465	
ESCO Reported Savings	\$4,214,229	Shortfall at 8 (-\$68,677)

ESCO escalated electricity by **2% per year**. Electricity performance year three at 13 campuses increased from **.5 to 12.5 %**. **2 Campuses** went down in electricity costs (which means calculations are done using the baseline year as the floor). Only 6 of the 15 campuses experienced a KW rate increase during the year three performance period.



## BBS Measurement and Verification

Where to go for help and resources?

<https://deq.nc.gov/conservation/energy-efficiency-resources/utility-savings-initiative/performance-contracting>

Our website for access to most all of NC documents and templates

- RFP, IGA, Schedules and ESA Templates
- Minimum M and V Guidelines
- Best Practices for Performance Contracting
- List of Pre-Qualified ESCOs
- Open RFPs



***Thank you all very much***

**Reid Conway, PEM**

**828-556-9250**

**[reid.conway@ncdenr.gov](mailto:reid.conway@ncdenr.gov)**



**Nam Nguyen**

Division of Energy  
Commonwealth of Virginia

U.S. DEPARTMENT OF  
**ENERGY**



**ENERGY PERFORMANCE CONTRACTING  
(EPC)  
FOR STATE AGENCIES & PUBLIC BODIES**

Division of Energy

[nam.nguyen@dmme.virginia.gov](mailto:nam.nguyen@dmme.virginia.gov)

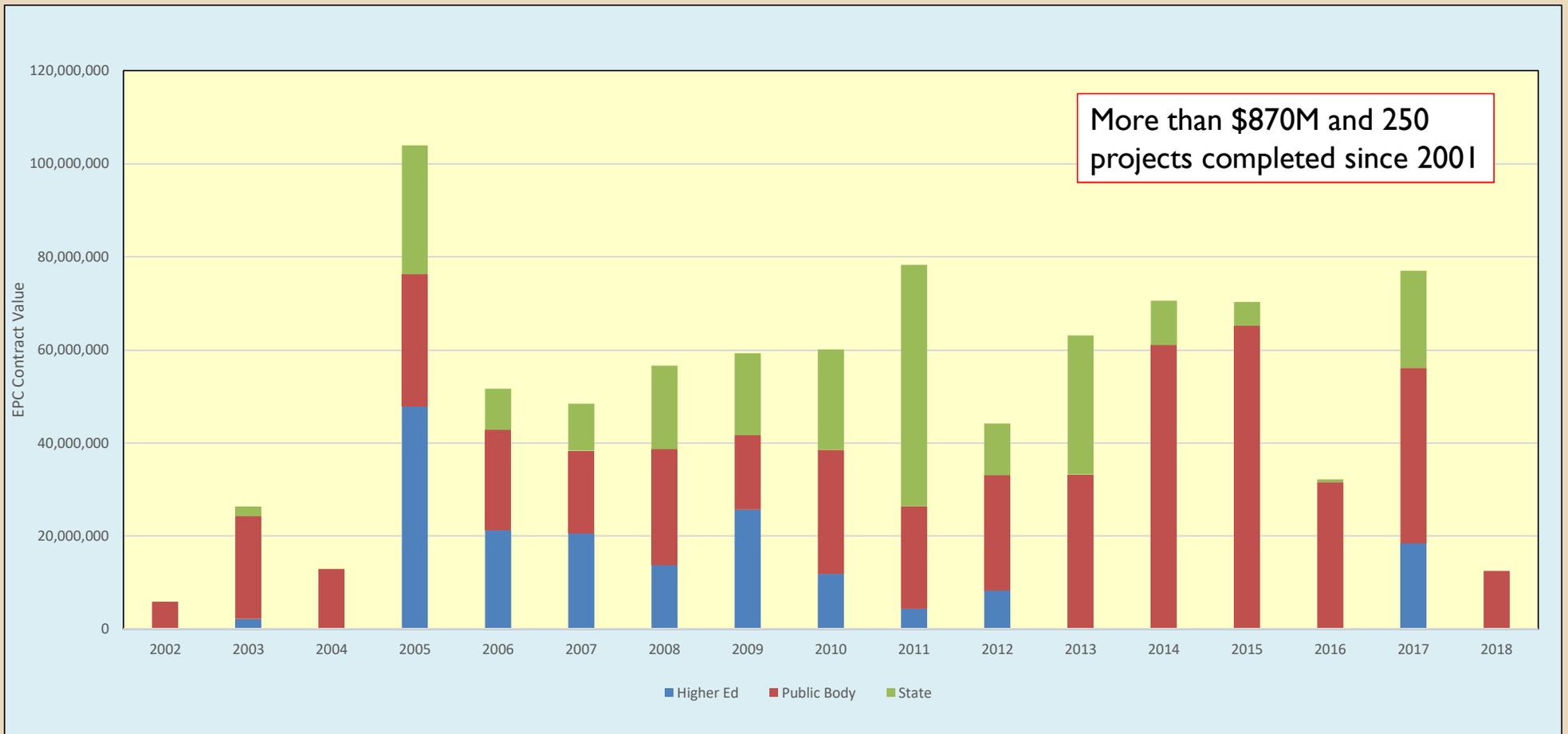
July 2019

[www.dmme.virginia.gov/DE/PerformanceContractingSupport.shtml](http://www.dmme.virginia.gov/DE/PerformanceContractingSupport.shtml)

# VIRGINIA ENERGY MANAGEMENT PROGRAM (VEMP)

- Energy Performance Contracting (EPC)
- Demand Response Program (DR)
- State energy fuel procurement contracts
- Technical advisor on energy issues

# ESPC PROGRAM IN VIRGINIA



# VIRGINIA ESPC PROCUREMENT VEHICLE

- **DMME's role**

- We are advocates for the EPC process, ensure both the customer and the ESCO are represented
- Meet with key stakeholders to provide validity to the vehicle/process
- Third party review – at no cost
- Ensure projects are completed according to the Code of Virginia
- Ensure both the customer & the ESCOs are operating within the Code.
- Ask ESCOs the tough questions
- Educate potential customers
  - How EPC works
  - Virginia's EPC procurement process
  - Why M&V is critical and what to expect

# VIRGINIA ESPC PROCUREMENT VEHICLE

- New contract approved; became effective in late 2017
- Key changes

OLD / PRE-2017 CONTRACT	CURRENT / NEW CONTRACT
<i>18 ESCOs and select a minimum of three to participate in Back of Envelope proposal process</i>	<i>15 Pre-qualified ESCOs and select all to participate in Back of Envelope proposal process</i>
<i>Roof replacements allowed</i>	<i>100% Roof replacements not allowed</i>
<i>No e-Project Builder (ePB) Requirement</i>	<b>ePB REQUIRED FOR ALL PROJECTS</b>
<b>M&amp;V REQUIRED FOR 3-5 YEARS</b>	<b>M&amp;V REQUIRED FOR LIFE OF THE EPC PROJECT</b>
<b>NO REQUIREMENT FOR DMME REVIEW</b>	<b>DMME M&amp;V REVIEW REQUIRED</b>

# VIRGINIA ESPC PROCUREMENT VEHICLE

- **M&V is critical for:**
  - Verifying Energy Savings, Cost Savings, Project Performance and Project Guarantees
  - Monitoring System Performance
  - Being pro-active in identifying changes in consumption, use, cost or any deviations
  - M&V ensures project is meeting guaranteed savings projections – NOT EFFICIENCY
- **Cost of M&V rolled into contract**
- **Must show as separate item on proposal, itemized annually**
- **ESCO has to deliver M&V report to customer and DMME annually**

# VIRGINIA ESPC PROCUREMENT VEHICLE

- **Why we now require M&V for the life of the EPC Project**
  - **PAST EXPERIENCE:**
    - Customers allowed to cancel M&V (primary factor is cost)
    - Customers have issues with the project after cancelling M&V
    - Customers did not understand the ramifications – Guarantee/contract implications
    - Projects not maximizing potential due to a lack of M&V
    - ESCOs enabling customers options to cancel M&V
  - **WHAT WE LEARNED:**
    - Many of the problems/issues were due to a lack of M&V
    - Many of these issues could have been avoided with proper M&V
    - Customers often times didn't know about project performance or how their facilities were performing
    - Customer education is key – Before, during & after Project completion
    - DMME involvement in M&V reporting is helpful to customers
    - M&V is critical to project performance AND customer engagement/satisfaction

## MEASUREMENT & VERIFICATION (M&V)

- International Performance Measurement and Verification Protocol (IPMVP) to measure energy savings
- M&V options depend upon the scope of work (Option A-D)
- Select approach that best matches project costs and savings magnitude, risks, and technology-specific requirements
- IPMVP option for each ECM stays the same for the term of the contract
- Yearly reconciliation required by Virginia Code
- DMME review/consultation
- ESCOs required to enter annual M&V results in ePB



**ENERGY PERFORMANCE CONTRACTING  
(EPC)  
FOR STATE AGENCIES & PUBLIC BODIES**

Division of Energy

[nam.nguyen@dmme.virginia.gov](mailto:nam.nguyen@dmme.virginia.gov)

July 2019

[www.dmme.virginia.gov/DE/PerformanceContractingSupport.shtml](http://www.dmme.virginia.gov/DE/PerformanceContractingSupport.shtml)

# Contacts

- John Agan, Weatherization and Intergovernmental Programs Office, U.S. Department of Energy  
[john.agan@ee.doe.gov](mailto:john.agan@ee.doe.gov)
- Reid Conway, Department of Environmental Quality, State of North Carolina  
[reid.conway@ncdenr.gov](mailto:reid.conway@ncdenr.gov)
- Nam Nguyen, Division of Energy, Commonwealth of Virginia  
[nam.nguyen@dmme.virginia.gov](mailto:nam.nguyen@dmme.virginia.gov)

# Thank You

Provide feedback on this session  
in the Summit App!

Download the app to your mobile device or go to  
[event.crowdcompass.com/bbsummit19](https://event.crowdcompass.com/bbsummit19)

