

EEAC EM&V BRIEFING

▶ June 29, 2015

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BRIEF STATUS REPORT AND OVERVIEW OF PRESENTATION

- ▶ **28 studies recently completed, spanning all categories**
- ▶ **2016-2018 Strategic Evaluation Plan (SEP) under development**
 - First draft included with April 30 Three-Year Plan Filing
 - Final draft to be included with final Three-Year Plan Filing
- ▶ **Council consultants presented detailed reviews of recent Residential and Non-Residential results in two webinars**
 - For slide decks see the following links:
 - <http://ma-eeac.org/wordpress/wp-content/uploads/EEAC-EMV-Results-Webinar-Non-Residential-5.27.15.pdf>
 - <http://ma-eeac.org/wordpress/wp-content/uploads/EEAC-EMV-Results-Webinar-Residential-6.01.15.pdf>
- ▶ **This presentation will not repeat the webinars**
- ▶ **Rather, will seek to answer the following question:**
 - **So what are all these studies telling us we should do differently?**



SO WHAT ARE ALL THESE EM&V REPORTS TELLING US SHOULD BE DIFFERENT IN THE 2016-2018 PROGRAM CYCLE?

THEME #1



Lighting Savings Will Remain Critical in Both Sectors, But Rapid Technological Change Creates Major Risks That Need to be Managed

- ▶ **Risk of under- or over-performance**
- ▶ **Risk of over- or under-estimation of Savings**

RESIDENTIAL AND NON-RESIDENTIAL LIGHTING: SITUATION ANALYSIS

- ▶ **Entire portfolio has been heavily reliant on lighting savings**
 - 2014 contribution of lighting to lifetime electric savings for each sector:
 - Residential non-low-income: 82% (spread across multiple programs)
 - Residential low-income: 64%
 - Non-residential: roughly 55%
 - EM&V studies have consistently established that reported lighting savings up until now are reliable
 - However, rapid commercialization of LEDs poses both major opportunities and major risks in 2016-2018
 - **Opportunity** to accelerate commercialization
 - **Risk** that programs will fall behind the market
 - The current three-year planning framework is not well adapted to managing these opportunities and risks
 - Technological change happening too quickly to plan effectively 3 years ahead
 - EM&V is trying to help by forecasting, but strong limits on what's knowable
 - Risk mitigation approaches are therefore needed

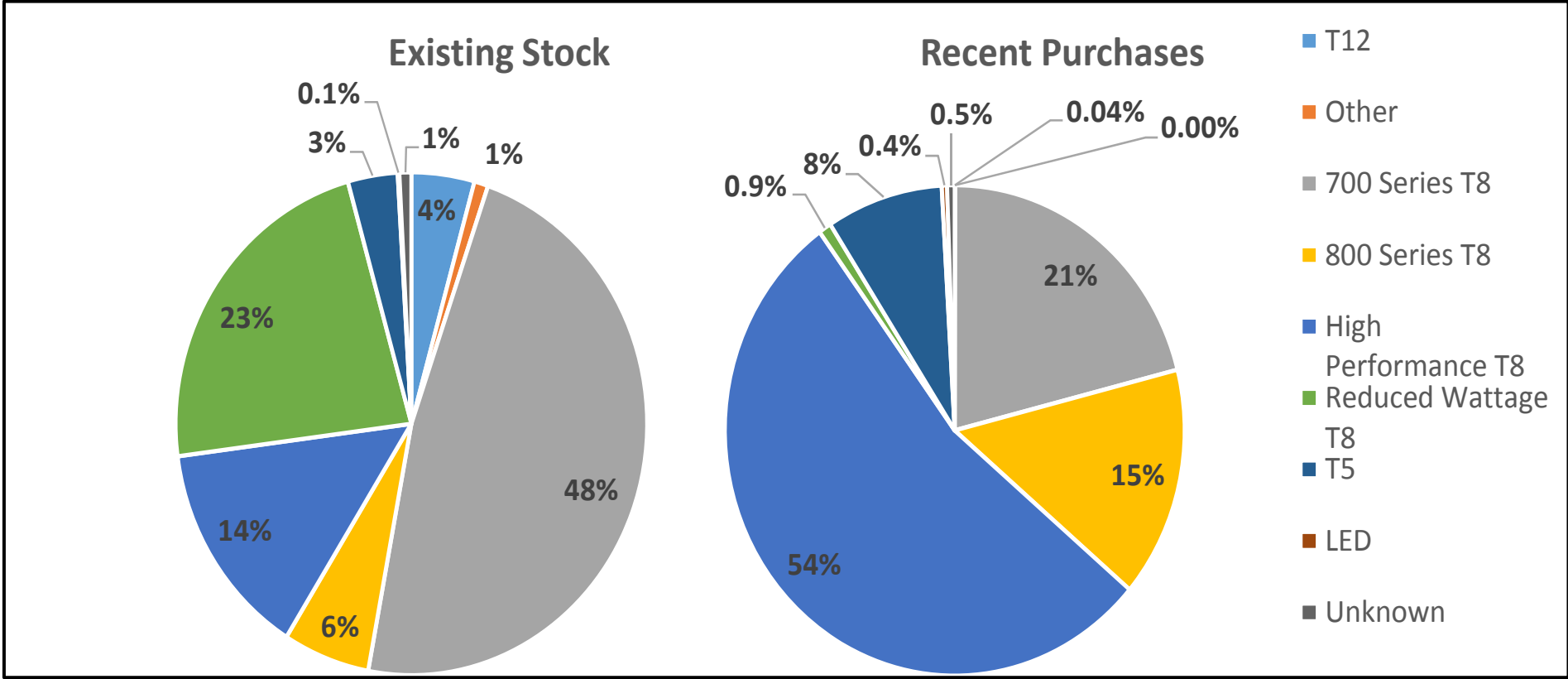
RESIDENTIAL LIGHTING

- ▶ **Recent EM&V studies establish conclusively that **as of now** the programs are having a strong positive effect on the market**
- ▶ **However, there are huge uncertainties regarding whether and how this can continue in the future**
 - Delta watts steadily falling due to more halogens and CFLs being replaced
 - Almost half of all sockets already have efficient bulbs in them
 - Rapid declines in incremental costs for LEDs create both opportunities and risks
 - DPU policy requires that net-to-gross assumptions be locked in for entire cycle
 - NTGR assumption for non-HTR LEDs declines from 90% in 2016 to 70% in 2018
 - This represents EM&V's best forecast, but there is huge uncertainty surrounding it
 - **Risk is that by 2018 actual NTGRs could deviate widely from forecast**
- ▶ **Given the outsized contribution of lighting to residential savings, outcome of these uncertainties will greatly affect 2016-2018 portfolio**

NON-RESIDENTIAL LIGHTING: LINEAR LIGHTING

- ▶ Represents the bulk of all non-res lighting consumption
- ▶ Lighting savings in 2013-2015 cycle driven largely by retrofitting either T12 or standard T8 systems with high-performance T8 systems
- ▶ C&I on-site study suggests that:
 - T12s are virtually gone
 - While many inefficient T8 systems remain, high-performance T8s may soon be the market baseline (i.e., main thing getting sold both in and outside the program)
- ▶ To maintain lighting savings, it will therefore be necessary to turn ASAP to LED linear technologies (fixtures, retrofit kits, or TLEDs)
 - Prices of these are falling, but they have not yet gained traction in the market
 - The critical decision will therefore be how quickly and sharply to turn to them
- ▶ As with residential, the outcome of these uncertainties will greatly affect the 2016-2018 portfolio

C&I ON-SITE STUDY, LINEAR LIGHTING: SATURATION IN BUILDINGS AND RECENT SALES PATTERNS



NON-RESIDENTIAL LIGHTING: SCREW-IN LAMPS

- ▶ **Much smaller share of total non-res lighting consumption than linears, but non-trivial**
- ▶ **LEDs estimated to have 81% current market share, and to already fill more than 20% of applicable sockets**
 - Above are interim results. Specific numbers sure to change, but overall pattern appears to be robust.
- ▶ **Upstream C&I lighting program is selling a large volume of LEDs, but initial analysis finds the bulk of total C&I LED sales appear to be out-of-program**
- ▶ **A separate study strongly suggests some of the high out-of-program LED sales may be due to spillover/market effects**
 - A new C&I LED spillover study is now underway
- ▶ **Should we walk away from this market sometime in 2016-2018? We don't know yet – but we may need to be ready to**

A LITTLE MORE ON WHAT WE MEAN BY “RISKS”

- ▶ **Wide range of risks to a variety of parties, all revolving around potential for rapid market change to lead to under/over-performance**
- ▶ **One Residential Scenario**
 - Residential LED prices plummet
 - By 2018, LEDs become the lamp of choice independent of EE programs
 - Because everyone is already buying LEDs without assistance, NTGRs decline far below the forecasted 2018 value (70%)
 - PAs try to redesign program to enhance NTGR, but cannot keep up with price drops, and therefore real program effects are lower than planned
 - **As a result, either program has to throttle way back, or savings end up being significantly overstated because of locked-in application of NTGR**
- ▶ **One Non-Residential Scenario**
 - Take-off of LED linear retrofits is slower than hoped
 - There is a period of time during which neither HPT8 nor LED linear retrofits are very cost-effective
 - **Planned lighting savings do not materialize, overall goals are not met**

RESIDENTIAL AND NON-RESIDENTIAL LIGHTING: RECOMMENDATIONS

- ▶ **Diversify, diversify, diversify**
 - Every extra kWh from a non-lighting source represents risk mitigation
- ▶ **Plan for continued substantial program-induced lighting savings, but recognize that actually achieving that will require:**
 - Close and frequent monitoring of how lighting markets evolve
 - Nimble, responsive planning and execution
- ▶ **Recognize that lighting markets are changing too rapidly for any three-year approach to them to be carved in stone**
 - Require frequent updates from PAs on their views regarding market evolution, and how they are responding in their program strategies
 - Require frequent updates from EM&V on market conditions and results
 - Consider petitioning DPU to make an exception to the “no changes to three-year goals” rule for lighting-related goals
 - Purpose would be to allow for annual review and changes for lighting only
 - Consider parallel alterations to performance incentive mechanisms to mitigate lighting-related risks

THEME #2



Smaller C&I Customers Will Need More Attention if the Goals Are to be Met

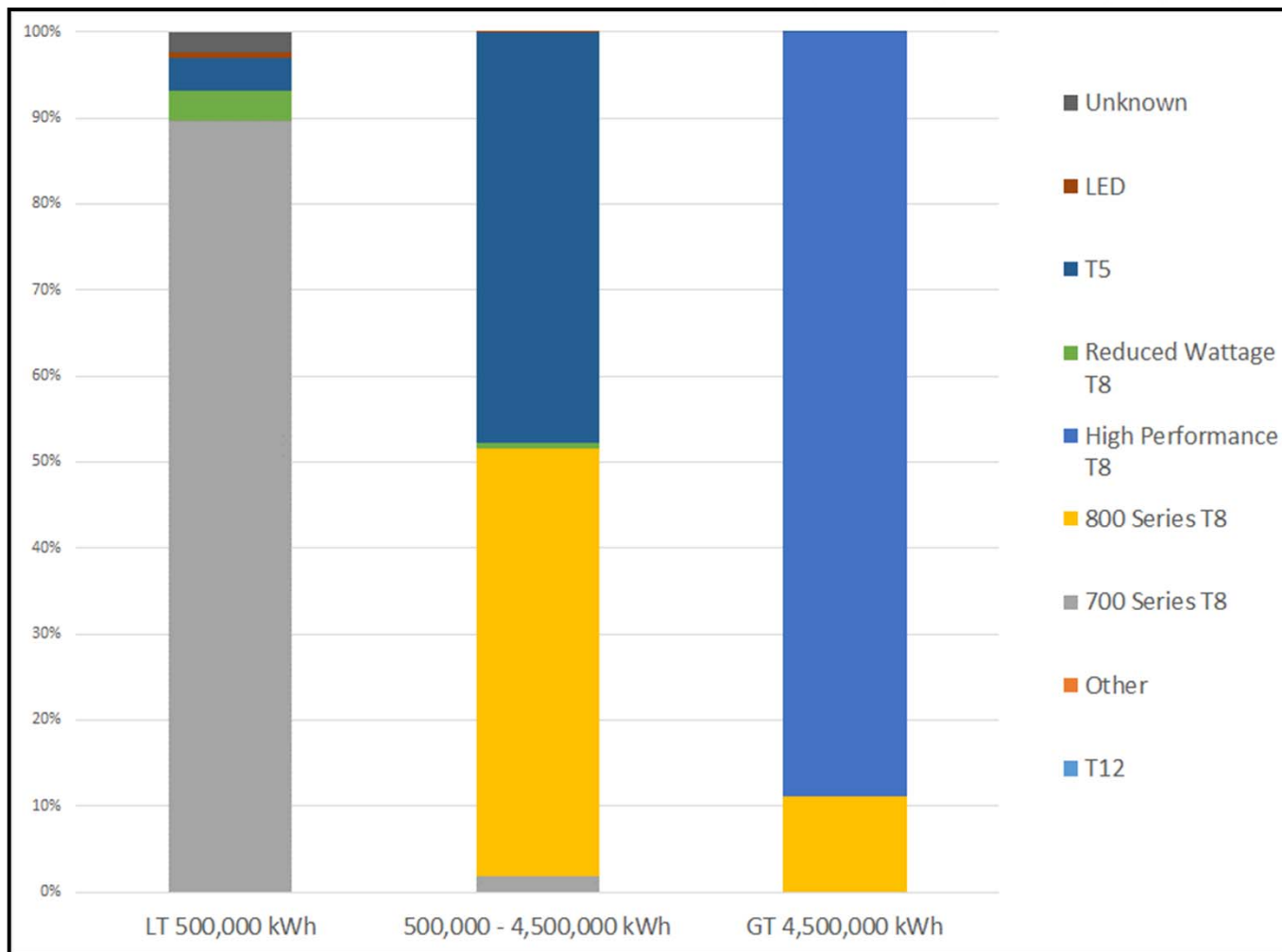
RESULTS OF MID-SIZED CUSTOMER STUDY

- ▶ **Following is a recap of a study completed in late 2013**
 - More recent results (to follow) suggest little has changed since then
- ▶ **Mid-sized C&I customers (300-750 kW):**
 - Save less as a percentage of total population-wide consumption than any other C&I size category
 - Have more complex needs than small customers, but fewer resources than large customers
 - May need more targeted services, marketing, and/or efforts to build supply-side market
- ▶ **Clear patterns across size categories in both participation rates and outcomes for participants**
 - The larger you are, the more likely you are to participate
 - The smaller you are, the higher your percentage savings when you participate
 - **Mid-sized customers neither participate as often as do large ones, nor save as much energy when they participate as do small ones**

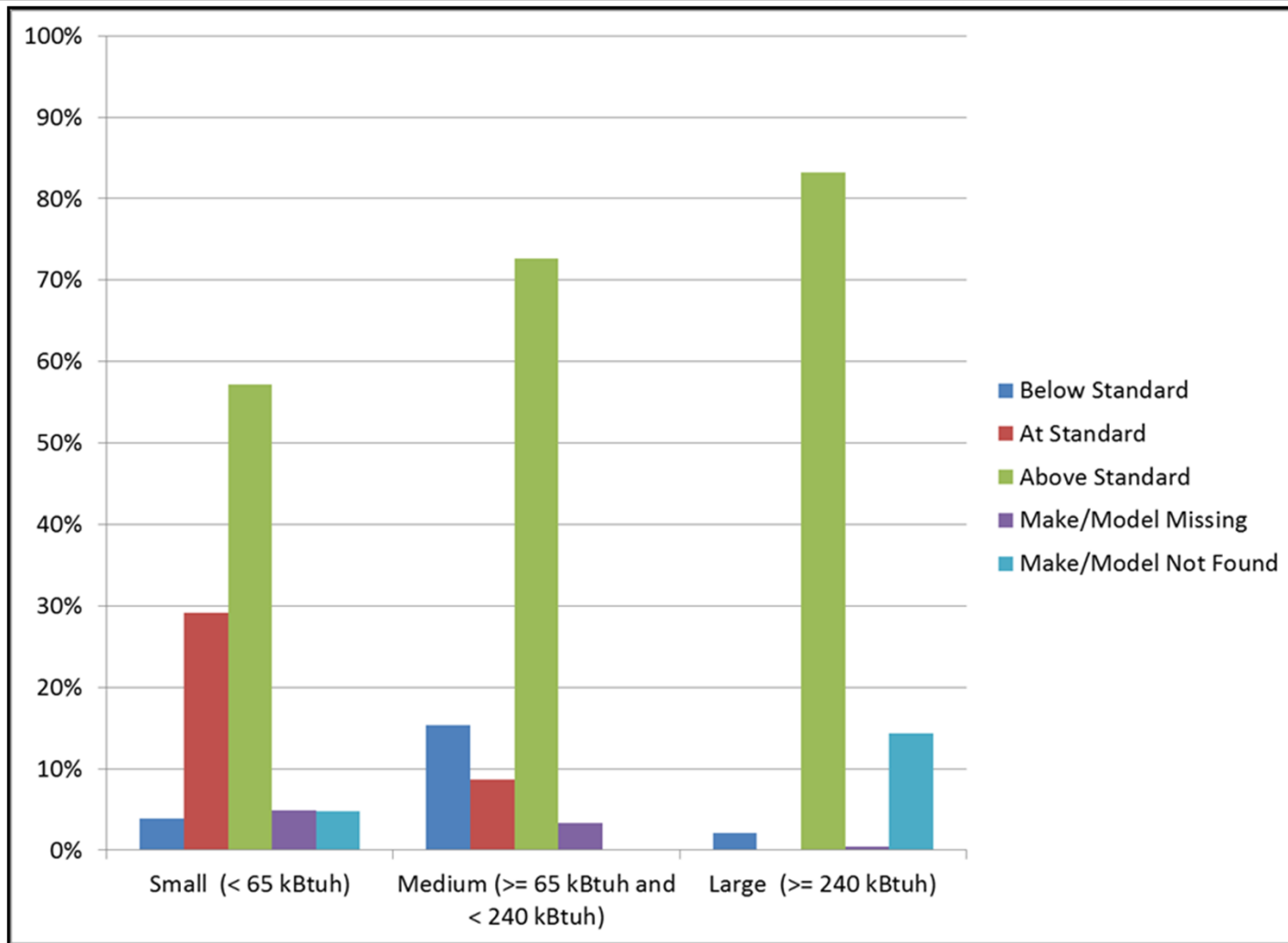
PY2013 C&I CUSTOMER PROFILE STUDY SHOWS THAT SMALLER CUSTOMER CLASSES CONTINUED TO SAVE LESS AS % OF TOTAL CONSUMPTION

	< 75 kW	75-300 kW	300-750 kW	750-1000 kW	1000-5000 kW	> 5000 kW
% of Sector-Wide Consumption Represented by Size Class	24%	18%	17%	5%	24%	10%
% of Total Consumption Saved Within Size Class	1.3%	1.5%	1.5%	1.9%	1.6%	3.6%

C&I ON-SITE STUDY SHOWS THAT THE BIGGER THE END-USER, THE MORE LIKELY THEY ARE BUYING EFFICIENT LIGHTING



C&I ON-SITE STUDY SHOWS THAT THE BIGGER THE NEW HVAC SPLIT/PACKAGED SYSTEM, THE MORE LIKELY IT IS EFFICIENT



SMALLER C&I CUSTOMERS: CONCLUSIONS AND RECOMMENDATIONS



- ▶ **Multiple EM&V studies over years have established that small and mid-sized customers are relatively untapped compared to large ones**
- ▶ **It will be challenging to increase or maintain current goals without addressing this imbalance**
- ▶ **Therefore, ensure that the final 2016-2018 plan contains specific provisions for enhancing marketing to small and mid-sized customers**

THEME #3



Statewide Integration Remains a Holy Grail

STATEWIDE INTEGRATION: BACKGROUND



- ▶ **Statewide integration means coordination and standardization of customer experience across:**
 - Fuels
 - PAs
 - Vendors
 - Sectors
- ▶ **EM&V studies have been identifying challenges with statewide integration for at least four years**
- ▶ **Significant progress has been made, but recent studies continue to consistently identify issues**

STATEWIDE INTEGRATION: FINDINGS AND RECOMMENDATIONS FROM MULTIFAMILY PROCESS EVALUATION

► Key Findings

- Multifamily Market Integrator has helped in initiating projects, however,
- Projects still must coordinate across res and C&I programs and fuels if multiple PAs
- Opportunities are foregone because assessment process is often focused on single-sector and/or lacks comprehensiveness
- The inability to easily identify and link all billing accounts associated with a multifamily property hampers coordination

► Recommendations

- Create a single point of contact*
- Improve tracking systems—unique premise ID for each property that can work across C&I/Residential and fuels.*
- Ensure consistent energy assessment process

STATEWIDE INTEGRATION: FINDINGS FROM SMALL BUSINESS PROCESS EVALUATION

- ▶ **Program has been much more successful in generating electric than gas savings**
 - Only 24% of participants install gas measures
 - Need for better identification and promotion of major gas measures (boilers, furnaces, insulation, water heating)
- ▶ **Integration of electric and gas has been a high-profile issue since 2010**
 - Significant progress in 2010-2011, but limited further progress since then
- ▶ **Significant differences in customer experience depending on vendor**

STATEWIDE INTEGRATION: RECOMMENDATIONS FROM SMALL BUSINESS PROCESS EVALUATION

- ▶ **Build achievement of non-lighting and gas savings into vendor contracting process**
- ▶ **Make contract process more consistent across PAs and eliminate duplication of effort**
- ▶ **Implement common tool or app for all vendors**
- ▶ **Require vendors to report major gas savings opportunities and share with gas PAs as quickly as possible**
- ▶ **Consider providing vendors with training on non-lighting and gas savings opportunities**
- ▶ **Improve consistency of tracking databases across PAs**

STATEWIDE INTEGRATION: FINDINGS FROM HES PROGRAM DELIVERY STUDY

- ▶ **Complex patterns of differences in key performance indicators depending on whether service is provided by a Lead Vendor (LV) or Home Performance Contractor (HPC)**
- ▶ **Appears to be due in part to LVs and HPCs reaching different kinds of customers**
- ▶ **Both LVs and HPCs are playing useful roles**
- ▶ **However, may be need for more consistent criteria for measure recommendations and program referrals across the two – i.e., integration**

STATEWIDE INTEGRATION: CONCLUSIONS AND RECOMMENDATIONS



- ▶ **With quantitative goal setting in the spotlight, it would be easy for qualitative issues such as statewide integration to be overlooked**
- ▶ **This could be costly, as increased savings depend on the details**
- ▶ **Therefore, ensure that the final 2016-2018 plan provides for continued progress toward statewide integration**

THEME #4



Residential Gas Equipment Savings Will Be Harder to Achieve

RESIDENTIAL GAS SAVINGS: RECENT EM&V FINDINGS

► Furnaces

- Based on multiple EM&V studies showing high efficient market share, ROF baseline increased from 80% to 85%
- Recently completed HEHE impact evaluation found further reductions in savings due to conditioned space being smaller than assumed
- Combined effect is that unit savings from ROF are greatly reduced

► Boilers

- HEHE impact evaluation found savings significantly reduced because return water temperatures too high to achieve condensing
- Offset by increase in savings due to higher than expected heat load

RESIDENTIAL GAS SAVINGS: RECOMMENDATIONS



- ▶ **Address performance problems with condensing boilers**
 - Consider putting measure on “hold” until a strategy is devised?
- ▶ **Try to offset reduced savings from furnaces with other residential gas initiatives**
 - Gas behavioral programs for those PAs that don’t have them
 - Multifamily
 - New measures (e.g., duct sealing)
- ▶ **If necessary, make up reduced savings from residential gas equipment in non-residential**

Thanks!

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▶ June 29, 2015



EXTRA SLIDES

THE EM&V WATERFRONT: WHAT OFTEN RECEIVES THE MOST ATTENTION



Type of Study	Methods	How Applied
Impact evaluation (gross)	End-use metering, billing analysis, site visits, engineering re-analysis	<ul style="list-style-type: none">•Refine planning assumptions prospectively, via TRM•True up savings retrospectively, via annual reports•Inform program screening and cost-benefit analysis

THE EM&V WATERFRONT: THE ACTUAL RANGE OF ACTIVITIES



Type of Study	Methods	How Applied
Impact evaluation (gross)	End-use metering, billing analysis, site visits, engineering re-analysis	<ul style="list-style-type: none"> •Refine planning assumptions prospectively, via TRM/TRL •True up savings retrospectively, via annual reports •Inform program screening and cost-benefit analysis
Impact evaluation (net to gross)	Survey research, sales data analysis, quasi-experimental design, econometric analysis	<ul style="list-style-type: none"> •Same as above •Support program planning
Market assessment	Surveys, interviews, focus groups, secondary research	<ul style="list-style-type: none"> •Support program planning and implementation •Inform policymaking
Process Evaluation	Surveys, interviews, focus groups, database review	<ul style="list-style-type: none"> •Improve program design and delivery
Data-Mining	Detailed analysis of tracking, billing and other databases	<ul style="list-style-type: none"> •Inform policymaking •Improve program design and delivery
Other (Measure cost, baseline, persistence, NEBs, etc.)	Various	Various