

# Appendix D.20 Commercial HVAC Program 2010 - 2017

OFFICIAL COPY

May 01 2018

Table 2. EM&V Data Incremental by Vintage Year	Program Participants			Energy Savings (Incremental)			Net kW			Incremental Energy Savings / Participant			Incremental Capacity Savings / Participant		
	Net kWh			Net kW			Net kWh/Participant			Net kW/Participant			Net kW/Participant		
	VA	NC	System	VA	NC	System	VA	NC	System	VA	NC	System	VA	NC	System
2010	28	-	28	105,350	-	105,350	176	-	176	3,763	-	3,763	6	-	6
2011	59	-	59	1,693,060	-	1,693,060	983	-	983	28,696	-	28,696	17	-	17
2012	36	4	40	528,192	57,627	585,819	398	32	430	14,672	14,407	14,645	11	8	11
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 3. EM&V Data Annualized by Vintage Year	Program Participants			Energy Savings (Annualized)			Net kW			Annualized Energy Savings / Participant			Annualized Capacity Savings / Participant		
	Net kWh			Net kW			Net kWh/Participant			Net kW/Participant			Net kW/Participant		
	VA	NC	System	VA	NC	System	VA	NC	System	VA	NC	System	VA	NC	System
2010	28	-	28	480,508	-	480,508	176	-	176	17,161	-	17,161	6	-	6
2011	59	-	59	4,522,387	-	4,522,387	983	-	983	76,651	-	76,651	17	-	17
2012	36	4	40	822,513	110,566	933,079	398	32	430	22,848	27,641	23,327	11	8	11
2013	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2017	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4. EM&V Data Accumulated through Vintage Year (for PPT)	Program Participants			Energy Savings for Program			Net kW			PPI Energy			PPI Capacity		
	Net kWh			Net kW			Net kWh/Participant			Net kW/Participant			Net kW/Participant		
	VA	NC	System	VA	NC	System	VA	NC	System	VA	NC	System	VA	NC	System
2010	28	-	28	105,350	-	105,350	176	-	176	3,763	-	3,763	6	-	6
2011	87	-	87	2,173,568	-	2,173,568	1,158	-	1,158	24,984	-	24,984	13	-	13
2012	123	4	127	5,531,087	57,627	5,588,714	1,380	32	1,412	44,968	14,407	44,006	11	8	11
2013	95	4	99	5,344,900	110,566	5,455,466	1,380	32	1,412	56,262	27,641	55,105	15	8	14
2014	36	4	40	822,513	110,566	933,079	398	32	430	22,848	27,641	23,327	11	8	11
2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2016	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2017	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 5. EM&V Data Accumulated through Vintage Year (for IRP)	Program Participants			Energy Savings for Integrated Resource Planning (IRP)			Net kW			IRP Energy Savings/Participant			IRP Capacity Savings/Participant		
	Net kWh			Net kW			Net kWh/Participant			Net kW/Participant			Net kW/Participant		
	VA	NC	System	VA	NC	System	VA	NC	System	VA	NC	System	VA	NC	System
2010	28	-	28	105,350	-	105,350	176	-	176	3,763	-	3,763	6	-	6
2011	87	-	87	2,173,568	-	2,173,568	1,158	-	1,158	24,984	-	24,984	13	-	13
2012	123	4	127	5,531,087	57,627	5,588,714	1,556	32	1,588	44,968	14,407	44,006	13	8	13
2013	123	4	127	5,825,408	110,566	5,935,974	1,556	32	1,588	47,361	27,641	46,740	13	8	13
2014	123	4	127	5,825,408	110,566	5,935,974	1,556	32	1,588	47,361	27,641	46,740	13	8	13
2015	123	4	127	5,825,408	110,566	5,935,974	1,556	32	1,588	47,361	27,641	46,740	13	8	13
2016	123	4	127	5,825,408	110,566	5,935,974	1,556	32	1,588	47,361	27,641	46,740	13	8	13
2017	123	4	99	5,825,408	110,566	5,935,974	1,556	32	1,588	47,361	27,641	59,959	13	8	16

Table 6. EM&V Data Accumulated through Vintage Year (for NC Lost Revenue)	Program Participants			Energy Savings for NC Lost			Net kW			NC Lost Revenue			NC Lost Revenue Capacity		
	Net kWh			Net kW			Net kWh/Participant			Net kW/Participant			Net kW/Participant		
	VA	NC	System	VA	NC	System	VA	NC	System	VA	NC	System	VA	NC	System
2010	28	-	28	105,350	-	105,350				3,763	-	3,763			
2011	87	-	87	2,173,568	-	2,173,568				24,984	-	24,984			
2012	123	4	127	5,531,087	57,627	5,588,714				44,968	14,407	44,006			
2013	123	4	127	5,760,100	110,566	5,870,666				46,830	27,641	46,226			
2014	95	4	99	4,028,706	110,566	4,139,271				42,407	27,641	41,811			
2015	36	4	40	362,864	62,152	425,016				10,080	15,538	10,625			
2016	-	-	-	-	-	-				-	-	-			
2017	N/A	N/A	N/A	N/A	N/A	N/A				N/A	N/A	N/A			



## APPENDIX E. GLOSSARY OF TERMS

Below is a list of selected key terms used in energy efficiency impact evaluation. All terms below are from the Glossary of Terms (Version 1.0): A Project of the Regional Evaluation, Measurement and Verification Forum, Mar. 2009. Prepared by Paul Horowitz of PAH Associates for the Northeast Energy Efficiency Partnerships.

**Assumed Error Ratio** – The strength of the association between the actual value and the estimated value. It is the primary driver of the sample size required to satisfy a given confidence interval.

**Coincidence Factor** – The ratio, expressed as a numerical value or as a percentage, of the simultaneous maximum demand within a specified period of a group of electrical appliances or consumers within a specified period, to the sum of their individual maximum demands within the same period.

**Confidence** – An indication of how close, expressed as a probability, the true value of the quantity in question is within a specified distance to the estimate of the value. Confidence is the likelihood that the evaluation has captured the true value of a variable within a certain estimated range. Also see Precision.

**Deemed Savings** – An estimate of energy or demand savings for a single unit of an installed energy efficiency measure that (a) has been developed from data sources and analytical methods that are widely considered acceptable for the measure and purpose, and (b) is applicable to the situation being evaluated. Individual parameters or calculation methods can also be deemed.

**Energy Efficiency Measure** – An installed piece of equipment or system, or modification of equipment, systems, or operations on end-use customer facilities that reduces the total amount of electrical energy and capacity that would otherwise have been needed to deliver an equivalent or improved level of end-use service.

**Evaluation, Measurement and Verification (EM&V)** – A subset of program impact evaluation that is associated with the documentation of energy savings at individual sites or projects using one or more methods that can involve measurements, engineering calculations, statistical analyses, and/or computer simulation modeling.

**Ex Ante Savings Estimate** – Forecasted savings used for program and portfolio planning purposes.

**Ex Post Savings Estimate** – Savings estimate reported by an evaluator after the energy impact evaluation has been completed.

**Free Driver** – A program non-participant who has adopted a particular efficiency measure or practice as a result of the evaluated program. Also see Spillover.

**Free-Rider** – A program participant who would have implemented the program measure or practice in the absence of the program. Free-riders can be (1) total, in which the participant's activity would have completely replicated the program measure; (2) partial, in which the participant's activity would have



partially replicated the program measure; or (3) deferred, in which the participant's activity would have completely replicated the program measure, but at a future time than the program's timeframe.

**Free-Ridership Rate** - The percent of savings attributable to free-riders.

**Gross Savings** - The change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated.

**Impact Evaluation** - An evaluation of the program-specific measures directly induced quantitative changes (e.g., kWh, kW) attributable to an energy efficiency program.

**Load Shapes** - Representations such as graphs, tables, and databases that show the time-of-use pattern of customer or equipment energy use. These are typically shown over a 24 hour or whole year (8760 hours) period.

**Model Based Statistical Sampling** - MBSS™ methodology is used to develop efficient sample designs and to assess the likely statistical precision.

**Net Savings** - The total change in load that is attributable to an energy efficiency program. This change in load may include, implicitly or explicitly, the effects of free drivers, free-riders, energy efficiency standards, changes in the level of energy service, and other causes of changes in energy consumption or demand.

**Peak Demand** - The maximum level of metered demand during a specified period, such as a billing month or a peak demand period.

**Peak Load** - The highest electrical demand within a particular period of time. Daily electric peaks on weekdays typically occur in late afternoon and early evening. Annual peaks typically occur on hot summer days.

**Precision** - The indication of the closeness of agreement among repeated measurements of the same physical quantity. It is also used to represent the degree to which an estimated result in social science (e.g. energy savings) would be replicated with repeated studies.

**Prescriptive Program** - An energy efficiency program focused on measures that are one-for-one replacements of the existing equipment and for which fixed customer incentives can be developed based on the anticipated similar savings that will accrue from their installation.

**Program Participant** - A consumer that received a service offered through an efficiency program in a given program year. The term "service" can be one or more of a wide variety of services, including financial rebates, technical assistance, product installations, training, energy efficiency information or other services, items, or conditions.

**Realization Rate** - The term is used in several contexts in the development of reported program savings. The primary applications include the ratio of project tracking system savings data (e.g., initial estimates of project savings) to savings (1) adjusted for data errors, (2) that incorporate evaluated or verified results of the tracked savings, and (3) that account for free-ridership and/or spillover.

**Representative Sample** - A sample that has approximately the same distribution of characteristics as the population from which it was drawn.

**Sampling Error** - The error that is caused by observing a sample and not the entire population.

**Spillover** - Reductions in energy consumption and/or demand caused by the presence of an energy efficiency program, beyond the program-related gross savings of the participants and without financial or technical assistance from the program.

**Standard Error** - A measure of the variability in a data sample, how far a "typical" data point is from the mean of a sample. In a large sample, about 2/3 of observations lie within one standard error of the mean, and 95% of observations lie within two standard errors.

**Stratified Ratio Estimation** - A sampling method that combines a stratified sample design with a ratio estimator to reduce the coefficient of variation by using the correlation of a known measure for the unit (e.g., expected energy savings) to stratify the population and allocate sample from strata for optimal sampling.

**Verification** - An independent assessment of the reliability (considering completeness and accuracy) of claimed energy savings