The Narragansett Electric Company
d/b/a National Grid
Docket No. XXXX
Attachment 3

2019 Measurement and Verification Plan

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1. Introduction

Evaluation, Measurement and Verification (EM&V) has been an integral part of the National Grid's energy efficiency program planning process. The Company's EM&V Plan continues to focus on evaluating Rhode Island sites and markets while leveraging as many resources as possible from evaluation studies in other National Grid territories in order to maximize value for ratepayers and keep costs low.

2. Evaluation studies completed in 2018

The Company, with oversight from the Rhode Island Energy Efficiency & Resource Management Council evaluation consultants and the office of energy resources evaluation staff, completed 14 evaluation studies in 2018 (see below). The research studies include impact evaluations, process evaluation and market studies in the residential and commercial and industrial sectors.

Commercial & Industrial

1. Impact Evaluation of Custom Gas Installations (ongoing)
2. Impact Evaluation of 2013-2015 Custom CDA (draft)
3. Impact Evaluation of PY2015 RI C&I Upstream Lighting Initiative (draft)
4. Impact Evaluation of PY2016 RI C&I Small Business Initiative: Phase I (draft)

Residential

1. Statewide Behavioral Evaluation: Savings Persistence Literature Review
2. 2017 Seasonal Savings Evaluation
3. Wifi Thermostat Demand Response
4. On-Site Saturation Lighting Market Assessment (draft)
5. EnergyWise HEATLoan Assessment (draft)
6. Residential Appliance Saturation Survey (draft)
7. Impact Evaluation of Income Eligible Services Single Family Program (draft)

Cross-Cutting

1. Jobs Study 2017
2. Avoided Energy Supply components in New England 2018
3. System reliability Procurement Study

Section 4 provides detailed description, findings and recommendations of each of the studies above along with selected research studies completed in other regions and/or other National Grid jurisdictions. The results of these evaluations have been judged by the Company to be applicable to its Rhode Island energy efficiency programs. The Company is adopting the results of these studies in 2019 program planning due to similarity, either in the measures offered, or in terms of structure or program delivery.

A complete list of historical research studies is provided in Section 5 along with a brief summary of the impact of those results in planning the Company's programs. Prior year studies that have been superseded by studies completed since the filing of the 2018 Energy Efficiency Plan have been deleted from this list.

3. 2019 Planned Evaluation Studies

This section describes planned studies that focus on areas of interest to the Rhode Island programs and build on the deep history of evaluation studies performed by the Company over many years. In order to optimize the use of evaluation resources, where programs are considered to be similar in program delivery and population served with those offered in Massachusetts, the studies will be done in conjunction with the Company's Massachusetts retail affiliate. The Company will also stay abreast of the voluminous Massachusetts evaluation activities that may be beneficial and applicable in Rhode Island.

Table 1 lists evaluation studies that the Company plans to conduct in 2019 to inform the next planning cycle. Study labeling codes have been added to the study names to facilitate distinct identification. The codes take the general form shown below.

[State] –	[Evaluation Year] –	[Sector] –	[Fuel] –	[Keyword]
RI	18	R = residential	E = electric	
	19	C = commercial	G = gas	
	⋮	X = cross sector	X = electric & gas	

For example, RI-17-CG-CustGas refers to the Custom Gas Evaluation Study that started in 2017 in the commercial sector for gas while RI-18-RE-LISF refers to evaluation study of the low income program single family program in 2019 for gas and electric.

Table 2. Planned Evaluation Studies in 2019

Sector	Study Code	Type	Affected Programs	Study Name	State Lead
C&I	RI-19-CG-CustGas	Impact (Rolling)	Custom	PY2017 Impact Evaluation of Custom Gas Installations	MA
C&I	RI-18-CE-CustElec	Impact (Rolling)	Custom	PY2016 Impact Evaluation of Custom Electric Installations (continued from 2018)	MA
C&I	RI-19-CE-CustElec	Impact (Rolling)	Custom	PY2017 Impact Evaluation of Custom Electric Installations	MA
C&I	RI-19-CE-UpstrLight	Impact (Rolling)	Upstream Lighting	PY20xx Impact Evaluation of Upstream Lighting Program [Year(s) TBD]	MA
C&I	RI-19-CE-SBNonLight	Impact	SB	PY2016 SBS Non-lighting Impact Evaluation	MA
C&I	RI-19-CX-Presc	Impact	Prescriptive Gas & Electric	Prescriptive Gas & Electric Measures (specific measures TBD)	MA
C&I	RI-19-CX-DataCollect	Market	Multiple	Site Primary Data Collection (for Potential Study)	RI
Res	RI-19-RX-LISF	Process	Low Income SF	Process Evaluation of Income Eligible Single Family Program	RI
Res	RI-19-RX-MF	Impact	EW MF, Low income MF	Impact Evaluation of EnergyWise and Income-Eligible Multifamily Program	RI
Res	RI-19-RE-UpstrLight	Market	Residential Lighting	Residential Lighting Market: Sales Data Analysis	MA
Res	RI-19-RE-AppRecyle	Market	Residential Products	Residential Products: Appliance Recycling Savings Update (including RI in MA effort)	MA
Res	RI-19-RE-HEM	Market/Impact	EnergyWise	Residential Home Energy Monitoring System	RI
Cross	RI-19-XE-HPmarket	Market	Multiple	Heat Pump Market Assessment	RI
Cross	RI-19-XX-Jobs	External	Multiple	Jobs study	RI
Cross	RI-18-XX-Piggybacking	Process	Multiple	Rhode Island Piggybacking Diagnostic Study (continued from 2018)	RI
Pilot	RI-19-XX-Pilots	Impact	Pilot	Pilot	RI
Others	RI-19-XX-M&VLegislation	External	Multiple	M&V Legislation	RI

The proposed budget for evaluation study expenditures in 2019 is approximately $2.1 ($1.64 million for electric and $0.43 million for gas) excluding internal staffing costs. The proposed budget for EM&V comprises approximately 1.8% of the total portfolio budget in 2019.

3.1 Commercial and Industrial Studies

a. RI-19-CG-CustGas - Impact Evaluation of PY2017 Custom Gas Installations

The objective of this impact evaluation is to provide verification of natural gas energy savings estimates for a sample of custom gas projects through site-specific inspection, metering, and analysis. The results of this study will be used to determine the realization rates for custom gas energy efficiency offerings based on installations from 2017. This will be the second of several 'rolling' evaluations in coordination with evaluation efforts in Massachusetts, where the first year was a 'full' study (as has historically been done every 3 years), while subsequent years will evaluate roughly 1/3 of the number of sites, which will keep the realization rates updated yearly.

b. RI-18-CE-CustElec - Impact Evaluation of PY2016 Custom Electric Installations (Continued from 2018)

The objective of this impact evaluation is to provide verification of electric energy savings estimates for a sample of custom electric projects through site-specific inspection, metering, and analysis. The results of this study will be used to determine the final realization rates for custom electric energy efficiency offerings based on installations from 2016. This is the first of several 'rolling' evaluations in coordination with evaluation efforts in Massachusetts, where the first year will be a 'full' study (as has historically been done every 3 years), while subsequent years will evaluate roughly 1/3 of the number of sites, which will keep the realization rates updated yearly.

c. RI-19-CE-CustElec - Impact Evaluation of PY2017 Custom Electric Installations

The objective of this impact evaluation is to provide verification of electric energy savings estimates for a sample of custom electric projects through site-specific inspection, metering, and analysis. The results of this study will be used to determine

the final realization rates for custom electric energy efficiency offerings based on installations from 2017. This will be the second of several 'rolling' evaluations in coordination with evaluation efforts in Massachusetts, where the first year was a 'full' study (as has historically been done every 3 years), while subsequent years will evaluate roughly 1/3 of the number of sites, which will keep the realization rates updated yearly.

d. RI-19-CE-UpstrLight - Impact Evaluation of PY20xx Upstream Lighting Program [Year(s) TBD]

The objective of this impact evaluation is to provide verification of electric energy savings estimates for a sample of upstream lighting projects through site-specific inspection, metering, and analysis. The results of this study will be used to determine the impact savings factors that will apply to upstream lighting offerings. The years on which this study will be based are still to be determined, as the details of the 'rolling' evaluation scheme is still being finalized. This will be the beginning of rolling evaluations in coordination with evaluation efforts in Massachusetts, where the first year was a 'full' study (as has historically been done every 3 years), while subsequent years will evaluate roughly 1/3 of the number of sites, which will keep the realization rates updated yearly.

e. RI-19-CE-SBNonLight - Impact Evaluation of PY2017 Small Business Electric Installations

The objective of this impact evaluation is to provide verification of electric energy savings estimates for a sample of small business non-lighting electric projects through site-specific inspection, monitoring, and analysis. The results of this study will be used to determine the final realization rates for small business, non-lighting electric energy efficiency offerings installed in 2017.

f. RI-19-CX-Presc –Prescriptive Gas & Electric Measures

The objective of this impact evaluation is to provide verification or re-estimation of electric energy and demand and/or natural gas savings estimates for a subset of Prescriptive projects through site-specific inspection, monitoring, and analysis. The results of this study will be used to determine new deemed savings values and/or savings parameters for selected Prescriptive energy efficiency offerings installed in 2017. The specific measures to include in this study are still to be determined.

g. RI-19-CX-DataCollect – Site Data Collection

This task will support primary data collection efforts in the C&I sector in preparation for a potential study in Rhode Island.

3.2 Residential Studies

a. RI-19-RX-LISF - Process Evaluation of the Income Eligible Single Family Program

This study is a process evaluation of the Residential Income-Eligible Services program for single family homes in Rhode Island. The objectives of this study are to assess effectiveness of program delivery procedures, determine barriers to program delivery and participation and identify practical approaches to improve the overall effectiveness of the program.

b. RI-19-RX-MF - Multifamily Program Impact Evaluation

This study is a Rhode Island specific impact evaluation of the income eligible and market rate multifamily family programs. This study will provide estimates of electric and gas savings resulting from participation in in-home retrofit of lighting and other electric and gas product measures. This proposed study will mirror and/or leverage a similar 2018 Massachusetts study to verify that recent program changes are leading to accurate savings estimates; the study approach will take into account the fact that Massachusetts and Rhode Island made different adjustments to program delivery based on the most recent multifamily evaluation.

c. RI-19-RE-UpstrLight - Residential Lighting Sales Data Analysis

The objective of this study is to characterize the current lighting market in Rhode Island. The proposed study will involve analyzing LightTracker and National Electrical Manufacturers Association (NEMA) shipment data and will be conducted in coordination with efforts done in Massachusetts. The results of this study will be used to inform program planning for the Residential Upstream Lighting program in Rhode Island.

d. RI-19-RE- AppRecycle - Residential Appliance Recycling Savings Update

This objective of this study is to examine the current characteristics of refrigerators and freezers being recycled through the Residential Products program and compare the results to the findings in 2011 Appliance Turn-In program. This study will review historical program tracking data, apply updated unit characteristics to the refrigerator and freezer models described in the Uniform Methods Project to update the savings for the next program planning cycle. This research effort will leverage the work done for the residential appliance recycling evaluation study conducted in Massachusetts.

e. RI-19-RE-HEM- Residential Home Energy Monitoring Demonstration

This study will evaluate the home energy monitoring demonstration in Rhode Island to understand how customers interact with this type of connected home technology. The study will quantify kWh reduction attributable to the device, customer satisfaction, and identify customers segments that are likely to benefit the most from the program.

3.3 Cross-Sector/Other Studies

a. RI-19-XE-HPmarket – Heat Pump Market Assessment

This study will evaluate the current status of the heat pump market and assess potential for future growth of heat pumps in Rhode Island. The study will collect data from heat pump owners, contractors, manufacturers and distributors and review existing research and evaluation in the small commercial and residential markets to understand the current status of the marker, trends and perceptions.

b. RI-19-XX-Jobs - Job Impacts Analysis Study

The Rhode Island job impacts study will determine the business and jobs impact due to energy efficiency programs in 2018, similar to the prior study. The study will survey the Company, vendors, distributors, partners, and market players to quantify the number of jobs and associated business impacts.

c. RI-18-XX-Piggybacking – Piggybacking Diagnostic Study (Continued from 2018)

This study is assessing the validity and strategic desirability of Rhode Island's historic practice of using evaluation results from other states and/or leveraging evaluation studies from other states with a Rhode Island sample. This study will identify best practices and key parameters for consideration when a Rhode Island specific evaluation is not undertaken. This study will also estimate the monetary benefit of using and/or leveraging study results for various monitoring and verification purposes such as program improvement or ISO-NE verification.

d. RI-19-XX-Pilots – Pilot Process and Impact Evaluations

This task will evaluate the process and impacts from pilots planned in Rhode Island. The Company plans to begin evaluations as new products or pilots/demonstrations are launched and generated sufficient amount data to determine impacts from these efforts. Planned pilot evaluations will be detailed further in the second draft.

Comment [EC1]: Will update in 2nd draft

e. RI-19-XX-M&VLegislation – M&V Legislation – Energy Efficiency Verification Study

The objective of this study is to verify claimed energy savings from the Company's energy efficiency programs as required by the M&V legislation in Rhode Island. The study will be managed by the office of energy resources.

4. Evaluation Study Findings

(This section will be completed in the second draft of the EE Plan)

Comment [EC2]: Update in 2nd draft

Study name:

Type of Study:
Evaluation Conducted by:
Date Evaluation Conducted:

Evaluation Objective and High Level Findings:

Programs to which the Results of the Study Apply:

Evaluation Recommendations included in the study:

Explain Whether or Not National Grid Decided to Adopt Recommendations from the Study:

Savings Impact:

5. Evaluation Studies Completed in 2010-2018

Sector	Program	Study type	2010	2011	2012	2013	2014	2015	2016	2017	2018
Residential	EnergyWise SF	Impact	■		■				■		
	EnergyWise SF	Process	■						■		■
	Income Eligible SF	Impact					■				■
	Income Eligible SF	Process					■				
	EnergyWise MF	Impact	■						■		
	EnergyWise MF	Process									
	Income Eligible MF	Impact	■						■		
	Income Eligible MF	Process									
	Home Energy Reports	Impact					■			■	
	EnergyStar Lighting	Impact/Market		■							■
	EnergyStar Products	Impact		■							
	HVAC	Impact							■		
	RNC	Impact			■					■	
C&I Electric	Custom	Impact									■
	HVAC	Impact		■						■	■
	Industrial Process	Impact			■					■	■
	CAIR	Impact			■						■
	Refrigeration, Motors, Other	Impact					■				■
	Custom Lighting	Impact				■					■
	Street Lighting	Impact									■
	CDA	Impact		■						■	
	CHP	Impact									
	Prescriptive Lighting	Impact				■					
	Upstream Lighting	Impact					■				■
	Upstream Lighting	Process				■					
	Prescriptive HVAC	Impact							chillers		
	Prescriptive VSD	Impact				■					
	Prescriptive CAIR	Impact							■		
	All	Process			■		■			■	
C&I Gas	Custom	Impact							■		■
	Prescriptive	Impact			MA			steam traps			
	All	Process			■		■	■		■	
Small Business	Lighting	Impact						prescriptive			■
	Non-Lighting Electric	Impact									
	All	Process			■						
Cross-cutting	Potential study	Market	■								
	Job Impact	Jobs				■	■		■		■
	Avoided Cost	Benefits				■		■		■	
	REMI	Benefits					■				■
	Participation	Market								■	
	RASS	Market									■
Pilots/Demo	Demand Response	Impact								■	

2018	
Study	**Impact Descriptions**
Illume Advising LLC, Rhode Island Statewide Behavioral Evaluation: Savings Persistence Literature Review. January 2018.	This study reviewed the existing research on the persistence of savings generated by HERs with particular attention to the applicability of each study to Rhode Island. The study explored potential impacts on HER program when reducing the cadence of reports.
Synapse Energy Economics, Avoided Energy Supply components in New England 2018 Report. March 2018.	This study developed new estimates of avoided costs associated with energy efficiency measures for program administrators throughout New England States. Rhode Island used the avoided costs of energy, capacity, natural gas, fuel oil, environmental costs and demand reduction induced price effects resulting from this study for 2019 program planning.
Navigant, 2017 Seasonal Savings Evaluation. March 2018.	This study evaluated the thermostat optimization program offered in Massachusetts and Rhode island. The study found that the program achieved energy and demand savings of 57 MWh and 134 kW, respectively, in Rhode Island
Navigant, 2017 Residential Wifi Thermostat Demand Response. April 2018.	This study evaluated the controllable thermostats as a demand response technology offered through Massachusetts and Rhode Island ConnectedSolutions programs. The study found average demand savings of 0.44 per thermostat in Massachusetts abnd 0.52 kW per thermostat in Rhode Island.
NMR, Rhode Island Lighting Market Assessment. July 2017 (draft)	This study estimated lighting saturation and other critical market indicators in Rhode Island and included a detailed comparison to Massachusetts. The study concluded that the two markets are substantially similar, therefore Rhode Island can use the results from the recently completed net-to-gross consensus study in MA to inform program planning for Residential Upstream Lighting program.
Research Into Action, Rhode Island HEATLoan Assessment. August 2018 (draft)	This study assessed the extent to which HEATLoan encourage uptake of weatherization and HVAC projects through the EnergyWise program.
NMR, Rhode Island Residential Appliance Saturation Survey. August 2017 (in-progress)	To be updated
Cadeo, Rhode Island Impact Evaluation of Income Eligible Services Single Family Program, August 2018 (in-progress)	To be updated

NMR, RLPNC 17-11 LED Net-to-Gross Consensus Panel Report. June 2018. (Leveraged study from MA)	This study yielded recommended prospective net-to-gross ratios for 2019 to 2021 for the Residential Upstream Lighting program in MA. Rhode Island adopted the NTG established for 2019 (35% for standard and 45% for reflector/specialty) due to similarity in lighting market condition.
NMR, RLPNC 18-4 Products Net-to-Gross Consensus Study, July 2018. (Leveraged study from MA)	This study yielded prospective net-to-gross for Residential Retail products for 2019 to 2021 in Massachusetts. Rhode Island adopted the results from this study to inform 2019 planning for the Residential Products program.
NMR, RLPNC 18-1 Appliance Recycling Results. July 2018. (Leveraged study from MA)	This study provided updated inputs for UEC and savings calculation for refrigerator and freezer recycling in Massachusetts. Rhode Island adopted the results from this study to inform 2019 planning for the Residential Products program.
Navigant, MA Residential Electric Loadshape and Baseline Study (Heating and Cooling Season report). July 2018. (Leveraged study from MA)	This study collected saturation, penetration and usage behavior data for all major electric and gas appliances in Massachusetts. Rhode Island adopted the end use load shapes determined by this study.
2017	
Study	**Impact Descriptions**
ILLUME Advising, LLC, Rhode Island Home Energy Report Program Impact and Process Evaluation. August 2017	This study estimated realization rates for electric and gas savings for program years 2014 to 2016 using a billing analysis. The realization rates from this study were adjusted to remove potential double counted savings from HER and other energy efficiency programs.
Navigant, Rhode Island Energy Efficiency Program Customer Participation Study – Phase 1, October 2017	The study characterized participants and non-participants in several energy efficiency programs and identified customers that can be potentially targeted to increase participation.
NMR, 2017 Rhode Island Single-Family Code Compliance/Baseline Study, July 2017	This study yielded the final agreed upon baseline values to update the User Defined Reference Home (UDRH) in Rhode Island
ICF, 2017 Rhode Island Residential Code Savings Analysis	This study found that the average Rhode Island home could attain annual electric savings of 3,690 kWh and gas savings of 10 MMBtu if it fully complied with the state's building energy code.
NBI, 2017 Rhode Island Commercial Code Savings Analysis	This study found that the average Rhode Island commercial building could attain annual electric savings of 0.73 kWh/sf and gas savings of 0.90 MMBtu/sf if it fully complied with the state's building energy code.

NMR, 2017 Rhode Island Code Compliance Enhancement Initiative Attribution and Savings Study	The study found residential and commercial attribution factors of 23% and 46, respectively, which were used along with study results on average savings as well as construction activity projections to calculate the CCEI's projected savings from 2018-2020.
Peregrine Energy Group, Analysis of Job Creation from 2016 Expenditures for Energy Efficiency in Rhode Island by National Grid, April 2017	A study of the job impacts of National Grid's energy efficiency programs delivered to Rhode Island electricity and natural gas customers in 2016. The study estimated that 702 FTE workers, across 923 companies and agencies were employed in 2016 as a result of investments energy efficiency programs in Rhode Island.
New Buildings Institute, Energy Impacts of Commercial Building Code Compliance in Rhode Island, July 2017	This study quantified the energy impacts of energy code compliance patterns from field data collection and analysis of building characteristics.
The Cadmus Group, Inc, Ductless Mini-Split Heat Pump Impact Evaluation, 2016	The 2018 PI plan includes 'strategy electrification' heat pump savings values that resulted from this study.
DNV-GL, Impact Evaluation of MA C&I upstream Lighting Program (September 2017 Draft)	Draft results from the MA study were used for the 2018 RI plan; the RI leveraged study is expected to be completed at the end of 2017.
DNV-GL, Impact Evaluation of 2014 Custom HVAC Installations, September 2017	The study updated realization rates for customer electric HVAC projects, as part of a study leveraging the MA study of the same program element.
DNV-GL, MA C&I Impact Evaluation of 2013 Custom Process Installations (August 2017 Draft)	Draft results from pooling the MA & RI samples were used for the 2018 RI plan. RI is currently working on a custom electric process evaluation leveraged on the MA study of the same program, and is waiting for MA to finalize their values.
TetraTech, C&I Programs Freeridership & Spillover Study, September 2017	This study updated free-ridership and spillover values for the C&I electric and gas programs.
DNV-GL, MA C&I Steam Trap Evaluation Phase 2 , Feb, 2017)	The 2018 RI plan C&I steam trap savings were updated based on results from the MA study.
DNV-GL, Gas Boiler Market Characterization Study Phase II: Final Report, March 2017	The 2018 RI plan C&I condensing boiler savings were updated based on the results from the MA boiler characterization study.
DNV-GL, MA45 Prescriptive Programmable Thermostats, March 2017	The 2018 RI plan uses results from the MA programmable thermostat study.
2016	
Study	**Impact Descriptions**
DNV-GL, Impact Evaluation of 2014 Custom Gas Installations in Rhode Island Final Report, July 2016	This study is RI-specific and yielded an energy realization rate for Custom Gas projects.

DNV-GL, Impact Evaluation of 2014 RI Prescriptive Compressed Air Installations Final Report, July 2016	This study is RI-specific and yielded an energy realization rate for prescriptive compressed air compressors, dryers, and EE accessories.
DNV-GL, Impact Evaluation of 2012 National Grid-Rhode Island Prescriptive Chiller Program Final Report, July 2016	This study is RI-specific and yielded an energy realization rate for prescriptive chillers.
DNV-GL, Multifamily Impact Evaluation, National Grid Rhode Island, January 2016	This study estimated realization rates for electric and gas savings for 2013 participants using a billing analysis. The results include a low level of precision and thus the realization rates are not applicable. The Company is improving tracking, savings estimations and verification processes in line with the study's recommendations.
Research Into Action, National Grid Rhode Island EnergyWise Single Family Process Evaluation, August 2016	This study surveyed customers, vendors, contractors, and lending agencies to order to assess customer experience, HEAT Loan lender perspectives on the program, performance of the lead vendor and sub-contractors and lessons learned from programs elsewhere in the country. The study will inform program design.
DNV-GL, Impact Evaluation of 2014 EnergyWise Single Family Program, National Grid Rhode Island, August 2016	This study estimated deemed savings values and realization rates for electric and gas 2014 participants using billing and engineering analysis. The Company adopted the deemed savings values in the 2017 program plan.
Massachusetts Special and Cross-Cutting Research Area: Low-Income Single-Family Health- and Safety-Related Non-Energy Impacts (NEIs) Study. Prepared by the NMR Group and Three3, Inc. for the Massachusetts Program Administrators. August 5, 2016.	This study developed Non Energy Impacts for low income programs, based on USODE's Weatherization Assistance Program tailored to MA context. Dollar benefits rose substantially over prior values primarily based on avoidance of deaths due to thermal stress.
Cadmus Group; Large Commercial and Industrial On-Bill Repayment Program Evaluation, September, 2016	National Grid commissioned this study to evaluate the financing component of their large commercial and industrial (LCI) energy efficiency program. Cadmus evaluated the program design, performance, and sustainability; the overall market for the program; and the program's penetration of that market to date.
Ductless Mini-Split Heat Pump (DMSHP) Final Heating Season Results; Ductless Mini-Split Heat Pump (DMSHP) Cooling Season Results, COOL SMART Impact Evaluation Team, 2015 / 2016	Heating and cooling memos that describe the number of full load hours found with field installed systems in MA and RI; these hours were used with historic data on incentivized systems to come up with average savings per unit.

DNV GL, Stage 2 Results—Commercial and Industrial New Construction Non-Energy Impacts Study—Final Report, prepared for the Massachusetts Program Administrators, March 2016	The purpose of this study was to quantify the dollar value of participant NEIs for C&I NC projects completed in 2013, and to estimate gross NEIs per unit of energy savings resulting from NC electric and gas measures separately.
2015	
Study	**Impact Descriptions**
DNV-GL, Rhode Island Small Business Energy Efficiency Program Prescriptive Lighting Study: Final Report, July 2015	This study is RI-specific and yielded an energy realization rate prescriptive lighting measures. For coincidence factors, the Company will continue to use values from the NEEP Evaluation, Measurement and Verification Forum.
Cadmus, Inc., High Efficiency Heating Equipment Impact Evaluation: Final Report, March 2015	The study determined revised deemed savings values for each furnace and boiler measure, including condensing boilers and early replacement of heating equipment. The study also reflected the increasing baseline for standard efficiency heating equipment.
DNV-GL, Retrofit Lighting Controls Measure Summary of Findings: Final Report (MA), October 2014	The study examined trends in lighting control savings and noted a decrease in savings over previous program years. It recommended updated coincidence factors as well as potential program and technology areas that may yield higher savings. Finally, the study recommended a change in the savings calculation algorithm for lighting controls.
Tabors Caramanis Rudkevich, Avoided Energy Supply Costs in New England: 2015 Report, April 2015	This study developed new estimates of avoided costs for application in 2016 through 2018 energy efficiency programs throughout the six New England states. Avoided costs were developed for natural gas, electric energy, electric capacity, demand reduction induced price effects (DRIPE), other fuels (oil, propane and wood), and carbon.
DNV-GL, Massachusetts 2013 Prescriptive Gas Impact Evaluation; Steam Trap Evaluation Phase 1, March 2015	The study concluded that there should continue to be both prescriptive an custom pathways for steam trap retrofit incentives, and further recommended that a group convene to review and revise the deemed savings estimate for steam traps. The study also recommended the use of a six year lifetime for steam traps.
Cadmus, Inc., LED Incremental Cost Study – Modeling LightTracker LED and Halogen Pricing Data, June 2015	This memo summarizes selected findings from the LightTracker LED, CFL, and halogen pricing data modeling effort and the resulting state-level price forecast through 2020 for LED, CFL, and halogen bulbs. These results are based on light bulb price data from 25 states that lacked LED programs from 2009 to 2014.

Cadmus, Inc, Cool Smart Incremental Cost Study: Final Report, July 2015	This incremental cost study estimates how manufacturing production costs (MPCs) and purchase prices of residential air conditioning (AC) and heat pump (HP) equipment change as equipment efficiency increases. The results support Cool Smart program enhancements and cost-effectiveness analysis, as well as potential upstream residential upstream heating, ventilation and air conditioning (HVAC) incentive programs.
Cadmus, Inc., Lighting Interactive Effects Study Preliminary Results – Draft, April 2015	This memo details the preliminary findings of the Lighting Interactive Effects study evaluated for the Massachusetts (MA) Program Administrators to better understand and report the true impact of energy efficient lighting retrofits. It recommended factors for electric and gas energy to be applied to residential program savings.
2014	
Study	**Impact Descriptions**
DNV GL, 2014 , Impact Evaluation of National Grid Rhode Island C&I Prescriptive Gas Pre-Rinse Spray Valve Measure	The evaluation examined the gas and water savings associated with the installation of reduced-flow pre-rinse spray valves. The results are based on site measurements from MA and RI facilities. The final gross gas and water savings are 11.4 MMBtu and 6.410 gallons per spray valve respectively.
DNV GL, 2014 Impact Evaluation of National Grid Rhode Island Custom Refrigerator, Motor and Other Installations	Three custom electric end-uses, Refrigerator, Motor, and Other, were evaluated to provide updated realization rates. The RI results were combined with MA results from a parallel study in order to increase the statistically significance of the final results. The final energy realization rate is 84.8%
DNV GL, 2014 Impact Evaluation of Rhode Island Commercial and Industrial Upstream Lighting Program	This study examined the performance of lighting systems that were discounted at the distribution level. The evaluation included metering at Rhode Island project sites that was combined with the results of metering done in MA to yield more accurate impacts for lighting offered in this upstream initiative. The final energy realization rate is 80.3% for LEDs and 109.5% for fluorescents.
NMR Group, Inc., Northeast Residential Lighting Hours-of-Use Study	This multi-State study provided updated hours-of-use assumptions for residential lighting programs in various room types.

The Cadmus Group, Impact Evaluation: Rhode Island Income Eligible Services, Volume II The Cadmus Group, National Grid Income Eligible Services Process Evaluation	This RI-specific impact evaluation focused on the electric and gas savings resulting from the participation of these dwellings in in-home retrofit of electrical components and weatherization of electric, gas, and fossil fuel heated homes. It used billing analysis, engineering reviews, and interviews for the process components.
National Grid, Macroeconomic Impacts of Rhode Island Energy Efficiency Investments REMI Analysis of National Grid's Energy Efficiency Programs	This study quantifies the macroeconomic impacts of National Grid's 2014 EE Program Plan for Rhode Island and provides updated economic impact multipliers to quantify the benefits of future EE programs in the Rhode Island economy. This updates the multipliers from an economic impact study conducted by Environment Northeast (ENE) in 2009.
2013	
Study	**Impact Descriptions**
KEMA, Inc., Impact Evaluation of 2011 Rhode Island Prescriptive Lighting Installations KEMA, Inc., Impact Evaluation of 2011 Rhode Island Custom Lighting Installations	The Custom and Prescriptive Lighting studies involved the impact evaluation of components of the Large Commercial and Industrial electric efficiency programs. The studies included on-site engineering and end-use metering of a statistically drawn random sample of participants. The custom portion of the study was coupled with the results of the 2013 Massachusetts Custom Lighting study.
Energy Efficiency Messaging, Residential Energy Efficiency Program Communications Focus Groups	The study analyzed customers' perceptions of energy efficiency programs and messaging materials via focus group testing.
KEMA, Inc., Impact Evaluation of 2011 Prescriptive Gas Measures	On-site monitoring and verification of installation provided updated impacts for four major prescriptive gas measures. Programs and measures are similar between National Grid affiliates in MA and RI, and results are applied to RI. The overall realization rate for the four measures was approximately 102% and the relative precision was about ±15%.
KEMA, Inc, and DMI, Inc., Impact Evaluation of 2011-2012 Prescriptive VSDs	This evaluation provided a new estimate of the impacts of prescriptive variable speed drives, based on pre-post metering of measures installed in 2011 and 2012. Programs and measures are similar between National Grid affiliates in MA and RI, and results are applied to RI. Key findings include an annual kWh realization rate was 94% with a relative precision of +/- 23%, and identification of factors that influenced the realization rate.

The Cadmus Group, Inc., 2012 Residential Heating, Water Heating, and Cooling Equipment Evaluation: Net-to-Gross, Market Effects, and Equipment Replacement Timing	The results of this study yielded updated net-to-gross factors and estimates of the timing of equipment replacement for residential heating and cooling measures. Programs and measures are similar between National Grid affiliates in MA and RI, and results are applied to RI.
KEMA, Inc., Process Evaluation of the 2012 Bright Opportunities Program	This study provided net-to-gross ratios for the Commercial Upstream Lighting initiative offered in MA and RI, as well as a process assessment of this generally successful initiative.
KEMA, Inc., Impact Evaluation of 2010 Prescriptive Lighting Installations	The RI Prescriptive lighting study listed above did not examine case lighting separately from other lighting systems. To complement the RI-specific results, this MA study provided impact updates on case lighting.
Opinion Dynamics (2013). Massachusetts Cross-Cutting Behavioral Program Evaluation Integrated Report.	This study provided an updated realization rate for savings from gas customers who participate in the Opt-out channel of the Home Energy Reports program.
2012	
Study	**Impact Descriptions**
KEMA, Inc., Impact Evaluation of the 2010 Custom –Industrial Process and Compressed Air impact evaluation, September, 2012	Study produced realization rates for energy, seasonal demand, and percent energy on peak for both programs. The RI results were combined with MA results from a parallel study in order to increase the statistical significance of the final results. The final energy realization rate is 92.7%.
TetraTech, Final Report – Commercial and Industrial Non-Energy Impacts Study, (prepared for Massachusetts Program Administrators), June 29, 2012	This report provides a comprehensive set of statistically reliable Non-energy impact (NEI) estimates across the range of C&I prescriptive and custom retrofit programs offered by the MA electric and gas Program Administrators (Pas). The analytical methods used allow this report's findings to be applicable to RI.
2011	
Study	**Impact Descriptions**
NMR Group, Inc., The Rhode Island Appliance Turn-In Program Process Evaluation, March 4, 2011.	Combined, these two studies assessed free-ridership rates and savings for the Rhode Island

NMR Group, Inc., The Rhode Island Appliance Turn-In Program Impact Evaluation, October 2011.	Refrigerator and Freezer Recycling program. In addition, the evaluation found that there were three distinct groups of refrigerators being recycled through the program – primary, secondary – replaced, and secondary – not replaced. The study produced updated free-ridership rates and savings for the three categories of refrigerators and freezers.
KEMA, Inc., Impact Evaluation of the 2009 Custom HVAC and 2008-2009 Custom CDA Installations, September 1, 2011	Study produced realization rates for energy, seasonal demand, and percent energy on peak for both programs. The RI results were combined with MA results from a parallel study in order to increase the statistical significance of the final results. The final energy realization rate for Custom HVAC is higher than the PY 2011 realization rate by about 10% (increased from 100.5% to 110.4%). The final energy realization rate for Custom CDA is higher than the PY 2011 realization rate by about 20% (increased from 97.2% to 119.6%).
KEMA, Inc., C&I Lighting Loadshape Project, Prepared for the Regional Evaluation, Measurement, and Verification Forum, June 2011.	A compilation of lighting loadshape data from the Northeast. The study provided updated coincidence factors for the Energy Initiative and Small Business Lighting programs. The Small Business program summer coincidence factor went from 0.80 to 0.79, while the Energy Initiative summer coincidence went from 0.88 to 0.89
KEMA, Inc., C&I Unitary HVAC Loadshape Project Final Report, Prepared for the Regional Evaluation, Measurement, and Verification Forum, June 2011.	From end use metering, the study produced updated diversity and equivalent full load hours for unitary HVAC measures
2010	
Study	**Impact Descriptions**
ADM Associates, Inc., Residential Central AC Regional Evaluation, Final Report, October 2009	KWh and kW savings figures for the installation of efficient residential CAC systems
2007	
Study	**Impact Descriptions**
RLW Analytics, Small Business Services Custom Measure Impact Evaluation, March 23, 2007	Verification of energy savings from custom lighting projects in the Small Business Services program.

RLW Analytics, Impact Evaluation Analysis of the 2005 Custom SBS Program, May 29, 2007	Realization rates for the Small Business Services program