



STATE OF RHODE ISLAND
**ENERGY EFFICIENCY &
RESOURCE MANAGEMENT COUNCIL**

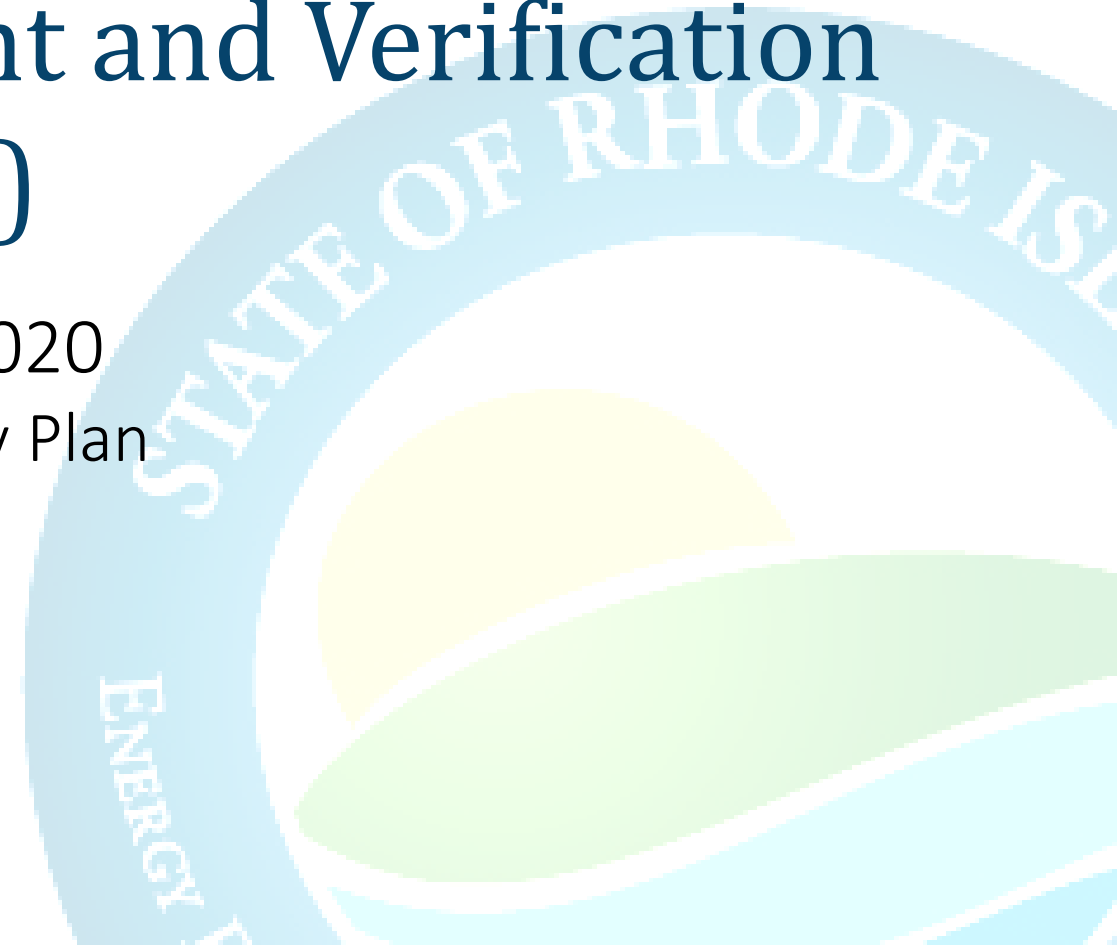
CONSULTANT TEAM

Evaluation, Measurement and Verification (EM&V)

Impacts on 2020
Energy Efficiency Plan

Presented By: Mark Kravatz

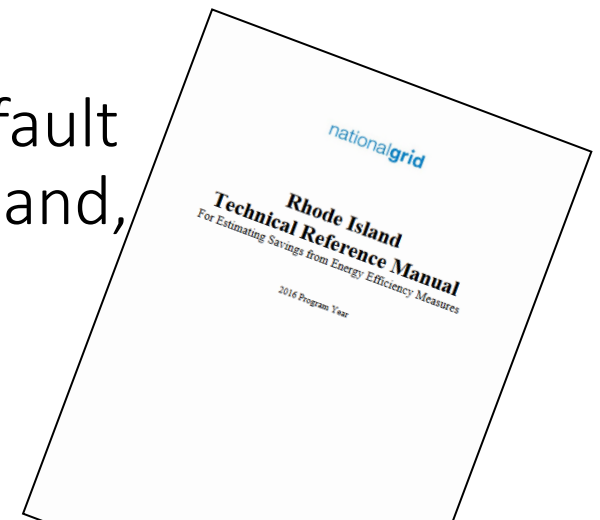
Date: July 25, 2019





Technical Reference Manual (TRM)

- Rhode Island's TRM is updated annually by N-Grid
 - Reflects annual changes in technology, baselines, and evaluation results.
 - Reviewed by EERMC, C-Team, OER and filed with the PUC
- The TRM documents for regulatory agencies, customers, and other stakeholders the methodologies and assumptions used by N-Grid to estimate measure savings.
- The TRM provides methods, formulas and default assumptions for estimating energy, peak demand, and other resource and non-energy impacts from efficiency measures.
 - This is called a measure characterization





Measure Characterization

Description of Measure

Name and
Description

Eligibility Criteria

Definition of
Baseline Case

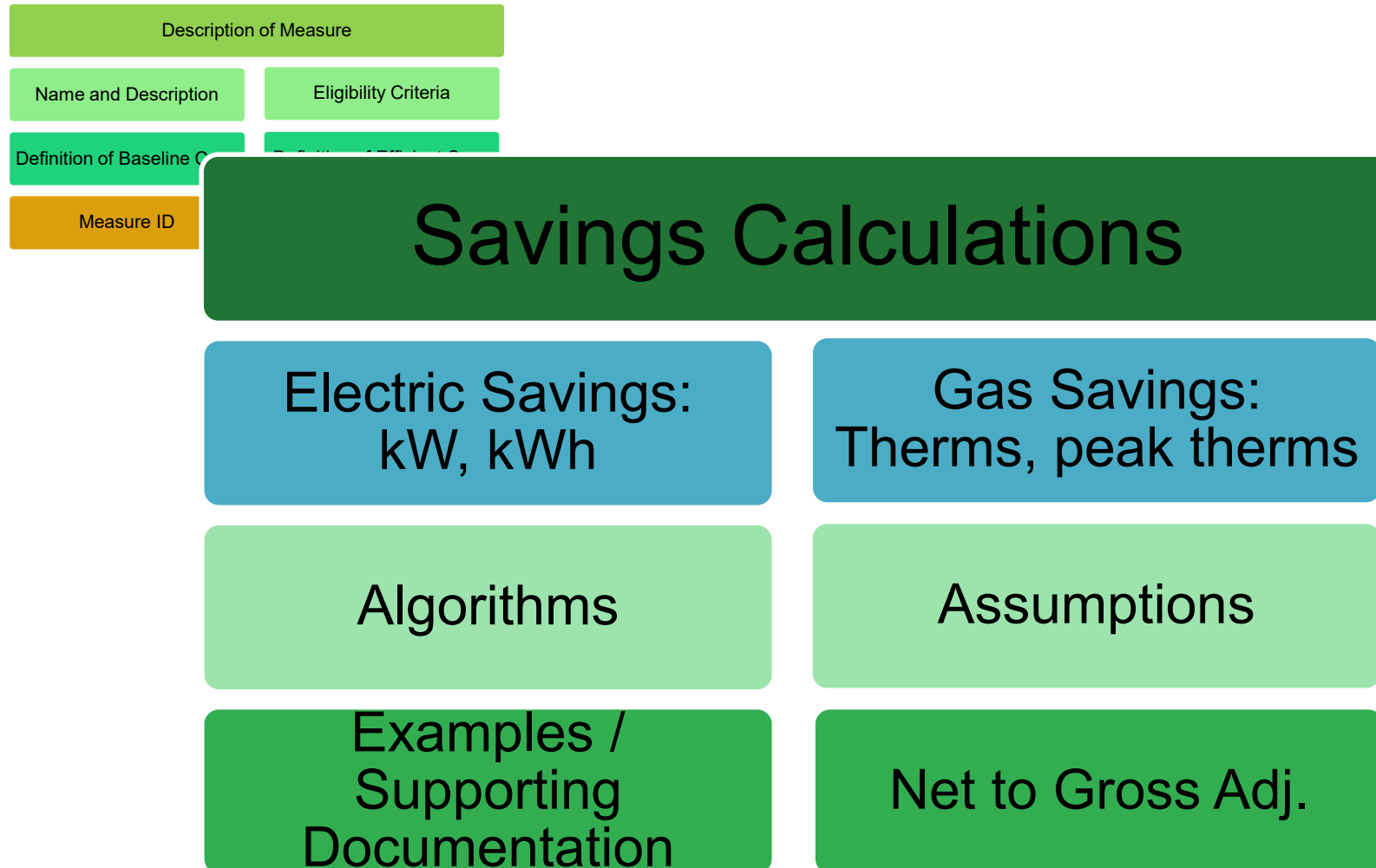
Definition of
Efficient Case

Measure ID

Effective Dates

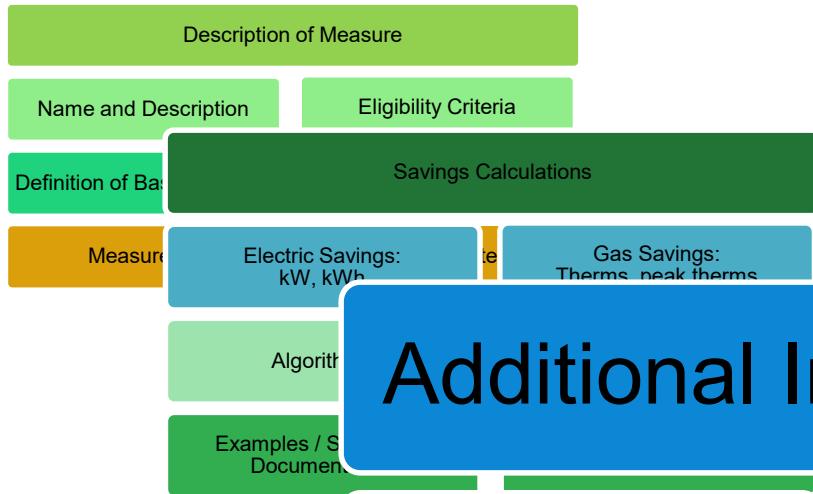


Measure Characterization

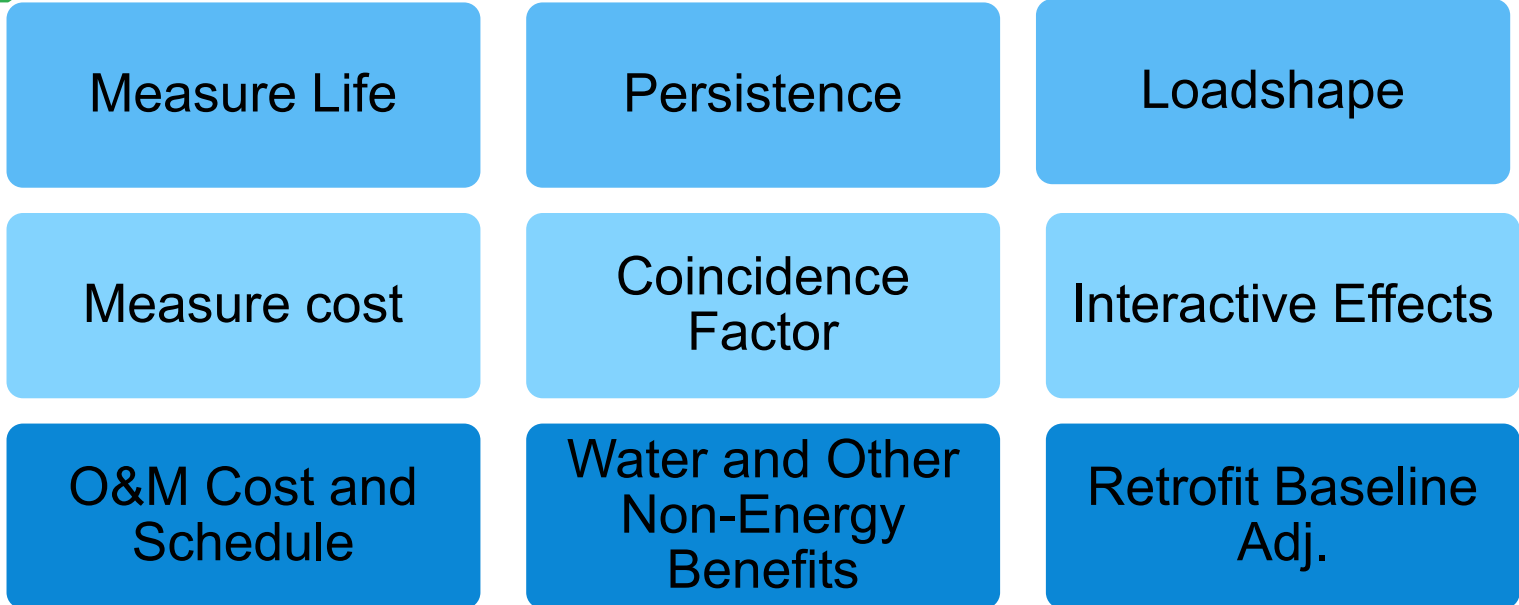




Measure Characterization



Additional Input for Cost-effectiveness





Identifying Cost-effective Potential: Benefit-Cost Ratio Model (B/C Model)

- Updated annually
- The BC Model is a table made up of Deemed and Customized Measure characterizations.
- The goal of the BC Model is to calculate the total benefits and the total costs in dollar terms from a certain vantage point to determine whether or not the overall benefits exceed the costs.
- A benefit-cost ratio above 1 means the program has positive net benefits. A benefit-cost ratio below 1 means the costs exceed the benefits.
- Results are reported either in net present value (NPV) dollars (method by difference) or as a ratio (i.e., benefits/costs).
- Basic Approach for calculating and representing cost-effectiveness:

Net Benefits (Difference)	$\text{Net Benefits}_a \text{ (dollars)} = \text{NPV } \sum \text{benefits}_a \text{ (dollars)} - \text{NPV } \sum \text{costs}_a \text{ (dollars)}$
Benefit-Cost Ratio	$\text{Benefit-Cost Ratio}_a = \frac{\text{NPV } \sum \text{benefits}_a \text{ (dollars)}}{\text{NPV } \sum \text{costs}_a \text{ (dollars)}}$



Key Rhode Island Evaluations Adopted in the B/C Model

Commercial & Industrial (in-progress)

- **Impact Evaluation of PY2016 Custom Gas Installations**
 - performed by DNV-GL
- **Impact Evaluation of PY2016 Custom Electric Installations**
 - performed by DNV-GL

Residential (complete)

- **Residential Lighting Market Assessments**
 - performed by NMR
- **Residential Appliance Recycling Savings Update**
 - performed by NMR
- **Wifi Thermostat Savings Update**
 - performed by Navigant



All RI and MA Evaluations Being Adopted in RI Plan

Sector	Programs	Study names	Fuel(s)	Type	State	Status (In-progress or Complete)
Res	IES SF	RI-19-RX-IESF - Process Evaluation of Income Eligible Single Family Program	Elec/Gas	Process	RI	Reporting
Res	Res Lighting	RI-19-RE-UpstrLight1 - Lighting Market Assessment: 2017/18 Sales Data Analysis	Elec	Market	RI	In-progress
Res	Res Lighting	RI-19-RE-UpstrLight2 - Lighting Market Assessment: 2018/19 Shelf Stocking Analysis	Elec	Market	RI	Reporting
Res	Res Products	RI-19-RE- AppRecycle - Residential Appliance Recycling Savings Update	Elec	Impact	RI	Complete
Res	Res Lighting	Lighting On-Site(RLPNC 18-10)	Elec	Market	MA	Complete
Res	Res Lighting	RLPNC 18-14 Delta Watts Update	Elec	Impact	MA	Reporting
Res	Res Lighting	Impact Evaluation of PY2015 Rhode Island Commercial and Industrial Upstream Lighting Initiative'	Elec	Impact	MA	Complete
Res	Res Lighting	RLPNC 17-11 LED NTG Consensus	Elec	Impact	MA	Complete
Res	Res Lighting	RLPNC 17-6 MAM 2019-2021 PLanning and 2017 Report	Elec	Impact	MA	Complete
Res	Res Lighting	RLPNC 179: 2019 —21 Planning Assumptions: Lighting Hours-of-Use and In-Service Rate	Elec	Impact	MA	Complete
Res	Res Products	RLPNC 18-4 Products NTG Consensus study	Elec	Impact	MA	Complete
Res	Res Products	RLPNC 17-3 Smart Power Strip Metering Study	Elec	Impact	MA	Complete
Res	Multiple	Wifi Thermostat Impact Evalaution Secondary Literature Review	Electric/Gas	Impact	MA	Complete
Res	HES	RLPNC 18-5 HEA LED NTG Consensus	Elec	Impact	MA	Complete
Res	HES	Res 34 HES Impact Evaluation	Elec	Impact	MA	Complete
C&I	C&I Gas	RI-18-CG-CustGas - Impact Evaluation of PY2016 Custom Gas Installations	Gas	Impact	RI	In-progress
C&I	C&I Elec	RI-18-CE-CustElec - Impact Evaluation of PY2016 Custom Electric Installations	Elec	Impact	RI	In-progress
C&I	C&I Lighting	Lighting Hours of Use Study (P86)	Elec	Impact	MA	In-progress
Cross	All	RI-18-XX-Piggybacking - Piggybacking Diagnostic Study (Continued from 2018)	Elec/Gas	Process	RI	In-progress
Cross	Others	RI-19-XX-Jobs - Jobs study	Elec/Gas	Impact	RI	Complete
Cross	HVAC	MA C&I Upstream HVAC NTG & Market Effects Study (TXC 35)	Elec	Impact/Market	MA	Complete



All 2019 In-Progress Evaluations Not Impacting the Plan

Sector	Programs	Study names	Fuel(s)	Type	State	Status (In-progress or Complete)
Res	Multiple	RI-19-RE-HEM - Residential Home Energy Monitoring (Sense) Demonstration	Elec	Impact/Process	RI	Scoping
C&I	C&I Gas	RI-19-CG-CustGas - Impact Evaluation of PY2017 Custom Gas Installations	Gas	Impact	RI	In-progress
C&I	C&I Elec	RI-19-CE-CustElec - Impact Evaluation of PY2017 Custom Electric Installations	Elec	Impact	RI	Scoping
C&I	C&I Lighting	RI-19-CE-UpstrLight - Impact Evaluation of PY20xx Upstream Lighting Program	Elec	Impact	RI	Scoping
C&I	C&I	RI-19-CX-Presc - Prescriptive Gas & Electric Measures	Elec/Gas	Impact	RI	Scoping
Cross	All	RI-19-XE-HPmarket - Heat Pump Market Assessment	Elec/Gas	Market	RI	Scoping
Cross	C&I Gas	RI-19-CG-GasDR - Gas Demand Response Pilot Evaluation Study	Gas	Impact/Process	RI	Scoping
Cross	All	RI-19-XX-M&Vlegislation - Legislated M&V Study	Elec/Gas	Impact	RI	In-progress