

Overview of Rhode Island Cost- Effectiveness Practice

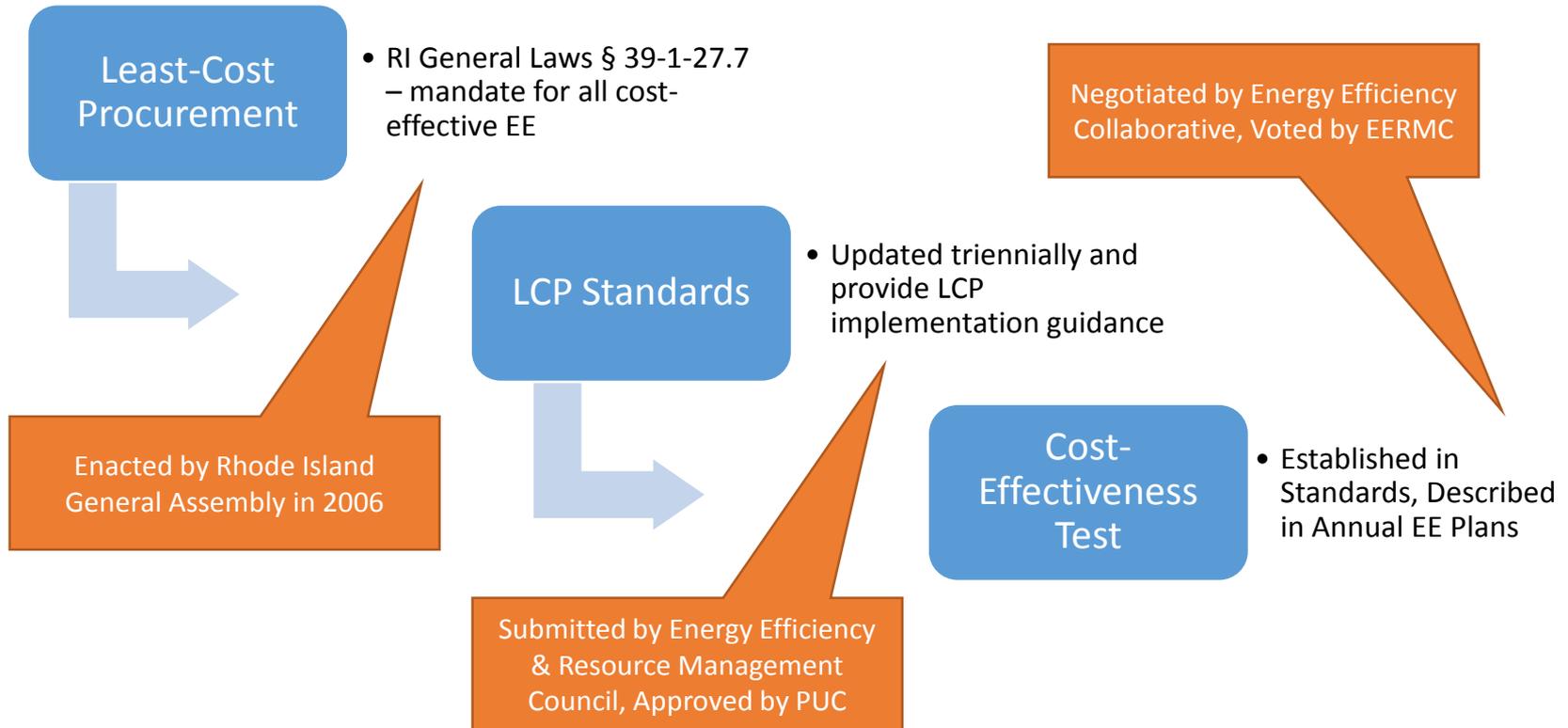
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RI C/E Practice: The Players & Process



RI has used a robust TRC cost-effectiveness standard to date

	Utility Test	TRC Test	Societal Cost Test
Energy Efficiency Program Benefits:			
Avoided Energy Costs	Yes	Yes	Yes
Avoided Capacity Costs	Yes	Yes	Yes
Avoided Transmission and Distribution Costs	Yes	Yes	Yes
Wholesale Market Price Suppression Effects	Yes	Yes	Yes
Avoided Cost of Environmental Compliance	Yes	Yes	Yes
Utility Non-Energy Benefits	Yes	Yes	Yes
Participant Non-Energy Benefits	---	Yes	Yes
Societal Benefits (e.g., environment, jobs)	---	---	Yes
Energy Efficiency Program Costs:			
Program Administrator Costs	Yes	Yes	Yes
EE Measure Cost: Program Financial Incentive	Yes	Yes	Yes
EE Measure Cost: Participant Contribution	---	Yes	Yes
Societal Costs	---	---	Yes

For Most EE



For CHP

- Participant non-energy benefits include:
 - Improved comfort
 - Improved sense of environmental responsibility
 - Reduced noise
 - Lighting quality
 - Improved health and safety
 - Property value increase
 - ... and more

RI will account for diverse energy policy goals in future cost-effectiveness screening

- New “**Rhode Island Test**” builds on Total Resource Cost test to ***“more fully reflect the policy objectives of the state with regard to energy, its costs, benefits, and environmental and societal impacts”***

Summary Table	Reliability / Resiliency	Economic development / Growth	Job creation	Price stability / Cost reduction	Environmental quality	Air quality / Health risks	GHG reductions	Fuel diversity
Rhode Island Utility Restructuring Act (1996)								
Renewable Energy Standard (2004)								
Least-Cost Procurement (2006)								
Net Metering (2011)								
Renewable Energy Growth Program (2014)								
Affordable Clean Energy Security Act (2014)								
Resilient Rhode Island Act (2014)								
Energy 2035: Rhode Island State Energy Plan (2015)								

RI Test: GHG Benefits are under development for 2018-2020 3-YR EE Plan

- **Preliminary GHG methodology**

- Current TRC includes avoided cost of carbon from RGGI and reasonably anticipated future federal regulations
- Proposal is to use \$100/ton (from 2015 AESC) net of embedded costs
- \$100/ton represents avoidance of highest cost GHG abatement strategy

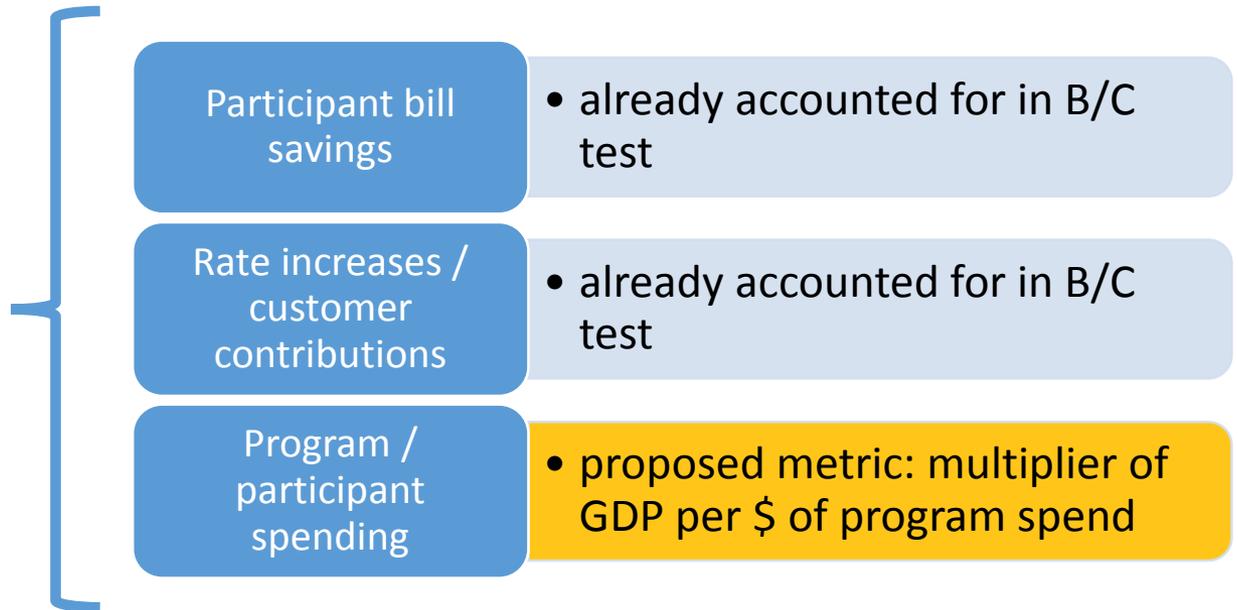
Exhibit 4-7. AESC 2015 Non-Embedded CO₂ Costs (2015 dollars per short ton CO₂)

	Marginal Abatement Cost a	Allowance Price b	Externality c = a - b
2015	\$100	\$6.28	\$93.72
2016	\$100	\$7.26	\$92.74
2017	\$100	\$7.87	\$92.13
2018	\$100	\$8.47	\$91.53
2019	\$100	\$9.32	\$90.68
2020	\$100	\$10.16	\$89.84
2021	\$100	\$12.54	\$87.46
2022	\$100	\$14.92	\$85.08
2023	\$100	\$17.30	\$82.70
2024	\$100	\$19.67	\$80.33
2025	\$100	\$22.05	\$77.95
2026	\$100	\$24.43	\$75.57
2027	\$100	\$26.80	\$73.20
2028	\$100	\$29.18	\$70.82
2029	\$100	\$31.56	\$68.44
2030	\$100	\$33.94	\$66.06

RI Test: Economic impacts are under development for 2018-2020 3-YR EE Plan

- **Preliminary economic development methodology**

EE programs impact local economy in three ways



The new RI Test could impact both measures and portfolios

- Filed 2017 Annual EE Plan BCR would move from **2.00 to 3.08**
- Example Measure: installation of a ductless mini-split air-source heat pump as a primary heating source could be cost-effective in certain instances

	Filed 2017		2017 with RI Test	
	Rhode Island Benefit/Cost (2)	Total Benefit	Rhode Island Benefit/Cost (2)	Total Benefit
Large Commercial & Industrial				
Commercial New Construction	4.55	\$23,281.0	6.89	\$35,261.3
Commercial Retrofit	2.54	\$105,858.8	3.91	\$163,106.0
Direct Install	1.50	\$16,500.4	2.53	\$27,875.3
C&I SUBTOTAL	2.17	\$145,640.2	3.37	\$226,242.5
Low Income				
Low Income Single Family	3.80	\$35,232.6	4.69	\$43,474.2
Low Income Multi Family	2.69	\$7,294.1	3.68	\$9,962.1
LI Residential SUBTOTAL	3.38	\$42,526.7	4.25	\$53,436.3
Residential Programs				
Residential New Construction	1.73	\$1,852.2	2.72	\$2,915.4
EnergyStar HVAC	1.37	\$3,060.5	2.26	\$5,056.0
EnergyWise	1.09	\$12,667.4	1.93	\$22,441.1
EnergyWise Multi Family	1.74	\$6,913.1	2.62	\$10,437.0
Behavior Feedback	1.02	\$2,504.3	2.11	\$5,152.2
EnergyStar Lighting	1.95	\$29,224.5	3.40	\$51,098.4
EnergyStar Appliances	1.26	\$3,482.9	2.16	\$5,972.7
Residential SUBTOTAL	1.40	\$59,704.9	2.41	\$103,072.7
TOTAL	2.00	\$247,871.8	3.08	\$382,751.6

RIPUC Docket 4600 created a Benefit/Cost Framework that builds further on the RI Test

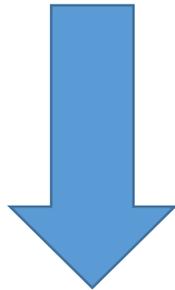
- The Framework is intended to capture all benefits and costs of interest in Rhode Island energy policy

Level	Example Cost / Benefit Category	System Attribute / Cost Driver	How to Measure / Monetize?	Visibility Requirements?
Power System	Distribution Costs	Locational Constraints, Losses, Marginal Prices...	Dynamic, Multi-Layered Forecasts	Interval or AMI Meters, Modeling, Planning
Customer	Low-Income Participant Benefits	Improved Health, Comfort, Property Value...	Current Values in EE Program	Interval or AMI Meters?
Societal	Economic Development	Impacts on GSP, Employment...	Economic Modeling	Detailed Economic Modeling

Illustrative

The B/C Framework will allow “apples-to-apples” comparison of diverse resources

Today: RI success with least-cost EE procurement



**Future application
of the B/C
Framework**

Tomorrow: Dynamic portfolio optimization of supply, demand, and infrastructure

- Energy Efficiency
- Demand Response
- Distributed Generation
- All DER
- Alternative Rate Designs
- Distribution Infrastructure
- Advanced Metering
- Dynamic Portfolio Optimization

Questions?

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