

Rhode Island GHG Emissions Reduction Study

*Meeting No. 2
Providence, RI*

April 6, 2016

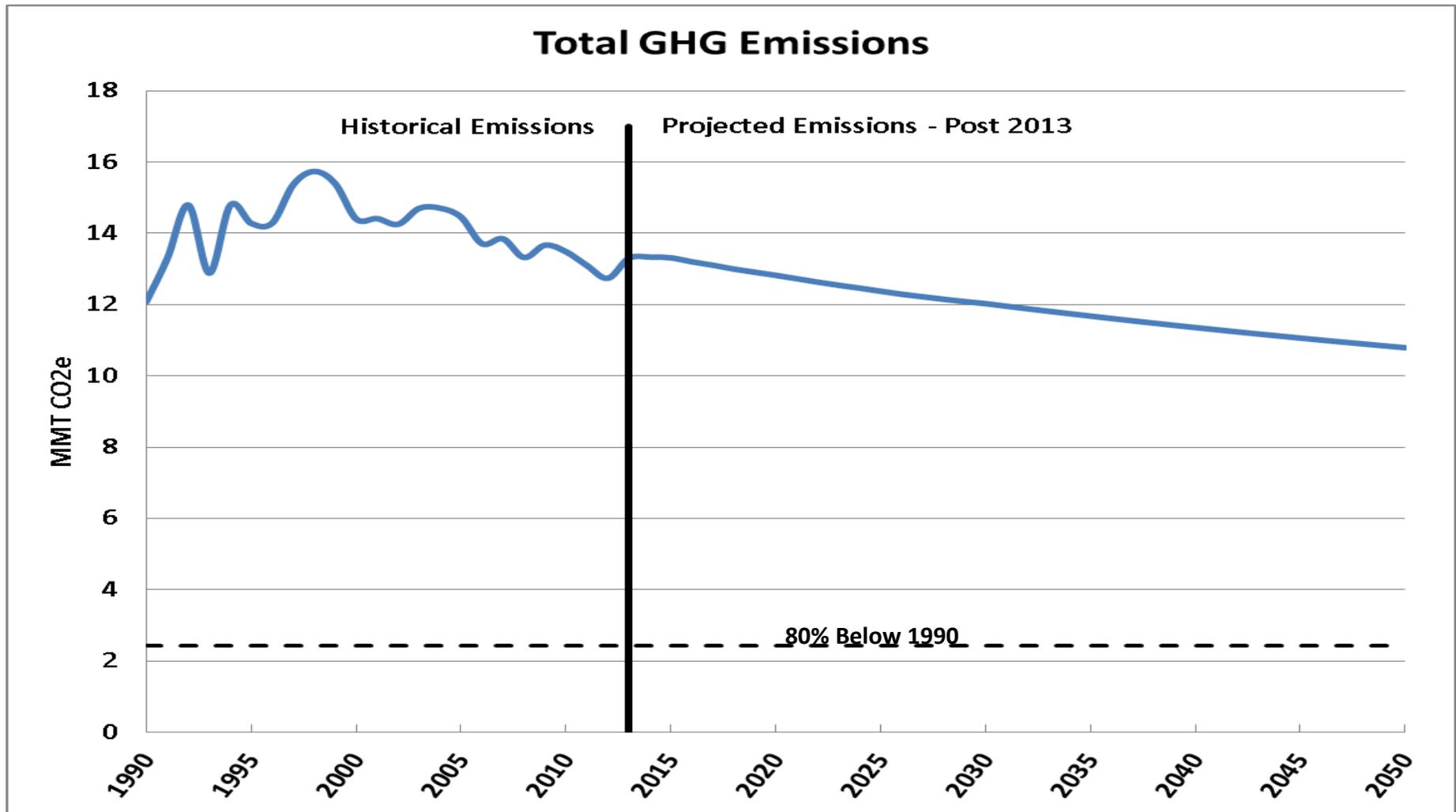
Overview of Today's Meeting

1. Objective of Baseline Task
2. Developing Baseline in LEAP
 - Key questions to address
 - Approach and data sources for baseline
 - Discussion Q & A and comments
3. Next steps & meetings
4. Public comment

Objective of Baseline Task

- Create within LEAP framework a realistic baseline of RI energy use, technologies, and practices
- Project their GHG emissions to 2050
- Use as starting point for GHG mitigation scenarios

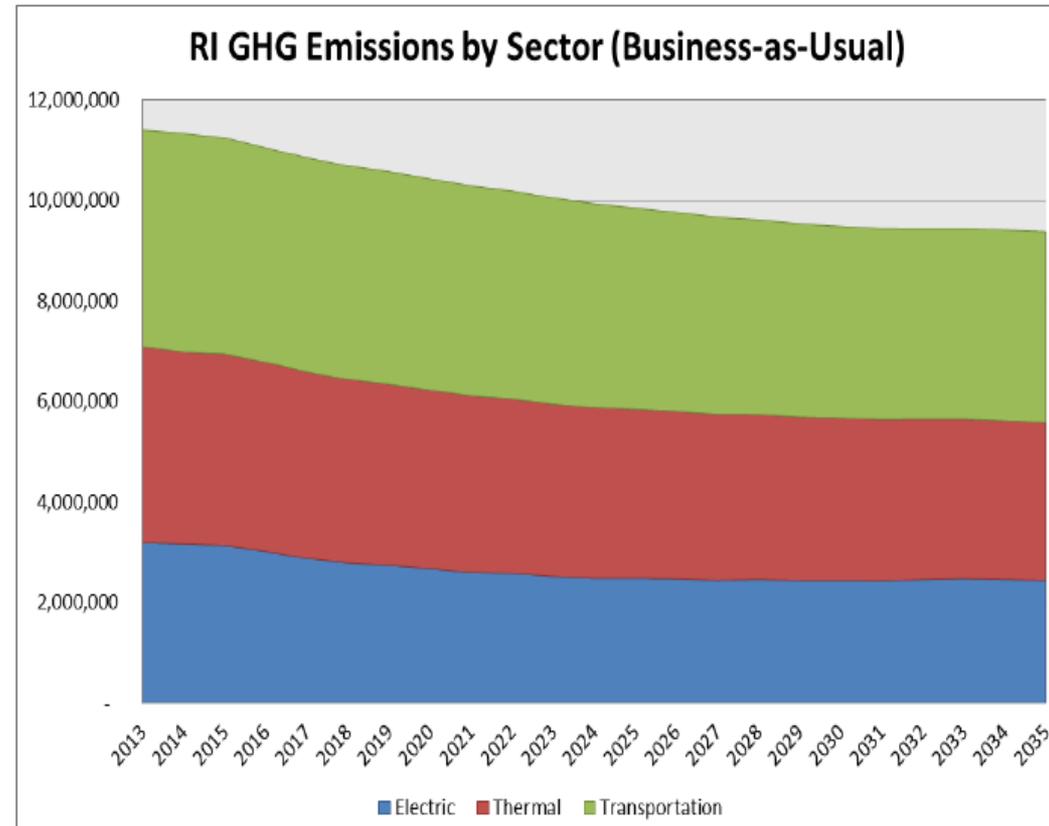
Need Realistic Baseline for GHG Scenarios



Based on EPA State Inventory Tool using AEO 2015 for projection

Energy Sector Trends Must Also be Realistic

- Calibrate baseline to historical data from:
 - EIA
 - RI GHG inventories
- Validate baseline using:
 - RI GHG Projection
 - RI State Energy Plan business-as-usual projections



Source: RI State Energy Plan



Baseline Modeling in LEAP

Key Questions to Address

- How well does the LEAP baseline reproduce RI's historical energy use and GHG emissions as a starting point for projecting future emissions?
- What does RI's projected GHG baseline emission trajectory look like through 2050 using the best currently available information?
- How high are RI's baseline GHG emissions projected to be in 2050 relative to its 80% reduction target?

Reminder: LEAP Background



*Long-range Energy
Alternatives Planning system*

- A comprehensive decision support tool for simulating different energy systems
- Developed at Stockholm Environment Institute
- 27,000 users in 190 countries
- Early version of LEAP previously used in 2002 RI GHG Action Plan
- LEAP being used in Conn. & Mass. GHG planning efforts

Role of LEAP Modeling in Emissions Reduction Study

- Provide an integrated, statewide model of energy demand, energy supply, and GHG emissions
- Quantify impacts of technical and behavioral mitigation measures
 - Emissions
 - Energy
 - Social costs and benefits
- Evaluate a range of scenarios – in particular, pathways to Resilient RI targets
- Support analysis of mitigation policies

Baseline Modeling – Overall Approach

Energy System

- Model calibrated to historical data from U.S. Energy Information Administration (EIA)
- Future energy demand projected via sectoral submodels
- Supply matched to demand – each fuel and year
- Emissions calculated using combustion emission factors
 - U.S. Environmental Protection Agency’s (EPA’s) State Inventory Tool (SIT)
 - EPA MOtor Vehicle Emission Simulator (MOVES)
 - EPA Emissions & Generation Resource Integrated Database (eGRID)
 - Intergovernmental Panel on Climate Change
 - EPA “AP-42” tabulated emission factors

Baseline Modeling – Overall Approach

Non-Energy GHG Emissions

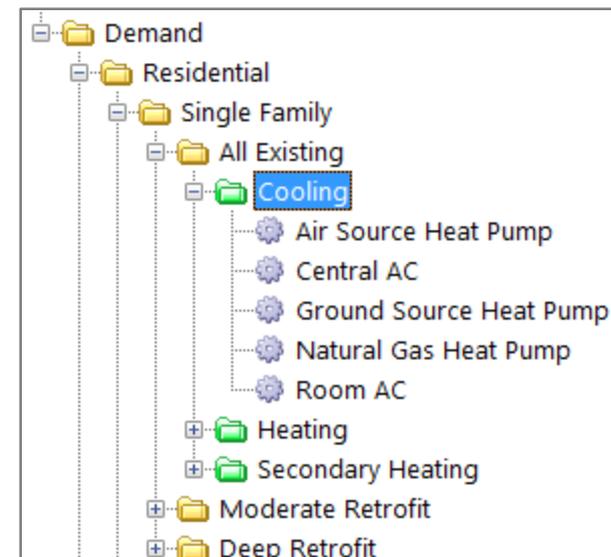
- Historical emissions taken from RI GHG inventories and SIT
- Future emissions projected outside LEAP using assumptions consistent with energy model (e.g., population)
- Projection results incorporated into LEAP model

Energy Demand: Residential and Commercial Buildings

- Downscale EIA's Annual Energy Outlook (AEO) Reference case projection to RI
- As far as data allow, model building types, energy end uses, and energy-using technologies
- Calibrate to projections of households, commercial floor space in RI

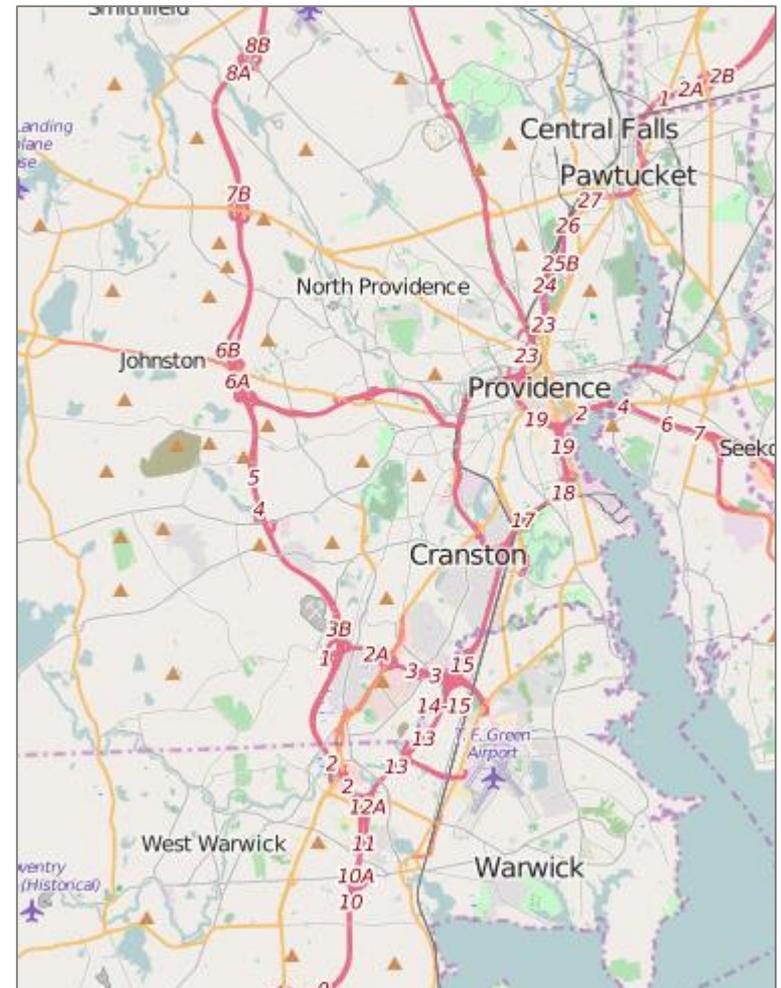


Source: Wikimedia



Energy Demand: Transportation

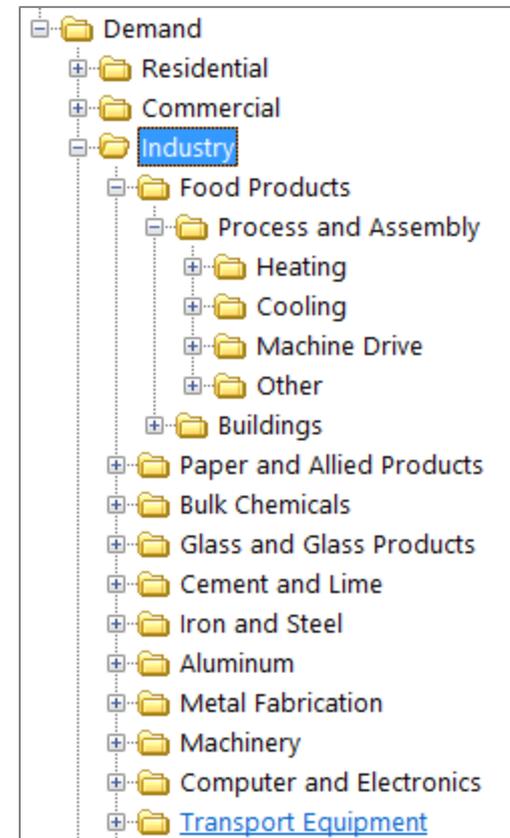
- Use RI-specific vehicle fleet data in MOVES
- Include in LEAP summary outputs from MOVES for RI
- Represent vehicle-miles traveled or passenger-miles traveled by mode (and vehicle class, for on-road)



Source: OpenStreetMap

Energy Demand: Industry

- Downscale AEO Reference case projection to RI
- As far as data allow, model energy end uses within industrial subsectors
 - Distinguish between energy used to operate buildings and energy used for industrial processes/assembly
- Calibrate to projections of industrial output in RI



Electricity Supply

- Model electricity generation, transmission, and distribution in ISO New England (ISO-NE) service area
 - Represent generating technologies, not individual plants or units
 - Aggregate data from EIA, ISO-NE, and EPA
 - Distinguish between generation resources inside and outside RI
 - Represent imports into ISO-NE area (and associate them with an average emission factor)
- Support in-state consumption-based and generation-based emissions accounting
- Base capacity expansion projection on ISO-NE forecasts, historical patterns, and other studies
- Simulate capacity dispatch using rules that reasonably reproduce historical record
- Harmonize with baseline power sector assumptions used in MA and CT GHG planning for 80% reduction by 2050

Supply of Other Fuels

Renewable Energy from RI Sources

- Project team compiling and developing estimates of resource potential
- Utilization for intermediate and final energy demands limited by potential in LEAP
- Impacts on non-energy emissions considered (e.g., landfill gas capture for power)

All Other Fuels

- All other fuels assumed to be imported into RI as needed
- Emissions impacts of production outside RI not modeled

Discussion Q & A and Comments

- Questions and comments?
- Can also email written comments to Pam Sherrill, meeting facilitator, sherrill6@cox.net; April 20 requested deadline
- Send technical questions to Paul Miller, NESCAUM, pmiller@nescaum.org



Next Steps & Meetings

May 9th Meeting on Task 1

Focus: Technology pathways and policy sets

- Initial list of sector-specific technologies and practices for achieving GHG reductions
- Initial inventory of policies and programs to enable greater deployment of GHG reduction technologies and practices
- Potential criteria for evaluating technology/practice and policy combinations

Review Process

- Review list of technology pathways and policy sets to be distributed ~2 weeks prior to May 9th meeting
- Discussion Q & A at meeting, with feedback on list
- 2 week comment period after May 9th meeting for additional input on technology pathways and policy sets

June 13th Meeting on Task 2

Focus: Defining Scenarios

- Meeting goals:
 - Take input on selected combinations of Task 1 technologies & practices presented at May 9th meeting
 - Use input to create initial 80% GHG mitigation scenarios for Task 4 scenario analysis
- Draft background materials to be distributed ~ 2 weeks before meeting, with comments taken afterwards

Recap of current and next steps

- Today's meeting presented reference case approach
- May 9th – take input on technologies and practices relevant to RI GHG mitigation
- June 13th – take input on scenario combinations for lowering reference case GHGs
- Late summer date tbd – present initial scenario analyses



Public Comment