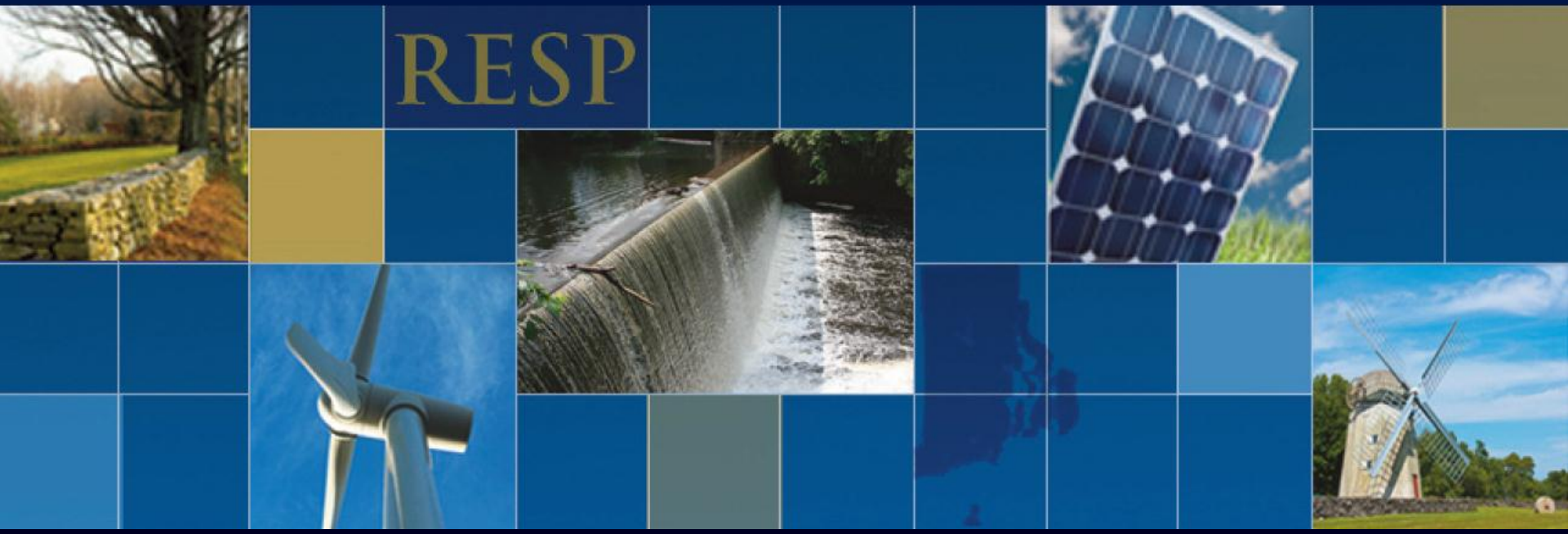
Rhode Island State Energy Plan

Stakeholder Meeting #1

January 17, 2012

RENEWABLE ENERGY SITING PARTNERSHIP (RESP)

Helping Communities Make Renewable Energy Decisions



RESP final products are available at:

http://seagrant.gso.uri.edu/resp/

Rhode Island
Renewable Energy Siting Partnership

Coastal Resources Center
University of Rhode Island

Sea Grant
Rhode Island

THE UNIVERSITY OF RHODE ISLAND
OUTREACH CENTER

Rhode Island

Renewable Energy Siting Partnership (RESP)

Rhode Islanders will have access to relevant information so they may make informed, fact-based decisions about renewable energy

RESP – NEXT STEPS

- The Office of Energy Resources (RIOER) and the Statewide Planning Program (RISPP) are **developing a comprehensive and strategic State Energy Plan**; and
- **RIEnergy.org and online web tools** will continually be updated with relevant resources and information (next update by this summer).

WIND TURBINE SITING GUIDELINES – NEXT STEPS

- **Compare all currently operating turbines in Rhode Island with the drafted wind siting guidelines** produced by SPP's Wind Advisory Council (formerly Volume 3 of the RESP);
- **Gather acoustic data** at a majority of the existing turbines over the next couple of months; and
- **Analyze the impact of wind turbines and other "disamenities" on property values** of adjacent dwellings using real estate data spanning the past 20 years.

Rhode Island State Energy Plan

Stakeholder Meeting #1

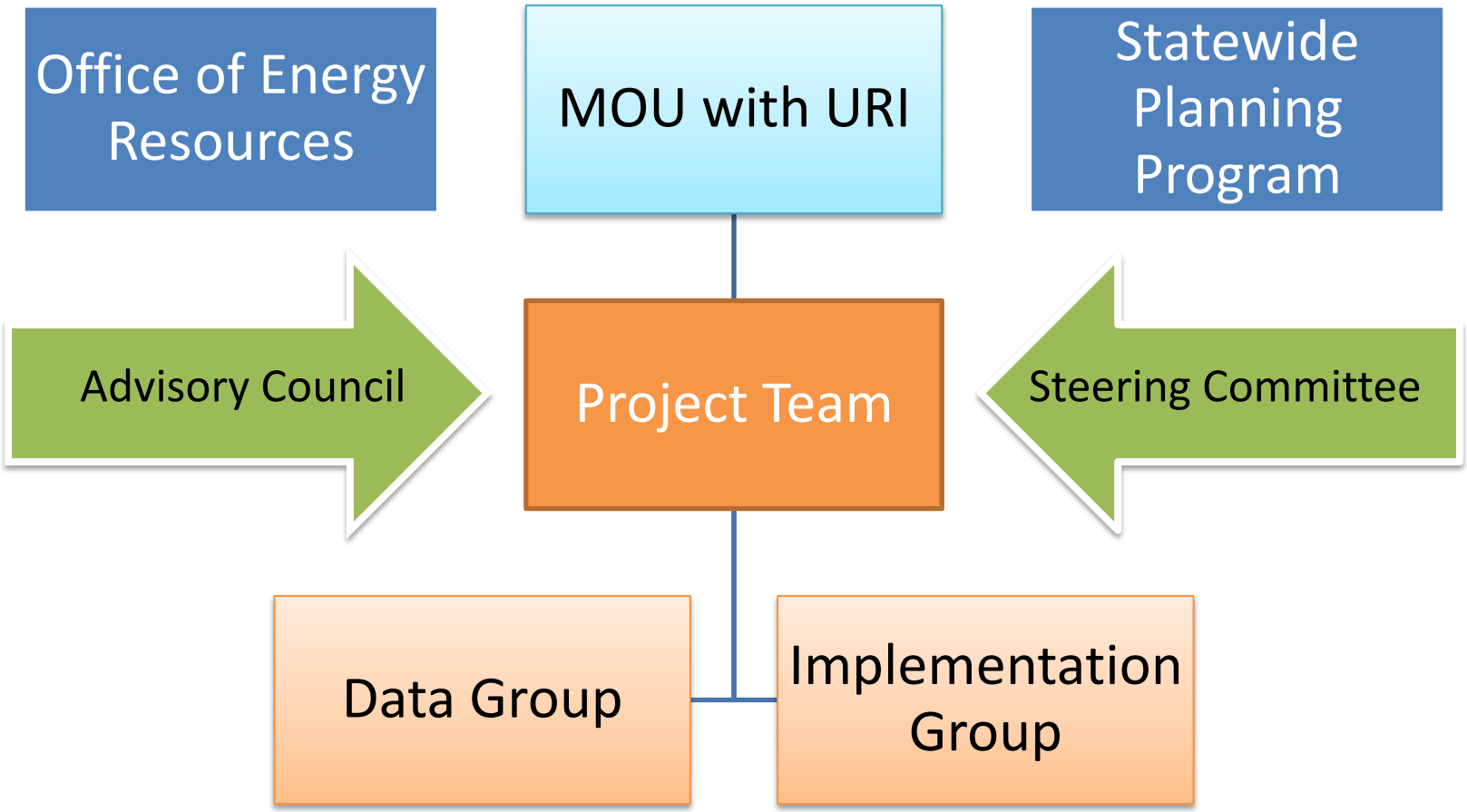
Danny Musher, Office of Energy Resources

January 17, 2012

The Rhode Island State Energy Plan

- State Guide Plan Element 781
- Last updated in 2002
- Sets guidance for municipal comprehensive plans
- Development of new update by March 2014 led by the Office of Energy Resources (RIOER) in partnership with the Statewide Planning Program (RISPP)

Advisory Structure



Advisory Structure

Supporting Groups

- Renewable Energy Coordinating Board (RECB)
- Energy Efficiency & Resource Management Council (EERMC)
- Petroleum Savings and Independence Advisory Commission
- State Planning Council
- State Planning Council Technical Committee
- State Agencies
- National Association of State Energy Officials (NASEO)
- Other states

Advisory Structure

Project Team – Data Group

Member	Affiliation	Role
Danny Musher	*RI Office of Energy Resources (RIOER)*	Project Management, Data Analysis
Hannah Morini	*RI Economic Development Corporation (RIEDC)*	Project Management, Policy Analysis
Christopher Damon	*URI Environmental Data Center (URI-EDC)*	GIS support
Jamie Howland	*ENE (Environment Northeast)*	Data Analysis & Forecasting
Varun Kumar	*ENE (Environment Northeast)*	Data Analysis & Forecasting
Kristina DiSanto	*University of Rhode Island (URI)*	Project Management, Outreach
Wendy Lucht	*University of Rhode Island (URI)*	Transportation SME, Outreach
[tbd]	*[tbd via RFP]*	Data Analysis & Scenario Modeling

Advisory Structure

Project Team – Implementation Groups

Members	Affiliation	Role
[tbd]	*[tbd]*	Electricity
[tbd]	*[tbd]*	Heating
[tbd]	*[tbd]*	Transportation

Timeline

Project Phases

Phase I: Research & Data Collection (December 2012 – May 2013) Gather and synthesize the best available energy data; Set measurable goals based on modeling analysis and stakeholder feedback; Design an actionable implementation strategy
Phase II: Preparation of Preliminary Draft Plan (June 2013 – September 2013) Distill research developed during Phase I into a Preliminary Draft Plan
Phase III: Technical & Public Review (October 2013 – March 2014) Vet Preliminary Draft Plan through a technical and public review process; Adopt Plan as State Guide Plan Element

Scope of Work

What do we want?

- Toast some bread
- Read a book at night
- Stay warm in the winter
- Stay cool in the summer
- Visit friends and family

→At the end of the day, what we want is ***energy services***

What do we want?

- Fossil fuels, energy efficiency and renewable energy are merely ***means*** of providing these energy services

→So how should we go about deciding ***how*** we want to provide energy services?

Setting criteria for providing energy services

- Safety
- Reliability
- Affordability
- Participation
- Environmental Protection
- Sustainability
- Economic Benefits

Emergency planning & resiliency to contingencies… Sandy!

VISION STATEMENT
*"In **2035**, Rhode Island will provide energy services across all sectors—electricity, thermal, and transportation—using a safe, reliable, affordable, participatory, environmentally sound, sustainable energy system that provides benefits to Rhode Island's economy."*

Rhode Island State Energy Plan Scope

- ***Gather Data**: Analyze and quantify the amount, cost, supply, and environmental effects of all forms of energy resources—currently used, and potentially available to use—within all sectors in Rhode Island.*

- ***Set Goals**: Identify measurable targets for providing energy services using a resource mix that meets a set of criteria advancing the health, environmental, economic, and human wellbeing of the people, communities, and environment of Rhode Island.*

- ***Recommend Action**: Design a comprehensive implementation strategy to meet the goals of the Plan through public, private, and individual efforts.*

What is the time frame?

- ***2023: By statute***
- ***2035: Long-range planning horizon***

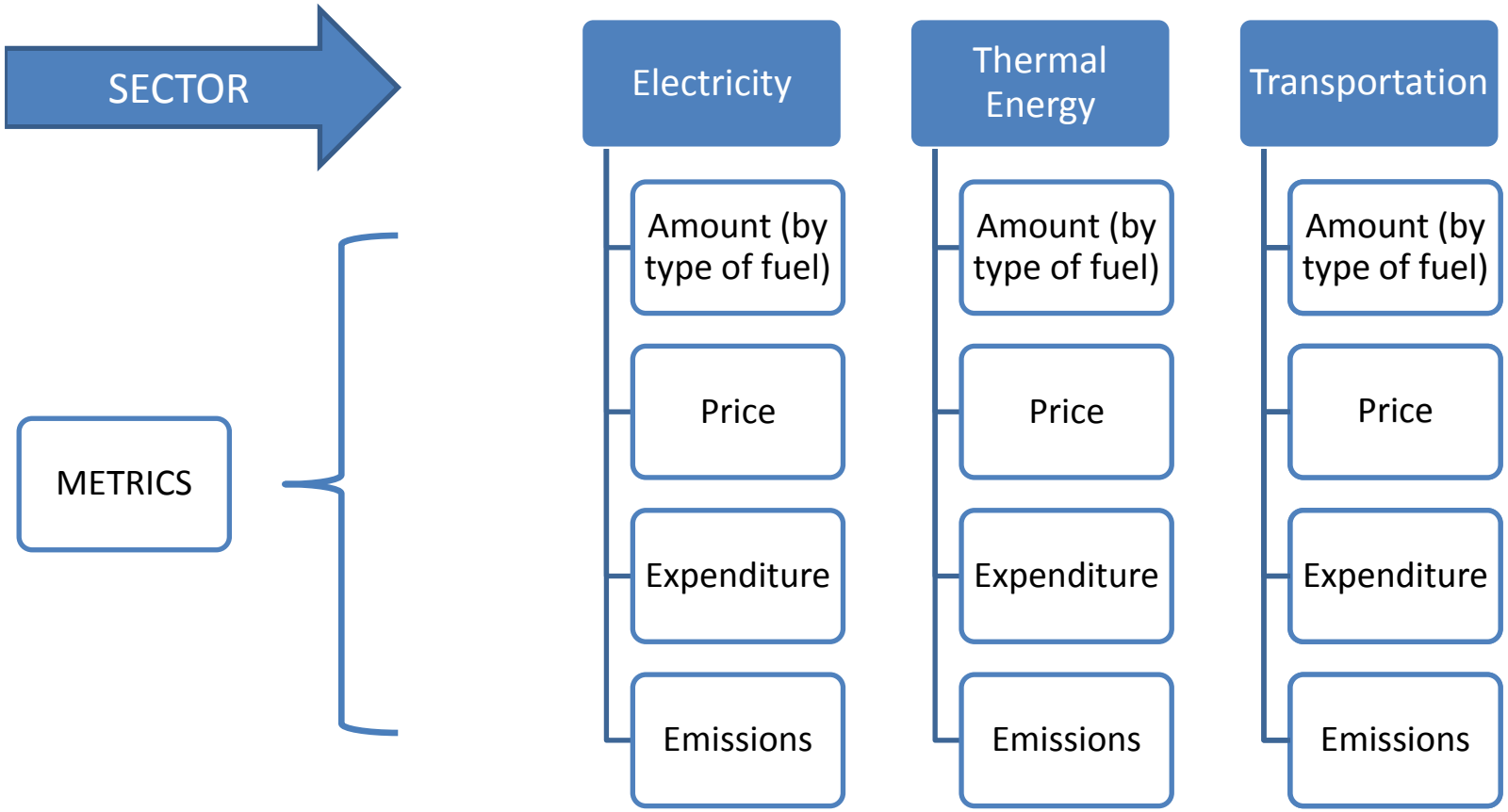
Step 1 - *Gather Data*

"What do we face?"

- ***Gather Data*: Analyze and quantify the amount, cost, supply, and environmental effects of all forms of energy resources—currently used, and potentially available to use—within all sectors in Rhode Island.**

Step 1 - *Gather Data*

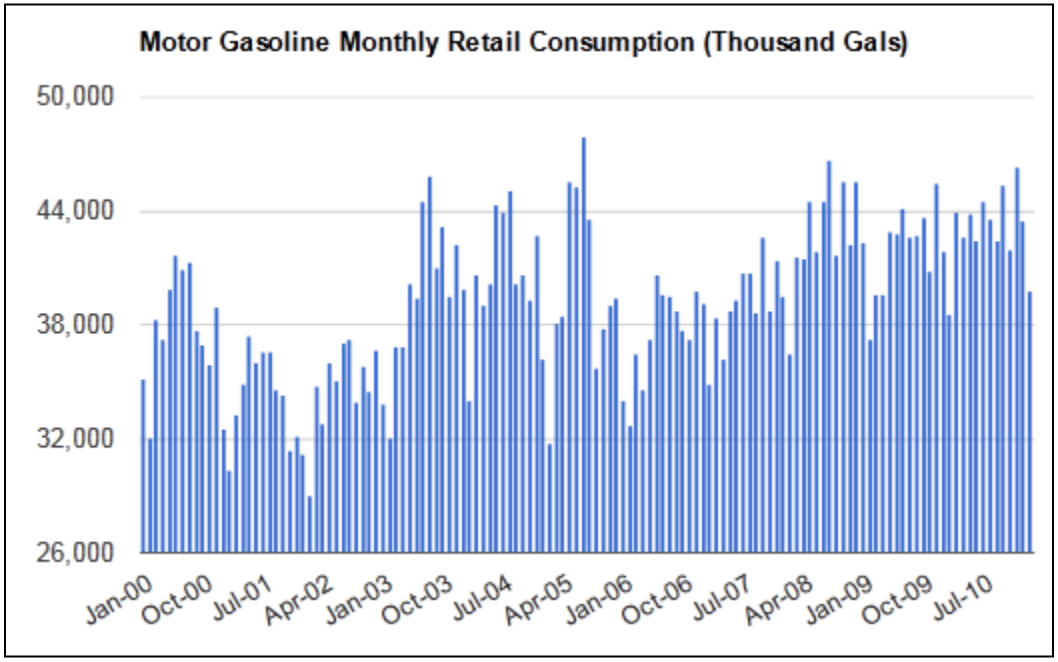
TASK 1: BASELINE



Step 1 - *Gather Data*

TASK 1: BASELINE

- Develop an **historical baseline** of energy demand & supply by sector*

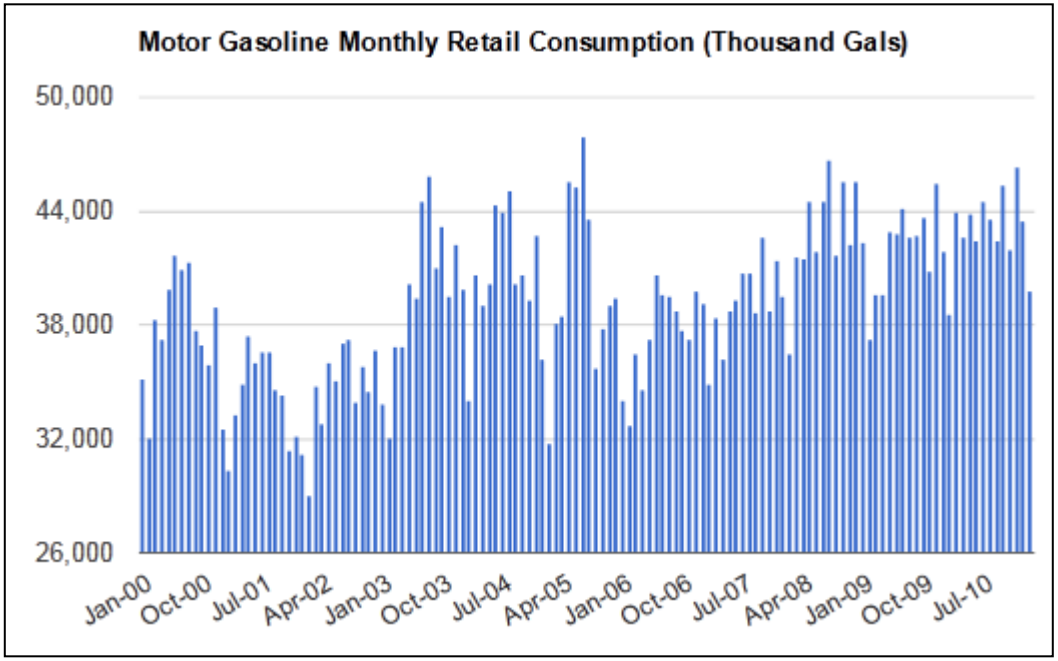


- Transportation
  - Amount (by type of fuel)
  - Price
  - Expenditure
  - Emissions

*Sources include EIA, ISO-NE, utility and state agency data

Step 1 - *Gather Data*

TASK 1: BASELINE

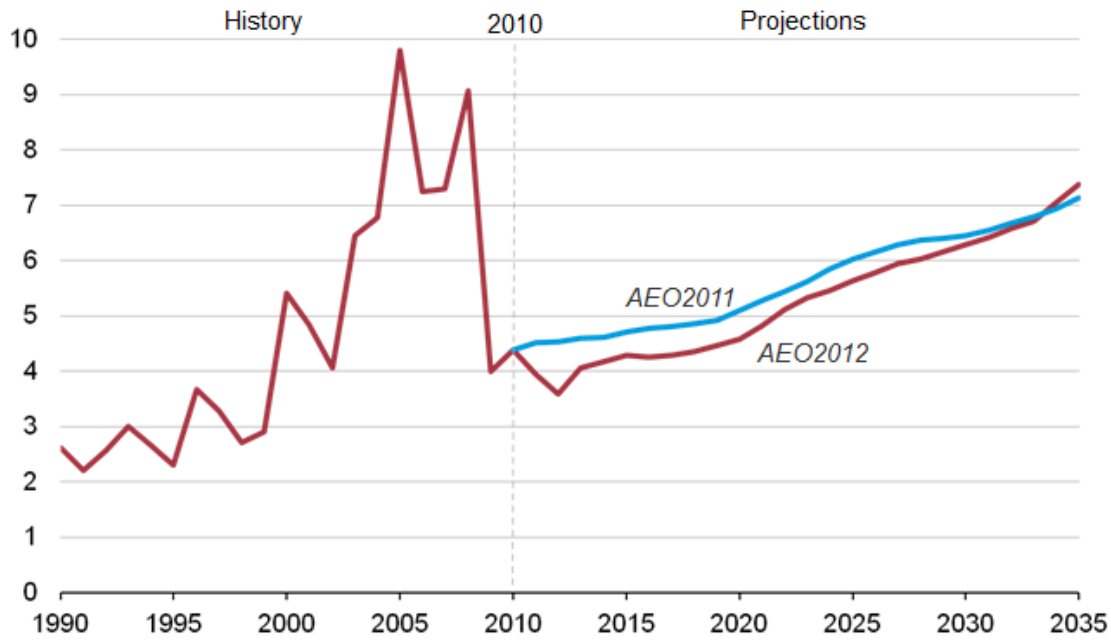


"In the year 2010 for Rhode Island, the transportation sector consumption was approximately 517,497 thousand gallons with average rates around 2.33 $/gallon excluding taxes. The state's expenditure on Gasoline was approximately $1.2 billion. Out of this expenditure, approximately $1.1 billion left the state as wholesale expenditure because the fuel was imported. This fuel consumption generated about 4.5 million tons of carbon dioxide (CO_2) emissions"

Step 1 - *Gather Data*

TASK 2: FORECAST

- Develop a **business-as-usual forecast** of energy demand and supply by sector*

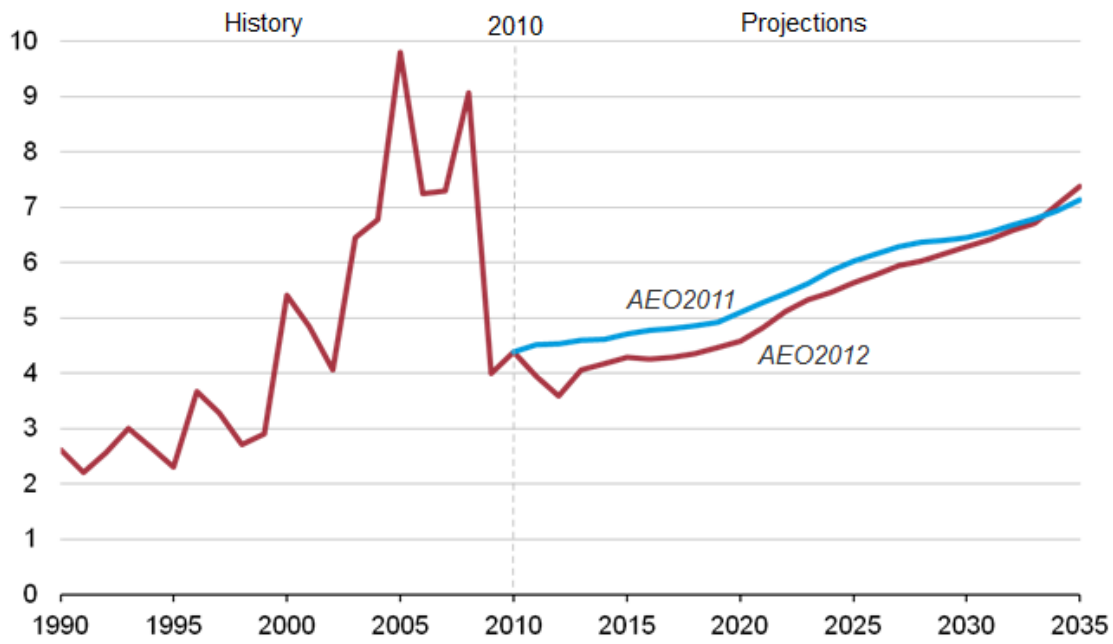


- Transportation
  - Amount (by type of fuel)
  - Price
  - Expenditure
  - Emissions

*Sources include EIA, ISO-NE

Step 1 - *Gather Data*

TASK 2: FORECAST

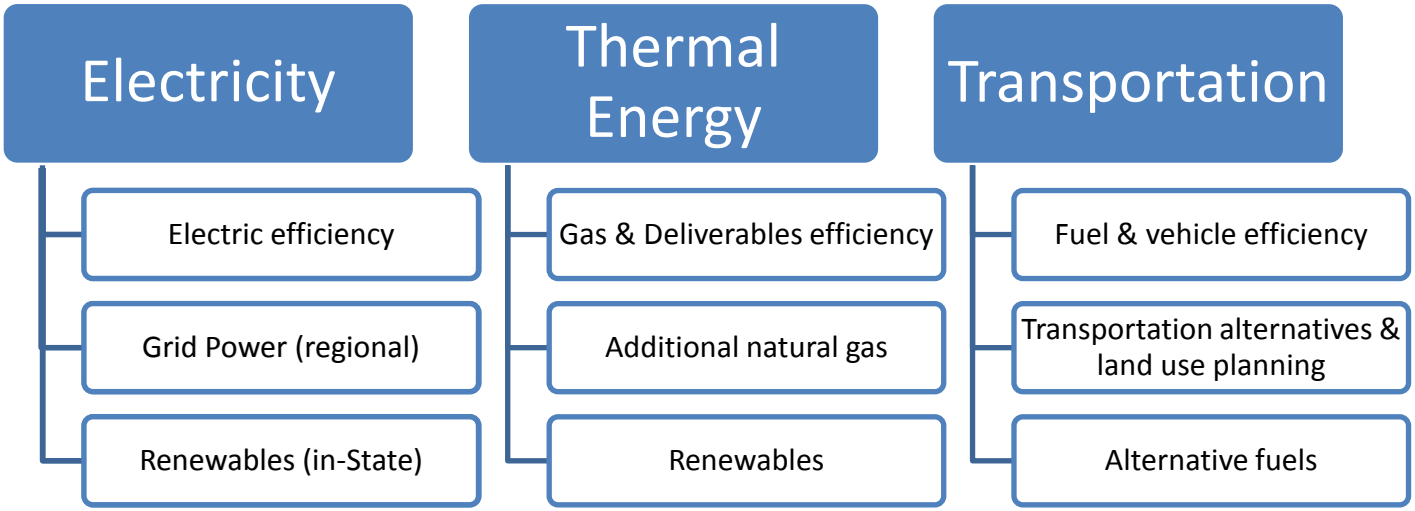


"In the year 2035 for Rhode Island, the transportation sector consumption will be about XXX,XXX thousand gallons with average rates around X.XX $/gallon excluding taxes. The state's expenditure on Gasoline will be about $X.X billion. Out of this expenditure, approximately $1.1 billion will leave the state as wholesale expenditure because the fuel is imported. This fuel consumption will generate about X.X million tons of carbon dioxide (CO_2) emissions"

Step 1 - *Gather Data*

TASK 3: RESOURCES

- Assess **potential supply, demand, and infrastructure resources** available to the State to meet future energy needs for each sector*



*Sources include existing Federal, State, and additional studies

Step 1 - *Gather Data*

TASK 3: RESOURCES

- Electricity
  - Electric efficiency
  - Grid Power (regional)
  - Renewables (in-State)

Rhode Island Onshore Renewable Energy Potential

Energy Source	Capacity Factor	MW Capacity	MWh Generation
Solar (distributed & large-scale)	14%	150	183,960
Municipal Solid Waste/Landfill Gas	80%	80	560,640
Wind (on-shore)	25%	50	109,500
Hydropower (conventional)	50%	20	87,600
TOTAL ANNUAL POTENTIAL (MWh)		**300**	**941,700**

TOTAL ANNUAL DEMAND (MWh) (ISO-NE)	Year	2019	**9,495,000**
% of load met with clean energy sources			10%

An Example: "For the electricity sector, the development of 300 MW of onshore resources – solar (150 MW), landfill gas (80 MW), wind (50 MW), and hydropower (10 MW) – could supply approximately 10% of 9 million MWh of anticipated demand."

Step 2 – ***Set Goals***

"What do we want?"

- ***Set Goals*: Identify measurable targets for providing energy services using a resource mix that meets a set of criteria advancing the health, environmental, economic, and human wellbeing of the people, communities, and environment of Rhode Island.**

Step 2 – *Set Goals*

TASK 4: SCENARIOS

- How do we know if our current course of action meets our criteria for a safe, reliable, affordable, participatory, environmentally sound, sustainable, and economically beneficial energy future?

VISION STATEMENT
*"In **2035**, Rhode Island will provide energy services across all sectors—electricity, thermal, and transportation—using a safe, reliable, affordable, participatory, environmentally sound, sustainable energy system that provides benefits to Rhode Island's economy."*

Step 2 – ***Set Goals***

TASK 4: SCENARIOS

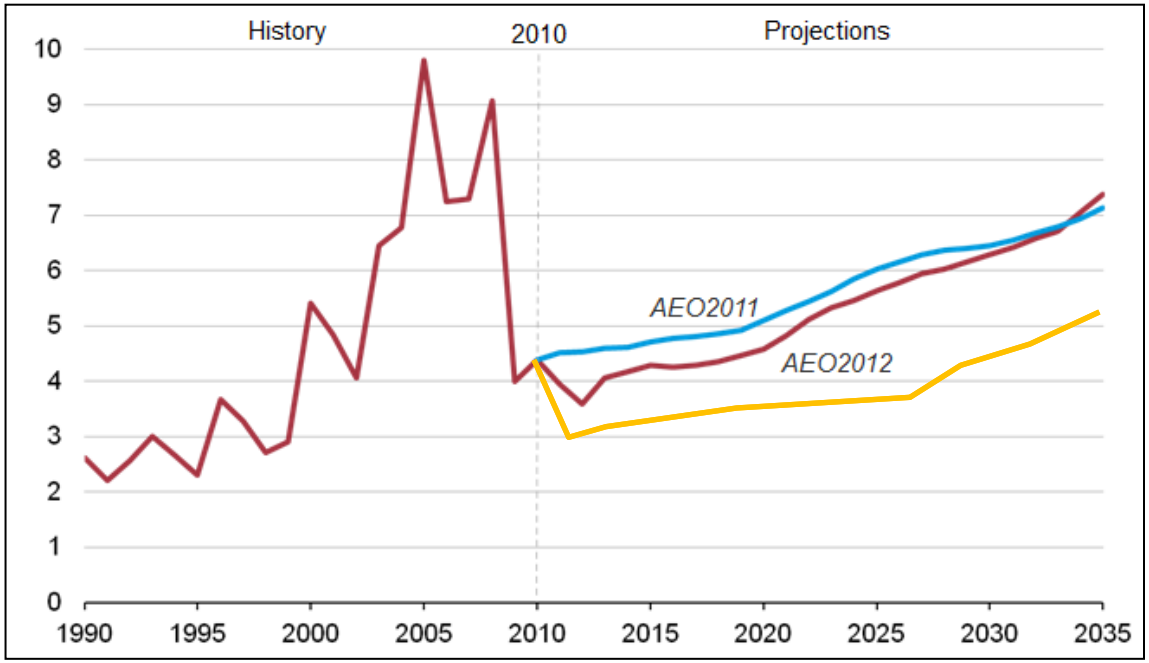
- How do we know if our current course of action meets our criteria for a safe, reliable, affordable, participatory, environmentally sound, sustainable, and economically beneficial energy future?

→In other words, ***can we do better?***

Step 2 – *Set Goals*

TASK 4: SCENARIOS

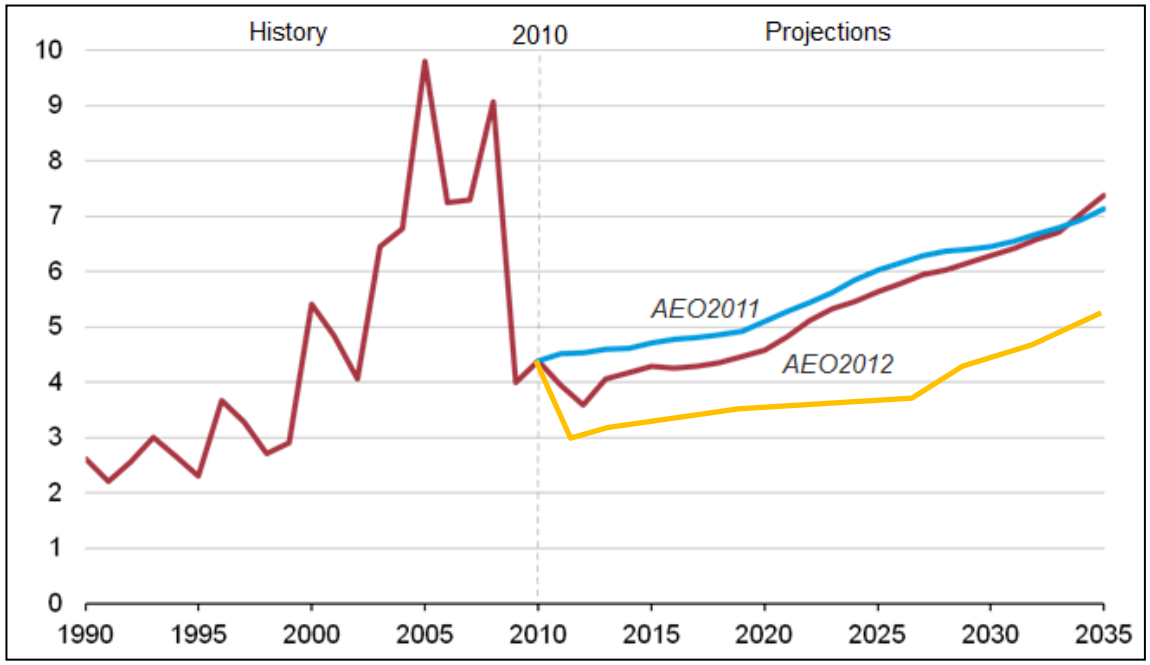
- Test **alternate energy futures** against **business-as-usual** forecast



- Transportation
  - Amount (by type of fuel)
  - Price
  - Expenditure
  - Emissions

Step 2 – *Set Goals*

TASK 4: SCENARIOS

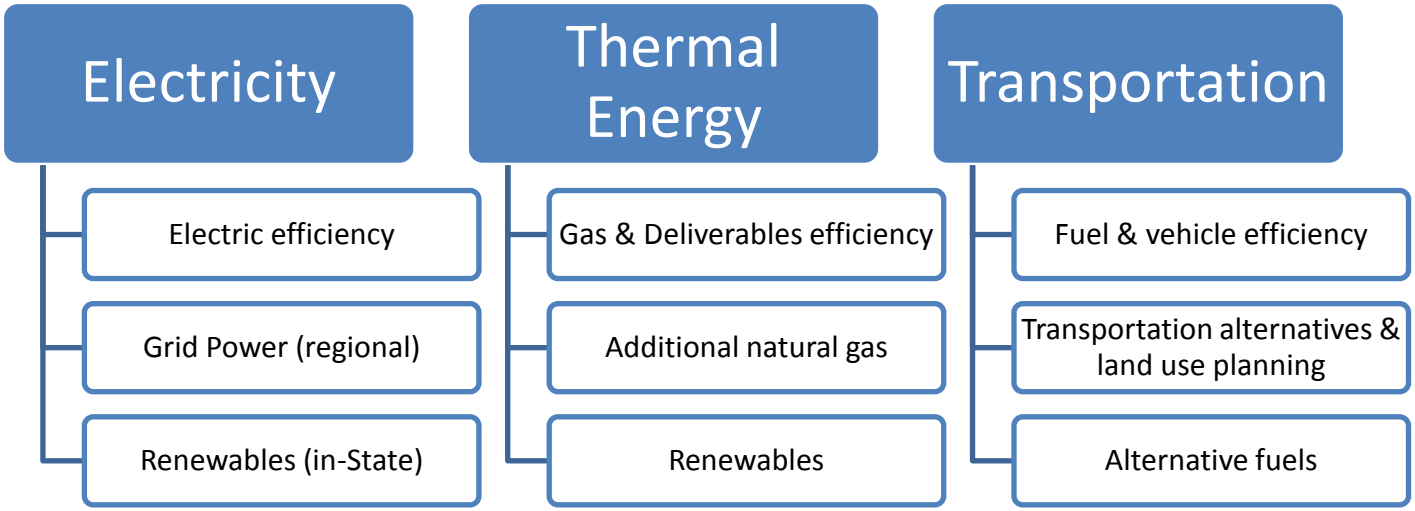


"In the year 2035 for Rhode Island, will the transportation sector consume less fuel, at a lower average prices, with less total expenditure on fuel (and less leaving the state), and reduced amounts of carbon dioxide emissions (CO_2) emissions?"

Step 2 – *Set Goals*

TASK 5: GOALS

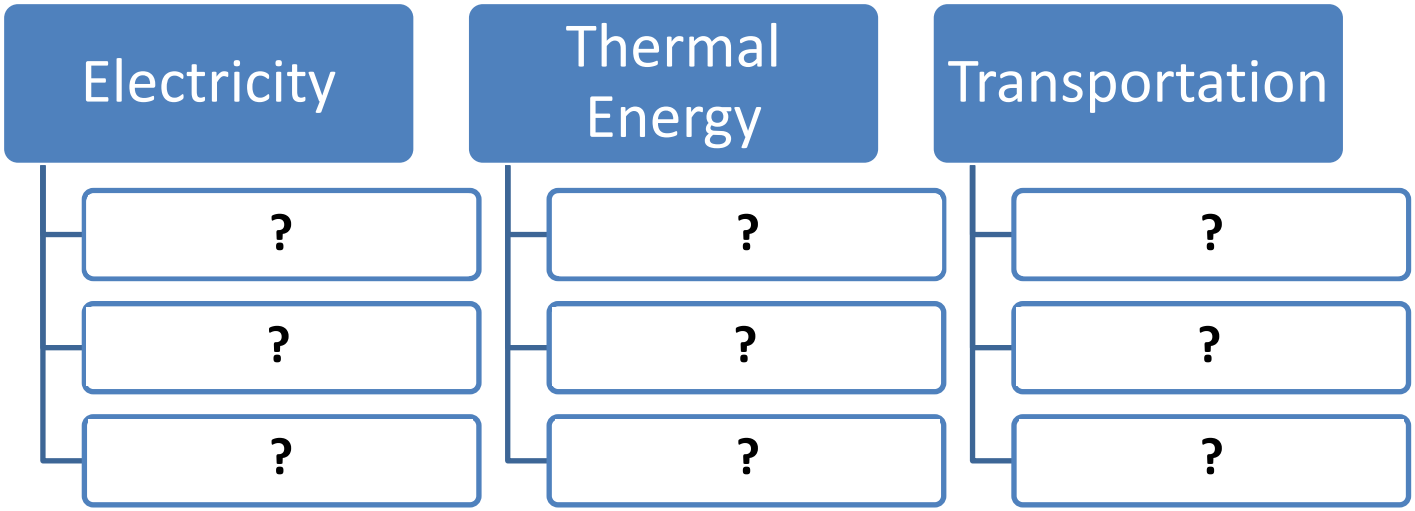
- Spell out **quantifiable targets** for the aspirational mix of supply and demand resources that could be used to provide energy services



Step 2 – *Set Goals*

TASK 5: GOALS

- Spell out **quantifiable targets** for the aspirational mix of supply and demand resources that could be used to provide energy services



Step 3 – *Recommend Action*

"How do we get there?"

- ***Recommend Action*: Design a comprehensive implementation strategy to meet the goals of the Plan through public, private, and individual efforts.**

Step 3 – *Recommend Action*

TASK 6: ROADMAP

- Recommend concrete **near- and long-term policy options** designed to attain the Plan goals

Water Resource Management (WRM)		Lead	Support	Timeline
Goal WRM-3	**Ensure a reasonable supply of quality drinking water for the State**			
Demand Management Policy	1. Reduce the overall demand for potable water			
	♦ Strategies			
	A. Identify areas where water reuse for nonpotable purposes is feasible	DEM	WS, DOH	MT
	A.1 Establish opportunites for nonpotable water reuse	DEM	DOH,WS	LT
	A.2 Develop capacity to review and assist with water reuse projects	DOH	DEM,WRBS	LT
	B. Continue existing Interagency MOU for review of water withdrawals and include aquifer replenishment projects	DEM	DOH,WRB,DOP	O
	C. Reduce seasonal demands	WS,U	WRB,URI	O
	D. Reduce Rhode Island's vulnerablity to annual seasonal dry periods			
	D.1 Adopt fines for improper lawn watering /outdoor water use	M	WS	ST
	D.2 Work with URI Master Gardeners/landscapers to encourage use of water efficient landscaping	WS,M	WRB,WC,RILA	ST
	D.3 Require use of rain sensors and soil moisture sensors in lawn irrigation systems.	M	WS	MT
	D.4 Educate public on installation and care of lawn irrigation technology	WS,M	WRB,RILA	O
	D.5 Educate private well owners and users not on public distribution systems on the need for water efficiency	WRB	DSC	O
	E. Promote public education for implementation of water efficiency measures	WS,M	WRB,URI	O
	E.1 Continue to support Drinking Water Week	WS	RIWWA,All	O
	E.2 Revise Plumbing code to futher promote effiicent water use	WRBS	BCC	MT
	E.3 Promote use of EPA Water Sense Appliances	WRB	BCC,URI	O
	F. Continue to promote water use/meter sizing reviews for major users	WS	M, RIWWA	O
	G. Promote rate structures and conservation pricing	WRB	WS,M,PUC	O
	H. Investigate other incentives to further reduce demands	WRBS	WS, WS, GA	LT
	I. Ensure that leakage shall not exceed 10% of total system water produced or purchased	WS	WRBS, DOH	O
	J. Reconsider reuse of abandoned supplies in light of new technologies, non-potable use needs and anticipated future demands without impacting public health	WS	DOH,EPA	LT
Goal WRM-4	**Ensure the protection of public health, safety and welfare and essential drinking water resources during water supply emergencies**			
Emergency Management Policy	1. Manage and conserve essential potable water resources in times of emergencies and or shortages			
	♦ Strategies			
	A. Evaluate intersystem temporary capabilities and needs for supply during emergencies	DOH	WS,M	MT
	B. Ensure emergency memorandums of understanding, stand-by-contracts for emergency connections, and price agreements for purchasing potable water at competitive prices are kept current	WS,M	WRBS	O
	C. Ensure all water systems have emergency plans for alternative distribution before emergencies occur	WS,M	WRBS,RIEMA	O
	D. Ensure all water systems have established priority uses and use restrictions for use during emergencies before emergencies occur	WS,M	WRBS	O
	E. Idenitfy interconnections for ongoing uses and for emergency responses	WS,M	DOH	ST
	F. Develop and enhance the redundancy capability of all systems	WS,M	WRB,DOH	ST
	G. Ensure that municipalities know the procedures to declare a water supply emergency	M,WS	DOH	O
	H. Ensure that state agencies involved in water emergency management have updated operational plans for water emergencies	SA	RIEMA	O
	I. Implement emergency preparedness plans of the PUC	WS,M	PUC	O
	J. Ensure that the state and municipal emergency operations plans and the emergency operations portions of WSSMPS are updated and implemented	WS,M	RIEMA	O

Step 3 – *Recommend Action*

TASK 7: REVISION

- Outline **mechanisms for revising** the Plan in order to monitor progress towards goals and reevaluate and adjust recommendations over time

> "Provide support and information to the division of planning and the state planning council in development of a ten (10) year Rhode Island Energy Guide Plan, **which shall be reviewed and amended if necessary every five (5) years**"

Rhode Island State Energy Plan

Stakeholder Meeting #1

January 17, 2012

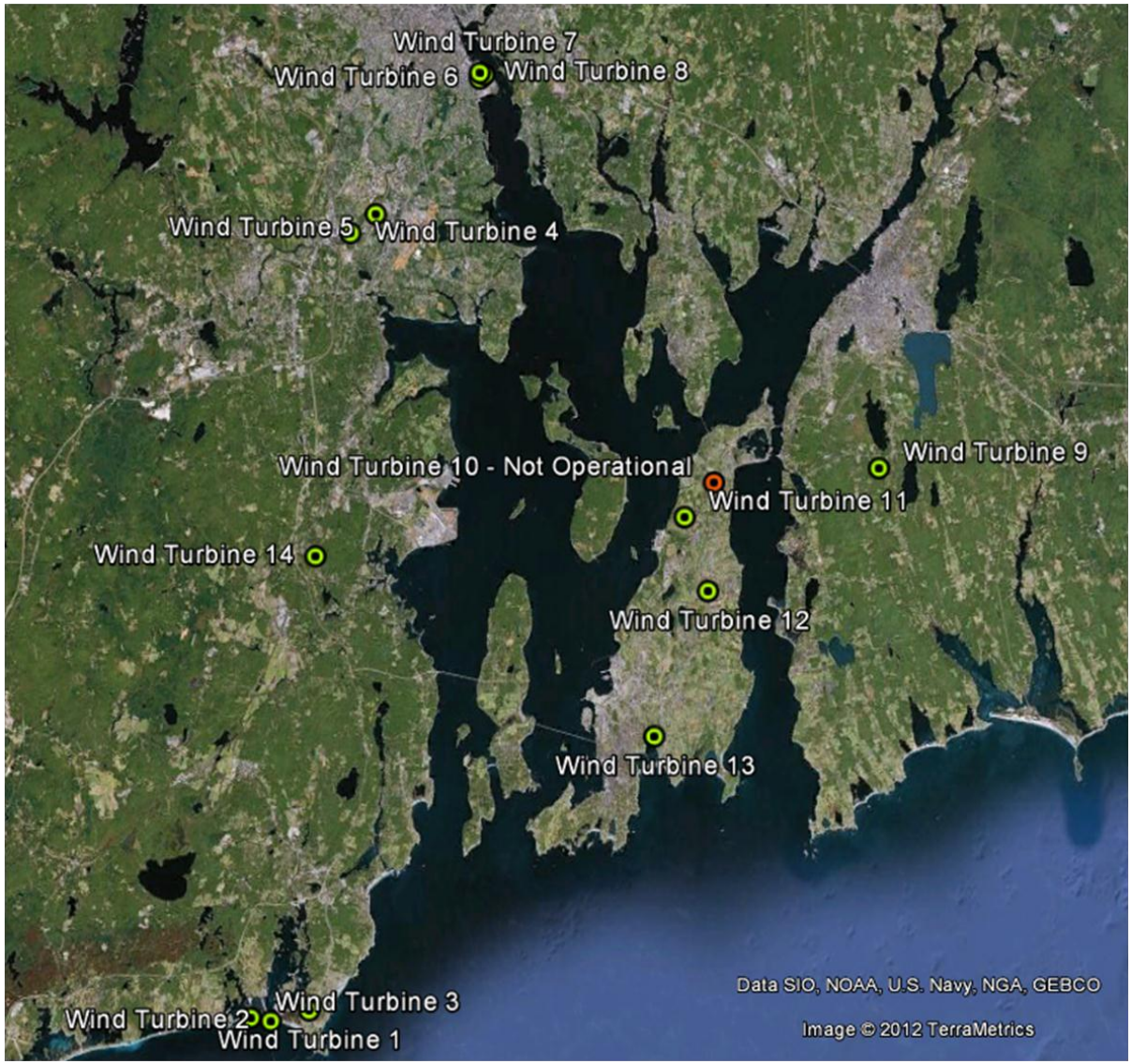
Radiated Noise Measurements of Installed Wind Turbines throughout Rhode Island

Harold “Bud” Vincent
Research Associate Professor
Department of Ocean Engineering
University of Rhode Island

BACKGROUND

- There are 14 wind turbines presently installed in RI
- No (limited) baseline noise measurement data exist for these sites
- URI will visit each operation site and collect repeated noise measurement data recordings to establish baseline levels for existing sites
- This data will serve to inform siting guidelines under development

RI Wind Turbine Locations



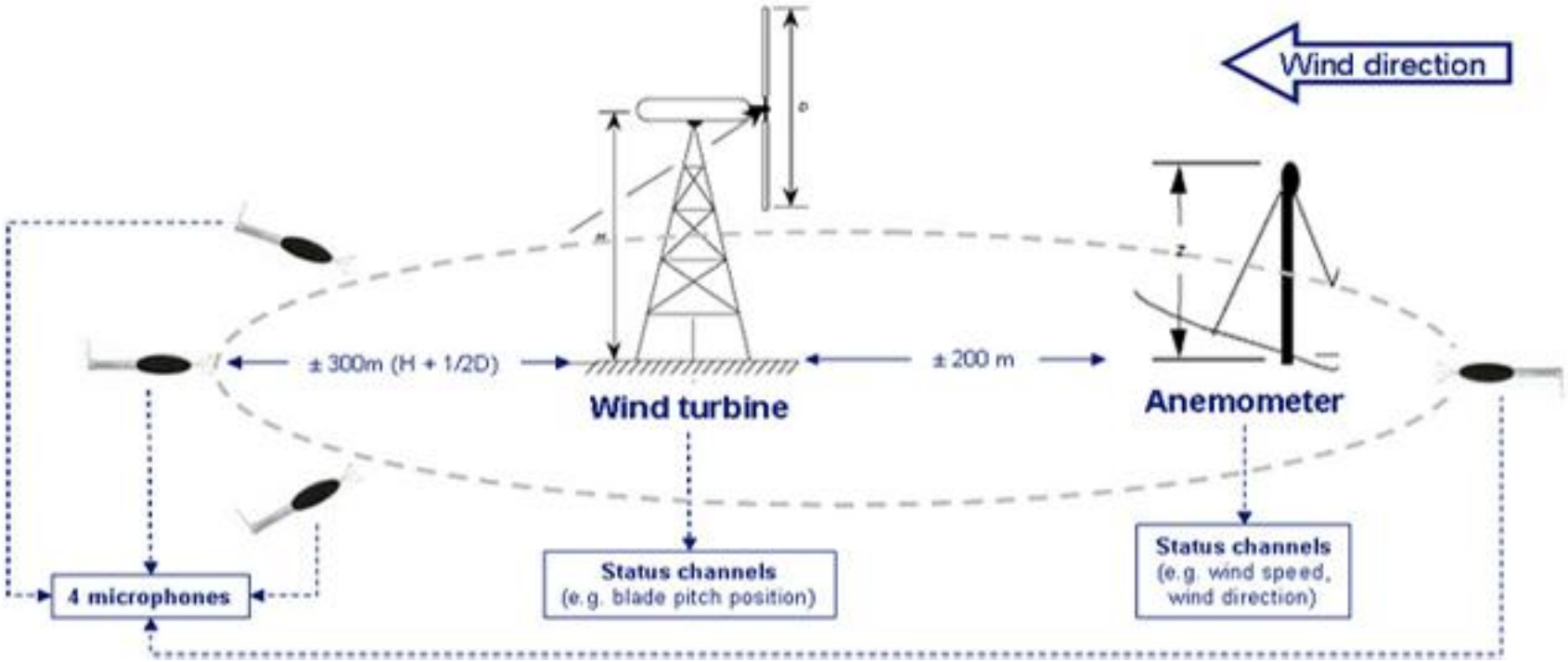
SITE PARAMETERS

- Each site is unique
- Some sites have multiple wind turbines
- Some are near interstate highway
- Some are near industrial activity
- One is near railroad
- All have varying distances to nearest property lines

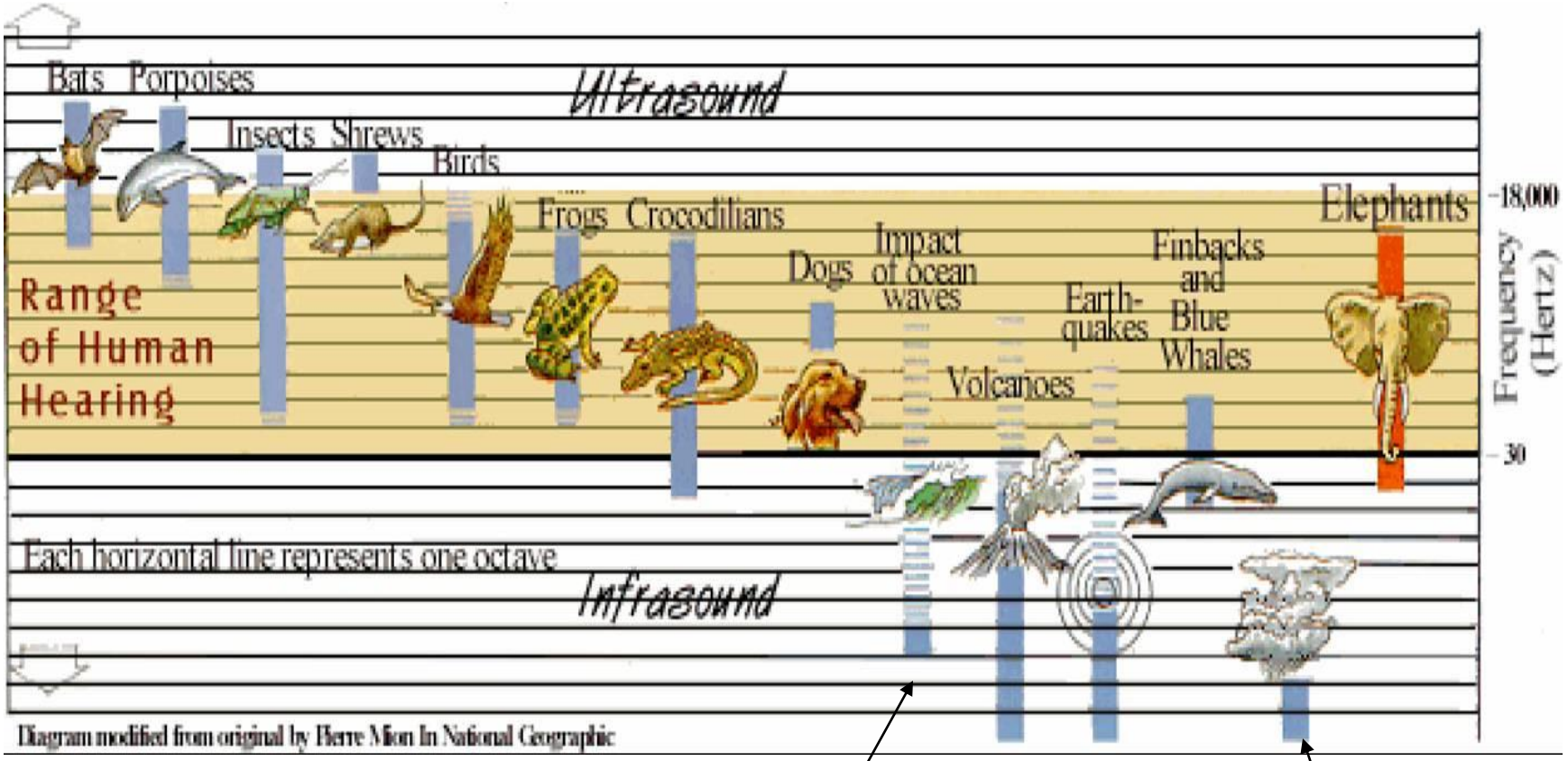
METHODOLOGY

- Each site will be visited multiple times from January 2013 – April 2013
- Data will be collected under a variety of conditions
  - Ambient background noise (e..g. traffic)
  - Temperature
  - Humidity
  - Wind Speed and direction
- Recordings will encompass both Audio and Infrasound frequency regions
  - Raw pressure recordings
  - Sound level meter recordings
- Calibrated equipment
- Standard methodology
  - Noise Testing of Wind Turbine Power Generators (IEC Standard 61400-11 2nd Ed.)
  - Under revision to 3rd Edition (will likely include infrasound)

TEST SETUP


Wind direction
± 300m (H + 1/2D)
± 200 m
Wind turbine
Anemometer
4 microphones
Status channels
(e.g. blade pitch position)
Status channels
(e.g. wind speed,
wind direction)

THE SOUND SPECTRUM



Surf Breaking 2-5 Hz

Microbaroms 0.1-0.5 Hz

OBJECTIVES & PLANNED RESULTS

- Data will be analyzed and archived
- Quality assurance will be performed to ensure computations are made on appropriate data sections
- Utilization of raw and calibrated instruments the results obtained will be traceable and re-peatable (one would hav ethe ability to reproduce the same results independently)
- Summarized in final report to RI OER

Rhode Island State Energy Plan

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January 17, 2012

The Effect of Wind Turbines on Property Values in Rhode Island

(proposed research)

Corey Lang

RISEP – Public Stakeholder Meeting #1

January 17, 2013

Research Team

Department of Environmental and Natural Resource Economics, University of Rhode Island

Corey Lang – professor and project lead

Jim Opaluch – professor

Susan Gorelick – graduate student

George Sfinarolakis – graduate student

Motivation

- Onshore wind turbines erected in Rhode Island beginning in 2006
- Contentious issue
- Common concern is property values
- Ben Hoen presentation
  - Didn’t necessarily apply to Rhode Island, which is isolated turbines in densely populated areas
- Our goal is to do something similar as Ben Hoen for Rhode Island

Research Plan

Collect data

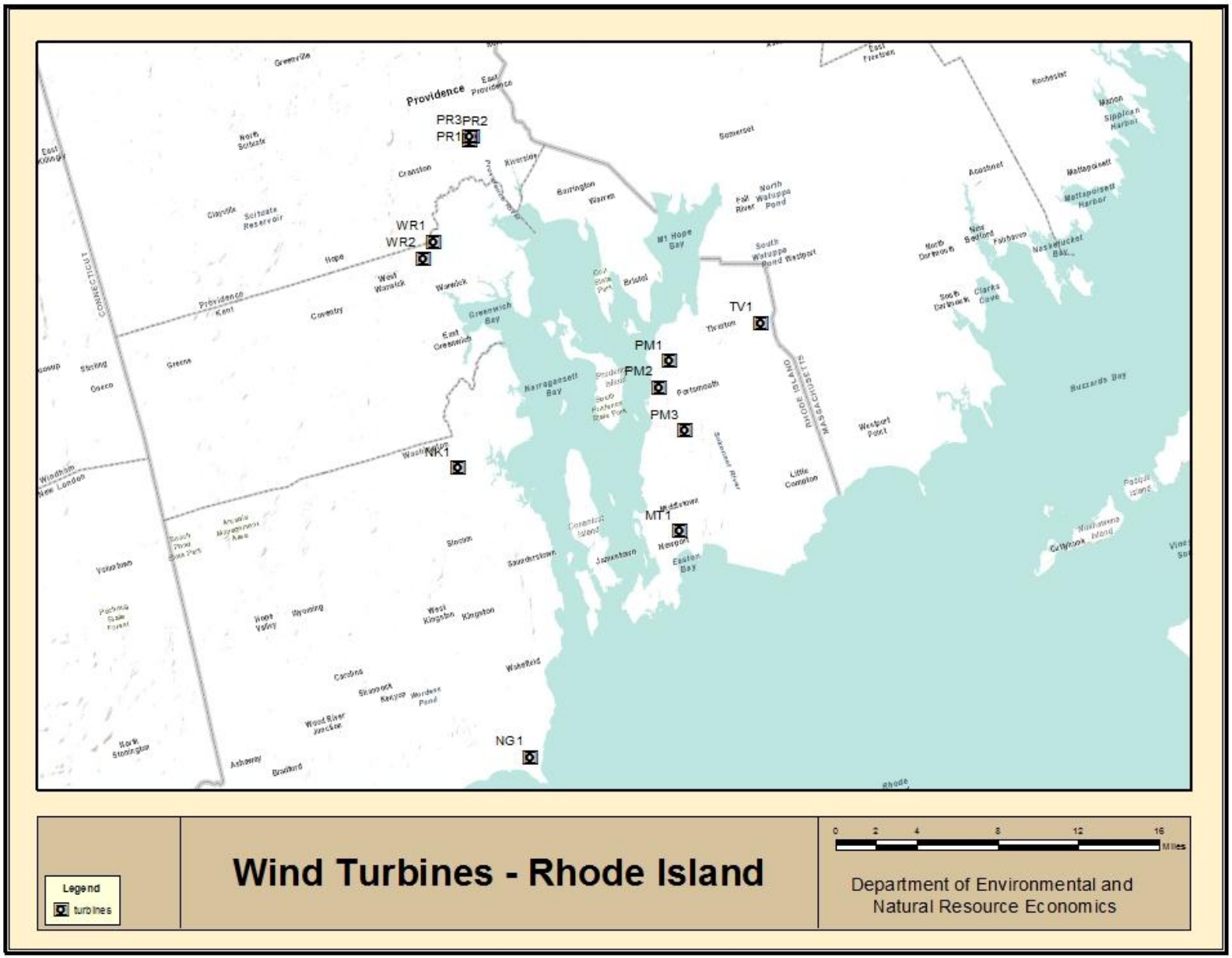
- House transactions
  - MLS sales data

    Jan. 1996 – Dec. 2012
- Viewshed
  - Create with mapping software (GIS) and through site visits
- Shadow flicker
  - Create with mapping software (GIS)

Research Plan

Develop a model that analyzes how house prices vary with respect to:

- Pre-announcement vs. post-announcement/pre-construction vs. post-construction
- Distance (0-0.25 miles, 0.25-0.5 miles, etc.)
- Viewshed and shadow flicker
- Characteristics of the turbine (height, capacity)



"Preliminary Draft" Jan 2013

Large Wind Energy Systems (LWES): greater than 200 feet in height, or 100kW

	Name	System Size	Height	Latitude	Longitude
1	Sandywoods Farm - Tiverton	275 kW	231 ft	-71.151880	41.623065
2	North Kingstown Green	1.5 MW	402 ft	-71.486847	41.581662
3	Portsmouth - Hodges Badge	250 kW	197 ft	-71.254948	41.566440
4	Portsmouth - High School	1.5 MW	336 ft	-71.251387	41.614340
5	Portsmouth - Abbey	660 kW	240 ft	-71.268658	41.599056
6	Middletown Aquidneck Corporate Park	100 kW	157 ft	-71.286725	41.502175
7	Narragansett - Fishermen's Memorial	100 kW	157 ft	-71.490600	41.380800
8	Warwick - New England Tech	100 kW	157 ft	-71.451459	41.732766
9	Warwick - Shalom Housing	100 kW	157 ft	-71.466457	41.723670
10	Providence - Narragansett Bay Commission #1	1.5 MW	360 ft	-71.389912	41.792698
11	Providence - Narragansett Bay Commission #2	1.5 MW	360 ft	-71.386830	41.794479
12	Providence - Narragansett Bay Commission #3	1.5 MW	360 ft	-71.389711	41.795240

Research Plan

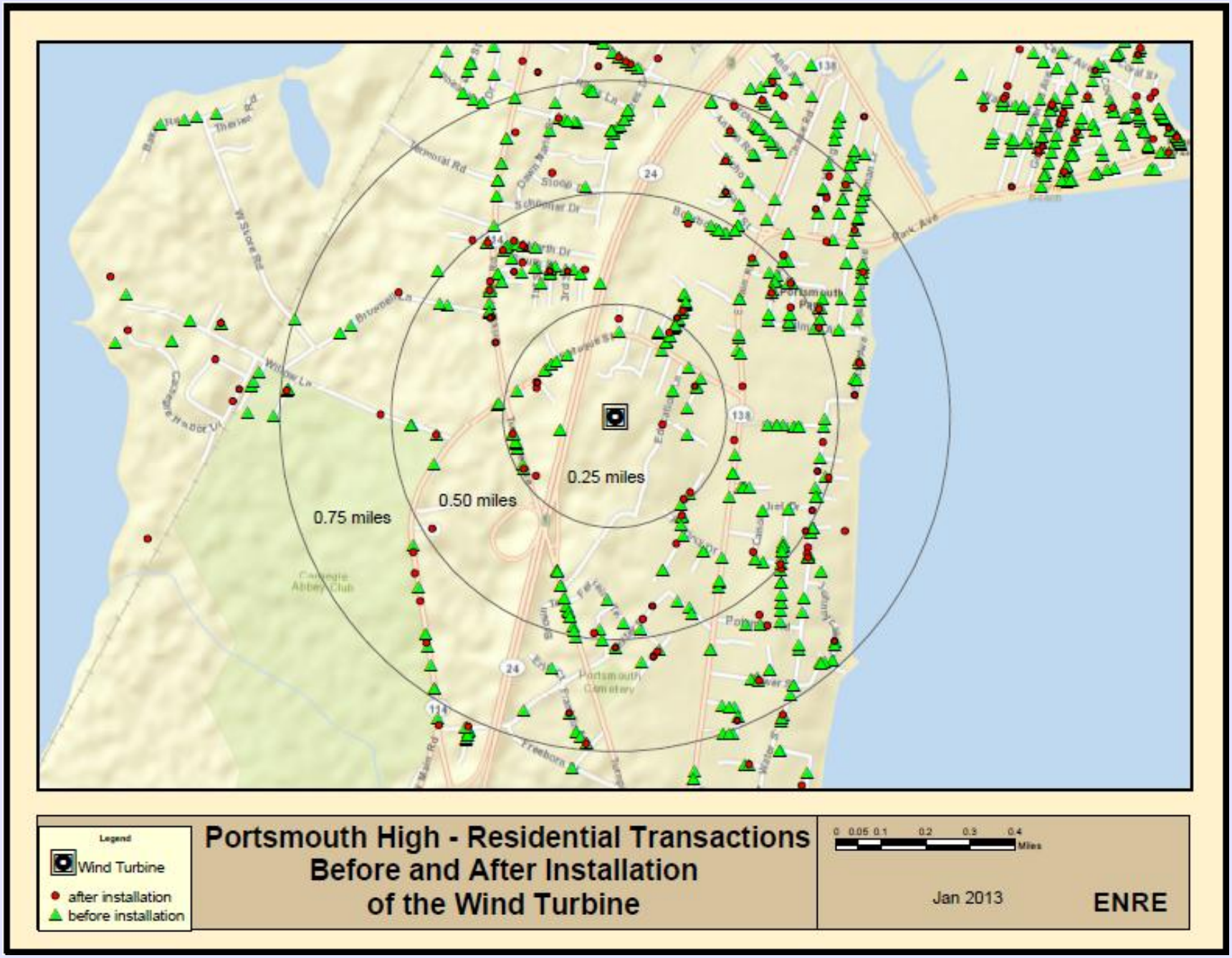
Things that I'm excited about:

1. Volume of transactions
   - Ben Hoen's analysis had 7500 sales within 10 miles of a turbine
   - We have roughly that same number within 1 mile and a hundred thousand more going out to 10 miles.

2. Proximity of transactions
   - Ben Hoen's analysis had less than 100 observation within 0.57 miles
   - We have over 300 observations within 0.25 miles

Location	Transactions	0.75 mile	0.5 mile	0.25 mile
New England Tech	Total	640	104	3
	Post construction	53	9	0
Fisherman's Memorial	Total	638	284	43
	Post construction	8	5	2
Portsmouth High	Total	851	373	93
	Post construction	87	32	10
All Locations	Total	6,191	2,409	323
	After Tower	345	128	21

preliminary draft



preliminary draft

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Next Steps

- Dates TBD for next meetings:
  - Additional stakeholder meetings will be scheduled, likely in May and August
  - Research results lectures will be scheduled, likely in June and July
- To stay informed:
  - RESP and RESPMUNI listservs will remain active
  - New OER website will be active in February; meeting materials will be posted
  - For additional questions, please contact: danny.musher@energy.ri.gov

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