



RAP

Energy solutions
for a changing world

The Role of Clean Energy Resources in a Comprehensive Energy and Environmental Policy: “Stay the Course”

Maine Energy & Environmental Policy: *Priorities for the 126th Legislature*
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March 21, 2013

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Topics

- What is the Big Picture and Where Are We Headed?
 - Two System Studies:
 - **ECF's ROADMAP 2050**
 - **NREL's Renewable Electricity Futures Study**
- Maine's RPS
- What Kind of Resource is Energy Efficiency?
- Why RGGI is the Cap-and-Trade Model for the Electricity Sector

System Studies--EU

- **ROADMAP 2050 – A Practical Guide to a Prosperous, Low-Carbon Europe**
 - 2009, EU Leadership--80% reductions by 2050
 - Developed by the European Climate Foundation (ECF) with contributions from McKinsey, KEMA, Imperial College London and Oxford Economics
 - <http://www.roadmap2050.eu/>
- **Participants**
 - Transmission System Operators
 - NGOs
 - Manufacturers
 - Plus 40 more companies,
 - NGOs and research institutes

ROADMAP 2050

- This was a “backcasting” exercise.
- Starting with defining a desirable future and then working backwards to identify policies and programs that will connect the future to the present.
- If I want to reach a certain goal, e.g., 80% carbon reductions across the economy by 2050, what needs to happen in order to get there?

ROADMAP 2050

When the Roadmap 2050 project began it was assumed that high-renewable energy scenarios would be too unstable to provide sufficient reliability, that high-renewable scenarios would be uneconomic and more costly, and that technology breakthroughs would be required to move Europe to a zero-carbon power sector. Roadmap 2050 has found all of these assertions to be untrue.

– Matt Phillips, Senior Associate, ECF

System Studies--US

- **NREL's Renewable Electricity Futures Study**
 - Investigation of the extent to which renewable energy supply can meet the electricity demands of the continental US over the next several decades.
 - Exploration of the implications and challenges of very high renewable electricity generation levels— from 30% up to 90%, focusing on 80%, of all U.S. electricity generation from renewable technologies— in 2050.

NREL's Renewable Electricity Futures Study

- Funded by the U.S. DOE's Office of Energy Efficiency and Renewable Energy
- A collaboration with more than 110 contributors from 35 organizations including
 - national laboratories, industry, universities, and non-governmental organizations.
 - http://www.nrel.gov/analysis/re_futures/

NREL Findings - 1

Renewable electricity generation from technologies that are commercially available today, in combination with a more flexible electric system, is more than adequate to supply 80% of total U.S. electricity generation in 2050 while meeting electricity demand on an hourly basis in every region of the country.

System Studies: Some Take Aways

- Meeting climate goals across the economy will first require:
 - Decarbonizing the electric sector;
 - Increased amounts of renewable resources;
 - Greater system flexibility through larger and smarter systems;
 - Electrification of buildings and light transportation; and
 - A large task whose size can be reduced through the continued deployment of energy efficiency.
- Feasible with technologies commercially available today.

ME Climate Goals

- Maine adopted and released an updated state climate action plan on December 1, 2004 to meet goals set in 2003 legislation:
 - reducing GHGs to 1990 levels by 2010,
 - 10 percent below those levels in 2020, and
 - by a sufficient amount to avert the threat of global warming over the longer term.

Maine's RPS

- **Review of RPS Requirements and Compliance in New England States,**

Report by London Economics International prepared for the Maine Public Utilities Commission, as required by LD 1570 (2011)

Maine's renewable energy strategy is very beneficial for the state, and Maine's economy stands to gain significantly from the effort to diversify our energy mix away from fossil fuel-based sources.

Benefits cont.

- *The report finds that the Maine RPS, in conjunction with the RPS in other New England states, is projected to create 11,700 jobs in Maine and increase the state's economy ("gross state product") by \$1.1 billion or 2%, compared to a cost to the economy of 0.06%.*

London Economics Report

Additional Findings of the London Economics Report

- **Diversification benefits** and reliability benefits from diversification away from natural gas for electricity generation
- **Energy cost reductions** through displacement of fossil-fuel generation
- **Energy security benefits** through reduced price volatility
- **Increased tax revenues** and **other** community **benefits** from capital investments across Maine counties and towns

A Trend in Energy Efficiency Program Savings:

- **2006** — The most aggressive electric efficiency program efforts in the country were achieving annual electric savings of about 1% of annual sales.
 - Connecticut and Rhode Island (1.2%),
 - Vermont (1.1%)
- **2010** — 12 states achieved annual electric savings of 1%.

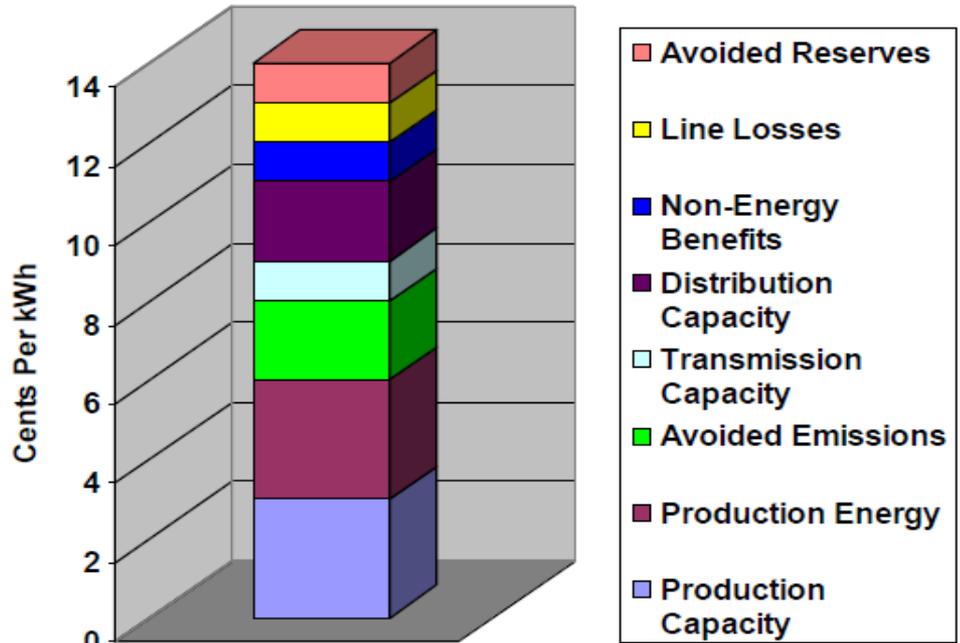
Efficiency Program Savings cont.

- 2013 – At least five different states either are achieving, or have plans in place to achieve, between 2.0% and 2.5% savings per year.
 - Massachusetts,
 - Vermont,
 - Arizona,
 - Connecticut, and
 - Rhode Island
- ME PUC Docket No. 2012-00449 Efficiency Maine Trust Request for Approval of Second Triennial Plan,
March 6, 2013

What Does End Use Efficiency Get You?

Layer Cake of EE

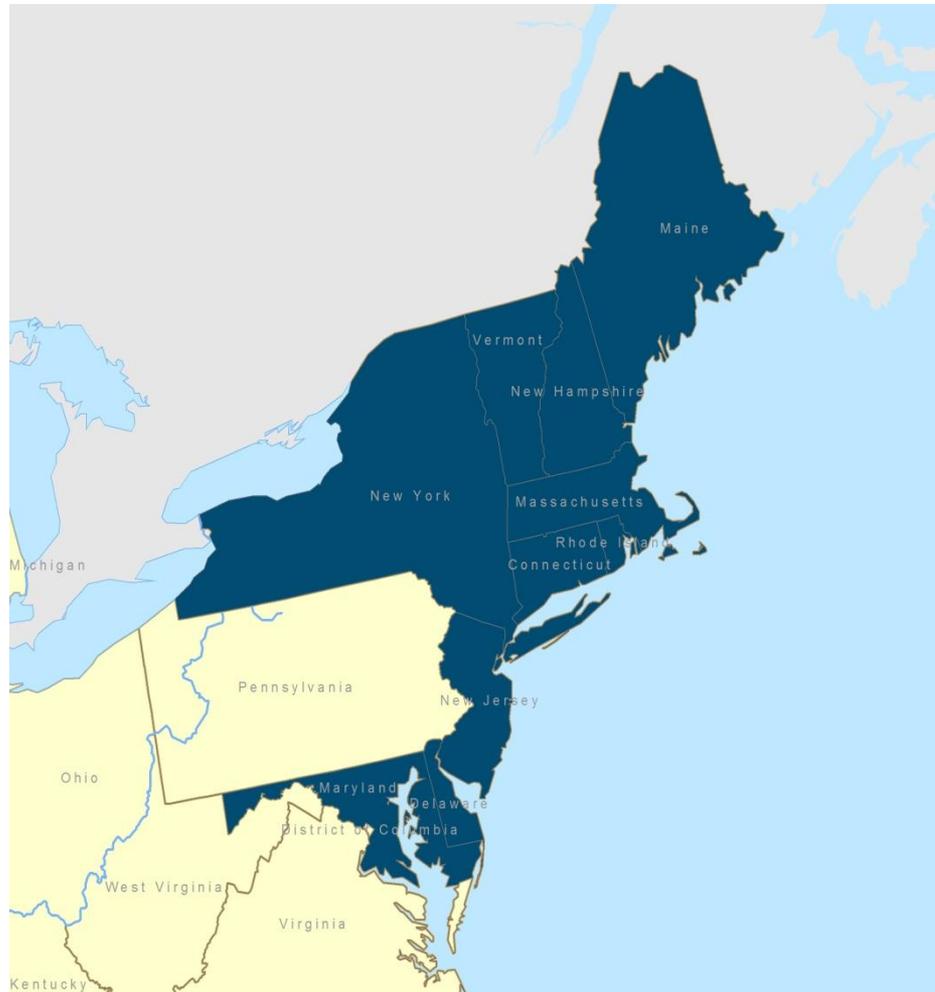
- Production Capacity
- Production Energy
- Avoided Emissions
- Transmission Capacity
- Distribution Capacity
- Non-Energy Benefits
- Line Loss Reduction
- Avoided Reserves



Benefits of EE that Flow to All Customers

- Increased system reliability.
- Reduce
 - risk and exposure to volatile fossil fuel prices.
 - cost of compliance with environmental regulations—
2014 more stringent ozone NAAQS
 - consumption of fossil fuels.
 - reliance upon imported fuels.
 - environmental impacts, including reduced greenhouse gases.
 - the price of the wholesale energy and capacity markets in New England.
 - Lower peak and energy demands means that marginal supply-side resources are dispatched less.

The Regional Greenhouse Gas Initiative



Memorandum of Understanding

- Allowance allocation:
 - as determined appropriate by each Signatory State, provided
 - each Signatory State agrees that 25% of the allowances will be allocated for a consumer benefit or strategic energy purpose.
- This includes:
 - the use of the allowances to promote energy efficiency, to directly mitigate electricity ratepayer impacts, to promote renewable or non-carbon-emitting energy technologies, to stimulate or reward investment in the development of innovative carbon emissions abatement technologies with significant carbon reduction potential, and/or to fund administration of this Program;

The Revenue Side of RGGI: States determined that price alone will not achieve program goals.

- Extensive modeling of end-use energy efficiency found:
 - Carbon allowance prices drop 25%
 - Need for new fossil capacity drops 33%
 - Customer bills drop 5 percent (Industrial) to 12 percent (Residential)
 - And even greater EE investments (quite attainable) would yield greater savings

Some RGGI Program Highlights

- **Allowance Allocation:** largely through quarterly auctions.
- **Revenues:** approx. \$1,225,727,892.19 to date.
- **Auction #19 (3/13):** \$2.80/ton
 - Several of the non-compliance financial parties bought very large amounts of allowances.
 - 69% of allowances went to compliance entities whereas in the first 19 RGGI auctions, compliance entities & affiliates purchased 88 percent on average.
 - By the way, *Koch Supply and Trading* was a qualified bidder.

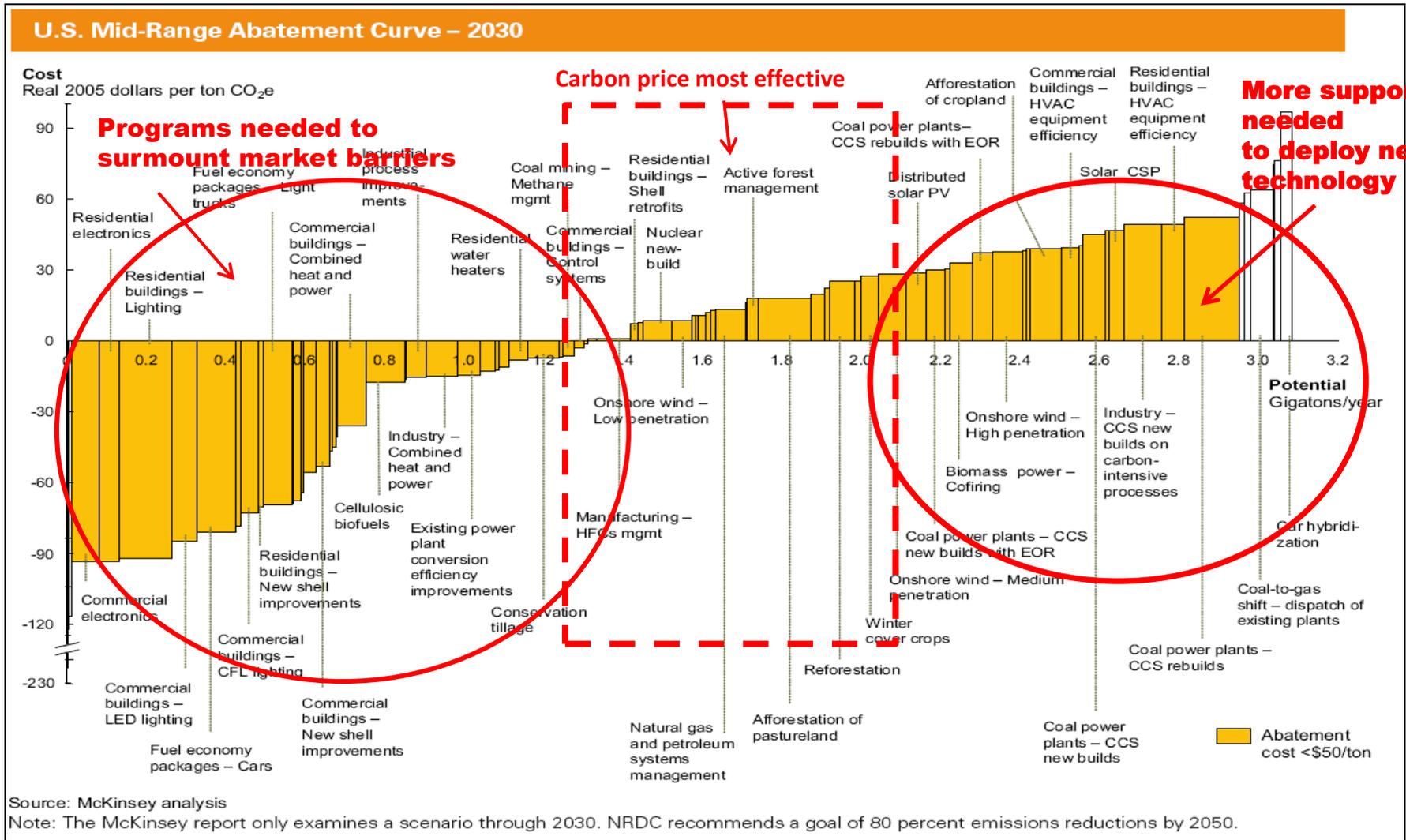
RGGI and Clean Energy Investment

- Conventional Wisdom: a price on carbon creates a signal.
- What else can a \$3.00/ton price accomplish?
 - Compliance technology?
 - The cheapest tons first—electric & thermal efficiency
- Approximately \$ 1.2 B in revenues to date
- Over half of this is spent on energy efficiency programs

Why is this Important?

- It is less about the price per ton, and more about allowance revenue investment:
 - Yes a cap creates a price signal: i.e., it imposes costs on emissions, (and, thereby, creates value in emissions reductions)
 - But RGGI state clean energy programs address barriers to clean energy development through programmatic investment (traditionally state-led activity).

Carbon Prices alone will deliver only a part of the abatement needed



Some Observations

- Meeting climate goals will require decarbonizing the electric sector, increasing
 - Amounts of renewable resources
 - System flexibility
- It will require electrification of buildings and light transportation
- The size of this task can be reduced through the continued deployment of energy efficiency.
- The decarbonization pathways analyzed are sustainable, technically feasible, and have a positive impact on the economy.

Conclusions: Stay the Course

- The decarbonization pathways analyzed are sustainable, technically feasible, and have a positive impact on the economy.
- Hold steady with policies that ME has adopted on RE, EE, and Climate

About RAP

that
power
policies

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the and natural gas sectors. RAP has deep expertise in regulatory and market that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raonline.org



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