

The Regional Greenhouse Gas Initiative (RGGI) and Energy Efficiency Helping Maine

The Jackson Laboratory

Case Study

#9

“With the help from Efficiency Maine and its RGGI funds, we were able to build this combined heat and power plant, fueled by Maine-sourced wood pellets. It has slashed Jackson Lab’s heating oil use while generating clean electricity we can use, too.”

– Norm Burdzel, Facilities Engineer,
Jackson Laboratory



The Jackson Laboratory, Bar Harbor's premiere biomedical research facility, strives for excellence in its energy systems as well as its research projects. The Lab installed a state-of-the-art wood pellet-fired steam power plant that provides combined heat and power to campus while cutting electricity costs and oil use.

For more case studies in this series, visit www.nrcm.org

RGGI and Energy Efficiency Helping Business



Goals

- Reduce electricity costs by generating on-site electricity from enhancing efficiency of new pellet-fired steam plant
- Increase Jackson Laboratory's sustainability while continuing to provide high quality air conditioning to laboratory mice and scientists

Challenges

- No natural gas service provided to island (a traditional fuel for combined heat and power)
- Precise air quality requirements for lab conditions

Solutions

- New Maine-sourced wood pellet-fired steam plant with a 600 kW turbine generates electricity from process steam
- Finely-tuned control system enables precise air quality output

The Jackson Laboratory, Bar Harbor

The Jackson Laboratory is a premiere biomedical research facility dedicated to finding cures to cancer and other risks to human health, like cardiovascular disease, diabetes, and obesity amongst others. The Laboratory also supplies mice to research facilities around the world. In FY 2012, three million mice were distributed to more than 900 research facilities in 56 countries. Twenty-six Nobel prizes are linked to Jackson Labs scientists and mice. The Lab employs more than 1,200 people, and is the largest employer in Hancock County.

Environmental conditions are a top priority for Jackson Laboratory. The mice populations require finely tuned temperature and humidity levels, a standard that requires energetically expensive heating, humidifying, and cooling. And, environmental sustainability is also important to the Lab, so it has completed multiple, significant energy saving projects, working with Efficiency Maine.



What They Did

In 2010, Jackson Laboratory proposed and was awarded a U.S. Department of Energy grant through Efficiency Maine to install an ultra-efficient, wood-fired steam plant that would deliver steam which could be used for both heat and power—the first of its kind in the U.S. Supported with American Recovery and Reinvestment Act stimulus dollars distributed through Efficiency Maine, the multi-million-dollar project uses sustainably harvested, pulverized wood pellets—instead of oil—to fire an ultra-efficient boiler, reducing campus CO2 emissions by 80% and displacing 1.2 million gallons of oil per year.

In 2011, building on this project's success, the Lab applied for and received from Efficiency Maine 50% of the funds it needed to improve the system to install a 600 kW steam driven turbine, thereby generating on-site electricity in addition to heat. These improvements were made possible using Efficiency Maine funds generated by the RGGI program. Generating electricity from process steam creates a super-efficient system, far superior to the traditional power plants from which Jackson and others would typically buy power.

Results

Jackson Laboratory installed the turbine that generates electricity at a cost of only \$0.03/kWh (a tiny fraction of retail rates). As a result, the Lab expects to buy about 8% less electricity from the electric grid. So far, the turbine has generated over 1 million kWh. That's more than is used in a year by 150 Maine homes.

Financial Analysis

Project Cost: \$730,000

RGGI-funded Efficiency Maine Incentive: \$365,000

Projected Savings: \$146,000 per year (currently 1 million kWh since 2012)

Payback Period: 2.5 years

Reduction in Grid-purchased Power: 8%

RGGI and Energy Efficiency Creating Jobs



Kinney Electric, Brewer

Kinney Electric received the bid for completing all of the electrical work for both the pellet boiler and the turbine at Jackson Lab. Kinney Electric is no stranger to Efficiency Maine funded projects. According to Dan Kinney, owner, the company's Efficiency Maine-funded projects usually take the form of lighting upgrades in commercial spaces like warehouses.

He was very happy to receive the bid for the additional project at Jackson Lab, saying: "This kind of work is important to us. It might seem like a small project for a small company, but here in Maine, almost everyone is a small company." Kinney is located in Brewer Maine and employs seven people. Kinney says working on this and other Efficiency Maine projects has been great. "The whole process was very smooth; it went very well for us."

Contractors Hired By Jackson Laboratory

- Kinney Electric, Brewer
- Pizzagalli Construction Company, Portland
- R.F. Jordan, Surry
- Johnson & Jordan, Scarborough
- Babcock & Wilcox, Yarmouth
- Reciprocal Energy, Sandwich (NH)
- Maine Wood Pellets, Athens
- Geneva Wood Products, StrongAllied Engineering, Portland
- Petrokraft, Sweden

Other Jackson Laboratory Efficiency Projects

Through Efficiency Maine's Business Program, which is partially funded by RGGI, Jackson Lab has also received financial support to install energy-efficient lighting, HVAC, and water systems. These improvements will save Jackson Lab tens of thousands of dollars annually.

- All lighting, heating, ventilation, and air-cooling systems at the Lab meet LEED standards
- All lights have been upgraded to fluorescents, on motion-sensors where applicable. Exterior lights are used less at night to cut light pollution.
- On-demand water heaters provide hot water efficiently, and new, non-HFC chillers provide cold water efficiently, too

The Regional Greenhouse Gas Initiative (RGGI) is a market-based effort among nine states to reduce climate-changing carbon pollution from power plants and spur investments in energy efficiency and clean energy. The program began in 2009, and today delivers cleaner, more efficient electricity, and a more energy-independent and competitive economy for Maine.

RGGI-Funded Grants

Bath Iron Works
Bowdoin College
Corning Life Science
GAC Chemical
Hannaford Brothers
Huhtamaki
Irving Forest Products
Jackson Labs
Lewiston-Auburn Water Authority
Madison Paper
Maine General Health
Maine Wild Blueberry
Mid Coast Hospital
Mid State Machine
Moose River Lumber
Mt. Abram
Old Town Fuel & Fiber
Poland Spring / Nestle
Portland Water District
Pratt & Whitney
Prime Tanning
Rumford Paper Company
SAPPI Paper
Smith & Wesson
State of Maine
Sugarloaf
Sunday River Ski Resort
Twin Rivers Paper
University of Maine
University of New England
University of Southern Maine
Verso
Woodland Pulp

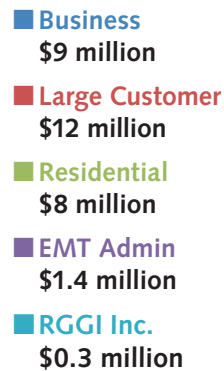
Competitive RGGI grants (averaging \$330,000) have helped Maine manufacturers and other large energy consumers make major cost-effective energy efficiency improvements. As of December 2013, \$12 million in large customer grants had leveraged roughly \$35 million in private spending, and generated \$139 million in lifetime energy savings.

RGGI Protecting Maine's Economy and Climate

For every \$1 of RGGI funds, Maine consumers save \$8 on energy bills, and the state economy grows by \$4

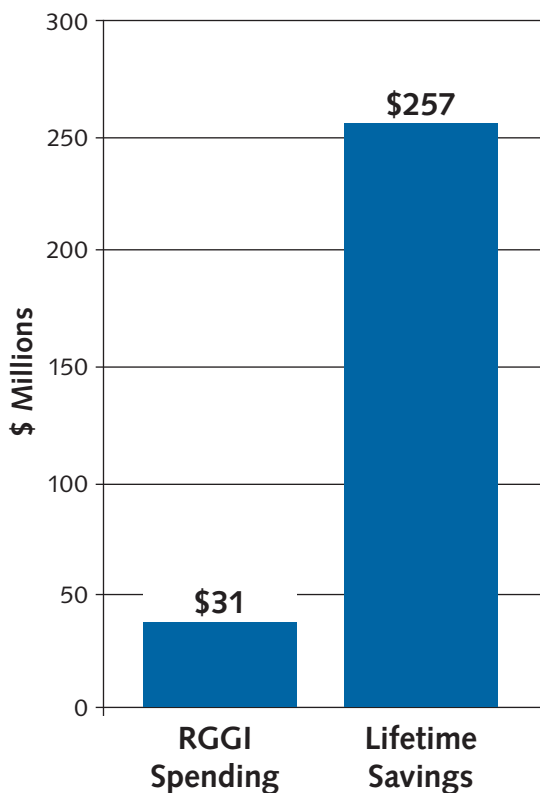
Independent analysis shows that RGGI has driven economic growth in Maine, primarily through investments in money-saving energy efficiency. As of December 2013, Maine had invested over \$31 million of RGGI-generated funds in energy efficiency improvements in homes, businesses and industrial facilities, creating \$257 million of savings over the lifetime of the improvements, including \$180 million for Maine businesses. Maine's gross state product (GSP) increases by \$4 for every \$1 invested in energy efficiency programs. To date, Maine's GSP has grown by more than \$100 million because of RGGI.

Allocation of RGGI Spending in Maine (2008-2013)



Source: Efficiency Maine

Total Energy Savings in Maine from RGGI



RGGI is Central to Efficiency Maine Saving Millions for Homes and Businesses

The largest portion of RGGI funds has gone to large customer projects, from paper mills to hospitals. In addition, substantial RGGI funds have gone to households and smaller businesses to help them cut electric bills. In late 2013, Efficiency Maine began using RGGI money to fund weatherization programs that predominantly reduce home heating oil bills. Going forward, 35% of all RGGI funds are being used to help homeowners insulate and tighten up homes, and for investment in high-efficiency heating equipment. So far this weatherization program has helped homeowners reduce heating bills by an average of 33% or \$1,100 per year.

Proposed EPA Limits on Carbon Pollution from Power Plants

RGGI gains new relevance in 2014, as the U.S. Environmental Protection Agency is working to establish national carbon limits for power plants to help address climate change. The EPA plan rewards Maine's leadership with RGGI, and our economy and climate will benefit as our other regions come closer to our standards of clean power.

For more information:

1. To save money in your home or business with energy efficiency, contact **Efficiency Maine**, at www.energymaine.com or call toll-free 1 (866) 376-2463.
2. Learn more about RGGI, energy efficiency opportunities and benefits, clean energy jobs, or additional case studies by visiting the **Natural Resources Council of Maine (NRCM) online** at www.nrcm.org.
3. Please help support strong energy efficiency policies and programs in Maine. Stay informed by joining **NRCM's Action Network**: visit www.nrcm.org or contact Emmie Theberge at emmie@nrcm.org or (207) 430-0105.



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