EFFICIENCY MAINE

FINDING THE BALANCE BETWEEN ENERGY EFFICIENCY AND HISTORIC PRESERVATION

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SAVE LIKE A Mainer

efficiency MAINE

The Key Issues in Balancing Historic Preservation and Improving Energy Efficiency

- Virtually every community in Maine values its heritage and the architecture representing years past.
- Energy costs for heating buildings, old or new, are escalating and are likely to continue doing so.
- Older buildings, while beautiful, can be costly to heat and maintain.
- For example:
  - **Residential Energy Use Intensity by Age**

Year Built	**KBtu/sq ft/yr**
Prior to 1950	74.5
1950 to 1969	66.0
1970 to 1979	59.4
1980 to 1989	51.9
1990 to 1999	48.2
2000 to 2005	44.7

- Source: Residential Energy Consumption Survey, 2005

The Challenge

Our challenge is to:

- Find an appropriate balance in preserving these architectural attributes while improving energy efficiency.

Where to Begin:
Step 1: Do Your Homework

- Collect information about your building such as energy usage and any past energy measures that have been completed.

- For more information on this subject be sure to read your local historic district ordinances and visit:
  - the Maine Historic Preservation Commission at http://www.maine.gov/mhpc
  - Maine Preservation at http://mainepreservation.com
  - Maine Development Foundation at www.mdf.org

- Seek the experience of others who have been through a similar process and ask for recommendations for professional services.

- Do your best to identify your historic features so you will be familiar with the results and reasoning behind an evaluation.

Step 2: Hire Qualified Professionals

Hire a qualified professional who will:

- Provide credentials of professional training in building science, such as with the Building Performance Institute (BPI) or Home Energy Rating System (HERS)
- Demonstrate what you will receive in the way of an evaluation/report that will identify prioritized energy saving opportunities
- Have available non-invasive technologies such as an infra-red camera, moisture meter, and blower door to identify and quantify issues
- Incorporate a holistic approach to treat the building as an integrated system
- Communicate with you in clear language about your options and how to develop a prioritized plan to make improvements

Step 3: Analyze Data and Options

- A building assessment will provide measures, costs and estimated savings, which will be prioritized to help the building owner create a plan through which the most readily available savings are achieved first.

- Consider performing a building occupant comfort survey to determine thermal, acoustic, indoor air quality, lighting levels, and other potential issues or observations that may be useful to know before completing a plan of action.

- Look into state and federal incentives for energy efficient equipment and low interest loan options and other weatherization incentives that may be available. Start with Efficiency Maine at ***efficiencymaine.com***

Examples of Efficiency Maine Incentives

Efficiency Maine Commercial Incentives:

- **Loans up to $35,000**, currently at 1% APR for up to 5 years, to help small businesses fund approved energy conservation measures of all types: electrical equipment including lighting, machinery, HVAC and refrigeration; heating equipment, regardless of fuel type and insulation. An energy audit identifying recommended energy efficiency measures is required.

- Efficiency Maine has calculated fixed or "**Prescriptive Incentives**" for certain types of equipment that generate consistent savings over a wide range of applications, including:
  - Lighting , HVAC equipment, Variable-speed motor drives, refrigeration

- Efficiency Maine provides **energy audits** to help small and medium-sized commercial, municipal, non-profit, and manufacturing facilities. To receive an audit, a company must:
  - Employ 50 or fewer FTE employees OR earn less than $5 million in annual revenue
  - Must have a facility that is at least 1,000-square-feet in size
  - Have no residential components to the business space that will be audited

Examples of Efficiency Maine Incentives

Efficiency Maine Renewable Incentives:

- **Solar Hot water and hot air systems up to $1,500 in addition to federal incentives**
- **Commercial photovoltaic systems, $2/watt up to $2,000 in addition to federal incentives**
- **Commercial wind incentives of $1/watt up to $4,000**

Step 4: Take other Factors into Consideration

- Remember to consider the original building concept as you design a plan. For example:
  - Building orientation for solar gain and protection from the west/north
  - Use of daylight as opposed to artificial light
  - Existing heat distribution systems
  - Existing airflow and ventilation from existing design and/or siting
  - Existing landscaping for shading or blocking wind
  - All may offer significant benefits and are integral to the optimal function of the building.
  - These systems may be interrelated; changing one may affect the others

Step 5: Review the Recommended Priorities

- Determine the most cost effective measures
  - Typically, the measures with the fastest payback are:
    - "Air sealing": blocking air leakage around the sill perimeter, doors, windows, wall penetrations, plumbing and wiring chaseways, and chimney areas
    - Insulation in easy-to-access areas such as the attic, hot air ducting, water piping and hot water storage.
    - Improving heating system efficiency with regular maintenance and modest controls
    - Changing out inefficient lighting and outdated appliances
    - Improving occupant energy consumption behavior and old habits

Be Prepared for the Unexpected

- The assessment may find other issues that may <u>not</u> be energy related such as:
  - Moisture problems in the basement/crawlspace
  - Possible mold or indoor air quality issues
  - Asbestos on an old boiler or in insulation
  - Water leakage around a chimney, exterior trim, into the basement
  - Presence of animals or insects
  - Lead paint
  - Lower than expected efficiency of the heating system
  - Combustion air leakage from decrepit equipment or piping

Let's Talk About Moisture

- Moisture is frequently misunderstood and can be successfully controlled by managing:
  - Bulk sources: Rain, surface runoff, melting of snow and ice against the building, groundwater into the basement
  - Capillarity: Moisture drawn into the building from ground sources through concrete, wood
  - Relative humidity: From internal sources such as respiration, drying firewood or laundry, showers, plants, etc.
  - Diffusion/airflow: Moisture carried gradually through permeable building surfaces such as walls and ceilings, or rapidly through a gaps in floors/walls, plumbing/wiring penetrations.
- *This is an area where competent expertise is critical.*

Step 6: Develop Your Plan

- Think of this challenge as a ten-year strategic plan with short, middle, and long-term plans and goals.
  - Short-term plan will include the more accessible cost effective measures and health and safety issues.
  - The mid-range plan will allow you to budget for larger issues such as attic insulation and gradual replacement of inefficient equipment.
  - Long-term planning can address major issues such as heating system replacement with modern controls, large projects such as moisture-proofing the basement or even renewable energy considerations if appropriate and cost effective.

Quality is a Good Investment

§ **Lessons learned from experience:**

- ü Professional expertise and quality materials are worth the investment.
- ü Going the extra mile today may make the difference in long-term performance of the building and ultimately, resale value of the property

Step 7: Get Started

- Put the plan in motion.
  - If your energy professional is willing, stay in touch, ask for guidance when needed and consider additional testing to confirm that the measures are performing as expected.

Some projects are more challenging than others!

Takeaways

- Do your homework, know your building
- Search out professional services specializing in historic preservation and energy efficiency
- Expect the unexpected
- Be realistic about the cost to do the work properly: quality is a good investment and take advantage of incentives!
- Consider short, mid and long-term strategies to address the findings
- Act on the information you receive!

Thank you! Questions?

Thanks to: ***Maine Preservation: Guidelines for Energy Efficiency in Historic Buildings***

Preservation Briefs: Improving Energy Efficiency in Historic Buildings
National Park Service, US Department of the Interior