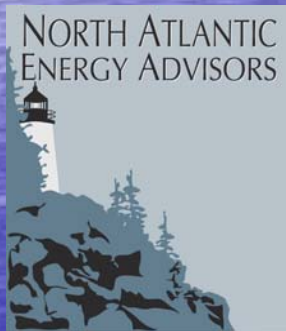
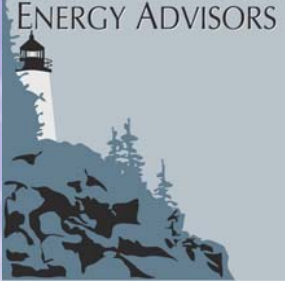


DEEP SAVINGS IN NON-RESIDENTIAL MARKETS: WHAT WE KNOW; WHAT WE DON'T



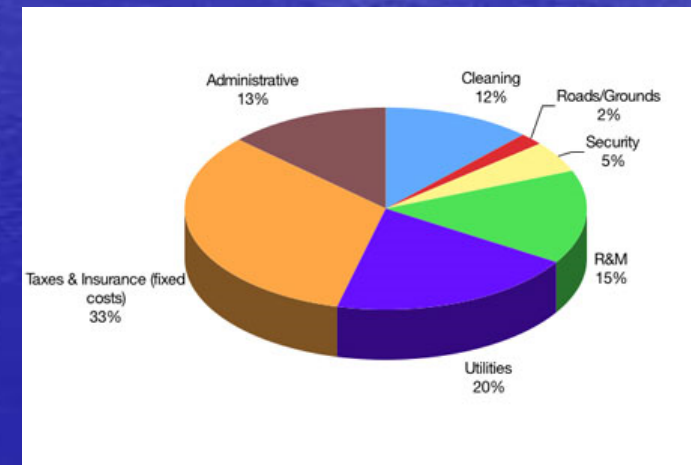
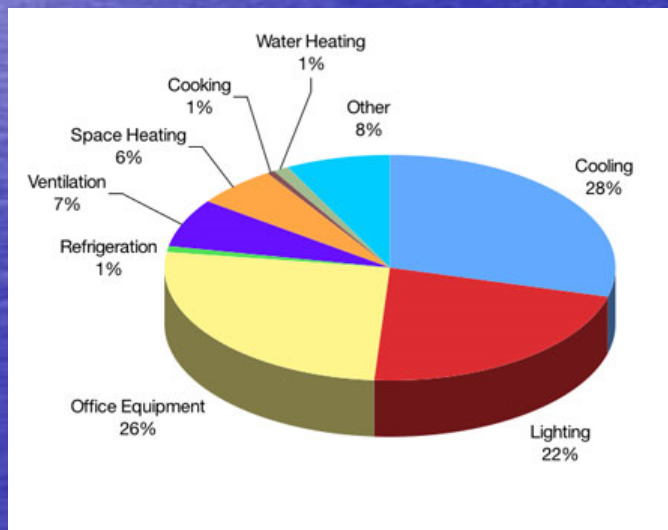
Doug Baston, Principal
North Atlantic Energy Advisors

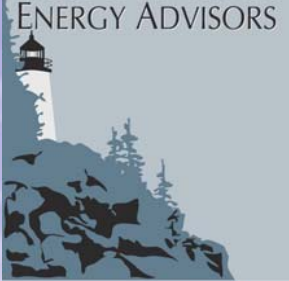
Phil Mosenthal, Partner
Optimal Energy
June 9, 2009



Commercial Energy Use Profile:

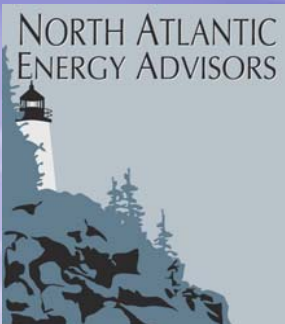
- Office buildings dominates the non-residential, non-industrial load
- Three end uses – lighting, HVAC, plug load = 66% energy
- Energy can be 30% of total operating costs





Historically, A Lighting Play:

- Programs (everywhere, not just MA) have relied on “metal for metal” change-outs:
 - 1st: T12s to T8s (20% savings from lighting);
 - Then T8s or T12s to HPT8s (20-40% savings)
- Some exceptions:
 - Multi-measure tiered incentives
 - Comprehensive Chiller Initiative
 - Performance Lighting
 - Controls and dimming

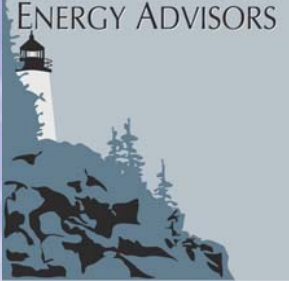


Options for the Future:

Office of the Future

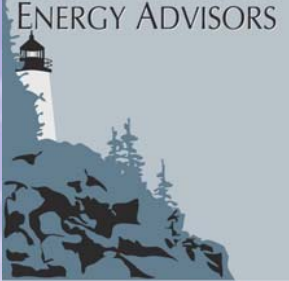
- Target is Tenant Fit-Ups – new facility or tenant change
 - Performance lighting;
 - Broader/deeper standard lighting templates with controls strategies (bi-level ballasts for daylight control, occupancy sensors, task lighting, etc.);
 - HVAC/EMS performance review/continuing review;
 - Plug load/office equipment upgrades and management;
 - All system demand control-enabled.

- “25% Solution” piloted this year
- “50% Solution” in 2010



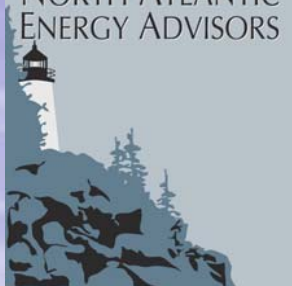
Whole Building Assessment:

- Several versions currently in pilot.
- Essentially, WBA provides a focused set of services – an opportunities assessment, leading to an integrated action plan, followed by technical assistance, incentives, and overall project management – all managed to acquire maximum total facility savings potential
- Draft Process Evaluation: Preliminary results show that approximately 30% of the recommended savings are installed; and
- Overall building energy use is reduced by 5%-15%



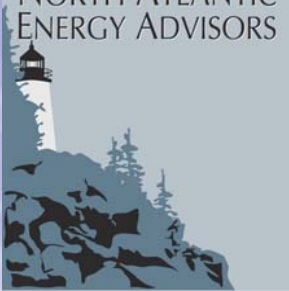
Retrocommissioning:

- National Grid is looking at multi-year, 18 facility pilot
- Service provided by a third-party firm
- Grid pays for service for the first year to demonstrate value, then customer assumes cost
- Retrocommissioning savings estimates highly variable by building type
- LBL: electric potential, 5-15%; gas, 1-23%
- Negatives: short measure lives, expensive



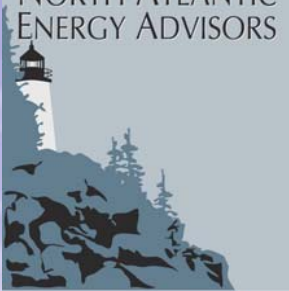
Advanced Buildings/ Core Performance

- Part of a national program
- Integrated with other New England state programs – Vermont, Maine, Rhode Island
- Set of Prescriptive Requirements (“the Core”) that when applied in their entirety will save 20-30% over a Massachusetts code-compliant building
- Targets the smaller (10-80,000 SF) buildings
- Can be an end, or a waypoint to LEED



The Future: What's Possible?

- 2007 NREL Study: "Energy efficiency improvements that use the best available technologies and practices and integrated, whole-building design approaches can, on average, reduce consumption by 43%."
- 2008 NBI Study of 121 LEED buildings: "... average LEED (building) energy use is 25-30% better than national average...(of all commercial buildings)"
- Core Performance Buildings can beat the code by 20-30%



Industrial:

- Most projects are Custom
 - Great potential in compressed air
 - Motors, drives, and motor system planning
- Recent studies (Optimal/VEIC potential study update for New York) shows potential for 29% improvement