

energy tips
FOR RETAIL

Retail

An effective way for businesses to increase their profits and to improve their public image is to aggressively make use of recent methods and technologies that use less fuel and power in the operation of their businesses. Different types of problems confront a small news stand versus a big box, but there is a wide array of solutions and resources out there to lower the sometimes daunting expense of business energy requirements.

Some Options for Retail Stores

EFFICIENCY

MICRO TURBINE - By generating your own power, you are creating a more economical and reliable source of power for your operation. The waste heat can also be utilized.

GEOTHERMAL HEAT PUMP - Businesses with parking lots have plenty of room to install a loop or well. Very appropriate for businesses as they often have a higher air conditioning load.

RECOVERING heat from freezers for hot water and/or space heating. **COVERS** should be provided on freezer displays



LIGHTING is a huge issue for business, particularly retail. Many larger stores are using T5HO and LED lighting where appropriate. The use of carefully planned and insulated skylights can slash energy bills.



The Hannaford Supermarket in Augusta, Maine became the first LEED certified supermarket with geothermal wells, PVs, a green roof, insulated skylights, & solar tubes for natural light, sliding insulated glass on freezers, low flow fixtures, etc. It was constructed in an abandoned high school.

ALTERNATIVE ENERGY

Restaurants can save **COOKING OIL** and service stations, **MOTOR OIL** as an alternative fuel source. Supermarkets generate high volumes of green waste which can be converted to biofuel in addition to providing compost.



PHOTOVOLTAICS

Businesses in big boxes have huge flat roofs which provide sufficient space for installing a large photovoltaic array. A trellis over the parking area and/or pedestrian canopies/arcades are also effective mounting areas.

WINDMILLS

A large parking lot for a business can sometimes accommodate a windmill. Businesses in a high rise can install special windmills on their facade or roof.



The innovated skylighting system in Hannafords achieved an R rating similar to the walls.

RESOURCES & INFORMATION

MAEEP - Massachusetts Energy Efficiency Partnership www.maeep.org
Gives technical assistance on commercial energy issues including utility demand side, chiller optimization, pump systems, process heating, steam systems.

EPA - Green Chill Advanced Refrigeration epa.gov

DEPARTMENT of ENERGY eren.doe.gov/buildings/info/retail/index.html

International Mass Retailers Assoc - IMRA

National Assoc of Convenience Stores- NACS

Freezers together with lighting represent a big portion of a supermarket's energy



Many big box retailers are implementing energy savings programs including Home Depot, Target, and Staples. Two of the more innovative retail projects have been built by Walmart in McKinney, TX and Aurora, CO. Some of the features in these experimental big boxes include:

- a Cogeneration Gas Micro Turbine combined with an Absorption Chiller
- Fabric Air Ducts, Radiant Floor Heating.
- Heat Recovery from the freezers for hot water & space heating
- A biofuel boiler that runs on recycled cooking & motor oil
- Several photovoltaic arrays including crystalline and thin film
- Wind mills in the parking lots.
- Clearstory lighting, T5HO Florescents, LEDs, & Solartube lighting

www.walmartfacts.com

Some energy efficient retail stores:

Giant Eagle, Columbus, Ohio - skylights with sensors, space heating from recovered freezer heat, windmills, and biofuels from trimmings and waste. LEED gold.

Stop & Shops - lighting, refrigeration & frig doors.

Shaw Stores. LED lights in freezers. PVs in Burlington. Newton store provides 90% energy from fuel cell

Office Depot - Skylights with tracking device & prismatic lens; lights dims when sun shines.

Grants, Rebates, Credits

FEDERAL \$1.80/sq ft for a building 50% more energy efficient than ASHREA Standard 90.1-2001 code www.efficientbuildings.org

NATIONAL GRID 50% to \$100K

Gas Retrofit - HVAC, Hot water, Heat recover, Steam systems, Kitchen equipment.
1-800-787-1706 gasnetworks.com

Electric Retrofit - Lighting, Controls, AC, Vending equip, Heat recover masssave.org

Custom Retrofit - 50% to \$100K for upgrades:

Direct Install - to 70% for lighting & controls
1-800-332-3333

New Construction - to 70%, electric;
50% to \$100K, natural gas. 800-787-1706

50% to \$750/kilowatt of Cogeneration.
781-907-2196, mark.stafford@ngrid.com

COMMONWEALTH SOLAR \$45/W DC to \$2250 for solar PVs; 25%, Solar hot water.

STATE Corporate tax deduction (deducted from net income)



PVs in the Garden Center



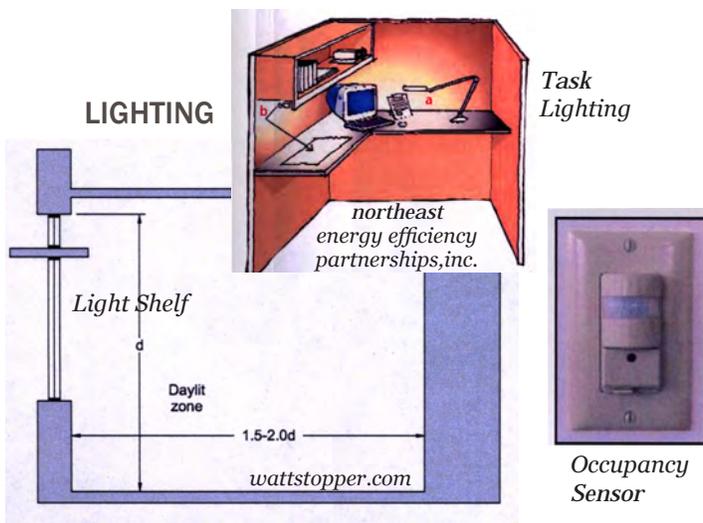
Recycled Oil

energy tips FOR LOWELL

Office Buildings

Office buildings come in many forms but they have similar interior functions and are all usually on a Monday through Friday, 9 to 5 schedule.

Consequently, natural daylighting and/or efficient florescents can play a significant part in leveling energy loads.



advancedbuildings.org

EQUIPMENT

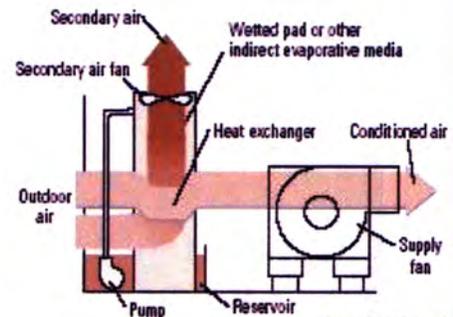
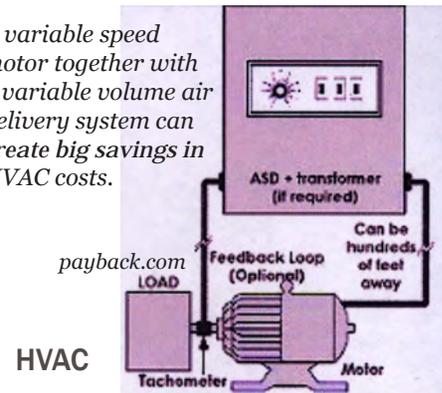
Efficient Equipment



Together with an efficient HVAC system, significant savings can be achieved. Office equipment is the third biggest energy consumer and should be upgraded accordingly.

Not only is the bottom line improved, but a more comfortable working environment can increase worker morale and project a better image to the public. In Europe, double skinned glass exteriors are common place and are beginning to make their appearance in this country. With appropriate ventilators, flexible screening, and sensors this one feature can decrease energy usage by half.

A variable speed motor together with a variable volume air delivery system can create big savings in HVAC costs.



utahefficiencyguide.com

RESOURCES & INFO

GreenBiz.com

Department of Energy Building Technologies www.eere.energy.gov

www.energystar.gov

www.energypriorities.com

Association of Energy Engineers aeecenter.org

American Soc. of Heating, Refrigeration & Air Cond. Engineers ashrae.org

IESNA- Illumination Engineering Society of North America



*Genzyme Center, Cambridge.
Lyme Properties*

*Mitre Center, Bedford, Ma -
Architect, Stubbins Associates*



*17 Gordon Avenue, South Providence
South Providence Development Corp,
DePasquale Building & Realty Co,
Providence Preservation Soc. Revolving Fund*



Significant Office Projects

- Mitre, Bedford - PVs on entry canopy & roof, Operable efficient windows
- Genzyme, Cambridge - Atrium acting as hugh duct, Natural light, Solar tracking mirrors, Operable windows, Double exterior glass skin
- Manulife, Boston - Double skin wall, Variable speed drives and digital control for HVAC, Air to air heat recovery.
- Four Times Square, NYC - Double glazing, Fuel cells, PVs, Absorption chillers, Light sensors
- 17 Gordon Avenue, S.Providence - Rehab of industrial building to business incubator- Green roof, PVs, Atrium
- UCS offices, Cambridge - PVs, Low-e windows & reflective interiors, Two stage heat pumps



Nobis Engineering's LEED certified offices in Lowell

Grants & Rebates

- COMMONWEALTH SOLAR \$.45/W DC to \$2250 for Solar PVs; to 25% for solar thermal.
- NATIONAL GRID - 50% to \$100K
 - Gas Retrofit - HVAC, Hot water
 - Electric Retrofit - Lighting, AC, Equipment
 - 1-800-787-1706 efficiency@nationalgrid.com
 - Custom Measures - 50% to \$100K for HVAC, building envelope, management systems
 - 1-800-787-1706
 - Direct Install - to 70% for lighting & controls.
 - 1-800-332-3333
 - New Construction Incentives -to 70% for electrical upgrades & to 50% for gas upgrades to \$100K.
 - Cogeneration - \$750/kilowatt . 781-907-2196
- FEDERAL tax \$1.80/sq ft for 50% reduction beyond ASHRAE standard

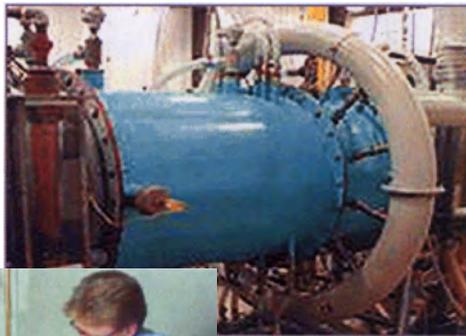
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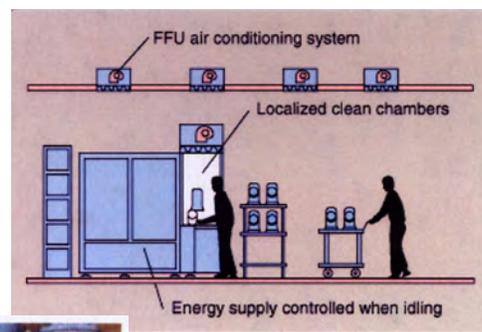
Industrial Utilities

One third of the energy in this country is consumed by industrial users including manufacturers, warehousing, transportation, storage, and maintenance facilities, and water and sewage plants etc. Most of their energy comes from oil and gas, followed by electricity and coal. Rising energy costs are putting many of them under pressure to perform an in depth audit and to upgrade the efficiency of their mechanical and processing equipment in order to survive.

Super Boiler Project DOE



Motors, pumps, and fans DOE



NEC Clean Room Energy Efficiency. necel.com

Compressed Air, DOE

Among the technologies that have more or less importance according to the nature of the operations are:

- ENERGY EFFICIENT MOTORS
- SENSORS & CONTROLS
- COMPRESSED AIR SYSTEMS - variable speed drives, sealed air leaks
- COMBINED HEAT & POWER SYSTEMS (CHP)
- CONTINUOUS FIBER CERAMIC COMPOSITS (CFCC) - performance in hot environments without getting brittle
- COMBUSTION - advanced burners in boilers & furnaces
- STEAM SYSTEMS - insulating and condensate return lines, stopping steam traps, condensate return to boiler

RESOURCES & INFORMATION

- Department of Energy
Industrial Technology Program
www.eere.gov/industry
- Mass Energy Efficiency Partnership
www.maep.org
- Center for Efficiency & Renewable Energy
www.ceere.org
- Massachusetts Municipal [mmwec.org](http://www.mmwec.org)
- Whole Building Design Guide
www.wbdg.org
- National Assoc. of Manufacturers
www.nam.org

Industrial and Utility Projects

Deer Island Sewage Treatment Plant in Boston - Hydroturbine in outfall tunnel; 16Kkw cogen from biomass.

Brockton, Pittsfield, Westford brightfields - Large PV arrays on old brownfields.

Malden Mills, Lawrence - Cogeneration System

Riverdale Mills, Blackstone River, MA. ("Aquamesh") - Gas powered cogen.

NEC Electronics, CA - Ultra efficient clean rooms

Veolia Energy, Cambridge - 277K kw natural gas cogen for district heating.

Pioneer Valley Resource Recovery - 9,400 kw cogen from waste; electric to grid, steam to wastewater treatment.



An Urban Bright Field



An energy efficient data Center in Holyoke, MA; a joint project of MIT, BU, UMass, NEastern, Cisco, & EMC.



Clark Distribution Center Warehouse is powered by 2304 solar panels, Milford, MA.

Malden Mills is powered by cogeneration



Grants & Rebates

NATIONAL GRID 50% to \$100K 800-787-1706

Gas Retrofit - HVAC, Hot water, Steam system upgrades, Process & manufacturing equipment.

Electric Retrofit - Lighting, Heat Pumps, AC, Motor VFDs, Air compressors. masssave.com

Custom Retrofit- with engineer's study

Direct Install- 70% lighting, controls 800-332-3333

To \$750/installed kilowatt, Cogeneration.

FEDERAL

\$1.80/sq ft for 50% over ASHRAE standard
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