

# Energy Efficiency Opportunities



*presented by*  
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**ENERGY & RESOURCE SOLUTIONS**

Efficiency is the Bottom Line:  
How Bay State Businesses Can  
Prosper by Saving Energy

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## Why Develop Energy Efficient Projects

- **Improved Equipment**
  - ❑ Higher Quality Lighting
  - ❑ Improved Comfort for Workers and Customers
  - ❑ Enhanced Operations
  - ❑ Increased Productivity
  - ❑ Improved Sales
- **Environmental Benefits**
- **Energy Cost Savings**
- **You Are Paying into the Fund (Mass Electric/ NStar Customers)**

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## Lighting for Human Performance

- Why is lighting important
- Elements of good lighting
  - Illumination level
  - Brightness
  - Color temperature and color rendering
  - Glare and other visual comfort issues



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## Lighting Opportunities

- Replace Incandescent Lighting with Fluorescent or Ceramic Metal Halide
  - Savings Potential – 60-75%
  - Longer Lamp Life
  - Reduced Heat & Glare
- Replace T12 Fluorescent Lighting with High Performance T8
  - Savings Potential – 20-40%
  - No Flicker
  - Improved Color Rendering
  - Longer Lamp Life
- Replace Metal Halide Lighting with High Intensity Fluorescent
  - Savings Potential – 20-80%
  - Eliminate Starting/Warming Time
  - Improved Color Rendering

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# Lighting Opportunities



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# Lighting Opportunities



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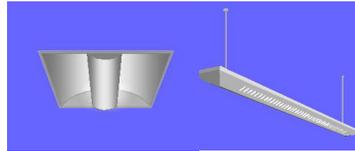
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# Hallways

## > Fluorescent – T8, T5, CFL

- Recessed Parabolic and Direct/Indirect
- Surface-Mounted Fixtures
- Fluorescent Wall-Washing Fixtures
- Pendant Direct/Indirect
- Pendant Fully Indirect
- Recessed CFL



## > Exit Signs

- LED
- Electroluminescent



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# Exterior Lighting

## > Pulse Start Metal Halide

## > High Pressure Sodium

## > Full Cut-Off Fixtures

- Eliminates All Stray Light Pollution
- Provides Effective Light Where Needed

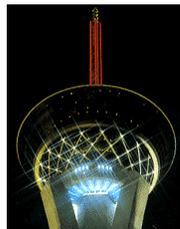
## > LED

## > Control

- Photocell
- Scheduling



Outdoor Photocell



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# Automatic Lighting Controls

## > Occupancy

- Occupancy controlled On/Off
- Occupancy controlled multi-level switching
- Occupancy controlled dimming

## > Daylighting

- Daylight harvesting – on/off
- Daylight harvesting – multi-level switched
- Daylight harvesting – dimming

## > Scheduling Controls



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# HVAC Opportunities



More funny pictures at [www.afunworld.com](http://www.afunworld.com)

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# HVAC Opportunities

## ➤ Replace Existing Heating and Cooling Systems with Modern Premium Efficiency Units

- Greater Comfort
- Reduced Noise
- Reduced Maintenance

## ➤ Repair and/or Install Economizers (Free Cooling)

- Take Advantage of Cool Outside air
- Improved Indoor Air Quality

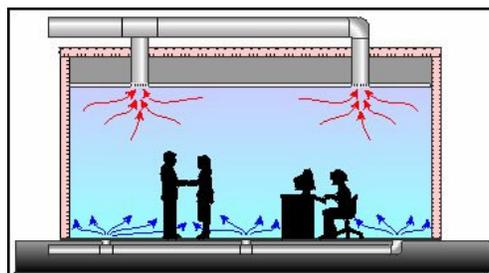
## ➤ Install and Program – Programmable Thermostats

- Cool and Heat Only as Needed

# HVAC Opportunities

## ➤ Displacement Ventilation

- Delivers Fresh Conditioned Air Gently at Floor Level
- Conditioned Air Rises Through the Space and Exhausts at the Ceiling



*Displacement ventilation.*

# Heat Recovery

## > Heat Recovery

- Heat Wheels
- Reverse Flow
- Heat Pipes
- Heat Pumps



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# Variable Frequency Drives (VFDs)- Applications

## > Variable Frequency Drives

- Pumps
  - Chilled Water Supply
  - Hot Water Supply
- Fans
  - Supply Fans
  - Return Fans
  - Ventilation Fans
  - Cooling Tower



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# Energy Management Systems (EMS)

## ➤ Energy Management Systems (EMS)

- Optimal Start/Stop
- Scheduling
- Temperature Set Point Control
- Ventilation Control
- Demand Control



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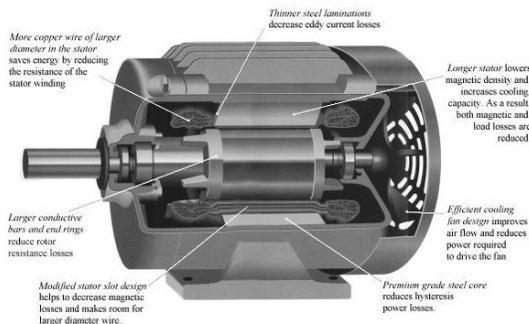
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# Premium Efficiency Motors

- Higher Efficiency
- Lower Operating Cost
- Utility Programs Offset Higher First Cost



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## Process Opportunities



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## Process Opportunities

- **“Smart” Kitchen Range Hood Controls**
- **Efficient Dishwasher Spray Valves**
- **Efficient Air Compressors & Associated Equipment**
- **VFDs for Process Motors, Fume Scrubbers, etc.**

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## Transportation



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## Transportation

- Car Pool
- Van Pool Programs
- Encourage Public Transportation
  - Always Provide Public Transportation Directions on Website and Brochures
- Purchase Efficient Fleets
- Use the Right Vehicles for the Job
- Provide Bike Racks and Showers

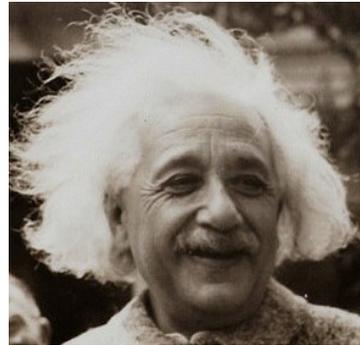
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# Conclusions



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# Questions?



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