Energy Management for Condominiums

Building Technologies

Energy & Environmental Solutions

Current Challenges for Condominiums

- Aging Infrastructure
  - Lots of 15-25 year old building stock
- Built for lowest first cost
  - Higher operating costs
  - Shorter useful life
  - Highest life cycle cost – paid through condo fees
- Pressure to keep operating costs down & preserve reserve funds
  - Maintenance deferral
- Code compliance & hazardous materials issues

Current Challenges for Condominiums

- Energy Conditions
  - Utilities are the fastest growing budget line item
  - Electricity markets changing
    - Smart metering
    - time of day rates
    - higher overall costs
  - Natural gas prices remain volatile
  - Kyoto commitments may produce further price pressures

Where Are We Going?

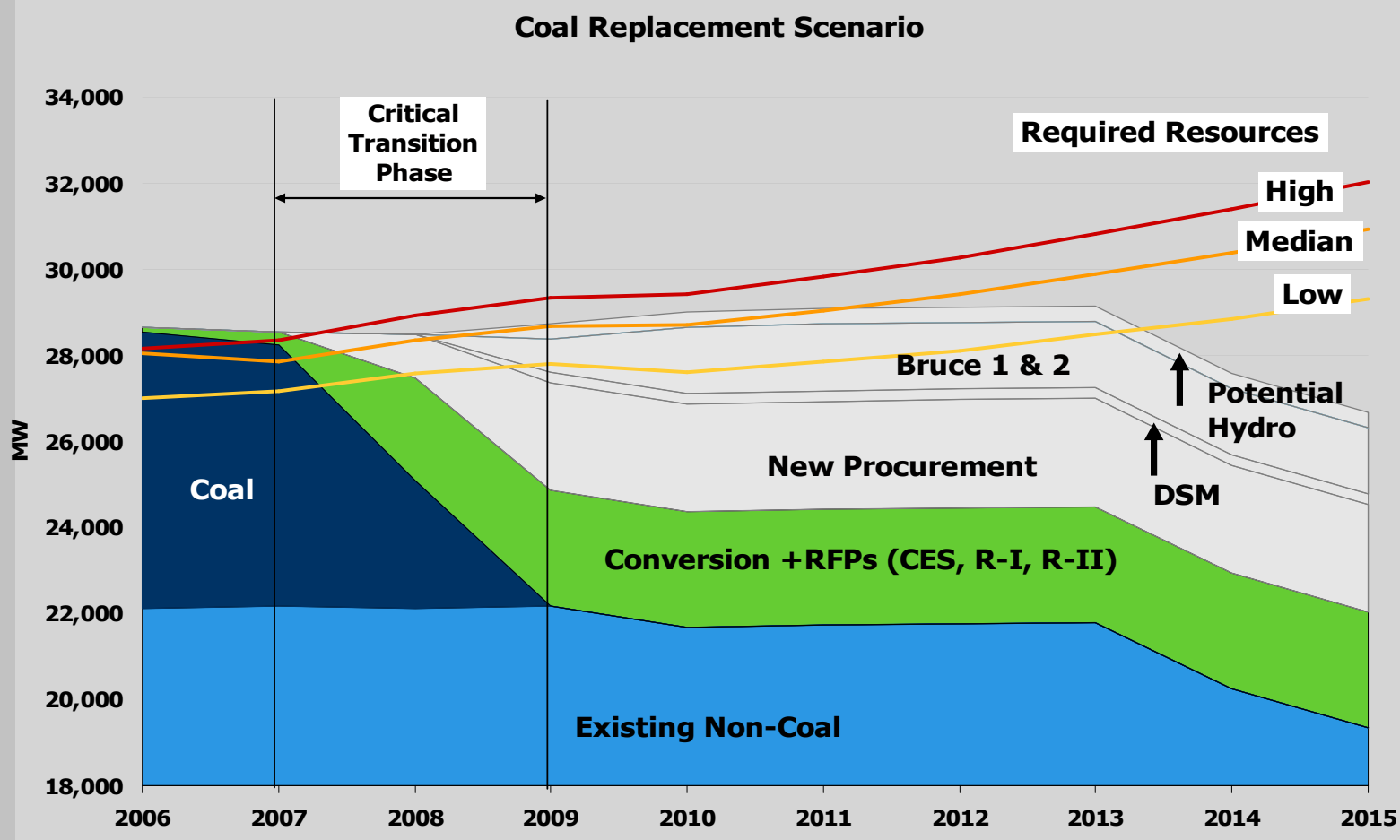
- Electricity pricing up **33%** in three years – 4.3 cents to 5.7 cents
- Imports up **40%**
- Consumption records broken in 10 out of 12 months
- New Peaks:
  - Peak Capacity: 25,805 MW – Dec 20, 2004
  - New Winter: 24,979 MW (Dec 20, 2004)
  - New Summer: 26,442 MW (July20, 2005)
- New Capacity Needed:
  -- 25,000 MW in next 10 to 20 years

Condominium Facility Needs & Objectives

- Increase property values by lowering the total cost of ownership
- Eliminate deferred maintenance backlog
- Reduce utility and operating costs
- Ensure physical plant reliability
- Protect reserve funds

Resource Adequacy

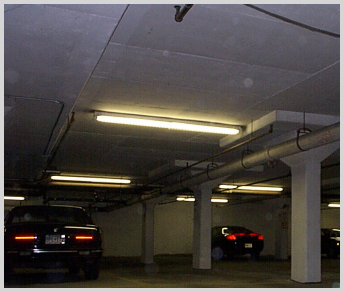
(at time of summer peak) Source: IESO Windsor Presentation October 12, 2005



Solutions……

Improvements - Lighting Retrofit

Present



- Aged fluorescent technology (T-12 – 46 lumens/watt)
- Incandescent lamps (pot lights, fire exit signs – 15 lumens/watt)
- Mercury vapour (exterior & garage illumination - 35 lumens/watt)

Future

- Energy efficient fluorescent technology (T-8 – 69 lumens/watt or T-5 – 93 lumens/watt)
- Compact Fluorescent lamps (45 lumens/watt)
- Light Emitting Diode (LED) or Glowlux Exit Signs
- High Intensity Discharge (54 to 100 lumens/watt)

Improvement - Make Up Optimization

Present

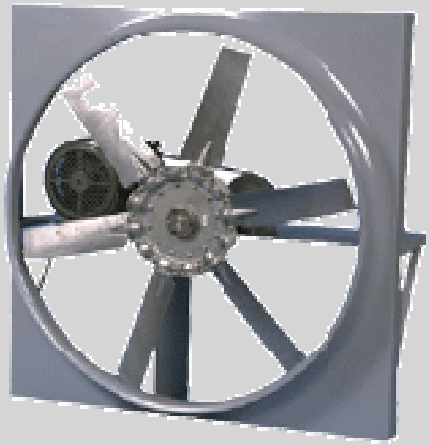
- Purpose: Hallway Pressurization
- Fixed Volume – Sized to meet maximum demand (10 cfm/room)
- Poor seasonal efficiency - (65%)

Future

- Vary volume to meet demand – Two speed motors or variable frequency drives (VFDs)
- Connect to central plant to capture improved seasonal efficiency

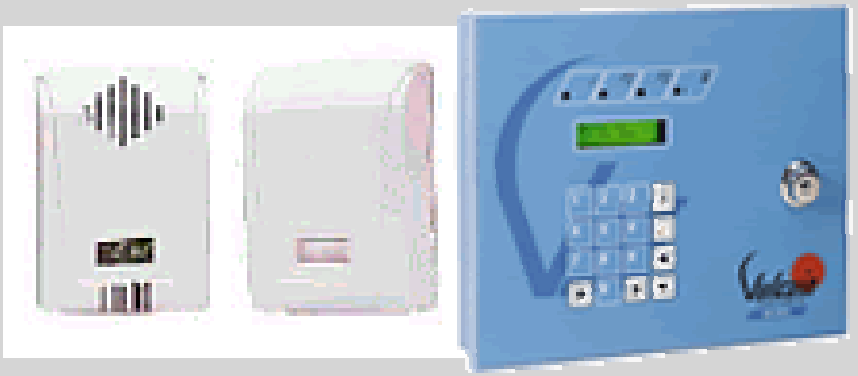
Improvements - Garage Ventilation Optimization

Present



- Purpose: Extraction of vehicle exhaust
- Constant volume, constant operation
- Sized to meet peak loads – Morning egress, evening returns

Future



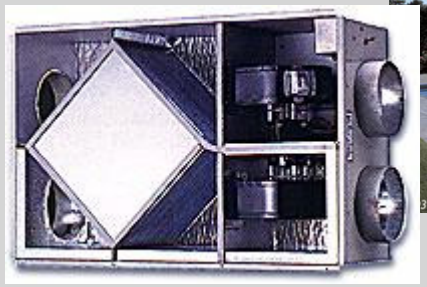
- Match exhaust volumes to meet actual requirements through variable speed operation under carbon monoxide monitoring
- Reduce exhaust of treated air

Improvements - Swimming Pool HVAC Optimization

Present

- Atmospheric pool water heaters – 65% Seasonal Efficiency
- Significant evaporative loss – chlorine odour migration & damaging condensation

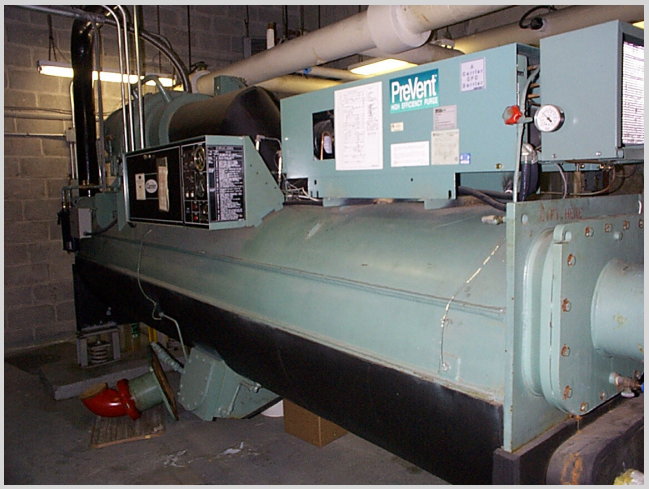
Future



- Medium to High efficiency heaters – 85 to 95% Seasonal Efficiency
- Automated Pool Covers
- Heat Recovery Dehumidification

Improvements - Chiller Replacement

Present



- CFC Abatement (R11 – 2006)
- Low energy efficiency (0.9kw/TR)
- Often oversized
- Majority near end of useful life (20 year average)

Future

- Ozone friendly refrigerants
- Improved energy efficiency (0.3kw/TR – 3 times better)
- Should be “right sized”
- Improved reliability

Improvements – Boiler Replacement

Present

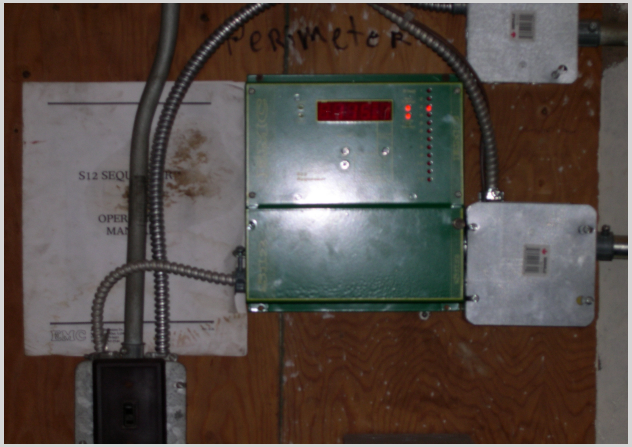
- Low first installation cost
- Poor seasonal efficiency (65%)
- Insufficient turn-down ratio (Poor Control)
- Stack effect can “steal” useful heat

Future

- Lowest life cycle cost
- Good seasonal efficiency (85% non-condensing, 95% condensing)
- Excellent modulating control (100 to 30%)
- Smaller footprint

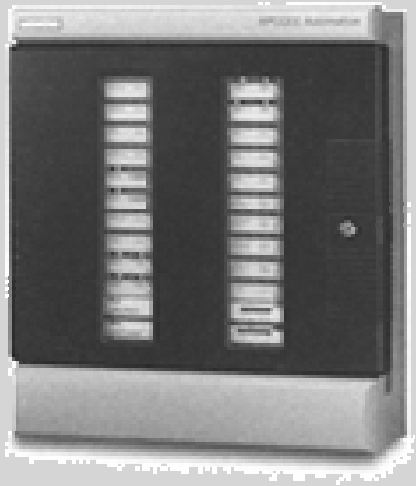
Improvements - Building Control Upgrade

Present



- Packaged Controllers – Follow Prescriptive Strategies
- Lack Central Monitoring and Control

Future



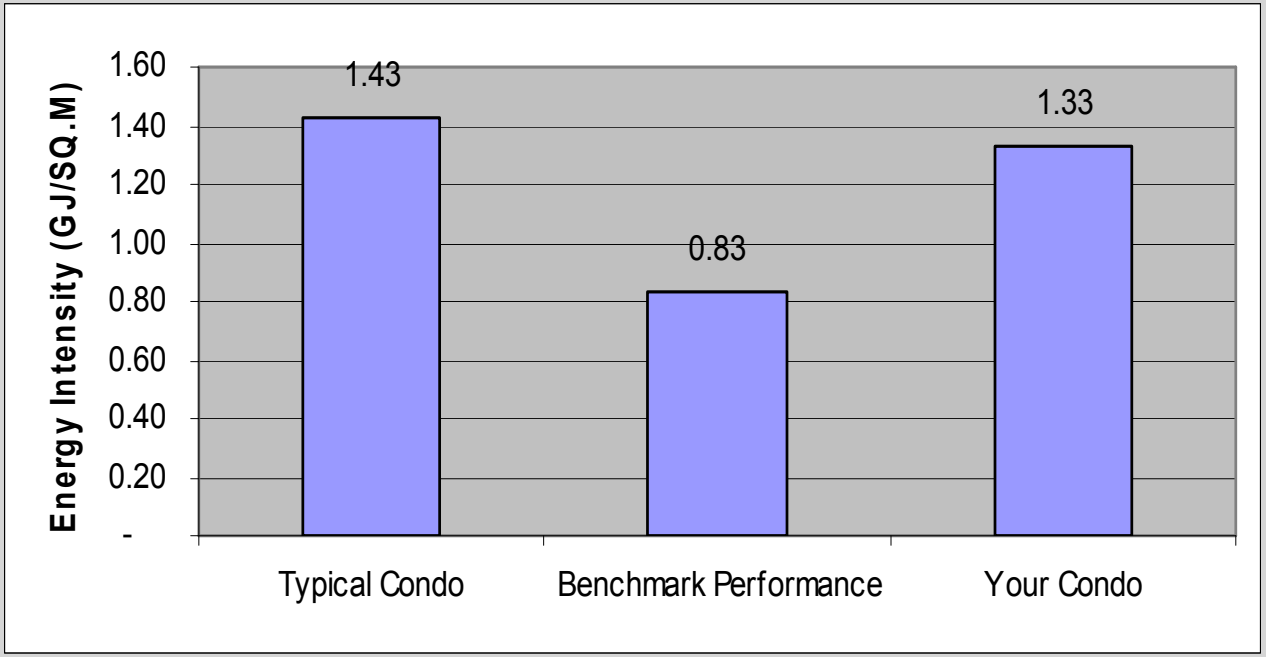
- Custom Energy Management Control Strategies
- Remote monitoring, alarming and troubleshooting
- Optimal comfort and energy use

Improvements – Other Possibilities

- Depending on your facility…
  - Electric submetering
  - In suite improvements
    - Setback thermostats
    - Low flow toilets/showerheads/aerators
    - Upgraded terminal heating equipment
  - Solar water/air heating
  - Desiccant cooling/dehumidification
  - Cogeneration
  - Window replacement
  - Envelope sealing
  - Fuel replacement – Elec to Gas – Dryers
  - Occupancy Sensors – Ltg/Water

Knowledge is Everything

- Compare your building against comparable facilities
- Focus on energy performance rather than cost performance
- Monitor continuously and chase down discrepancies



Energy Management Economics

- Potential Energy Cost Savings – 20 to 30%
- Typical Paybacks
  - 3 to 7 years for 'pure' energy savings
  - 7+ years for broader equipment renewal and facility improvement program
- Available Incentives
  - Natural Resources Canada
    - Up to $25k for study; $500k for implementation
  - Union Gas
    - Up to $5k for study; $30k for implementation
  - Electric Distributor (ie Enwin Powerlines)
    - Programs vary by region – ASK!
- Project Implementation
  - Savings and cost guarantees –Low Risk
  - Financed through energy savings – Preserve Reserve Fund
  - Results monitored and verified – Drives Accountability

Sample Projects

Celebrity Place – MTCC 678

Measures

- Lighting Retrofit
- Building Automation
- Domestic Water Boiler Upgrade
- Pool Cover

Energy Savings

$135,000/annum

Investment

$687,000

Sample Projects

100 Prudential Drive – YCC 386

Measures

- Architectural, Air Sealing
- Redesign/Rebalance Corridor Ventilation System
- Install Condensing Type Heating Boiler
- Install Condensing Type Domestic Hot Water Boiler
- Reduce City Water Makeup
- Install Building Automation System

Energy Savings

$50,400/annum

Investment

$337,000

Sample Projects

Camelot on the Park - PCC 361

Measures

- Lighting Retrofit
- Pool Dehumidification
- Controls (MUA, Thermostats)
- Domestic Hot Water Heating, Plant Redesign and Renewal

Energy Savings

$60,000/annum

Cost of Measures

$324,000

Sample Projects

The Esplanade – MTCC 850

Measures

- Building Automation
- VFD on Cooling Tower
- Fan Coil Thermostats
- Modifications to MVA System to Achieve Free Cooling

Energy Savings

$94,000/annum

Cost of Measures

$304,000

Sample Projects

Victoria Park Place - Essex Condo #35

Measures

- Lighting Retrofit
- VFD EE Motor for DHW
- Indv Metering
- Carbon Monoxide Detectors – Garage
- In-Suite Measures

Energy Savings

$161,000/annum

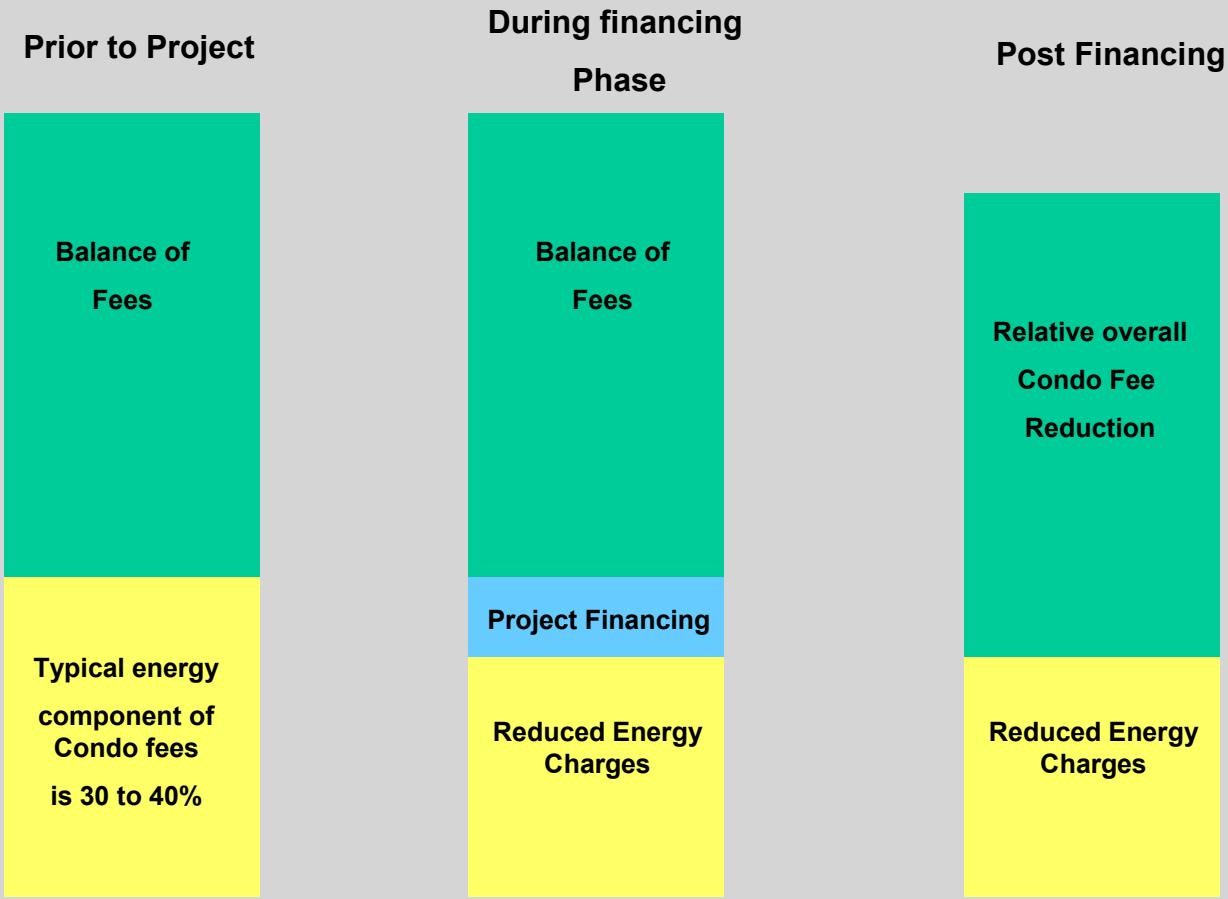
Cost of Measures

$1,036,000

Why Invest in an Energy Savings Program?

- You will save money in the near future and protect yourselves incrementally over rising energy rates
- Your units will be more attractive to buy than other inefficient condos
- You will help protect the environment

How Does an Energy Project affect Condo Fees



The Retrofit Process

- Initial Assessment (No Cost-No Obligation)
  - 12 Months Utility Records (Gas, Electricity, Water)
  - Gross Floor Area
  - Energy benchmark comparison
  - 1 Day Site “walk through”
  - Estimate of savings and implementation costs
- Preliminary Engineering Study ($2,000 to $5,000)
  - Budget grade pricing of individual measures
  - Economic Feasibility of savings
  - Reserve Fund Study Matching
- Detailed Feasibility Study ($10,000 to $40,000)
  - At least 50% fundable through incentives
  - Commits to costs and savings/financing
- Implementation ($100,000 to $1,000,000)
  - Turnkey solution
  - Financed or paid from reserves
- Performance Assurance
  - Appropriate for larger projects (>$300k)
  - Verify savings for long term value

Questions and Answers……