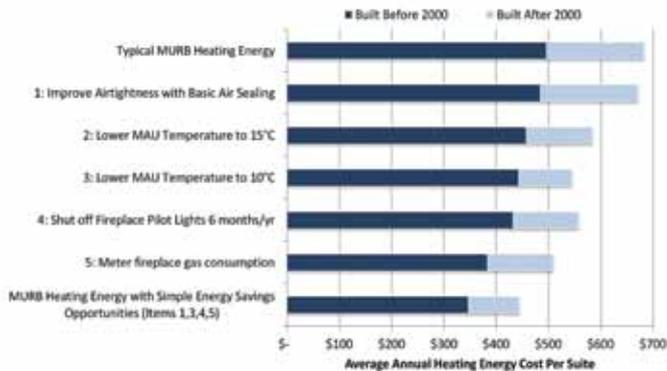


# TUNING UP HIGH-RISE BUILDINGS

Retrofits present the ideal opportunity to implement energy conservation measures.  
BY WARREN KNOWLES AND GRAHAM FINCH



Typical space heat energy savings for each suite owner from simple building energy tune-ups.

**E**nergy costs are a significant component of the operational and maintenance budget of a multi-residential building. However, quite often fairly simple tune-ups or retro-commissioning can significantly reduce the amount of wasted energy and, subsequently, reduce the billing costs for owners and occupants.

## How is Energy Used in Your Building?

People use energy in buildings for a variety of purposes including space heat, ventilation, hot-water, lighting, and to provide power to appliances and electronics. The energy is typically provided by a combination of electricity and natural gas. The following is a list of potential areas where energy savings may be realized as a result of tune-ups or retro-commissioning.

## Make-up Air Units (MAUs)

The gas used to heat ventilation air by MAUs can be the largest single component of energy use within a high-rise, particularly in newer buildings. Maintaining MAUs in optimal condition is essential, and is usually performed by maintenance contractors at regular servicing intervals. When adopting measures to reduce energy consumption, it is important to remember that ventilation air is provided for the health and comfort of the building occupants. For this reason, the make-up air unit flow rate should never be turned down, off, set-back, or put on a timer, unless a professional confirms that sufficient ventilation rates will still be achieved with these adjustments.

The owner group may consider turning down the set-point temperature of the MAU. A set-point of about 15°C is typically assumed in design and is sufficient for tempering the make-up air. However, a set-point of 21°C or higher is often set by the owner group or maintenance personnel to reduce cold drafts which will significantly increase the energy consumption, rather than simply adjusting the baseboard heaters.

Door-threshold sweeps are often installed by occupants to reduce noise, odours, or light from the corridors. These sweeps also block the make-up fresh air from the corridors which is intended to go in the suites. Suite owners and occupants should keep this gap open as initially designed to better allow the distribution of this fresh air.

## Air-Sealing

In order to effectively ventilate a building, whether passively (open windows) or mechanically (MAUs), air sealing and compartmentalization is critical. Simple adjustments to building assemblies to better control the air flow through, and within buildings can have a major impact on the energy consumption. Window and door gaskets or hardware can be easily adjusted as part of the maintenance program. A review of mechanical, plumbing, electrical and electrical shafts often identify opportunities to better seal penetrations and restrict uncontrolled air-flow by compartmentalizing the building.

Compartmentalization results in reduced loads on the make-up air delivery systems and associated energy consumption. With the improved delivery of make-up air to all areas within a building, there is less need for occupants to open their windows for fresh air during the cooler times of the year.

## Natural Gas Fireplaces

Gas fireplaces are inefficient when used for space heating, and consume large amounts of energy. Building owners may wish to install sub-meters to better inform the occupants of the actual energy use and associated costs. Pilot lights should be shut off during summer months to conserve energy. On-off switches



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## RETROFIT/RESTORATION

should be replaced with thermostat and/or timer controls, so that fireplaces are not left on as heating appliances.

### Elevators

Elevators rely on controls to be energy efficient. Older elevators may have controls that are malfunctioning or are inefficient compared to newer equipment. Specialized elevator consultants and service contractors should review the elevator operation and power supply. For example, continuously running power converters can waste a significant amount of energy.

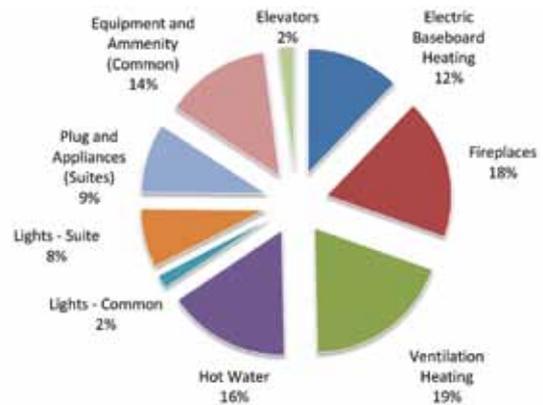
### Other Opportunities

Adjustments and controls can significantly improve energy efficiency of domestic hot water space heating and lighting systems. Lighting upgrades to fluorescents or LED fixtures are another way to conserve energy.

### Renewals Tune-Ups

Over the service life of a building, significant renewals (or in some cases rehabilitation) will be necessary. This presents the ideal opportunity to implement energy conservation measures. For example, window replacement projects can greatly improve the air tightness of a building and reduce heat loss (or overheating in the summer time). Repiping projects may also provide a good opportunity to replace bathroom fans in the area of the piping work.

Most of the above energy saving measures have little or no cost, particularly if done in conjunction with other work. However, these measures can result in savings per suite ranging from \$350 to \$650 per year, particularly for newer buildings.



Distribution of annual energy consumption in a typical MURB, as percentage of total consumption.

For all of the above measures, it is important to keep in mind the overall operation of the building beyond just energy consumption. Be sure to consider how changes to the building systems may impact other functions including moisture control, indoor air quality, and comfort. ❖

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The contents of this article are primarily based on the results of a study into multi-unit residential building energy consumption conducted by RDH for CMHC, HPO, City of Vancouver, BC Hydro, Terasen Gas and Fortis BC.



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