

Affordable Warmth BC Multi Unit Residential Energy Evaluation Report

| | | | |
|------------------|---|-------------------|-------------|
| Building Name: | Kitsun Housing Society | Date of Report: | Oct 18, 07 |
| Address: | #10, 2431 Vine Street, Vancouver, V6K 3K7 | Year Built: | 1979 / 1903 |
| Contact Name: | Paulette Stroo | Number of Suites: | 17 |
| Contact Details: | pvstroo@hotmail.com | Number of Floors: | 3 |

Dear Paulette Stroo, Kitsun Housing Society,

On behalf of Environment Canada, we would like to thank you for participating in the Affordable Warmth BC Program.

Your building has been visited by a qualified energy advisor based on standard conditions. The 'walk-through' energy evaluation report represents the advisor's best judgment, given the information available at the time of the evaluation. The purpose of this walk-through energy evaluation was to identify energy savings opportunities in your building; it was not meant to replace a full building inspection or full energy audit. City Green makes no warranty, expressed or implied, with respect to the energy consumption figures or energy efficiency recommendations included in this assessment. Actual energy consumption and costs depend on a host of factors beyond the control of City Green.

The assessment revealed a range of potential energy saving upgrades. Recommendations in the report are prioritized by cost effectiveness. Tackle easy upgrades first and build support in your building for more extensive building energy upgrades. It's good to bear in mind that fuel costs are rising and that equipment and labor costs are expected to increase correspondingly. So now is the best time to initiate energy saving upgrades.

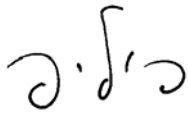
Recommended Upgrade Sequence:

1. Insulation and Air Sealing
2. Thermostats and zone control valves
3. Ventilation
4. Heating System and Domestic Hot Water
5. Lighting
6. Window shading
7. Appliances
8. Water Conservation

Further information for each upgrade area is presented in the following pages.

Please contact City Green Solutions at 1 866 381 9995 with any questions or concerns.

Sincerely,



Philip Be'er
City Green Solutions



Environment
Canada

Environnement
Canada



Affordable Warmth BC Multi-Unit Residential Energy Evaluation Report

Building: Kitsun Housing Society

File#: AWP00001

Page: 2 of 5

NOTE: Qualified contractors should be consulted before implementing any of the recommendations listed below.

General:

- By far the highest priority for buildings is to prevent heat from escaping through the building envelope.
- We do this by:
 - Maximizing the building's insulation potential.
 - Reducing air leakage from the building.
 - Supplying mechanical ventilation.
- When we upgrade our heating systems we select the smallest and most efficient systems capable of supplying the required heat. We assure that the entire heat distribution system operates as efficiently as possible and generate only as much heat as is needed.

Insulation

- If the walls contain less than 2 inches of insulation, then they should be insulated using batt insulation, dense packed cellulose or Icynene foam to a minimum of R-12 level.
- Heat is lost in every direction. Insulate horizontal surfaces above and below the building's living-space envelope using appropriate insulation materials, to levels approaching or exceeding R-40.
- Heating ducts (supply and return) and water pipes that pass through cool spaces must be insulated using suitable duct or pipe insulating materials.
- Pour concrete over the exposed crawlspace to prevent/reduce intake of humidity. Insulate the concrete using extruded polystyrene or another appropriate insulating material.
- Add a vapor barrier on the warm side of the insulation in the crawl space. Repair the crawl-space insulation and upgrade insulation and air sealing beneath the stairs.

Rationale and Best Practices

- The insulation must cover the building envelope surfaces completely and evenly - any uninsulated areas could allow convection to occur, causing heat to bypass the insulation completely.
- Minimise thermal bridging - a **thermal bridge** is any non-insulating material that connects the warm side of the envelope to the cold side (e.g., a wall stud).

Notes and Tips

- The existing level of insulation can be verified by drilling/cutting a few easy-to-hide holes in walls and ceilings. Alternatively, ask an insulation contractor to verify existing insulation levels for you.
- Detailed information about **insulation materials and insulating practices** can be found online at: "Keeping the Heat In": <http://www.citygreen.ca/pdfs/KTHI.pdf>.

Optimum ventilation in a well sealed building

- Install an Energy Star bathroom or kitchen ventilation fan in each suite.
- Use the fan for pulling fresh air into the suite, improving indoor air quality and reducing moisture and uncontrolled heat loss.
- Use caulks, vapour-barriers and weatherstripping to reduce air leakage throughout the building.
- Plug gaps around pipes, ducts, fans and vents that go through walls, ceilings and floors from heated to unheated spaces.
- Seal and insulate the electrical services cavity besides the stairs on each floor. Heat is escaping continuously from all the adjacent building components. The most important areas for reducing heat loss are at the very top of this conduit and the very bottom, if it's open to the atmosphere.



Environment Canada
Environnement Canada



Affordable Warmth BC Multi-Unit Residential Energy Evaluation Report

Building: Kitsun Housing Society

File#: AWP00001

Page: 3 of 5

- Seal the vents in the “skylight” above the stairs of 2431 Vine Street. If ventilation is required in this area, install a small ventilation fan to extract air.
- Air is leaking from some of the pocket doors. Seal the area around these doors.

Rationale and Best Practices

- Sealing a building and assuring that windows are closed enables us to reduce **costly, uncontrolled** heat loss.
- Our **ventilation target** is the replacement of **up to about one third of the volume of air** in the building every hour (when the house is occupied.)
- **Fresh air** is pulled in through the remaining leaks in the building envelope (or through adjustable vents.)
- In those cases where the home is so well sealed that the amount of make-up air is less than 1/3 of the building’s volume per hour, a **balanced system of supply and exhaust** fans or a Heat Recovery Ventilator (**HRV**) is recommended.
- Annual **savings of up to 7%** of heating costs can sometimes be achieved by using economical ventilation fans **rather than opening windows**.
- Ventilation fans are **engineered to operate quietly, efficiently (Energy Star rated) and continuously**. This differentiates them from the noisy bathroom exhaust fans with which we’re familiar.
 - Example: <http://www.panasonic.ca/english/appliance/ventilationfans/index.asp>
- In **ventilating mode** the fan should operate at a **low speed**. The fan should switch to high speed **exhaust mode** when an occupancy-sensor is triggered or when a humidistat is triggered by moisture from bathing or cooking.
- Corridor and central exhaust fans can be turned off and on using automatic timers. When these fans operate intermittently, less cold air is drawn into the building and less heating is required.

Notes and Tips

- Why is it important to close windows?
 - When we heat our homes we cause a **stack effect** - Air heated by the building’s heating system rises, causing the pressure in the upper part of the house to be higher than the pressure outdoors.
 - Pressure in the lower part of the house is usually lower than the air pressure outside.
 - When we open a window in the **upper part of the house** to let fresh air in, this can have an unwanted outcome - the high air pressure tends to cause the heated air to **flow outwards** rather than allowing cool, fresh air to enter. However, **cool air** will often rush into the lower areas of the home where the indoor air pressure is less than outside, **making the basement or lower floors much cooler and draftier**.
 - Operating the ventilation fan “continuously” can cost less than \$20 a year and can save hundreds of dollars in heating over the life of the fan.
- Install foam gaskets behind cover plates of electrical outlets, switches and lighting fixtures to reduce air leaks.
- Detailed information about the **sealing and the ventilation of buildings** can be found online at: “Keeping the Heat In”: <http://www.citygreen.ca/pdfs/KTHI.pdf>.

Heating Systems

- Replace the existing boiler system with a high-efficiency condensing boiler system. IBC Technologies <http://www.ibcboiler.com/> in Vancouver manufactures a boiler system that is capable of replacing your existing boiler and your hot water tanks. The IBC system would provide extremely high combustion and heating system efficiencies, paying for itself in energy savings within just a few years.
- Install zone controls valves and programmable thermostats in all suites (2431 Vine Street).



Environment Canada
Environnement Canada



Affordable Warmth BC Multi-Unit Residential Energy Evaluation Report

Building: Kitsun Housing Society

File#: AWP00001

Page: 4 of 5

- Use the programmable thermostats to lower the setpoint temperature when the home is unoccupied and when the occupants are sleeping.
- Encourage residents to purchase a portable infra-red heater for localised heating, and to lower the air temperature setpoint in the apartment.

Rationale and Best Practices

- Zone control valves must be regularly maintained to prevent the buildup of sludge that causes premature failure. Immediately **replace** all valves that do not prevent flow when shut. (If a section of water pipe is still warm an hour after the section has been isolated using the zone control valve then the valve needs to be repaired or replaced.)

Notes and Tips

- **Infra-red heaters:**
 - Infra-red (or halogen) heaters can be used for localised heating. These IR-radiant heaters provide an immediate and affordable heat by warming the objects ahead of them and not the surrounding air mass.
 - Portable and wall/ceiling mounted units are commonly available.
 - They should be installed with a timer to assure automatic shut off.



Windows and Doors

- Install louvers over all vertical and sloped south facing windows in the Broadway building to prevent direct-sunlight from penetrating during the summer. Calculate the size, the spacing and the angle of the louvers using a solar calculator in order to maximise insolation during the cooler seasons.
- Install exhaust fans, if necessary, to remove excess heat from the Trombe Wall area in summer.
- Assure that the Trombe Wall area is well sealed during the heating season.
- When the temperature outside is lower than the temperature inside, allow the insulated dampers to close and use compact fluorescent lights for lighting. The energy used for lighting will, in most cases, be a fraction of the potential heating energy that might be lost when the dampers are left open. (Double glazed windows have an R-value of about R3.5 whereas the dampers are probably R-12 or R-20.)

Domestic hot and cold water

- Replace the hot water tanks at 2431 Vine Street with a high efficiency indirect-heated water tank (uses water from a high efficiency boiler like the IBC system to heat the domestic hot water) or with instantaneous gas heaters deployed through the building (possibly one-per-floor or one for 4 suites.) If the DHW distribution pipes are insulated then the more efficient system would be the indirectly heated system. Otherwise the instantaneous heaters are more efficient.
- Insulate all hot-water pipes.
- Upgrade to 6-litre-per-flush or dual flush toilets and reduce water consumption by up to 70%.
- Upgrade to ENERGY STAR® rated front-loading clothes washers and use 40% less water and 50% less energy.

Rationale and Best Practices

- Reduce your domestic hot water temperatures to a safe level of 60°C/ 140°F, but not lower. Legionella pneumophila that causes Legionnaire's disease can colonize in hot water systems set at 46°C (115°F) or lower.
- Replace clothes washers with Energy Star rated front loading washers. Front loading washers use considerably less warm water. Clothes that are spun dry in front loading washing machines retain less water and therefore, require less time in the drier.

Affordable Warmth BC Multi-Unit Residential Energy Evaluation Report

Building: Kitsun Housing Society

File#: AWP00001

Page: 5 of 5

Notes and Tips

- Install outdoor clothes lines for shared tenant use, where possible.
- Rough-in dimensions of low-flow or dual flush toilets may differ than regular toilets. Before purchasing, compare measurements to be sure the new toilets will fit properly in the required space.

Appliances

- When replacing lighting, appliances, electronics and office equipment, look for ENERGY STAR® labelled products.
- More information about energy efficient appliances can be found in the AWBC TOOLKIT.

Lighting

- Replace incandescent light bulbs with compact fluorescent lights.
- Utilize task lighting (CFL Torchiere and the Energy Efficiency Desk Lamp) in living room and study areas.
- When halogen spots and miniature spots burn out, replace them with Infra-Red Halogens

Rationale and Best Practices

- Qualified Energy Star compact-fluorescent light bulbs (CFLs) consume up to two-thirds less energy than a standard incandescent bulb, and last up to 11 times longer.
- Infra Red Halogens optimize lumen output, giving you up to 67% longer life and up to 40% in energy savings compared to a standard halogen. These lights often require a special order.
http://www.nam.lighting.philips.com/us/ecatalog/catalogs/halogen_brochure.pdf?PHPSESSID=4769a0a6d5f607983b21373104b7f758

Notes and Tips

- Fluorescent lights contain mercury and should always be disposed of safely. For a recycling location near you see: <http://www.bchydro.com/powersmart/elibrary/elibrary40640.html>

Additional notes:

These additional notes were recorded by Trish Mau.

- Some heat is being lost through the top kitchen window.
- #2307 W. Broadway: Press down the metal inside the heater in the ceiling to create a seal -- cold air is getting in.
- #2313 W. Broadway: The insulation along the west side of the building is open to the air. The wall should be sealed so that cold air doesn't leak into the suite.
- During the assessment, I mentioned the possibility of installing an Air Source Heat Pump. Upon reflection, I realized that the high-efficiency, condensing-boiler suggested above, is a better option for the Vine Street building than an ASHP.
- Electrical room, Vine Street building:
 - Add weather stripping around the door to prevent air leaking into suite above.
 - Insulate pipes inside electrical room.
 - Door should fasten tightly -- switch to a sliding lock or other mechanism.

Thank you, Trish.



Environment Canada
Environnement Canada



Affordable Warmth BC Multi Unit Residential Building Report

Appendix 1 - In Suite Lighting - Potential lighting upgrades for file number AWPB00001

| Zone | Existing Technology | Retrofit | Quantity | Average Operating Hours | Existing Watts /Unit ** | Revised Watts /Unit ** | Savings (Watts) | Total Kwh Savings | Total Annual Energy Savings* ** | Total Net Cost | Simple Payback Years | |
|--|---------------------|------------------------|------------------------------|-------------------------|-------------------------|------------------------|-----------------|-------------------|---------------------------------------|----------------|----------------------|-------|
| . | | | | | | | | | | | | |
| Suite | Incandescent | CFL < 42 W - Screw In | 7 | 945 | 75 | 20 | 55 | 364 | \$ 18 | \$ 56.00 | 3.1 | |
| Vanity | Incandescent | CFL < 42 W - Screw In | 4 | 700 | 75 | 20 | 55 | 154 | \$ 8 | \$ 32.00 | 4.2 | |
| . | | | Incandescent Subtotal | | | | | | 518 | \$ 26 | \$ 88.00 | 3.4 |
| Halogens (30W-50W Operating hours adjusted to account for lower wattage) | Halogen < 100 W | Halogen Infrared Lamps | 6 | 365 | 75 | 45 | 30 | 66 | \$ 3.29 | \$ 66.00 | 20.09 | |
| . | | | Halogen Subtotal | | | | | | 66 | \$ 3.29 | \$ 66.00 | 20.09 |
| . | | | Common Subtotals | | | | | | 584 | \$ 29 | \$ 154.00 | 5.3 |
| | | | | | | | | | Approximate values for a single suite | | | |

Note:

- * BC Hydro incentive levels reflect those in effect as of May, 2007
- ** Including ballasts
- *** Energy savings are based upon an average electricity rate of \$0.05/kWh

Disclaimer:

This spreadsheet is intended as a tool for BC Hydro customers to estimate the financial benefits and costs of certain energy retrofits. While BC Hydro has attempted to provide meaningful estimates of average savings and costs as a starting point, these can vary widely depending upon the project, and customers are responsible for verifying their actual savings rates and costs.



Environment
Canada

Environnement
Canada

www.citygreen.ca

outreach@citygreen.ca

1 866 381 9995



Affordable Warmth BC Multi Unit Residential Building Report

Appendix 2 - Common Area Lighting for file number AWP00001 - Potential lighting upgrades

| Zone | BC Hydro Incentive per Unit* | Existing Technology | Retrofit | Quantity | Average Operating Hours | Existing Watts /Unit ** | Revised Watts /Unit ** | Savings (Watts) | Total Kwh Savings | Total Annual Energy Savings*** | Annual Maintenance Savings | Annual Total Savings | Total Installed Cost | Total Incentive | Total Net Cost | Simple Payback Years |
|---------------------------------|------------------------------|--------------------------------|---------------------------|----------|-------------------------|-------------------------|------------------------|-----------------|-------------------|--------------------------------|----------------------------|----------------------|----------------------|-----------------|----------------|----------------------|
| Fluorescent T12 to T8 | | | | | | | | | | | | | | | | |
| Parking | \$ 7.00 | 4' 1 lamp T12 magnetic ballast | ES T8 - 4' 1 lamp fixture | 12 | 8,760 | 41 | 27 | 14 | 1,472 | \$ 73.58 | \$ 17.28 | \$ 90.86 | \$ 540.00 | \$ 84.00 | \$ 456.00 | 5.02 |
| Fluorescent T12 Subtotal | | | | | | | | | 1,472 | \$ 73.58 | \$ 17.28 | \$ 90.86 | \$ 540.00 | \$ 84.00 | \$ 456.00 | 5.02 |
| Exit Signs | | | | | | | | | | | | | | | | |
| Exits | \$ 10.00 | Incandescent Exit Sign | LED Exit Sign | 4 | 8,760 | 30 | 1.75 | 28 | 990 | \$ 49.49 | \$ 93.44 | \$ 142.93 | \$ 240.00 | \$ 40.00 | \$ 200.00 | 1.40 |
| Exit Signs Subtotal | | | | | | | | | 990 | \$ 49.49 | \$ 93.44 | \$ 142.93 | \$ 240.00 | \$ 40.00 | \$ 200.00 | 1.40 |
| Common Subtotal | | | | | | | | | 2,462 | \$ 123 | \$ 110.72 | \$ 233.80 | \$ 780.00 | \$ 124 | \$ 656.00 | 2.81 |

Note:

* BC Hydro incentive levels reflect those in effect as of May, 2007
 ** Including ballasts
 *** Energy savings are based upon an average electricity rate of \$0.05/kWh

Disclaimer:

This spreadsheet is intended as a tool for BC Hydro customers to estimate the financial benefits and costs of certain energy retrofits. While BC Hydro has attempted to provide meaningful estimates of average savings and costs as a starting point, these can vary widely depending upon the project, and customers are responsible for verifying their actual savings rates and costs.



www.citygreen.ca



Environment
Canada

Environnement
Canada

outreach@citygreen.ca

1 866 381 9995

