RESEARCH REPORT

External Research Program

Household Environmental Monitoring Project

Volume 2: Appendices

Canada

CMHC SCHL

HOME TO CANADIANS

CMHC—HOME TO CANADIANS

Canada Mortgage and Housing Corporation (CMHC) has been Canada's national housing agency for more than 60 years.

Together with other housing stakeholders, we help ensure that Canada maintains one of the best housing systems in the world. We are committed to helping Canadians access a wide choice of quality, affordable homes, while making vibrant, healthy communities and cities a reality across the country.

For more information, visit our website at **www.cmhc.ca**

You can also reach us by phone at 1-800-668-2642 or by fax at 1-800-245-9274.

Outside Canada call 613-748-2003 or fax to 613-748-2016.

Canada Mortgage and Housing Corporation supports the Government of Canada policy on access to information for people with disabilities. If you wish to obtain this publication in alternative formats, call 1-800-668-2642.

Appendix 1: Previous Research

Motivational Techniques for Encouraging Sustainable Behaviour

Cullbridge Marketing and Communications. 2005. Tools of Change: Proven Methods for Promoting Health, Safety and Environmental Citizenship. Retrieved from http://www.toolsofchange.com/English/firstsplit.asp (May 15, 2005)

- how-to guide for community groups and other organizations to promote environmental awareness and implement a strategy for changing behaviour within a target group -- includes successful case studies
- promotes tools that use principles of community-based social marketing such as obtaining commitment for change from participants, creating incentives and removing barriers to change

McKenzie-Mohr, D. and Smith, W. 1999. Fostering Sustainable Behaviour: An Introduction to Community-Based Social Marketing. Gabriola Island: New Society Publishers.

- outline of suggested actions that can be taken in communities to promote sustainable behaviour, based on previous research in environmental psychology

Environmental Monitoring Tools

California Urban Water Conservation Council. 2002. h2ouse.org: Water Saver Home Water Use Calculator. Retrieved from http://www.waterbudgets.com/ConserVision/CUWCC/DataInput.htm (July 27, 2004)

- web tool for Californian residents that calculates home water use, and provides a "water budget" that advises user on the ideal amount of water that should be used based on area in which home is located, size of lot, numbers of fixtures, etc. – informs user of potential cost savings when actions taken to reduce water use

Canada Green Building Council. 2003. LEED Canada – Green Building Rating System. Retrieved from http://www.cagbc.org/building_rating_systems/leed_rating_system.php (September 1, 2005)

- rating system for new construction or major renovation of commercial, institutional, industrial buildings that allows design team to consider several sustainable design practices based on a point system

Canada Mortgage and Housing Research Division. 2000. Practices for Sustainable Communities. SCIP (Sustainable Communities Indicators Program). Ottawa: Canada Mortgage and Housing Corporation. Also retrieved from http://www.ec.gc.ca/soer_ree/English/scip/index.cfm (January 15, 2005)

- database of customized sustainability indicators to compare past and future environmental performance from national to neighbourhood census tract level – consists of a software package and web site
- used by planners, governments and other decision-makers to increase awareness of and prioritize environmental strategies – continual collection of data allows for monitoring of sustainable progress

Canada Mortgage and Housing Research Division. 2004. Household Greenhouse Gas Emissions Questionnaire. Also retrieved from http://www.district.north-van.bc.ca/article.asp?a=448&c=388 (January 15, 2005)

- questionnaire rates actions based on resultant greenhouse gas emissions -- items assessed include home energy use, transportation, waste, food consumption patterns
- user inserts values based on personal consumption patterns and can compare values with those of an average Canadian family -- suggestions to reduce emissions included

Celto Canadian Envirosystems Ltd. Carbon Lifestyle Model.

- model described as a 'decision-helping tool', created to aid residents and workers in low-rise buildings in reducing carbon emissions through examination of physical features of site/building and promotion of behavioural changes by residents
- recommendations made based on physical and behavioural consumption data that is entered into tool -- emphasis on sustainable improvements to biological and waste treatment systems
- degree of success of recommendations is determined by physical measurement of biological and waste treatment systems, and through community evaluations obtained through workshops and surveys

City of Edmonton, Office of the Environment. 2004. CO_2RE (Carbon Dioxide Reduction Edmonton), Edmonton's Greenhouse Gas Reduction and Energy Strategy. Retrieved from http://www.co2re.ca (December 12, 2004)

- booklets and information on website, designed to educate reader and provide incentives for upgrades to reduce greenhouse gases and save money
- tailored to specific requirements of Edmonton homeowners, based on survey of housing demographics, building code and results of previous EnerGuide home audits

City of Toronto. 2004. Water Efficiency – Indoor Water Efficiency Retrofit Kit. Retrieved from http://www.toronto.ca/watereff/water_saving_kits/indoor_kit.htm (July 27, 2004)

- web site outlines cost and resource savings benefits and components of water retrofit kit available for Toronto residents from City of Toronto

David Suzuki Foundation. 2005. The Nature Challenge. Retrieved from http://www.davidsuzuki.org/WOL/Challenge/ (August 15, 2005)

- web tool that calculates participant's effects on nature through greenhouse gases generated, air and water pollutants generated, water used, loss of farms and wetlands
- invites participant to pledge actions to reduce environmental impact and sign up as part of commitment to change
- compares participant's current and potential environmental performance with average Canadian statistics

Earthday Network, Redefining Progress. 2002. Ecological Footprint Quiz. Retrieved from http://www.myfootprint.org/ (December 15, 2004)

- tool compares amount of global biologically productive land available to amount of land required to supply user's consumption requirements – allows user to specify Canadian values
- user enters consumption values in categories such as food, housing, transportation, waste
- recommendations to reduce consumption provided upon completion of quiz

EnerACT. 2005. Smart Living Journal. Retrieved from http://www.smartliving.ca/StJournal.pdf (May 16, 2005)

- 12-week guide to reduce energy use – two to three recommendations made per week
- participant enters value of last hydro and gas bill consumption both prior to and upon completion of 12-week period
- participant encouraged to check each recommended action as it is completed, then sign and send back completed journal to EnerACT group (Toronto-based organization that created journal) to register commitment and enter a draw for free EnerGuide audit

EPA Victoria, Centre for Design at RMIT (Melbourne), Redefining Progress. 2005. Household Eco-footprint Calculator. Retrieved from http://www.epa.vic.gov.au/eco-footprint/docs/Home_EF_2.0.xls (July 20, 2005)

- Australian eco-footprint calculator web tool (compares global land available to land required to sustain current level of consumption) – user enters consumption values for home heating, electricity and water use, food, alcohol and clothing purchases, transportation, waste production
- participant can compare results with Australian or world average eco-footprint

Government of Canada. 2004. Your Guide to the One-Tonne Challenge (Cat. No. M144-27/2003E). Ottawa. Also retrieved from http://www.climatechange.gc.ca/onetonne/english (February 15, 2005)

- lifestyle quiz developed to determine effects of individual consumption on greenhouse gas emissions
- includes a comparison to average Canadian emission levels and recommendations to reduce emissions by at least one tonne
- provides link to community efforts taking place across Canada

Natural Resources Canada, CANMET Energy Technology Centre. 2004. RETScreen International Clean Energy Decision Support Centre. Retrieved from http://www.retscreen.net/ang/menu.php (September 1, 2005)

- helps planners and designers to implement renewable energy and energy efficient technologies, with an emphasis on technologies for commercial, industrial and institutional buildings
- includes tools to calculate effects of wind energy, photovoltaics, biomass, passive solar design, solar air & water heating, ground-source heat pumps

National Resources Canada, Office of Energy Efficiency. 2005. The Anti-Idling Toolkit. Ottawa: Natural Resources Canada, Office of Energy Efficiency. Retrieved from http:/oee.nrcan.gc.ca/transportation/idling/material/tool-kit-introduction.cfm (January 10, 2005)

- website offers free materials for use by community groups to organise an anti-idling campaign to reduce emission of greenhouse gases
- includes a "CO_2 Calculator" that describes potential CO_2, fuel and cost savings when idling time reduced

Natural Resources Canada, Office of Energy Efficiency. 2003. Commercial Building Incentive Program (CBIP) Screening Tool. Retrieved from http://buildingsgroup.nrcan.gc.ca/ee4/english/home/index.php (September 1, 2005)

- allows users to determine if the design of a new commercial, multi-residential or institutional building exceeds the requirements of the Model National Energy Code for Buildings

Natural Resources Canada, Office of Energy Efficiency. 2004. EnerGuide for Houses Home Energy Plan. Ottawa: Natural Resources Canada, Office of Energy Efficiency.
- residential energy assessment developed by NRCan that examines such items as air leakage and insulation levels in building envelope and mechanical equipment
- report provides energy efficiency rating for house, and lists recommendations to reduce energy use

Natural Resources Canada, Office of Energy Efficiency. 2004. The EnerGuide Appliance Directory. Retrieved from http://oee.nrcan.gc.ca/residential/personal/appliances.cfm?attr=4 (November 4, 2004)
- booklet provides information on efficiency ratings for major appliances sold in Canada

Natural Resources Canada, Office of Energy Efficiency. 2005. Energy Star Simple Savings Calculator. Retrieved from http://oee.nrcan.gc.ca/energystar/english/participants/procurement/calculator.cfm?attr=20 (September 1, 2005)
- used to compare the costs of purchasing energy-efficient products compared to conventional equipment for commercial and institutional buildings

Natural Resources Canada, Office of Energy Efficiency. 2005. Fuel Consumption Guide 2005. Retrieved from http://oee.nrcan.gc.ca/transportation/tools/fuel-consumption-guide/fuel-consumption-guide.cfm (January 20, 2005)
- booklet provides information on fuel efficiency ratings for vehicles sold in Canada

Natural Resources Canada, Office of Energy Efficiency. 2005. Simple Payback Calculator (Lighting). Retrieved from http://oee.nrcan.gc.ca/commercial/technical-info/tools/payback-lighting.cfm?attr=20 (September 1, 2005)
- calculates approximate cost savings when replacing lighting fixtures with more energy efficient units

Partners for Climate Protection. 2004. Inventory Quantification Support Spreadsheet (part of Partners for Climate Protection GHG software). Retrieved from http://kn.fcm.ca/ev.php?URL_ID=4702&URL_DO=DO_TOPIC&URL_SECTION=201&reload=1098300161 (July 20, 2005)
- database tool used to calculate level of municipal carbon dioxide emissions by inputting values of heating fuel, electricity, water and transportation fuel use and waste production – examines industrial, commercial, residential resource consumption

Pembina Institute (with founding partner Climate Change Action Fund, Government of Canada). 2004. One Less Tonne Tool. Retrieved from http://www.onelesstonne.ca (June 2, 2004)
- web tool designed to aid individuals in reducing their own greenhouse gas emissions – promotes reductions in electricity, heating energy, transportation fuel and water use
- when cycling through several suggested actions to reduce emissions, user is encouraged to press "commit" button before moving to next item – accumulated total of commitments displayed at bottom of screen records potential cost savings and emission reductions
- upon completion of tool, user is encouraged to register his or her commitment by typing name and email address – summary of commitments and information updates are sent to participant as future reminders

Redefining Progress. 2003. Household Ecological Footprint Calculator. Retrieved from http://www.rprogress.org/newprojects/ecolFoot/faq/ef_household_0203.xls (November 2, 2004)
- eco-footprint calculator web tool (compares global land available to land required to sustain current level of consumption) – user enters consumption values for home heating, electricity and water use, food, alcohol and clothing purchases, transportation, waste production

Analyses of Environmentally Sustainable Projects

Anielski Management Inc., The Canadian Federation of Canadian Municipalities. 2005. Ecological Footprints of Canadian Municipalities and Regions. Retrieved from http://www.anielski.com/Documents/EFA%20Report%20FINAL%20Feb%202.pdf (July 20, 2005)

- examines variations in ecological footprint values among various Canadian municipalities

Canada Mortgage and Housing Research Division. 2001. CMHC Research Highlights: Analysis of the Annual Energy and Water Consumption of Apartment Buildings in the CMHC HiSTAR Database, Technical Series 01-142. Ottawa: Canada Mortgage and Housing Corporation.

- report on energy and water consumption data from 40 multi-unit residential buildings across Canada as collected in HiSTAR database developed by CMHC and NRCan – additional information from future assessments to be added to database

Canada Mortgage and Housing Research Division. 2003. CMHC Research Highlights: Case Studies of Major Home Energy Retrofits, Technical Series 03-115. Ottawa: Canada Mortgage and Housing Corporation.

- describes energy-efficient residential retrofits made to provide examples of energy and cost savings possible in existing housing stock -- improvements made to building envelope & furnace, electrical appliances, water conservation measures

Canada Mortgage and Housing Research Division. 2001. CMHC Research Highlights: EcoPerth: A Small Rural Community Takes Action on Climate Change. Ottawa: Canada Mortgage and Housing Corporation.

- a description of efforts by local businesses, community groups and residents of the Ontario town of Perth to increase and involve members in environmentally-friendly community practices with a primary aim to reduce greenhouse gases
- inventory taken of initial greenhouse gas emissions and potential improvements – after making changes, community documents results and shares information on successful practices with residents

Canada Mortgage and Housing Research Division. 2001. CMHC Research Highlights: Energy Use Patterns in Off-Grid Houses, Technical Series 01-103. Ottawa: Canada Mortgage and Housing Corporation.

- examines off-grid electrical energy use and associated lifestyle patterns in 12 Canadian households – study goal to provide examples of energy-saving measures for grid-connected houses

Hill, Duncan. 2001. Case Study of a Successful Innovative Multi-Unit Residential Building: A Compendium of Research of the Conservation Co-op Building. Ottawa: Canada Mortgage and Housing Corporation.

- performance review of environmental features of building and behaviour of residents, 5 years after construction

Natural Resources Canada, Office of Energy Efficiency. 1997. 1994 Home Energy Retrofit Survey. Ottawa: Natural Resources Canada, Office of Energy Efficiency. Retrieved from http://oee.nrcan.gc.ca/infosource/pdfs/Retrofit-full_e.pdf (November 2, 2004)

- description of most common home energy efficiency retrofits made in Canada in 1994

Natural Resources Canada, Office of Energy Efficiency. 2000. 1997 Survey of Household Energy Use: Summary Report. Ottawa: Natural Resources Canada, Office of Energy Efficiency.
- residential component of the National Energy Use Database - examines trends in energy use for heating, air conditioning and ventilating (including building envelope characteristics) and electrical (heating if applicable, appliances, lighting)

Natural Resources Canada, Office of Energy Efficiency. 2004. Annual fuel consumption, fuel cost and CO_2 emissions. Retrieved from http://oee.nrcan.gc.ca/transportation/tools/fuel-consumption-guide/guide-consume-cost-co2.cfm?attr=8 (November 9, 2004)
- provides information on environmental impacts and costs of vehicle use

Perks, William T. and Wilton-Clark, Andrea. 1996. Consumer Receptivity to Sustainable Community Design: Designing an Alternative for the Residential Suburb in Calgary and Seeking the Consumer's Opinions and Choices. Ottawa: Canada Mortgage and Housing Corporation.
- assesses receptivity of potential householders to various sustainable features in community planning and design

Resource Conservation Techniques and Manuals

American Water Works Association. 2005. Water Conservation Around the Home. Retrieved from http://www.awwa.org/advocacy/learn/conserve (January 6, 2005)
- outlines tips for reducing water use around the home

Canada Mortgage and Housing Corporation. 1985. Energy-Efficient Housing Construction. Ottawa: Canada Mortgage and Housing Corporation.
- provides information on methods and materials for energy-efficient design

Canada Mortgage and Housing Corporation. 2004. Install water conserving fixtures. Retrieved from http://www.cmhc.ca/en/imquaf/himu/wacon/waensatip/waensatip_009.cfm (January 23, 2004)
- outlines benefits to upgrading to low-flow toilets, showerheads and faucets
- includes information on costs and energy savings that result when upgrades are made

City of Ottawa. 2004. Garbage, Recycling and Leaf & Yard Waste. Retrieved from http://ottawa.ca/city_services/garbage/11_0_en.shtml (July 27, 2004)
- web site provides information on garbage collection, recycling, compost and "Take it Back" program
- information on locations and dates for Household Hazardous Waste program

Enermodal Engineering, Gas Technology Canada, Canada Mortgage and Housing Corporation, Natural Resources Canada, Public Works and Government Services Canada. 2005. Advanced Buildings: Technologies and Practices. Retrieved from http://www.advancedbuildings.org (September 1, 2005)
- provides technical information and case studies for use by building professionals that includes information on energy efficiency, electricity production, water conservation, waste management and indoor air quality

Environment Canada. 2004. Water: No Time to Waste – A consumer's guide to water conservation. Retrieved from http://www.ec.gc.ca/water/en/info/pubs/nttw/e_nttwi5.htm (May 19, 2004)
- describes water-saving tips around the home including kitchen, bath, outdoors

Environment Canada. 2005. Freshwater Website: Quickfacts. Retrieved from http://www.ec.gc.ca/water/en/e_quickfacts.htm (January 19, 2005)

Epp, E., Perron, R., Perks, W. T., Sale, C. and van Vilet, D. 1999. Sustainable Community Design. Ottawa: Canada Mortgage and Housing Corporation.
- CD-ROM to be used as a checklist of features to be considered in sustainable community design

European Commission, Directorate General XVII for Energy, and the Architect's Council of Europe. 1999. A Green Vitruvius: Principles and Practice of Sustainable Architectural Design. London: James & James Ltd.
- provides information on methods and materials for sustainable design

Griffin, D. & Morgan, D. 2004. A New Water Projection Model Accounts for Water Efficiency. Ottawa: Canada Mortgage and Housing Corporation. Retrieved from http://www.cmhc.ca/en/imquaf/himu/wacon/wacon_102.cfm (December 10, 2004)
- provides information on costs of water-efficient upgrades

Guthrie, P. 1998. The Architect's Portable Handbook. New York: McGraw-Hill.
- provides standards on several sustainable design features, including passive solar design and daylighting methods

Harland, E. 1999. Eco-Renovation: The Ecological Home Improvement Guide. Vermont: Chelsea Green Publishing.
- provides information on methods, materials and case studies of sustainable design

Jones, L. 1998. Tap the Sun: passive solar techniques and home designs. Ottawa: Canada Mortgage and Housing Corporation, Natural Resources Canada.
- provides information on passive solar design features including window sizing and orientation, thermal mass, super-insulated building envelope

Lechner, N. 2001. Heating, Cooling, Lighting: Design Methods for Architects. New York: John Wiley & Sons.
- provides information on methods, materials and case studies of energy-efficient design including passive solar design, daylighting, passive cooling methods

Natural Resources Canada, Office of Energy Efficiency. 2003. EnerGuide: Tips for Your Home. Retrieved from http://oee.nrcan.gc.ca/houses-maisons/english/homeowners/eneractive/tips.cfm (September 11, 2003)
- provides tips for reducing energy and resource usage for appliances, heating equipment, lighting, plumbing, landscaping, etc.

Natural Resources Canada, Office of Energy Efficiency. 1998. Household Lighting (Cat. No. M91-10/6-1998E). Retrieved from http://oee.nrcan.gc.ca/publications/infosource/pub/home/Household_Lighting.cfm (November 2, 2004)
- provides information on energy consumption and costs of various types of residential lighting systems

Natural Resources Canada, Office of Energy Efficiency. 2005. Reference Libraries for Commercial and Institutional Buildings and Equipment. Retrieved from http://oee.nrcan.gc.ca/commercial/technical-info/reference/index.cfm?attr=20 (September 1, 2005)

- provides technical information and case studies for sustainable practices for new and existing buildings

Wackernagel, M. and Rees, W. 1996. Our Ecological Footprint: Reducing Human Impact on the Earth. Gabriola Island: New Society Publishers.

- provides information and tips on how to reduce consumption patterns and live more sustainably while maintaining an acceptable quality of life

Wayne State University. 2004. Energy Conservation for Office Computers. Retrieved from http://computing.wayne.edu/hardware/saveenergy.php (May 17, 2004)

- includes tips to save energy when operating personal computers

Wilhide, E. 2002. ECO: An Essential Sourcebook for Environmentally Friendly Design and Decoration. New York: Rizzoli.

- provides information on methods, materials and case studies of sustainable design

Information Sources for
Physical Context, Results and Recommendations
Sections of Household Reports

Physical Context Section

Site Sketch
- glazing percentages and house area calculations do not include basement values

Landscaping and Outdoor Water Use
- landscaped areas calculated using VectorWorks software
- recommendation to increase garden space: gardens require less water than grass lawns: "Flower gardens with tall plants help retain moisture in the ground. In fact, larger gardens means you spend less energy on watering and mowing your lawn." (NRCan, 2003)

Passive Solar Heating and Cooling
- increased glazing recommendation: good passive solar design can provide up to one-third to one-half of the heating needs for a new home; 6% glazing for passive solar design; glazing most effective within 30^{o} of south (Jones, 1998)

Natural Ventilation
- increased operable glazing recommendation: 8% operable glazing optimal for natural ventilation (Lechner, 2001)

Daylighting
- increased glazing recommendation: 10% to 25% glazing optimal for daylighting (Guthrie, 1998)

Alternative Energy Sources
- solar hot water and solar air heating info provided by Les Rodriques at Carearth, 25 Selwyn Crescent, Kanata, ON, www.carearth.com

References for Physical Context section:

Guthrie, P. 1998. The Architect's Portable Handbook. New York: McGraw-Hill.

Jones, L. 1998. Tap the Sun: passive solar techniques and home designs. Ottawa: Canada Mortgage and Housing Corporation, Natural Resources Canada.

Lechner, N. 2001. Heating, Cooling, Lighting: Design Methods for Architects. New York: John Wiley & Sons.

Natural Resources Canada, Office of Energy Efficiency (2003). EnerGuide: Tips for Your Home. Retrieved from http://oee.nrcan.gc.ca/houses-maisons/english/homeowners/eneractive/tips.cfm (September 11, 2003)

Results Section

Explanation of Electricity Results
- appliance consumption data provided by Natural Resources Canada, Office of Energy Efficiency
- lightbulb info.: compact fluorescent light bulbs use up to 75% less electricity and last up to 10 times longer than incandescent bulbs (Natural Resources Canada, Office of Energy Efficiency)

Explanation of Water Results
- assume resource savings of 40% when using kitchen faucet aerator (15 L/min – 8.8 L/min) (CMHC, 2004; Enviroshop, 2004)
- "If your toilet is more than ten years old…(it uses) about 18 litres or more of water per flush." "If your toilet was manufactured after 1985, it could be a water-conserving type which used about 13 litres per flush." (Environment Canada, 2004)
- assume resource savings of 5.5 L/minute when switching to low-flow showerhead (15 L – 9.5 L): "…the shower is the second heaviest water user in the house, averaging flow rates of 15 to 20 litres per minute." (Environment Canada, 2004)
- effectiveness of different lawn sprinkler types: "When it comes to watering plants and flower beds, drip irrigation is the most effective method….If you use a sprinkler for your lawn, choose the type that spins in a circle. This type lays down water in a flat pattern in large droplets which drop to the soil surface, thus minimizing evaporative losses. The oscillating type which cycles back and forth applies water in a fine spray straight up part of the time, leading to higher evaporative losses." (Environment Canada, 2004)

Explanation of Transportation Results
- car consumption values provided by Natural Resources Canada

References for Results section:

Canada Mortgage and Housing Corporation. 2004. Install water conserving fixtures. Retrieved from http://www.cmhc.ca/en/imquaf/himu/wacon/waensatip/waensatip_009.cfm (January 23, 2004)

Environment Canada. 2004. Water: No Time to Waste – A consumer's guide to water conservation. Retrieved from http://www.ec.gc.ca/water/en/info/pubs/nttw/e_nttwi5.htm (May 19, 2004)

Natural Resources Canada, Office of Energy Efficiency. 2004. The EnerGuide Appliance Directory. Retrieved from http://oee.nrcan.gc.ca/publications/infosource/pub/appliances/eg-environment.cfm (November 4, 2004)

Natural Resources Canada, Office of Energy Efficiency. 2004. Fuel Consumption Guide 2004. Retrieved from http://oee.nrcan.gc.ca/transportation/tools/fuel-consumption-guide/fuel-consumption-guide.cfm (November 9, 2004)

Natural Resources Canada, Office of Energy Efficiency. 1998. Household Lighting (Cat. No. M91-10/6-1998E). Retrieved from http://oee.nrcan.gc.ca/publications/infosource/pub/home/Household_Lighting.cfm (November 2, 2004)

Recommendations Section

Heating Energy Recommendations:

EnerGuide recommendations

- recommended to all participants based on results of *EnerGuide Home Energy Plan* – results transferred from *Home Energy Plan* to participant report

insulate water tank

- recommended when *EnerGuide Home Energy Plan* indicates that water tank efficiency is 0.70 or lower

Calculations for water tank insulation:
implementation cost: $26.00
annual resource savings 1337 MJ
annual cost savings of $26.00
annual GHG reduction 0.13 T

Source Info:

- hot water tank blanket cost listed at $26.00 (http://www.envirocentre.ca/English/EnviroShop.htm)
- annual cost savings listed at $26.00 (http://www.envirocentre.ca/English/EnviroShop.htm)
- 1 kWh = 3.6 MJ Energy Information Administration, Annual Review 2003
- annual GHG reduction calculated with Athena V2.0 Environmental Impact Estimator Software

install solar hot water heating system

- recommended when participant household has acceptable roof solar access for installation of solar hot water heating system

Calculations for installation of solar hot water heating system:
implementation cost: $5400.00 for household of 2 occupants or less, $6600.00 for household of 3 occupants or more
annual resource savings (MJ) = (total annual heating energy consumption) x 17.5%
annual cost savings: (total annual heating energy cost) x 17.5%
annual GHG reduction: determined using Athena V2.0 Environmental Impact Estimator

Source Info:

- implementation cost information supplied by Les Rodriques at Carearth, 25 Selwyn Crescent, Kanata, ON, www.carearth.com
- resource and cost savings: water heating accounts for an average of 35% of total annual heating energy consumption; solar water heating reduces water heating energy consumption by an average of 50% in the Ottawa area – information supplied by Les Rodriques at Carearth, 25 Selwyn Crescent, Kanata, ON, www.carearth.com
- annual GHG reduction determined using Athena V2.0 Environmental Impact Estimator

General Heating Energy Recommendations:

turn down furnace thermostat

- recommended when participant questionnaire indicates that daytime heating thermostat is set at 21^{o}C or higher

wash clothes in warm water and rinse in cold water

- recommended when participant questionnaire indicates that clothes are washed or rinsed in hot water

Source Info:

- "For every 1^{o}C (2^{o}F) you lower your thermostat, you save 2% on your heating bill." (Government of Canada, One Tonne Challenge)
- "Washing in warm rather than hot water uses 50% less energy…" (Government of Canada, One Tone Challenge)

References for heating recommendations:

Government of Canada. 2004. Your Guide to the One-Tonne Challenge (Cat. No. M144-27/2003E). Ottawa.

Jones, L. 1998. Tap the Sun: passive solar techniques and home designs. Ottawa: Canada Mortgage and Housing Corporation, Natural Resources Canada.

Natural Resources Canada. 2004. EnerGuide for Houses Home Energy Plan. Ottawa.

Electricity Recommendations:

cost for electricity supply: $0.047 per kWh;
cost for electricity including transmission and delivery: $0.07 per kWh
(http://www.energyshop.com/es/prices/on/eleON.cfm)

replace 5 incandescent bulbs with compact fluorescent bulbs

- recommended when more than 10 light bulbs in home are incandescent

Calculations for compact fluorescent bulb installation:
implementation cost: $5.00/light bulb x 5 lightbulbs = $25.00
annual resource savings = 429 kWh (cost savings of $30.00 ÷ $0.07 per kWh)
annual cost savings for 5 lightbulbs: $30.00
annual GHG reduction (T) = 0.16

Source Info:

- "By replacing five of the most used standard bulbs in your home with Energy Star-qualified compact fluorescent light bulbs, you can reduce your GHGs and save about $30 per year." (Government of Canada One-Tonne Challenge); $30/yr was divided by $0.07/kWh (cost per kWh in Ontario including transmission and delivery) for annual resource savings of 429 kWh/yr
- compact fluorescent light bulbs use up to 75% less electricity and last up to 10 times longer than incandescent bulbs (Natural Resources Canada, Office of Energy Efficiency)
- annual GHG reduction calculated with Athena V2.0 Environmental Impact Estimator Software

eliminate use of freezer

- recommended when stand-alone freezer is used by participant household

Calculations for freezer elimination:
implementation cost: none
annual resource savings (kWh): based on annual electricity consumption info. provided by NRCan
annual cost savings: (annual kWh consumption) x $0.07
annual GHG reduction: determined using Athena V2.0 Environmental Impact Estimator

Source Info:

- annual freezer electricity consumption data provided by Natural Resources Canada, Office of Energy Efficiency
- annual GHG reduction determined using Athena V2.0 Environmental Impact Estimator

upgrade refrigerator to Energy Star model

- recommended when electricity consumption of current refrigerator in participant household is 800 kWh or higher

Calculations for refrigerator upgrade:
implementation cost: $1100.00
annual resource savings (kWh): (annual kWh consumption of existing refrigerator) – 440 kWh
annual cost savings: (annual kWh savings) x $0.07
annual GHG reduction: determined using Athena V2.0 Environmental Impact Estimator

Source Info:

- refrigerator implementation cost of $1100.00 provided by Sears Home Store, 2685 Iris Street, Ottawa, ON, 613-820-5551
- annual existing refrigerator electricity consumption data provided by Natural Resources Canada, Office of Energy Efficiency
- average 2002 Energy Star-qualified refrigerator consumption is 440 kWh/yr (NRCan OEE, 2004)
- annual GHG reduction determined using Athena V2.0 Environmental Impact Estimator

upgrade clothes washer to Energy Star, front-loading model

- recommended when electricity consumption of current clothes washer in participant household is 600 kWh or higher

Calculations for clothes washer upgrade:
implementation cost: $1100.00
annual resource savings (kWh): (annual kWh consumption of existing clothes washer) – 300 kWh
annual cost savings: (annual kWh savings) x $0.07
annual GHG reduction: determined using Athena V2.0 Environmental Impact Estimator

Source Info:

- clothes washer implementation cost of $1100.00 provided by Sears Home Store, 2685 Iris Street, Ottawa, ON, 613-820-5551
- annual existing clothes washer electricity consumption data provided by Natural Resources Canada, Office of Energy Efficiency
- an average 2002 Energy Star qualified clothes washer uses 300 kWh/yr (NRCan OEE, 2004)
- annual GHG reduction determined using Athena V2.0 Environmental Impact Estimator

install and use a clothes line instead of clothes dryer for 25% of annual wash load

- recommended when participant questionnaire has indicated that clothes are currently not hung to dry

Calculations for clothes line installation:
implementation cost: $25.00 - $100.00
annual resource savings (kWh): (annual kWh consumption of existing clothes dryer) x 0.25
annual cost savings: (annual kWh savings) x $0.07
annual GHG reduction: determined using Athena V2.0 Environmental Impact Estimator

Source Info:

- clothes line kit cost of $25.00 provided by Home Depot, 1900 Baseline Road, Ottawa, 613-723-5900
- annual existing clothes dryer electricity consumption data provided by Natural Resources Canada, Office of Energy Efficiency

- annual GHG reduction determined using Athena V2.0 Environmental Impact Estimator

General Electricity Recommendations:

install ceiling fans; use fans instead of air conditioning whenever possible
- recommended when participant household does not have ceiling fans in living areas or bedrooms

Source Info:
- "…a 60-watt ceiling fan costs between 8 cents and $1.50 to operate monthly, while an air conditioner can cost between $6.75 and $40.50 a month." (Government of Canada, One Tonne Challenge);

References for electricity recommendations:

Government of Canada. 2004. Your Guide to the One-Tonne Challenge (Cat. No. M144-27/2003E). Ottawa.

Natural Resources Canada, Office of Energy Efficiency. 2004. The EnerGuide Appliance Directory. Retrieved from http://oee.nrcan.gc.ca/publications/infosource/pub/appliances/eg-environment.cfm (November 4, 2004)

Natural Resources Canada, Office of Energy Efficiency. 1998. Household Lighting (Cat. No. M91-10/6-1998E). Retrieved from http://oee.nrcan.gc.ca/publications/infosource/pub/home/Household_Lighting.cfm (November 2, 2004)

Water Use Recommendations:

conversions: 1 m^3 = 1000 litres
cost: A = (L of water savings) ÷ 1000 x $0.585 + $2.00
B = A x 1.66
Total Cost = A + B

replace toilets with 6L per flush low-volume models
- recommended when low-volume toilets are not found in participant household

Calculations for toilet replacement recommendation:
implementation cost (dollars) = (no. of toilets) x $250.00
annual resource savings (L):
when switching from 13 L/flush toilet to 6 L/flush = (no. of occupants) x 7 L x 4 flushes/day x 365 days
when switching from 18 L/flush toilet to 6 L/flush = (no. of occupants) x 12 L x 4 flushes/day x 365 days
cost savings (dollars) = ((annual water savings, L) ÷ 1000 x 0.585 + 2.00) + ((annual water savings, L) ÷ 1000 x 0.585 + 2.00) x 1.66

Source Info:
- assume 4 toilet flushes/person/day in each participant household (Griffin & Morgan, 2004)
- "If your toilet is more than ten years old…(it uses) about 18 litres or more of water per flush." "If your toilet was manufactured after 1985, it could be a water-conserving type which used about 13 litres per flush." (Environment Canada, 2004)
- $250.00 cost of new toilet provided by Home Depot, 1900 Baseline Road, Ottawa, 613-723-5900, www.homedepot.ca

install water-saving showerheads (flow rate of 9.5 litres/minute or less)
- recommended when low-flow showerheads are not found in participant household

Calculations for showerhead replacement recommendation:
implementation cost (dollars) = (no. of showerheads) x $9.00
annual resource savings (L) = (total length of showers in minutes for household during monitoring week) x 5.5 L x 52 weeks
annual cost savings = ((annual resource savings (L)) ÷ 1000 x 0.585 + 2.00) + ((annual resource savings (L)) ÷ 1000 x 0.585 + 2.00) x 1.66

Source Info:
- $9.00 cost of low-flow showerhead provided by Envirocentre Enviroshop
- assume resource savings of 5.5 L/minute when switching to low-flow showerhead (15 L – 9.5 L): "…the shower is the second heaviest water user in the house, averaging flow rates of 15 to 20 litres per minute." (Environment Canada, 2004)

attach low-flow aerator to kitchen faucet and use for dishwashing by hand (can reduce flow rate by approximately 40%)

- recommended when aerator for kitchen faucet is not found in participant household, and when dishes in household are washed by hand

Calculations for kitchen faucet aerator recommendation:

implementation cost (dollars) = $7.00

annual resource savings (L) = (no. of hand dishwashing loads during monitoring week) x 21 L x 52 weeks

annual cost savings = ((annual resource savings (L)) ÷ 1000 x 0.585 + 2.00) + ((annual resource savings (L)) ÷ 1000 x 0.585 + 2.00) x 1.66

Source Info:

- assume resource savings of 40% when using kitchen faucet aerator (15 L/min – 8.8 L/min), reducing average water use for dishwashing by hand from 35 L to 14 L (21 L savings):
- kitchen faucet aerator available at Envirocentre Enviroshop (8.8 L/min flow) at cost of $6.96
- “Kitchen and bathroom faucets can be responsible for 10% to 15% of total indoor use at a flow rate of 10 to 20 L/m.” (CMHC, 2004)
- water consumption: dishwashing by hand – 35 L (Environment Canada, 2005)

reduce use of outdoor sprinkler by a half-hour per week (during June, July, August)

- recommended when participant indicates sprinkler is used during summer months for more than 1 hour per week

Calculations for sprinkler reduction:

implementation cost: none

annual resource savings (L) = 12 weeks x 700 L/half-hour = 8400 L

annual cost savings (dollars) = (8400 L ÷ 1000 x 0.585 + 2.00) + (8400 L ÷ 1000 x 0.585 + 2.00) x 1.66 = $18.41

Source Info:

- "Watering your lawn uses 700 litres in half an hour.” That is more than the average daily water consumption of an entire household." (Government of Canada, One Tonne Challenge)

<u>General Water Recommendations</u>:

install and use rain barrels to collect water for your garden

- recommended when household does not have rain barrel

Source Info:

- $35.00 cost per rainbarrel provided by Arbour Environmental Shoppe, 800 Bank Street, Ottawa, 613-567-3168, www.arbour.on.ca

References for water use recommendations:

Canada Mortgage and Housing Corporation. 2004. Install water conserving fixtures. Retrieved from http://www.cmhc.ca/en/imquaf/himu/wacon/waensatip/waensatip_009.cfm (January 23, 2004)

Environment Canada. 2004. Water: No Time to Waste – A consumer's guide to water conservation. Retrieved from http://www.ec.gc.ca/water/en/info/pubs/nttw/e_nttwi5.htm (May 19, 2004)

Environment Canada. 2005. Freshwater Website: Quickfacts. Retrieved from http://www.ec.gc.ca/water/en/e_quickfacts.htm (Janurary 19, 2005)

Government of Canada. 2004. Your Guide to the One-Tonne Challenge (Cat. No. M144-27/2003E). Ottawa.

Griffin, D. & Morgan, D. 2004. A New Water Projection Model Accounts for Water Efficiency. Ottawa: Canada Mortgage and Housing Corporation. Retrieved from http://www.cmhc.ca/en/imquaf/himu/wacon/wacon_102.cfm (December 10, 2004)

Transportation Recommendations:

upgrade to the most efficient 2005 vehicle model in same class

- recommended to participant if (a) payback period is under 30 years, or (b) participant is considering purchase of new vehicle within the coming year

Calculations for vehicle upgrade to best in 2005 class (same size/type or smaller):
implementation cost: cost of vehicle (dealer base price + additional 10%) – (current vehicle price)
annual resource savings (L of fuel) = (km driven during monitoring week) ÷ 100 x ((current vehicle rating) – (new vehicle rating)) x 52 weeks
annual cost savings (dollars) = (annual fuel savings) x 0.804
CO_2 reduction (Tonnes) = (annual fuel savings) x 2.36 ÷ 1000

Source Info:

- EnerGuide List of Most Fuel-Efficient Vehicles for 2005 (NRCan OEE, 2005):

Automobile Class	EnerGuide 2005 Fuel-Efficient Vehicles	L/100 km (city)	L/100 km (hwy)	Base Price	Pricing Info.
Compact	Honda Civic Hybrid	4.9	4.5	28,500.00	honda.ca
Mid-size	Toyota Prius	4.0	4.2	30,530.00	toyota.ca
Station wagon	Pontiac Vibe/Toyota Corolla Matrix	7.9	5.9	19,900.00	gmcanada.com toyota.ca
Pickup	Ford Ranger/Mazda B2300	10.0	7.5	18,010.00	ford.ca
Special Purpose	Ford Escape Hybrid	6.6	7.0	33,195.00	ford.ca
Van	Honda Odyssey Ex-L	12.0	7.7	32,700.00	honda.ca

- average regular unleaded fuel cost during monitoring week was $0.804/L (www.ottawagasprices.com/stats/2004/monthly-200410.shtml)
- average vehicle fuel efficiency based on 55 percent city and 45 percent highway driving (NRCan OEE, 2004)
- 1 L of regular unleaded gasoline produces 2.36 kg of CO_2 tailpipe emissions (NRCan OEE, 2004)
- estimate of current vehicle price based on sample prices at www.autotrader.ca

use 10% ethanol-blended gasoline

- recommended to all participants

Calculations for switch to 10% ethanol-blended gasoline from regular unleaded:
implementation cost (dollars): (L of fuel consumed during monitoring week) x $0.02 x 52 weeks
annual resource savings = none
annual cost savings (dollars) = none
CO_2 reduction (Tonnes) = (L of fuel consumed during monitoring week) x (0.00236 T – 0.00212 T) x 52 weeks

Source Info:

- 1 L of regular unleaded gasoline produces 2.36 kg of CO_2 tailpipe emissions (NRCan OEE, 2004)
- 1 L of 10 percent ethanol gasoline produces 2.12 kg of CO_2 tailpipe emissions (NRCan OEE, 2004)
- 10 percent ethanol gasoline cost during monitoring week was assumed to be $0.02 higher than regular unleaded (pricing info supplied by MacEwen Petroleum, 1063 Bank Street, Ottawa, 730-0327)

reduce car use by 25% (by taking public transit, using carpool, walking or biking)

- recommended to all participants

Calculations for reduction of car use by 25%:

implementation cost (dollars) = (cost of one adult bus pass: $63) x 12 months = $756.00
annual resource savings (L of fuel) = (L of fuel consumed during monitoring week) x 0.25 x 52 weeks
annual cost savings (dollars) = (annual fuel savings) x $0.804 + vehicle maintenance
CO_2 reduction (Tonnes) = (annual fuel savings) x 0.00236 T

Source Info:

- cost of one adult bus pass in Ottawa is $63.00/month (www.octranspo.com/fares_menuE.htm)
- average regular unleaded fuel cost during monitoring week was $0.804/L (www.ottawagasprices.com/stats/2004/monthly-200410.shtml)
- average vehicle fuel efficiency based on 55 percent city and 45 percent highway driving (NRCan OEE, 2004)
- 1 L of regular unleaded gasoline produces 2.36 kg of CO_2 tailpipe emissions (NRCan OEE, 2004)

References for transportation recommendations:

Natural Resources Canada, Office of Energy Efficiency. 2004. Fuel Consumption Guide 2004. Retrieved from http://oee.nrcan.gc.ca/transportation/tools/fuel-consumption-guide/fuel-consumption-guide.cfm (November 9, 2004)

Natural Resources Canada, Office of Energy Efficiency. 2004. Annual fuel consumption, fuel cost and CO_2 emissions. Retrieved from http://oee.nrcan.ca/vehicles/guide/guide_07_costs.cfm (November 9, 2004)

The
Household Environmental
Monitoring Project

sponsored by
Canada Mortgage and Housing Corporation

Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario, K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

Welcome to the Household Environmental Monitoring Project.

This information sheet describes the purpose of the study, the requirements of participating households, and the benefits to participants. Please review this material, and if you are interested in taking part in the study, complete the application form and return it to our office by September 21th, 2004. Please direct any questions to us at 747-8104. We will contact you by September 25th to schedule a home visit and questionnaire delivery.

Study Objective

The goal of this study is to develop techniques to assist households to reduce their environmental impact. The study will provide participants with a record of their weekly household consumption, the environmental and financial costs of that consumption, practical suggestions for reducing that impact, and then will assess the value of this approach in motivating and enabling reduced environmental impact at the individual household level.

Study Framework

September 2004	- Application forms are completed and participants contacted.
October 2004	- Households complete a one week monitoring period record and background questionnaire, receive an Energuide audit and professional house assessment.
January 2005	- Participants receive individual household reports.
March 2005	- A forum is held to discuss community-wide results and possibilities.
October 2005	- Participants are contacted to determine whether any of the report recommendations have been implemented and the results of these initiatives.

Participant Requirements

1. Households must be located in the community of Lindenlea (bounded by Springfield, Maple Lane, Acacia, and Beechwood) and lived in by the owners. House type may be detached, semi-detached or townhouse, but not multi-family buildings with a common entrance or stairwell.

2. At least one member of the household must be in residence throughout the week of October 16 - 22, 2004 and available to complete a one week monitoring record based on typical occupancy patterns. This record will track water use, electricity use, home heating fuel consumption, travel by automobile, public transportation, cycling/walking, and waste/recycling.

3. Homeowners should intend to continue living in their present home until October 2005 when the study period is complete.

4. The study group will include as representative as possible a mix of family types and size, dwelling size and condition, and knowledge and interest in environmental issues. If more than twenty application forms are received, participants will be selected to reflect this variety based on responses to the application form questions.

5. During the course of the study, participants will be required to fill out two questionnaires. The first will gather background information affecting household consumption such as appliances and equipment in the home, previous house renovations, commuting methods, etc. The second questionnaire, completed at the end of the study, will ask participants to assess the usefulness of the information provided to them, comment on the recommendations they are most and least likely to implement, and offer their suggestions for improving the monitoring technique.

6. Participants will provide authorization for the research team to review utility bills for the household in the year previous to and following the monitoring period.

7. In March of 2005, one or more members of each household will be asked to take part in a two hour forum to discuss community wide results and potential initiatives that may arise from the study.

8. One year following the monitoring period, participants will be contacted to determine whether any of the recommendations contained in their household report have been implemented and whether there have been any resulting benefits from these measures.

Participant Benefits

1. Each participating household will receive an Energuide audit and report assessing the energy efficiency of their home. The report provides retrofit suggestions and anticipated energy savings to be generated. The $175-$200 cost of this audit is covered by the research grant provided by CMHC to Jane Thompson Architect. Households that have completed the Energuide audit are eligible for a subsequent Federal grant based on improved efficiency ratings once any upgrades have been made.

2. The research team will provide a professional assessment of additional aspects of the home affecting environmental performance including water and electricity efficiency, passive and active solar opportunities, landscaping options, indoor air quality concerns, and the impacts of household consumption patterns.

3. Participants will receive data on their average weekly costs and consumption levels for heating/air conditioning, water, electricity and transportation. Suggestions for reduced environmental impact will include approximate retrofit cost, anticipated operational savings, and options for sourcing recommended measures. Participants will have an opportunity to learn from measures that have worked successfully for other similar households.

4. Each household will learn how their consumption in each category fits within the neighbourhood range without their results being identified to other participants. All data collected will be protected by privacy regulations.

5. The information and recommendations presented to participants are intended for their personal use without any commitment or expectation that they implement any suggested recommendations. Households will not receive any promotional or sales calls as a result of participation in this study.

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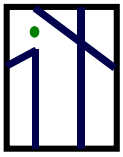

Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario, K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

HOUSEHOLD ENVIRONMENTAL MONITORING PROJECT
APPLICATION FORM

Please fill out the information below and return to the address in the header.

Name of Primary Contact_____

Mailing Address _____

Telephone Number_____

Email _____

How many persons live in your home? (Indicate the number of persons in each age group.)

☐ under 20 ☐ 20-40 ☐ 40-60 ☐ over 60

Approximate year of home construction. (Check one.)

☐ before 1900 ☐ 1900-1939 ☐ 1940-1979 ☐ after 1980

Approximate square footage of your home (excluding basement & garage)

☐ under 1400 sq.ft. ☐ 1400-2000 sq.ft. ☐ over 2000 sq.ft.

Extent to which your home has been altered since the original construction.

☐ no changes ☐ minor changes (kitchen or bathroom remodels, window replacements)

☐ major renovations (additions, full interior rebuilds)

How would you rate your knowledge of the options available to reduce the environmental impact of your household?

☐ poor ☐ fair ☐ good

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Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

HOME VISIT CHECKLIST AND RESEARCHER NOTES

HOUSEHOLD: _____

Table 1 – General Measurements

Site Sketch on separate page, noting:
- lot size
- north orientation
- house footprint measurements
- major tree locations/approximate heights & types
- approximate height & distance of neighbouring buildings to south of house

Heated House Area (sq.m.):		**Total Window Areas**		
Basement			operable	non-operable
Ground Floor		N		
Second Floor				
Third Floor		E		
Total				
Number of Storeys		S		
Wall Construction				
Estimated Insulation Levels:		W		
roof				
above-grade walls		skylights		
basement				

Table 2 - Home Energy Factors (Heat & Electricity)

Outdoor		**Living Areas/Halls**	
no. of fluorescent bulbs		no. of fluorescent bulbs	
no. of halogen bulbs		no. of halogen bulbs	
no. of incandescent bulbs		no. of incandescent bulbs	
Utility Room/Basement/Laundry		ceiling fans?	
heating source: size/efficiency			
air conditioner type		**Bedrooms**	
water heater: gas or electricity?		no. of fluorescent bulbs	
insulated?		no. of halogen bulbs	
temperature setting		no. of incandescent bulbs	
exposed plumbing insulated?		ceiling fans?	
second fridge (brand/model/year)		**Bathroom 1**	
clothes washer brand/model/year		no. of fluorescent bulbs	
clothes dryer brand/model/year		no. of halogen bulbs	
no. of fluorescent bulbs		no. of incandescent bulbs	
no. of halogen bulbs		**Bathroom 2**	
no. of incandescent bulbs		no. of fluorescent bulbs	
		no. of halogen bulbs	
Kitchen		no. of incandescent bulbs	
refrigerator brand/model/year		**Bathroom 3**	
no. of fluorescent bulbs		no. of fluorescent bulbs	
no. of halogen bulbs		no. of halogen bulbs	
no. of incandescent bulbs		no. of incandescent bulbs	

Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

Table 3 – Water Use Factors

Outdoor		**Bathroom 1**	
paved surface area		showerhead: low flow?	
percentage of total lot area		leaking?	
grass surface area		tub: size/type	
percentage of total lot area		faucet leaking?	
garden surface area		sinks: number	
percentage of total lot area		leaking?	
in-ground sprinkler?		toilet: low flow?	
no. of rainbarrels		volume reduced?	
no. of downspouts/location		leaking?	
		Bathroom 2	
Laundry		showerhead: low flow?	
sink faucet leaking/dripping?		leaking?	
insulated plumbing?		tub: size/type	
		faucet leaking?	
Kitchen		sinks: number	
dishwasher brand/model/year		leaking?	
type of kitchen sink		toilet: low flow?	
sink faucet – aerated/ condition?		volume reduced?	
garbage disposal?		leaking?	
water filtration system?			
		Bathroom 3	
Utility and Heat		showerhead: low flow?	
in-floor radiant heating? where?		leaking?	
		tub: size/type	
		faucet leaking?	
		sinks: number	
		leaking?	
		toilet: low flow?	
		volume reduced?	
		leaking?	

Table 4 – Waste Factors

outdoor composter?	
indoor kitchen composter?	
blue box? (y/n, where kept?)	
black box? (y/n, where kept?)	
trash compacter?	

Miscellaneous Notes:

Fire place or wood stove in house? Used for heating or only on special occasions?

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Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

HOUSEHOLD LOG BOOK

Table 1 – Meter Readings

	START: Monday, October 18		**END:** Monday, October 25	
	Reading:		Reading:	
Water Meter Reading				
Electricity Meter Reading				
Oil Tank Level				
Gas Meter Reading				
Odometer Vehicle 1				
Odometer Vehicle 2				

Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

Table 2 – Water Use Log

		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Notes
OUTDOOR WATER USAGE	**Lawn & Garden Watering** (approximate number of minutes exterior taps are running each day)								
	Car Washing & General Usage (approximate number of minutes water is used)								
INDOOR WATER USAGE	**Laundry** (number of loads)								
	Showers (total length of showers for all occupants each day)								
	Baths (number of baths, how full of water is the tub)								
	Dishwashing with Dishwasher (number of loads)								
	Dishwashing by Hand (number of loads)								

Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

Table 3 – Transportation Log

		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
TRANSPORTATION	**Public Transit** (number of trips and destinations)							
	Biking (number of trips and destinations)							
	Walking (number of trips and destinations)							
	Motor Vehicle 1 (number of trips and destinations)							
	Motor Vehicle 2 (number of trips and destinations)							

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Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

Table 4 – Waste Log

		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Notes
WASTE	**Garbage** (Collect your garbage into the plastic bag provided. Indicate at the end of the week the weight of your garbage bag.)							**Garbage Bag** Weight:	
	Recycling (Weigh your blue box and black box at the start of the week. Collect your recyclables and weigh your boxes again at the end of the week. Report the weights.)	**Blue Box** Start Weight: **Black Box** Start Weight:						**Blue Box** End Weight: **Black Box** End Weight:	
	Compost (Place your compost in the bag provided. Weigh your bag at the end of the week.)							**Compost Bag** Weight:	

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1 Middleton Drive, Ottawa, Ontario K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

Occupancy Considerations

How long have you lived in your house? _____ yrs

How long do you expect to continue living in this house?

_____ yrs

How many occupants are typically in the house during the daytime?_____

Is your house used for a home business? _____

Given the current usage patterns of your house do you consider your house:

the right size too small too big

Prioritize the following considerations in making decisions about home upgrades: (1 through 5, 1 being most important)

Personal Comfort & Convenience	
Resale Value	
Long term Operating Cost Savings	
Improving Indoor Air Quality	
Reducing Environmental Impact eg. energy consumption, protecting green space etc.	

Home Energy Use

Have you upgraded the insulation levels in your home?
yes no

Do you know the thickness or rating of the insulation in your walls and attic?
yes no

if yes; walls _____ attic _____

Have you taken any of the following measures to reduce home heat loss during winter months?

storm windows seal windows with plastic wrap

Does your furnace have a programmable thermostat?
yes no

If yes, during heating months, at what temperature do you set your thermostat?

_____daytime temp _____nighttime temp

If you own an air conditioner:

At what outside temperature do you turn the a/c on? _____

At what outside temperature do you turn the a/c off? _____

If a thermostat is used to control your a/c system, at what temperature is it generally set? _____

At what temperature do you wash your clothes?
(Hot, Warm, Cold)

Whites_____ Colours_____

Do you hang clothes up to dry?
yes no

if yes; seasonally? all year?

How many computers are in your home? _____

How many hours per week are all computers on? _____

Water Use

What type of lawn sprinkler do you use?

overhead circulating drip irrigation

During an average summer week, how long is your water sprinkler running?

0-1 hour 1-2 hours over 2 hours

How many dishwasher loads do you do during an avg week?

0 loads 1-5 loads more than 5 loads

How many loads of dishes do you do by hand during an average week?

0 loads 1-5 loads more than 5 loads

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Household Waste

Do you recycle the following items?

paper cans glass plastics

Do you compost the following items

egg shells fruit & vegetable wastes

coffee grinds leaves & grass

On average every two weeks, how full is your blue box?

empty ½ full full more than one box used

On average every two weeks, how full is your black box?

empty ½ full full more than one box used

On an average week, how full is your garbage bag when taken out for pickup?

½ full full more than one bag used

Transportation Energy Use

What is the distance from your home to your workplace/school?

____ Occupant 1 ____ Occupant 2

____ Occupant 3 ____ Occupant 4

____ Occupant 5 ____ Occupant 6

What is the make, model and year of your vehicle(s)?

Car 1: _____

Car 2: _____

Car 3: _____

What is the primary use of your vehicle?

If you own more than one vehicle what is the primary reason for owning the additional vehicles?

Do any members of the household regularly carpool?

yes no

Would you be interested in a neighbourhood carpool?

yes no

Based on your family's trips in any given week, approximately what percentage would be assigned to each mode of transport?

Walking _____

Bicycle _____

Public Transit _____

Car _____

Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

Household Action to Reduce Impact

Would you say you consciously make efforts to reduce the environmental impact of your household?

yes no

How would you rate your household's effort to reduce environmental impact as compared with other households you know?

more equal less

Would knowing of your neighbours' efforts motivate you to act?

yes no

Prioritize the following obstacles to your household reducing its impact on the environment; (1 through 5, with 1 being the biggest obstacle.)

____ Don't feel it will make much of a difference.

____ Concern about an adverse impact on your lifestyle.

____ Lack of knowledge about where to begin and how to proceed.

____ Fear of possible financial costs of implementing measures.

____ Lack of available time to consider and implement changes.

____ Other (please specify) _____

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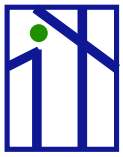


Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

RELEASE OF WATER CONSUMPTION INFORMATION

I agree to allow Jane Thompson Architect to access my City of Ottawa Water & Sewer records only for the purpose of monitoring changes in my consumption. By entering the account information below I authorize the utility to release my consumption history to Jane Thompson Architect for monitoring purposes only. I understand that all information will be kept confidential and will only be used for the purpose of The Household Environmental Monitoring Project.

Name _____

Address _____

Date _____

Signature _____

City of Ottawa Water & Sewer account number _____

RELEASE OF ENERGUIDE ENERGY ASSESSMENT INFORMATION

I agree to allow Jane Thompson Architect to access my EnerGuide Energy Assessment Report only for the purpose of assessing energy efficiency performance as part of The Household Environmental Monitoring Project. I understand that all information will be kept confidential and will only be used for the purpose of The Household Environmental Monitoring Project.

Name _____

Address _____

Date _____

Signature _____

Household Descriptions

Household	Number of Occupants	Year of House Construction	Extent of Alterations Since Construction	Knowledge of Options to Reduce Environmental Impact
1	4	1900-1939	major renovations or additions	fair
2	2	1900-1939	major renovations or additions	good
3	2	1900-1939	major renovations or additions	poor
4	4	1900-1939	major renovations or additions	good
5	4	1900-1939	major renovations or additions	fair
6	4	1900-1939	major renovations or additions	fair
7	2	1900-1939	minor changes	fair
8	4	1900-1939	major renovations or additions	fair
9	4	1900-1939	major renovations	good
10	3	1900-1939	major renovations or additions	fair
11	5 (week); 6 (year)	1900-1939	major renovations or additions	good
12	4	1900-1939	minor changes	fair
13	3	1940-1979	major renovations or additions	fair
14	1	1900-1939	minor changes	fair
15	4	1900-1939	major renovations or additions	good
16	4	after 1980	no changes	fair
17	2	1940-1979	minor changes	fair
18	4	1900-1939	major renovations or additions	good
19	3	1900-1939	major renovations or additions	good
20	2	1940-1979	minor changes	good

Occupancy Considersations

						(1 through 5, 1 being most important)				
Household	How long have you lived in your house? (yrs)	How long do you expect to continue living in this house?	How many occupants are typically in the house during the daytime?	Is your house used for a home business?	Given the current usage patterns of your house, do you consider your house (right size, too small, too big)	Personal Comfort & Convenience	Resale Value	Long term Operating Cost Savings	Improving Indoor Air Quality	Reducing Environmental Impact
1	2	>40	1	TRUE	the right size	1	3	2	5	4
2	17	>40	1	TRUE	the right size	1	2	2	2	2
3	21	10	2	FALSE	the right size	1	2	3	5	4
4	3	n/a	0	TRUE	the right size	5	2	3	1	4
5	3	>40	0	FALSE	the right size	1	3	2	5	4
6	4	4	3	FALSE	too small	5	4	1	3	2
7	<1	10	0	FALSE	the right size	1	2	3	5	4
8	2	8	0	FALSE	the right size	1	4	1	5	3
9	15	25	0	TRUE	the right size	1	5	4	2	3
10	19	24	0	FALSE	the right size	3	5	2	4	1
11	19	35	1.5	TRUE	the right size	1	5	2	3	4
12	8	25	4	TRUE	too small	4	5	2	3	1
13	5	>40	2	TRUE	the right size	1	3	2	4	2
14	2	5	0	FALSE	the right size	1	2	3	4	5
15	5	15	0	FALSE	too big	1	5	3	4	2
16	5	10	0	FALSE	the right size	1	2	4	5	3
17	3	7	2	TRUE	the right size	3	1	2	5	4
18	2	10	3	TRUE	the right size	1	5	2	4	3
19	<1	20	3	FALSE	too small	1	4	2	1	1
20	12	15	0.5	TRUE	the right size	4	5	3	1	2

General Measurements

	House Size and Construction								Estimated Insulation Levels				Total Window Areas (sq.m.)								Skylights	
Household	Ground Floor	Second Floor	Third Floor	Total Above-Grade Area (sq.m)	Total Perimeter Length (m)	Total Lot Area	Number of Storeys	Wall Construction	Roof	Roof RSI	Above-grade walls	Wall RSI	North oprble	North non oprble	East oprble	East non-oprble	South oprble	South non-oprble	West oprble	West non-oprble	oprble	non-oprble
1	93.37	78.6		171.97	41	361	2	double brick, 2x4 stud	R40	7.1	none in existing, addition R12	2.1	0.62	1.17	7.89	0	3.1	0.37	4.74	0.87		
2	113.96	69.04		183	50	416	2	stucco	R35	6.25	R12	2.1	1.65	1.11	4.9	0.75	6.02	2.6	4.47	1.61		
3	100.61	100.61	39.75	240.97	44	397	3	old brick on wood frame					4.96	5.42	3.95	2.03	7.42	1.72	7.53	1.2	6.3	
4	80.64	80.64		161.28	81	307	2		R40	7.1	R10 - 20	1.8 - 3.5	5.2	1.86	4.23	0	5.94	1.82	1.56	0		
5	73.67	68.28		141.96	38	355	2		insulation in ceiling joists				0.6	0	5.37	0	6.09	0	5.33	0		
6	64.66	64.66		129.32	37	364	2						4.22	0.48	9.43	0.26	3.77	1.03	2.06	2.84		
7	58.53	58.53		117.06	33	475	2		wood chips		wood chips		4.82	2.34	2.31	0	3.45	0.7	3.19	3.46		
8	83.15	83.15		166.3	41	335	2		R40	7.1	R20	3.5	5.72	2.14 + 4.02 GB	0.34	0.45	3.39	1.6 + 4.02GB	5.59	0		
9	91.88	91.88		183.76	44	325	2	brick (original), stucco (addition)	4-6" batt in addition		almost no insulation in original, stucco on 2x6 stud in addition		3.71	5.89	2.31	1.69	4.19	0.47	2.34	2.88	8.3	
10	79.06	79.06		158.12	37	313	2		R200 1995				1.04	1.84	3.99	2.31	3.43	1.24	6.9	0		
11	115.94	99.87		215.81	47	312	2	brick on original, vinyl siding on addition	R40	7.1	R12/R20	2.1 - 3.5	3.12	0	10.53	0.72	7.93	0	2.36	7.87		
12	74.04	74.04		148.09	37	208	2	load bearing masonry					0.54	0	1.92	2.53	5.63	0.47	3.22	2.16		
13	87.51	66.7		154.22	39	374	1-2	brick (12" thick)					7.87	0	5.11	0	5.33	1.46	1.08	0.22	5.3	
14	69.68	48.77		118.45	43	352	2	brick on 2x4 studs	R20	3.5	brick and studs (only one wall with insulation)		1.45	0	3.44	1.93	0	2.53	4.14	0	6.3	
15	78.04	78.04	78.04	234.12	38	249	3	brick/stucco					5.82	0.13	3.36	0.75	4.64	0	3.74	0	5.3	
16	111.76	111.76		223.52	50	377	2				2x6 studs with batt insulation		2.99	2.86	3.96	6.35	5.52	1.83	2.68	5.57		
17	87.14			87.14	39	369	1	brick/stucco on 2x4 studs	batt				1.05	0.08	2.1	0	0.5	0	1.1	2.92		
18	102.38	75.25		177.63	47	367	2	stucco, brick, siding on 2x4 studs					0.76	1.06	6.81	3.01	2.06	2.74	7.39	0		21.6
19	93.09	93.09		186.18	45	322	2						1.64	0.75	6	1.31	0	0	4.74	0		
20	72.28	66.24		138.52	37	267	2		none		none		6.62	0	2.05	2.57	6.02	0	1.59	0		

Household Action to Reduce Impact

Household	Make efforts to reduce the environmental impact of household?	Rate your household's effort to reduce environmental impact compared with other households.	Would knowing your neighbours' effforts motivate you to act?	Prioritize the following obstacles to your household reducing its impoact on the environment: (1 through 5, with 1 being the biggest obstacle)						
				Don't feel it will make much of a difference.	Concern about an adverse impact on your lifestyle.	Lack of knowledge about where to egin and how to proceed.	Fear of possible financial costs of implementing measures.	Lack of available time to consider and implement changes.	Other (please specify)	Other ranking
1	yes	equal	no	4	5	3	1	2		
2	yes	more	no				1		return on investment	
3	yes	equal	no	3	2	1	4	5		
4	yes	more	yes	3	5	4	1	2		
5	yes	equal	yes	4	1	3	2	5		
6	yes	equal		5	4	2	3	1		
7	yes	equal	yes	5	3	4	1	2		
8	yes	more	yes	5	5	5	5	5	Lack of financial resources	
9	yes	more	yes	4	5	3	1	2		
10	yes	more	no			2	3	4	proliferation of plastic packaging	1
11	yes	more	yes	5	4	1	3	2		
12	yes	more	yes	2	3	1	5	4		
13	yes	more	yes	4	3	2	3	2		
14	yes	equal	yes	5	1	3	4	2		
15	yes	more	yes	5	4	1	2	3		
16	yes	equal	yes	2	4	3	5	1		
17	yes	equal	yes	5	4	2	5	1	cost of hiring an expert or buy solar panels	3
18	yes	more	yes	5	4	2	1	3		
19	yes	more	yes	5	4	3	3	2		
20	yes	equal	no	4	5	3	1	2		

Home Energy Use

	Insulation				Window Actions			Programmable Thermostat			Air Conditioner			Laundry			Computers	
			if yes:	if yes:	Have you taken any measures to reduce home heat loss:				If yes, at what temperature do you set your thermostat?		If you own an air conditioner:			At what temperature do you wash your clothes?				
Household	**Have you upgraded the insul?**	**Do you know the rating of your insul?**	**walls**	**attic**	**storm windows**	**seal windows with plastic wrap**	**caulking to seal gaps**	**Does furnace have a program thermostat?**	**day time temp**	**night time temp**	**At what outside temperature do you turn the a/c on?**	**At what outside temperature do you turn the a/c off?**	**At what temperature is a/c thermostat generally set?**	**Whites**	**Colours**	**Do you hang your clothes up to dry?**	**How many computers are in your home?**	**How many hours per week are all computers on?**
1	No	No			TRUE	FALSE	TRUE	Yes	19	14	n/a	n/a	27	cold	cold	Yes - All Year	3	5
2	Yes	Yes	R12	R35	TRUE	FALSE	FALSE	Yes	n/a	n/a	n/a	n/a	n/a	cold/cold	cold/cold		3	60
3	No	No			FALSE	FALSE	FALSE	Yes	20	15	n/a	n/a	22	warm/warm	warm/warm	Yes - Seasonally	1	3-4
4	Yes	Yes	R10-R20	R40	TRUE	TRUE		No	18-20	18-20	22-24	18	22-23	warm/warm	warm/warm	No	3	4
5	Yes	No			TRUE	FALSE	FALSE	Yes	22	18	27	n/a	25	hot/hot	cold/cold	No	1	15
6	Yes	No			FALSE	FALSE		Yes	20	18	28	26	26	warm/warm	cold/cold	No	1	4-5
7	No	No			FALSE	TRUE		Yes	16	16	25	20	25	warm/warm	cold/cold	Yes - Seasonally	1	8
8	Yes	Yes	R20	R40	TRUE	FALSE	FALSE	Yes	20	16	n/a	n/a	n/a	hot/cold	warm/cold	Yes - All Year	4	45
9	Yes	Yes	varies	R12	FALSE	TRUE	FALSE	Yes	20	18	30	24	24	hot/hot	warm/cold	No	2	21
10	Yes	No			TRUE	TRUE	FALSE	No	n/a	n/a	n/a	n/a	n/a	cold/cold	cold/cold	Yes - Seasonally	1	15
11	Yes	Yes	R12/R20	R40	TRUE	FALSE		No	19	15	31	29	25	cold/cold	cold/cold	Yes - All Year	2	50-60
12	Yes	No			FALSE	FALSE	FALSE	No	20	21	26	n/a	25	cold/cold	cold/cold	No	1	14-20
13	No	No			FALSE	FALSE	FALSE	No	n/a	n/a	n/a	n/a	n/a	warm/warm	cold/cold	Yes - Seasonally	1	35
14	Yes	Yes		R20	FALSE	FALSE		Yes	18	20	28	26	22	warm/warm	warm/warm		0	
15	Yes	No			FALSE	FALSE		Yes	16	16	30	30	24	warm/warm	cold/cold	Yes - All Year	1	15
16	No	No			FALSE	FALSE		Yes	20	17	30	28	24	warm/warm	cold/cold	No	1	10
17	No	No			FALSE	FALSE	FALSE	Yes	22	18	n/a	n/a	n/a	hot/hot	warm/cold	Yes - Seasonally	2	240
18	Yes	Yes	R12		TRUE	TRUE	FALSE	Yes	19	18	30	28	22	hot/hot	cold/cold	Yes - All Year	1	70
19	No	No			FALSE	FALSE		No	20	16	32	28	25	warm/warm	cold/cold	No	1	2
20	Yes	No			FALSE	FALSE		Yes	21	18	26	24	24	warm/warm	cold/cold	No	1	8

Water Use

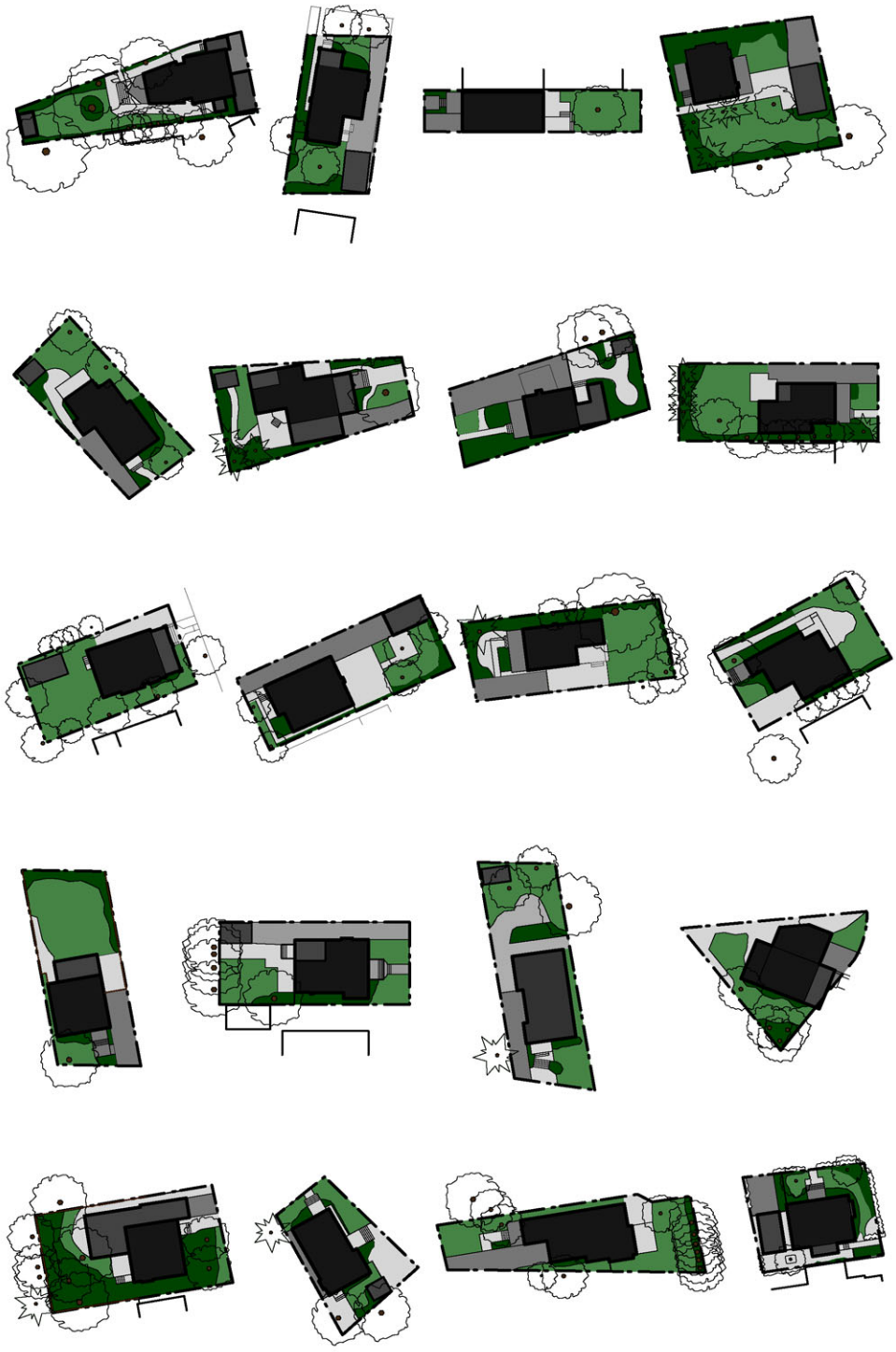
Household	What type of lawn sprinkler do you use?	How long is your water sprinkler running?	How many dishwasher loads during a week?	How many loads of dishes do you do by hand during an average week?
1	overhead	0-1 hour	1-5 loads	more than 5 loads
2	overhead	over 2 hours	1-5 loads	1-5 loads
3		1-2 hours	more than 5 loads	0 loads
4	circulating	0-1 hour	0 loads	more than 5 loads
5	none	0-1 hour	more than 5 loads	1-5 loads
6	drip irrigation	0-1 hour	more than 5 loads	1-5 loads
7	none	0-1 hour	1-5 loads	1-5 loads
8	overhead	0-1 hour	1-5 loads	1-5 loads
9	overhead	0-1 hour	more than 5 loads	0 loads
10	overhead	0-1 hour	1-5 loads	more than 5 loads
11	circulating	0-1 hour	more than 5 loads	1-5 loads
12	circulating	0-1 hour	more than 5 loads	1-5 loads
13	circulating	1-2 hours	more than 5 loads	1-5 loads
14	circulating	1-2 hours	1-5 loads	1-5 loads
15	circulating	0-1 hour	1-5 loads	1-5 loads
16	overhead	1-2 hours	1-5 loads	more than 5 loads
17	none	0-1 hour	1-5 loads	0 loads
18	none	0-1 hour	1-5 loads	1-5 loads
19	none	0-1 hour	1-5 loads	more than 5 loads
20	overhead	1-2 hours	1-5 loads	1-5 loads

Household Waste

	Do you recycle the following items?				Do you compost the following items?						
Household	paper	cans	glass	plastics	egg shells	fruit & vegetable	coffee grinds	leaves & grass	Every two weeks, how full is blue box?	Every two weeks, how full is black box?	How full is weekly garbage bag?
1	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	full	full	full
2	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	full	full	1/2 full
3	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	1/2 full	more than one box used	more than one bag used
4	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	TRUE	full	full	full
5	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	more than one box used	more than one box used	more than one bag used
6	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	full	more than one box used	full
7	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	1/2 full	full	full
8	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE	more than one box used	more than one box used	1/2 full
9	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	more than one box used	more than one box used	more than one bag used
10	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	full	full	1/2 full
11	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	full	full	full
12	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	more than one box used	more than one box used	more than one bag used
13	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	full	full	full
14	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	full	full	full
15	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE	TRUE	1/2 full	full	full
16	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	full	full	full
17	TRUE	TRUE	TRUE	TRUE	FALSE	TRUE	TRUE	TRUE	full	more than one box used	1/2 full
18	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	more than one box used	more than one box used	1/2 full
19	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	full	full	1/2 full
20	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	1/2 full	1/2 full	1/2 full

Transportation Energy Use

	What is the distance from your home to your workplace/school?					What is the make, model and year of your vehicle(s)?									Percentage assigned to each mode of weekly transport?			
Household	**Occup 1**	**Occup 2**	**Occup 3**	**Occup 4**	**Occup 5**	**Car 1**	**Car 1 Hwy Eff**	**Car 1 City Eff**	**Car 2**	**Car 2 Hwy Eff**	**Car 2 City Eff**	**Primary use of vehicle?**	**Reason for owning additional vehicles?**	**Currently carpool?**	**Interest in carpool?**	**Walking**	**Bicycle**	**Public Transit**	**Car**
1	5	11	0.8	0.8		station wagon	8.4	11.4				cottage and back		No	Yes	50	35	0	15
2	0	6				SUV	7.9	10.9				family and business		No	No	50	5	0	45
3	4	0				minivan	9	13.4	compact	5.9	8.3	pleasure, work/travel	convenience	No	No	25	0	0	75
4	10	0-200	1	6		minivan	8.6	13.3	truck	9.7	14.4	family, work	business	No	Yes	10	0	10	80
5	3	3	1.5	1.5		SUV	11.1	15.7	sedan	7.9	11.3	commute to work, trips to cottage	weekend errands, summer cottage commute	No	No	40	0	0	60
6	2.5					SUV	8.1	10.8				groceries, errands, trips		No	No	65	20	7.5	7.5
7	30	10				sedan	7.1	10.2				transportation to work for occupant 1		No	No	5	0	40	55
8	9	3.5	0.5	0.5		SUV	12.2	17.6	SUV	8.1	10.5	recreation/travel	parental gift	No		40	40	10	10
9	3	4	5	8		sedan	6.9	9.8				Commuting		No	No	10	20	30	40
10	5	10	4			sedan	7.3	10.3				pleasure		No	Yes	7	20	40	33
11	10	2.5	5	5	1.5	hybrid sedan	4.2	4				business, shopping, lessons, social events		Yes	Yes	30	20	40	10
12	3	3	1			minivan	8.1	12.2				leisure, work		Yes	No	22	1	1	75
13	6					compact	6.3	9.1				commuting, vacations		No	No	90	0	0	10
14	28					sedan	7.8	10.8				work, errands		No	No	35	0	0	65
15	6	8	3	0.5		compact	6.8	9.3				errands and recreation		No	No	27.5	16.5	32.5	23.5
16	5	5				minivan	8.2	12	sedan	8.2	11.6	work, weekend activities	conflicting activities	No	No	20	0	20	60
17	8	3				compact	6.4	8.1				odd errands		No	Yes	30	5	50	15
18	4	0	1	1		minivan	8.5	13.1				errands, long trips		No	No	50	0	25	25
19	5	3				minivan	8.8	13.5				drive to work		No	Yes	12.5	17.5	20	50
20	25	3				compact	7.2	11.6	sedan	6.3	9.1	to commute to work	work in different places, need extra car for Dr. apts.	No	No	9	0	1	90



REPORT FOR HOUSEHOLD 1

The Household Environmental Monitoring Project

sponsored by
Canada Mortgage and Housing Corporation

Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

Introduction

The following report provides an overview of the environmental impact of your household and guidance on the most effective means to reduce that impact.

The results and recommendations in this report are based upon our analysis and interpretation of the information you provided through the questionnaire and monitoring week log books, your previous year utility bills, the home visit completed by our office, and the EnerGuide assessment completed by the EnviroCentre. A copy of this material is included for your reference at the end of the report. This household specific information has been supplemented by available general research and data. While we have attempted to ensure the information provided is as accurate as possible, given the nature of this type of research, the suggested energy savings, cost savings and emission reductions should be taken as approximations only.

The report is divided into sections that will help you to understand the scope of the environmental impact of your household. These sections address your attitudes toward environmental issues, examine the physical characteristics of your house and surrounding property, present consumption rates for home heating, electricity, water, transportation and waste, and compare these results with the study group and average Canadian levels. The last section presents recommendations for reducing environmental impact that are tailored to the consumption patterns and lifestyle of your household.

Wherever information was available, results have been shown for both the monitoring week and an average weekly amount based on last year's utility bill. This allows us to compare weekly consumption with the activities reported in your log book during the monitoring week, and also to check these rates against a more representative year long weekly average. Results for personal transportation and waste were available only for the one week monitoring period, therefore may less accurately reflect typical yearly consumption. Since some factors, such as waste and water consumption are highly dependent on the number of occupants, while others such as home heating are not, these comparisons are made on both a total household and per occupant basis.

The recommendations page lists possible house infrastructure and lifestyle changes that we believe are worth considering from the perspective of reducing environmental impact, promoting resource conservation, improving the quality and comfort of your home and reducing operating costs. These recommendations are ranked as high, medium or low priority based on the estimated length of time to recuperate any initial investment. Recommendations with a longer than thirty year payback have not been included in this list in an effort to prioritize the many options available. Other options may, however, make sense in your particular circumstances, or be justified on other grounds. For example, the replacement of an automobile or appliance in good working order with a more energy-efficient alternative may not be immediately justified from a payback perspective, but should be considered at the point when replacement is necessary. Wherever relevant, recommendations have been marked with an asterisk to indicate that they will have a lifestyle impact that may or may not be acceptable for your household.

A "date implemented" column has been included on the recommendation page. We ask that you complete this column entry whenever your household decides to implement one of the suggested measures. During our follow up check in October 2005, these entries will help us to understand which kinds of measures are of greatest interest, and allow us to compare your following year utility bills against any changes that have been made.

As you will see in the following pages, the existing environmental impact of your household is well below both the study group average and typical Canadian levels. Nonetheless, we hope the following information will be of use to you in determining specific areas where further improvement is possible and practical.

We appreciate your participation in this study and welcome any questions or comments you may have.

Magda Goemans Jane Thompson Andrew Wisniowski

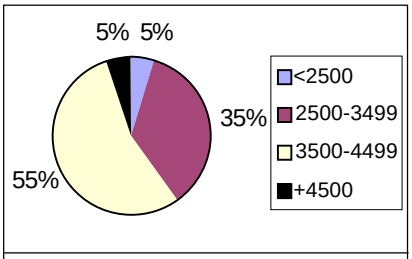
Profile of Twenty Participating Households

Household Characteristics

The following charts illustrate the range of physical characteristics of the twenty households participating in this study. Each of these characteristics will have some effect on the consumption rates of a household. For example, a large older house with few upgrades will generally require higher than average fuel to heat; a household with many occupants will generally consume more water and electricity and produce more waste.

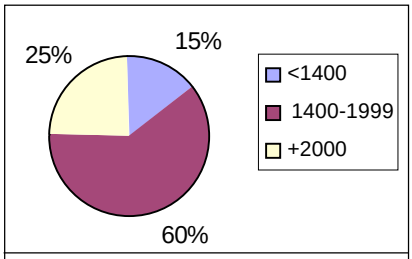
In each of the eight areas below, your household falls within the most common household characteristics of the study group. Based on these physical characteristics alone, it is expected that your household consumption rates would be in the mid-range of values within the study group.

Lot Area (sq. ft.)



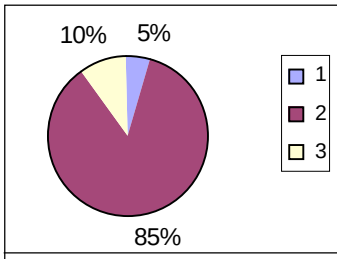
Your Lot Area: 3880 sq.ft.

House Area (sq. ft.)



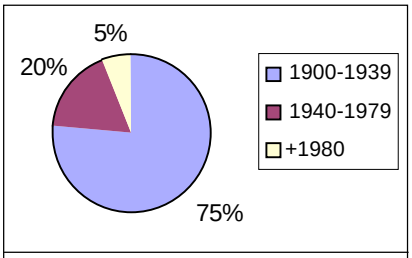
Your House Area: 1850 sq.ft.

Number of Stories



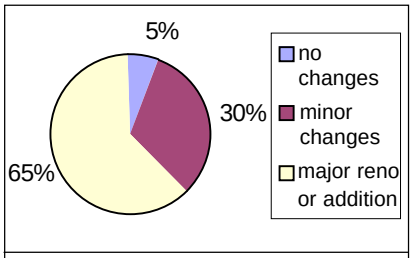
Number of Stories in Your House: 2

Approx. Date of Construction



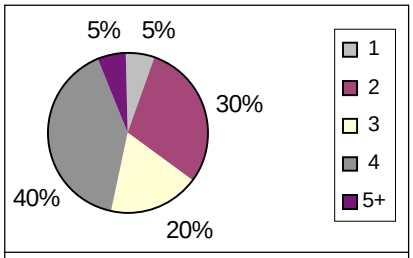
Approximate Date of Construction of Your House: 1920

Extent of House Modifications



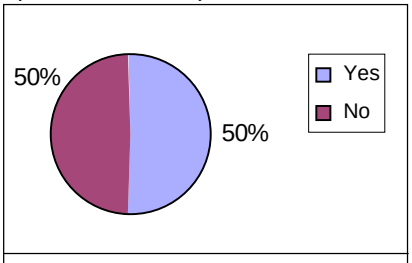
Extent of Modifications to Your House: major reno or addition

Number of Occupants



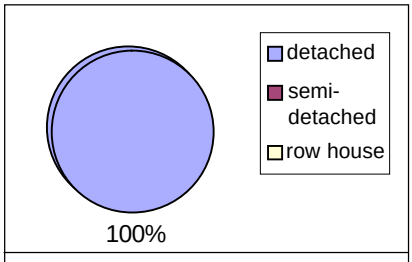
Number of Occupants in Your Household: 4

Home Business in Household (Full or Part Time)



Your Household Response: Yes

Housing Type



Your Household Type: Detached

Profile of Twenty Participating Households

Household Attitudes

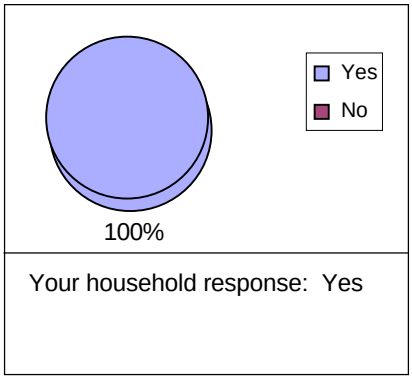
Along with the physical characteristics of each household, occupant attitudes to and knowledge of environmental conservation have an effect on lifestyle choices and consumption rates. Differing priorities and perceived obstacles to reducing household impact suggest different approaches to assisting your household to reduce consumption.

Your household has indicated a slightly lower to average level of knowledge and effort to reduce environmental impact among the study group. It is likely, however, that the households willing to volunteer for this study generally possess a higher level of environmental interest and awareness than the norm. As you will see in the report, the recorded results of your household consumption also suggest that your evaluation of your efforts is overly modest!

Your priorities in making decisions about home upgrades and perceived obstacles to reducing household impact match the most common responses of the study group. These priorities suggest that practical, cost-effective measures that improve the quality of your home are of greater interest to you than options justifiable on environmental grounds alone, and that providing information and time-saving assistance would be beneficial to your household.

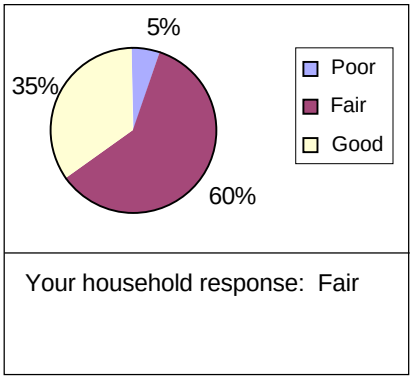
Your response that knowing of your neighbours' efforts would not motivate you to act suggests that the comparisons made on the following pages may provide less of an incentive for you than some other participants.

Do You Make Conscious Efforts to Reduce Your Environmental Impact?



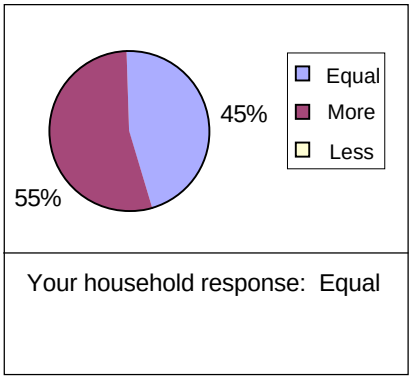
Your household response: Yes

Rate Your Household's Knowledge of Environmental Options



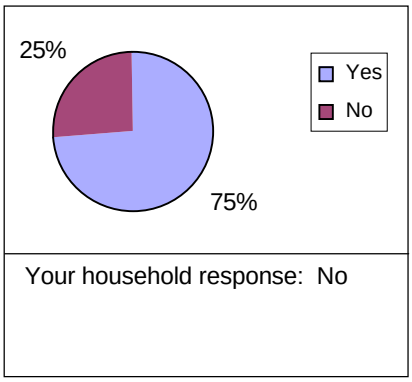
Your household response: Fair

Rate Your Household's Environmental Effort in Comparison to Others You Know



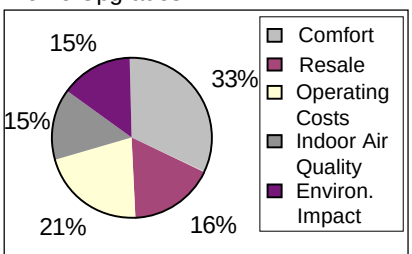
Your household response: Equal

Would Knowing of Your Neighbours' Efforts Motivate You to Act?



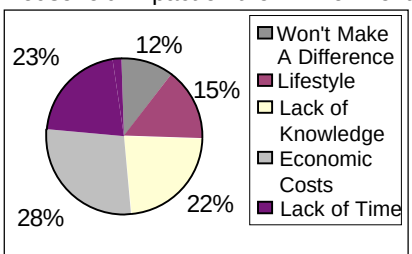
Your household response: No

Priorities in Making Decisions About Home Upgrades



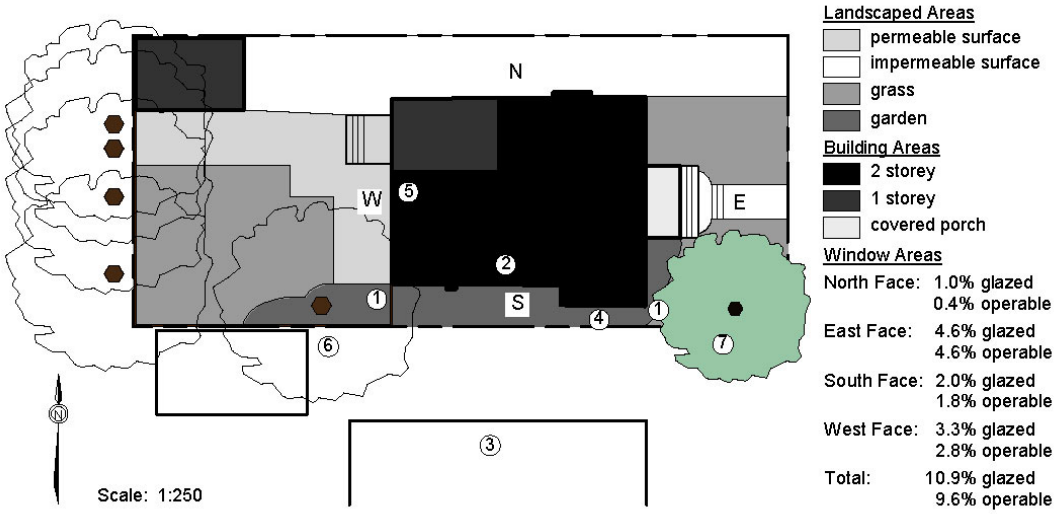
Your top 3 priorities:
1. Comfort
2. Operating Costs
3. Resale Value

Most Common Obstacles to Reducing Household Impact on the Environment



Your top 3 responses:
1. Economic Cost
2. Lack of Time
3. Lack of Knowledge

Physical Context



Landscaping and Outdoor Water Use

The landscaped portion of your lot is currently composed of 30% impermeable area (concrete or asphalt), 18% permeable area (pavers), 40% grass area, and 12% garden area. Garden areas generally require less watering each week, so replacing some grass areas with gardens could reduce your water consumption. Reducing the amount of impermeable area by replacing asphalt or concrete driveways and patios with light coloured, more permeable surfaces such as pavers, stone or gravel would reduce water runoff and heat build-up around your property.

Installation of eavestroughs and downspouts to collect roof rainwater that can then be stored in rain barrels at recommended locations (1), would reduce your water consumption requirements.

Passive Solar Heating and Cooling

The location and the extent of windows can have a significant effect on the amount of energy required to heat and cool your home. A house in Canada designed for passive solar heat can receive from 30% to 50% of its heating needs from the sun. The EnerGuide Home Energy audit determined that the current solar contribution to your home heating is 9.4%, a fairly low value.

Glazing on a wall within 30 degrees of south provides the best passive solar gain. In your home, the wall adjacent to your neighbour's driveway faces close to due south (2). Although it receives some shading from the neighbour's house (3), morning, midday and afternoon sun reaches portions of the wall, particularly on the second floor.

The current percentage of south glazing in your home is 2%, whereas south glazing area equal to 6% to 8% of the floor area of a home is generally recommended to provide substantial amount of passive solar gain without excessive overheating. Your house would benefit from the addition of windows on this face, but note that regulations prohibit windows on walls closer than 4 feet to the property line, which appears to be the case for the front portion of the wall (4).

To conserve energy, north facing glazing should be kept to a minimum and energy efficient triple glazed windows installed. Your house is fortunate to have a low value of 1.2% glazing on the north face.

East and west windows make some contribution to solar gain but also contribute to overheating if they are left unshaded, particularly west facing windows (5). The existing deciduous trees at the rear of the property are well located to provide shading of the west windows in warmer months and allow sun penetration when bare of leaves in the colder months (6). The addition of a deciduous tree in the southeast corner of your property is recommended to achieve the same effect on the east side of the house (7).

Natural Ventilation

Operable glazing equal to 8% of the floor area of your home and evenly distributed on all sides of your home is recommended to provide good levels of natural ventilation and reduce your requirement for mechanical air conditioning. Operable glazing above this level contributes to some heat loss since operable windows are less energy efficient than fixed windows. Your home has about 9.5% operable windows, an amount close to the ideal level.

Daylighting

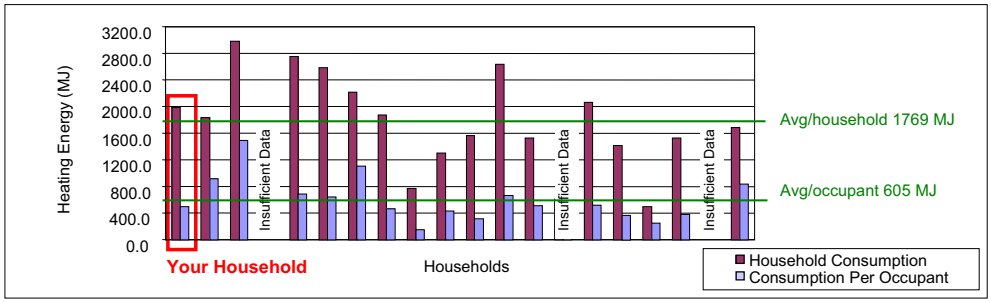
A glazed area of 10 - 20% of the floor area, distributed wherever possible on more than one wall of a room, provides good daylighting and reduces the requirement for electric lighting. Your total glazed area of 11% is at the low end of this range. The addition of windows, particularly to the south face of your home, would improve natural lighting.

Alternative Energy Sources

Sources include photovoltaic panels or wind turbines to produce electricity, solar panels for hot water heating and home heating, and ground source heating systems. For an urban home like yours the most cost-efficient and practical alternative energy source would be a solar hot water system that could provide about 50% of your hot water heating requirement. The south facing portion of your roof would provide an ideal location for the installation of one or more roof mounted solar collectors for hot water heating. A solar air heating unit which preheats air before it enters your home and reduces demand on your furnace could also be considered for installation on the upper portion of the south wall or south facing roof. The remaining alternative sources are not yet cost effective for your home.

Monitoring Results - Home Heating Energy

Heating Energy During Monitoring Week (October 18 -25, 2004)



During the monitoring week your household consumed 1989 MJ of energy or 497 MJ per person. This amount is 112% of the average amount per household and 80% of the average amount per occupant for the households in the study group.

Average Weekly Heating Energy Based on Previous Year Utility Records

Based on your gas bills from October 2003 to October 2004 your average weekly energy use over the last year was 2728 MJ or 682 MJ per person. This amount is 112% of the average amount per household and 73% of the average amount per occupant for the households in the study group. Heating fuel consumed over the year cost $1,670.00 and produced about 8.5 tonnes of greenhouse gas emissions.

EnerGuide Energy Efficiency Rating

Based on the Home Energy Report provided by the EnviroCentre, your existing rating of 44 is one of the lower values in the study group. However, your home has significant potential for upgrade to a quite typical rating of 69. Upgrades would also make a significant improvement in the areas you indicated as priorities – improving home comfort, lowering operating costs and increasing resale value.

The energy savings calculator used in the Home Energy Report to calculate total energy used and potential savings relies on assumptions geared to a typical Canadian home. When we compare these results with the utility bills for your house, the energy savings calculator estimation is 1.8 times your actual energy consumption. For the purposes of our recommendations page at the end of this report, we have reduced the savings predicted in the Home Energy Report by this factor to more accurately reflect your actual household consumption.

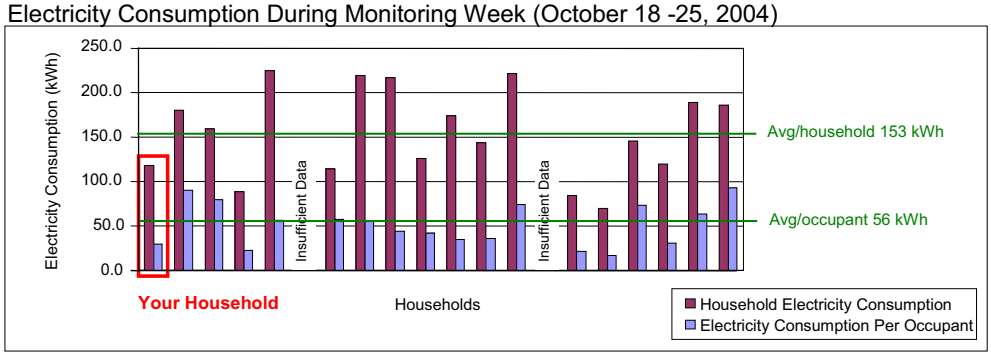
Explanation of Results

Your home heating consumption is slightly above average for the study group on a household basis. The following factors contribute to this result:

- As indicated by the EnerGuide rating, the energy efficiency rating of your house is 23% lower than the study group average.
- The house area requiring heating is slightly above the average house size in the study group.
- The solar contribution to home heating is below average levels for the group.
- The very high efficiency of your furnace (one of the highest in the group) helps to compensate for the factors noted above to reduce consumption.
- Your thermostat is set to lower than average levels to further reduce energy use.

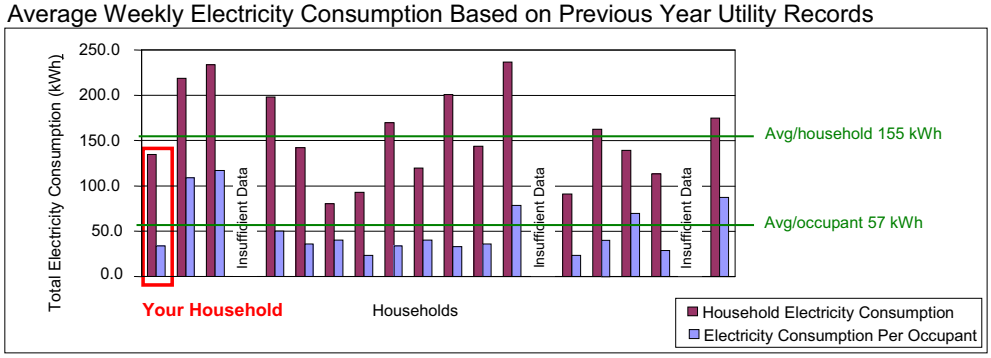
Monitoring Results - Electricity

Electricity Consumption During Monitoring Week (October 18 -25, 2004)



During the monitoring week your household consumed 118 kWh of electricity or 30 kWh per person. This amount is 77% of the average amount per household and 53% of the average amount per person for the households in the study group.

Average Weekly Electricity Consumption Based on Previous Year Utility Records



Based on your electricity bills between October 2003 and October 2004 your average weekly electricity consumption over the past year was 135 kWh per household or 33.5 kWh per person. This amount is 85% of the average amount per household and 57% of the average amount per person for the households studied. The amount of electricity consumed over the year cost $328.77 and produced about 2.5 tonnes of greenhouse gas emissions.

Explanation of Results

Your electricity consumption is lower than the majority of monitored households in your neighbourhood. This appears to be primarily due to good electricity conservation practices by your family, since the appliances and light fixtures in your household are not particularly energy efficient.

Some of the good practices noted were-

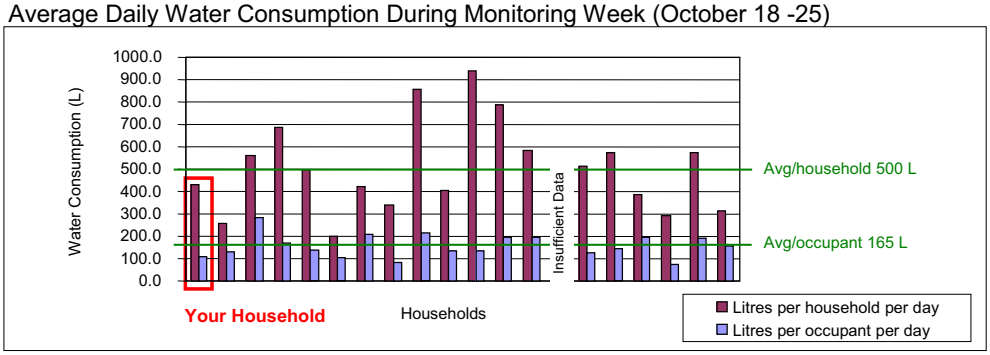
- Air conditioning is almost never used.
- Clothes are hung up to dry throughout the year.
- Computers are running for an average of only 5 hours during the week.
- More dish loads on average are washed by hand in your household than with a dishwasher.

Some areas where electricity use could be reduced further-

- Your major appliances have the following annual energy consumption ratings:
  - Refrigerator: 830 kWh (current EnergyStar models use about 50% less energy)
  - Clothes dryer: 890 kWh (about average energy use in comparison with current models)
  - Clothes washer: 1470 kWh (current EnergyStar models use about 60% less energy)
- There is a stand-alone freezer running in your home which uses about 620 kWh or about 9% of your annual electricity consumption.
- 89% of the lightbulbs in your home are incandescent. Incandescent bulbs use 75% more energy than compact fluorescent bulbs and 15 - 40% more than halogen bulbs.

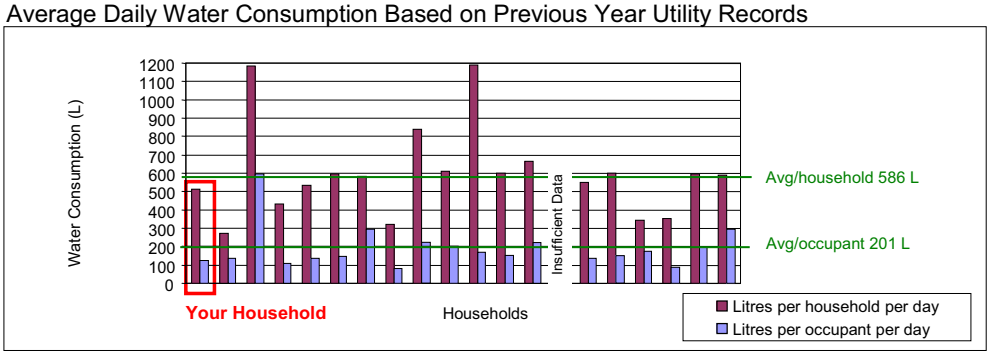
Monitoring Results - Water

Average Daily Water Consumption During Monitoring Week (October 18 -25)



During the monitoring week your household consumed 429 L of water or 107 L per person per day. This amount is 87% of the average amount per household and 63% of the average amount per person for the households in the study group.

Average Daily Water Consumption Based on Previous Year Utility Records



Based on consumption recorded on your water bills between October 2003 and October 2004 your average daily water consumption over the past year was 511 L of water or 127 L per person per day. This amount is 87% of the average amount per household and 61% of the average amount per person for the twenty Lindenlea households studied. The amount of water consumed over the year was 185,000 L and cost you approximately $110 in water supply charges and $183 in sewerage surcharges.

Explanation of Results

Your average weekly consumption matched consumption during the monitoring week very closely, therefore the information you recorded about water use during the monitoring week provides a good indication of typical water use and opportunities for reduction. Your water consumption per person is substantially lower than the average of the households in the study. Similarly to the electricity results, this appears to be largely due to good conservation practices.

- During summer months you estimated your lawn sprinkler is running for a relatively low amount of time in comparison to other participant households.
- More dish loads on average are washed by hand in your household than with a dishwasher.

The following are areas where improvements could be made:

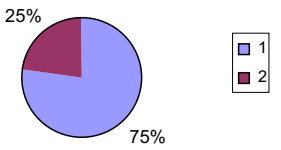
- Based on our observations, there are 3 higher-volume toilets and 1 higher-volume showerhead in your home. Higher-volume toilets use an average of 70% more water than newer low-flow models, and higher-volume faucets use an average of 60% more water than water-saving showerheads.
- There are no aerators on the faucets in your home. The addition of an aerator to a kitchen faucet can reduce water use by about 40%.
- Your household does not collect water in rain barrels for watering the garden.
- An overhead sprinkler is used to water your grass, a method that uses quite a bit of water due to high evaporative losses. Drip irrigation is the most effective method for lawn watering; the second best option is a circulating sprinkler. Either of these methods would allow you to water less often and for a shorter period of time.

Monitoring Results - Transportation

Your responses to questions about transportation habits suggest that your fuel consumption would be less than most households in the group. Your estimated transportation split indicates low automobile transportation use, and your monitoring week log resulted in even lower use than your estimate. Your household was one of the few that expressed an interest in a neighbourhood carpool.

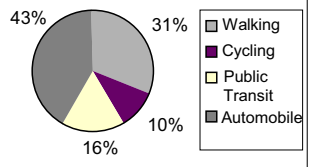
The vehicle fuel consumption chart below combines the distance you drove during the monitoring week with the fuel efficiency of your vehicle to determine the approximate gas consumption of your household.

Number of Cars in Study Group



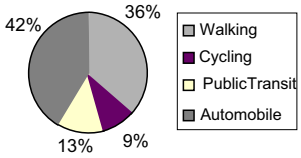
Your response: 1

Estimated Transportation Split By Trips



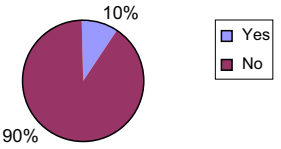
Your estimate: 40% - 75% walking
0% - 35% cycling
25% automobile

Monitoring Week Transportation Split By Logged Trips



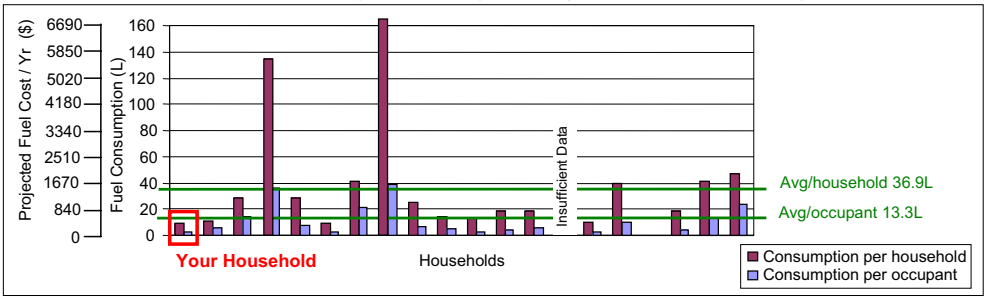
Your results: 65% walking
24% cycling
11% automobile

Would You Be Interested in a Neighbourhood Carpool?



Your response: yes

Vehicle Fuel Consumption During Monitoring Week (October 18 -25, 2004)



During the monitoring week your household consumed 9.26L of vehicle fuel or 2.32L per occupant. This amount is 25% of the average amount per household and 17% of the average amount per occupant for the households in the study group. This level of fuel consumption projected over a one-year period would cost $387.00 for the year and produce 1.1 tonnes of CO_2.

Automobile Fuel Consumption (City Fuel Consumption)

Best Fuel Efficiency
Among Participating Households
4.0 L/100km

Average Fuel Efficiency
Among Participating Households
11.3 L/100km

Your Automobile's
Fuel Efficiency
11.4 L/100km

The fuel consumption rating of your 1998 Subaru Legacy Outback is 11.4 L/100km (city) and 8.4 L/100km (hwy). The city fuel consumption value is 2.85 times higher than the best fuel efficiency among participating households (achieved by a hybrid vehicle), and 1.01 times the average fuel efficiency.

Explanation of Results

Your transportation fuel consumption for the monitoring week was among the lowest in the study group. While your vehicle is not particularly fuel efficient, the amount your car is driven was very low during this week. It is possible, however, that the monitoring week results are lower than is typical for your household, since the monitoring week results included less automobile use than your estimated transportation split.

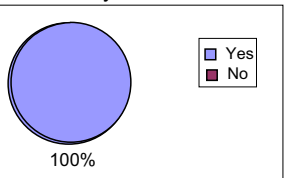
Because your non-automobile trips are by foot or bicycle, you are not generating additional emissions from the use of public transportation.

Monitoring Results - Waste

Like almost all households in the study group you recycle and compost to divert most of your waste from landfill. Your waste log shows that the percentage of your total waste that is garbage is low and black box is high.

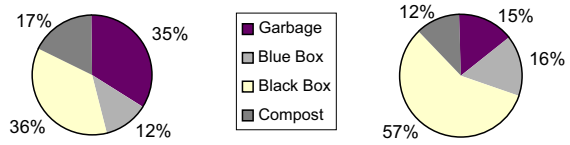
The Household Waste Stream charts below compare the total weight of waste by category for the monitoring week per household and per occupant. Both your total waste and the garbage component of this total are much lower than the average.

Do You Recycle?



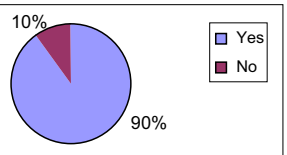
Your Response: Yes

Waste Log

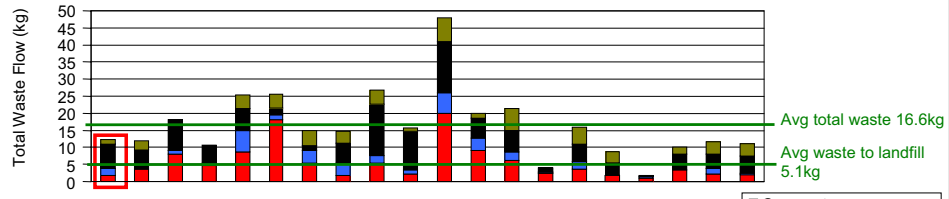


Average Community Split | Your Household

Do You Compost?

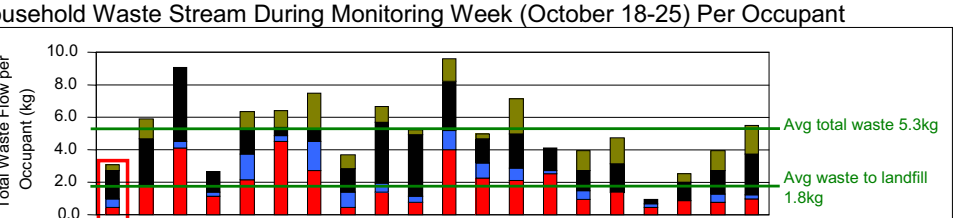


Your Response: Yes



During the monitoring week your household produced 12.3 kg of waste: 1.8 kg was sent to landfill, and the rest was either recycled or composted. Your total waste produced was 70% of the average amount produced per household for the households in the study group. This level of waste production projected over a one-year period would amount to a total of 639.6 kg of which 93.6 kg would be sent to landfill.

Household Waste Stream During Monitoring Week (October 18-25) Per Occupant



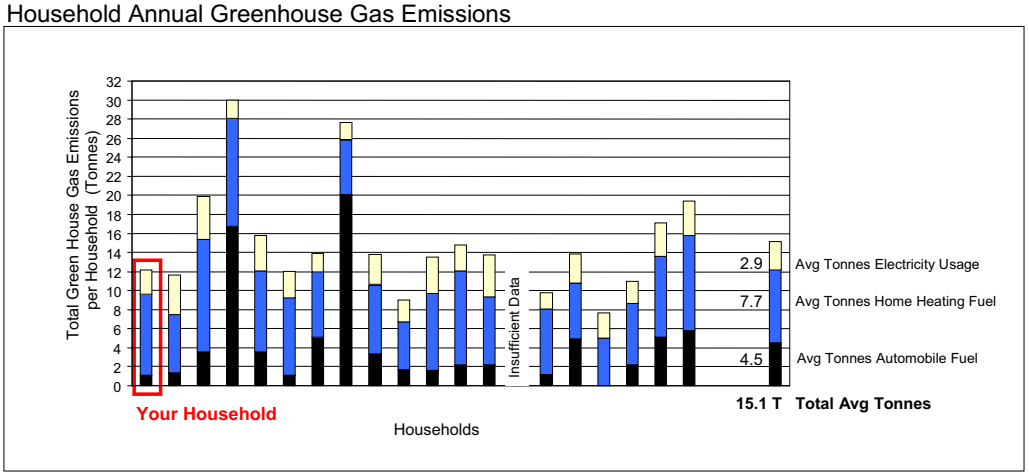
During the monitoring week each occupant in your household produced 3.1 kg of waste: 0.5 kg was sent to landfill, and the rest was either recycled or composted. Your per occupant waste produced is 52% of the average amount produced per person for the households in the study group. This level of waste production projected over a one-year period would amount to a total of 161.2 kg; 26.0 kg would be sent to landfill.

Explanation of Results

Your total waste consumption is among the lowest of the study group per occupant, and a very large portion of the waste you do generate is being diverted from landfill. Further reductions would be possible only by reducing the total amount consumed or the amount of packaging included with the products you buy.

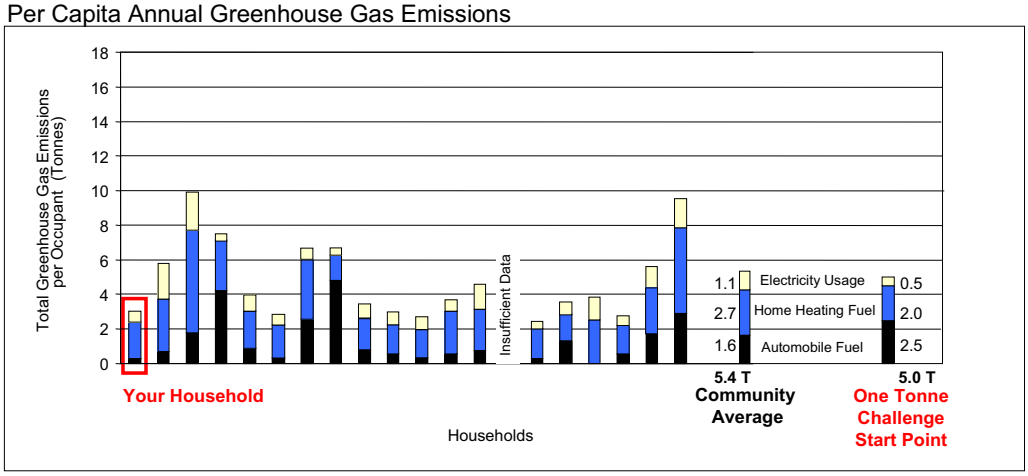
Monitoring Results - Greenhouse Gas Emissions

Household Annual Greenhouse Gas Emissions



Based on your use of automobile fuel, home heating fuel, and electricity, your household is responsible for just over 12 tonnes of greenhouse gas emissions each year. This total is made up of about 8.5 tonnes from home heating, 2.5 tonnes from electricity and 1 tonne from personal transportation. This amount is 82% of the average amount produced by the study group households. The emissions arising from the consumption of home heating fuel accounts for about two thirds of your total.

Per Capita Annual Greenhouse Gas Emissions



When your total household emissions are divided by the number of household occupants, the result is about 3 tonnes per person, one of the lower values among the 20 households.

Reducing this data to per occupant emissions allows comparison of these results with the recent Federal Government initiative, the One Tonne Challenge. This initiative asks each Canadian to reduce their personal greenhouse gas emissions by one tonne, or about 20% of the 5 tonne Canadian average, in order to help Canada to reach its Kyoto targets. However, as the graph above illustrates, this average figure should not be taken to literally mean that we each generate at a rate of 5 tonnes and should therefore each reduce by 1 tonne to achieve a personal 20% reduction. The Lindenlea study group average is not far off the expected 5 tonne figure, but the variations within even this single community make an across the board cut of one tonne seem like an unbalanced approach. The large variations in per person emissions seen here are primarily a result of differing extents of automobile use, and the number of occupants sharing the total household heating, electricity and automobile fuel consumption.

Your current level of per person emissions puts you well ahead of the One Tonne Challenge goal of 4 tonnes. However, while our Kyoto target is to reduce emissions by 6% below 1990 levels, it is believed that this target should be viewed as a small first step, and that to prevent global climate change, Canadians should be reducing their emissions to 60% below 1990 levels or about 2.5 tonnes per person.

The recommendations on the final page of this report illustrate ways you could reduce your current emissions by a further 5.7 tonnes for your household, or 1.4 tonnes per occupant. This level of reduction allow you to live within the more challenging 60% below 1990 goal.

Recommendations

	Approximate Implementation Cost	Potential Annual Resource Savings	Potential Annual Cost Savings	Potential Annual GHG Reduction (Tonnes per year)	Priority	Date Implemented
Heating Energy (kJ)		MJ				
add R13 insulation to inside of main walls with 2" rigid boards	$8,000.00	36300	$440.00	1.80	M	
increase air tightness by 25% by sealing leaks in plumbing stacks, chimneys and duct chases; remove potlights or replace with airtight units	$1,500.00	10400	$125.00	0.50	M	
insulate foundation to R12 with rigid board and/or sprayed foam	$4,000.00	10900	$135.00	0.60	L	
insulate hot wter take with insulating blanket (required if tank feels warm to the touch)	$25.00	1340	$25.00	0.10	H	
install solar hot water heating system	$6,600.00	24830	$290.00	1.49	L	
Electricity (kWh)		kWh				
replace 5 incandescent bulbs with compact fluorescent bulbs	$25.00	430	$30.00	0.20	H	
eliminate use of freezer (if not required)	$0.00	620	$45.00	0.20	H*	
upgrade clothes washer to Energy Star, front-loading model	$1,100.00	1170	$80.00	0.40	M	
Water (L)		L				
replace toilets with 6L per flush low-flow models (3 toilets)	$750.00	210240	$300.00	n/a	H	
install 1 water-saving showerhead (flow rate of 9.5 litres/minute or less)	$10.00	8580	$20.00	n/a	H	
attach low-flow aerator to kitchen faucet and use for dishwashing by hand	$10.00	4350	$10.00	n/a	H	
Transportation (L)		L				
use 10% ethanol-blended gasoline	$0 - $10.00	none	$0.00	0.10	H	
reduce vehicle use by 25%	$0.00	0.125	$100.00	0.29	H*	
All Recommendations	**$22,000.00**		**$1,600.00**	**5.68**		

Additional Recommendations

plant a deciduous tree at southeast corner of property	
enable the 'sleep' mode on your computer to cut the energy use to less than half (screen savers do not save energy	
install and use rainbarrels to collect water for your garden	

Other Measures Your Household Has Taken

Legend

Priority - H 0-10 year payback
M 11-20 year payback
L 21-30 year payback

* Recommendation will have a lifestyle impact

The
Household Environmental
Monitoring Project

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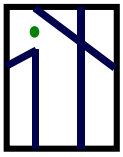

Jane Thompson Architect
1 Middleton Drive, Ottawa, Ontario, K1M 1B8
tel: 613-747-8104 fax: 613-747-8396
jtarch@cyberus.ca

HOUSEHOLD ENVIRONMENTAL MONITORING PROJECT QUESTIONNAIRE

1. Please indicate how useful you found each of the following:

EnerGuide Assessment (blower door test and report provided by the EnviroCentre)
☐Very Useful ☐Useful ☐Not Useful

Aspects of the EnerGuide Assessment you found most useful:

_____

_____

Areas where the EnerGuide Assessment could be improved:

_____

_____

Monitoring Week (utility readings and activity log completed by your household)
☐Very Useful ☐Useful ☐Not Useful

Aspects of the Monitoring Week process you found most useful:

_____

_____

Areas where the Monitoring Week process could be improved:

_____

_____

Household Report (results and recommendations for heating, electricity, water, transportation and waste)
☐Very Useful ☐Useful ☐Not Useful

Aspects of the Household Report you found most useful:

_____

_____

Areas where the Household Report could be improved:

_____

_____

Of the three documents the most useful was:
☐ EnerGuide Assessment
☐ Monitoring Week
☐ Household Report

2. Comparisons made between households in the Household Report were intended to provide participants with a sense of their consumption in a community context, and to allow the research team to better understand which household characteristics typically lead to higher or lower environmental impact. Do you think these comparisons are useful as presented? ☐Yes ☐No

Comments:

_____

_____

_____

3. Did you receive any particular surprises or insights from the results for your household in the Household Report? Were there any surprises or insights from the community results?

_____

_____

_____

_____

4. Are you satisfied with the level of household information provided by this study? Do you feel that the amount of effort your household put into this research study was worth the results and recommendations you received?

_____

_____

_____

5. Please list those recommendations made at the end of the Household Report that you are most likely to implement:

Recommendation	**Have already implemented**	**Very likely to implement this year**	**Would like to implement some day**
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

6. Evaluate how effective the potential government initiatives listed below would be to reduce the environmental impact of your household:

Potential Initiative	**High Priority**	**Very Effective**	**Somewhat Effective**	**Not Effective**
Increase utility charges (heating fuel, electricity, water) to reflect the full cost of production and environmental impact.				
Implement progressive utility billing where rates increase with household consumption.				
Promote voluntary energy efficiency standards for appliances and vehicles.				
Legislate higher energy efficiency standards for appliances and vehicles.				
Provide significant tax rebates for purchase of energy-efficient appliances, vehicles, alternative energy sources.				
Increase taxes on inefficient vehicles or appliances.				
Promote resource conservation programs for individuals such as the One Tonne Challenge.				
Provide additional grants for energy-efficient home improvements, similar to those currently provided through the EnerGuide program.				
Expand the EnerGuide program to include assessment of lifestyle factors, electricity, water, transportation and waste consumption (similar to the Household Report)				
Implement community programs to assist households in reduction of environmental impact.				
Improve transportation infrastructure to encourage public transit use, biking and/or walking.				
Fund community-based alternative energy sources or other sustainable initiatives.				
Other suggestions:				

Comments:

Appendix 5: Community Forum Summary

On May 9, 2005, a community forum was held at the Lindenlea Community Centre to discuss the results of The Household Environmental Monitoring Project and future community initiatives. The forum consisted of a brief presentation by Jane Thompson of common themes encountered in the individual reports and some suggested directions or initiatives for future resource use reduction. Participants were encouraged to comment on the process and what they had learned, and suggest changes they would like to see implemented at the community level. Sixteen of the twenty households were represented at the forum; their comments are summarized below:

1. **Discussion of the effectiveness of EnerGuide Assessment, Monitoring Week and Household Report:**

EnerGuide Assessment:

All participants in attendance stated they found the EnerGuide assessment useful, and approximately one-third of participants found the report the most useful of the three tools.

Comments made by participants:

- some of the more technical consumption tables in the report were difficult to understand
- some energy retrofit methods described in the accompanying literature may not be correct
- a presentation to the community on energy retrofit methods by a local contractor or building supply representative would help homeowners implement EnerGuide recommendations

Monitoring Week:

The majority of participants expressed satisfaction with the one-week monitoring period. A small number of participants indicated a willingness to participate for more than one week to obtain more accurate average results, but the majority felt one week was sufficient.

Comments made by participants:

- the monitoring week was useful in assembling data for the Household Report, but this length of assessment may not reflect average consumption patterns
- the monitoring week documents made participants very aware of day-to-day consumption habits
- air travel was not measured, and could potentially be added to future surveys
- information about pets should have been included in the survey (eg. cat litter waste would have had an impact on waste total)

Household Report:

Participants felt the Household Report was an important part of the process primarily because it brought together the results of the EnerGuide Assessment, Monitoring Week, Home Visit and questionnaire.

Comments made by participants:

- a sufficient level of detail in the report helped participants determine resource reduction priorities – comparison charts between households were excellent
- report incorporated EnerGuide and Monitoring Week info into one understandable document
- it would be most relevant to compare results of households with the same number of occupants (ie. comparing 4-person and 1-person households does not appear to be as valid)
- attaching dollar savings and cost information provided good incentive to implement recommendations

2. Discussion of the merit of the recommendations provided:

Most participants agreed that the Household Reports contained a suitable number of recommendations, and that most recommendations were relevant and realistic.

Comments made by participants:

- many recommendations can be incorporated into future renovations
- suggestions for changes to lifestyle habits are useful, and provide a reminder for the homeowner when participating in daily activities (eg. changing lightbulbs, shopping, driving)
- regarding transportation fuel reduction recommendations, there are many variables to consider when purchasing a vehicle (family size, etc.), and fuel efficiency is not always as high a priority -- perhaps car use should be recorded separately from household consumption
- solar hot water heating systems were recommended, but these have not yet received city approval
- on-demand water heating systems could also have been suggested to reduce heating energy use

3. Discussion of best techniques for achieving reduction in household environmental impact:

Most participants stated they believe legislated changes are more effective than voluntary measures. Most participants support higher charges for high levels of consumption and financial incentives to support sustainable purchases.

Comments made by individual participants:

- One Tonne Challenge may not be a useful approach, as varying levels of reduction are required for individuals to reduce greenhouse gas emission level to four tonnes
- legislation and incentives in other regions of North America (eg. increased parking charges downtown) has helped to reduce automobile emissions
- Canadian media should encourage environmental sustainability to counteract prevalent consumerism
- vehicles are getting larger – projects like the Household Environmental Monitoring Project could potentially show marketers and government that there are consumers who are interested in smaller and more efficient vehicle choices
- smart meters should be made more readily available for water, electricity, gas
- the community should talk to the city about the Compost-Plus program, and talk to Ottawa Hydro about renewable energy options
- the community could potentially become a “carbon-neutral” group (purchase/sell credits)

- the compactness of the Lindenlea neighbourhood encourages use of sustainable transportation methods
- the community aspect of the study is relevant, but current municipal planning in most areas of the city often makes it difficult to travel without a car
- it may be very difficult to achieve the densities proposed in the Ottawa 20/20 plan, as municipal planning is limited in its ability to influence commercial interests and the desire for large lots

- use community involvement and comparison as incentive for change
- there should be a follow-up study performed – Lindenlea was formed as a model planned community, and could become a model environmental community as well
- a study of the environmental impact of this type of community compared to typical suburban neighbourhoods would be beneficial

Post-Report Questionnaires: A Summary of Responses

Questionnaires were provided to households in May 2005 to assess the effectiveness of the Household Monitoring Project and its various components. Fifteen of the twenty households responded; their comments are summarized below:

1. Rating of EnerGuide Assessment, Monitoring Week and Household Report

The first section of the questionnaire asked participants to rate how useful they found the EnerGuide Assessment, the Monitoring Week and the Household Report.

EnerGuide Assessment:

A majority of respondents gave the EnerGuide Assessment a 'Very Useful' rating as indicated below:

Very Useful:	87%
Useful:	13%
Not Useful:	0%

Most Useful (as compared to Monitoring Week and Household Report): 37%

Comments on the beneficial aspects of the assessment:

- the EnerGuide Assessment provided information about areas of greatest heat loss in the home, and made suggestions about such items as furnace or HRV upgrades that the homeowners had not previously considered
- the assessment allows homeowners to prioritize the most cost-efficient energy upgrades, including simple improvements (eg. caulking of air leaks at joints) that can be done by the homeowners themselves
- the potential for a government grant is an incentive to make energy-efficient retrofits

Concerns and suggested improvements:

- more extensive explanations should be provided of the HOTXP energy use/savings tables and EnerGuide scores contained in the assessment report
- some EnerGuide recommendations are unlikely to be implemented as they would be fairly costly and payback time frames are unrealistic
- one participant who has previous experience with thermal imaging to determine areas of heat loss in a building envelope believes this would be a valuable addition to the EnerGuide assessment

Monitoring Week:

Most respondents rated the monitoring week as 'Useful' as shown below, but none ranked it as the most useful of the three:

Very Useful:	20%
Useful:	80%
Not Useful:	0%

Most Useful (as compared to EnerGuide Assessment and Household Report): 0%

Comments on the beneficial aspects of the monitoring week:

- tracking of household habits identified the causes of highest resource consumption for their household
- made them very aware of consumption and impact on the environment
- necessary part of data collection to produce the Household Report

Concerns about the Monitoring Week and suggested improvements:

- average annual waste and transportation fuel consumption could not be accurately assessed over a one-week period, especially if one or more occupants was away from the house during this period
- the measurement of waste production was not very exact, and the level of total waste production in comparison to other households may have been affected by factors such as pet ownership or a large amount of diaper waste that resulted from having a young baby in the home
- a significant proportion of resources are often used outside the home, affecting the household's rating of environmental impact (eg. using water when showering at work, creating waste by purchasing meals with disposable packaging at restaurants)
- one participant noted that in measuring transportation patterns, the distance traveled would be a greater indicator than the number of trips taken, as many short trips use a smaller amount of fuel than a few long trips

Household Report:

Most respondents rated the monitoring week as 'Very Useful' as shown below, and the highest number of participants rated the Household Report as 'Most Useful' among the three Household Monitoring Project components:

Very Useful:	73%
Useful:	27%
Not Useful:	0%

Most Useful (as compared to EnerGuide Assessment and Monitoring Week): 63%

Comments on the beneficial aspects of the Household Report:

- most comprehensive of three since it incorporated EnerGuide report and Monitoring Week info.
- the comment most often made by respondents was that comparisons made between households regarding environmental impact were very relevant, providing either confirmation of the benefits of measures they had already taken or incentive to make future improvements
- many homeowners also found that the customized information provided by the report allowed them to implement changes that would make the most difference to that household's environmental impact
- liked comparisons within the community

Concerns or suggested improvements:

- some participants noted that a more extensive measurement of certain household factors or lifestyle patterns (eg. height of existing landscaping to provide natural cooling, air travel not accounted for, reasons for excessive automobile use, some family members not home that week) could have provided a more accurate comparison between households

- comparisons would be most relevant between households with the same number of occupants
- some respondents felt the recommendation section could be improved by adding more detail on how recommendations could be implemented; others felt that some recommendations were impractical, not suited to the lifestyle of occupants or size of household, or could negatively affect the look of the house

2. Household Comparisons

The second section of the questionnaire asked participants if comparisons between households were useful as presented. A large majority of respondents (87%) found the comparisons useful, 7% found them somewhat useful, and 7% did not find them useful. The following additional comments were made by participants:

- One participant was surprised at the level of variation in consumption rates of other households, while others attributed differences to certain physical factors such as the age of the home or travel distance to work. Some respondents expressed an interest in learning in more detail which factors made the most difference among households.
- The respondent who rated the comparisons as somewhat useful commented that the comparison of households with similar traits (ie. number of occupants, number of cars) would be more relevant.

3. Surprises or Insights

The third section of the questionnaire asked if participants had received any surprises or insights from their results or those of the community:

- Many respondents expressed surprise that their own levels of resource consumption were higher than they expected. While some acknowledged that individual lifestyle patterns contributed to these results, others attributed these levels to some physical factors of the home, such as unexpected levels of heat loss in the building envelope resulting in higher levels of heating fuel consumption.
- Several respondents were pleasantly surprised to discover their levels of resource consumption were much lower than they had assumed.
- While one respondent noted that higher levels of consumption among other households had negatively affected the community total, another participant described the Lindenlea community as ‘conservation-minded’ in comparison to their own household results.
- Some respondents were surprised to learn about the energy-efficiency failings of their house, eg. no insulation in some walls

4. Satisfaction with Information Provided

When asked if households were satisfied with the amount of information they received in comparison to the level of effort required to participate in the study, all respondents stated they were satisfied, and about half added comments indicating they were very pleased with the information provided.

- Several respondents noted an appreciation of recommendations suited to their households; these recommendations confirmed their own assumptions regarding the environmental benefits of certain actions that had been previously considered.

5. Recommendations Most Likely to Be Implemented

Participants were asked which recommendations they were most likely to implement:

- Many participants had already implemented several recommendations from the report. The most common measures implemented were lightbulb replacements and reductions in vehicle use (each adopted by 6 households).
- Other measures implemented by 3-4 households were a switch to ethanol gas, measures to increase house air tightness and insulation, a switch to low-flow showerheads and the use of the 'sleep mode' feature to reduce computer energy use.
- The measures most likely to be implemented by respondents within the year include energy-efficient upgrades to the building envelope (increased insulation, air tightness), kitchen faucet aerator and showerhead replacement and lightbulb replacement.
- Other commonly noted measures to be completed within this time frame include the lowering of thermostat temperature, toilet and water heater replacement and the addition of rain barrels and ceiling fans.

Recommendation	have already implemented	very likely to implement this year	combined total	would like to implement someday
replace lightbulbs with compact fluorescents	6	5	11	1
insulation upgrades	2	9	11	3
increase air tightness of building envelope	3	7	10	1
install kitchen faucet aerator	0	8	8	0
reduce vehicle usage	6	1	7	0
install low-flow showerhead	2	5	7	0
use ethanol gas	4	0	4	0
insulate hot water tank	0	4	4	0
use energy-saving features on computer	3	0	3	0
replace toilet with water saving model	1	2	3	3
lower heating thermostat	0	3	3	0
use clothes line and/or drying rack	1	1	2	0
use rain barrels	0	2	2	1
install and use ceiling fans	0	2	2	0
replace water heater with more efficient model	0	2	2	3
install heat recovery ventilator	1	0	1	0
wash laundry in warm water, rinse in cold	1	0	1	0
close curtains during day to reduce cooling energy	1	0	1	0
eliminate freezer	0	1	1	0
reduce lawn sprinkler use	0	1	1	0
start composting	0	1	1	0
replace furnace with high-efficiency model	0	0	0	2
replace vehicle with more fuel efficient model	0	0	0	2
install solar water heating system	0	0	0	2

6. Effectiveness of Measures to Reduce Environmental Impact

Participants were asked to rate the effectiveness of several suggested measures to reduce the environmental impact of their households:

- Voluntary energy efficiency standards and conservation programs such as the One Tonne Challenge were felt to be not effective or only somewhat effective by the majority of respondents.
- Highest priority initiatives included legislating higher energy-efficiency standards, promoting good environmental choices by providing tax rebates for energy-efficient purchases, increasing taxes on inefficient vehicles or appliances and implementing progressive utility billing. The item with the highest combined rating of 'high priority' or 'very effective' was improving transportation infrastructure to encourage public transit, biking or walking. Each of these initiatives involve government taking a stronger role in legislating and supporting good environmental practice, and on consumers paying for the environmental cost of their consumption.

- Other suggestions:
    - implement higher hydro peak period pricing
    - free parking and the use of bus lanes on downtown streets for hybrid and electric vehicles
    - implement more sustainable urban planning measures that support intensification and reduce expansion into greenspaces
    - reduce the sale of energy to the US to encourage its adoption of more sustainable energy policies
    - contractor do-it-yourself workshops and bulk-buying of environmentally-friendly products within local communities

Initiative	High Priority	Very Effective	Combined Total	Somewhat Effective	Not Effective
Improve transportation infrastructure to encourage public transit use, biking and/or walking.	47%	47%	93%	7%	0%
Legislate higher energy efficiency standards for appliances and vehicles.	67%	13%	80%	20%	0%
Provide significant tax rebates for purchase of energy-efficient appliances, vehicles, alternative energy sources.	47%	33%	80%	20%	0%
Provide additional grants for energy-efficient home improvements, similar to those currently provided through the EnerGuide program.	33%	40%	73%	27%	0%
Implement progressive utility billing where rates increase with household consumption.	40%	33%	73%	27%	0%
Increase utility charges (heating fuel, electricity, water) to reflect the full cost of production and environmental impact.	20%	53%	73%	20%	7%
Increase taxes on inefficient vehicles or appliances.	47%	20%	67%	27%	7%
Fund community-based alternative energy sources or other sustainable initiatives.	13%	47%	60%	40%	0%
Expand the EnerGuide program to include assessment of lifestyle factors, electricity, water, transportation and waste consumption (similar to the Household Report).	14%	36%	50%	36%	14%
Implement community programs to assist households in reduction of household impact.	13%	33%	47%	53%	0%
Promote resource conservation programs for individuals such as the One Tonne Challenge.	0%	27%	27%	73%	0%
Promote voluntary energy efficiency standards for appliances and vehicles.	7%	7%	13%	53%	33%

Heating and Cooling Degree Days for Ottawa

Heating Degree Days			
Month	**2003**	**2004**	**Difference 2003 to 2004**
November	468.8	484.3	3% higher
December	722.2	814.9	13% higher
Subtotal: November-December	**1191.0**	**1299.2**	**9% higher**
Month	**2004**	**2005**	**Difference 2004 to 2005**
January	1045.3	920.7	12% lower
February	750.0	700.6	7% lower
March	559.2	668.8	20% higher
April	377.8	324.8	14% lower
May	166.2	205.0	23% higher
June	54.0	16.1 *	70% lower
July	1.8	2.9	61% higher
August	29.8	8.4	72% lower
September	66.8	57.2 *	14% lower
October	287.0	269.8 *	6% lower
Subtotal: January-October	**3337.9**	**3174.3**	**5% lower**
Yearly Total	**4528.9**	**4473.5**	**1% lower**

Cooling Degree Days			
Month	**2003**	**2004**	**Difference 2003 to 2004**
November	0.0	0.0	
December	0.0	0.0	
Subtotal: November-December	**0.0**	**0.0**	
Month	**2004**	**2005**	**Difference 2004 to 2005**
January	0.0	0.0	
February	0.0	0.0	
March	0.0	0.0	
April	1.9	0.0	
May	4.0	1.9	53% lower
June	27.1	111.6 *	312% higher
July	86.5	128.6	49% higher
August	47.5	115.4	143% higher
September	11.1	33.1 *	198% higher
October	0.0	6.4 *	
Subtotal: January-October	**178.1**	**397.0**	**123% higher**
Yearly Total	**178.1**	**397.0**	**123% higher**

Source: Environment Canada

Notes:

1. *Estimated figure according to Environment Canada.

2. Heating degree-days for a given day are the number of Celsius degrees that the mean temperature is below 18°C. If the temperature is equal to or greater than 18°C, then the number will be zero. For example, a day with a mean temperature of 15.5°C has 2.5 heating degree-days; a day with a mean temperature of 20.5°C has zero degree-days. Heating degree-days are used primarily to estimate the heating requirements of buildings.

3. Cooling degree-days for a given day are the number of Celsius degrees that the mean temperature is above 18°C. If the temperature is equal to or less than 18°C, then the number will be zero. For example, a day with a mean temperature of 20.5°C has 2.5 cooling degree-days; a day with a mean temperature of 15.5°C has zero degree-days. Cooling degree-days are used primarily to estimate the air-conditioning requirements of buildings.

Implementation Statistics (page 1 of 2)

Household	install outdoor reset control thermostat for boiler system		insulate foundation wall		add insulation to above-grade walls		insulate attic		replace water heater with more efficient model		increase air tightness of building envelope		replace furnace with high-efficiency model		insulate hot water tank		install solar water heating system		install a heat recovery ventilation system		replace incandes lightbulbs with compact fluor		upgrade fridge to more efficient model		eliminate freezer or second fridge		upgrade clothes washer to more efficient model		use clothes line and/or drying rack instead of dryer		repair leaking faucets		replace toilet with water saving model		install low-flow showerhd		install kitchen faucet aerator and use for hand dishwash		reduce lawn sprinkler use		use ethanol-blended gas	
	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl
1	0	0	1	1*	1	0	0	1*	0	0	1	1	0	0	1	0	1	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	1	1	1	1	1	0	0	0	1	0
2	0	0	1	0	0	1*	1	0	0	0	0	1*	0	0	1	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	1	1	0
3	0	0	1	0	1	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0	1	0	1	0	1	0	1	0
4	0	0	1	1	1	0	0	0	1	0	1	1	1	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	1	0	1	0
5	0	0	1	0	0	0	1	0	1	0	1	0	1	1	0	0	1	0	0	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	1	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0	1	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0
7	0	0	1	0	0	0	1	0	0	0	1	1	1	0	1	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1	1	0	0	1	1
8	0	0	1	0	1	1	0	0	1	0	1	1	1	0	0	1*	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	1	1	1	1	0	0	1	1
9	0	0	1	0	1	0	0	0	1	0	1	1	1	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	1
10	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	1	1	0	0	0	0	1	0	0	0	0	0	1	1	1	0	1	1	0	0	1	0
11	0	0	1	1	0	0	1	0	1	0	1	1	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	1	1	1	0	1	1	1	1	0	0	1	1
12	0	0	0	0	1	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0	1	1
13	1	0	1	0	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	1	0	1	0	1	1	1	0
14	0	0	1	1	1	1	0	0	1	0	1	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	1	0	1	0	1	1	1	0
15	0	0	1	1	0	0	0	0	1	0	1	1	0	0	0	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	1	0
16	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	1	0	1	0	0	0	0	0	1	0	0	0	1	0	1	0
17	0	0	1	1	0	0	0	0	1	0	0	1*	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0
19	0	0	1	0	1	0	1	0	1	0	1	0	1	0	0	1*	0	0	0	0	1	0	0	0	1	0	1	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0
20	0	0	1	0	1	1	0	0	0	0	1	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	1	1	1	1
Totals	**1**	**0**	**15**	**6***	**10**	**4***	**6**	**1***	**11**	**0**	**15**	**10***	**8**	**1**	**9**	**5***	**16**	**0**	**1**	**1**	**17**	**11**	**1**	**0**	**14**	**0**	**5**	**0**	**8**	**1**	**1**	**1**	**16**	**5**	**15**	**3**	**14**	**5**	**7**	**4**	**19**	**6**
a **b**	**5%**	**0%**	**75%**	**30%**	**50%**	**20%**	**30%**	**5%**	**55%**	**0%**	**75%**	**50%**	**40%**	**5%**	**45%**	**25%**	**80%**	**0%**	**5%**	**5%**	**85%**	**55%**	**5%**	**0%**	**70%**	**0%**	**25%**	**0%**	**40%**	**5%**	**5%**	**5%**	**80%**	**25%**	**75%**	**15%**	**70%**	**25%**	**35%**	**20%**	**95%**	**30%**
c	**0%**		**33%**		**30%**		**0%**		**0%**		**53%**		**13%**		**33%**		**0%**		**100%**		**65%**				**0%**		**0%**		**13%**		**100%**		**31%**		**20%**		**36%**		**57%**		**32%**	

a = percentage of households that received recommendation (out of 20 households)

b = percentage of measures implemented (whether recommended in individual Household Report or not)

c = percentage of recommended measures implemented

*includes implemented measures that were not recommended in individual Household Report

Implementation Statistics (page 2 of 2)

reduce vehicle usage by 25%		replace vehicle with more fuel efficient model		lower heating thermostat		install and use ceiling fans and/or reduce ac usage		use energy-saving features on computer		install and use rainbarrels		wash laundry in warm water, rinse in cold		compost all applicable items		Other measures	Totals		% impl.
rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl	rec	impl		rec.	impl.	
1	1	0	0	0	0	0	0	1	1	1	0	0	0	0	0	insulate attic walls & floors, replace door, insulate crawlsp	15	8	53%
1	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0	replaced two windows, improved wall insulation and air tightness	14	4	29%
1	0	0	0	0	0	1	0	1	0	1	0	0	0	1	0		19	0	0%
1	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0		17	2	12%
1	0	0	1*	1	0	1	1	1	0	1	0	1	0	0	0	replaced vehicles	18	4	22%
1	0	0	0	0	0	1	0	1	0	1	0	0	0	0	0		12	0	0%
1	1	1	0	0	0	1	0	1	1	1	0	0	0	0	0		17	6	35%
1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	changing exterior doors, hot water tank insulation	16	13	81%
1	0	0	0	0	0	1	0	1	0	0	0	1	0	0	0		15	3	20%
1	0	0	0	0	0	1	0	1	0	1	1	0	0	0	0	install bath faucet aerators	13	5	38%
1	1	0	0	0	0	1	0	1	1	1	0	0	0	0	0		16	9	56%
1	0	0	0	1	1	1	0	1	0	1	0	0	0	0	0	carpool, install bath faucet aerators	15	3	20%
1	1	0	0	0	0	1	1	1	1	1	0	0	0	0	0		16	6	38%
1	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0		17	5	29%
1	0	0	0	0	0	0	0	1	1	1	0	0	0	1	0	installed new window on east side of house	13	6	46%
1	0	0	0	0	0	0	0	1	0	1	0	0	0	1	0		13	1	8%
0	0	0	0	1	0	0	1*	1	1	1	0	1	1	1	0	adjusted dishwasher, reduced ac use, increased air tightness	11	6	55%
1	1	0	0	0	0	0	0	1	1	1	1	1	1	0	0		11	5	45%
1	0	0	0	0	0	1	0	1	0	1	1	0	0	0	0	insulate hot water tank	16	2	13%
1	0	0	0	1	1	1	0	1	0	1	0	0	0	0	0		14	5	36%
19	6	4	2*	4	2	15	4*	18	8	19	4	5	3	6	0				
95%	30%	20%	10%	20%	10%	75%	20%	90%	40%	95%	20%	25%	15%	30%	0%				
32%		25%		50%		20%		44%		21%		60%		0%					

Recommendations with Largest Average Resource Savings

Heating Energy *				
Recommendation	**Avg. Resource Savings (MJ)**	**Avg. GHG Savings (T)**	**Highest Individual Household Savings (MJ)**	**Highest Indiv GHG Savings (T)**
insulate above grade walls	29215	1.75	44205	2.65
upgrade furnace	20275	1.22	27114	1.63
install solar hot water heating system	21946	1.32	34799	2.09
insulate foundation	17842	1.07	49163	2.95
insulate ceiling	18779	1.13	18779	1.13
increase air tightness	9257	0.55	20608	1.24
install heat recovery system	6222	0.37	6222	0.37
replace hot water tank	6067	0.36	9179	0.55
insulate hot water tank	1337	0.13	1337	0.13
Electricity				
Recommendation	**Avg. Resource Savings (kWh)**	**Avg. GHG Savings (T)**	**Highest Individual Household Savings (kWh)**	**Highest Indiv GHG Savings (T)**
upgrade clothes washer to Energy Star, front-loader	515	0.19	1172	0.43
replace 5 incandescent bulbs with fluorescent	429	0.16	429	0.16
eliminate use of freezer	415	0.15	621	0.23
install and use clothes line for 25% of wash load	205	0.07	238	0.09
upgrade fridge to Energy Star model	192	0.07	484	0.18
Water				
Recommendation	**Avg. Resource Savings (L)**	**Avg. GHG Savings (T)**	**Highest Individual Household Savings (L)**	**Highest Indiv GHG Savings (T)**
replace toilets with 6L per flush low-volume models	56940	n/a	56940	n/a
install water-saving showerheads	16896	n/a	51480	n/a
reduce use of outdoor sprinker by half-hour per week during summer months	8400	n/a	8400	n/a
use low-flow aerator to kitchen faucet for hand dishwashing	3081	n/a	16016	n/a
Transportation				
Recommendation	**Avg. Resource Savings (L)**	**Avg. GHG Savings (T)**	**Highest Individual Household Savings (L)**	**Highest Indiv GHG Savings (T)**
upgrade vehicle to most efficient model in same class	609	1.44	4206	9.93
reduce car use by 25%	384	0.91	1901	4.49
use 10% ethanol-blended gasoline	n/a	0.37	n/a	1.83

* Averages and highest values in Heating Energy category calculated from measures recommended in Household Reports (other measures recommended in individual EnerGuide assessments not included in calculations).

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