

Designing Water Efficiency into Residential Development

Glen Pleasance
Water Efficiency Coordinator
Region of Durham

Durham Region



Durham Region

- On the eastern border of Toronto
- Region covers 1,000 mi²
- Pop. 550,000, most along the northern shore of Lake Ontario
- 80% homes metered, rest on rural private wells
- Population will double by 2021
- Use Water Eff. to reduce the cost of this growth

Water Efficiency as a Planning Tool

- Region is responsible for water & sewer systems
- Water Efficiency initiatives as a source of water within the existing infrastructure
- This delays water and sewer plant expansions
- = reduced cost of infrastructure expansion

Partners

- In addition to Durham Region, the following are contributing technically & financially:
 - Natural Resources Canada (NRCan) manage the ENERGY STAR® program
 - Tribute Communities
 - 4th. Under negotiation



Water & Energy Efficient Community

- Three years in planning
- Upgraded fixtures & appliances in 100 homes built by Tribute Communities in Ajax
- homes also receive a \$450 xeriscape plant package & low impact lawn care education
- First homes occupied in August 2004

Affordability

- Development is mostly starter homes
- Homes are on 30', 37' & 56' lots
- Improvements in water and energy efficiency to be affordable in all new homes
- Perception of affordability will come from the project

Selling Efficiency

The first 100 buyers who choose the Builders Appliance package, get the Efficient Package

Choose Efficient Package (worth \$2,000) or \$3,000 in builder upgrades



deluxe appliance package upgrade

As part of our on-going commitment to Quality and Community, Tribute is offering a limited number of deluxe appliance packages exclusively to new residents of The Hamlet.

The package includes 5 top-of-line Frigidaire appliances. These appliances offer energy and water efficiency, innovative features, performance and savings.

Tribute Communities, in partnership with the Regional Municipality of Durham, Canada Mortgage and Housing Corporation and Natural Resources Canada is committed to protecting our environment and delivering superior quality and performance. The appliance package we're offering has been recommended by experts in the areas of energy and water efficiency.

Front-loading Clothes Washer

Frigidaire model GLFT1210A



Features

- 12-Cycles
- 3.1 Cubic Ft. Capacity
- Stainless steel drum
- 4-Wash / Rinse Temperature Combinations
- Sound Silencer Quiet Package
- Automatic Water Level Adjustment
- Automatic Temperature Control
- Front console for easy transfer of clothes to dryer

This energy saving model also saves water; in fact it uses 43% less water than top loading washers - that equals 250 free loads of wash each year. Clothes tumble through water, ensuring more thorough cleaning and a gentler wash. The washer accommodates much larger loads than a top-loading machine and the tumbling action means clothes come out dryer, which translates to less time in the dryer and more energy savings!

Top-Mount Refrigerator

Frigidaire model FRT18H56AW



Features

- Refrigerator section
- 2 Full-width SpillSafe glass shelves
- 3 Fixed door bins; 2 with gallon storage
- Clear dairy door and deli door
- 2 Clear humidity-controlled crispers
- Never-clean condenser
- Rounded, stylised doors

Freezer section

- Full-width, SpillSafe shelf
- 2 Door racks with guard bars

This refrigerator offers over 18 cubic feet of storage capacity - 30% more than standard refrigerators - but uses only 431 kWh (electricity) per year. This means the refrigerator will only cost about \$34.48 yearly to run.

Clothes Dryer

Frigidaire model GLEQ332A



Features

- 3 Temperature Options with Rotary Control
- 5.7 Cubic Ft. Capacity
- Moisture Sensor
- Soft Touch Knobs
- Spill-saver Top with Dura Finish
- Reversible Door
- Total Front Serviceability

With tumble care design to protect clothes and 7-cycles for custom drying selection.

Dishwasher

Frigidaire Model FDB641RAS



Features

- 12 Easy Clean Electronic Touchpads with Digital Display
- 5-Level Precision Wash System with Power Spray
- Self-Cleaning Stainless Steel Filter
- UltraQuietPlus Sound Package
- Variable (1 to 9 hour) Delay Start
- Energy-Saving 1/2 Load Wash Option
- NSF Certified Sanitise Rinse Option reduces bacteria by 99.999%
- Power Dry Fan System for fast, superior drying
- Smart Soil Sensor adjusts wash cycle as needed
- Premium Silverware Basket and Utility Basket
- Maximum TuffRacks with 5 Year Limited Warranty

Using 39% less water, detergent and energy, its Precision Wash model will save you the equivalent of 119 loads each year. With 100% filtered water even food particles the size of coffee ground are removed, eliminating the need to pre-rinse dishes.

Cooking Range

Frigidaire model CFEF312AS



Features

- Full-size 10" high back-guard
- Upward, SpillSafe cook-top
- Electronic TOD clock
- Two 8" and two 6" cooking elements with chrome drip bowls
- Large storage drawer with integrated handle
- Oven door has colour co-ordinated panel with window
- Automatic and switch controlled oven light
- One-piece, stylised, curved handle
- Full metal back guard
- Porcelain Broiler Pan and Grill

Offering ample cooking space this 30" Porcelain oven has a clean, modern style and easy-to-use features.






Selling Efficiency

Study Area
Homeowners
will also receive
Drought
Tolerant front
garden, training
in reducing
chemicals and
water use on
their lawns



premium landscape package

This landscape package is a premium only available to those purchasing the Deluxe Energy Star® Appliance Package. It is a limited offer: only 100 packages are available.



The Premium Landscape Package will have a minimum value of \$300.00. The package features flowering shrubs, perennials, annuals and cedar mulch - to retain moisture and inhibit weed growth. The landscape package will form a decorative and beautiful front yard.



It is an 'instant front garden' that will be built as soon as conditions allow. The garden will provide all the beauty without the work. Not only do you get free plants and installation, once in place, they require less watering and maintenance. The plants to be used - predominantly shrubs and perennials - will be well known, beautiful additions to your new home.



 Natural Resources Canada Ressources naturelles Canada

 DURHAM REGION

 CMHC SCHL
HOME TO CANADIANS
Canada

 Tribute
communities

Upgrades

- Three types of toilets:
 - Foremost *Premier* 6L same price as builder's, but better performer (50 homes)
 - Caroma *Tasman* dual flush (3L & 6L) in every first floor Powder Room where most 3L use expected
 - Vitra *Capizzi* 4L pressure assist (other 50 homes)

Testing the Lower Limits

- *Vitra Capizzi 4L* uses Sloan Pressure vessel
- Retains water line pressure
- Second floor baths in 50 homes



Lower Limits

- Caroma *Tasman 3/6L*
- Saves 26% over 6L.
- Wash down design



Improving Toilets in New Homes

- New homes = worst toilets
- Foremost *Premier 6L*
- Costs same as builders'
- Reduce customer callbacks
- Happier homeowner
- Greater water savings
- 6L get better rep.



ENERGY STAR®

- Upgraded appliances include dishwasher, fridge, washer & dryer
- Frigidaire appliances
- Upgraded showerheads
- Track water, hydro & GHG changes
- Calculate benefit/cost



Measuring Change

- Reading water, electricity & gas meters in 90 Study & 90 in Control Area homes
- Study = Efficient, Control = Standard
- 10 Study + 10 Control homes Sub-Metered
- Water: outdoor faucets (front & rear) , dishwasher, clothes washer (hot & cold), water heater supply

Sub-Metering

- Electricity: dishwasher, fridge, stove, washer & dryer, whole home
- Water meters are radio frequency (RF) and mount next to appliance/use
- Electricity meters connect to main panel in basement (also RF)
- Home access only at project beginning and end (after 1 year)

Water Sub-Metering

- Master Meter
- Central receiver
- Data via phone line, downloaded daily
- Troubleshoot
- No lost data



Electrical Sub-Metering

- IMS electrical meter
- Connect to appliance circuit
- Measures consumption
- Firstpoint data logger transmits data



Temperature Sub-Metering

- Use two Log Tags
- Log fridge temp.
- Log kitchen temp.
- Context for fridge Energy consumption



Sub-Metering

- Study to measure both water & energy consumption
- Enables calculation of benefit/cost analysis for each upgrade: dishwasher, fridge, clothes washer & dryer
- Quantify GHG and imbedded energy reductions as well

Sub-Metering Insight

- Monitoring water heater will enable measurement of upgraded showerheads
- Plenty of data on toilet consumption as a proportion of indoor water use



Toilet Consumption

- Will measure flush volume at beginning, 6 and 12 months
- This will measure stability of savings



Sub-Metering Status

- Tendering = 6 month delay
- 20 sub-metered homes recruited
- Equipment ordered
- Organized two information sessions, each for 10 homes (10 Study & 10 Control)
- Installations to begin early June
- Will monitor through May 2006

Qualitative Measures

- Tribute establishes 'community' meetings soon after people move in
- Provides troubleshooting & educational opportunities
- Will give customer satisfaction feedback on fixtures and appliances
- Can quantify cost of the builder's customer callbacks in Study & Control areas

Project Costs

- Appliance upgrades: \$75,000, split 4 ways
Durham, NRCan, Tribute & 4th
- Landscape upgrades: \$45,000, split, Durham
(\$30,000) and Tribute (\$15,000)
- Toilet upgrades: \$64,000, Tribute (\$24,000),
Durham \$40,000
- Sub-metering: \$8,500/home, Durham, NRCan,
4th. (REUS \$5,000/home water only)

Creating a Template

- The first results should be available late 2005, early 2006
- This project will put a price to builder's use of poor toilets (outside Study Area)
- Tell us how people like the new fixtures & appliances
- Tell us what info people need to optimize efficiency

Creating a Template

- Will hopefully prove the efficacy of choosing these fixtures and appliances to both home owners and home builders
- Plan to hold meetings with other builders once the results come in
- Hope the economic & marketing benefits will lead other builders to choose efficiency

Creating a Template

- Provide real-world data on ENERGY STAR® appliances
- Benefit/cost ratios for all changes to show where municipal subsidies make sense
- Direction for tightening Regional Standards in new homes to increase efficiency
- Additionally, Unified North American Requirements (UNAR) to sustain toilet-derived savings

Thank You

- Questions?
- Glen.pleasance@region.durham.on.ca