

# Green Affordable Housing Summit

## Breakout 1C – Innovative Green

Jim Steele, CEO

Windsor Essex Community Housing Corporation

October 4, 2011



# Mission



- CHC provides well maintained, safe and affordable community housing in a respectful and fair manner. We are leaders in the housing sector and contribute to the development and support of strong communities in the city of Windsor and the county of Essex.



# CHC Quick Facts



- Over 4,700 units under direct management; over 300 rent supplement
- Three programs – Former Public Housing, Family Non Profit, Senior Non Profit
- Over 700 buildings



# CHC Quick Facts

Building Type	Average Age	# of Units (4708)
High Rise apt(10 floors or more)	1974	1024
Mid-rise apt (w elevator 6-9 floors)	1978	969
Low Rise apt (w elevator) 2-5 floors	1970	128
Townhouses/walkups	1974	2327
Houses	1976	260



# Seek Sustainable Partnerships

- CFL resident exchange program.
- Partnerships with SHSC GLOBE initiatives.
- Multi-residential recycling programs with Essex Windsor Solid Waste Authority.
- Community Gardens
- Tenant Engagement



GLOBE

[www.globeservices.ca](http://www.globeservices.ca)





# Now House Windsor 5





- CMHC contacted CHC regarding ongoing work elsewhere. This resulted in a call to the Now House<sup>®</sup>.



# Now House<sup>®</sup>

- Retrofitting existing older houses into net zero energy homes – homes that produce as much energy as they use on an annual basis.
- We needed to identify the most cost-effective, net-zero energy retro fit model for future application to similar homes in the CHC portfolio.







# Now House<sup>®</sup>

Lorraine Gauthier and Work Worth Doing chose a 60 year old wartime house as their first project.

The similar layout and footprint, coupled with a million such houses in Canada. If proven successful provided opportunities to replicate the Now House process.





# Net Zero – How





**WALL INSULATION**



**BASEMENT INSULATION**





**ENERGY STAR Appliances**

- Refrigerator
- Gas range
- Front-loading washer
- Gas dryer





**ENERGY-SAVING  
LIGHTS**



**LOW-FLOW WATER  
FIXTURES**





## **Now House Windsor 5**

### **Heating and Cooling Systems**

**5**

Different approaches  
for each model





## MODEL ONE: 1307 RANKIN AVE

- High efficiency hydronic furnace
- Heat Recovery Ventilator
- Tankless water heater
- High efficiency central A/C.

High efficiency hydronic furnace

Heat Recovery Ventilator

Tankless water heater

High efficiency central A/C



# Model 1 -

***1307 Rankin Avenue, Windsor, ON (Model 1)***

Retrofit:

Base Model +

High efficiency tankless water heater

High efficiency central A/C

High efficiency hydronic furnace

Heat Recovery Ventilator





# Analysis Results Model 1

	Electrical Consumption	Gas Consumption	Water Consumption
Pre-retrofit	6594.12kWh	3050.613 m3	246.27m3
Post-retrofit	5305.22 kWh	1733.852 m3	117.62 m3
% Change	19.5 %	43.2 %	52.2 %
Cost Savings	\$131.56	\$405.25	\$34.22
GHG Reduction	283.56 KgCO2e	2441.45KgCO2e	





## MODEL TWO: 1301 RANKIN AVE

- High efficiency forced air gas furnace
- Heat Recovery Ventilator
- Tankless water heater
- High efficiency central A/C
- Solar photovoltaic system 2.1 kW.

High efficiency forced air gas furnace

Heat Recovery Ventilator

Tankless water heater

High efficiency central A/C

Solar photo voltaic system 2.1 kW



# Model 2 -

Retrofit: **1301 Rankin Avenue, Windsor, ON (Model 2)**

Base Model +

High efficiency forced air gas furnace

High efficiency central A/C

High efficiency tankless water heater

Heat Recovery Ventilator

2.1 kW solar photovoltaic system



# Analysis Results Model 2

	Electrical Consumption	Gas Consumption	Water Consumption
Pre-retrofit	8382.14 kWh	4127.286 m3	459.87 m3
Post-retrofit	4802.38 kWh	1647.025 m3	166.43 m3
% Change	42.71 %	60.1 %	63.8 %
Cost Savings	\$362.63	\$749.09	\$78.06
GHG Reduction	787.55 KgCO2e	4598.73KgCO2e	





High efficiency hydronic furnace ~ Heat Recovery Ventilator

Tankless water heater ~ High efficiency central A/C

Solar thermal system plus storage tank

Solar photovoltaic system 2.1 kW

New ENERGY STAR windows



# Model 3 -

Retrofit: 1291 Rankin Avenue, Windsor, ON (Model 3)

Base Model +

High efficiency tankless water heater

High efficiency central A/C

High efficiency hydronic furnace

Heat Recovery Ventilator

Solar thermal system

2.1 kW solar photovoltaic system

Windows



# Analysis Results Model 3

	Electrical Consumption	Gas Consumption	Water Consumption
Pre-retrofit	10703.64 kWh	3189.614 m3	214.40 m3
Post-retrofit	1692.14 kWh	718 m3	
% Change	84.19 %	77.5 %	
Cost Savings			
GHG Reduction			





## MODEL FOUR: 1283 RANKIN AVE

- High efficiency forced air gas furnace
- Heat Recovery Ventilator
- Tankless water heater
- High efficiency central A/C.

High efficiency forced air gas furnace

Heat Recovery Ventilator

Tankless water heater

High efficiency central A/C





# Model 4 -

- ***1283 Rankin Avenue, Windsor, ON (Model 4)***
- Base Model +
- High efficiency forced air gas furnace
- Heat Recovery Ventilator
- Tankless water heater
- High efficiency central A/C



# Analysis Results Model 4

	Electrical Consumption	Gas Consumption	Water Consumption
Pre-retrofit	5432.28 kWh	3312.986 m3	165.44 m3
Post-retrofit	3900.40 kWh	1468.859 m3	193.78 m3
% Change	28.2 %	55.6 %	- 17.1 %
Cost Savings	\$155.18	\$589.76	-\$7.54
GHG Reduction	337.02 KgCO2e	3419.26KgCO2e	





## MODEL FIVE: 1275 RANKIN AVE

Post monitoring phase the following will be added:

- High efficiency forced air gas furnace
- Heat Recovery Ventilator
- Tankless water heater
- High efficiency central A/C.

Post monitoring – following has been added  
High efficiency forced air gas furnace  
Heat recovery Ventilator  
Tankless water heater  
High efficiency central A/C



# Model 5 -

- **1275 Rankin Avenue, Windsor, ON (Model 5)**

## Retrofit:

Base Model (excluding 4 appliances)

In June 2010 the following was added;

High efficiency forced air gas furnace  
High efficiency central A/C

Heat Recovery Ventilator



# Analysis Results Model 5

	Electrical Consumption	Gas Consumption	Water Consumption
Pre-retrofit	12557.28 kWh	2912.440 m3	229.93 m3
Post-retrofit	10373.50 kWh	1516.136 m3	166.30 m3
% Change	17.4 %	47.9 %	27.7 %
Cost Savings	\$228.55	\$420.25	\$16.93
GHG Reduction	480.43 KgCO2e	2588.94KgCO2e	



The Five Retrofits after one year of operation showed considerable savings from a utility, economic and emissions perspective. The following table is a summary of our findings.

Model House	Electrical Reduction	Electrical Savings	**PV Electrical Generation	**PV Earnings	Gas Reduction	Gas Savings	Water Reduction	GHG Reduction (KgCO2e)
1	19.5 %	\$131.56	n/a	n/a	43.2 %	\$405.25	52.2 %	2725.01
2	42.7 %	\$363.63	655.99kWh	\$526.10	60.1 %	\$749.09	63.8 %	5530.60
3*	84.2 %	-	552 kWh	\$463.70	77.5 %	-	-	-
4	28.2 %	\$155.18	n/a	n/a	55.6 %	\$589.76	-17.1 %#	3756.28
5	17.4 %	\$228.55	n/a	n/a	47.9 %	\$420.25	27.7 %	3069.37

\* Savings have been influenced by the absence of occupants due to the house functioning as a demonstration house.

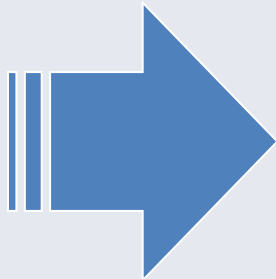
\*\* The PV generation & earnings represents three months of data only.

# Negative value represents an increase in usage.



# Post Retrofit

NHW5	EGH- Pre-Retrofit	EGH Post-Retrofit
Model 1	18	77
Model 2	35	79
Model 3	28	79
Model 4	55	81
Model 5	55	74



Model 2 proved most

- ✓ cost effective
- ✓ energy savings
- ✓ operating savings
- ✓ CO2 reduction



# Impact

- Saving Energy
  - ✓ in all five houses
  - ✓ 2 houses achieving net-zero energy cost
- Simplified the process of replication
- Improved affordability







- Testing 5 different energy reduction models for potential application to 125 other homes.
- Provide range of templates for easy replication.
- NHW5 employed 15 Windsor companies during the retrofit.
- Building materials and products were purchased locally wherever feasible.



**Now House**<sup>®</sup>



# Affordability

From \$85 K to \$35 K

The addition of solar PV to the homes would increase cost per house by \$25,000 – approx. \$35,000

2008 Toronto

- First Now House
- Near net-zero energy retrofit
- CMHC Equilibrium Sustainable Demonstration Housing Initiative
- Cost \$ 85,000

2010  
Windsor

- Now House Windsor 5
- Model 2 net-zero-energy cost home
- Cost \$66,000

2011 Windsor

- 95 homes in portfolio
- Replicated Model 2 (minus solar)
- \$10,730 after grants and rebates \$7,182 per house
- Design allows for later installation of solar





# A net-zero energy cost home for \$35,000

- That's a marketable message and affordable retrofit process

Lorraine Gauthier

Work Worth Doing Now House project



# Now House® Windsor 5



- “We are committed to working with tenants and community partners to make our portfolio greener,” said Jim Steele, CEO of Windsor Essex CHC. “This project gives us valuable experience with implementing energy conservation measures on our existing single-family homes. Windsor Star Oct 28 2009





# Tenant Education

- Manual
- Resident Survey
- Watt Watt Tutsi
- Media engagement, training of residents

## Now House Windsor 5 Resident Survey

1. How long have you lived in this house in Bridgeview?  
 Less than 1 year  
 1 year to 3 years  
 3 years to 5 years  
 More than 5 years
2. How many people live in your household?
3. How old are the people who live in your house?  
Number    Age  
        1 - 14 years  
        15 - 24 years  
        25 - 64 years  
        65 years and older
4. Check the categories that best describes your occupation and employment?  
 Office/clerical  
 Health care  
 Sales or service  
 Education  
 Trades  
 Homemaker  
 Other  
 Full-time employment



# Resident's Handbook



  
**Now House Windsor 5**  
Resident's Handbook

Sponsored by:  
**OPA**  
Ontario Power Authority



Good management of windows and doors can save a lot of energy in winter and in summer. Always be sure your windows are in good repair. If there is a hole or crack in a window, call Window Issues CAC to have it repaired.





# Market Value

“Project outcome is a cost-effective, replicable, net-zero energy cost retrofit process.”

Lorraine Gauthier, Now House

Submission to:



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