Reduction of Consumption

How Buildings and Their Users Can Help the Grid

Dr. Russell Richman, Assistant Professor, Building Science
Department of Architectural Science
RYERSON UNIVERSITY

CUE Seminar Series
Smart Grid Solutions for Sustainable Buildings
January 26, 2012

The Motivation and Driving Factors

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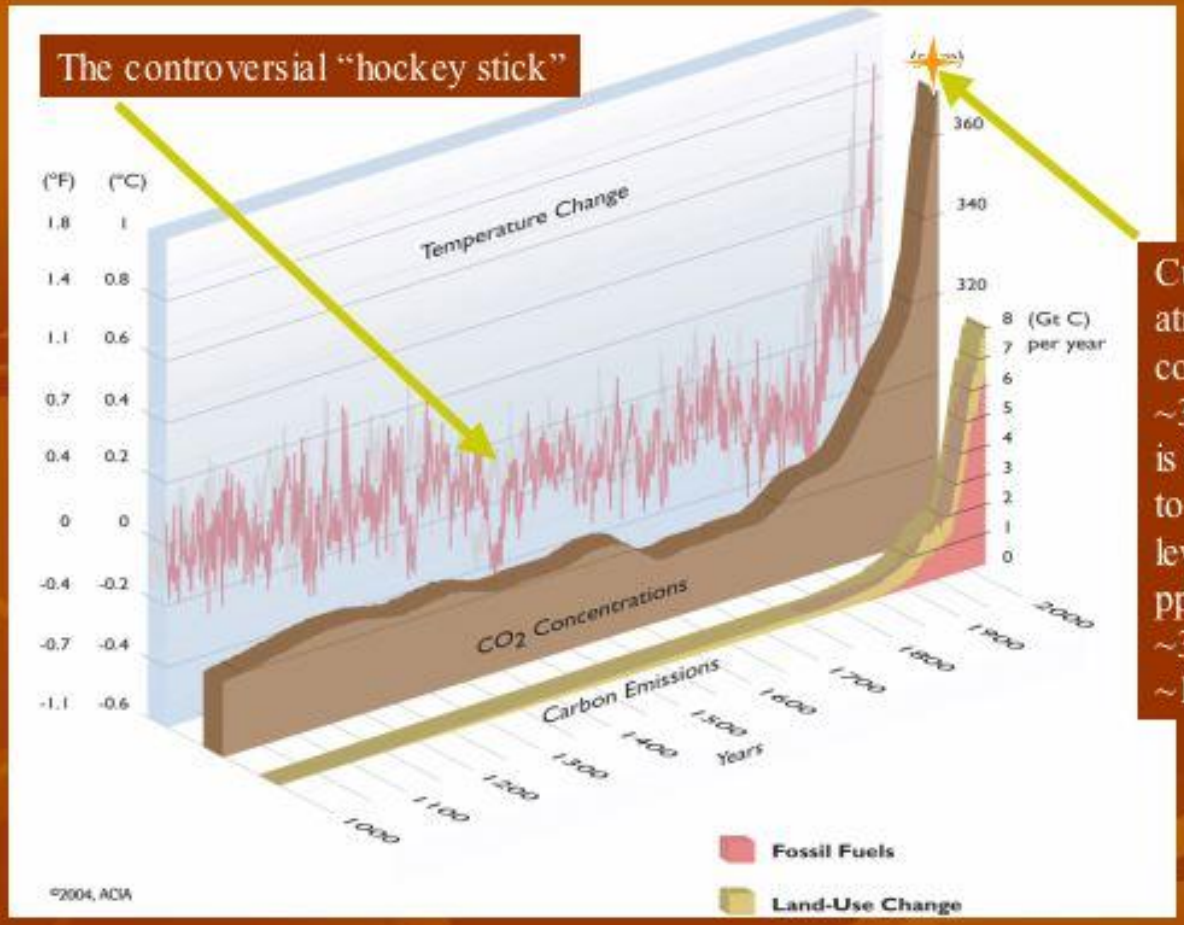
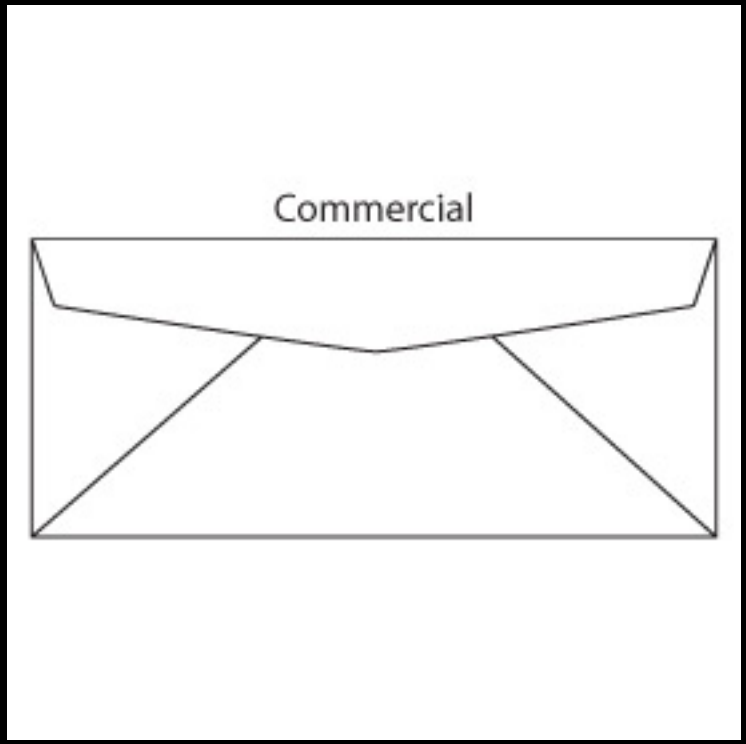


Current, 2007, atmospheric CO2 concentration is ~383 ppmv, which is to be compared to the pre-industrial level of ~280 ppmv, an increase of ~36% over the past ~160 years

That global warming would be caused by increasing CO2 levels was predicted by the Nobel chemist Arrhenius~1840

The Problems


Commercial

TORONTO Building

North York District
5100 Yonge Street
Toronto, Ont. M2N 5V7
Tel: (416) 395-7541
Fax:(416) 395-7589

BUILDING PERMIT

This card must be kept posted in a conspicuous place on site of construction.

09 140892 BLD 00 BA

It Makes Sense to Conserve

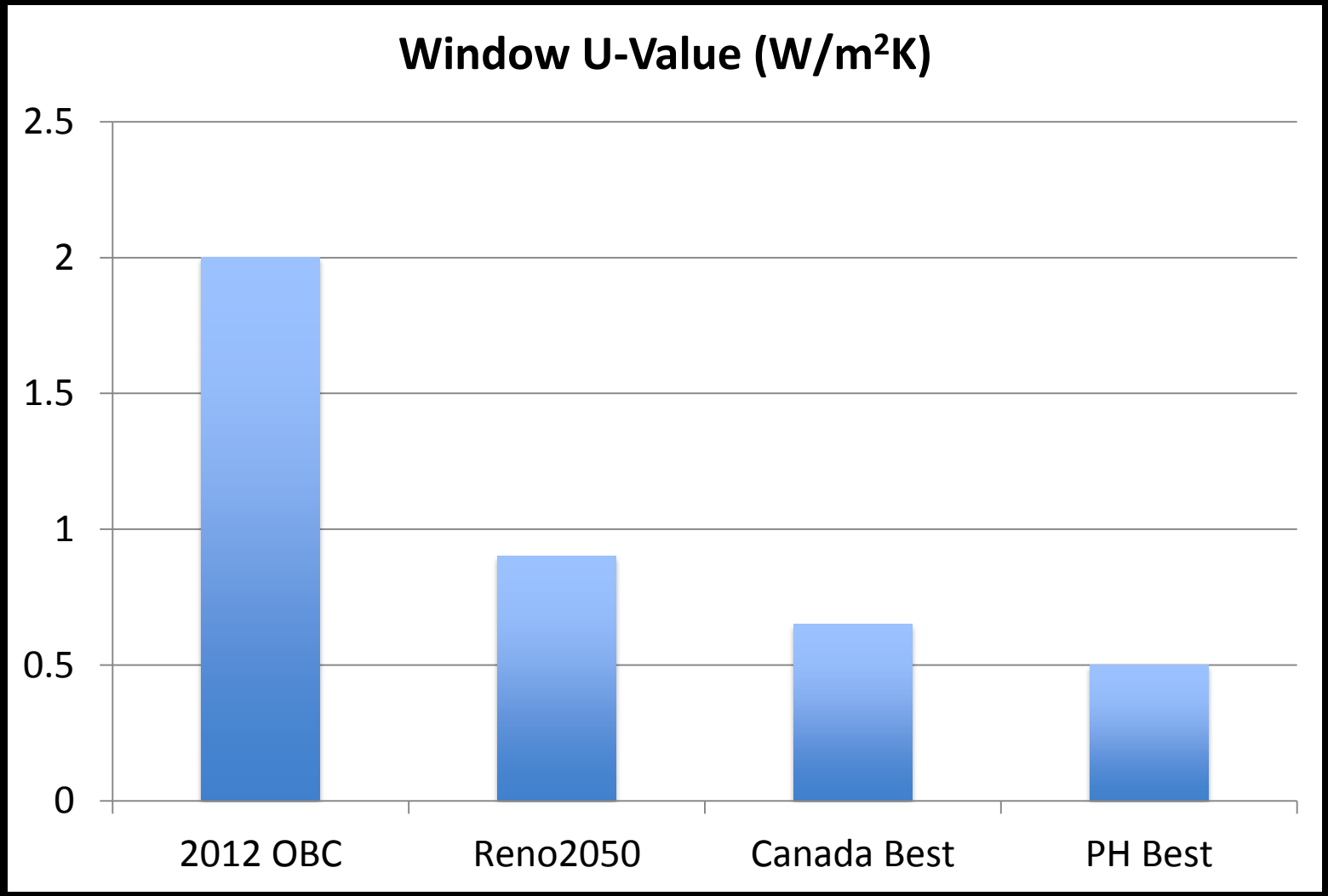
Capital Costs of Electricity Generation

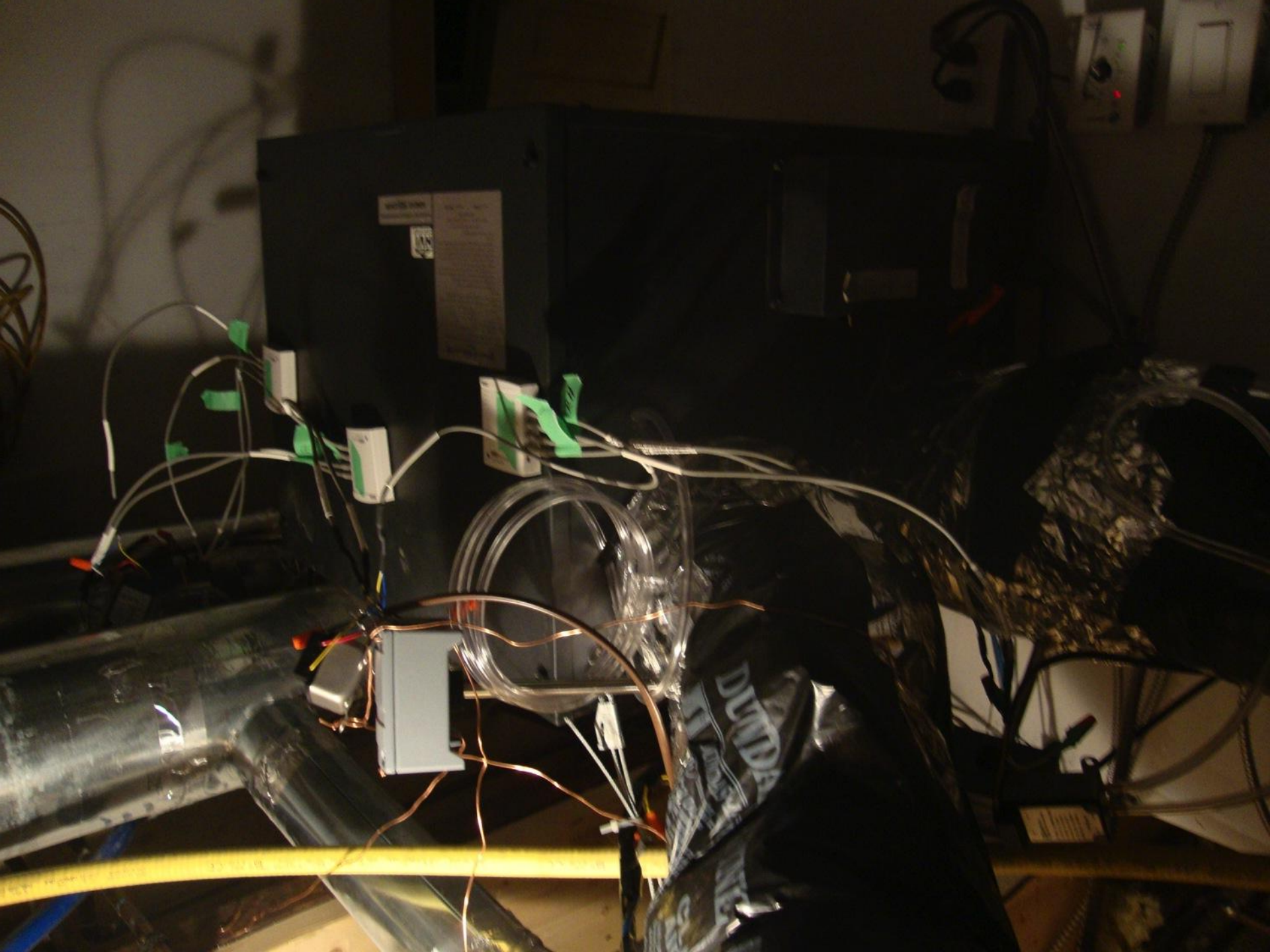
The California Energy Commission + Connecticut Integrated Resource Plan CC&C = Carbon Capture and Storage	***Capital Cost (US$/kW)***
Nuclear	2000- 5000
Supercritical Coal + CC&S	3500 - 4500
Gas-combined cycle + CC&S	1400- 1600
Gas combined Cycle	850- 950
Fuel Cell	3,500- 10,000
Photovoltaic	4,500- 6,000
Wind Turbine	800- 3,500

Capital Costs of Electricity Conservation

The California Energy Commission + Connecticut Integrated Resource Plan CC&C = Carbon Capture and Storage	***Capital Cost (US$/kW)***
Seal Ducts	1,500
Insulate Basement	1,500
Install Programmable Thermostat	1,300
Insulate Attics	2,000

We Have the Technology


Window U-Value (W/m²K)
2.5
2
1.5
1
0.5
0
2012 OBC
Reno2050
Canada Best
PH Best



The Low Hanging Fruit
(the first 10%)


50
60
70
80
50
60
70
80


OFF

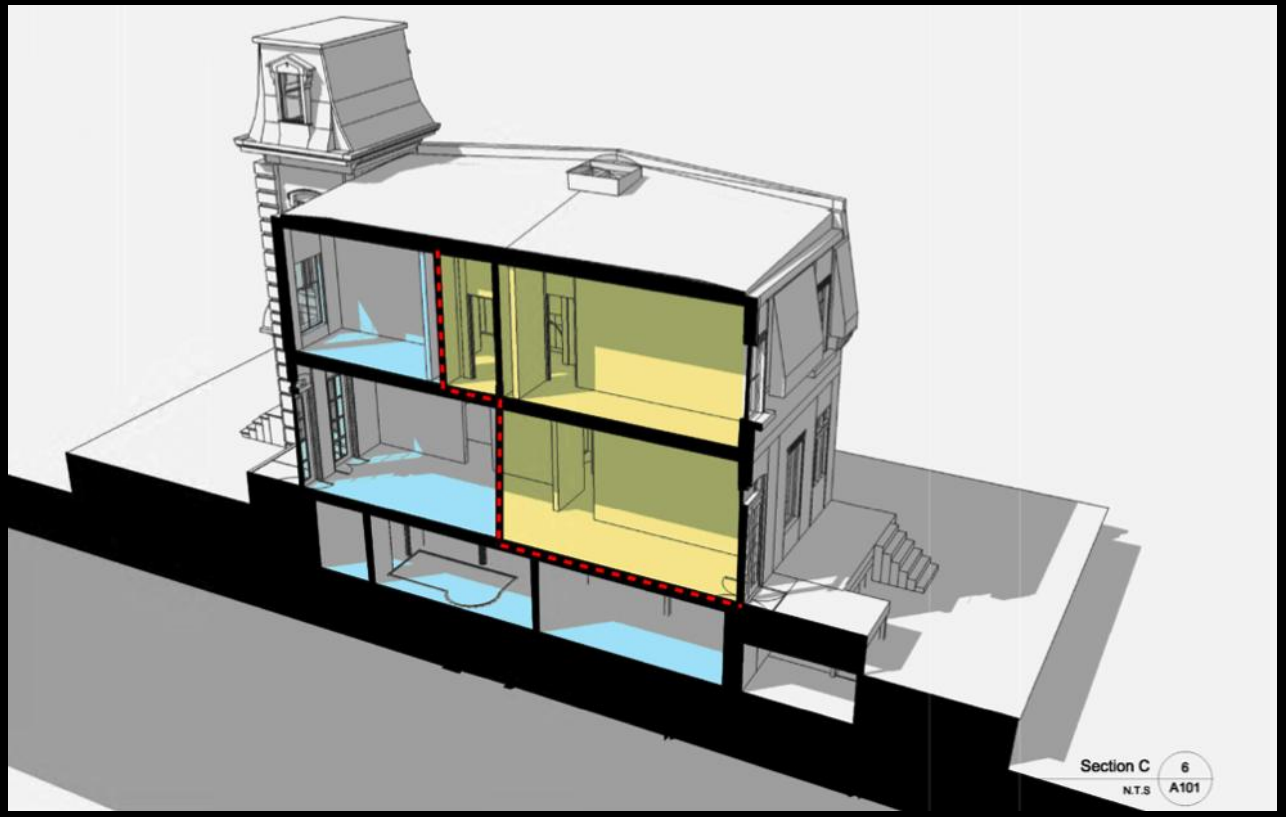
Elements Requiring More Effort (the next 10%)

100%

A Lofty Goal
(getting to 80% or 90%)

Legislation

Innovation


Section C
N.T.S
6
A101

- Below Grade Preheating Water
- Earth Tubes Preheating Air
- Passive Heating and Cooling
- ‘Black Box’ Mechanical Systems

What We Need
(the research)

Data

Understand the User

Constructability

Cost

Policy

RYERSON UNIVERSITY

thank you

richman@ryerson.ca

References

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