

WELCOME TO

BUILDING *smart* #12

SPRING 2010



CHANGES TO PART 10 *of the*
BC BUILDING CODE *and* EMERGING
GREEN TECHNOLOGIES

Brought to you by:



Homeowner
Protection Office

Branch of BC Housing

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Presented by:

Murray Frank

Constructive Home Solutions Inc.

BRITISH COLUMBIA BUILDING CODE



Changes to Part 10 of
the BC Building Code

Emerging Green Technologies

Ancient Codes

- If a builder builds a house for someone, and does not construct it properly, and the house which he built falls in and kills its owner, *then the builder shall be put to death*
- Code of Hammurabi (1796 - 1750 BC), *Babylonian Law*



Ancient Codes

An ancient builder seeking interpretation of the code?



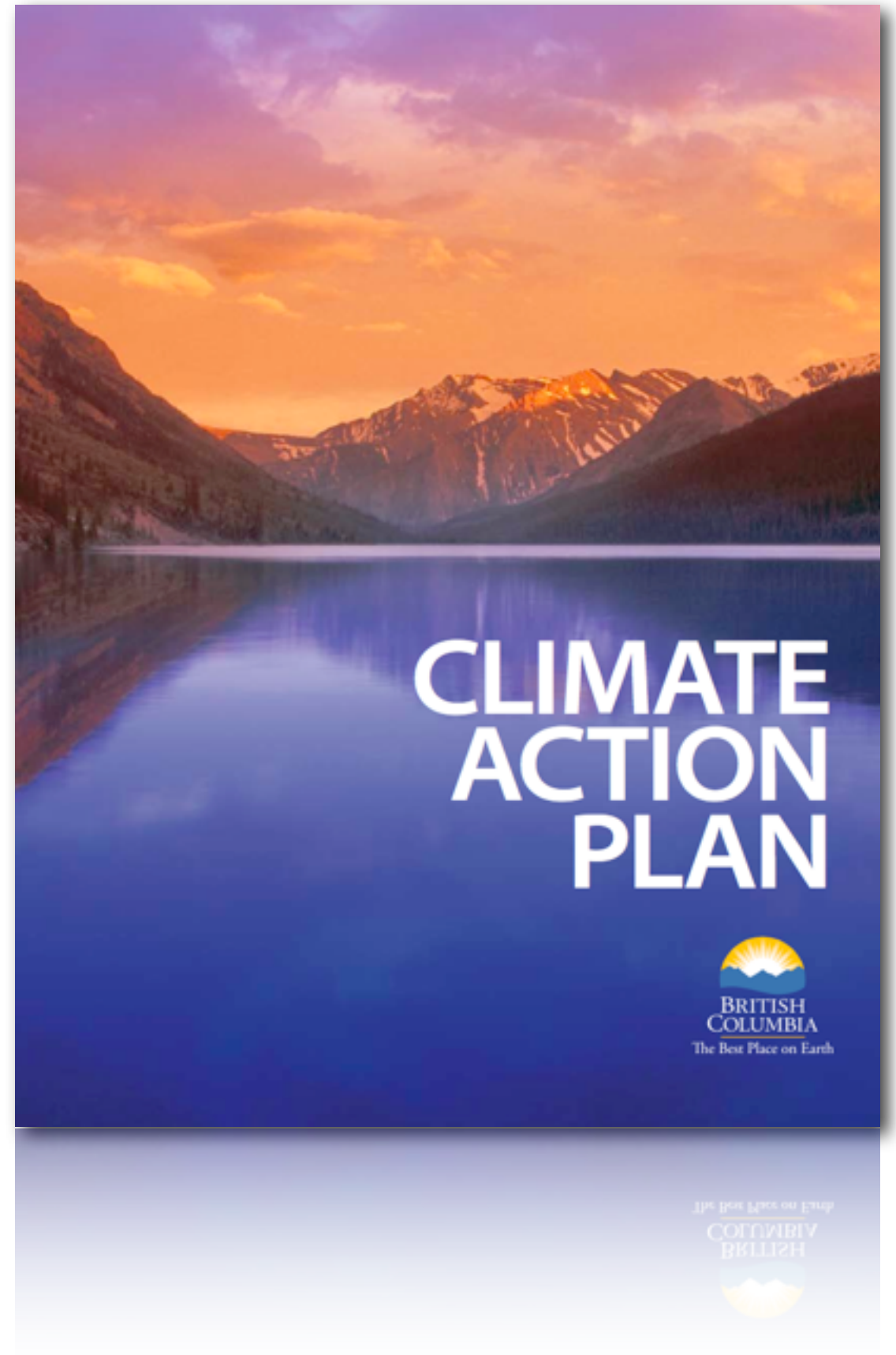


What Changes Are
Anticipated and When?

This is What is Being Discussed

The Plan

- ✓ Start with 2008 code “Greening”
- ⦿ Target EnerGuide 80 for new homes by 2010
- ⦿ Pursue energy labelling of homes at time of sale
- ⦿ To have 100,000 solar roofs by 2020
- ⦿ Supply 50% on new water demand through conservation
- ⦿ Mandate Purple Pipes for water reuse by 2010



Recently Added: A Challenge to Industry

- Net Zero houses for Green House Gasses
- Net Zero ready houses for energy
- By 2020

My ministry is currently working towards mandating Energuide 80 energy performance for housing. By 2020, my challenge to you is to be building housing that is net zero for GHG emissions with superior airtightness and insulation that will enable net zero energy performance through the addition of renewable energy generation such as solar panels.



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The Best Place on Earth

Message from the Minister

Our homes account for 13 per cent of energy use and a significant proportion of greenhouse gas emissions in BC. The housing we build today and the energy loads it represents will still be with us many years from now. It is imperative that we move aggressively to reduce the energy demands and GHG emissions for new housing.

We began the job in 2008 as a first step in the greening of the building code. We've seen some improvement. We have to do better. We also need more certainty that our energy and climate change objectives are being met consistently across the province.

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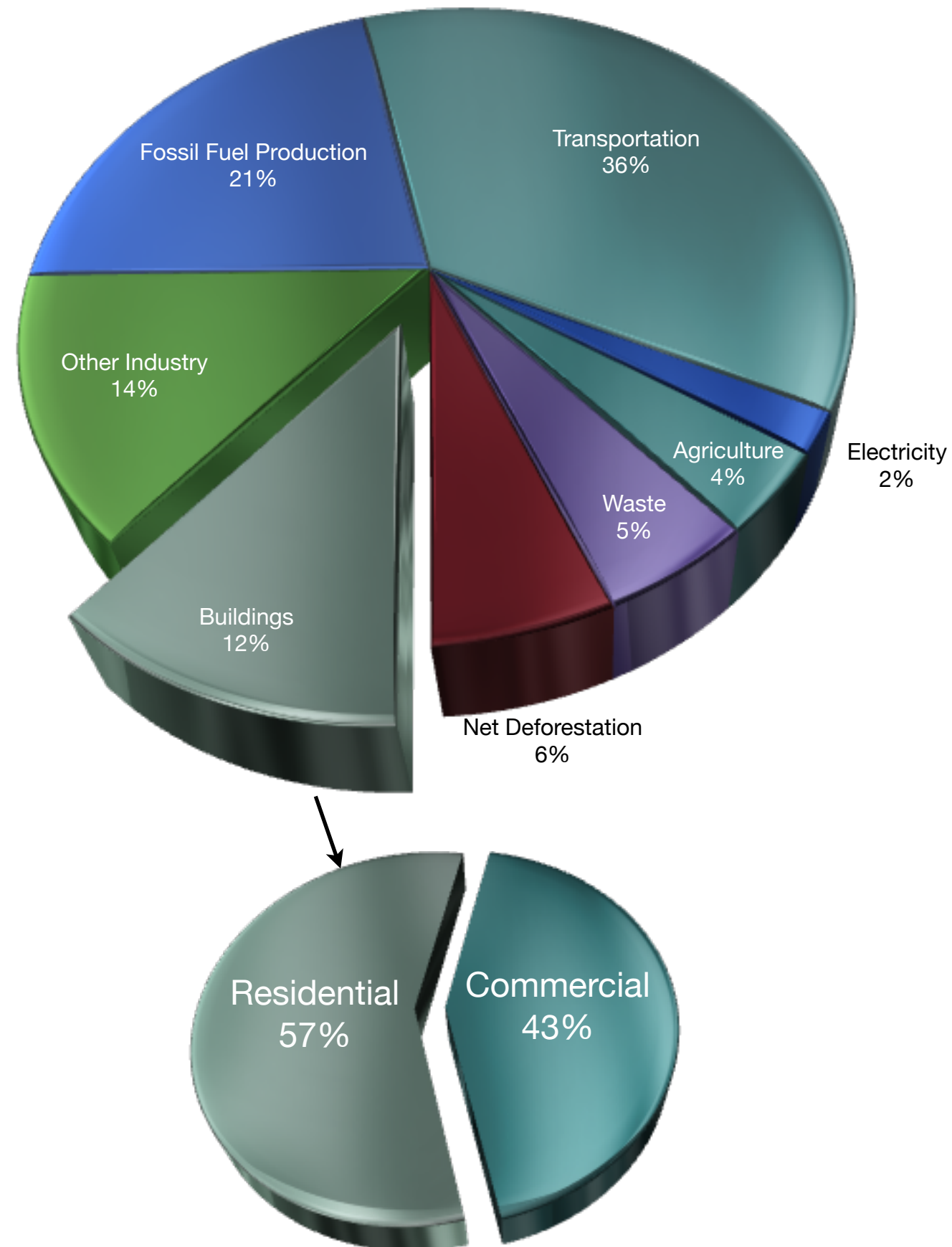
To get there we will need to do a lot of things differently. We know it can be done. BC has a wealth of pioneering builders who are mastering the art of the net zero home from multi-unit buildings such as the Olympic Village and Dockside Green to the CMHC Equilibrium demonstration homes in Burnaby and Kamloops. We can learn from their experiences.

This next step up in housing energy efficiency is an important one, marking the beginning of a significant change in the culture of the residential construction sector. BC can be a leader and maintain our economic strength through challenging times by stepping boldly towards a greener economy and our home builders can help lead the way.

Greenhouse Gas

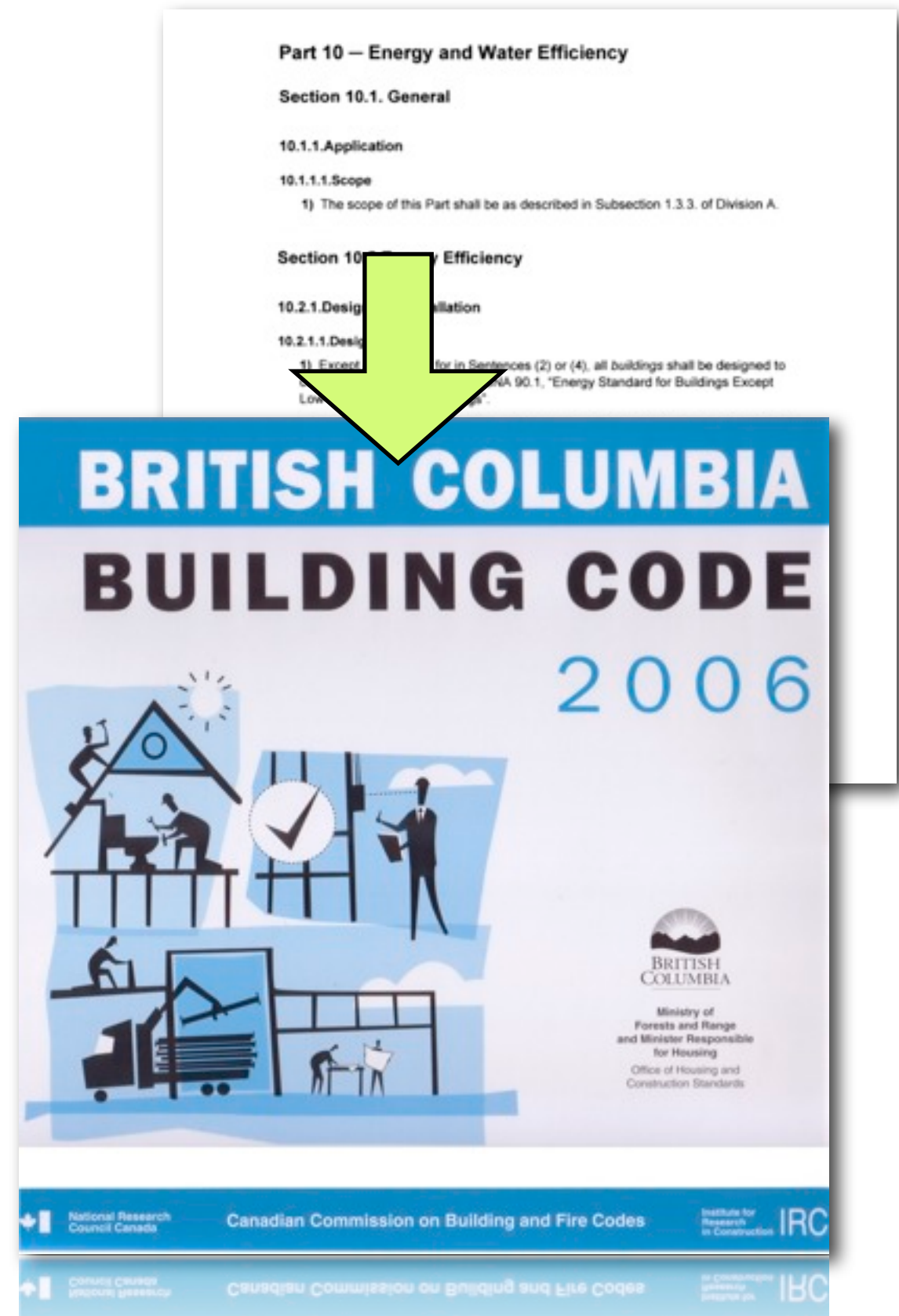
- Buildings contribute significant GHG to our environment

B.C. Greenhouse Gas Emmissions (2006)



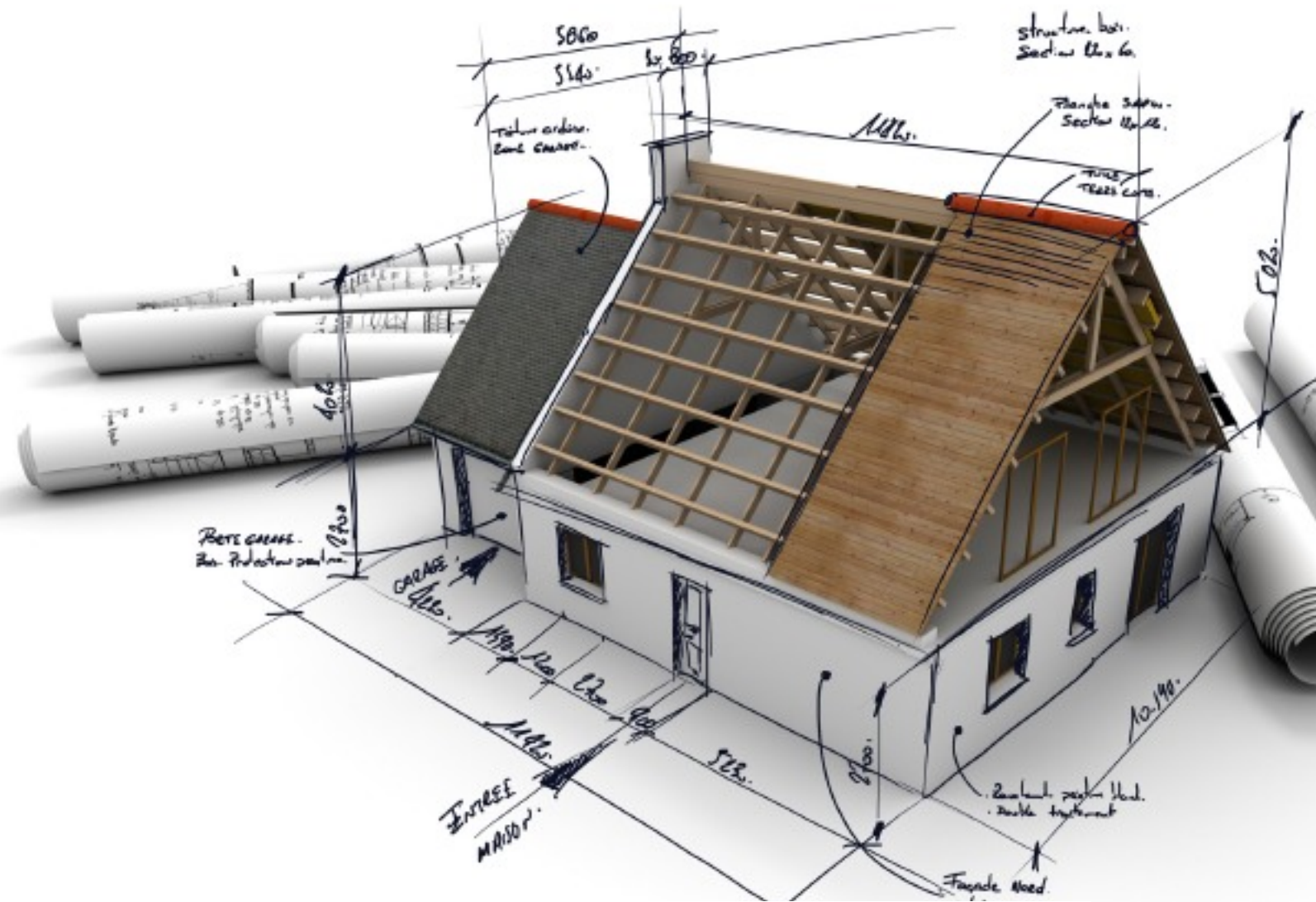
2008 - The First Steps

- ✓ Increased insulation levels for small structures
- ✓ Provided an alternate, performance path to EnerGuide 77
- ✓ Adopted ASHRAE 90.1 (2004) for larger buildings
- ✓ Low-flow toilets and other water saving plumbing fixtures
- ✓ Announced further changes coming including greywater recycling and lighting sensors.

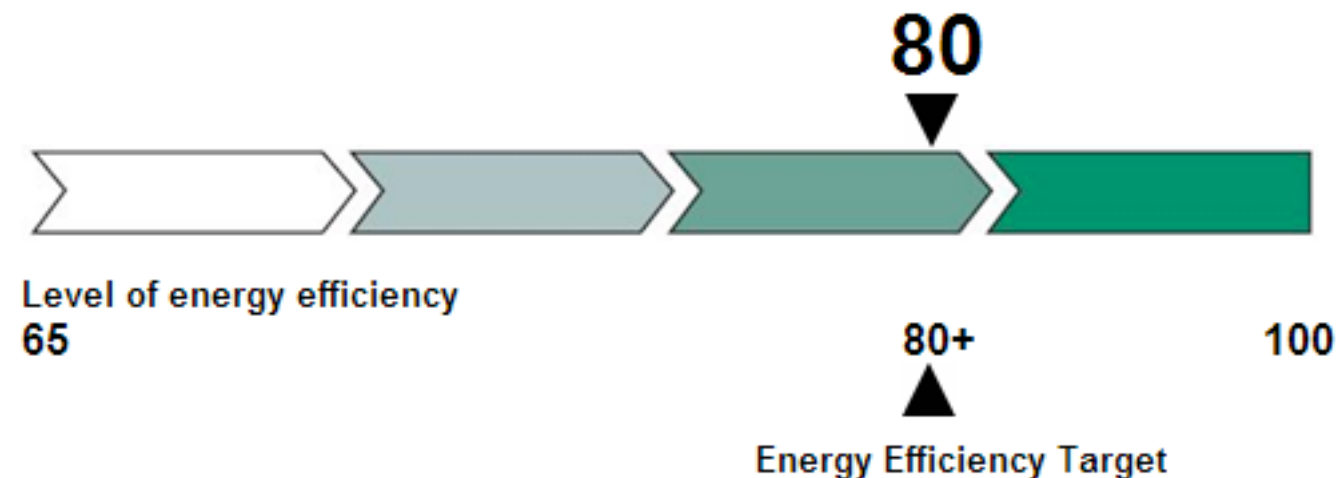


The Next Steps

- Target EnerGuide 80 for new homes by 2010
 - Provisions expected in the revisions to Part 10
 - 3 paths:
 - Prescriptive
 - Trade-offs
 - Performance
- All with expectation of achieving EnerGuide 80



Energy Efficiency Evaluation Report



The Next Steps

- Pursue energy labelling of homes at time of sale
 - ▶ Intended for all new and existing homes
 - ▶ Pilot program in some BC Communities



Winter 2009-2010

Time of Sale Home Energy Labelling Pilot
Frequently Asked Questions for Home Sellers & Buyers

BC Hydro 
powersmart

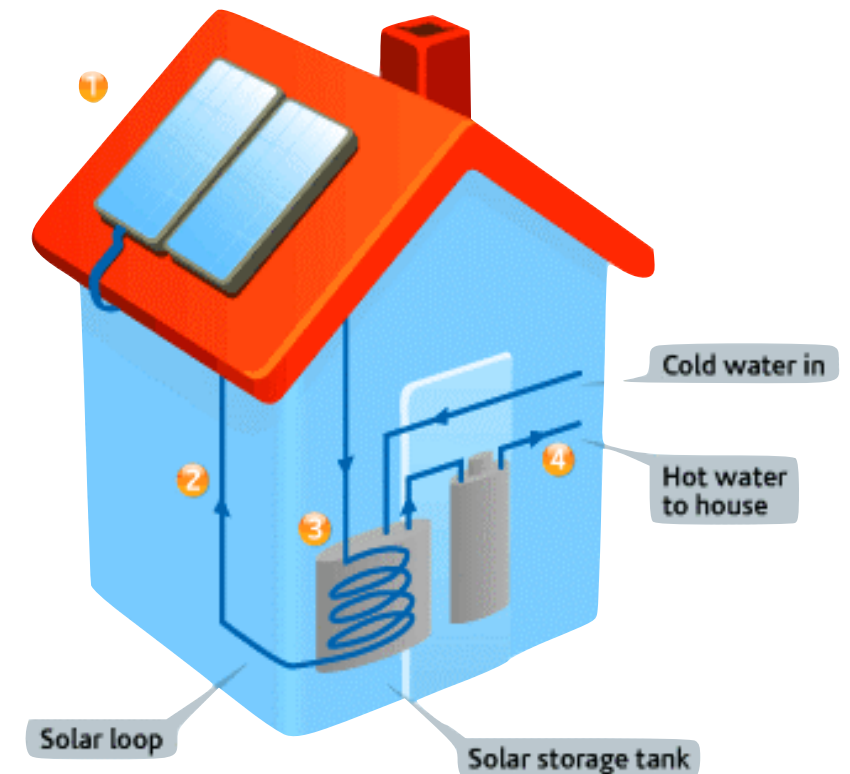
 **Victoria
Real Estate Board**
AN ASSOCIATION OF REALTORS®


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LiveSmart  **BC.ca**

The Next Steps

- To have 100,000 solar roofs by 2020
 - ▶ Solar thermal used to offset hot water costs
 - ▶ Solar photovoltaic (PV) used to generate power
 - ▶ Some grants and incentives available



The Next Steps

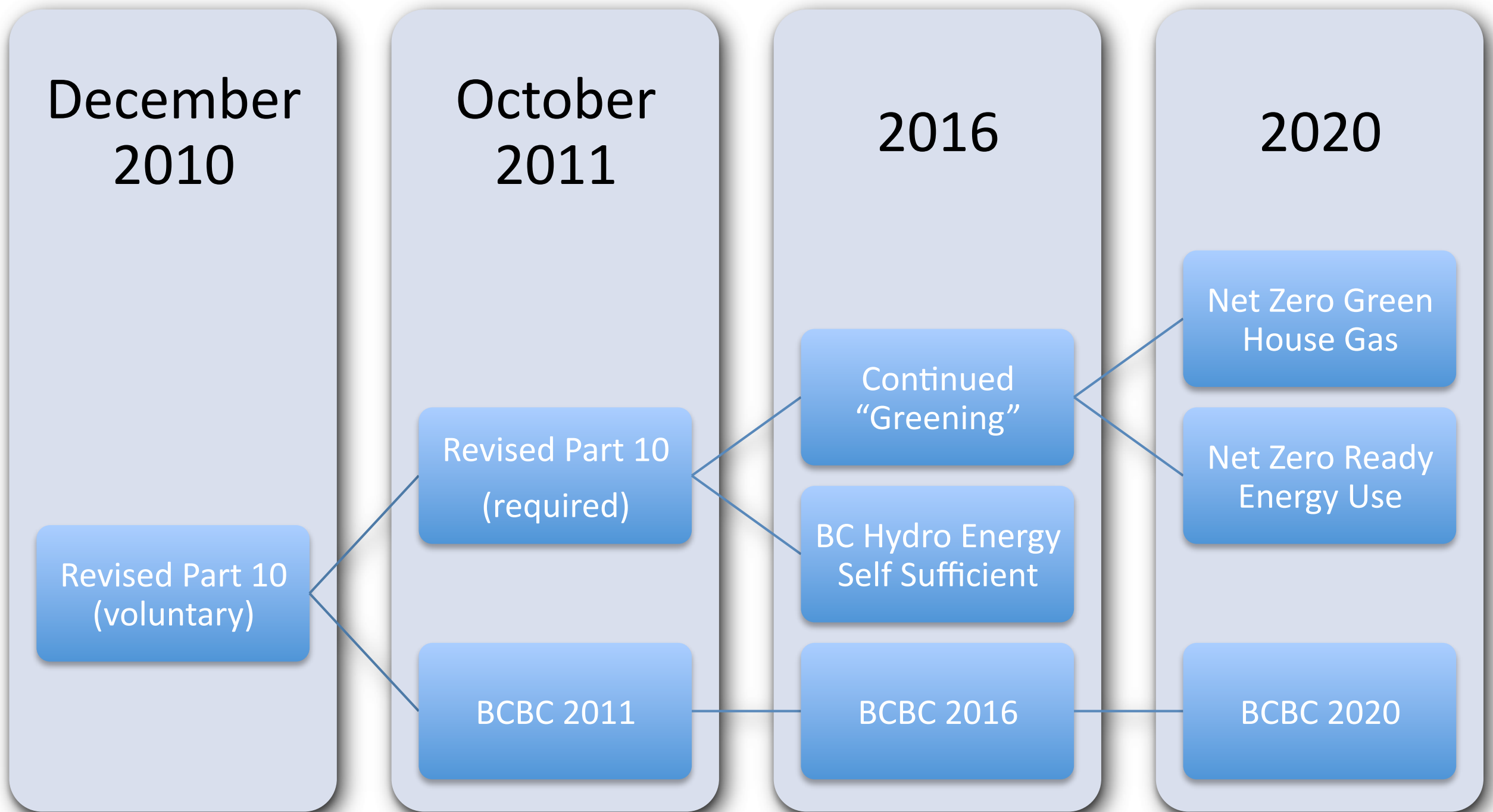
- Supply 50% of new water demand through conservation
 - ▶ Can not be implemented by code alone
 - ▶ Building & Safety Standards Branch, Ministry of Environment and others developing a framework
 - ▶ Promote treatment standard such as CSA B128.3 (Fall 2010)
 - ▶ Code will *allow* use of non-potable water systems
 - ▶ Code will *require* connection to centralized system, if present
 - ▶ Purple Pipe not mandatory yet





When?

Anticipated Dates for Codes



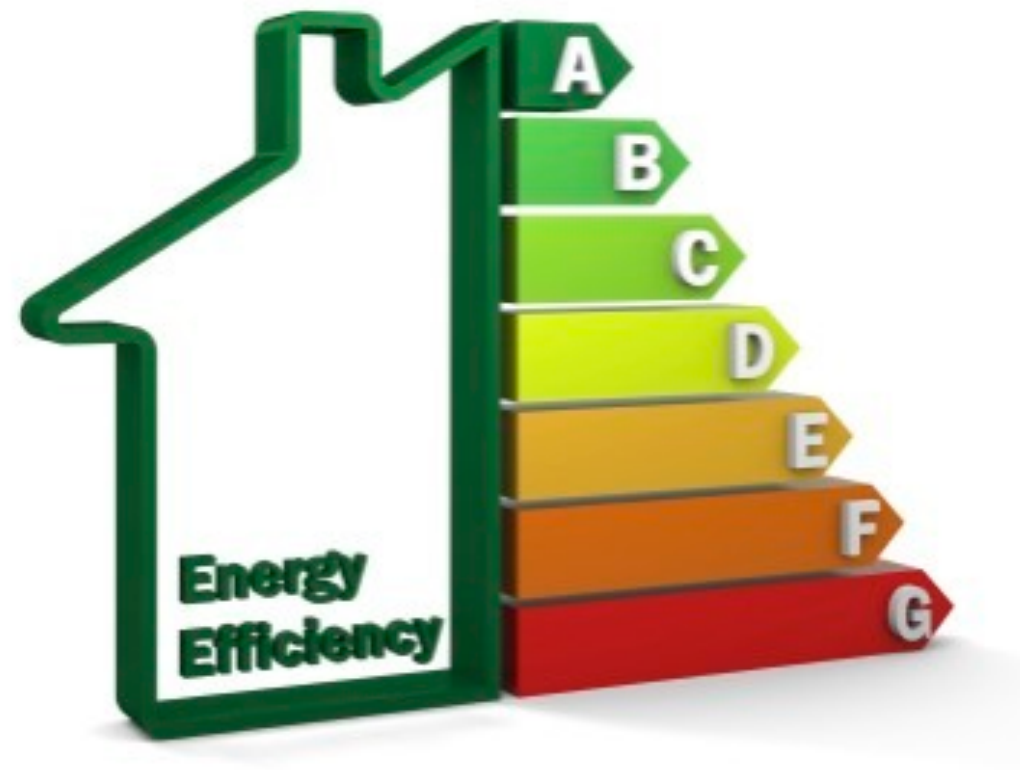
Key Target Dates

The Dates of Significant Changes



Preparing for 2011

New Methods,
Systems & Materials



The First Challenge

Getting to EnerGuide 80

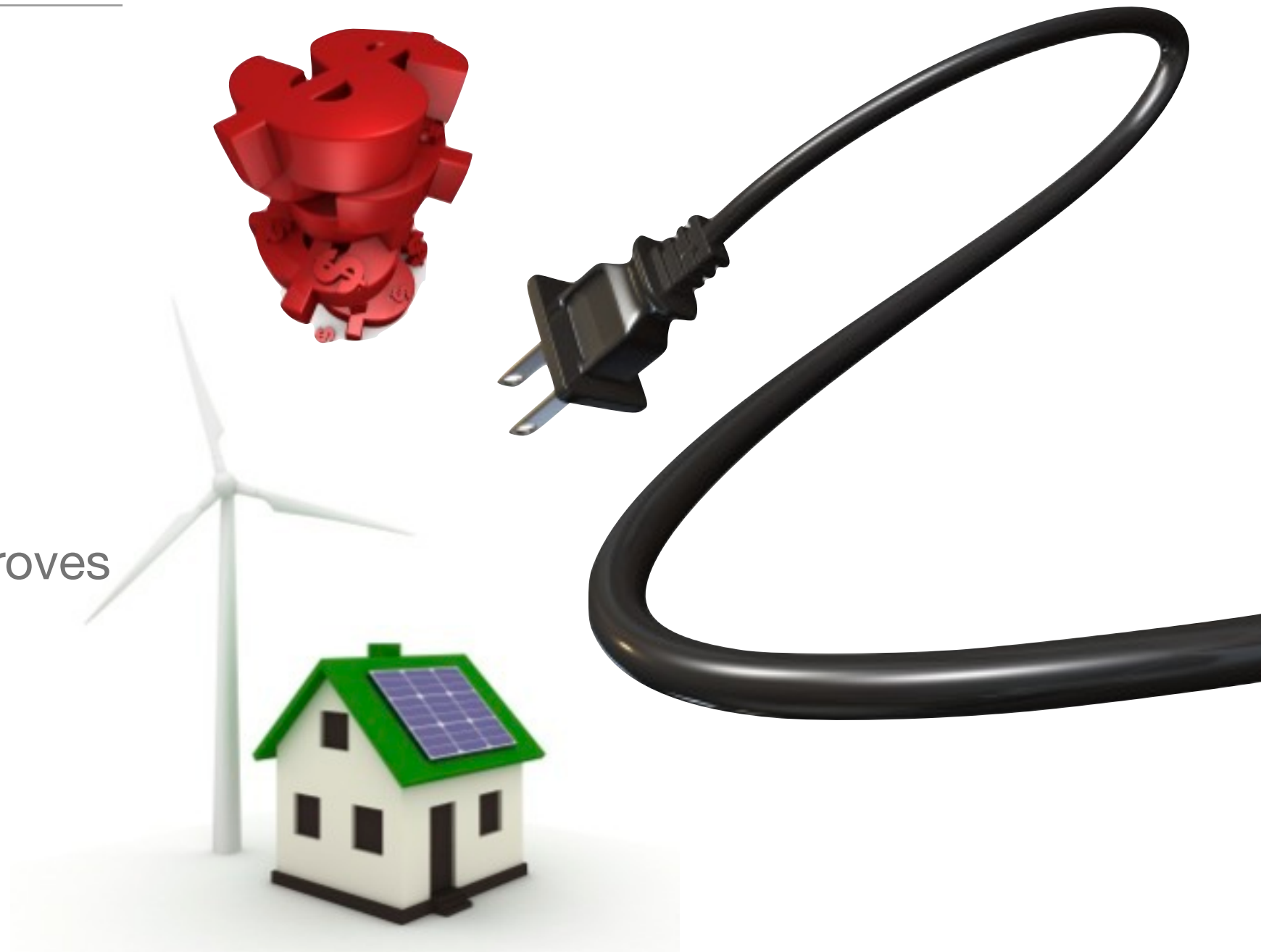
The First Law

- Energy can neither be created or destroyed, it can only change forms
- The energy in equals:
 - ▶ the work done in the home, plus
 - ▶ the energy lost from the home



Energy In

- Two ways to get energy:
 - ▶ Buy it
 - ▶ Take it for free
 - ▶ Any “Free” energy improves the EnerGuide rating



Energy Use

- Reducing energy consumption within the home:
 - ▶ More efficient mechanical systems
 - ▶ More efficient electrical devices
 - ▶ More efficient lighting



Energy Loss

- Reducing energy loss from the home:
 - ▶ More insulation
 - ▶ Higher efficiency windows
 - ▶ Improve airtightness
 - ▶ Heat recovery ventilators
 - ▶ Reduce thermal bridging



- Prescriptive:

- ▶ High insulation
- ▶ Significant airtightness (may require testing)
- ▶ Possibly HRV

- Trade-offs:

- Insulation / windows / air tightness (with testing) / HRV / mechanical efficiency

- Performance:

- EnerGuide 80 or equivalent



Energy Efficiency Evaluation Report

80



Level of energy efficiency
65

80+

100

Energy Efficiency Target

Builders Questions Stakeholder Meetings

- What changes would need to take place to achieve a minimum energy efficiency rating?
- What are the costs?
- If EnerGuide equivalent is required for new homes:
 - Will a blower door test be required, and are enough practitioners available?
 - If blower door testing is not required, who would be liable if a house is later found to be below the mandated requirement?

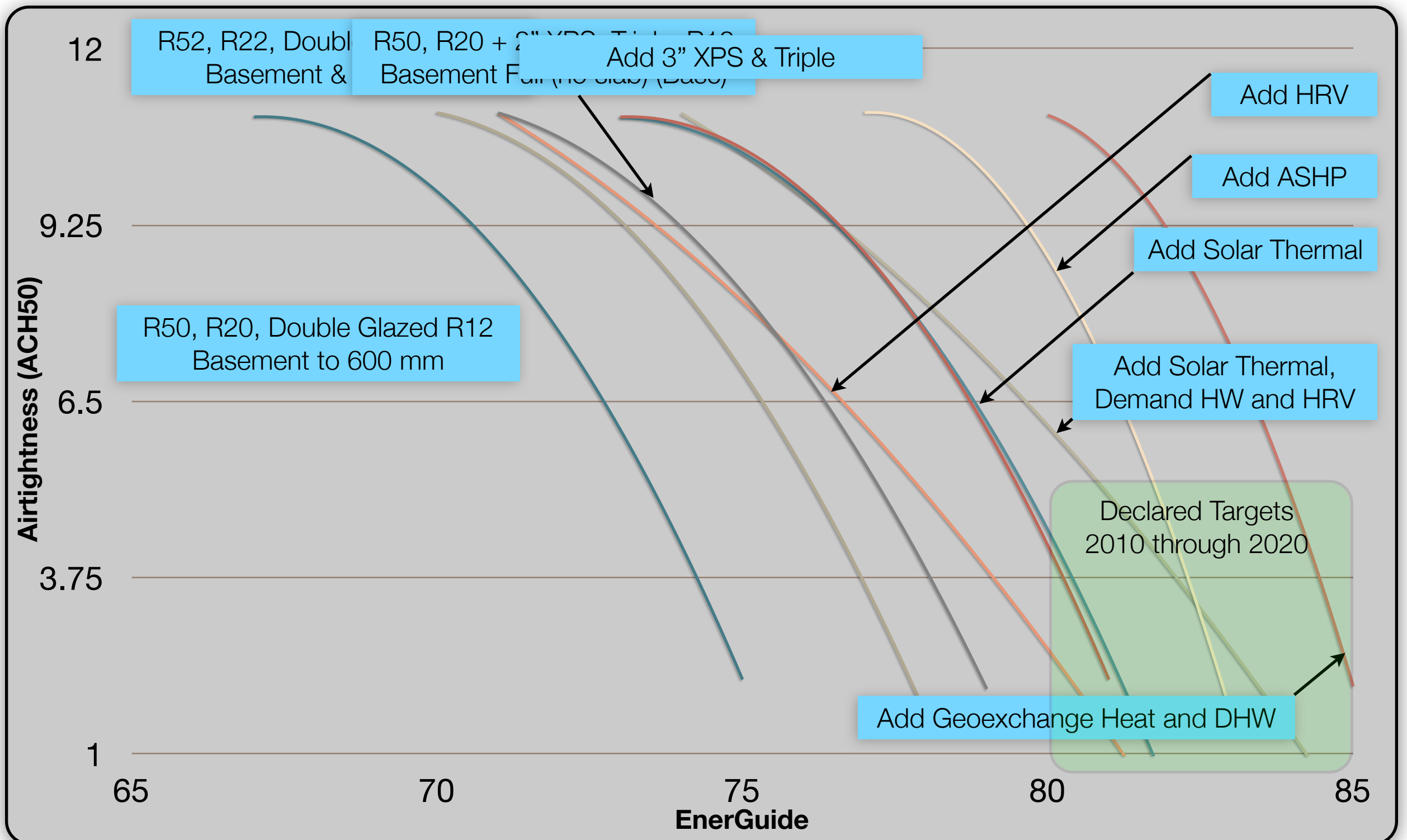


The Tools for Energy Efficiency

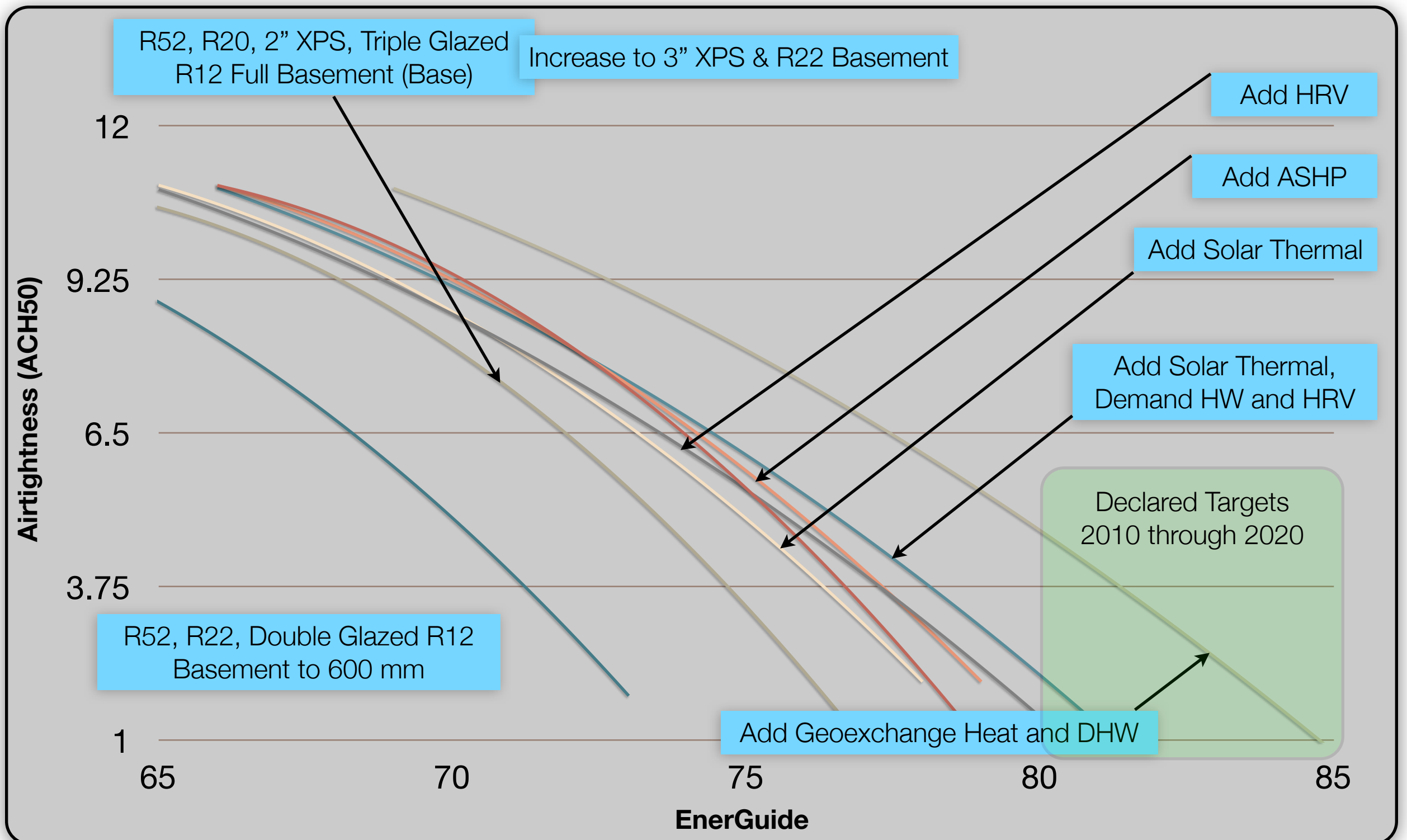
- Windows
- Heat Source
- Heat Pumps
- Air Tightness
- Heat Recovery Ventilation
- Solar
- Energy Efficient Lighting
- Alternate Structural Systems
- Advanced Insulation Systems



Exploring Airtightness Vs. EnerGuide, Lower Mainland Case Study



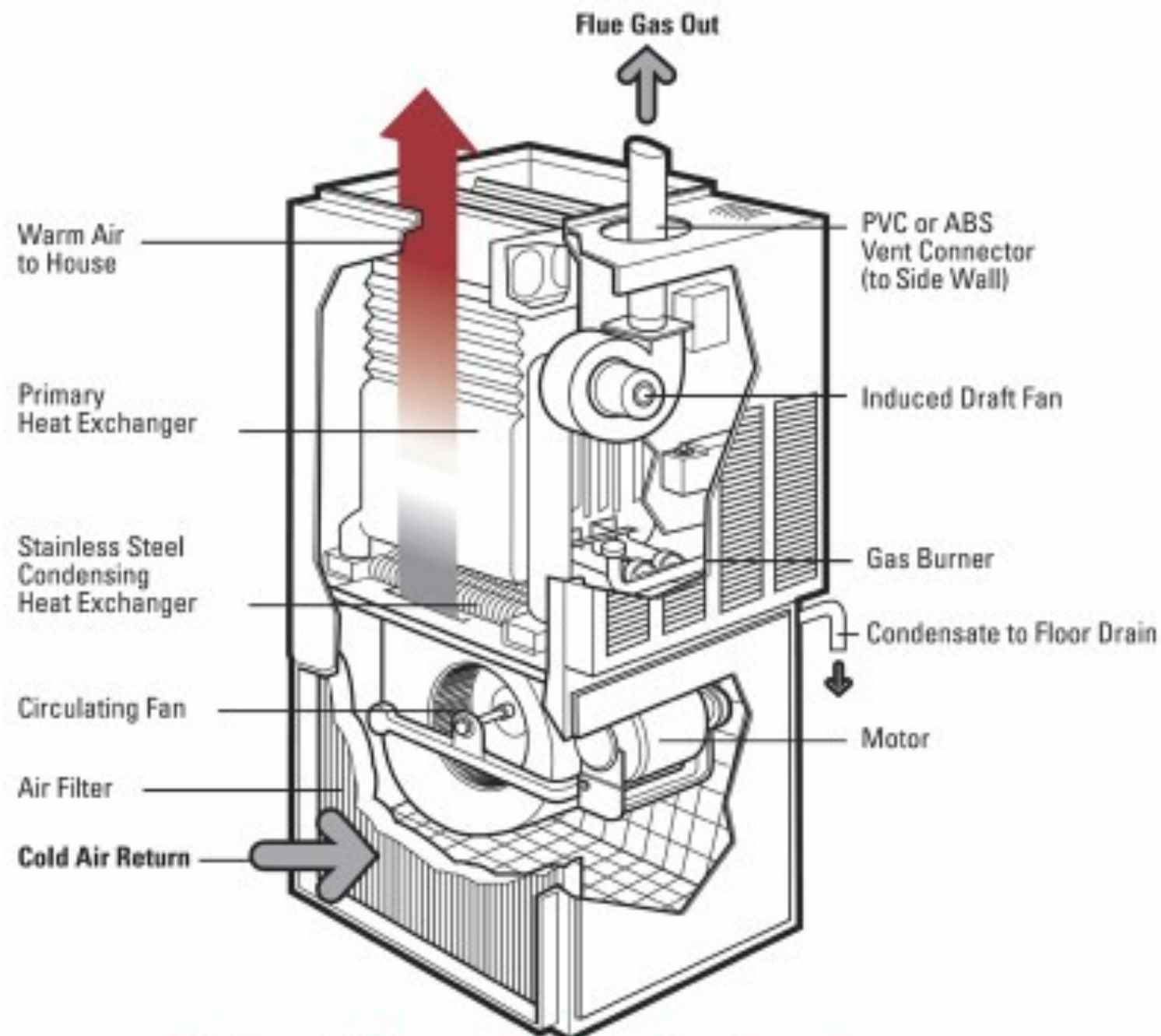
Exploring Airtightness Vs. EnerGuide, Prince George Case Study



High Performance Windows



Condensing Furnace



High-efficiency Condensing Gas Furnace

Natural Resources Canada's Office of Energy Efficiency

Air Source Heat Pump



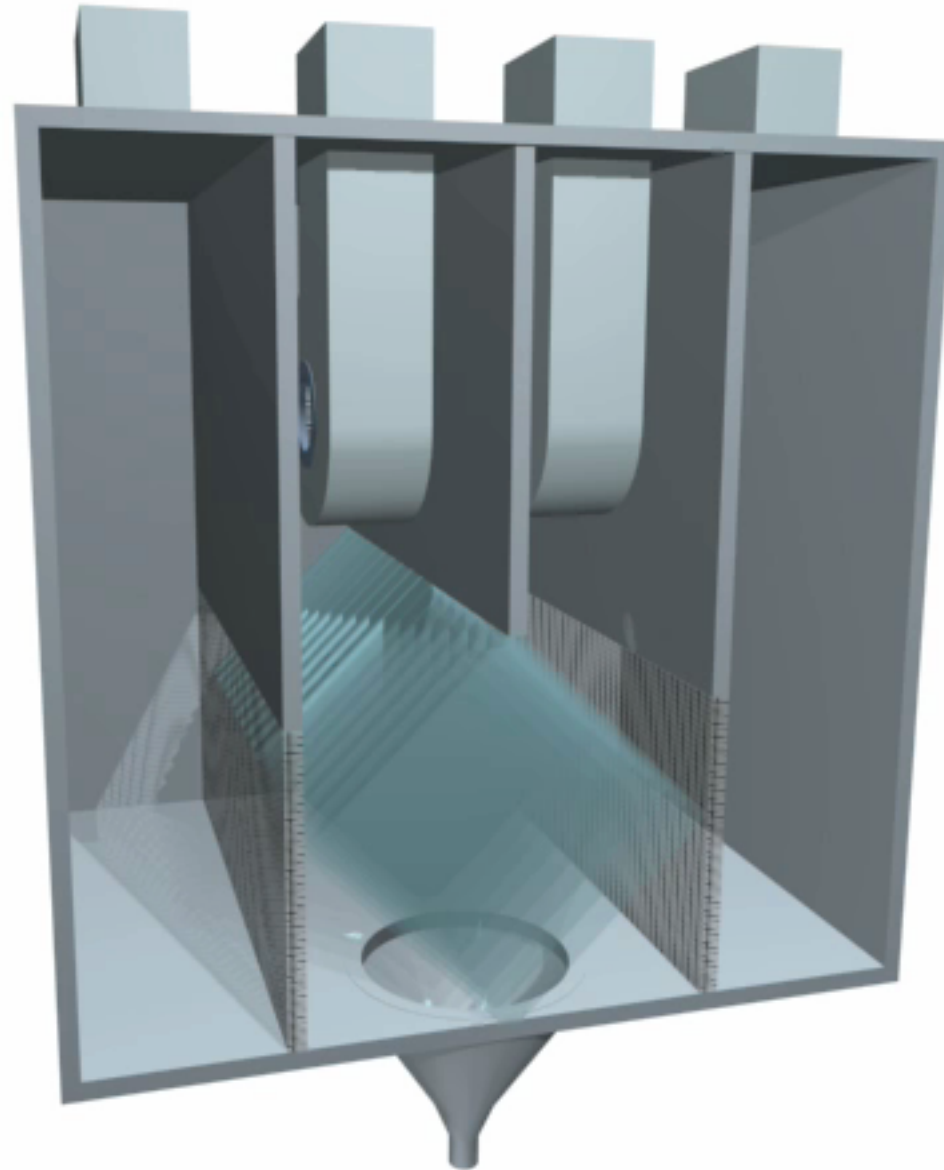
Ground Source Heat Pump (Geoechange)



HRV with Forced Air Furnace



Heat Recovery Ventilator (HRV)

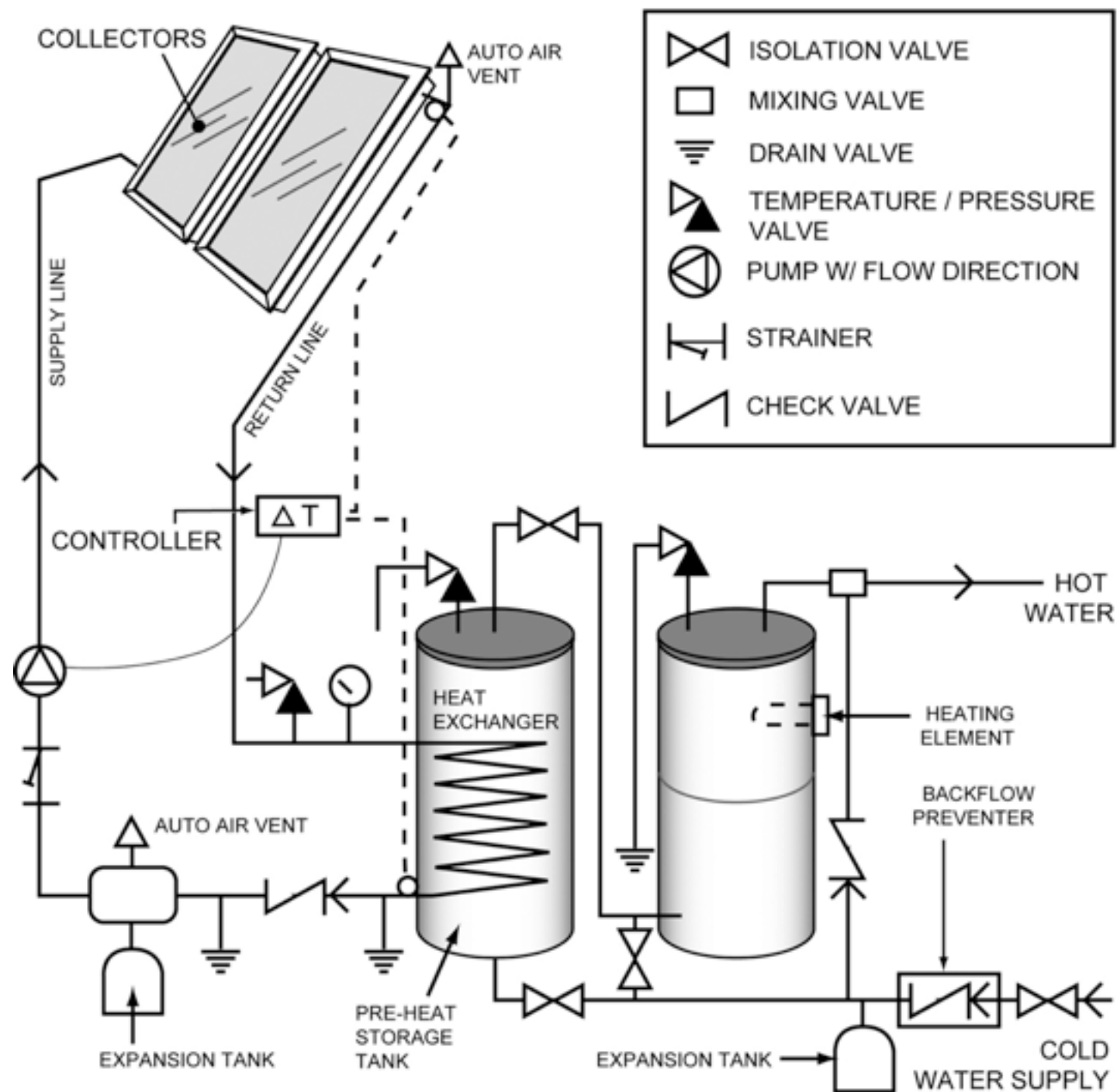


Solar Thermal

- Can be used in all of Canada
- Potential DHW savings of 50%
- Incentives available
- Significant information at www.SolarBC.ca
- Size efficiently & “Share the Roof”



Solar Thermal Schematic



Some BC Installs



Solar Photovoltaic (PV)

- Germany are leaders
- Southern Europe, China, Japan also major PV regions
- USA growing at a very fast pace
- World interest in Ontario since FIT announced in May 2009
- Capital cost dropping, but still above utility price
- Net metering available in BC and uses the grid as storage
- The case for FIT in BC?

Canadian cities PV potential

World cities PV potential

Major Canadian cities and capitals	Yearly PV potential (kWh/kW)	Major cities worldwide	Yearly PV potential (kWh/kW)
Regina (Saskatchewan)	1361	Cairo, Egypt	1635
Calgary (Alberta)	1292	Capetown, South Africa	1538
Winnipeg (Manitoba)	1277	New Delhi, India	1523
Edmonton (Alberta)	1245	Los Angeles, U.S.A.	1485
Ottawa (Ontario)	1198	Mexico City, Mexico	1425
Montréal (Quebec)	1185	Regina, Canada	1361
Toronto (Ontario)	1161	Sydney, Australia	1343
Fredericton (New Brunswick)	1145	Rome, Italy	1283
Québec (Quebec)	1134	Rio de Janeiro, Brazil	1253
Charlottetown (Prince Edward Island)	1095	Beijing, China	1148
Yellowknife (Northwest Territories)	1094	Washington, D.C., U.S.A.	1133
Victoria (British Columbia)	1091	Paris, France	838
Halifax (Nova Scotia)	1074	St. John's, Canada	933
Iqaluit (Nunavut)	1059	Tokyo, Japan	885
Vancouver (British Columbia)	1009	Berlin, Germany	848
Whitehorse (Yukon)	960	Moscow, Russia	803
St. John's (Newfoundland and Labrador)	933	London, England	728

Source: Natural Resources Canada. (2007). Photovoltaic potential and solar resources maps of Canada. Retrieved February 1, 2010, from <https://glfc.cfsnet.nfis.org/mapserver/pv/rank.php?NEK=e>

Canadian PV Installs (from CMHC “About Your House Photovoltaic (PV) Systems”)



Figures 5 and 6 Avalon Discovery 3, an EQuilibrium™ demonstration home in Red Deer, Alberta uses PV roofing tiles

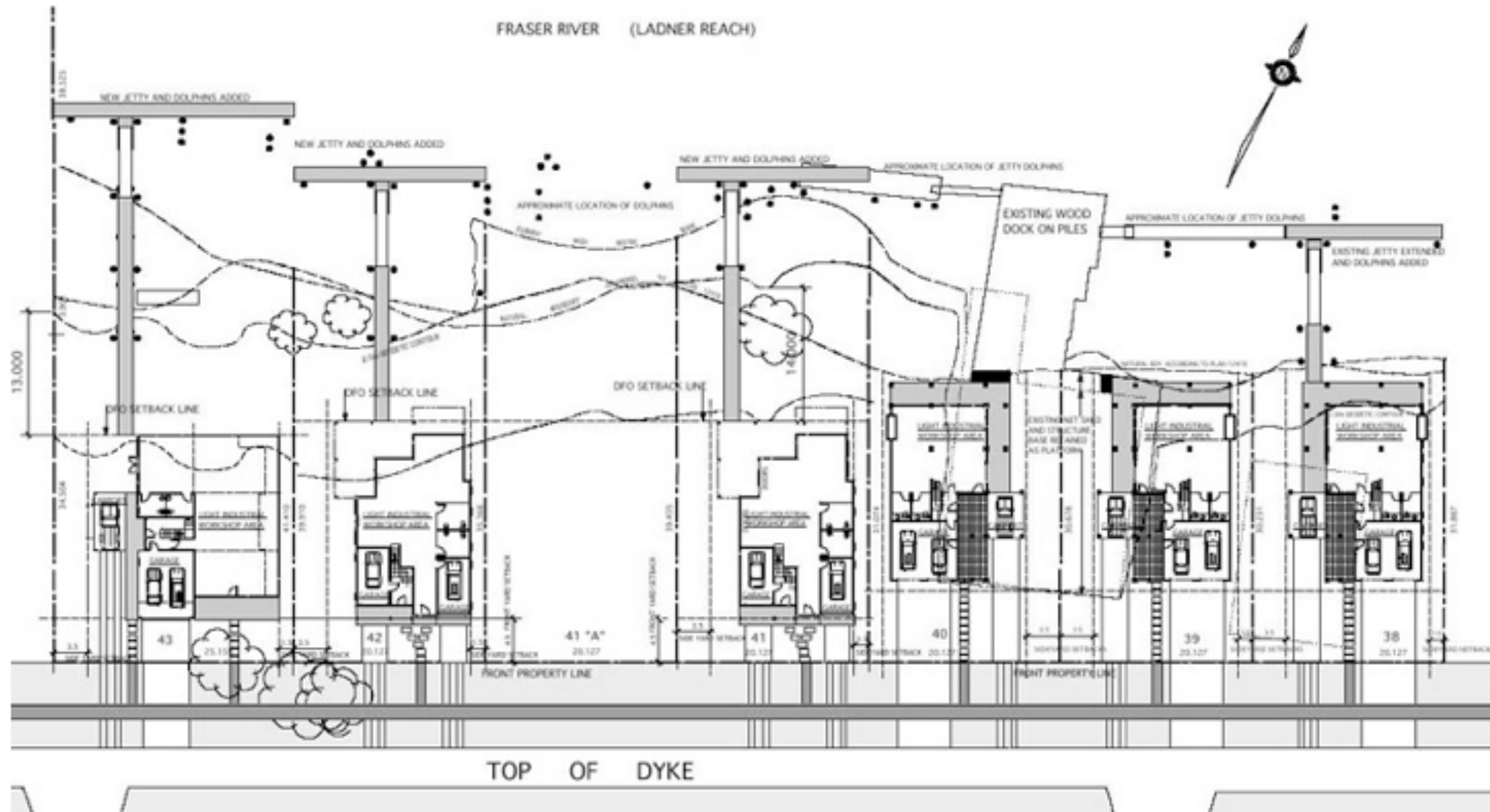


Figures 7 and 8 ÉcoTerra™, an EQuilibrium™ demonstration home in Eastman, Quebec uses amorphous PV panels stuck directly on its metal roof



Building Comfort, A Case Study

Sustainability
Without Compromise?



River Road West

Net Zero Homes on the River



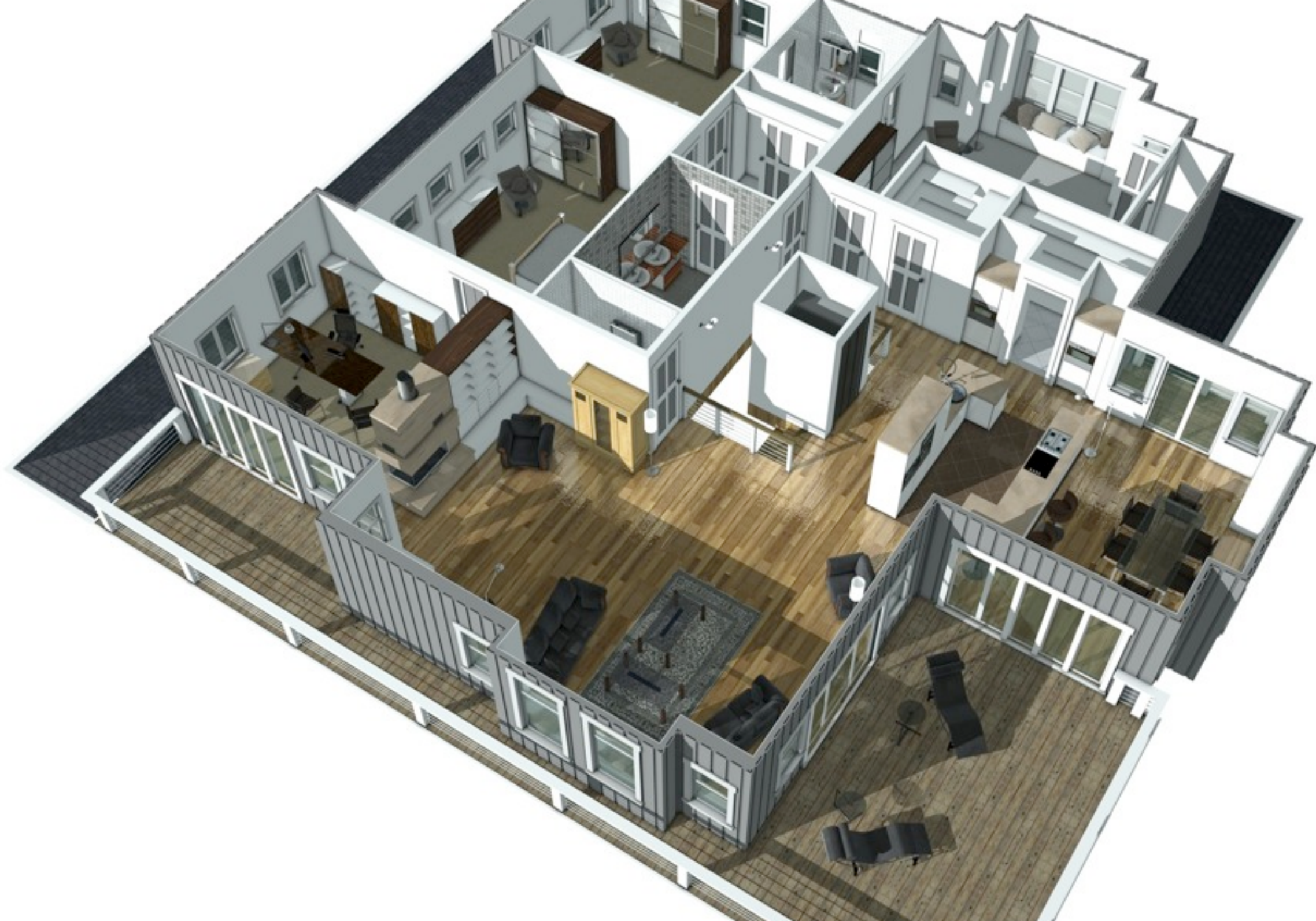
Designed First for Aesthetics

Sustainability Integrated Second



Main

Electric Car with PV Charging?

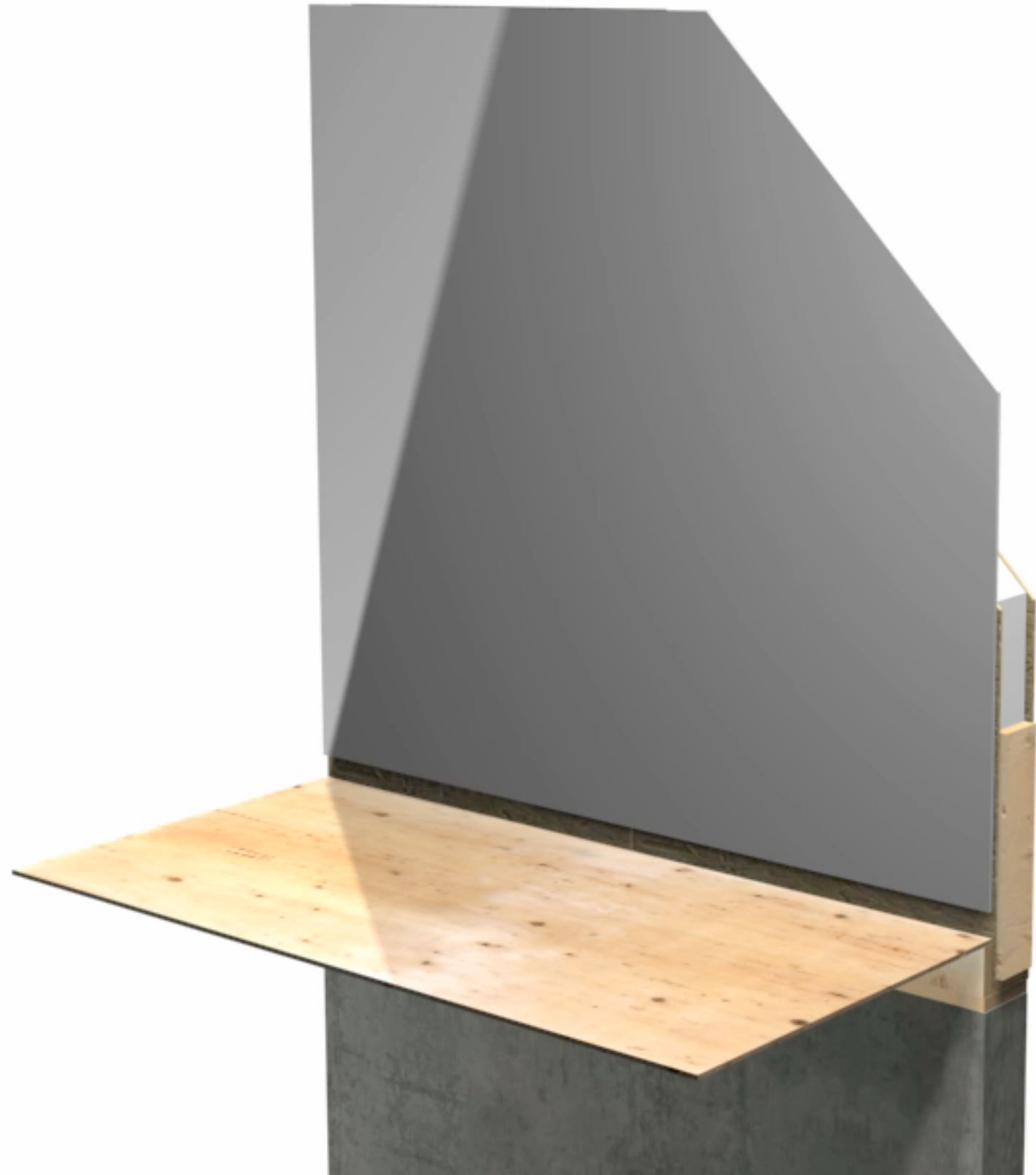


Top Floor

Driven by Comfort

SIPs Panel Construction

8 1/4" SIPs panel const

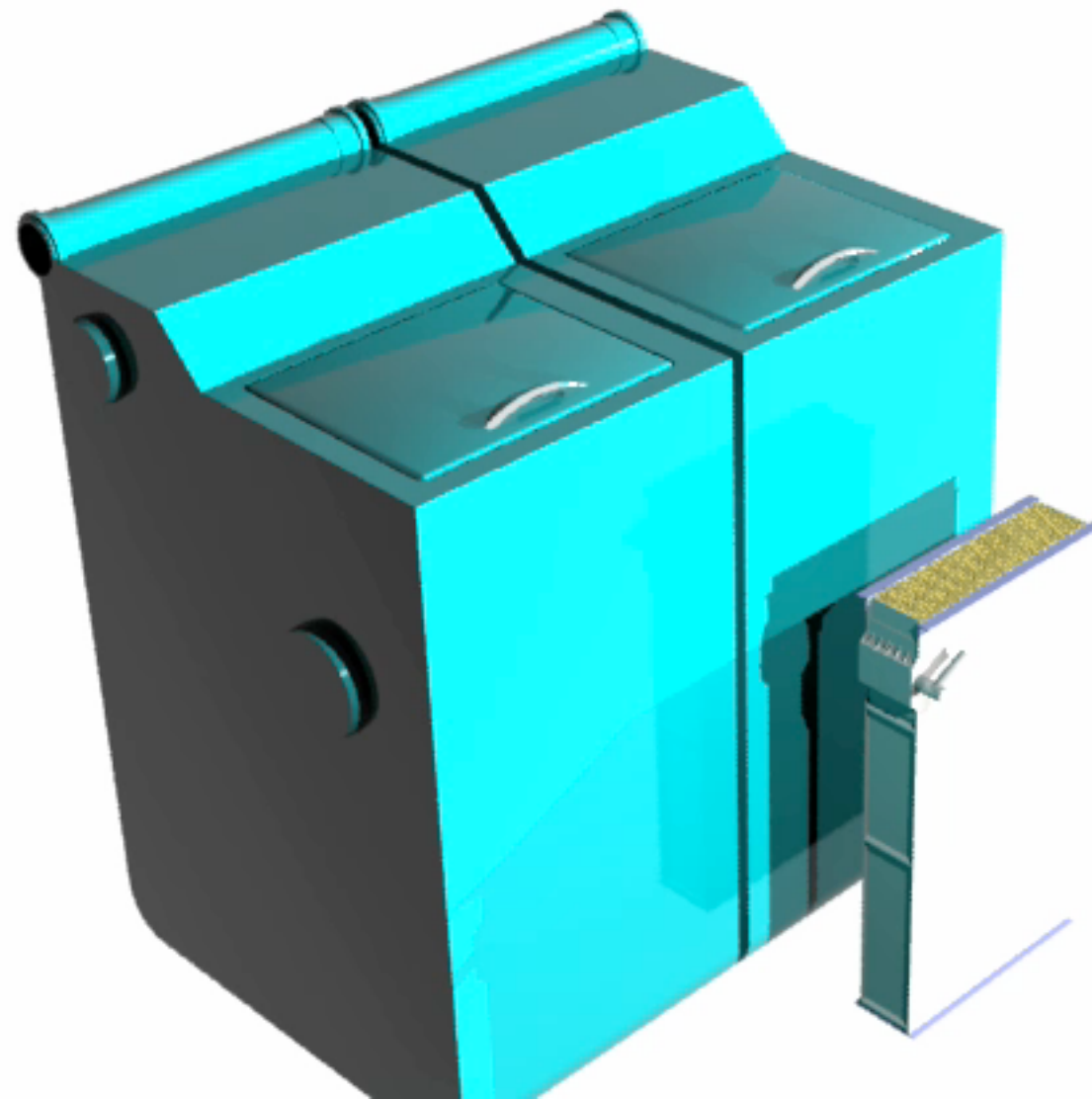


Solar

PV & Thermal?

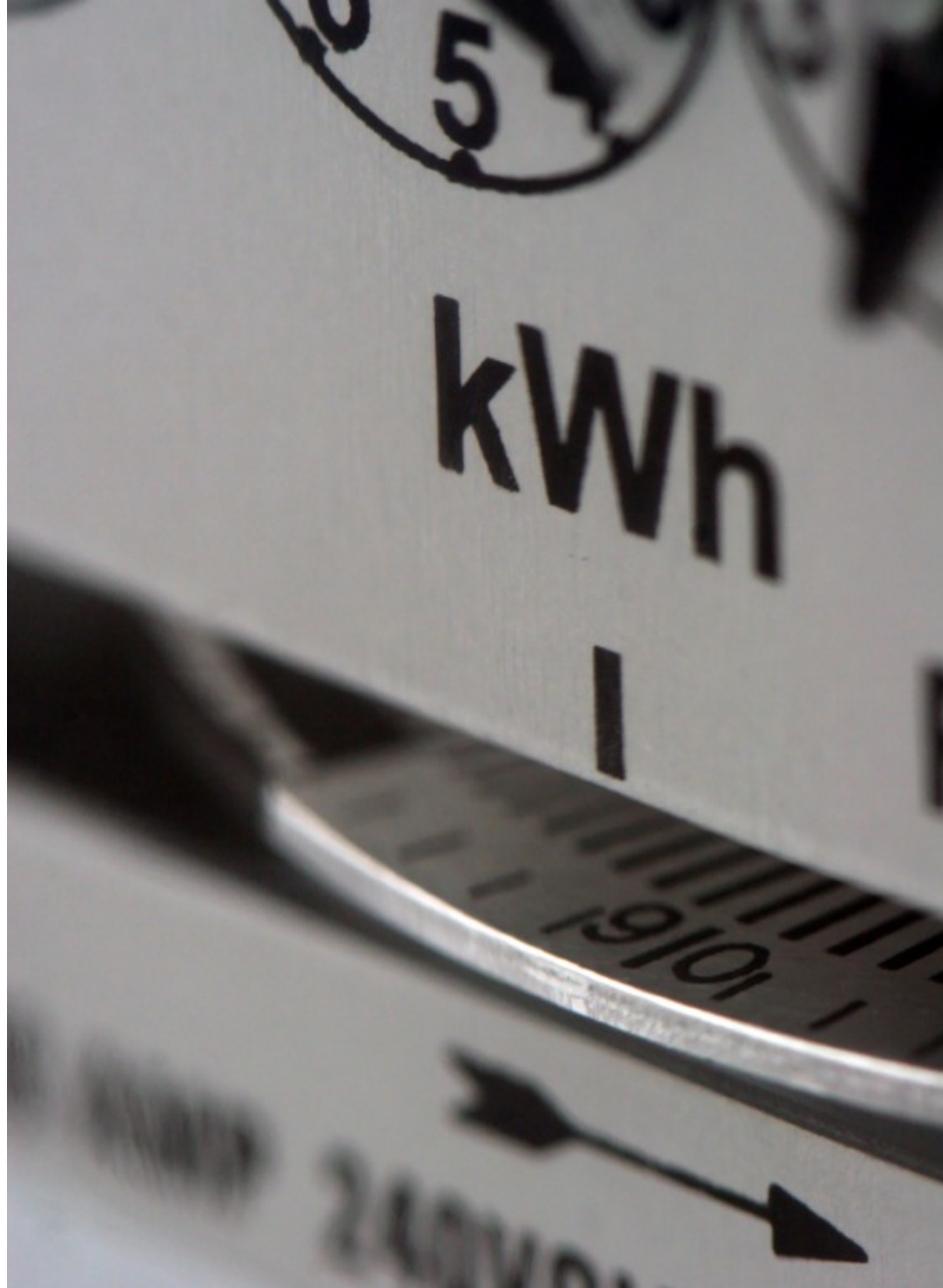


Waste Water Treatment In-home



The Rest of the Systems

- Triple glazed, insulated fiberglass windows with double low-e and argon
- Airtightness - 0.5 ACH₅₀
- River loop geexchange heat/cooling/DHW
- HRV
- LED Lighting
- Second car electric with PV charging from the roof





Net Zero With Style

Beyond Municipal Services

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