

Decarb Lunch Series

zebx

 **BC Hydro**
Power smart

Putting a Label on High-Performance

Tue Sep 28, 2021,
from 12- 1pm PDT
Free Webinar | zebx.org



Music: Delight - Karmawin

COLLABORATE

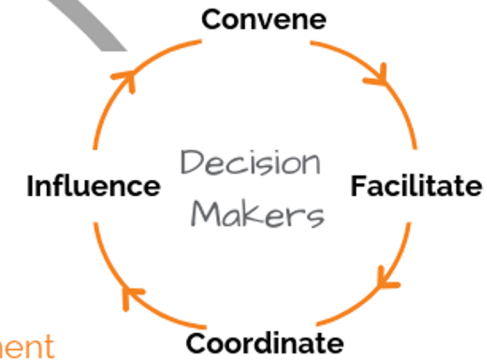
Accelerate Solutions



Designers
Builders
Academia
Developers
Manufacturers

ADVANCE

Remove Barriers &
Identify Opportunities



Government
Global Experts
Mission-Aligned Organizations
Industry Associations

SCALE

Build Capacity



Deep Emissions Retrofit Dialogue

Series

zebx

 **BC Hydro**
Power smart

Best Practices for Large Buildings

Tue, Sep 21, 2021
from 12.30pm - 2.30 pm PDT
Free webinar | zebx.org



Be part of it first.

Join the **Building to Electrification
Coalition launch event**

Sep 29, 2021

11am- 12pm PDT

Free Webinar

Building

zebox

Electrification

CASE STUDY

zeb^x
NET-ZERO ENERGY READY BUILDINGS

cleanBC
BETTER BUILDINGS

NET-ZERO ENERGY-READY
CHALLENGE

WINNERS SERIES

Supporting, promoting and
celebrating the design and
construction of net-zero
energy-ready buildings

825 Pacific Street

Net-Zero Energy-Ready Challenge Winners Series
Sep 2021

A photograph of a modern, multi-story residential building at dusk. The building features a mix of light grey and dark grey panels, large windows, and balconies with glass railings. Interior lights are on, and some balconies have small outdoor lights. The sky is a deep blue.

CONSTRUCTION COST ANALYSIS OF HIGH-PERFORMANCE MULTI-UNIT RESIDENTIAL BUILDINGS IN BRITISH COLUMBIA

The Zebx logo, consisting of the word "Zebx" in a white, lowercase, sans-serif font. The 'Z' is stylized with a horizontal bar that extends to the left.

zebx

JUNE 2021

ARTICLE



Marketing the High-Performance Home

Sep 2021

Categories:

- ☐ Articles
- ☐ Case Studies
- ☐ Past Events
- ☐ Reports
- ☐ Videos & Slides

Series:

- ☐ NZER Challenge Playbook Series
- ☐ NZER Challenge Winners Series

Systems:

- ☐ Building Enclosure
- ☐ Domestic Hot Water Heat Pump
- ☐ Geothermal
- ☐ Mechanical
- ☐ Solar Energy

Subjects:

- ☐ All-Electric Building
- ☐ BC Energy Step Code
- ☐ Construction
- ☐ Cost
- ☐ Design
- ☐ Embodied Carbon
- ☐ LEED
- ☐ Part 3 Building
- ☐ Part 9 Building
- ☐ Passive House
- ☐ Retrofit
- ☐ Step 4

POLL 1

Tell us about yourself!

Three-part anonymous poll



The CHBA Net Zero Home Labelling Program

ZEBx Decarb Lunch & Learn Series



Service Organization Labelling Process



Today's Topics Include:

- How to become a CHBA Qualified Net Zero Builder
- How to label a Net Zero/Ready home
- Net Zero Training Program

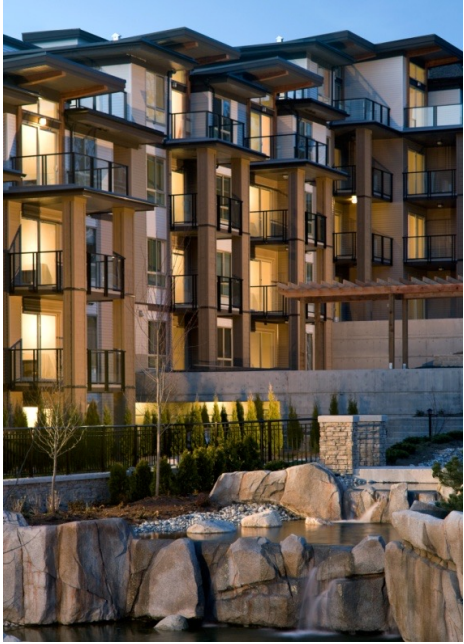
Presented by: Vanessa Joehl, Director, Energy Programs & Service Organization Manager

Canadian Home Builders' Association of BC





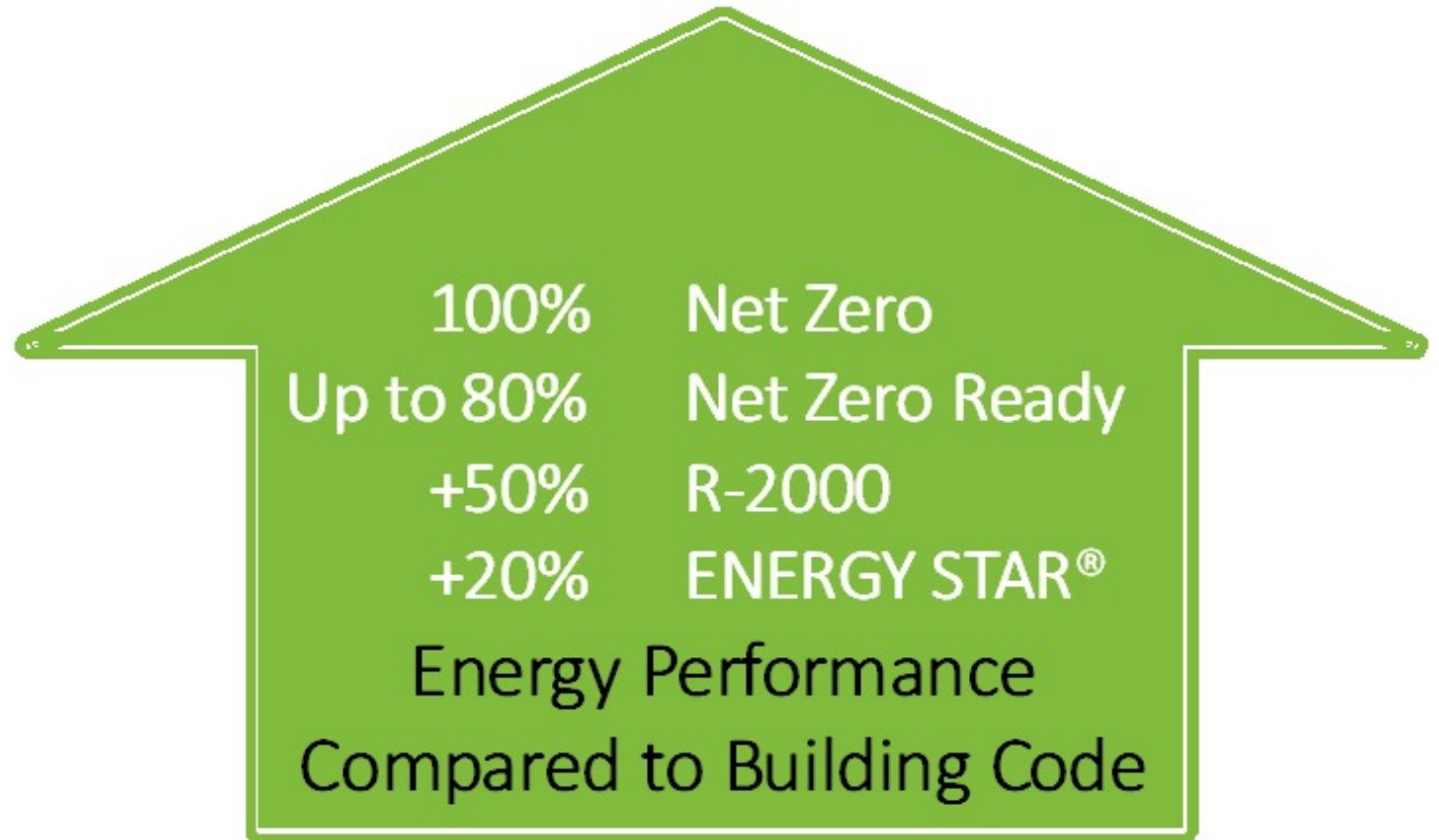
Are these homes energy efficient?



But how do you know?

What is a Net Zero Home?

- ✓ Net Zero Homes produce as much clean energy as they consume.
- ✓ They are up to 80% more energy efficient than typical new homes and
- ✓ They use renewable energy systems to produce the remaining energy they need.





Measuring Energy with the EnerGuide Rating System

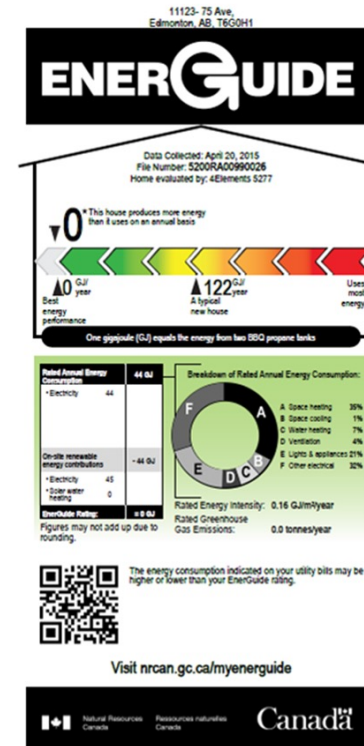
- National system developed by Natural Resources Canada to **rate the energy performance** of a house.
- The EnerGuide Rating is the **annual net energy consumption** of a house based on calculated energy use and production.
- Equipment and components considered in the EnerGuide Rating include **the building envelope, mechanical systems, permanent structures** that shade windows and enclosed, unconditioned spaces adjacent to the *heated* volume.
- The **EnerGuide Rating is used within many labeling programs** to assess energy consumption of the house.

Net Zero & Energy Advisors

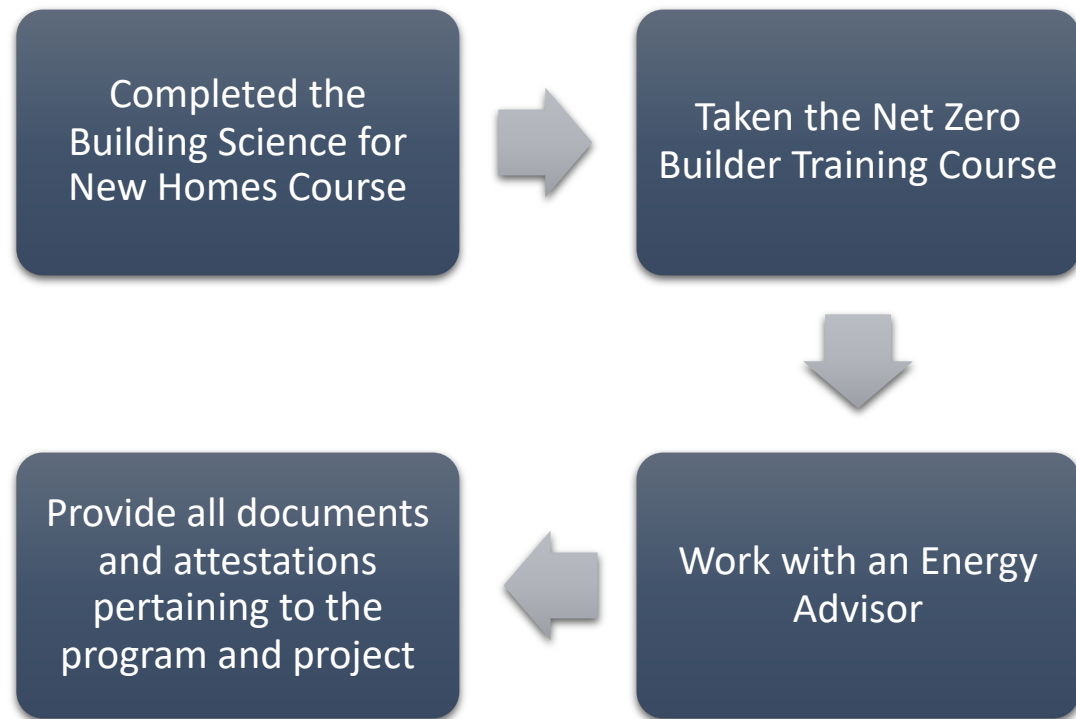
Builders & Energy Advisors will work closely towards a performance target



- ✓ Licensed Third Party Consultants
- ✓ Trained, Mentored and Managed by Service Organizations
- ✓ Varied Construction Industry Backgrounds
- ✓ Detailed Auditing Process
- ✓ Various services available



Qualified Net Zero Builders



Upcoming Training Opportunities

CHBA BC is an Approved Service Organization to Deliver Training

- We provide training through a two-part live webinar
- Course is interactive & considered formal training worth 16 CPD
- Next course aiming for a late Fall 2021 delivery
- **Course dates announced through CHBA BC e-Newsletter**



Labelling a Net Zero Home

There are two labelling options:



THIS LABEL IS FOR THE FOLLOWING HOME:

BUILDER/RENOVATOR:

ENERGY ADVISOR:

SERVICE ORGANIZATION:

CHBANZH ID#:

DATE APPROVED:

This label indicates that this home is recognized by the Canadian Home Builders' Association (CHBA) based on the attestations by the builder, its Net Zero Qualified Service Organization and a Net Zero Qualified Energy Advisor, that the home has met CHBA's Net Zero Home Program Technical Requirements, including the energy performance rating according to the Government of Canada's EnerGuide Rating System. More information is available at www.NetZeroHome.com



THIS LABEL IS FOR THE FOLLOWING HOME:

BUILDER/RENOVATOR:

ENERGY ADVISOR:

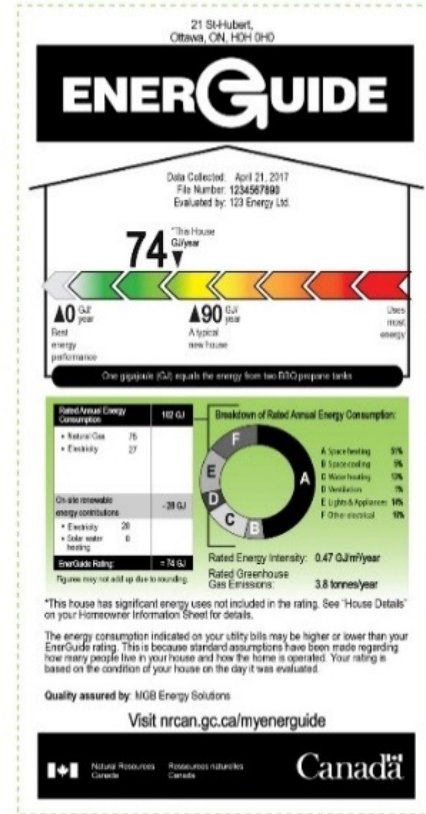
SERVICE ORGANIZATION:

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Visit: BetterHomesBC.ca



Contact Details

Vanessa Joehl

Director, Energy Programs & Service Organization Manager
Canadian Home Builders' Association of BC

Email: vanessa@chbabc.org
CHBABC.ORG



November 26, 2020

Honourable Selina Robinson
Minister of Finance
Parliament Buildings
Victoria, British Columbia V8V 1X4

Dear Minister Robinson:

Thank you for agreeing to serve British Columbians as Minister of Finance. You are taking on this responsibility at a time when people in our province face significant challenges as a result of the global COVID-19 pandemic.

COVID-19 has turned the lives of British Columbians upside down. None of us expected to face the challenges of the past number of months, yet British Columbians have demonstrated incredible resilience, time and time again. We will get through the pandemic and its aftereffects by building on this resilience and focusing on what matters most to people.

British Columbians voted for a government focused on their priorities: fighting the COVID-19 pandemic, providing better health care for people and families, delivering affordability and security in our communities, and investing in good jobs and livelihoods in a clean-energy future.

I expect you – and the work of your ministry – to focus on the commitments detailed in our platform, *Working for You*, along with the following foundational principles:

- **Putting people first:** Since 2017, our government has focused on making decisions to meet people's needs. That focus drove our work in our first term and will continue to be our priority. British Columbians are counting on the government to keep them safe and to build an economic recovery that works for everyone, not just those at the top. Keeping people at the centre of everything we do means protecting and enhancing the public services people rely on and working to make life more affordable for everyone.
- **Lasting and meaningful reconciliation:** Reconciliation is an ongoing process and a shared responsibility for us all. The unanimous passage of the *Declaration on the Rights of Indigenous Peoples Act* was a significant step forward in this journey. True

.../2

Office of the
Premier

Web Site:
www.gov.bc.ca

Mailing Address:
PO Box 9041 Stn Prov Govt
Victoria BC V8W 9E1

Location:
Parliament Buildings
Victoria

Context

Over the course of our mandate, I expect you will make progress on the following items:

- Support the Minister of Energy, Mines and Low Carbon Innovation to require realtors to provide energy efficiency information on listed homes to incent energy-saving upgrades and let purchasers know what energy bills they will face

PRESS RELEASE

Study: Home Energy Ratings in Real Estate Listings Would Steer Buyers to Efficient Choices

August 6, 2020

- Energy efficiency information encouraged home buyers to avoid the least-efficient homes and choose more-efficient ones. Home buyers with such information clicked on the least-efficient listing less often (23% less), and the most-efficient option more often (14% more), compared to those who did not see this information.
- Presenting efficiency information for only the most efficient listings (mirroring a voluntary labeling policy) was not an effective strategy for encouraging choice of efficient homes.
- Home buyers valued efficiency most when it was presented as an image depicting the home's efficiency score along a scale from inefficient to efficient.



NearZero.ca

A green initiative sponsored by the City of Vancouver and CleanBC to gather data and encourage the construction of more high-performance homes.

PROJECT BROUGHT TO YOU BY:

PASSIVEHOUSE
CANADA Build better.
Feel better.

 CITY OF
VANCOUVER

 **GREENEST**
CITY

zebx
ZERO EMISSIONS BUILDING EXCHANGE

cleanBC
our nature. our power. our future.

[Home](#)

[About NearZero](#)

[Overview](#)

[Requirements](#)

[Deliverables](#)

[Compensation](#)

[ZEBx](#)

[Register](#)

POLL 1

What did you tell us about yourself?



Feature Speaker | Gavin McLeod



**Decarb
Lunch** Series

**Putting a Label on
High-Performance**

zebx
BC Hydro
Power smart

Tue Sep 28, 2021,
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CANADIAN
HOME BUILDERS' ASSOCIATION
BRITISH COLUMBIA
ENERGY PROGRAMS



BUILDING HOMES AND DUPLEXES IN VANCOUVER



MH + HG Architects



MH + HG Architects



Alex Glegg Design

BUILDING CUSTOM HOMES AND DUPLEXES IN VANCOUVER



Intarsia Design + Jason Letkeman Design

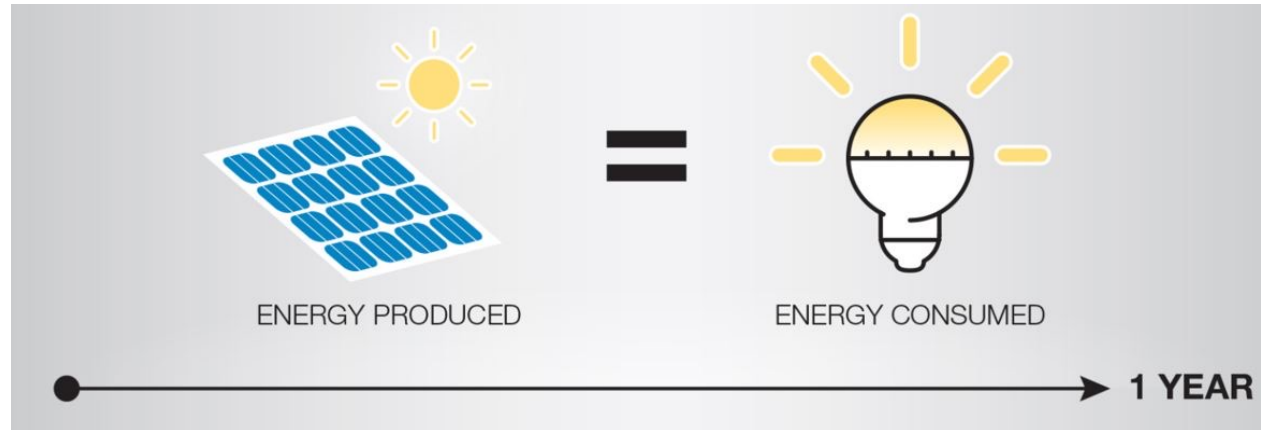
- Building in Vancouver since 2007
- Custom Homes & Duplexes for Homeowners and Market
- Improving quality of indoor living by building an “Efficient Home Operating System”

BUILDING CUSTOM HOMES AND DUPLEXES IN VANCOUVER



- Home building is transitioning to highly efficient homes as the norm and using renewable resources to further reduce the carbon footprint.
- Adapting to changing building codes.
- Implementing innovations in Building Science

NETZERO CERTIFIED IS A “GAME CHANGER”

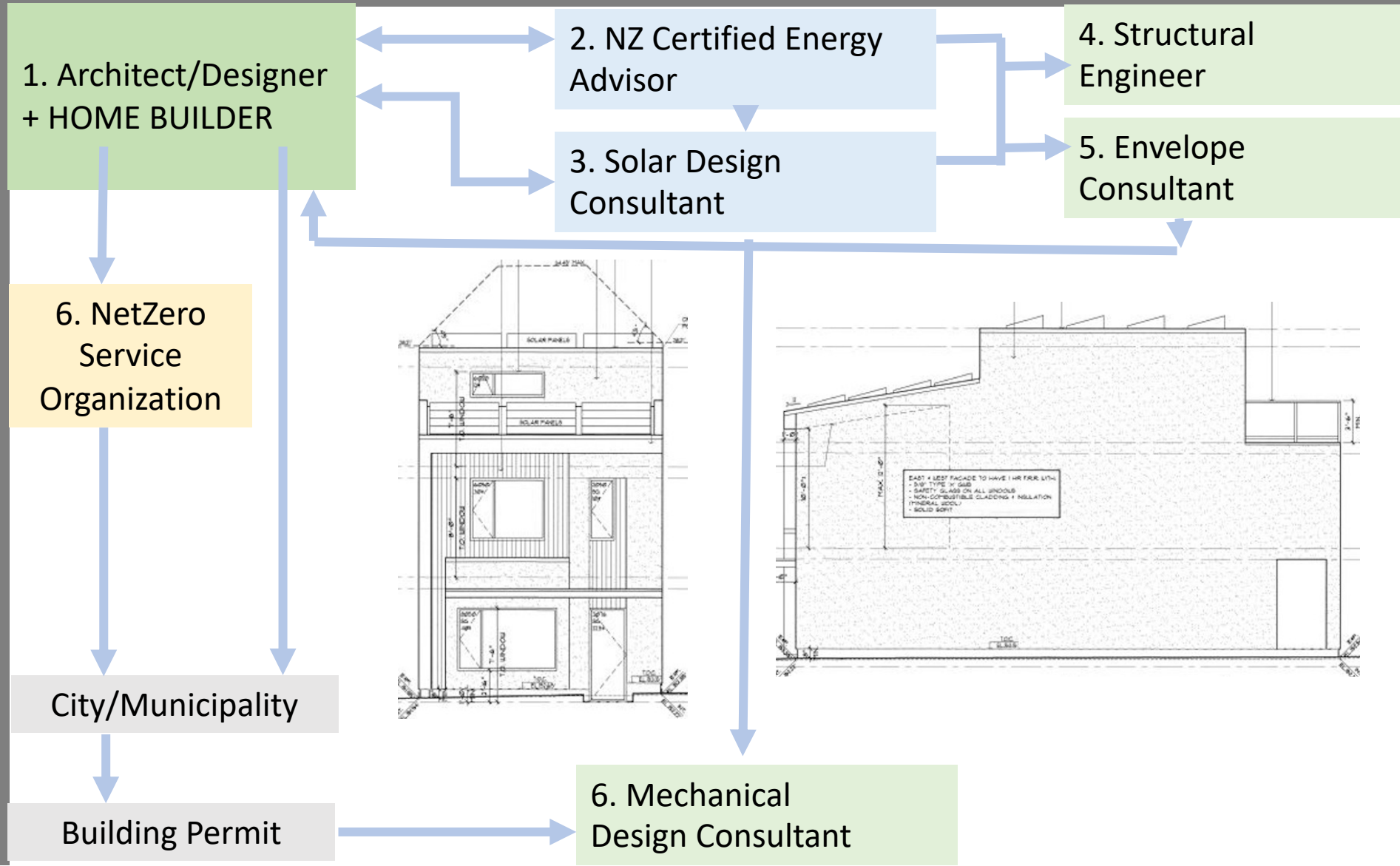


**ZERO EMISSIONS
SPACE AND WATER
HEATING**

*By 2025, all new and
replacement heating and
hot water systems
will be zero emissions.*

- Government mandated reduction in GHG Emissions leads to electricity as the energy source for heating and hot water.
- The Netzero Labeling program is a standard that supports delivery of “performance designed model”.
- Building “Air-tight” with increased insulation in wall assemblies reduces the energy a home demands and the amount of renewable energy required to replace it.

INTEGRATED DESIGN PROCESS (IDP) IS KEY TO NETZERO



Key Consultants

1. Architect/Designer + Builder
2. Netzero Certified Energy Advisor
3. Solar Designer
4. Structural Engineer
5. Envelope Consultant
6. Mechanical Consultant / Engineer
7. Netzero Service Organization

BUILDING A NETZERO CERTIFIED HOME

25' LOT | FRASERHOOD SINGLE FAMILY DWELLING

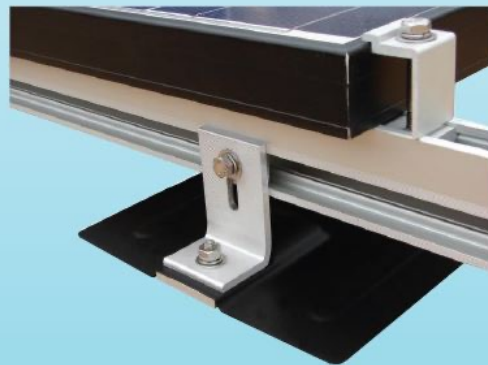


- City of Vancouver incentives provided an additional 16% of allowable Floor Space making it attractive for all new home builds to consider (Cost/Benefit)
- Ideal for the 1st Avera Netzero site in Vancouver on a 25' lot - with peat soil conditions
- R-38 Wall Assemblies with 4" of insulation on Exterior and insulated 2x8 Framing.
- R-30 below slab, R-50 Roof Insulation
- Double Glazed Windows (Glazing = % of Exterior Wall Area)
- Target Air Changes Per Hour = .5
- Air to Water Heat Pump Electric Boiler for Heat Pumps and Hot Water Tank

PLANNING FOR SOLAR AS THE NET ZERO RENEWABLE RESOURCE



K-Rack™ and K-Flash™
are manufactured in North America



- Property Location and Surrounding Area (exposure direction, shading)
- **Roof Design** and Materials (Metal, Asphalt Shingle, Asphalt Torch-On)
- Structural Engineer Requirements (panels and racks)

SOLAR PANEL DESIGN AND LAYOUT

Sizing Solar in Vancouver for common size homes (2,500 – 3,000 SF)

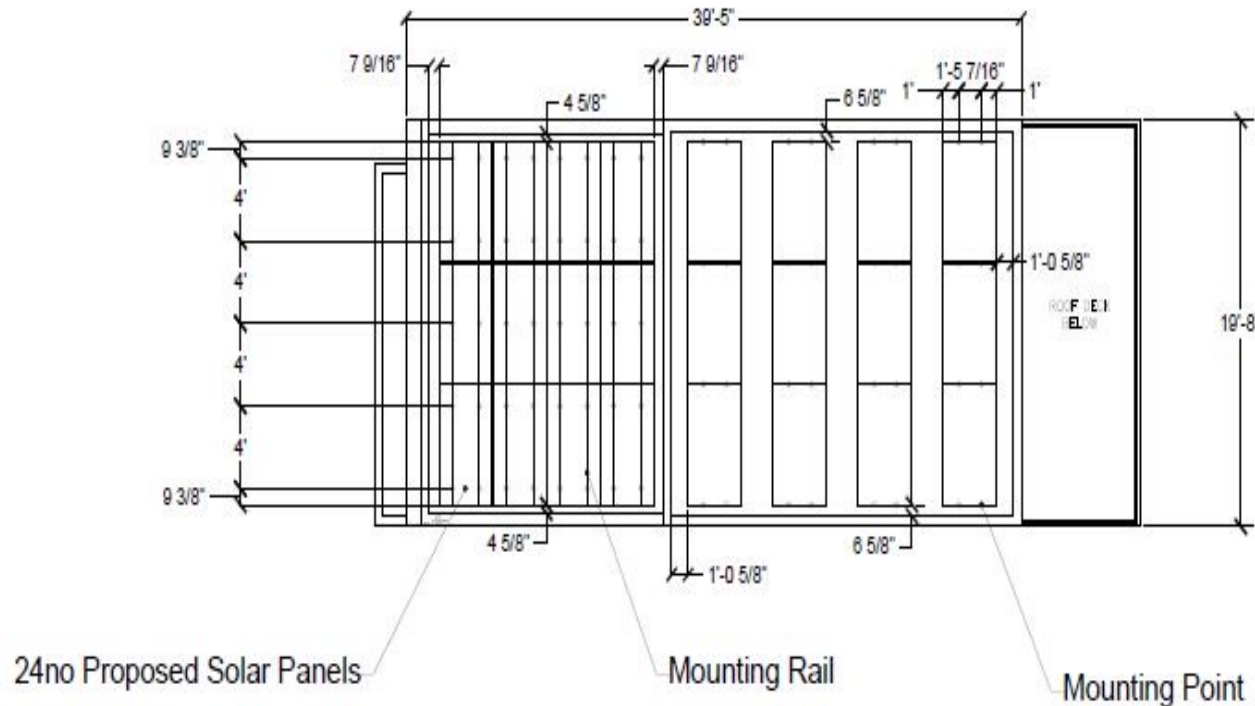
Consumption for heating and h/w = 11,000 K/W per year

1,100 K/W per KW solar install = 10 KW solar required

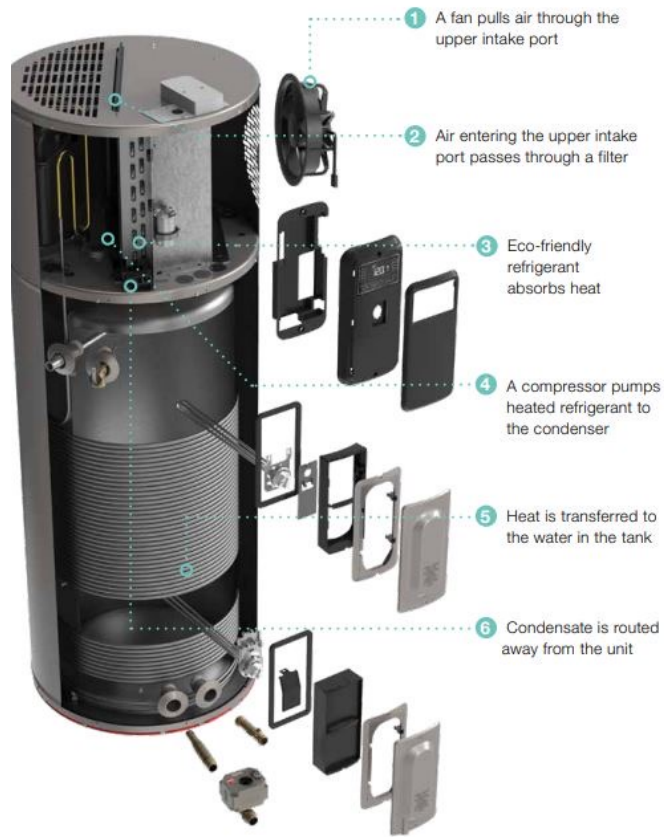
3 solar panels = approx. 1 KW solar install

= 30 solar panels 40" x 69" dimension

= 575 SF + roof area required



MECHANICAL SYSTEMS TO REDUCE ENERGY REQUIRED FOR HEATING, COOLING, AND HOT WATER



- Heat Pumps will be standard for all new home construction
- Air to Water Electric Hydronic Heating or Electric Cable in floor heating
- Air to Water to Air Cooling System (Ducted or Ductless)
- Efficient Air to Water + Electric Hot Water Tanks

Key Points / Takeaway

- Building Efficient homes to include Netzero and Solar will become standard for reducing GHGs
- An Integrated Design Process engaging the builder is key to successful permitting, design, and construction
- Building Netzero for most common size homes is possible and practical
- Solar is the optimal renewable resource.
- Roof design plays an important part for solar install capacity
- Heat Pumps will be necessary for all new home builds when electric becomes only source for heating, cooling, and hot water



Thank-You





About Naikoon

We are internationally recognized as a full-cycle Construction Management boutique, specializing in innovative projects throughout Western Canada.

Naikoon is Built to Last.



3x labelled
4x in progress

Naikoon continues to be a construction industry leader that partners with a sophisticated and specialized clientele. Utilizing building information modeling (BIM) to enable virtual design & construction, we optimize all aspects of the complex building endeavor.

Through international industry collaboration, continual education, and quality benchmarking, Naikoon is an award-winning innovator. Emphasis on carbon neutrality, energy performance, off-site assembly, and mass timber, support our continued success.

Our vision is attainable through the passion of our people. Through exceptional quality, refined processes, and skilled performance we build and maintain lasting relationships.

The future is today.

North Vancouver Custom Residence



- Project completed: December 2020
- Project Size: approx. 4100 sq ft
- 3 Bedrooms
- 3 Bathrooms
- 1 Flex Room (Office / Guest Bedroom w/ flip down Murphy Bed)
- 1 Theatre/Games/Wine Display Room
- 1 Fully Fitted out Garage
- 1 Library w/ reading nook
- Great Room (Kitchen/Living/Dining) opens onto the expansive outdoor patio
- Case Study by :

Assemblies- Thermal bridge free construction

Details (Assembly / System Type / Fuel Type / Etc.)			Eff RSI , USI, SHGC, etc
Exterior Walls & Floor Headers	5" Mineral Wool, 2x6 @ 16" o/c R-24 Mineral Wool Garage: 4" Mineral Wool, 2x6 @ 16" o/c R-24 Mineral Wool	Effective R _{SI}	7.29
Roof / Ceilings	Flat: 5" R-27 Soprema ISO, 11 7/8" TJI @ 16" o/c R-48 Mineral Wool	Effective R _{SI}	11.66
Foundation Walls, Headers, & Slabs	Wall: 2 3/8" EPS, R-22 ICF Slab: 12" EPS rigid foam Slab Is: <input checked="" type="checkbox"/> Below OR <input type="checkbox"/> Above Frost Line <input type="checkbox"/> Heated OR <input checked="" type="checkbox"/> Unheated	Effective R _{SI}	5.98
Floors Over Unheated Spaces	Exposed Floor: TJI @ 16" o/c R-48 Batt, 2" Mineral Wool	Effective R _{SI}	8.98
Fenestration & Doors	Windows: triple-glazed, low-e coating, argon gas fill, vinyl frame Doors: solid wood entry door, fiberglass-insulated core FDWR <u>28.92</u> %	U _{SI} SHGC	USI 0.62-1.1 SHGC 0.21-0.25
Air Barrier System & Location	Aerobarrier, exterior taped sheathing / membrane		
Space Conditioning (Heating & Cooling)	Primary: air-to-Water Heat pump split system Secondary: Air source heat pump	%, HSPF, &/or SEER	4.01 COP 9.04 HSPF 15.5 SEER
Service Water Heating	Combo with air-to-water heat pump	EF &/or % eff	0.9 EF
Ventilation	Heat recovery ventilator, connected to heating ductwork		88% SRE @ 0 dgree C
Other Energy Impacting Features	Floor above foundations: TJI @16" o/c R-48 Mineral Wool		



Wall Assemblies – Below Grade



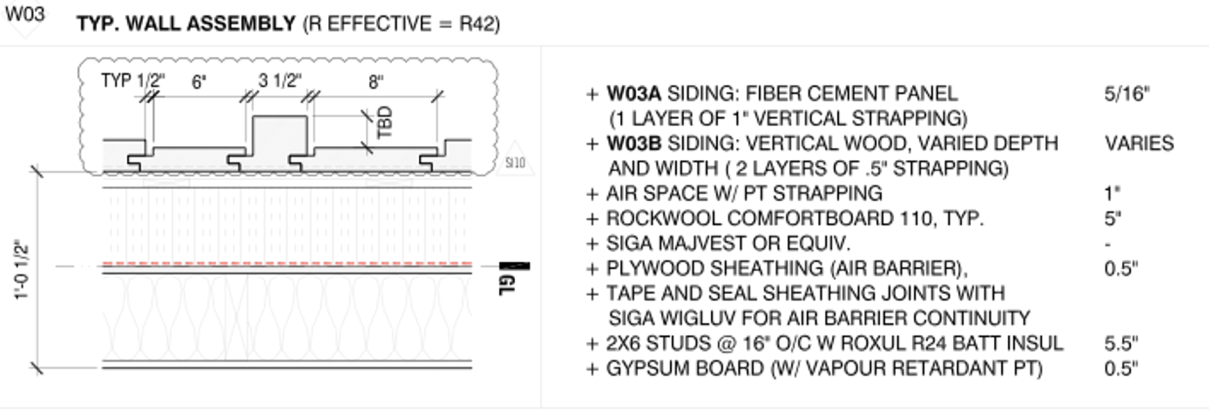
Foundation Walls, Headers, & Slabs	Wall: 2 3/8" EPS, R-22 ICF		Effective	5.98
	Slab: 12" EPS rigid foam		R _{SI}	
	Slab Is: <input checked="" type="checkbox"/> Below OR <input type="checkbox"/> Above Frost Line <input type="checkbox"/> Heated OR <input checked="" type="checkbox"/> Unheated			

Wall Assemblies – Below Grade

Big diesel truck x 6
Lots of EPS Foam



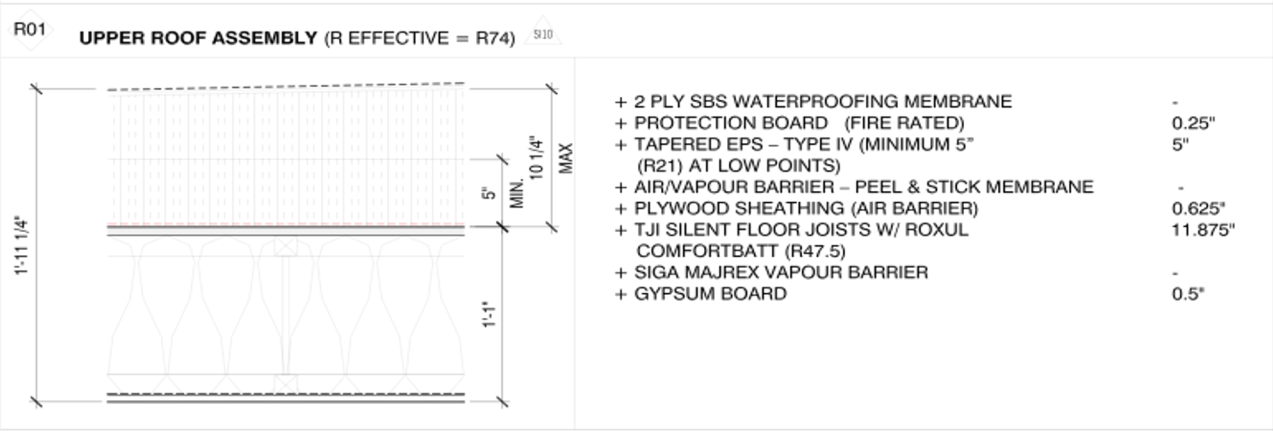
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Wall Assemblies



Roof Assemblies

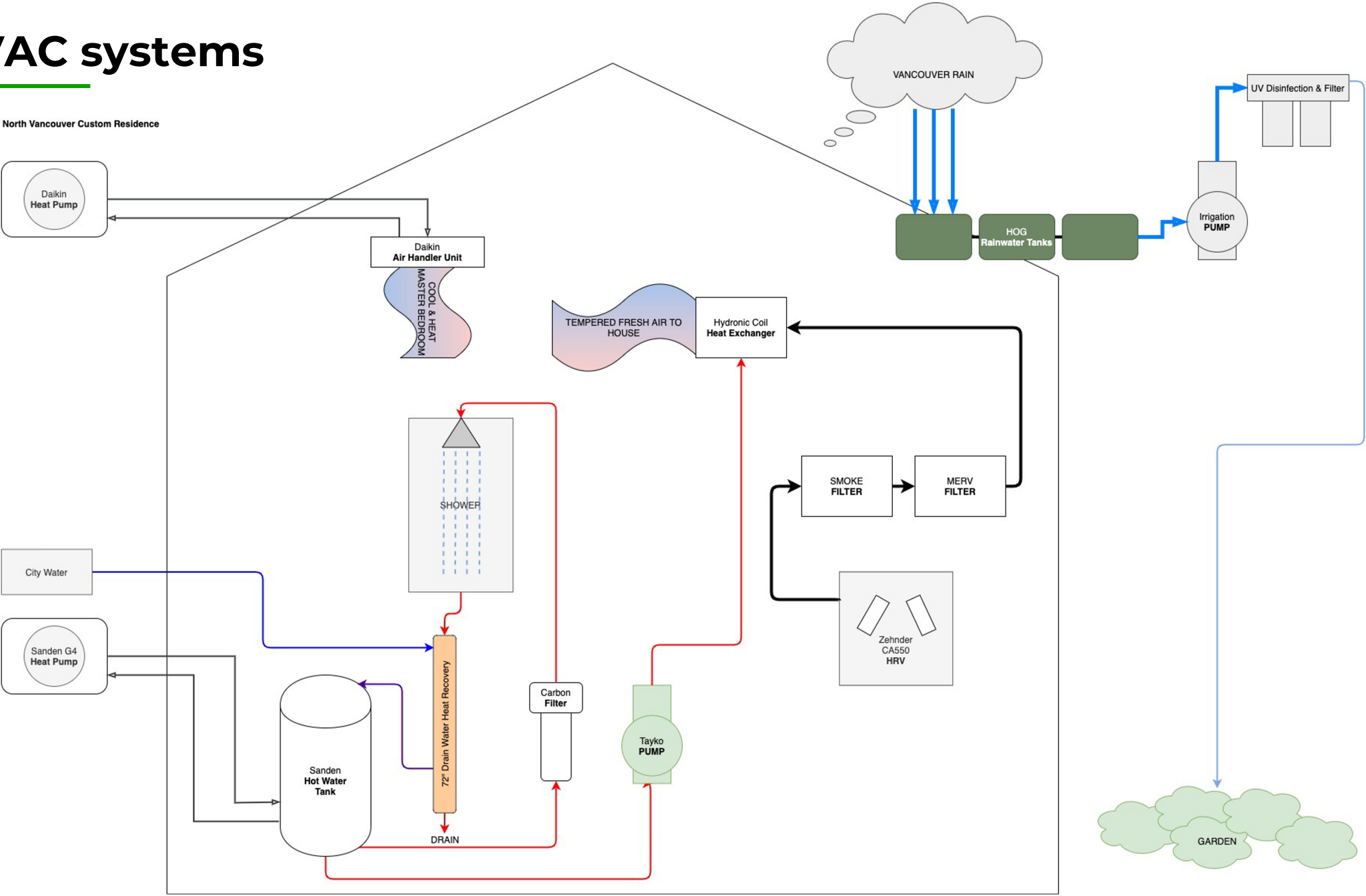


Roof / Ceilings Flat: 5" R-27 Soprema ISO, 11 7/8" TJI @ 16" o/c R-48 Mineral Wool

Effective R _{SI}	11.66
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HVAC systems

North Vancouver Custom Residence



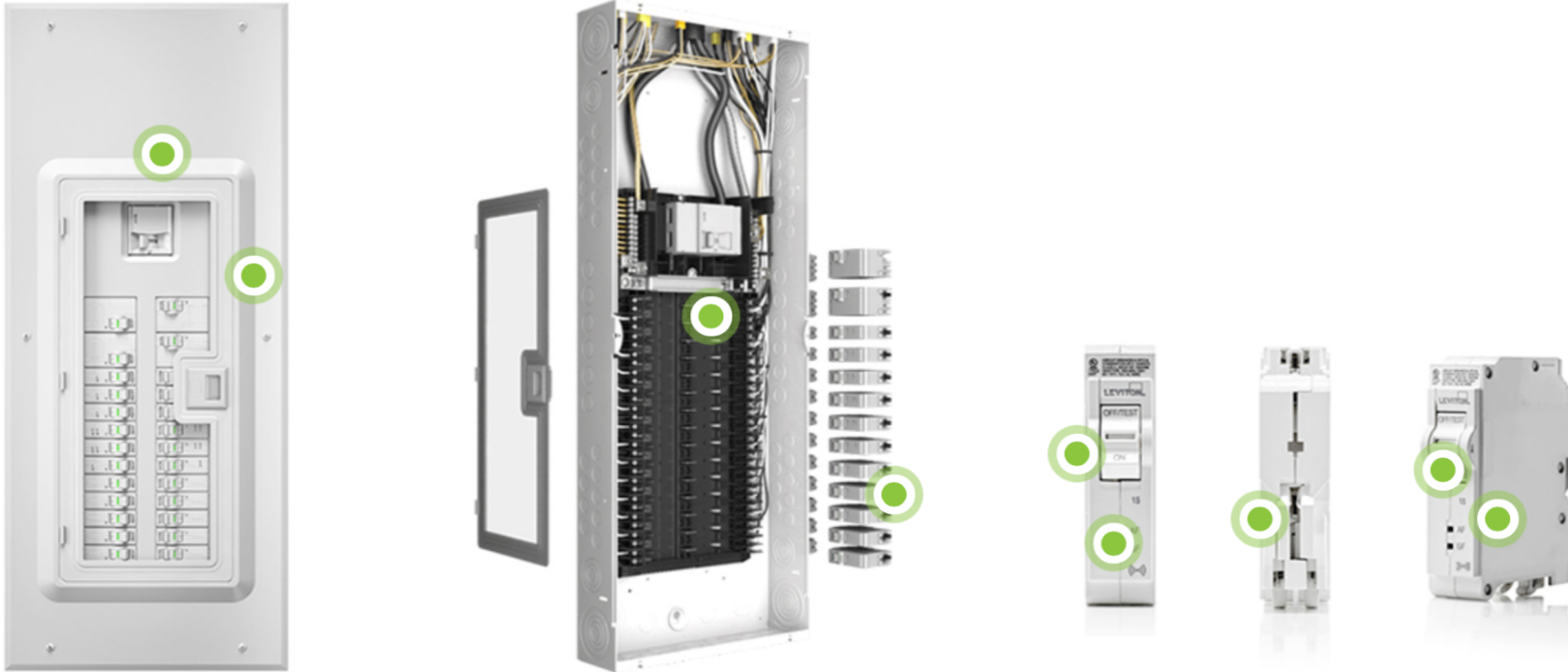
HVAC system



HVAC system- Covid stylz



load Management System



- Leviton Load Center with energy monitoring

Solar System

11.3 kw Solar system using Soprasolar Mounts



Solar and Battery Management System

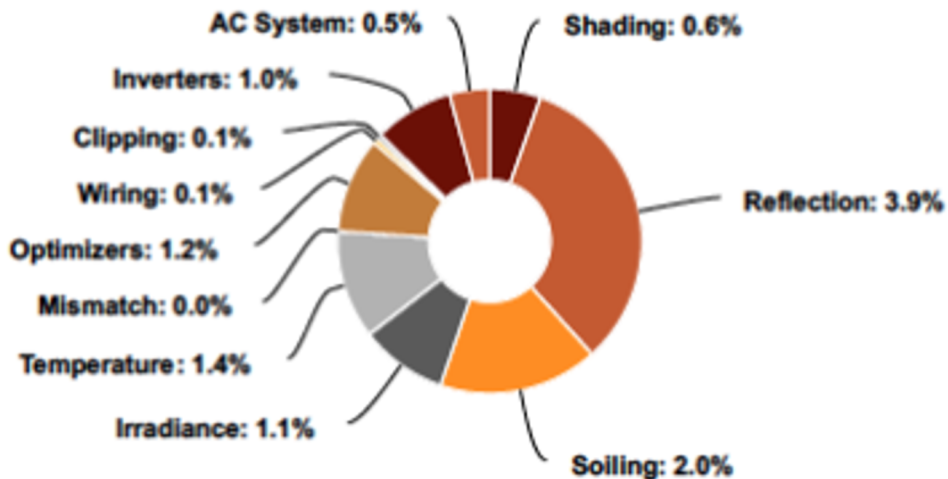
System Metrics

Design	Design 1
Module DC Nameplate	11.3 kW
Inverter AC Nameplate	10.00 kW Load Ratio: 1.13
Annual Production	13.34 MWh
Performance Ratio	88.8%
kWh/kWp	1,176.5
Weather Dataset	TMY, 10km Grid, meteonorm (meteonorm)
Simulator Version	0faeeb23b4-d40d0f9b48-d121d9dfd7-855a0e20b2

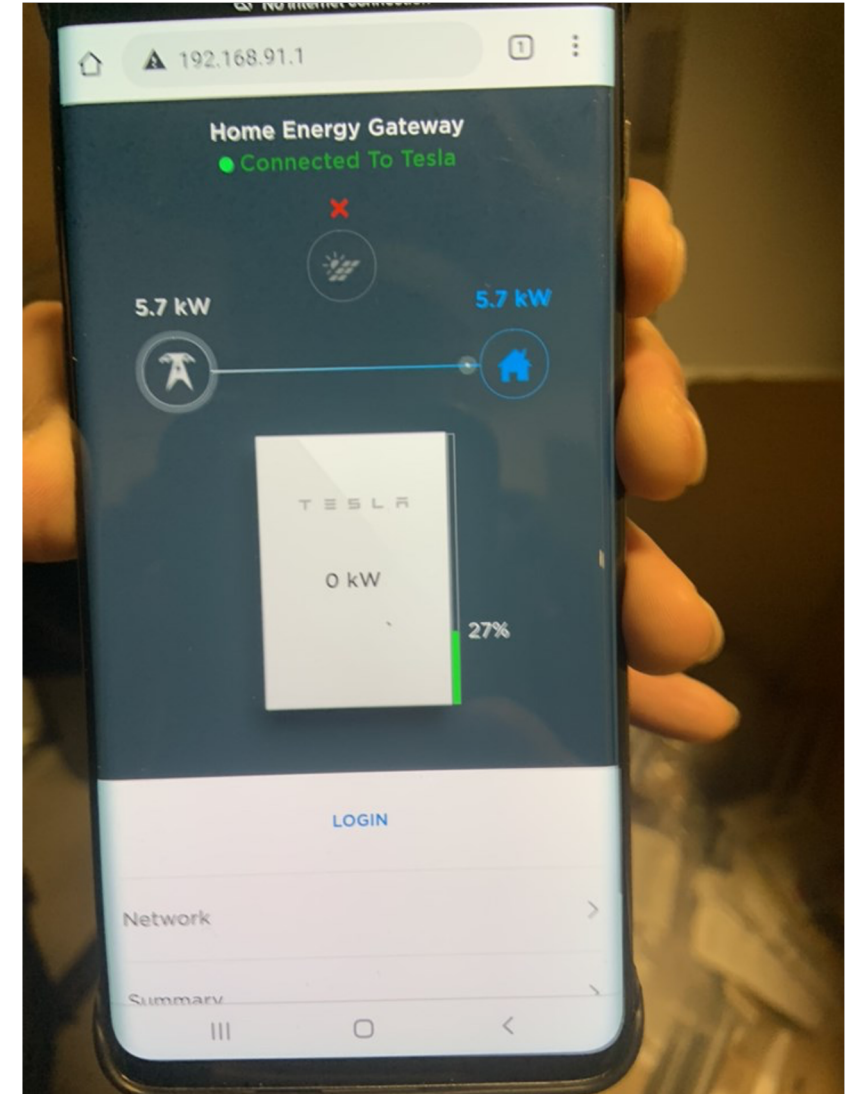
Monthly Production



Sources of System Loss



Battery System




North Vancouver Custom Residence

Ener Guide

HOMEOWNER INFORMATION SHEET

Your EnerGuide* rating and this report are based on data collected and, where necessary, presumed from your evaluation. Rating calculations are made using standard operating conditions.



Jan 15, 2021 9:32:47 AM

ENERGUIDE

Rating: 0 gigajoules per year (GJ/year)

Heated floor area: 359.5 m² (3869.6 ft²)
Rated energy intensity: 0.09 GJ/m²/year
Evaluated by: Y.Byun Capital Home Energy Inc
Quality assured by: CHBA-BC
File number: 5198N00028
Data collected: March 23, 2021
Year built: 2021

NRCan.gc.ca/myenerguide

HOW YOUR RATING IS CALCULATED:

- I. Rated annual energy consumption 31 GJ/year
II. Minus renewable energy contribution - 31 GJ/year
Equals your **EnerGuide rating** = 0 GJ/year

I. Your rated annual energy consumption is the total amount of energy your house would use in a year based on the EnerGuide Rating System standard operating conditions. For your house, this includes 20.67 GJ of passive solar gain.

Energy Sources	Rated Consumption (GJ/year)	Equivalent Units (per year)	Greenhouse Gas Emissions (tonnes/year)
Electricity	31	8650 kWh	0.1
Total	31		0.1

II. On-site renewable power generation systems can offset some or even all of your home's energy consumption. Renewable energy contributions are factored differently for your rating and your greenhouse gas emissions calculations.¹

On-Site Renewable Energy	Estimated Contribution (GJ/year)	Equivalent Units (per year)	Offset Greenhouse Gas Emissions (tonnes/year)
Electricity	39	10912 kWh	0.1
Solar water heating	0	0	0.0
Total	39		0.1

HOW YOUR CONSUMPTION COMPARES:

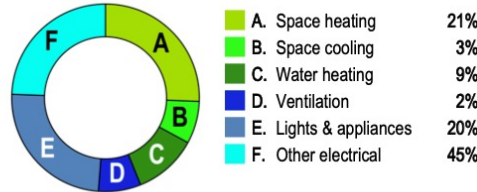
Compared to a typical new house, your house uses:

70.2% less energy;

86.3% less energy, when excluding the estimated energy consumption of lighting, appliances and electronics.

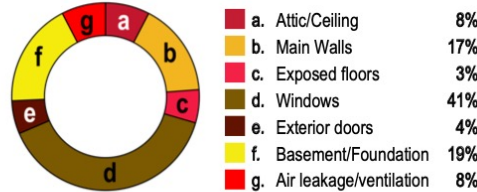
HOW YOUR RATED ENERGY IS USED:

The chart below represents the breakdown of rated annual energy consumption in your home under standard operating conditions. You can use these figures as a guide to help identify where you can lower home energy costs through proper home maintenance, efficient home operation, energy efficiency renovations or equipment replacement.



WHERE YOUR HOME LOSES HEAT:

Houses lose heat through their exterior shell, or building envelope. The chart below shows where and how your home loses heat. The quality and upkeep of your home can have a major impact on the amount of energy your heating and cooling systems use annually.



*EnerGuide is an official mark of Natural Resources Canada.
Refer to the glossary section for an explanation of relevant terms.



Data collected: March 23, 2021
File number: 5198N00028
Evaluated by: Y.Byun Capital Home Energy Inc

0 *This house produces more energy than it uses on an annual basis GJ/year

Best energy performance **0** GJ/year A typical new house **104** GJ/year Uses most energy

One gigajoule (GJ) equals the energy from two BBQ propane tanks

Rated Annual Energy Consumption	31 GJ
• Electricity	31
On-site renewable energy contributions	- 31 GJ
• Electricity	39
• Solar water heating	0
EnerGuide Rating:	= 0 GJ

Figures may not add up due to rounding.

Breakdown of Rated Annual Energy Consumption:

A. Space heating	21%
B. Space cooling	3%
C. Water heating	9%
D. Ventilation	2%
E. Lights & appliances	20%
F. Other electrical	45%

Rated Energy Intensity: 0.09 GJ/m²/year
Rated Greenhouse Gas Emissions: 0.0 tonnes/year

*This house has significant energy uses not included in the rating. See "House Details" on your Homeowner Information Sheet for details.

The energy consumption indicated on your utility bills may be higher or lower than your EnerGuide rating. This is because standard assumptions have been made regarding how many people live in your house and how the home is operated. Your rating is based on the condition of your house on the day it was evaluated.

Quality assured by: CHBA-BC

Builder: Naikoon Contracting Ltd.

Visit NRCan.gc.ca/myenerguide

North Vancouver Custom Residence



Building quality			This building		Criteria	Alternative criteria
Heating	Heating demand	[kW h/(m ² a)]	10	≤	15	-
	Heating load	[W/m ²]	10	≤	-	10
Cooling	Frequency of overheating (> 25 °C)	[%]	3	≤	10	
Airtightness	Pressurization test result	(n ₅₀) [1/h]	0.4	≤	0.6	
Non-renewable primary energy (PE)						
	PE demand	[kW h/(m ² a)]	102	≤	0	
Renewable primary energy (PER)						
	PER-demand	[kW h/(m ² a)]	43	≤	60	56
	Generation (reference to ground area)	[kW h/(m ² a)]	77	≥	#REF!	#REF!



North Vancouver Custom Residence

LESSONS LEARNED



IDP- The only way to go for any project

Stay on top of ever changing Building codes

Beware of the risks of using new innovative products

Actual occupant loads vs modelled loads – consumer beware! (and salesperson beware)

NZ Label vs. PH Cert- costs and challenges in Architectural homes

Where is the sweet spot ?? Law of diminishing returns..... (environmentally and economic)