ECOSAGE

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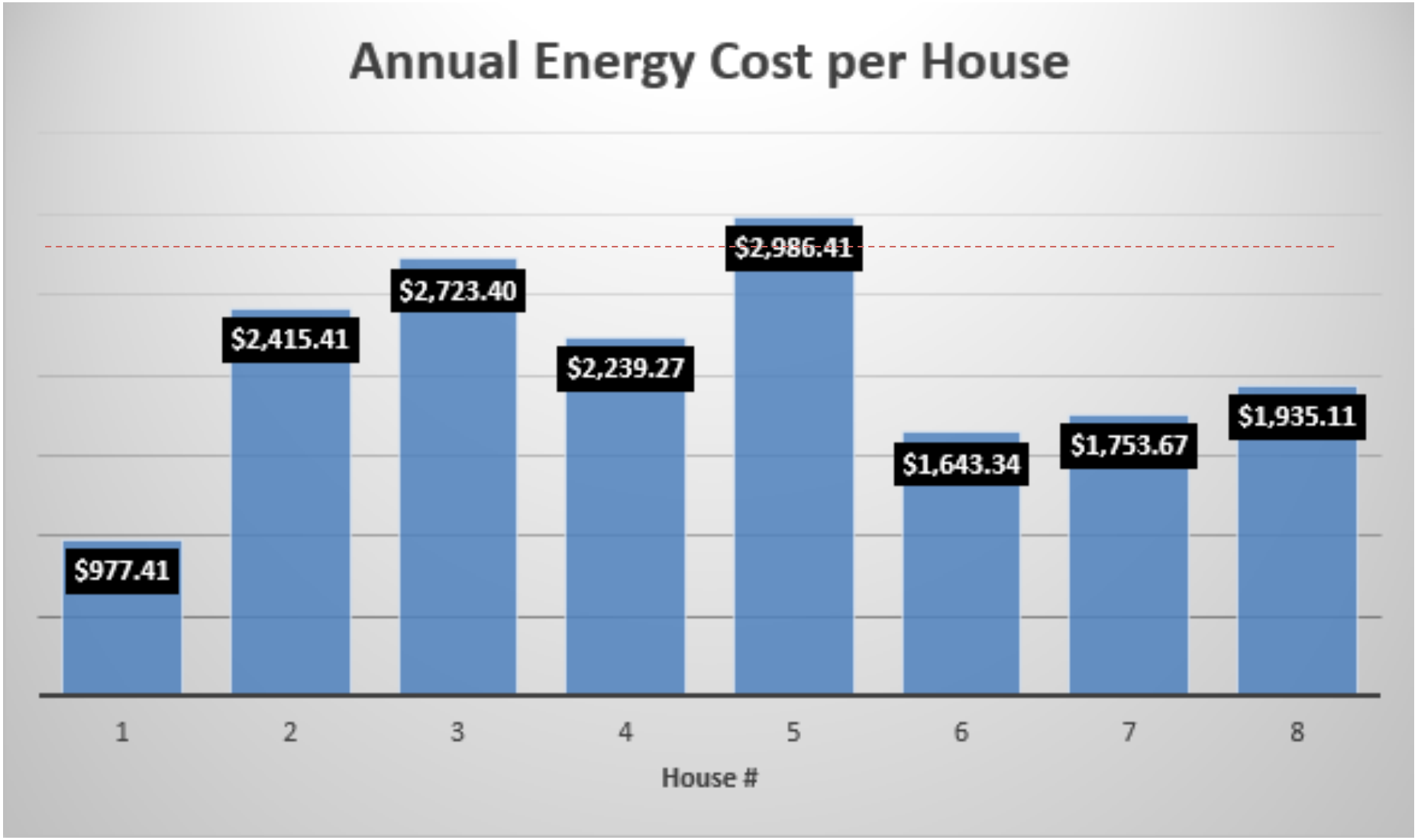
PENTICTON INDIAN BAND

FORTIS BC

What is an Energy Efficient Home?


Annual Energy Cost per House
$977.41
$2,415.41
$2,723.40
$2,239.27
$2,986.41
$1,643.34
$1,753.67
$1,935.11
1
2
3
4
5
6
7
8
House #

SUPER EFFICIENT NEW CONSTRUCTION (SENC)

Requirements: -

- Encouraged Passive Energy approach
- ENERGUIDE 90 (later reduced to 88)
- Domestic hot water (COP of 2)
- No PV

Where to Begin?

Passive House Institute

Canadian Home Builders' Association

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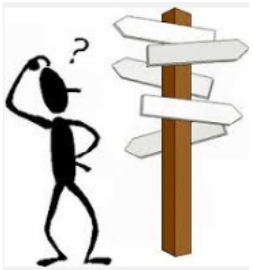
ENERGY STAR HOMES

LEED™



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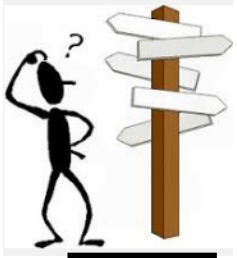
FORTIS BC

BC hydro

CITY OF VANCOUVER

NETZERO
ENERGY BUILDING CERTIFICATION℠

ENERGUIDE



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AIBC
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ENERGUIDE

LEED™

Passive House Institute

Energy Modelling

ENERGUIDE

Passive House Institute

Annual Energy Prediction kWh

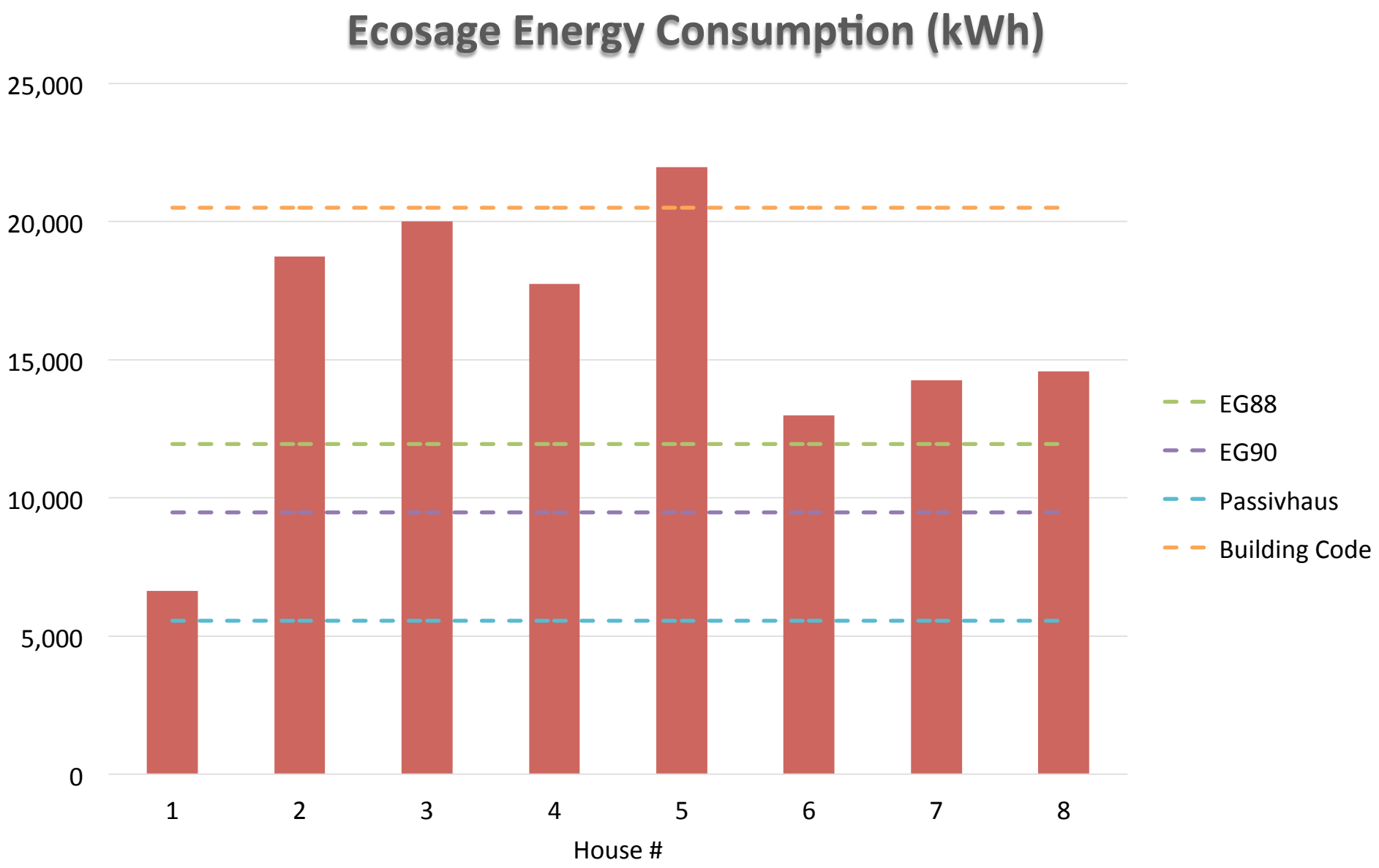
Rating: 0 to 100	✓ Air tightness < 0.6 ACH ✓ Heating energy < 15kWh/m^2 or 10W/m^2 ✓ primary energy< 120kWh/m^2

building components

House #:	1	2	3	4	5	6	7	8
Passive House Certified (pending) & Energuide 90	√							
LEED Platinum (pending)		√						
Energuide 88		√	√	√	√	√	√	√
Framed (R66 roof; R52 wall; R44 slab)	√							
Structural insulated Panels (R50 roof; R28 Walls; R20 Slab)		√	√	√	√	√	√	√
Air Tightness: <0.6ACH (50Pa)	√	√	√	√	√	√	√	√
Space Conditioning: Zehnder HRV plus preheat ground loop	√							
Space Conditioning & DHW Daikin Air to Water Heat Pump (in-floor radiant)		√	√	√	√	√		
Space Heating: Daikin mini-split air to air heat pump							√	√
Domestic Hot Water: Solar Hot Water System	√							
Domestic Hot Water: Air Tap (cold climate) air to water heat pump							√	√
2kW Solar photovoltaic system	√							
Windows: Euroline Passive House Certified	√							
Windows: Cascadia triple pane (fibreglass)		√	√	√	√	√	√	√
Roof: Metal cool roof	√	√	√	√	√	√	√	√
Lighting: LED and CFL	√	√	√	√	√	√	√	√
Landscaping: Xeriscape	√	√	√	√	√	√	√	√

- Orientation (including window location and overhang)
- Building envelope (insulation and cool roof)
- Space Heating(heat pumps – air to water/ air to air)
- Cooling
- Domestic Hot Water (heat pumps)
- Heat Recovery Ventilators
- Appliances and lighting

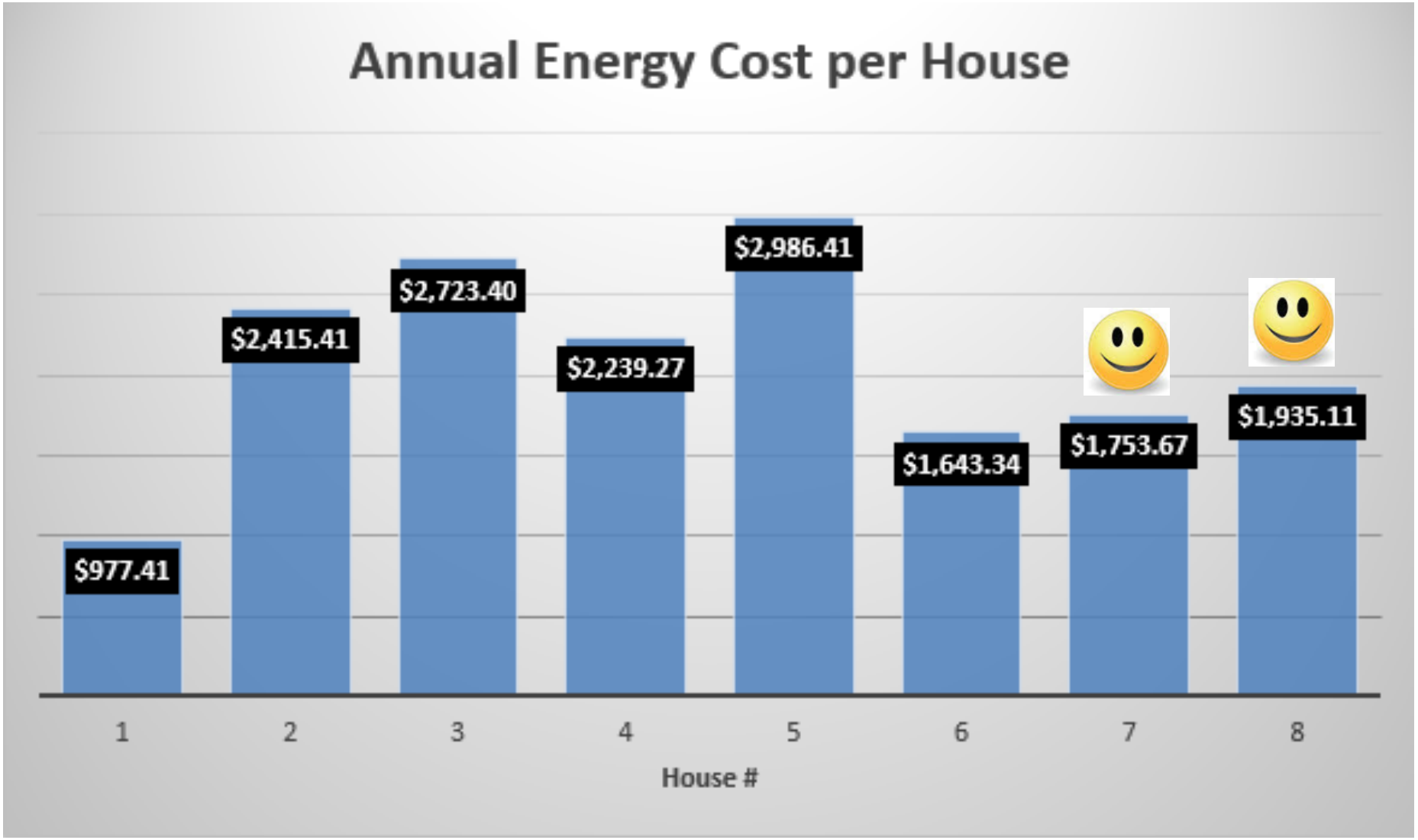
Performance


Ecosage Energy Consumption (kWh)
25,000
20,000
15,000
10,000
5,000
0
1
2
3
4
5
6
7
8
House #
EG88
EG90
Passivhaus
Building Code

Solar Production

House #1					
	Days	Del (kWh)	Rec (kWh)	Balance	$ balance
Nov 10,2014 to Feb 2, 2015	84	4564	36	4528	666.52
Feb 2 to Mar 11	37	1070	100	970	142.78
Mar 11 to May 13	63	429	573	-144	-21.20
May 13 to Jul 13	61	521	467	54	7.95
July 13 to Sep 11	60	574	349	225	33.12
Sep 11 to Nov 12	62	1235	228	1007	148.23
	367	8393	1753	6640	977.41
Solar used by the home:		4770	kWh		
Net minus solar (for comparison):		13163	kWh		

	kWh	Installed Cost ($)
Solar PV:	2724	10,275.00
Solar Hot Water:	2046	7,550.00
Total:	4770	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Cost

How much does it cost?

- Okanagan $150 to $300 per ft^2 ($225,000 to $450,000)
- Actual Cost $166/$ft^2$ or $250,000 (inc. $30,000 subsidy toward energy efficiency)

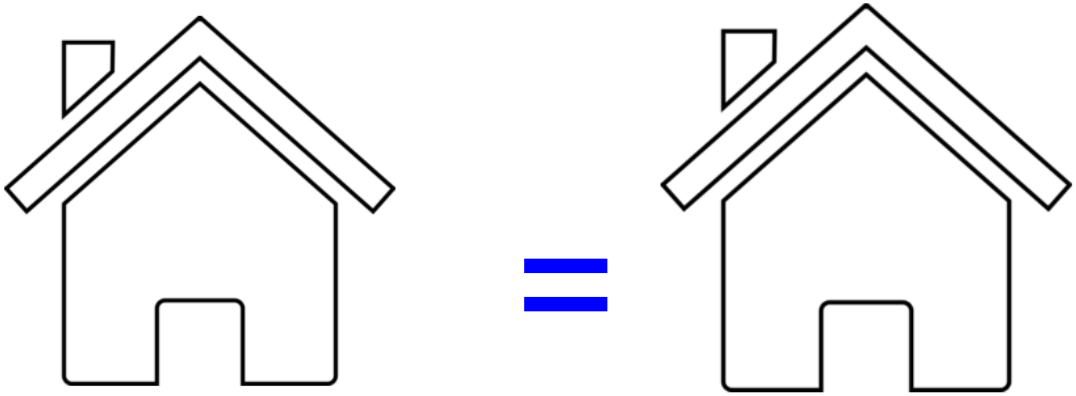
Ecosage based on modelled savings have a simple payback of 20 years

Lessons Learned

Trades & Supply Chain

- Building efficiently isn’t easy
- Energy efficient trade training
- European components expensive

Occupant Behavior



- Rebound effect (thermostats set high)
- Passivhaus' generally owned by passive people
- Smart meters and in-home displays
- Occupant training
- Technology needs maintenance

Questions