



Manor House

Design Team: Tim Judge, Len Sakuragi, Yan Marineau-Brachmann, Sarah Bozoian, Ellen Klein, Jesse Listoen, Rashad Brugmann, Christy Love (RDH Building Science); Paul Ristow, Frank Lee (FRESCO); Scott Sinclair (SES Consulting); Victor Lü (AES)

Presenter: Christy Love



System features (current state)	
Envelope	2x4 stud insulation; single glazed alum windows; attic insulation
Space Heating (suites)	Hydronic heating via standard eff. gas boilers.
Space Heating (common areas, MUA)	No heat in MUA
Cooling	None
Domestic Hot Water	Newer condensing gas boiler
Ventilation	Operable windows, unconditioned corridor pressurization fans

FortisBC Deep Retrofit Pilot



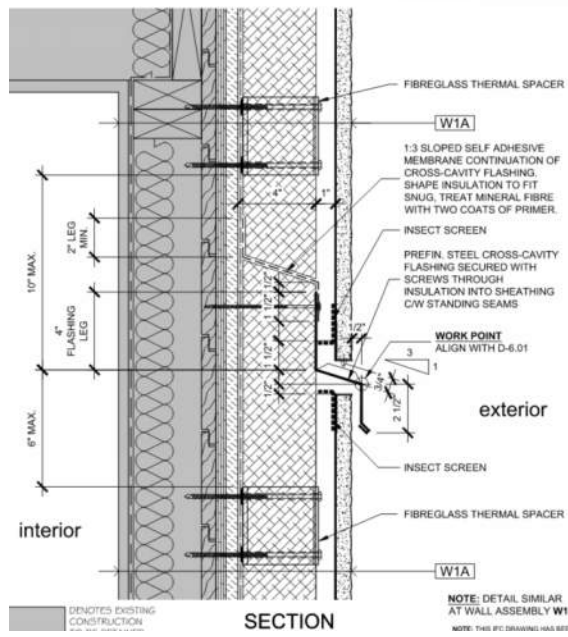
Focus:

- How far can we reduce emissions with gas-based solutions?
- Target 50-80% emissions reductions
= emphasis on demand reduction
- 5 buildings
- Construction completion by fall 2024
- Inform incentive program

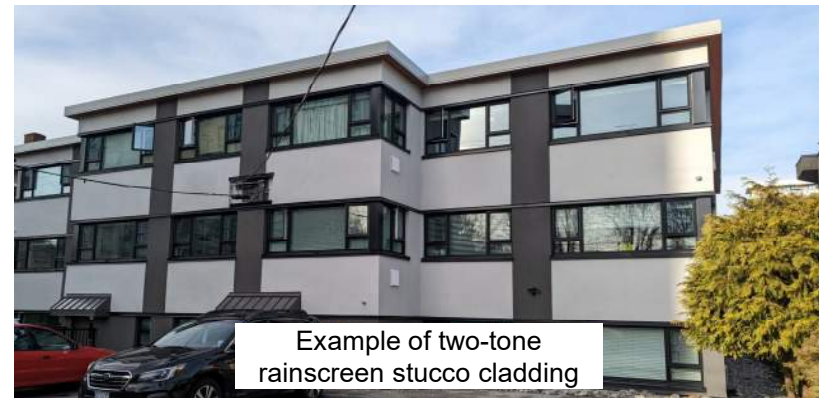
Proposed Approach

- High performance windows (+ estimated 20% improvement in airtightness)
- Exterior wall insulation and reclad (+ 10% improvement in airtightness)
- Roof insulation (+ 20% improvement in airtightness)
- Parkade ceiling insulation
- Space heating Gas Absorption Heat Pump (GAHP) + Water Loop Air Conditioners
- Domestic Hot Water GAHP
- Drain Water Heat Recovery
- In-suite HRVs
- Solar DHW pre-heat
- BAS Upgrade
- (+ shading option)

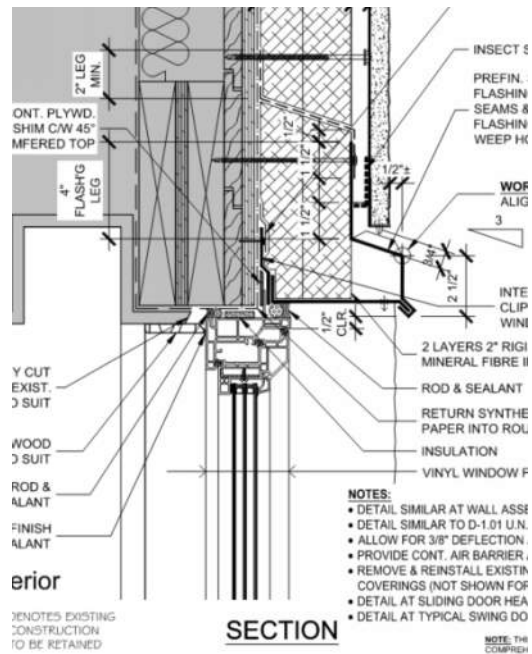
BUILDING ENCLOSURE – EXTERIOR WALL DESIGN



- New rainscreen cladding
- New 6" exterior insulation
- New continuous air barrier



BUILDING ENCLOSURE – WINDOW AND SLIDING DOOR DESIGN

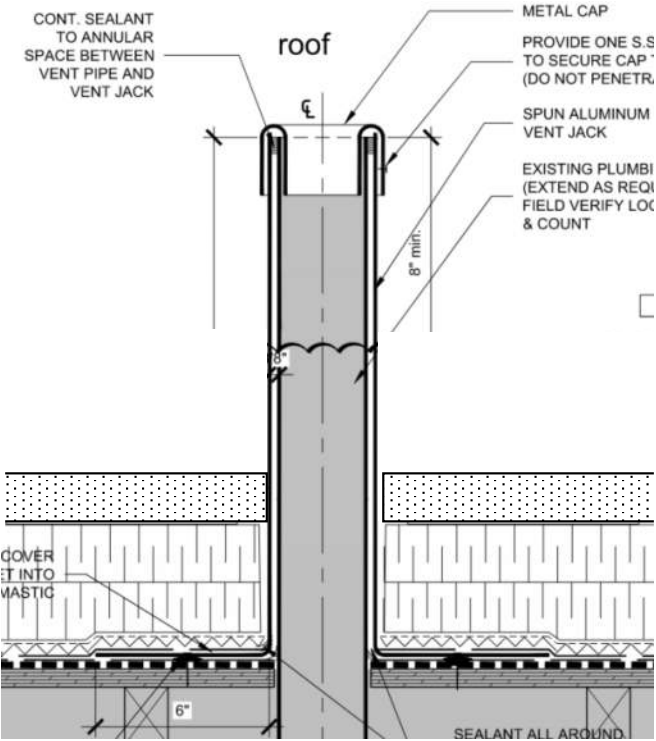


- New vinyl (or fibreglass) framed windows and sliding doors
- Triple glazed IGUs
- Awning or casement operable vents



Example of triple glazed vinyl framed window with casement operable vent

BUILDING ENCLOSURE – ROOF DESIGN

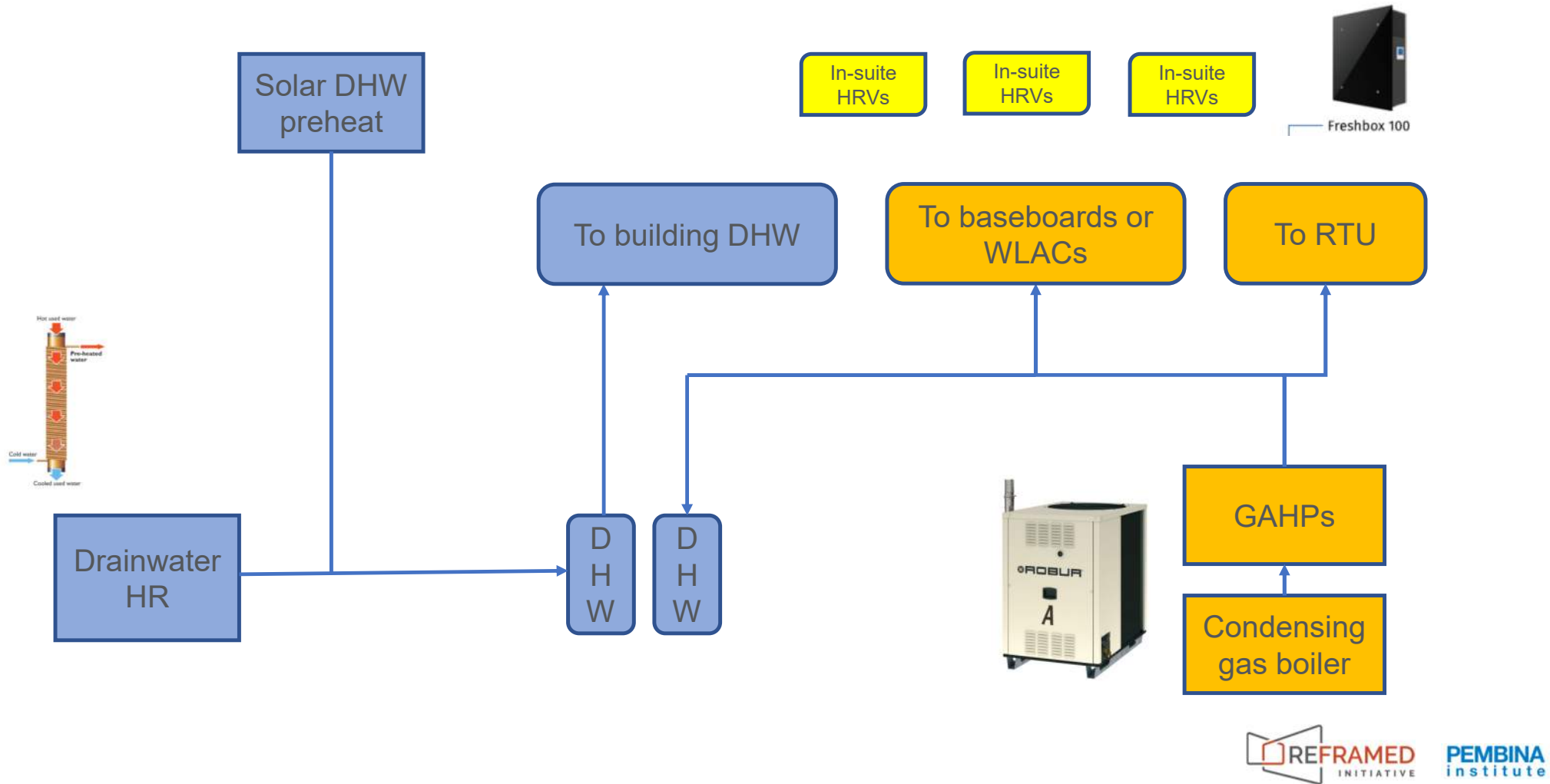


- New 6" exterior insulated low-slope roof
- New 2-ply SBS membrane



Example of exterior insulated roof assembly installation in progress

PROPOSED MECHANICAL SYSTEM SCHEMATIC



Proposed approach

Component	Options			
Envelope	Stripping Recladding	Overcladding pannelization	New windows/doors Triple glazed U-0.17 SHGC .21	Insulation 6" cavityrock exterior 6" polyiso roof
Space Heating (in-suite)	Baseboards	Heat Pump	High perf. Boiler/Furnace	GAHP
Space Heating (common areas)	Baseboards	Heat Pump	High perf. Boiler/Furnace	GAHP
Cooling	Active – centralized	Active-distributed	Passive	Common areas In-suite
Domestic Hot Water	Resistance	GA Heat Pump	High eff gas	Heat capture Solar preheat + drainwater HR
Ventilation	Distributed	Centralized	HRV	ducted
Seismic	Synergistic	Collapse prevention	Life safety	Immediate occupancy
Electrical service upgrades	Sub-panel	Main service	Transformer	
Solar	Positive	Rooftop PV	Storage	

Vitals	
GHG	-73% 11 kgCO2/m ² yr
Energy	-54% 116 kWh/m ² yr
NPV <i>without incentives</i>	
NPV <i>with incentives</i>	N/A

Detailed Energy/GHG Results

	Existing Condition (Baseline A)	With BAU replacements due in next five years (Baseline B)	Proposed design A (preferred bundle A)	Comment
GHGi (kgCO ₂ e/m ² , % reduction over BAU)	41	36	11, 69%	
TEUI (ekWh/m ² , % reduction over BAU)	256	234	116, 51%	
Annual Energy Cost (\$, % reduction over BAU)	\$52,800	\$51,300	\$38,600, 25%	
Demand (kW, % reduction over BAU)	44	71	78, -10%	
CEDI (kWh/m ²)	0	11	11	
TEDI (kWh/m ² , % reduction over BAU)	99	82	19, 77%	
Hours over 80% acceptability w/passive measures (hours, % reduction over BAU)	~1,500 (southwest) Max temp = 46 C (historic files)	0	0	Mech cooling assumed in Baseline B and proposed

Detailed Financial Results

	Existing Conditions (baseline A)	Base renewal (baseline B)	Proposed design A (preferred bundle A)
Capital Cost	N/A	\$4,624,000	\$6,920,000
Net Cost = Capital – Renewal Amount – Incentives, \$	N/A	N/A	-\$2,296,000
NPV without incentives (Net Cost, 40 years), \$	N/A	N/A	
NPV with incentives (Net Cost, 40 years), \$	N/A	N/A	N/A
IRR (annual), %	N/A	N/A	
NPV solar system	N/A	N/A	N/A



PEMBINA
institute

Questions?

Christy Love
clove@rdh.com

