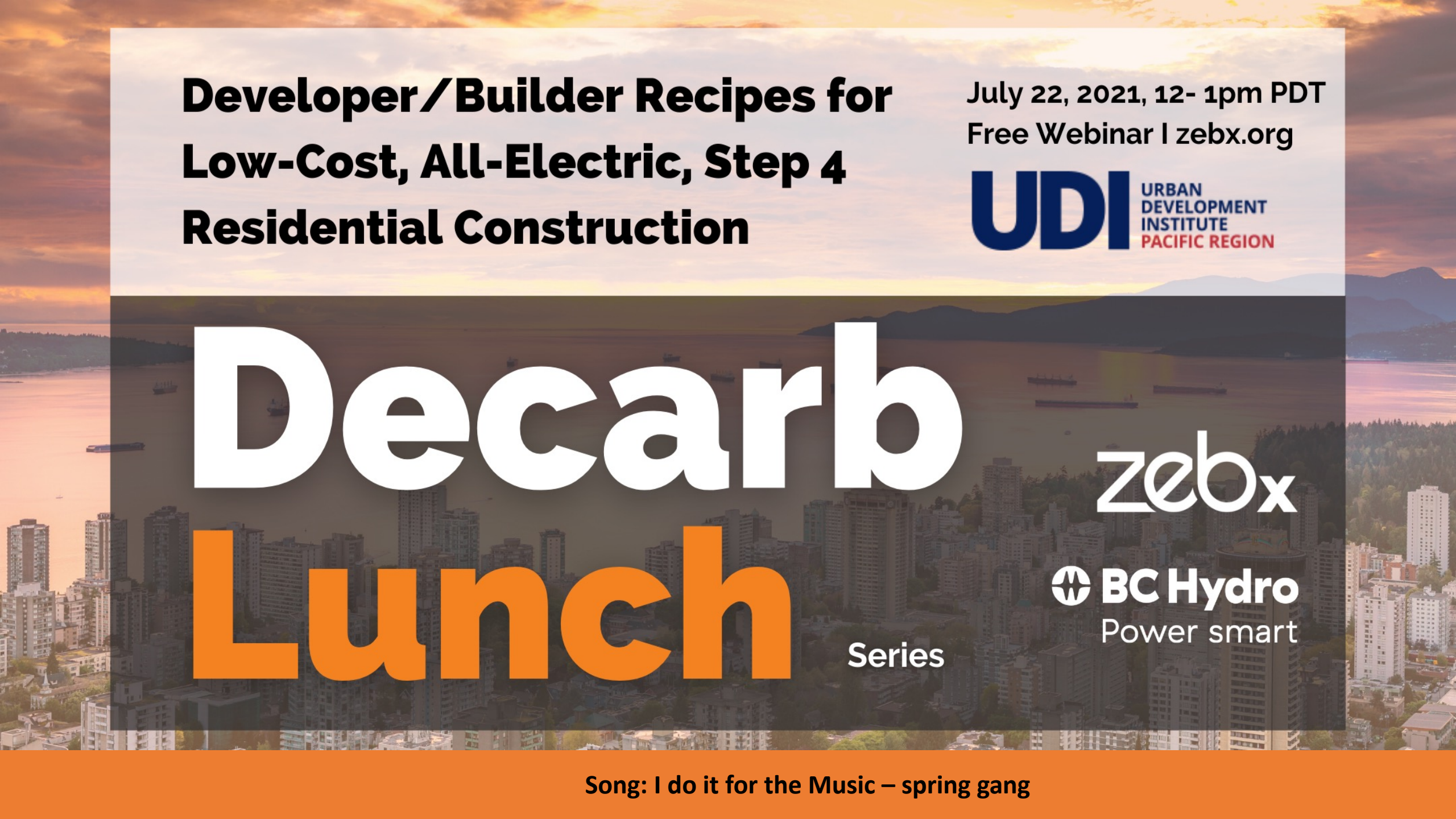
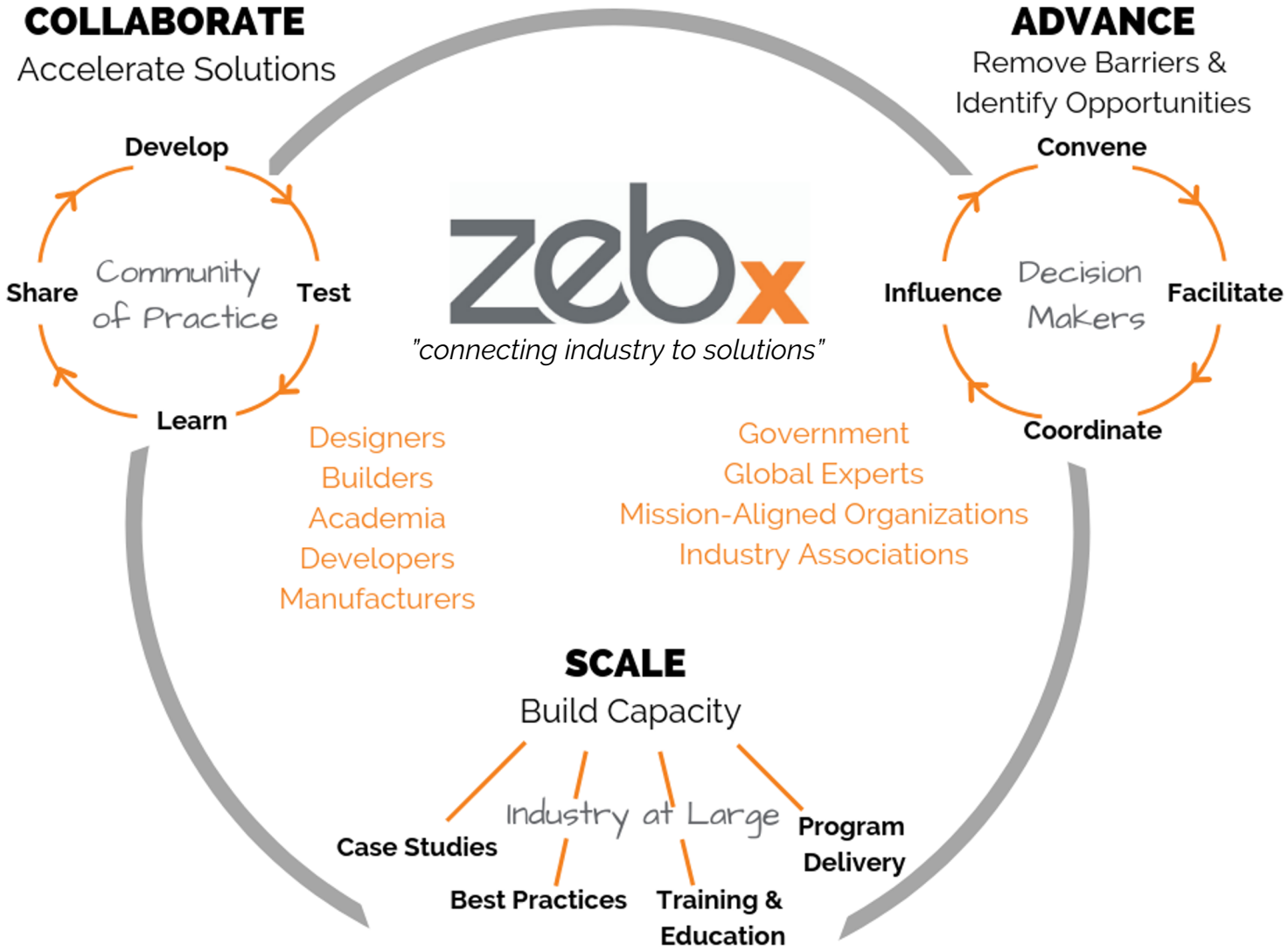

Developer/Builder Recipes for
Low-Cost, All-Electric, Step 4
Residential Construction
July 22, 2021, 12- 1pm PDT
Free Webinar I zebx.org
UDI
URBAN
DEVELOPMENT
INSTITUTE
PACIFIC REGION
Decarb
Lunch
Series
zebx
BC Hydro
Power smart
Song: I do it for the Music – spring gang


COLLABORATE
Accelerate Solutions
Develop
Test
Learn
Share
Community of Practice
ADVANCE
Remove Barriers & Identify Opportunities
Convene
Facilitate
Coordinate
Influence
Decision Makers
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CASE STUDY

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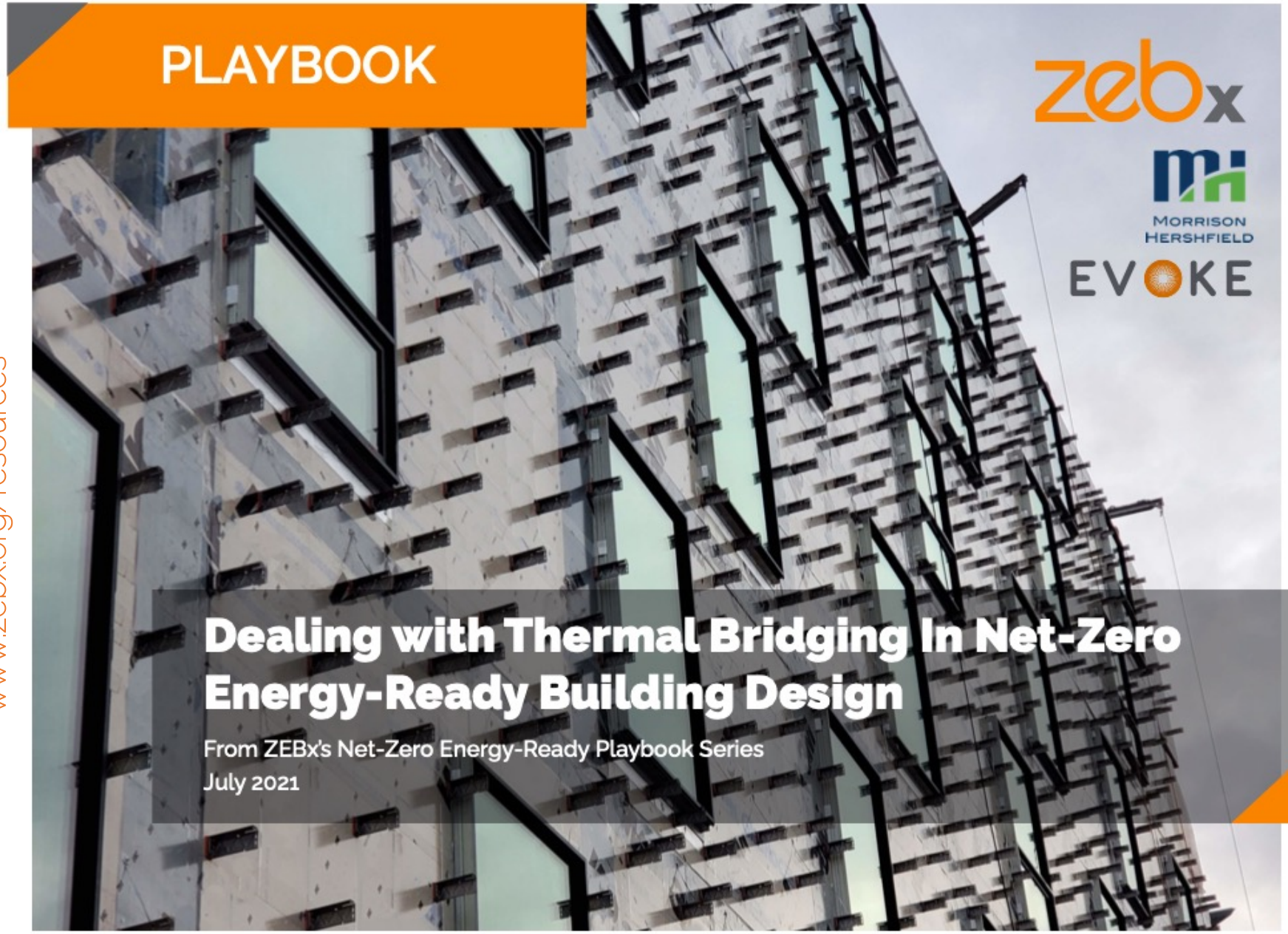
cleanBC BETTER BUILDINGS

NET-ZERO ENERGY-READY CHALLENGE

WINNERS SERIES

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



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cleanBC BETTER BUILDINGS

NET-ZERO ENERGY-READY CHALLENGE

PLAYBOOK SERIES

- Ventilation Strategies for High-Performance MURBs
- Planning Airtight Buildings
- LCA Practice to Estimate Embodied Carbon
- Thermal Bridging
- Low-Carbon Energy Systems
- Planning High-Performance Buildings

ORION: A NEAR-ZERO EMISSIONS MULTI-UNIT RESIDENTIAL BUILDING IN PEMBERTON, B.C.

CASE STUDY

Orion is a multi-unit residential building in Pemberton, British Columbia. The project is expected to exceed the energy efficiency requirements set for its region and meet Step 4, the highest level of the BC Energy Step Code, while maintaining the construction cost below the market rate. This case study presents practical solutions and strategies implemented during design and construction to deliver an affordable, sustainable, low-carbon, healthy building in British Columbia's South Coast.

October 2020

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Categories:

- [ ] Articles
- [ ] Case Studies
- [ ] Past Events
- [ ] Reports
- [ ] Videos & Slides

Series:

- [ ] NZER Challenge Playbook Series
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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

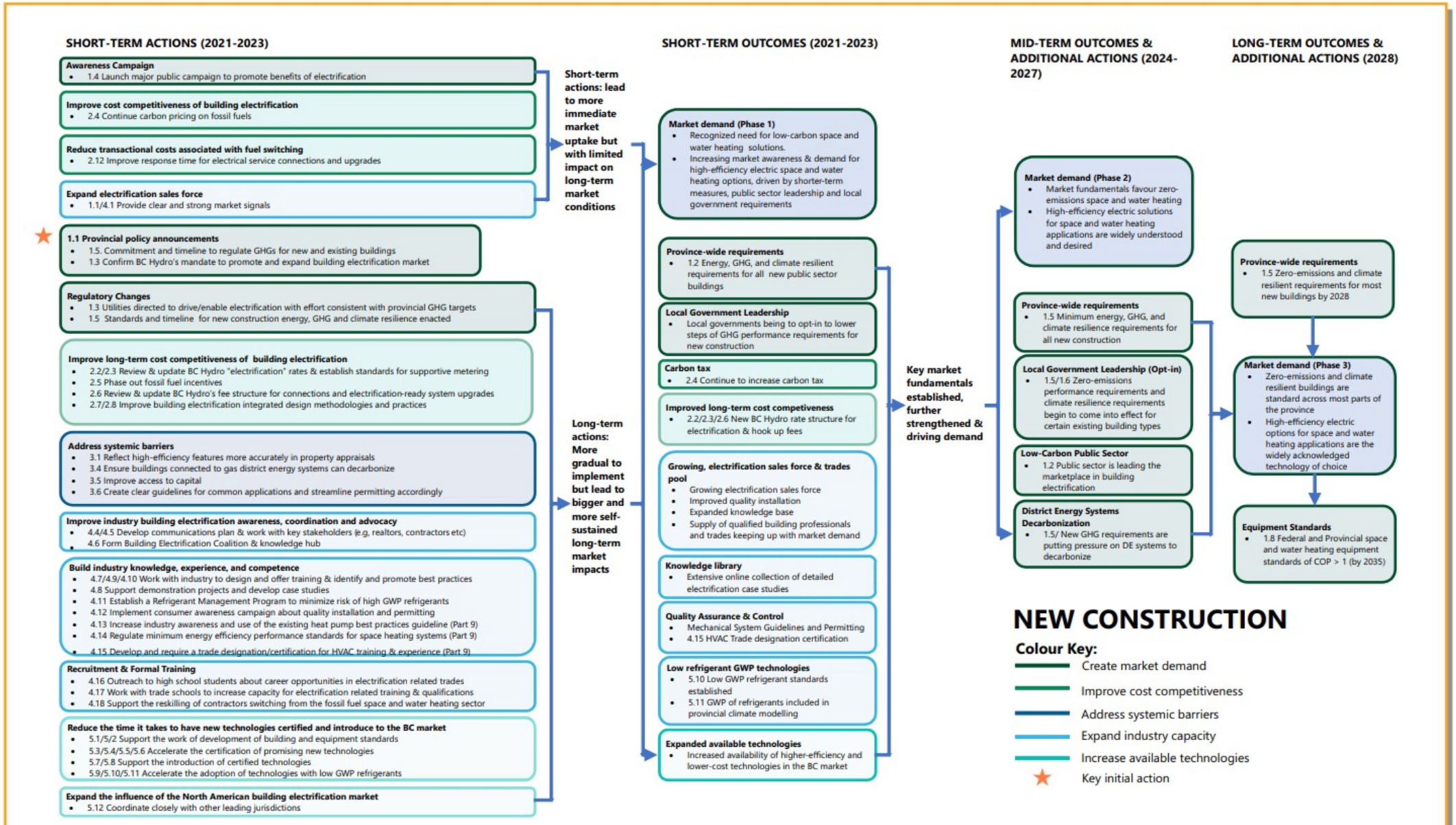
ZebX Decarb Lunch

BC Hydro
Power smart

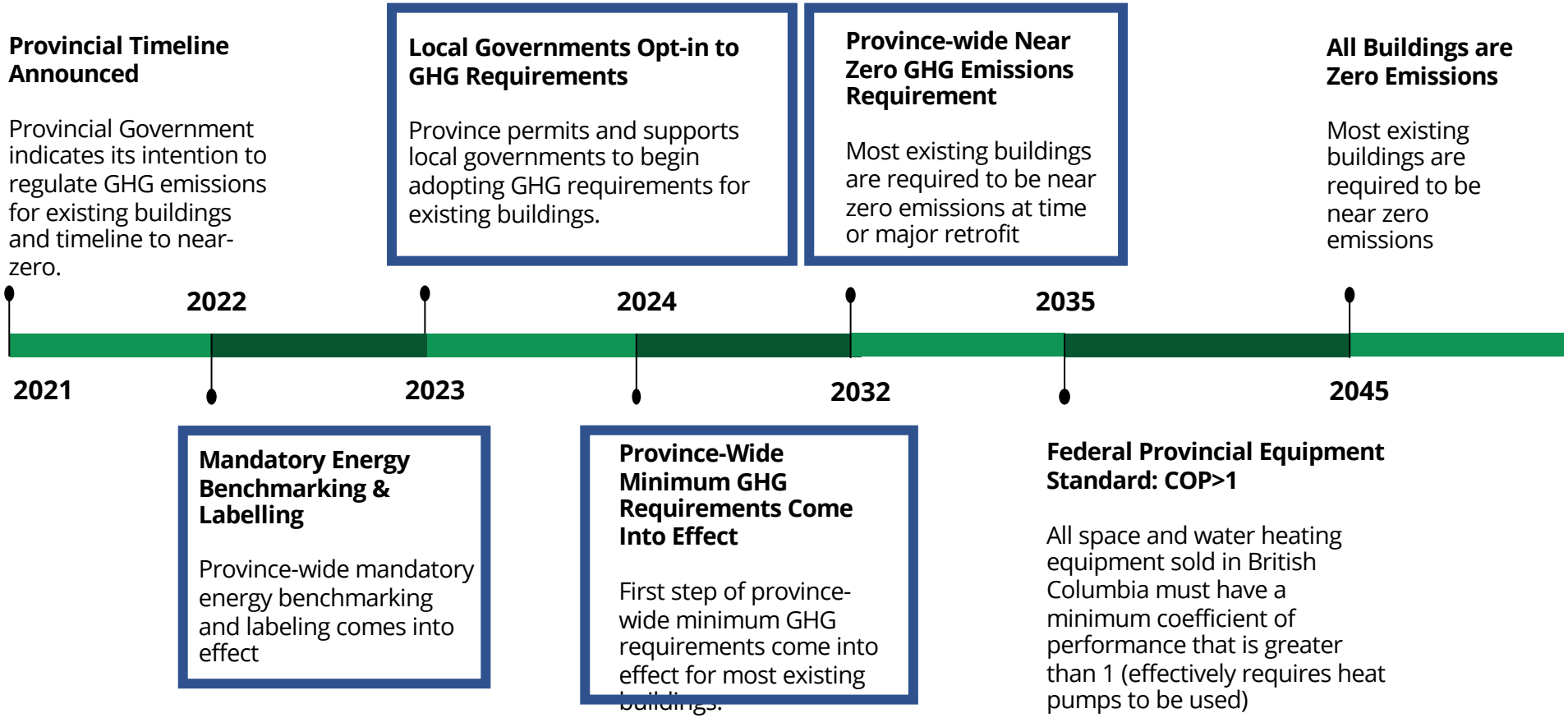
Working with partners

BC Hydro
Power smart

The Building Electrification Road Map for New Construction 2021-2028



Recommended Regulatory Timeline: Existing Buildings



Recommendations to BC Hydro

1. Rates and Fees

- Preferred rates for electrification
- Reduced connection / system upgrade fees
- More predictable cost estimates.
- Improved response times
- Construction of capacity improvements

2. Customer care

- Connection process
- System specifications, cost estimates, and connection requirements
- Guidance on installation, commissioning and ongoing system optimization

3. Messaging

- BC Hydro's support for building electrification
- Clarification around electrical supply and distribution capacity

4. Supporting roles

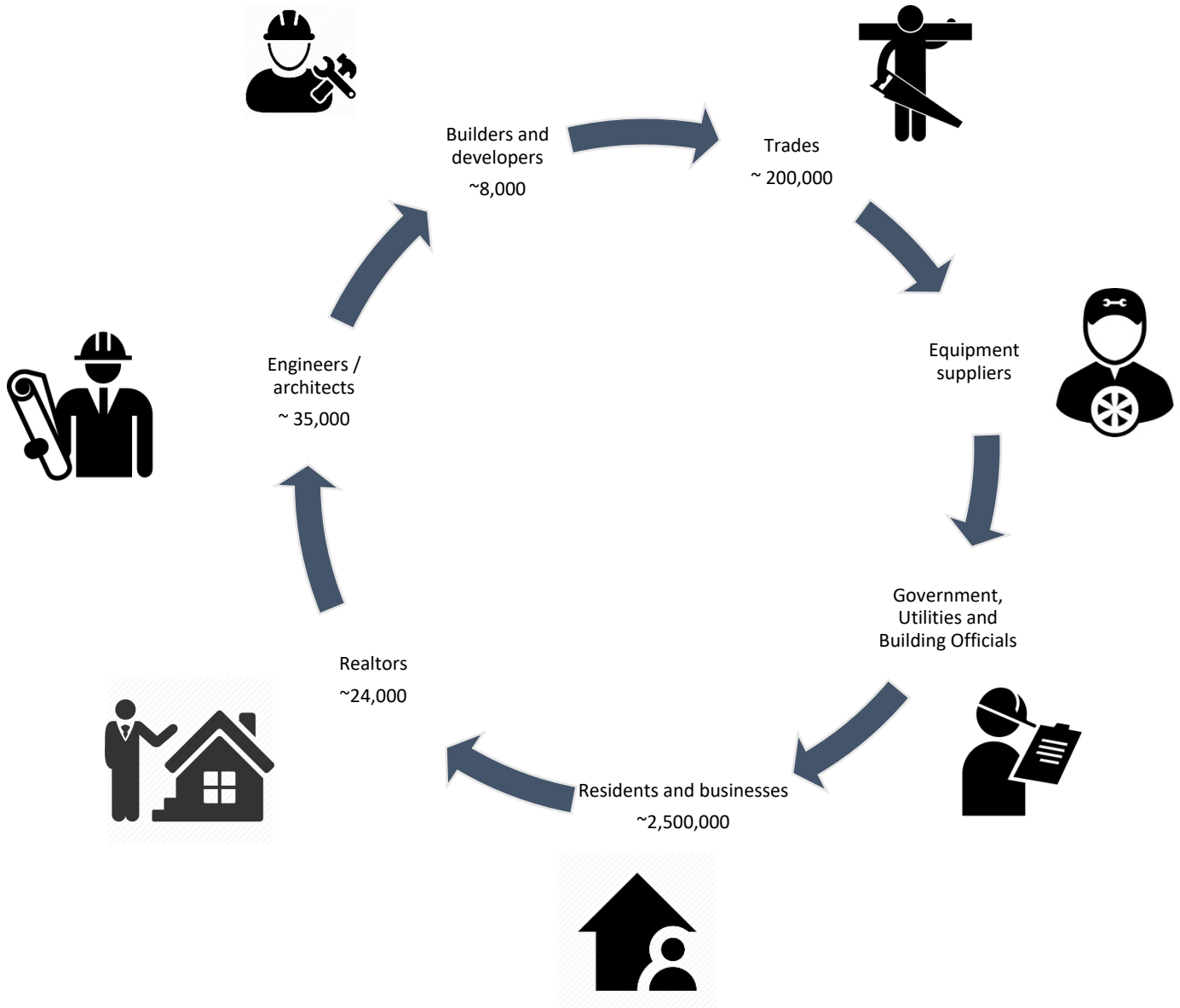
- Accelerate introduction of promising new technologies
- Industry capacity building

Electrification Plan – Fall 2021

BC Hydro
Power smart

Implementing Building Electrification Roadmap

Building Electrification Coalition



BC Hydro
Power smart

CleanBC Better Buildings Offers

Commercial New Construction (Part 3)

- Support fuel-switching away from natural gas/fossil fuels to clean electricity
- Focus on Space Heating, Water Heating and Ventilation
- Up to $15,000 in Energy Study funding and $500,000 in Capital Incentives available.
- Projects built to 100% electric space, ventilation and domestic hot water heating (with no gas boiler as a backup) are eligible to **receive a 10% bonus of the Capital Incentive**.

https://betterbuildingsbc.ca/incentives/cleanbc-commercial-new-construction-program/

BRITISH COLUMBIA | cleanBC BETTER BUILDINGS

POLL 1

What did you tell us about yourself?

POLL 2

Cooling in buildings of the future?

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

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Zebx

JUNE 2021

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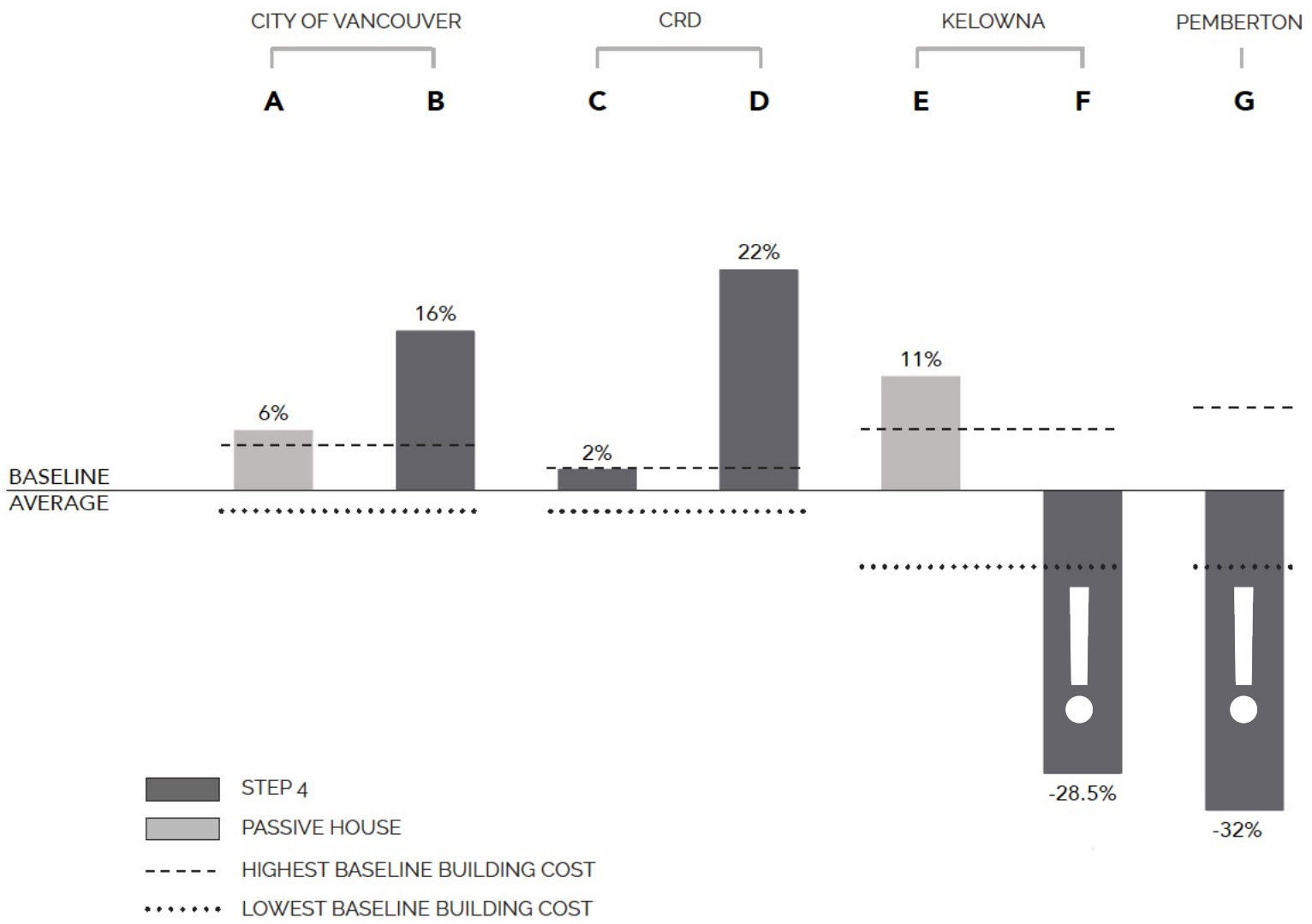
Overall Cost Comparison



POLL 2
RESULTS

Cooling in buildings of the future?

HIGH STREET

INTRODUCTION

- Developer – Builder based in Kelowna
- Approximately 50 employees
- Started in 2005
- 27 different projects consisting of 4000 homes

MILESTONES

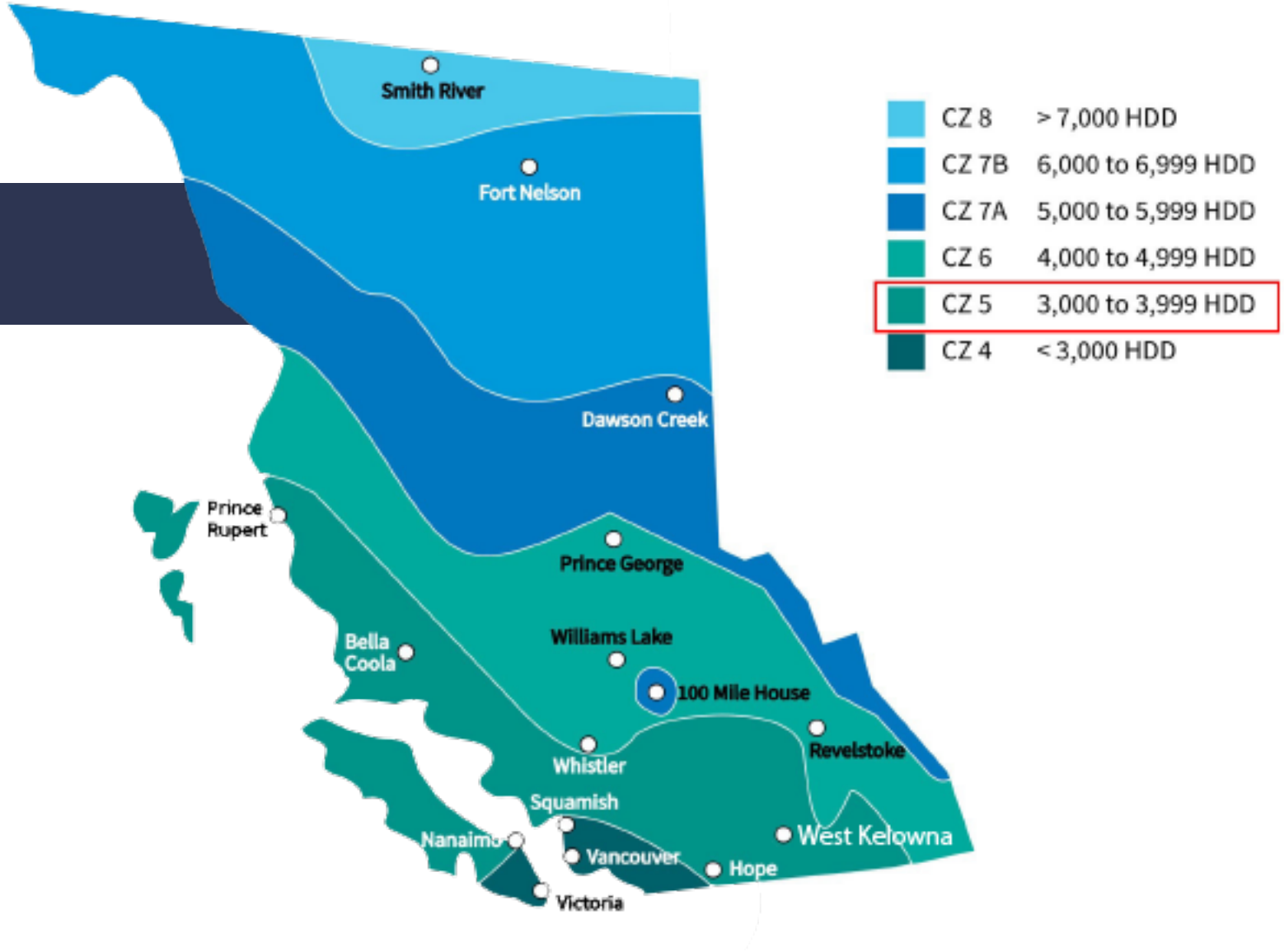
- **2016**: Highstreet Construction
- **2018:** Completed First project
- **2020:** First Step 4 building, Highstreet Architecture
- **2021:** First complete Step 4 project finished

Current capacity is 800-1000 units in construction at a time.

HIGH STREET

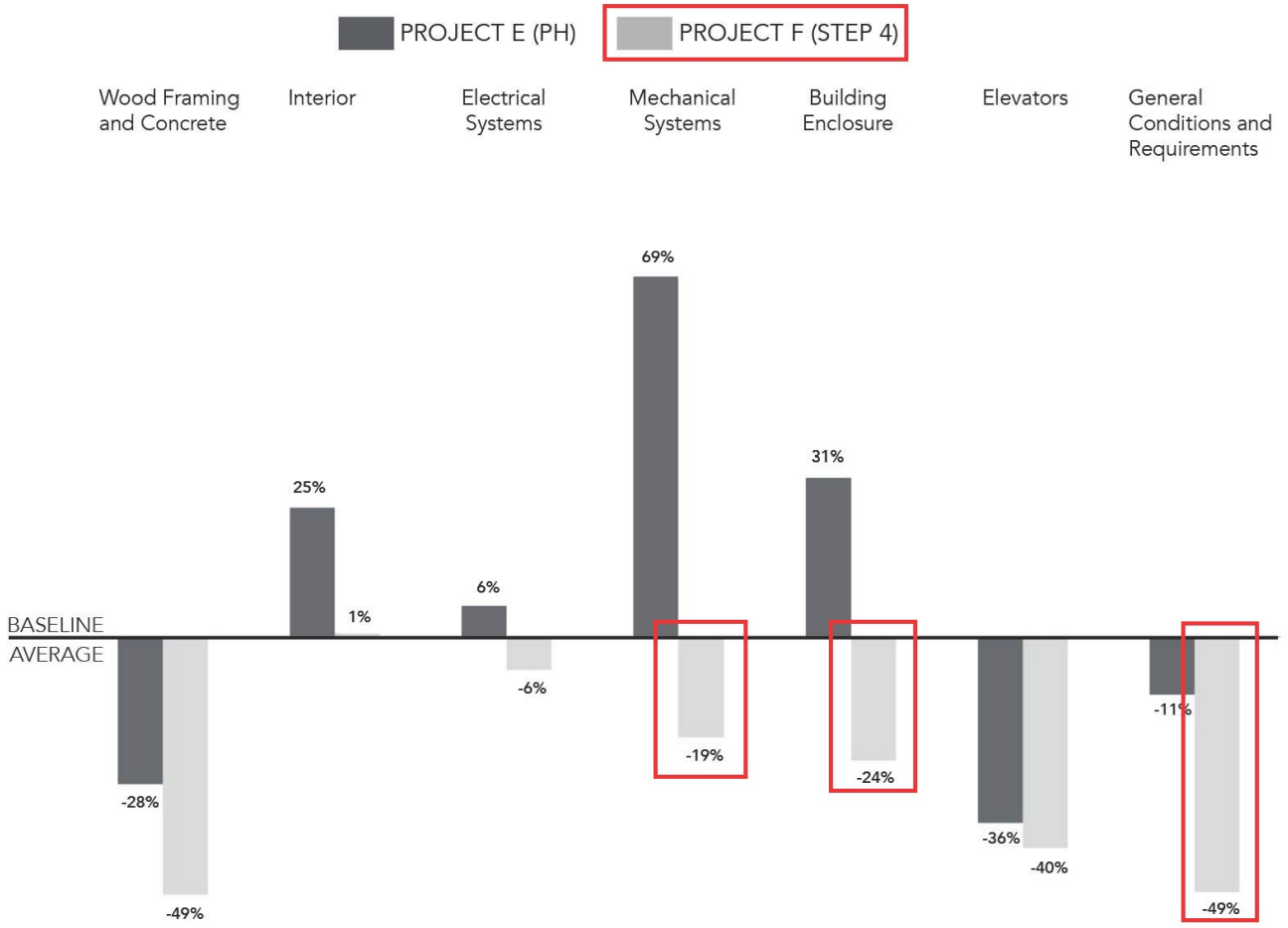
CARRINGTON VIEW

- 186 rental apartments
- West Kelowna
- Built Green Platinum
- LEED (Building A)
- BC Step 4 (Building A)
- Climate Zone 5



HIGH STREET

COMPARISON TO CODE BUILDING



HIGH STREET

SYSTEMS

- All electric systems
  - Carrier Heat Pumps
  - Panasonic ERVs
  - A.O Smith Hybrid HWTs
- Water heating and decentralized
  - Why decentralized

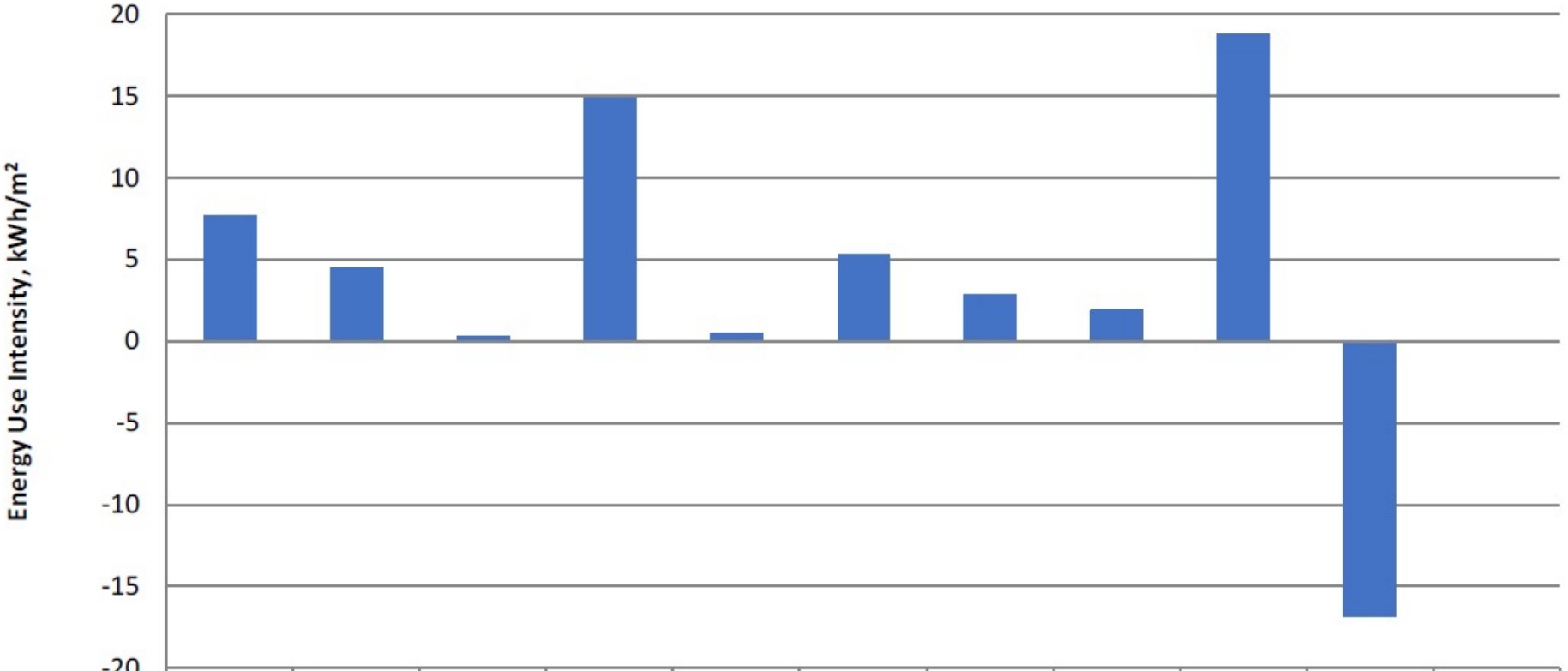
HIGH STREET

FEATURES + FEATURES

- Cooling
- Underground parking
- Stainless steel appliances
- Quartz countertops
- Solar

HIGH STREET

ENERGY METRICS



	Space heating	Space cooling	Heat Rejection	Interior lighting	Exterior lighting	Service Water heating	Fans	Garage fans	Other misc equip	Site Generation	Total
Proposed	7.7	4.5	0.3	14.9	0.5	5.3	2.8	1.9	18.7	-16.8	39.7

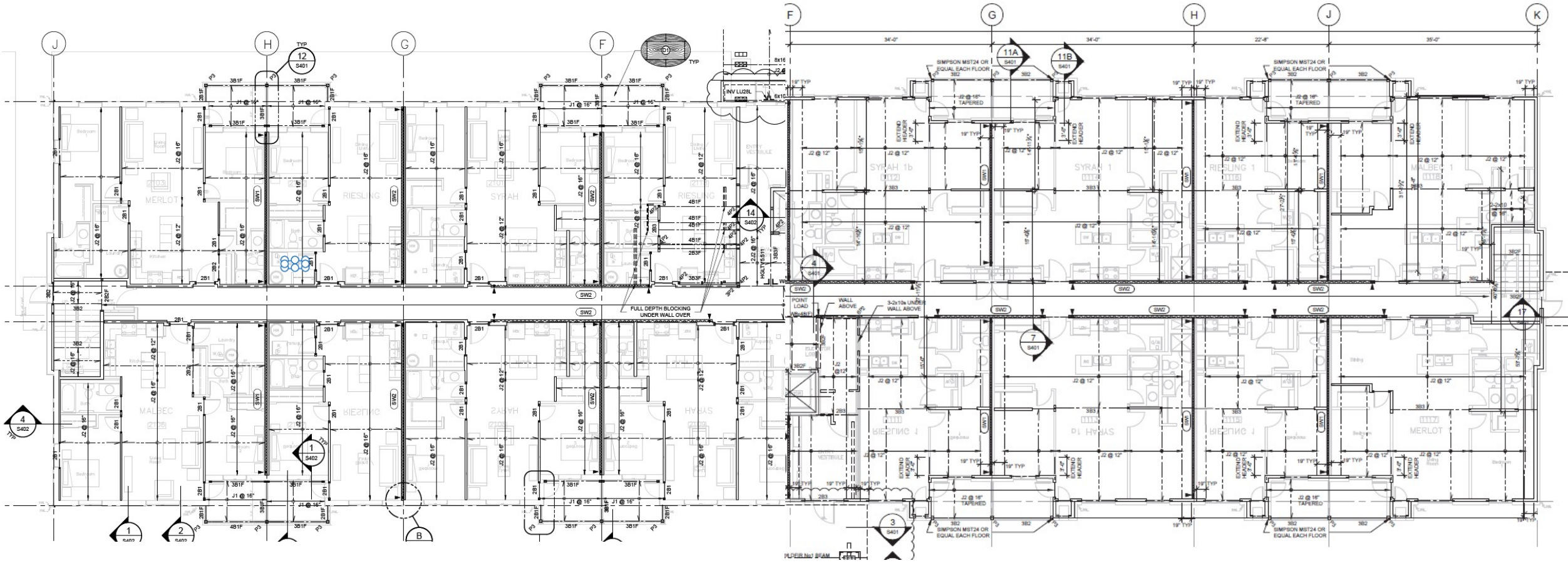
Figure 2: Annual Energy Use Intensity by End Use

HIGH STREET

EXTERIOR + ENVELOPE

- SIPS
- Taped seams using 3M and SIGA tapes
- Tyvek building wrap
- 2” Exterior Roxul
- Window to Wall Ratio 17.4%

HIGH STREET


J
H
G
F
K
MERLOT
RIESLING
SYRAH
MALBEC
SYRAH 1b
FULL DEPTH BLOCKING UNDER WALL OVER
SIMPSON MST24 OR EQUAL EACH FLOOR
EXTEND HEADER
TAPERED
WALL ABOVE

HIGH STREET

SIMPLE.
REPEATABLE.
ITERATIVE.

- Formwork and framing crews show up knowing exactly what to expect and what to do
- Similar design has been used on 20+ of our buildings
- No figuring it out or hair pulling, less waiting for RFIs SIs

HIGH STREET

SPEED

- Using the design principles of the previous slide speeds up our builds
- Less time on site keeps our general costs down
  - Supervision
  - Equipment, trailers, washrooms
  - Security, First aid and Safety
- Culture of Speed = Better subtrade pricing

HIGH STREET


HIGH STREET

DEVELOPER/BUILDER + OWNER/OPERATOR

- Constant feedback from our operations and sales team as to what adds value
- Similar feedback from construction team and trades as to what design items drive up costs
- Everything has a purpose – whether to speed up construction or improve rents and sales

LEARNING POINTS

- **SIPS** – Initially were going to save time and money
- Code issues with Flame spread added time and costs

HIGH STREET

LEARNING POINTS

- Locating the heat pumps condensing units
- Hot water tanks centralized

HIGH STREET


Simple works

Radius building

Energy

Who we are

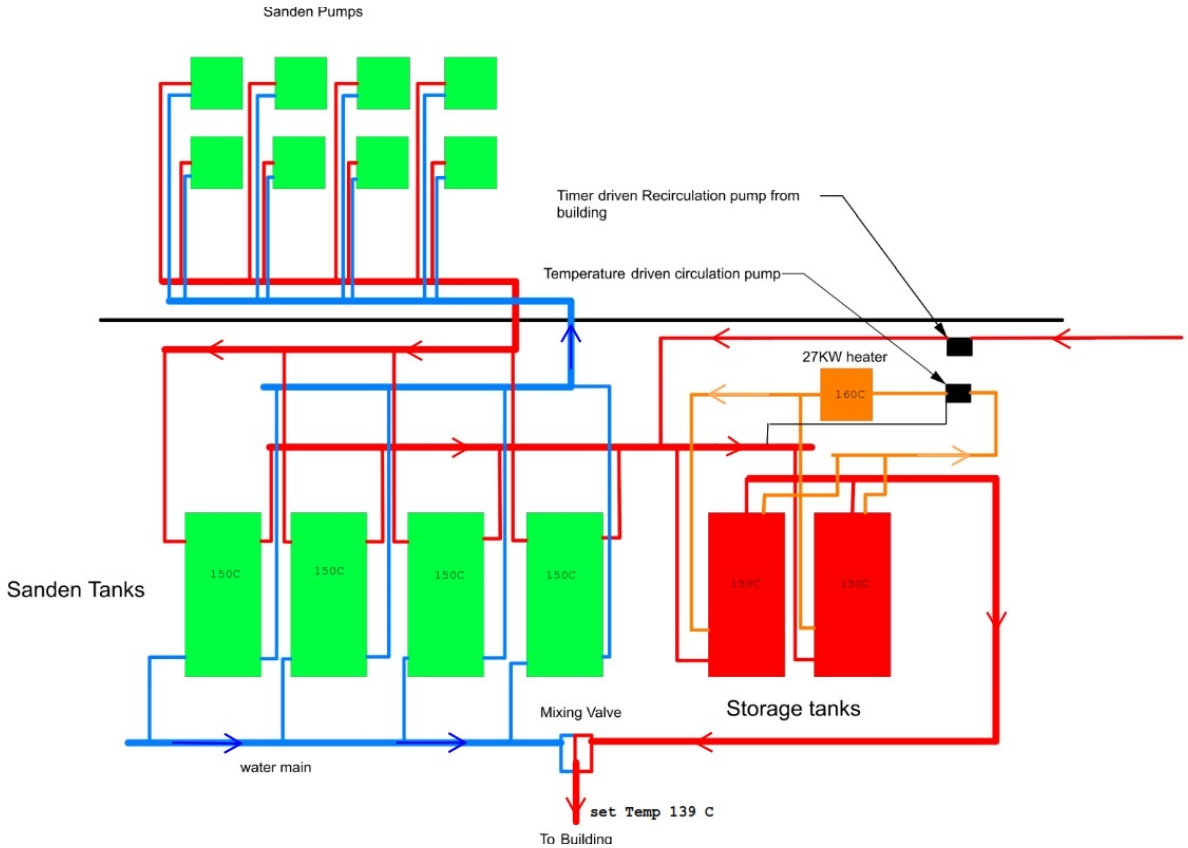

KOMATSU
PC 55


Wood framed 2 hour rated parkade with R40 insulation


GOLD
GOLD


Health

Heat Pump Hot Water System



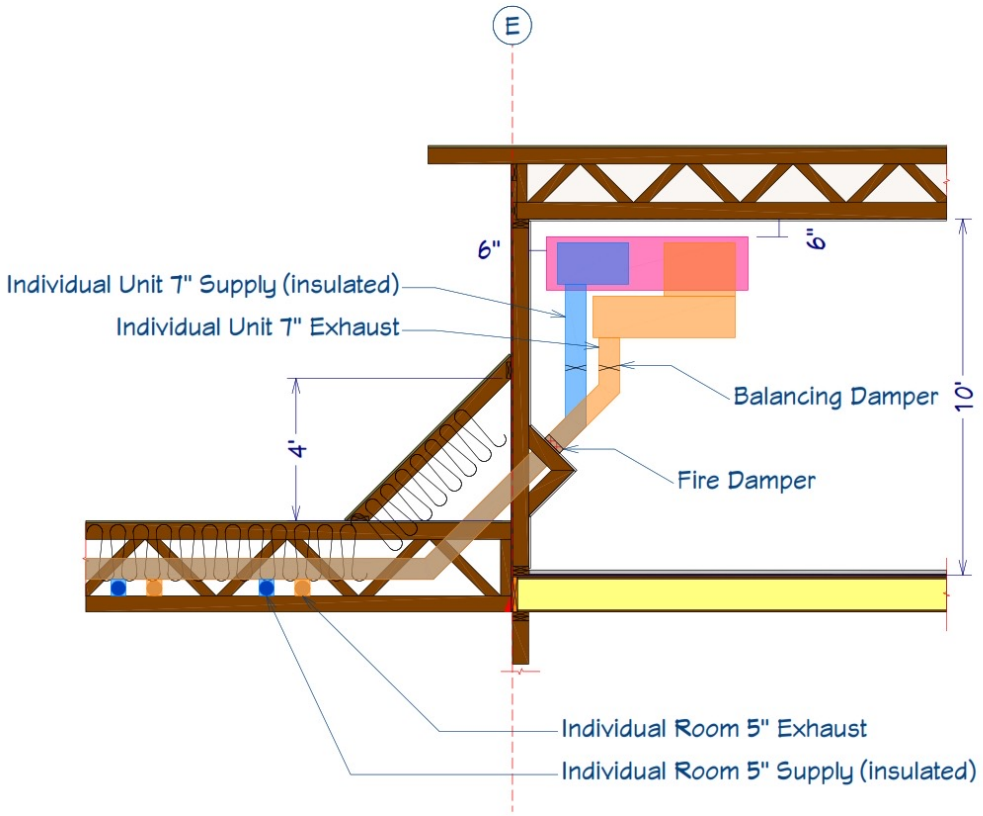

Hot water

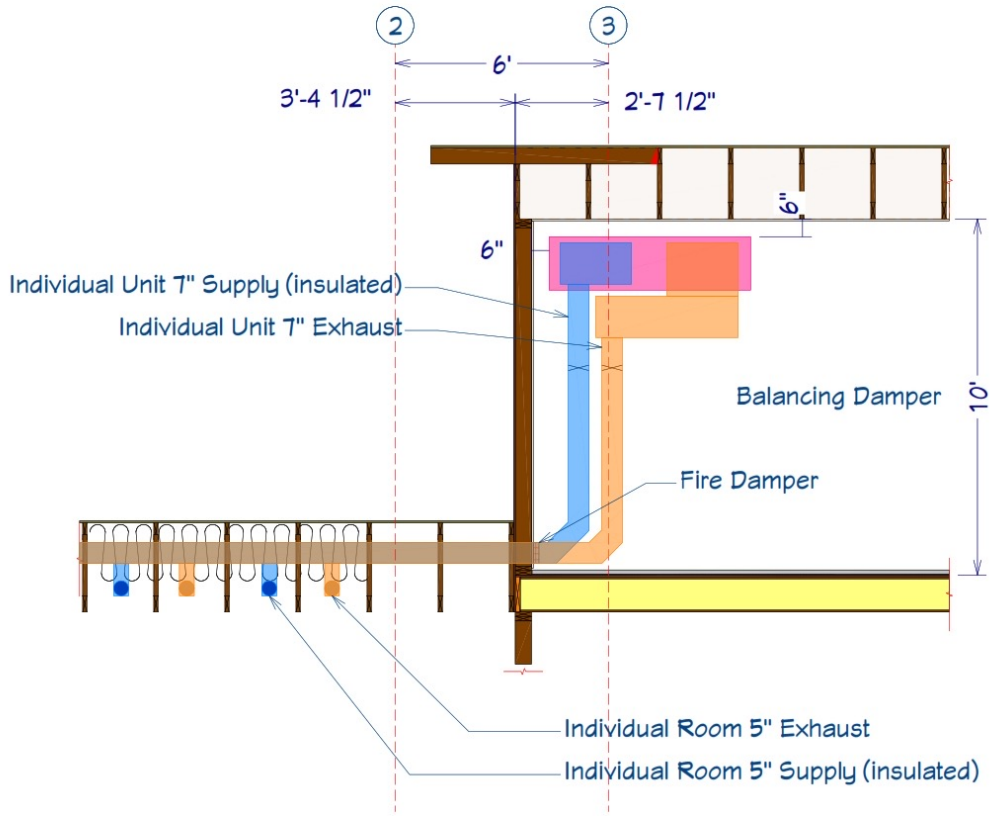
Hot water


Winter Framing


Optimum value framing


MARY'S MOTEL





Mechanical Room HVAC - Floor / Roof Detail

2

Revision Table

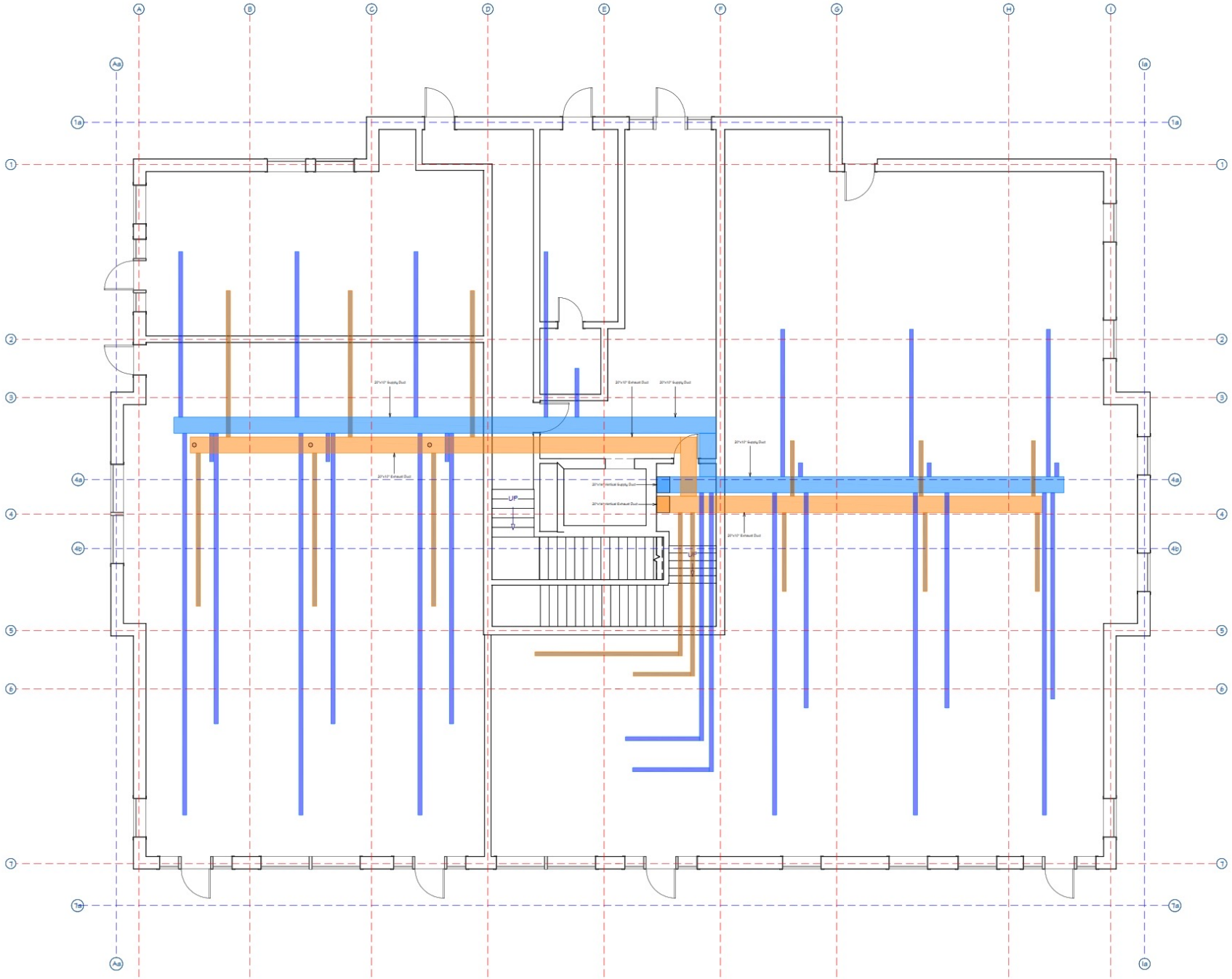
Number	Date	Revised By	Description

INNOVATION BUILDING

Oso Mechanical Plans

DRAWINGS PROVIDED BY:
Innovation Building Group
Ryan Nadeau
ryan.nadeau@innovationbuilding.com

DATE:



3

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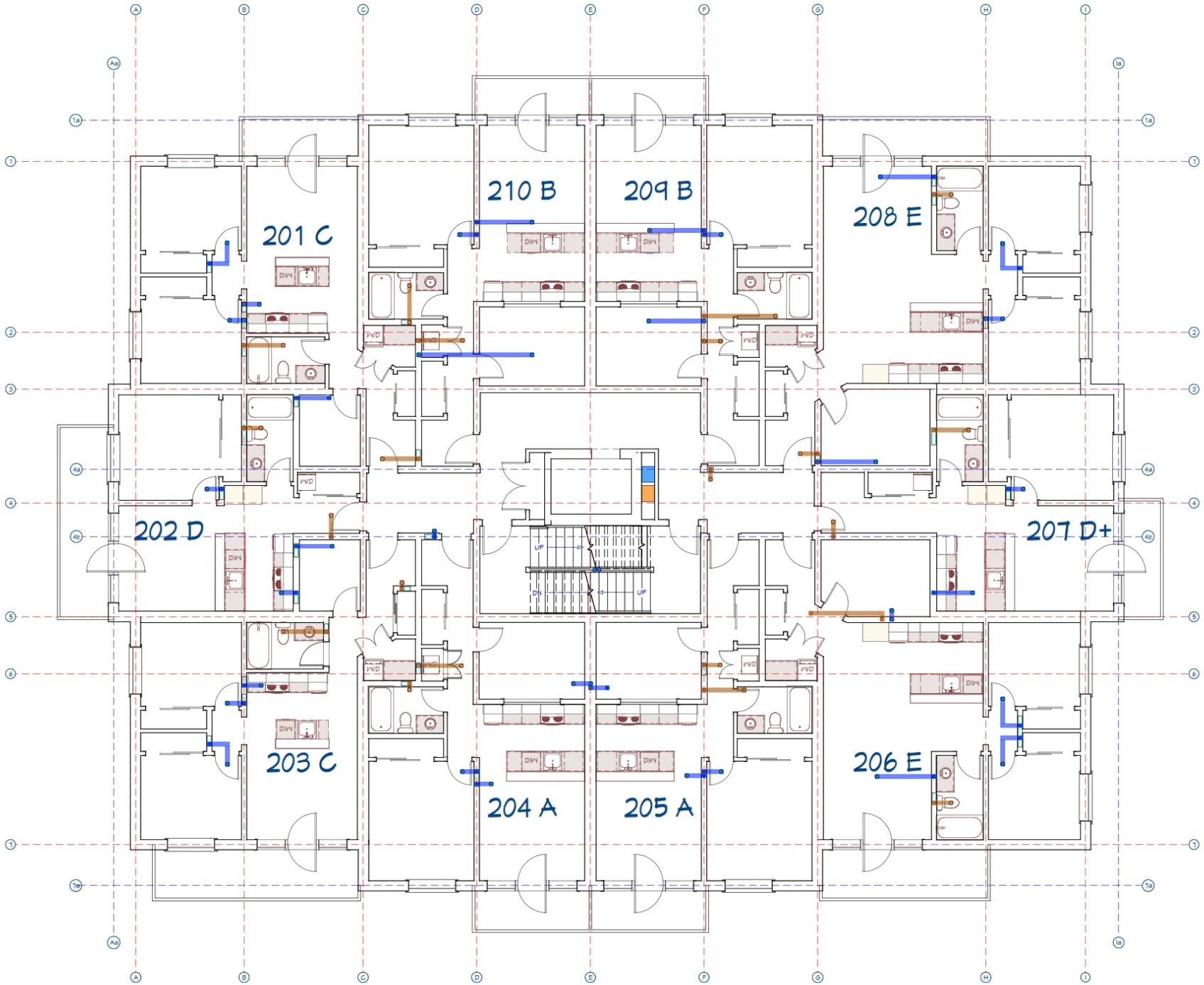
2021-06-17

SCALE:



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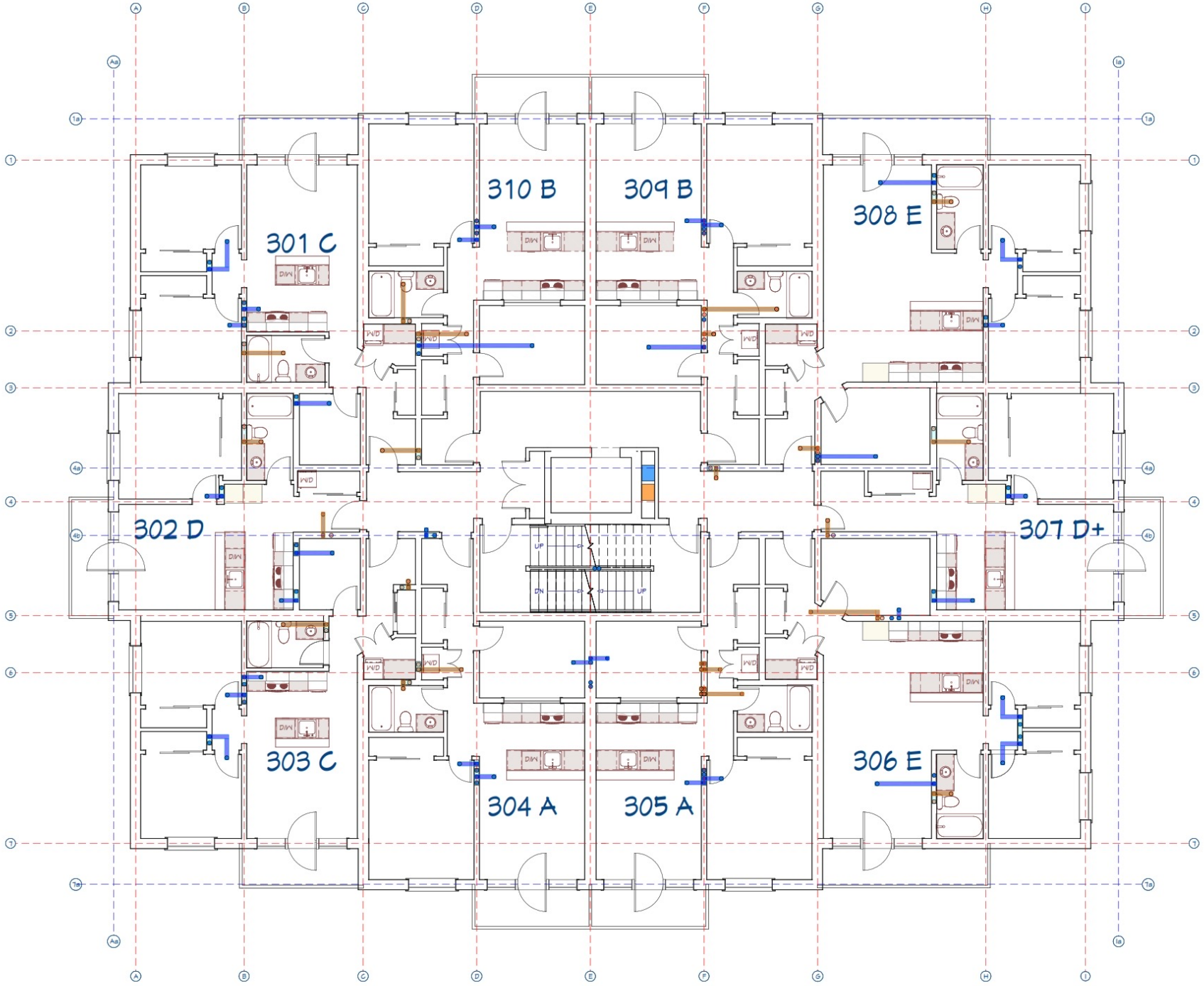
SCALE:
3/16" = 1'



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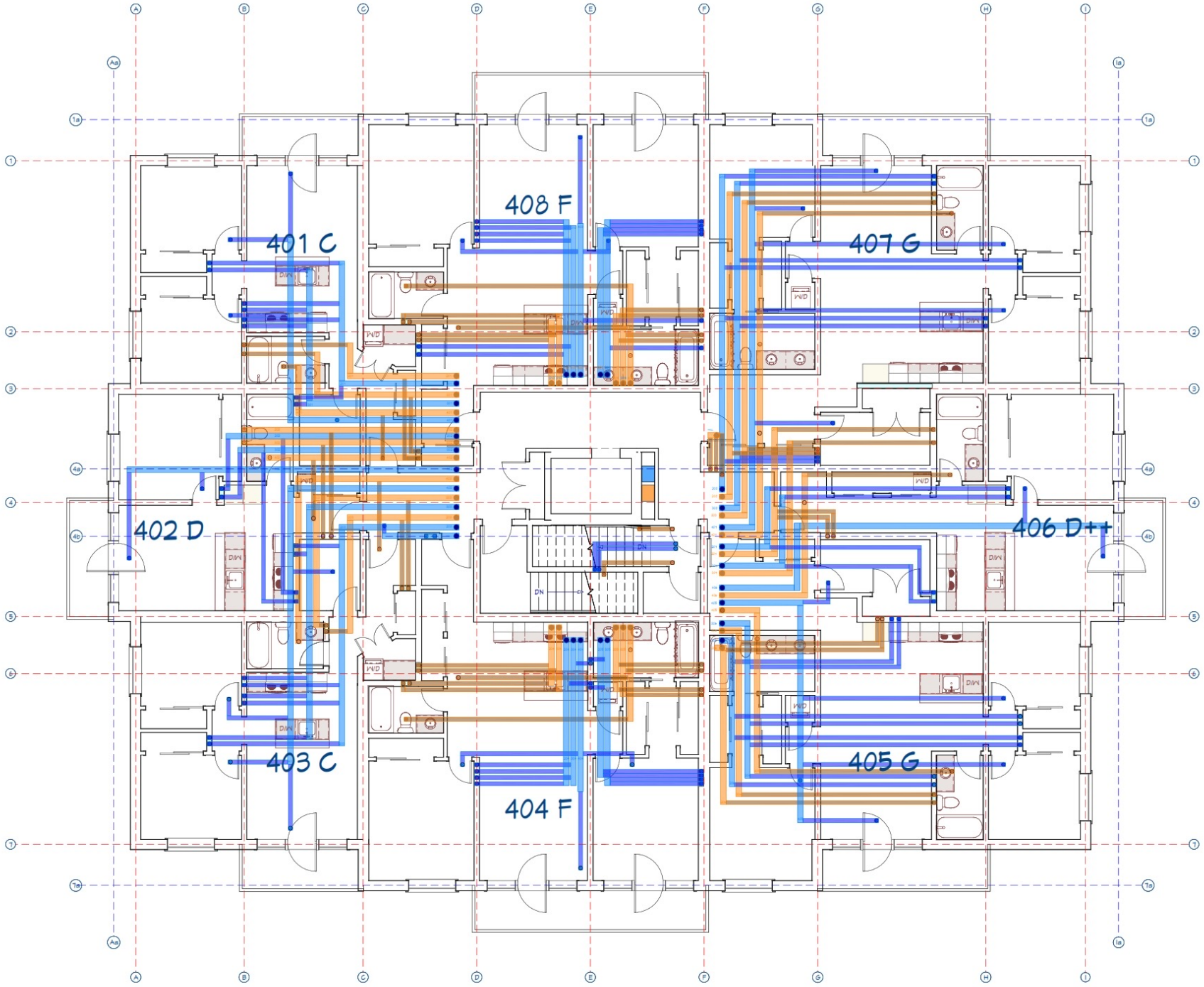

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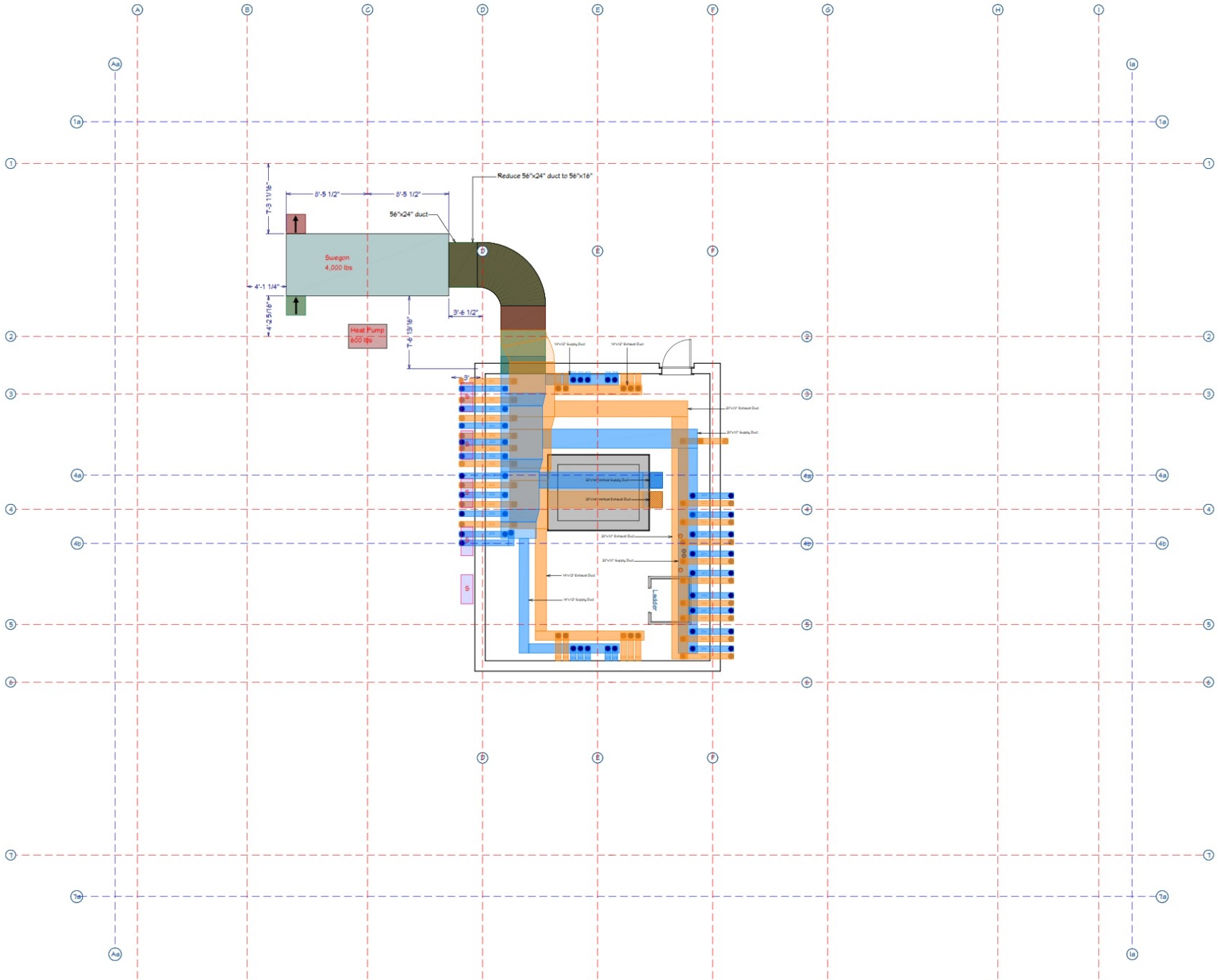

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DATE:
2021-06-17

SCALE:

Optimum value framing


Clean BC Net Zero Energy Award

Modern framing

EIFS from Adex

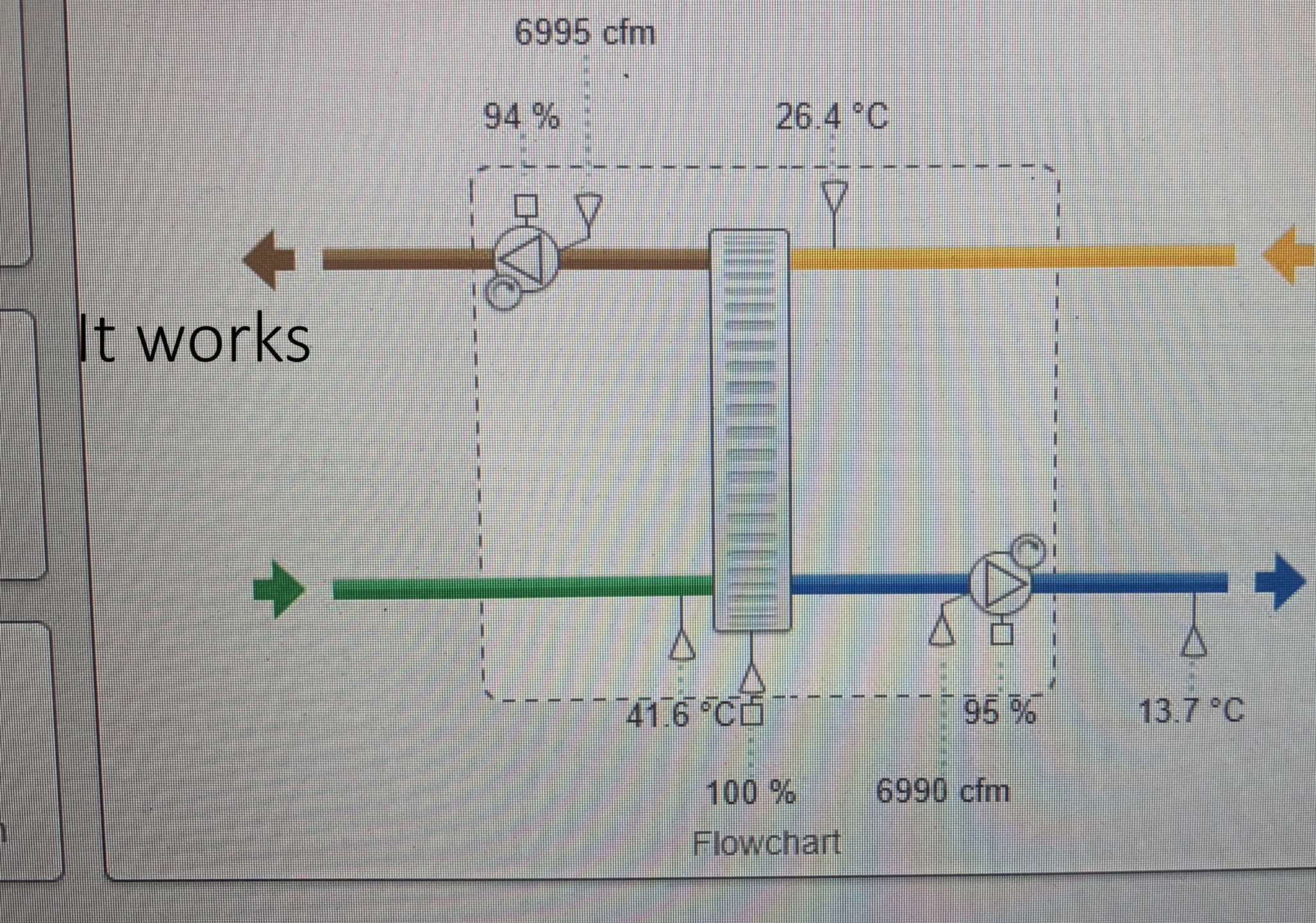

Profit center


Storage
202


Bikes

	KWh	KWh	KWh	KWh	KWh	KWh	KWh	KWh	KWh	KWh	KWh	KWh
Energy usage	Water Sandens	Water Tankless boiler	Total Water	Secondary 8 ton	Swegon ERV	Primary 10 ton	Total heat Cooling	Total water cool heat	Total Mechanical	General Hydro	Orion total Hydro	Radius Hydro
Jun 20, Jul 21	2,387	1,753	4,140	382	3,658	1,190	1,572	5,712	9,370	13,510	22,880	22,400
Jul 22, Aug 20	2,063	1,214	3,277	972	2,730	2,852	3,824	7,101	9,831	12,889	22,720	23,600
Aug 21, Sept 21	2,405	1,272	3,677	221	1,456	1,532	1,753	5,430	6,886	13,914	20,800	22,000
Sept 22, Oct 21	2,708	814	3,523	79	1,201	339	417	3,940	5,140	16,620	21,760	19,800
Oct 22, Nov 20	3,929	390	4,319	79	1,192	927	1,005	5,325	6,516	24,684	31,200	24,000
Nov 21, Dec 21	4,594	66	4,660	84	1,305	2,089	2,174	6,834	8,139	26,901	35,040	26,400
Dec 22, Jan 21	4,946	57	5,003	84	1,282	2,444	2,528	7,531	8,813	28,467	37,280	26,867
Jan 22, Feb 22	5,306	24	5,330	87	1,103	2,153	2,240	7,570	8,673	30,207	38,880	26,400
Feb 23, Mar 23	3,717	11	3,728	79	1,233	1,240	1,319	5,047	6,280	24,120	30,400	20,200
Mar 24, Apr 22	3,397	22	3,419	80	1,260	653	733	4,152	5,412	22,908	28,320	19,600
Apr 22, May 21	3,106	22	3,128	78	1,229	441	519	3,647	4,876	20,084	24,960	17,400
			-				-	-	-	-		
Total	38,559	5,644	44,203	2,224	17,651	15,861	18,085	62,288	79,939	234,301	314,240	248,667
Cost at $012/KWh	$ 4,627	$ 677	$ 5,304	$ 267	$ 2,118	$ 1,903	$ 2,170	$ 7,475	$ 9,593	$ 28,116	$ 37,709	$ 29,840
Cost per unit	$ 103	$ 15	$ 118	$ 6	$ 47	$ 42	$ 48	$ 166	$ 213	$ 625	$ 838	$ 663

It works




Thanks for
listening