

# Step Code Advancement in the CRD

Implications for Part 3 Buildings:  
Design, Construction, and Costs

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# GHGI

## Emission Factors in BC

**“Zero” is aspirational but not a mandate**

**Name of the game is *minimizing* GHG emissions**

Table 1.2 Emissions Factors by Fuel Type	
Fuel Type	Emissions Factor (kgCO <sub>2e</sub> /kWh)
Natural Gas	0.185
Electricity	0.011
District Energy System	as provided by utility <sup>1,2</sup>

**≈ 12.1 t CO<sub>2e</sub> / GWh**

**For British Columbia,  
DECARBONIZATION ≈ ELECTRIFICATION**



# GHGI

In British Columbia,  
**NATURAL GAS** is  
**17x** more  
carbon-intensive  
than **GRID**  
**ELECTRICITY**

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*\* Step Code uses City of Vancouver Energy Modeling Guidelines for Emission Factors. CleanBC, Existing Buildings may use other sources.*



# Playing the Game

## Sports Analogy #1:

*Old way of measuring buildings:  
"% Better Than X"*

You win as long as you are better than the opponent (baseline compliant building)

## Sports Analogy #2:

*Just scoring lots of goals is not enough to win.*

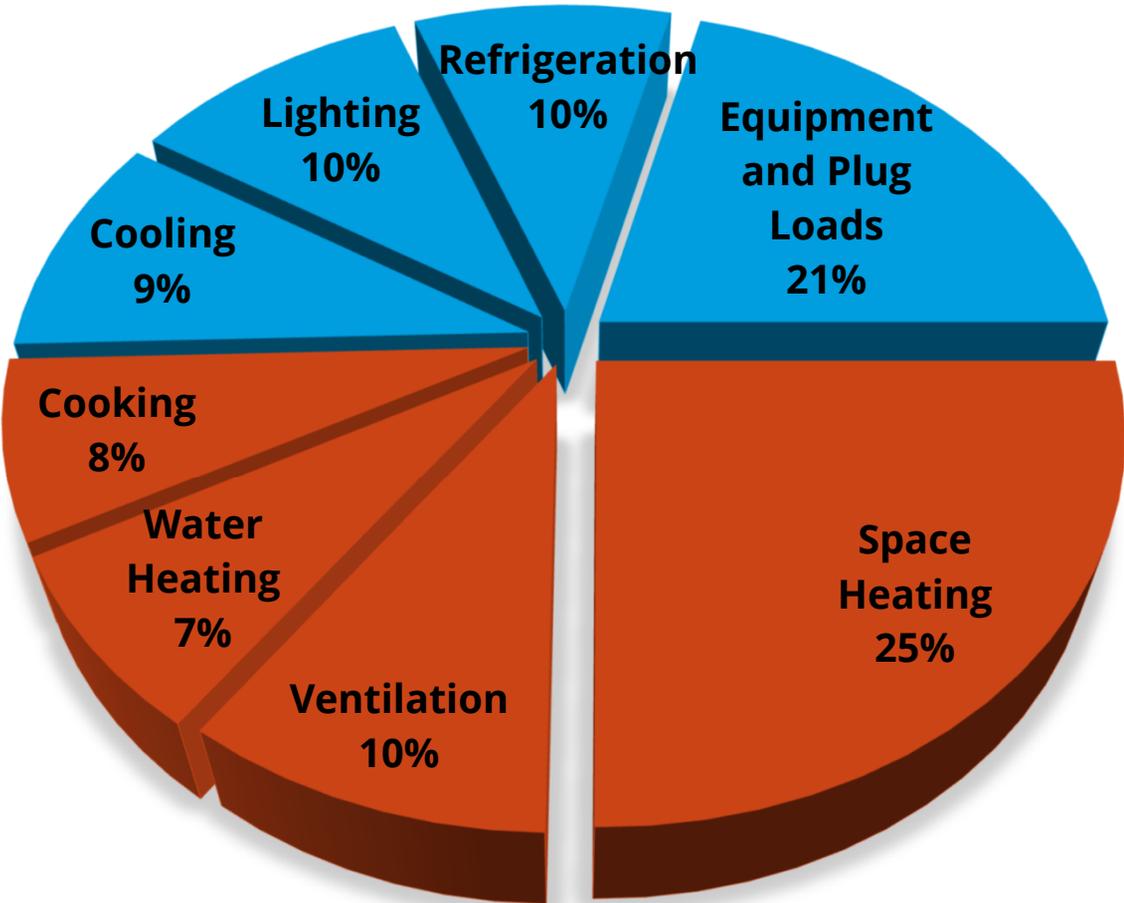
Step Code Compliance requires a balance of offense and defense—active vs. passive design measures



# Playing the Game: Energy and Emission Profiles for Part 3

**ELECTRIC  
END-USES**

**GAS/FUEL/OIL  
/ELECTRIC  
END-USES**

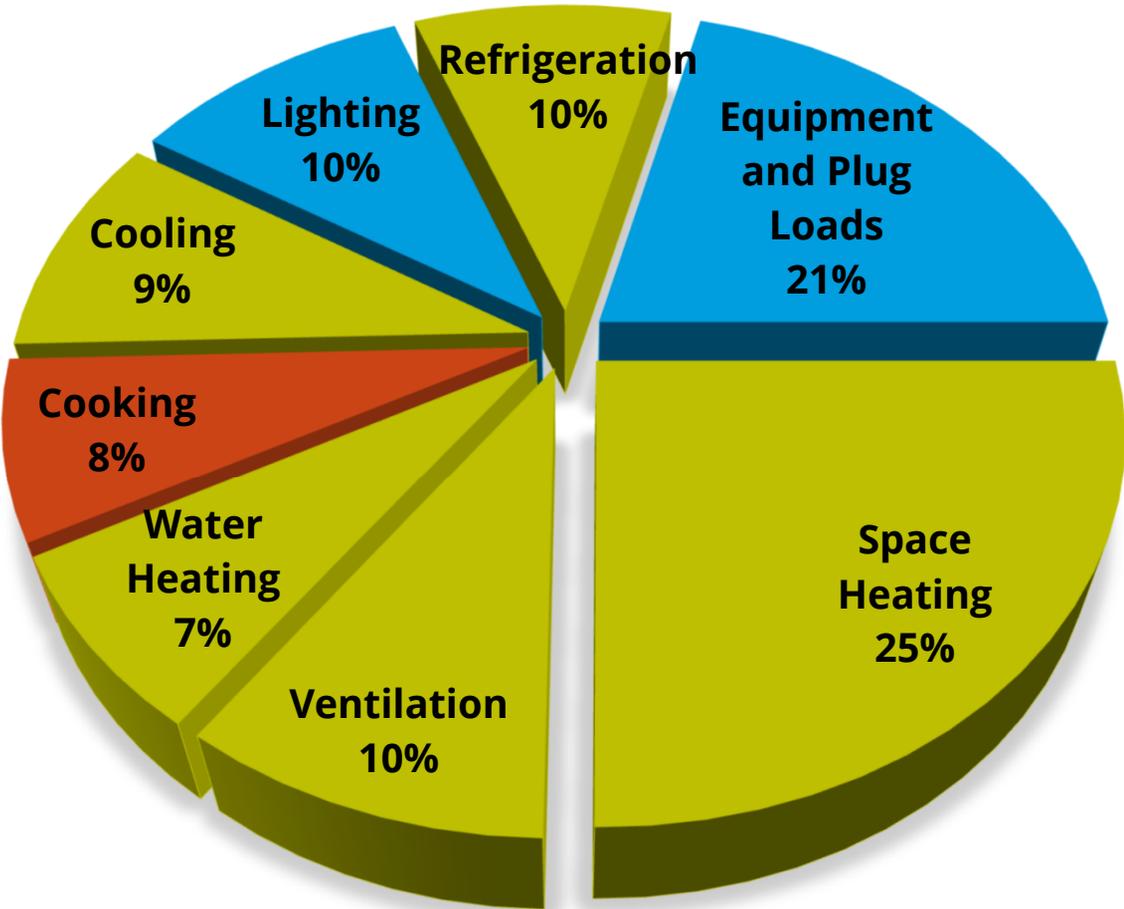


# Playing the Game: Energy and Emission Profiles for Part 3

**ELECTRIC  
END-USES**

~~**GAS/FUEL/OIL  
/ELECTRIC  
END-USES**~~

**HEAT PUMPS?**



Building Energy Use (DOE EIA 2012)



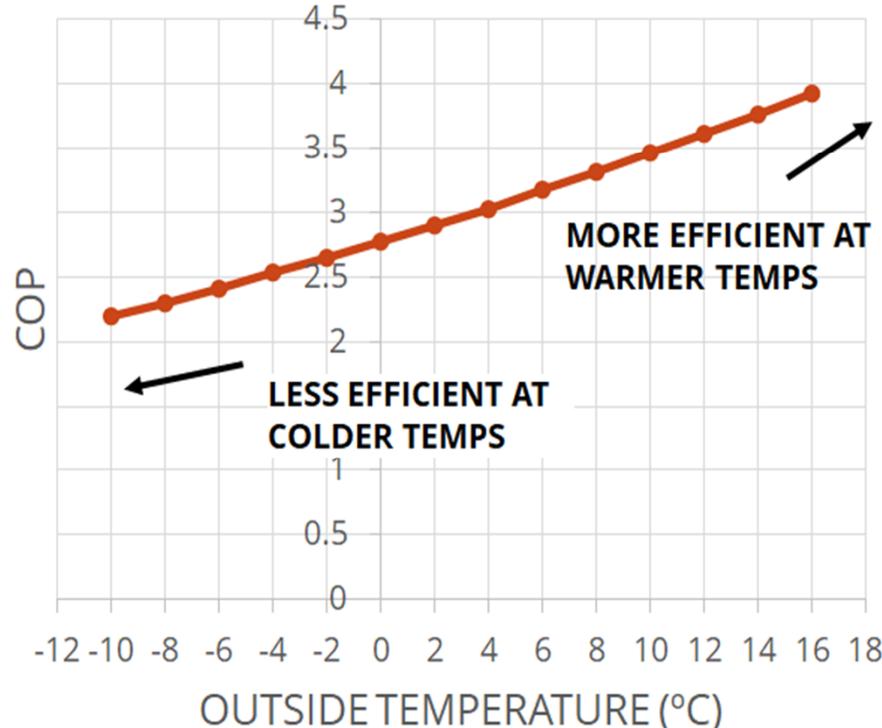
# Playing the Game: Read Between the Lines with GHGI

TARGET LEVEL	GHGI kgCO <sub>2</sub> e/m <sup>2</sup> -yr			SYSTEM IMPLICATIONS
	MURB	Office	Retail	
<b>Medium</b>	<b>8</b>	<b>5</b>	<b>6</b>	<ul style="list-style-type: none"> <li>Decarbonize one major system</li> <li>e.g. electric space heating, but gas DHW is OK</li> </ul>
<b>Low</b>	<b>4</b>	<b>3</b>	<b>3</b>	<ul style="list-style-type: none"> <li>Decarbonize both space heating and DHW</li> <li>High-carbon peaking heat, accent fire-places, cooking etc. OK</li> </ul>
<b>Zero-Carbon Ready</b>	<b>2</b>	<b>1.5</b>	<b>2</b>	<ul style="list-style-type: none"> <li>Fully electrified including cooking</li> <li>Backup may be possible</li> </ul>

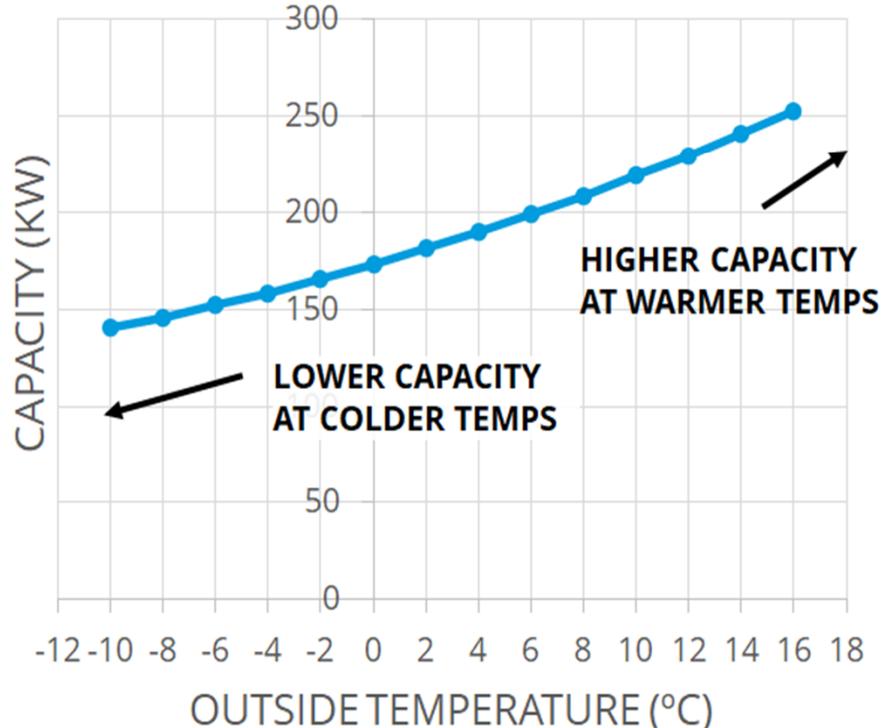


# Playing the Game: Zero is Aspirational but may not be Practical

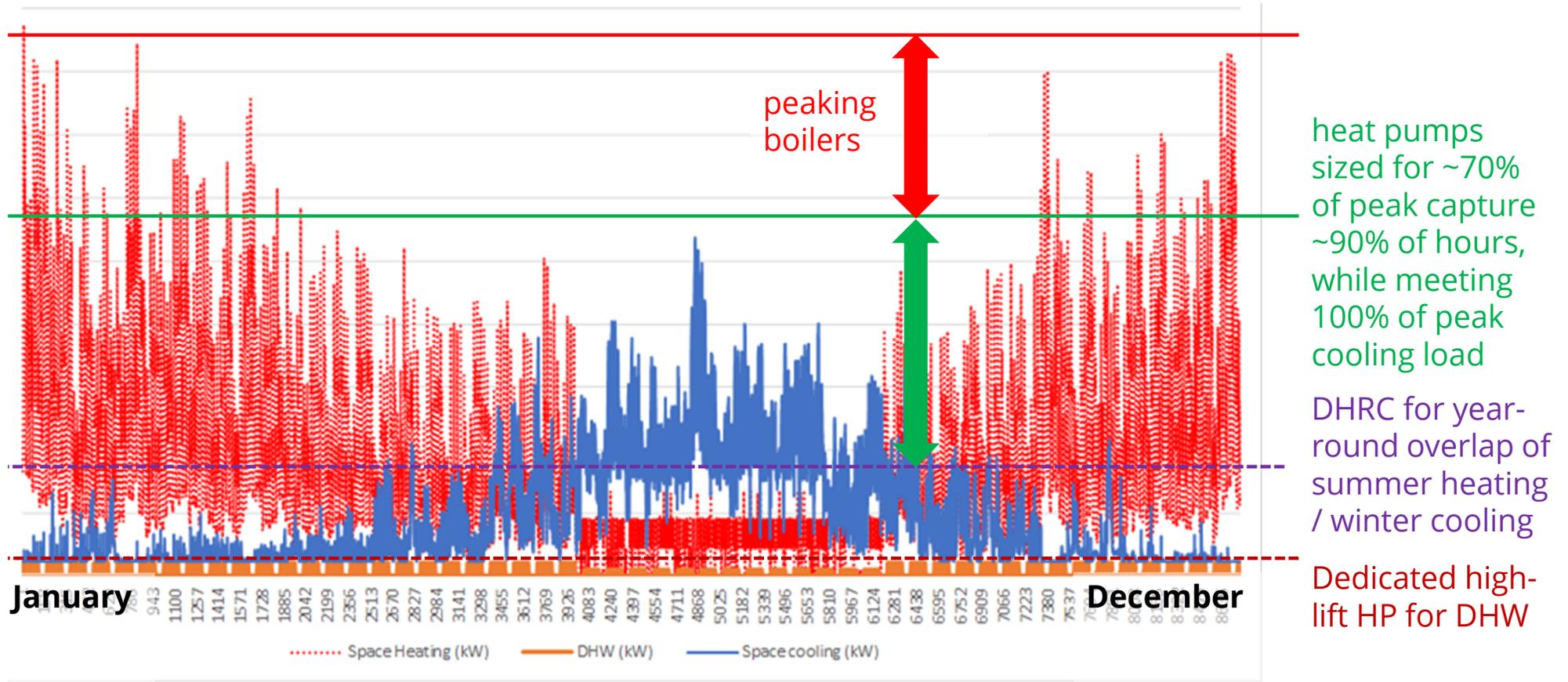
EFFICIENCY DECREASES  
WITH COLDER TEMPS



HEATING CAPACITY DECREASES  
WITH COLDER TEMPS



# Playing the Game: Zero is Aspirational but may not be Practical



# Technology



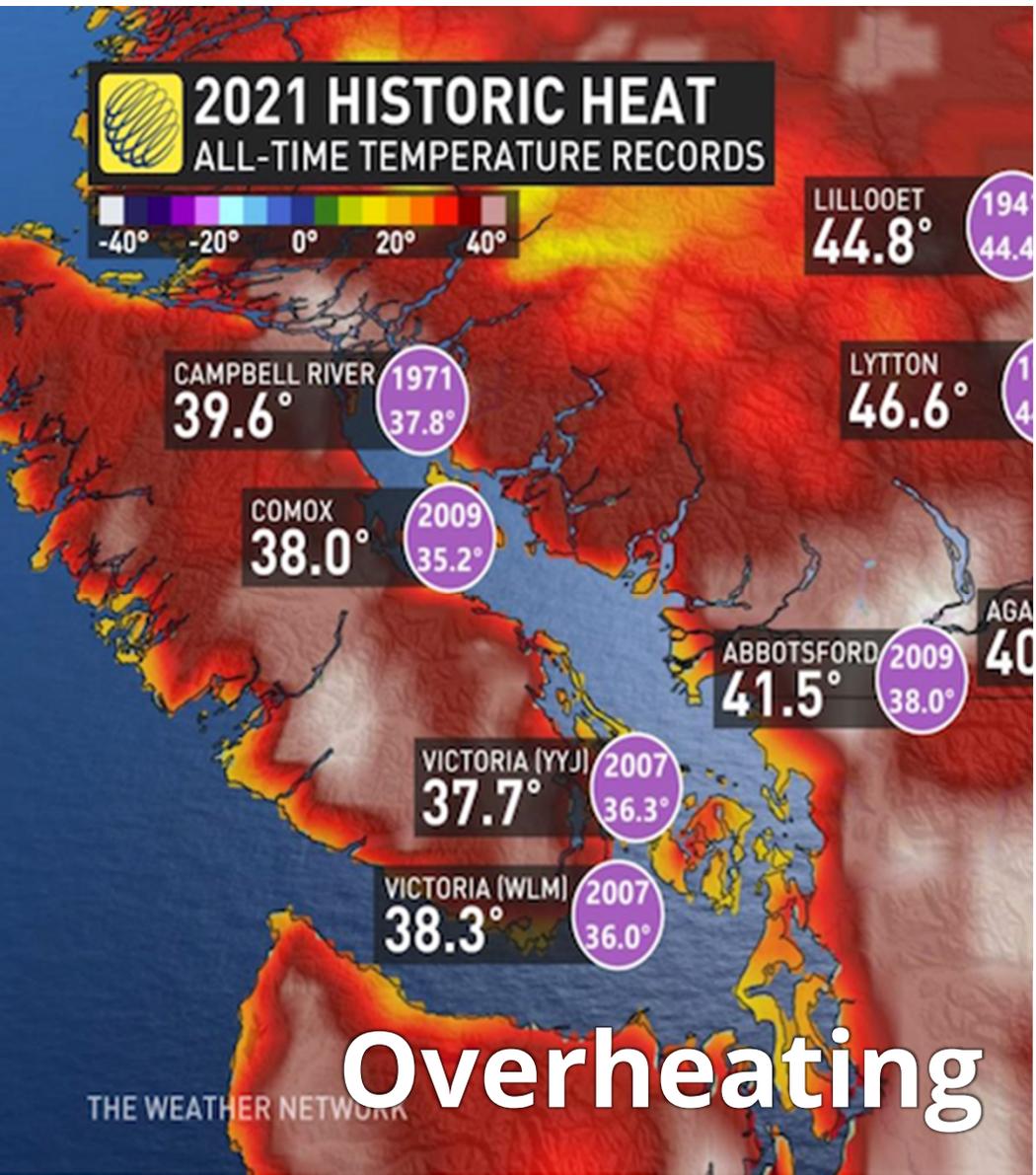
Air Source Heat Pumps  
(R410a & R134a)



CO2 Heat Pumps for DHW



Heat Recovery Ventilators



Embodied Carbon

# Bottom Line Takeaways

1. Market is Ready
2. Play the (right) Game
3. Embrace the (right) HRV
4. Mandate is to Minimize GHGs not eliminate outright
5. Strategize High-Lift Applications
6. Cost of Tech is a factor, but not the biggest

