Maintaining Thermal Comfort in MURBs under a Changing Climate

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UBC GREEN BUILDING ACTION PLAN

VISION:
By 2035, UBC’s buildings will make net positive contributions to human and natural systems.

https://planning.ubc.ca/vancouver/sustainability-operations/green-buildings
“City of UBC” – Wesbrook Neighbourhood
A Changing Climate

Cooling Degree Days: Recent Past

Cooling Degree Days: 2050s

Source: Metro Vancouver (2016)
Generating “Future Weather Files” For Building Energy Modelling

- TMY – Typical Meteorological Year for building modelling
- “Morphing” future daily temperature to hourly TMY

UBC SEEDS Project: Future weather files to support climate resilient building design in Vancouver. Ek et al. 2018
Designing Climate Resilient MURBs – Partnership Project
Unmet Cooling Hours – New Low Rise Archetype

Building Archetype
Low Rise New
(No Mechanical Cooling)
Unmet Cooling Hours: New Low Rise Archetype

Energy Step Code: Step 3

Energy Step Code: Step 4

Draft Results
Resilience to Summer Heating Events: New Low Rise Archetype

Draft Results
Cooling Energy Demand Intensity (CEDI) – New High Rise Archetype

Building Archetype

*High Rise New (Mechanical Cooling)*

[Bar chart showing energy demand intensity over different scenarios and time periods.]
Cooling Energy Demand Intensity (CEDI): New High Rise Archetype

Energy Step Code: Step 3

- Baseling (Step 3)
- Bundle 1: Reduced WWR + Reduced SHGC + Fixed shading
- Bundle 2: Reduced SHGC + Operable shading

Energy Step Code: Step 4

- Baseling (Step 4)
- Bundle 1: Reduced WWR + Reduced SHGC + Fixed shading
- Bundle 2: Reduced SHGC + Operable shading

Draft Results
Resilience to Power Outage: New High Rise Archetype
Looking Ahead

Source: Pacific Climate Impacts Consortium
Looking Ahead

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Questions?