

# Campus as a Living Lab from an Operational Perspective

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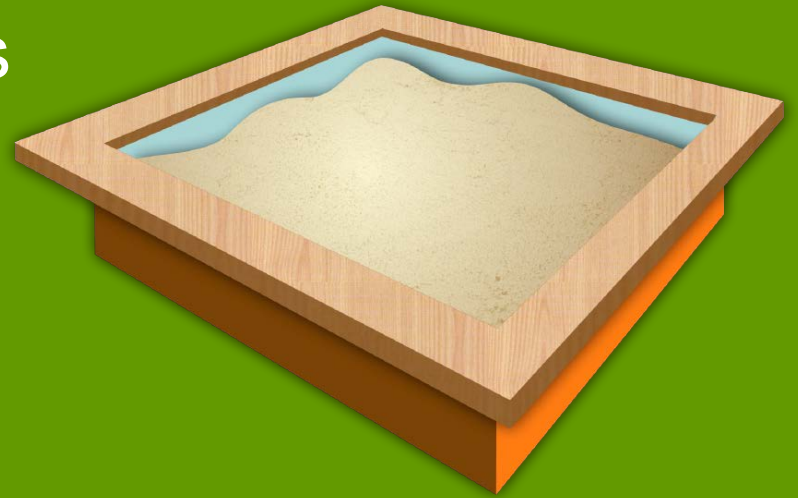
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# Campus as a sustainability test-bed

Universities uniquely suited for this role

- Single (owner-)occupiers
- Public mandate
- Teaching
- Research



Develop integrated campus-scale systems

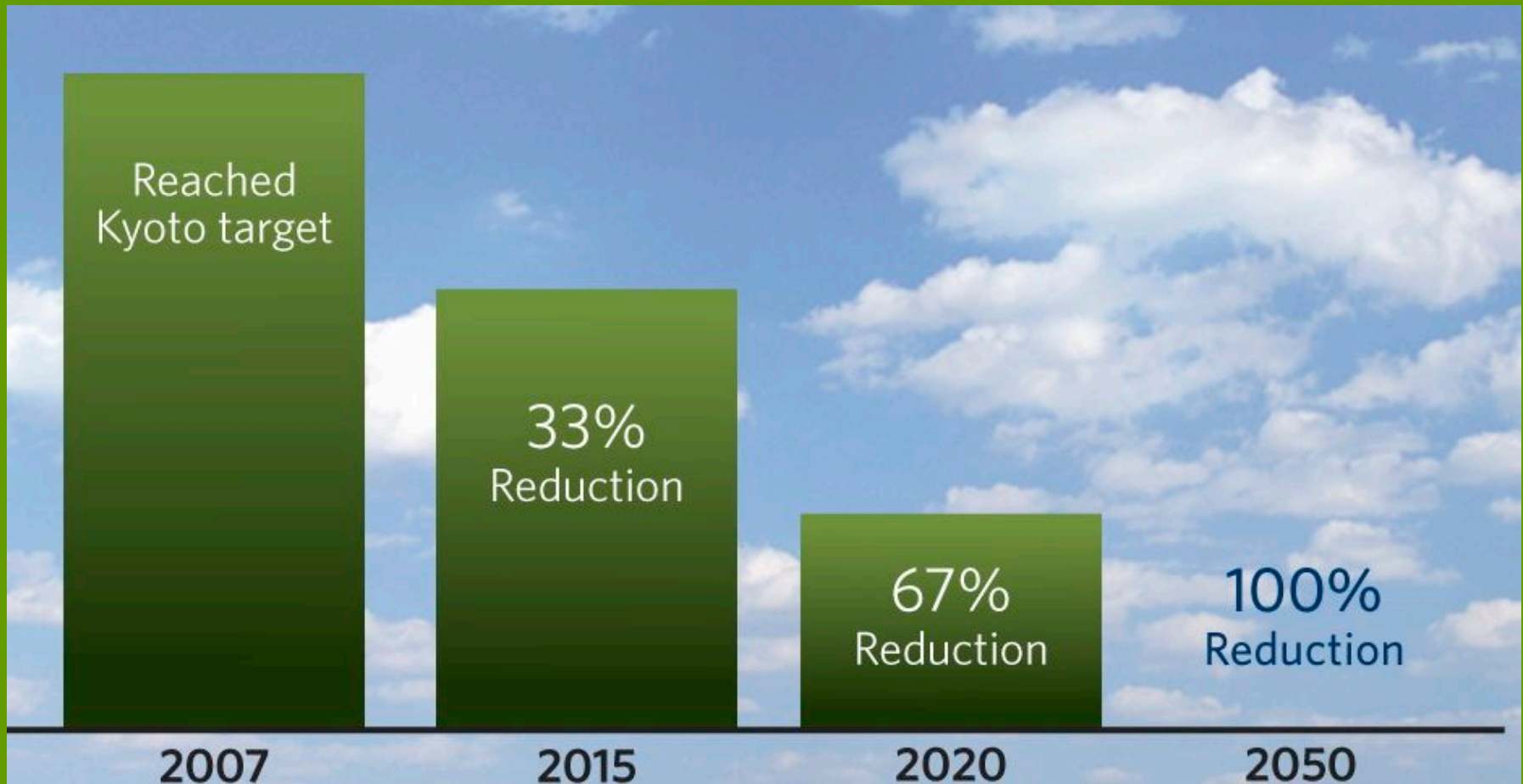
- Demonstration and research
- Engage and train students; develop new curricula and programs

# Key Factors at UBC

- Culture of sustainability
- Positive academic-operations relationships
- Clear campus-wide targets
- Operational road map



# Campus Climate Action Targets



Greenhouse Gas Emissions at UBC

# Operational Roadmap

**2015**

**33% GHG Reduction**

Supply:

**Bioenergy R&D Project (9%)**

Demand:

Steam to Hot water conversion (start) (17%)

Continuous Optimization; Pulse Energy (10%)

**New Buildings: low energy use intensity (e.g. CIRS)**

**2020**

**67% GHG Reduction**

Expanded bioenergy or renewable natural gas (23%)

Steam to Hot water conversion (completion) (5%)

Continuous Optimization; BC Hydro Self-Sufficiency (6.5%)

**New Buildings: low temperature, energy neutral**

**2050**

**100% GHG Reduction**

***New clean energy sources: Ocean, Waste, Aquifer?***

*TRIUMF Heat Recovery*

*Extend District Heating system to all campus buildings*

*Continuous Optimization*

***New Buildings: regenerative***

*Transport changes*



# Centre for Interactive Research on Sustainability (CIRS)

Completed August 2011



- High performance demonstration and research building with goal for net positive energy, water and carbon
- LEED Platinum+ lifecycle costs
- Research on human behavior and innovative building systems

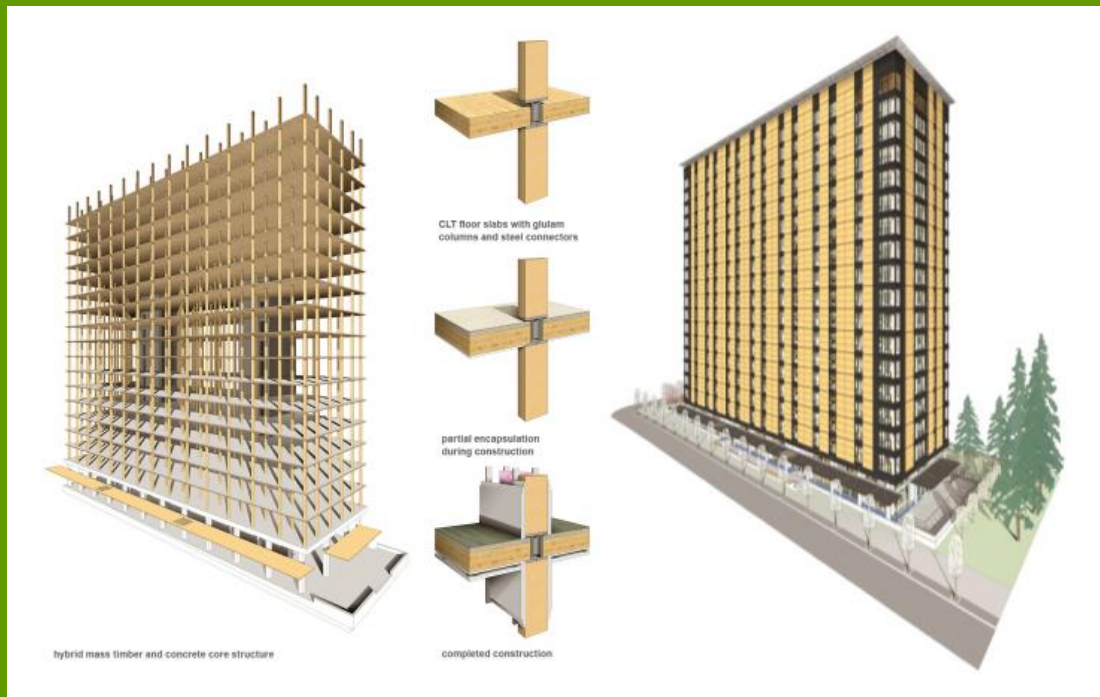
# UBC Bioenergy Research & Demonstration Facility

Completed July 2012



- Four storey CLT building
- Heating: 6 MW
- RNG Power Gen: 2 MW(elec) + 2.4 MW(heat recovery)
- GHG Reduction: 6,800 tonnes/year CO<sub>2</sub>e
- Research on process, materials, fuel, life-cycle

# Brock Commons Tall Wood Building



Target Completion:  
August 2017

- 18 storey mass timber student residence tower
- Cross-laminated timber (CLT) floor plates, glulam columns
- Total carbon benefit (storage/emissions): 2,600 tonnes CO<sub>2</sub>e
- Research on moisture, vibration, vertical movement, life-cycle



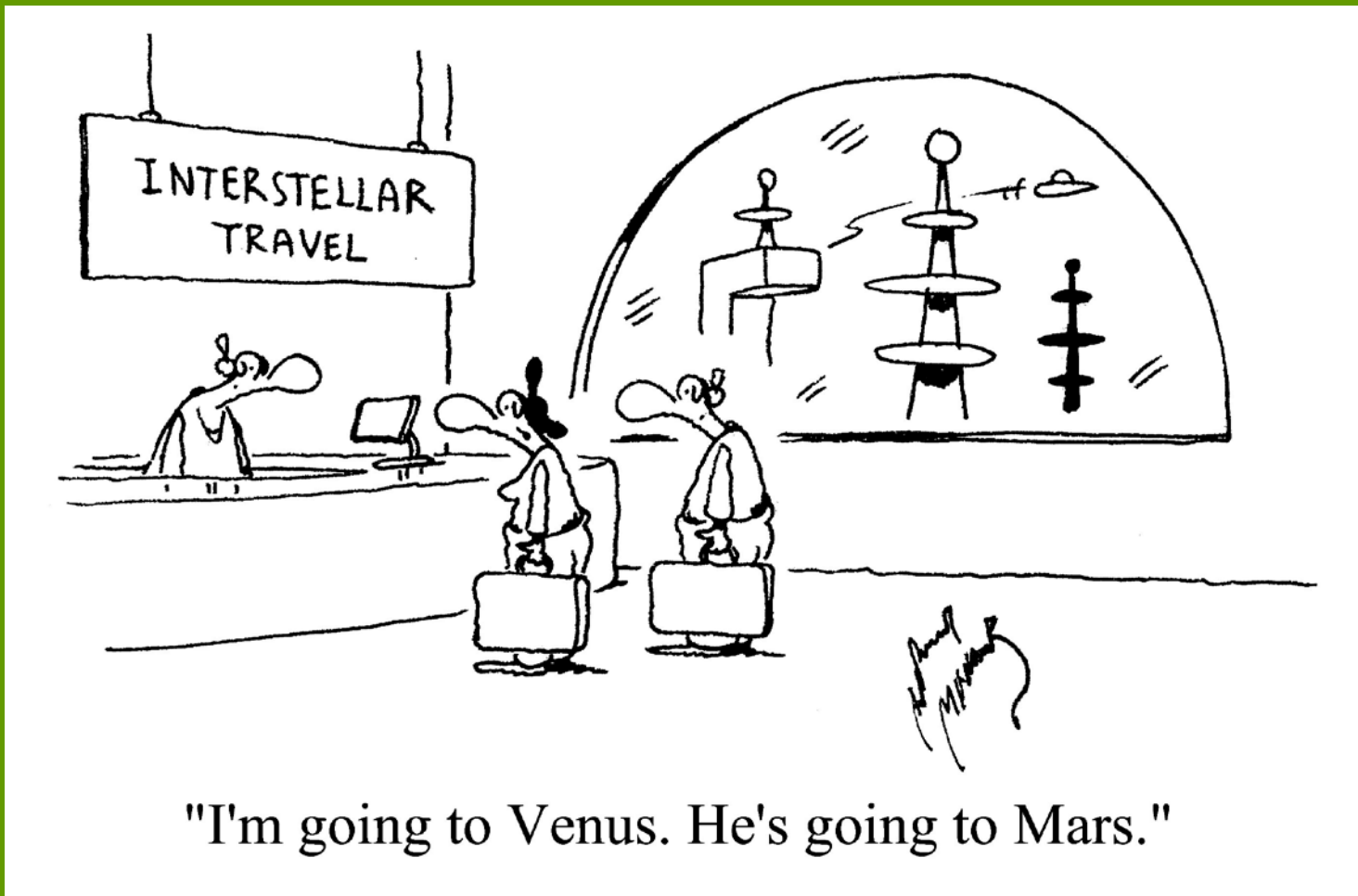
# Operational Benefits

- Provision of useful infrastructure
- GHG reduction
- Cost savings
- Knowledge transfer
- Staff motivation and inspiration



# Challenges

- Operations and Research have different perspectives on risk, timelines and objectives



"I'm going to Venus. He's going to Mars."

# Lessons Learned

- Solid business case
- Plan B for risk mitigation
- Mix of large and small projects
- Dedicated project management
- Committed and motivated partners



# Questions?



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