

1 INTRODUCTION



The global imperative of climate change is considered the greatest sustainability challenge facing organizations and communities today, and the effects are widespread. Building and infrastructure performance impact climate change through the release of greenhouse gas emissions, while climate change is altering local climates around the globe. One result of climate change is the change in rainfall patterns that are leading to significant challenges to the availability of water for people, agriculture, and the avoidance of summer fires. This is of particular concern for the Okanagan region of British Columbia. Climate change will continue to be one of the key drivers that will influence decision making at the University of British Columbia and inform how the institution as a whole will continue to evolve and improve its campus operations, policies and programs at its Okanagan Campus.

The University of British Columbia Okanagan (UBCO) Campus, in particular, is at a pivotal point for exploring opportunities for deepening its sustainability performance and establishing a framework for future infrastructure development required to support the future growth of its campus by 2030 and 2050. Guided by the principles of whole systems thinking, UBCO commissioned the *Whole Systems Infrastructure Plan* to examine opportunities at a campus scale, rather than at the individual building level, to optimize the performance of its infrastructure systems and uncover where synergies between systems and performance goals may exist.

Building upon UBCO's Campus Planning Principle #4, "*campus growth should be managed through a whole systems lens that incorporates environmental, economic and social sustainability outcomes, to achieve a net-positive impact on the well-being of the campus community and ecology,*" this plan establishes a future roadmap, targets, and a 5-Year Implementation Plan for improving the overall campus performance and ensuring that it is resilient to future changes in growth, utility rates, and climate change. More importantly, it substantiates the imperative of acting now and the cost of inaction, and outlines a framework for achieving significant carbon emission reductions—a cornerstone of the overall the infrastructure vision and plan.

Embedded within this roadmap is a 5-Year Implementation Plan that outlines recommendations for:

- optimizing the performance of existing infrastructure and buildings;
- deepening the performance of the next generation of new building construction planned for the campus in the next five years;
- developing a long-range district scale and potential renewable solutions for energy, water and stormwater; and
- strengthening the protection, restoration, and management of the unique Okanagan ecology of the campus.



Coupled with these recommendations is a recognition that successful implementation of this plan will require a shift in organizational thinking along with a strong commitment and leadership from key UBCO decision-makers and engagement from multiple stakeholders including staff, faculty and students.

1.1 WHOLE SYSTEMS INFRASTRUCTURE PLAN OBJECTIVES AND GOALS

UBC Okanagan established the following set of performance goals for the *Whole Systems Infrastructure Plan*:

- Goal #1 Achieve a net positive performance in operational energy and carbon
- Goal #2 Implement a framework that supports low embodied carbon in future development
- Goal #3 Optimize water quality, supply, and security
- Goal #4 Enhance and/or restore the ecology
- Goal #5 100% diversion of stormwater from municipal systems
- Goal #6 Strive towards full waste recovery/reuse

For purposes of this *Plan*, Goal #6 “Strive towards full waste recovery/reuse” was excluded from the scope of this deliverable. However, the notion of waste recovery is only considered in the context of optimizing the energy and carbon approach for the campus and as part the energy generation discussion under Goal #1.

In order to achieve the above performance goals, UBCO created the following guiding objectives that have provided an overarching framework for the analysis, assessment and recommendations proposed in this study. The *Whole Systems Infrastructure Plan* and recommendations are intended to:

1. Support the *20-Year Sustainability Strategy* for UBC (2014 draft);
2. Uphold the UBC’s academic mission (Place and Promise and Aspire) and community wellbeing;
3. Minimize total cost of ownership;
4. Be easy to implement and maintain;
5. Optimize flexibility for expansion and change;
6. Maximize regional partnerships and benefits;
7. Support strategic decision making and risk management;
8. Build in resilience to climate change;

9. Acknowledge strengths, weaknesses, opportunities and constraints of the campus and surrounding context; and
10. Build on the campus' successes and broader best practices.

1.2 REPORT STRUCTURE

The *Whole Systems Infrastructure Plan* is structured in two parts. Part 1 summarizes the overall vision and implementation plan for UBCO, and Part 2 presents the technical analysis that supports the performance goals that address: energy, carbon, water, ecological landscape and biodiversity, and stormwater. Although waste was identified as a performance goal, it was excluded from the scope of this deliverable.

Part 1 includes a brief summary of the approach and methodology, context, a summary of recommended measures and implementation plan—along with recommendations for a governance structure and stakeholder engagement.

Part 2 provides a detailed summary of the approach and methodology undertaken to complete the study, and the analysis and recommendations for each performance goal, including:

- a summary of the overall existing conditions;
- measures for improvement and the related performance benefits;
- where possible, synergies with other performance measures;
- cost analysis and funding opportunities; and
- implementation recommendations.

The Appendices include a number of reference and supporting documents.

Where possible, after each measure proposed to achieve the key performance goals, a matrix of synergies is provided to demonstrate the effects of implementation in other areas. If synergies exist the box for the related area will be a solid colour.

