



## **Credit Guidance**

## **Energy and Atmosphere**

Bioenergy Research Demonstration Facility, UBC Vancouver Campus

**Prerequisite:**  
**Building-Level**  
**Energy Metering**

CAMPUS	MANDATORY	PRIORITY	AVAILABLE
Vancouver			Required
Okanagan			

**REQUIREMENTS**

All projects must comply as per the requirements of LEED BD+C v4.1.

**GUIDANCE**

UBC will provide a letter to verify UBC’s commitment to share energy consumption data with the USGBC. Contact the Vancouver campus Green Building Manager or Okanagan campus Associate Director, Sustainability Operations.



Building energy meters.

**EA Credit:**  
**Enhanced**  
**Commissioning**

CAMPUS	MANDATORY	PRIORITY	AVAILABLE
Vancouver	4	2	6
Okanagan	4	2	

**REQUIREMENTS**

All projects must comply as per the requirements of LEED BD+C v4.1, Option 1, Path 2: Enhanced and Monitoring-Based Commissioning for a minimum of four points. Building enclosure commissioning is encouraged but not required.

**VANCOUVER RESOURCES**

[UBC Technical Guidelines - Vancouver Campus - Section 01 91 00 Commissioning](#)

[UBC Technical Guidelines - Vancouver Campus - Section 01 92 00 Monitoring Based Commissioning](#)

**OKANAGAN RESOURCES**

[UBC Technical Guidelines - Okanagan Campus - Section 01 91 00 Commissioning](#)

[UBC Technical Guidelines - Okanagan Campus - Section 01 92 00 Monitoring Based Commissioning](#)

**GUIDANCE**

A Commissioning Authority must be engaged before the completion of Design Development, and project teams are urged to consider the requirements of Fundamental Commissioning and Verification within the mandatory requirements of the Enhanced Commissioning credit. Teams are encouraged to develop a strong Basis of Design (BOD) document in response the Owners Project Requirements (OPR). Submit the BOD and OPR prior to Development Permit application, and the Commissioning and Measurement and Verification Plan prior to Building Permit application.

Project teams should refer to the [UBC Technical Guidelines: Section 01 92 00 Monitoring Based Commissioning](#) specific to the Vancouver or Okanagan campuses accordingly as well as the [UBC Integrated Sustainability Process, Appendix A](#).



UBC Vancouver Campus Building Operations and Facilities Management

## EA Credit: Optimize Energy Performance

CAMPUS	MANDATORY	PRIORITY	AVAILABLE
Vancouver	10	8	18
Okanagan	10	8	

### REQUIREMENTS

All projects must comply as per the requirements of the LEED BD+C v4.1 Reference Guide.

Projects teams must comply with the Prerequisite Minimum Energy Performance and the Optimize Energy Performance credit by applying *Option 1, Energy Performance Compliance to achieve ten or more points*.

In addition to the mandatory minimum LEED Energy Performance points, projects are required to meet mandatory UBC energy and GHG targets (TEUI, TEDI, GHGI) as per the project Design Brief. Note that different energy modeling methodologies are used to evaluate energy savings for LEED and the Design Brief energy targets.

UBC's Climate Action Plan (CAP) sets a target of 100% reduction in GHG emissions below 2007 levels by 2035. In support of this plan, natural gas shall not be used as the primary heating source in new and replacement air handling and space heating equipment. Natural gas may be used as a backup heating source at the unit where required to ensure heating requirements can be met.

The project's energy modeler should provide guidance to the project team on the number of Optimize Energy points likely to be achieved by meeting the UBC targets.

Points earned are based on the combined total performance of energy cost and greenhouse gas emissions reductions achieved relative to the Performance Cost Index percentage reduction for the building type.

### Option 1

Energy Performance Compliance is the preferred pathway, as it aligns with UBC Green Building Action Plan and the Climate Ready Requirements for UBC Buildings. Pursuing Option 1 is required to count savings in the Renewable Energy and the Grid Harmonization credit.

Project teams may choose to follow [EA Pilot ACP 143](#) which allows either ASHRAE 90.1 or NECB to be used as the reference energy code. Note that projects applying the pilot are evaluated based on energy consumption and greenhouse gas emissions. Projects that use NECB as the reference code must still comply with certain mandatory requirements.

District energy system (DES) modeling methodology, and guidance on how to account for DES carbon profiles and upstream equipment and distribution efficiencies, has not yet been published as part of the LEEDv4.1 Beta credit language. Until this direction becomes available project teams should consider using the LEED v4 methodology for DES modeling per Option 1, Path 2: Full accounting of DES upstream and downstream equipment. Project teams should confirm the approach used for DES modeling with GBCI Canada (via [leedcoach@gbcicanada.ca](mailto:leedcoach@gbcicanada.ca)) at the early stages of schematic design.

**VANCOUVER RESOURCES**

[Appendix A - UBC Integrated Sustainability Process](#)

[Appendix H - Vancouver Campus: District Energy System Guidance and Utility Data](#)

[UBC Green Building Action Plan](#)

[UBC Climate Action Plan](#)

[UBC Climate Ready Requirements](#)

[UBC Technical Guidelines: Section 20 00 30 Thermal Comfort Requirements;](#)

[UBC Technical Guidelines: Section 20 00 05 Mechanical General Requirements; Section 23 05 00 HVAC - General Requirements](#)

[Alternative Compliance Paths for Canadian LEED Projects](#)

[UBC Energy Modelling Guideline \(current version\)](#)

[National Emissions Inventory Report](#)

[Provincial Greenhouse Gas Factors](#)

[Electricity Emission Intensity Factors for Grid-Connected Entities](#)

**VANCOUVER GUIDANCE**

New buildings are required to connect to the Academic District Energy System for thermal heat unless a variance is granted. Connectivity requirements include building heating and may include domestic hot water heating. When heat pump systems are utilized, district energy shall be used for supplemental heat.

The Academic District Energy System on the Vancouver campus is supplied by a combination of three main fuel sources that will impact the number of energy points for any project required to connect:

- The *BRDF's biomass boilers* - the existing 6 MW and a new 12 MW thermal energy boilers run on wood waste and produce thermal energy. These serve as the primary energy source to the district energy system.
- The *BRDF's cogeneration unit* - a 2 MWe combined heat and power engine is fueled by a mix of natural gas and renewable natural gas (RNG). 2.4 MW of thermal energy is recovered from the engine which is also part of the base load.
- The *Campus Energy Centre (CEC)* - consists of three 15 MW high-efficiency hot water boilers fueled by natural gas for winter peak loads.

Projects that connect to the Academic District Energy System are encouraged to consider applying LEEDv4 *Option 1, Path 2: Full accounting of DES upstream and downstream equipment* to take full advantage of the UBC Academic District Energy System efficiencies and greenhouse gas emission contribution to maximize the number of available LEED points. Until DES modeling methodology is published for LEEDv4.1, project teams are advised to confirm the approach used with GBCI Canada (via [leedcoach@gbcicanada.ca](mailto:leedcoach@gbcicanada.ca)) at the early stages of schematic design.

Refer to Appendix H - Vancouver Campus: District Energy System Guidance and Utility Data for energy modeling inputs including DES system efficiencies, utility costs and calculated contributions from each fuel source for electrical and thermal energy production. Note that monthly variations in the DES greenhouse gas emission profiles must be accounted for. Project teams should contact UBC Energy and Water Services at the start of the project to confirm the most recent Appendix H data to apply to the project.

**OKANAGAN RESOURCES**

[Appendix H - Okanagan Campus: District Energy System Guidance and Utility Data](#)

[Green Building Action Plan \(2018\)](#)

[UBC Okanagan Climate Action Plan 2030](#)

[UBC Technical Guidelines: Section 20 00 30 Thermal Comfort Requirements](#)

[UBC Climate Ready Requirements](#)

[Okanagan Whole Systems Infrastructure Plan \(2016\)](#)

[UBC Energy Modelling Guideline \(current version\)](#)

[National Emissions Inventory Report](#)

[Provincial Greenhouse Gas Factors](#)

[Electricity Emission Intensity Factors for Grid-Connected Entities](#)

**OKANAGAN GUIDANCE**

[UBC Okanagan's Whole Systems Infrastructure Plan \(WSIP\)](#) sets climate adaptive guidelines along with a goal for net positive performance in both energy and carbon by 2050. UBCO district energy supply optimization, expansion, and decarbonization is in support of this goal.

There are two district energy networks at UBC Okanagan:

- The Low Temperature District Energy System (LDES) and
- The Medium Temperature District Energy System (MDES).

The LDES system is an ambient closed loop campus system that serves most of the academic buildings. Projects connecting into the LDES both extract and reject heat into the loop. The heating and cooling source for the LDES includes a combination of gas fired boilers, geo-exchange through aquifer HX, cooling towers, and HX with the MDES loop. The MDES system is supplied by heat from the central heating plant (CHP) which is fueled with gas-fired boilers.

Energy utility inputs, costs, and GHG factors for district provided heating and cooling will be provided by UBCO to the project team early in the project as part of the project's Design Brief and OPR.

To take full advantage of the District Energy System efficiencies and carbon profiles *LEEDv4 Option 1, Path 2: Full accounting of DES upstream and downstream equipment* may be advantageous for some projects depending on typology, load profiles and LDES/MDES connectivity requirements. Project teams are advised to evaluate compliance paths at the early stages of Schematic Design to determine the most advantageous compliance path for the project. Until the DES modeling methodology is published for LEEDv4.1, project teams should confirm the approach used for DES modeling with GBCI Canada (via [leedcoach@gbcicanada.ca](mailto:leedcoach@gbcicanada.ca)) at the early stages of schematic design.

Refer to Appendix H - Okanagan Campus: District Energy System Guidance and Utility Data

**EA Credit:**  
**Advanced**  
**Energy Metering**

CAMPUS	MANDATORY	PRIORITY	AVAILABLE
Vancouver	1		1
Okanagan	1		

**REQUIREMENTS**

All projects must comply as per the requirements LEED BD+C v4.1 Reference Guide.

**RESOURCES**

[UBC Technical Guidelines: Vancouver and Okanagan - Section 01 92 00 Monitoring Based Commissioning](#)

**VANCOUVER GUIDANCE**

Project teams should reference the UBC Technical Guidelines Section 01 92 00 Monitoring Based Commissioning to inform and align the metering strategy. During the design process, project teams are urged to engage UBC Energy and Water Services or Student Housing and Community Services to develop a monitoring strategy and meaningful data reporting protocol to maximize opportunities for energy and water savings and provide operator feedback.

**OKANAGAN GUIDANCE**

During the design process, project teams are urged to engage UBCO Facilities Management, Energy Team and Student Housing and Hospitality Services, to develop a monitoring strategy and operational data reporting protocol to maximize opportunities for operator feedback.



Meter reading

## EA Credit: Grid Harmonization

CAMPUS	MANDATORY	PRIORITY	AVAILABLE
Vancouver	1		2
Okanagan	1		

### REQUIREMENTS

All projects must comply as per the requirements of the LEED BD+C v4.1 Reference Guide.

Projects teams are required to earn at least one point as per the requirements of LEED BD+C v4.1, *Case 2: Demand Response Capable Building* or *Case 3: Load Flexibility and Management Strategies*. Teams should consider implementing demand response, load shedding and peak management strategies to achieve at least one point.

*Case 1: Demand Response Program Participation* is unavailable as demand response programs are currently not offered by the utility providers in Vancouver or Kelowna.

### RESOURCES

[UBC Technical Guidelines - Vancouver/Okanagan Campuses: Section 01 92 00 Monitoring Based Commissioning](#)

### GUIDANCE

Demand response capable buildings and load flexibility and management is a priority for UBC to implement on projects for effective building operation. Project teams are encouraged to consider the requirements of this credit early in design to support future opportunities to align with a fully automated demand response program. Teams are urged to coordinate their approach with UBC Energy & Water Services (Vancouver) and Energy Management Team (Okanagan) to facilitate alignment with UBC operational requirements and for projects connected to DES system align approach with available data.

UBC is not currently participating in a demand response contract with BC Hydro or Fortis BC, making Case 1 unavailable to projects. However, both campuses are implementing strategies on the building side in new projects.

*Case 2* is based on developing a plan to shed at least 10% of the annual on-peak electricity demand (based on the energy modeling done as part of the Optimized Energy Credit). The demand response system programming must be tested to effectively reduce demand as required by the LEED credit and commissioned as part of the Commissioning Authority's scope of work. Be aware that UBC is a major research university and any demand response programming must not

adversely impact research, and curtailment must not target critical research equipment.

*Case 3* is based on adopting at least one of listed load flexibility and management strategies:

- Peak Load Optimization
- Flexible Operating Scenarios
- On-site Thermal and/or Electricity Storage
- Grid Resilience Technologies

Note: Fossil fuel fired backup generators or co-generation is not eligible as strategy. If a portion of the fuel mix is renewable natural gas (RNG) and remaining is natural gas in co-generation, this would be not eligible.

Note: When a project is connected to the District Energy System and efficiency is claimed for the DES in the *Optimized Energy Performance* credit, the modeled DES demand must be included. Grid harmonization strategies applied to the DES may be used to document achievement at the building level. In this case, the interval recording and building automation system communications may be located in the DES and not in the building. Project teams pursuing this option are advised to contact UBC Energy & Water Services (Vancouver) or the Energy Team (Okanagan) for information.



### EA Credit: Renewable Energy

CAMPUS	MANDATORY	PRIORITY	AVAILABLE
Vancouver		1	5
Okanagan		1	

**REQUIREMENTS**

All projects are encouraged to earn one point where feasible. Teams should consider the credit early in the design process. If credit is pursued, projects should produce life cycle costing and demonstrate the business case as part of the UBC Integrated Sustainability Process, Appendix A.

**RESOURCES**

- [Appendix H - Okanagan Campus: District Energy System Guidance and Utility Data](#)
- [UBC Climate Action Plan](#)
- [Alternative Compliance Paths for Canadian LEED Projects](#)
- [National Emissions Inventory Report](#)
- [Provincial Greenhouse Gas Factors](#)
- [Electricity Emission Intensity Factors for Grid-Connected Entities](#)

**VANCOUVER GUIDANCE**

Refer to project Design Briefs for building specific renewable energy requirements.

LEED v4.1 does not define biomass as a renewable energy source unless harvested within the campus boundary. As such, the renewable energy contribution from the Academic District Energy System will not contribute. It is recommended that project teams investigate updates or pilot paths associated with biomass treatment for this credit as it applies to renewable energy systems.

**OKANAGAN GUIDANCE**

Refer to project Design Briefs for building specific renewable energy requirements.

LEED v4.1 does not define geothermal energy that uses a heat pump as a renewable energy source, as such, there is no renewable energy contribution from the Low Temperature District Energy System (LDES).

### EA Credit: Enhanced Refrigerant Management

CAMPUS	MANDATORY	PRIORITY	AVAILABLE
Vancouver	1		1
Okanagan	1		

**REQUIREMENTS**

All projects must comply as per the requirements of the LEED BD+C v4.1 Reference Guide.

**GUIDANCE**

Projects must comply with Option 1 or Option 2.

Option 2 is the most likely compliance path for projects on both campuses, as most will have cooling or heat pump equipment. Project teams are encouraged to select preferred equipment early to confirm compatible refrigerant types. Perform calculations early in the design process to confirm the total refrigerant charge meets the credit requirements and verify calculations if different equipment is selected at later stages in the project.

If equipment is selected with a novel refrigerant, such as CO<sub>2</sub> heat pumps or high temperature heat pumps using R1234ze, project teams are advised to coordinate with UBC Building Operations.