

UW Requirements for Life Cycle Cost Analysis (LCCA) and Energy Life Cycle Cost Analysis (eLCCA) for Facilities and Capital Projects

1. OVERVIEW

This document sets new standards for conducting a life cycle cost analysis (LCCA) for University of Washington projects. Life cycle cost analysis is a projection of initial and on-going costs of ownership or leasing, operations and maintenance, operational energy, and greenhouse gas emissions (GHGs) for a facility or site over its useful life. It is usually one of many factors considered when deciding to proceed with a facilities or capital project. Other factors often include the business need, availability of funding, schedule constraints, jurisdictional and community interests.

These new LCCA requirements are necessary for UW to comply with multiple State and local mandates, as well as the goals of UW's Sustainability Action Plan. State mandates include the State Clean Building Performance Standard (CBPS) and State Climate Commitment Act (CCA). ***The CBPS requires the University to significantly reduce energy consumption and meet energy use intensity (EUI) targets by specific dates, at all three campus locations.*** Conducting an LCCA is a tracking and reporting requirement for CBPS compliance. This document is to be used in conjunction with existing applicable State of Washington requirements, to analyze both operational energy and associated greenhouse gas emissions.¹ The CCA requires the University of Washington Seattle Campus to significantly reduce carbon emissions from the combustion of fossil fuel at the central plant. The City of Seattle has similar requirements in place for both EUI and emissions reductions, however UW's Seattle Campus is currently exempt from those requirements because compliance with the State CCA requirements takes precedent. UW Tacoma and Bothell campuses, as well as other UW owned buildings that are not connected to a central campus district energy system, may have to comply with local regulations and/or the City's Building Performance Standards depending on where the buildings are located.

Incorporating a rigorous LCCA is industry standard best-practice for project design and decision-making at a variety of scales. The pressure to reduce first costs is a constant part of capital projects, but in many cases these first cost savings for the project budget come at a substantial premium to the "total cost of ownership" paid for with operating dollars. Operating cost impacts are often less visible; occurring well after most of those involved in executing a project would have any awareness of the long-term consequences of their decisions. A regular source of frustration on projects is that there are limited ways for future operating cost savings to be brought forward to fund options which come at a higher first cost, but that accounting problem should not be a reason for making short-sighted decisions.

There are two life cycle cost analysis tools maintained by the State, the Life Cycle Cost Tool (LCCT) maintained by the OFM and the Energy Life Cycle Cost Analysis (ELCCA) maintained by the DES Energy Program. While these two tools are not required by the State for predesign, they are required in early stages of the design phase for State Agency facility construction projects. State law

¹ Please note that the State requirement for the completion of a Life Cycle Cost Model (LCCM) is NOT addressed in this document. An LCCM is an analysis required by the State, and is typically used to make decisions around owning and leasing buildings.

([RCW 39.35](#)) requires public agencies to ensure that energy conservation and renewable energy systems are considered in the design phase of major facilities.

2. PURPOSE

The purpose of this document is to 1) establish a UW LCCA policy requiring project teams to complete the required analysis or analyses, 2) Ensure that UW projects use the State LCCT to conduct an LCCA/eLCCA in project analysis, and use the findings for decision-making to ensure the highest and best use of funds, and 3) standardize UW's process, including inputs, for utilizing the State LCCT.

3. APPLICABILITY

- a. All University of Washington owned and/or leased facilities located in the State of Washington.

4. DEFINITIONS (See the [State definitions under RCW 39.35.030](#))

- a. **Energy Life Cycle Cost Analysis:** Energy Life-Cycle Cost Analysis (ELCCA) is a decision-making tool that compares owning and operating costs for energy using systems in new and remodeled facilities.
- b. **Life Cycle Cost:** [See RCW 39.35.030 \(11\)](#)
- c. **Life Cycle Cost Analysis (LCCA):** [See RCW 39.35.030 \(12\)](#). The University of Washington's definition of LCCA is the same as the State's, with the additional requirement that greenhouse gas emissions must be evaluated as part of the LCCA using the LCCT tool.²
- d. **Life Cycle Cost Tool (LCCT):** [State Office of Financial Management's Life Cycle Cost Tool](#).
- e. **Life Cycle Cost Documents:** The LCCT analysis (Excel file), cut sheets, pictures, additional project documents used in decision-making process.
- f. **Major renovation** means work on a building, structure, or facility that demolishes the space down to the shell structure and rebuilds it with new interior walls, ceilings, floor coverings, and systems when the work affects 50 percent or more of the affected project square footage and the affected space is greater than 5,000 square feet.
- g. **Minor renovation** means a project that is not a major renovation that makes a substantial modification to the mechanical (i.e. CCW, compressed air, steam, etc.) and electrical system. A substantial modification to the mechanical system means the addition or replacement of heating or cooling equipment serving 50 percent or more of the heating or cooling load of the affected space served by the mechanical system. A substantial modification to the electrical system means the addition or replacement of 20 percent or more of the fixtures, or 20 percent or more of the lamps plus ballasts in an affected space.

5. REQUIREMENTS

- a. State Requirements: State law requires state agencies, including colleges and universities, to conduct:

² The State's current definition of Life Cycle Cost Analysis does not include greenhouse gas emissions nor require them to be evaluated, but the LCCT does include a GHG analysis. The State is in the process of updating their LCCA definition to include GHGs, in order to ensure that LCCA policy is aligned with the State Climate Commitment Act.

- i. An LCCA for all projects valued over \$5,000,000 or projects constructing new building space over 5,000 square feet. Agencies will utilize the Life Cycle Cost Tool (LCCT) which standardizes rates and methodology to perform the analysis.
 - ii. An ELCCA when public funds are used to build and/or operate the new or renovated major facility. This includes:
 - Publicly-owned or operated buildings
 - Major facilities (25,000 square feet or more of usable space)
 - New construction or renovations
 - Colleges and universities, state agencies, and political subdivisions to include: cities, counties, school districts, and other special taxing districts.
- b. UW Requirements:
- i. An LCCA is required for Major and Minor Renovations, as defined in part 4 of this policy.
 - ii. An LCCA is required when evaluating initiatives, major systems (i.e. structural, mechanical, controls, etc.), energy or water consuming processes or equipment, requests from stakeholders that may have a significant impact to the project budget, variance to the Facilities Design Standards (FDS), and/or impact to our UW Sustainability Action Plan.
 - iii. As a general rule, UW Facilities requires buildings currently connected to a Central Plant to stay connected to the Central Plant. Connection to central systems is preferred by UWF. Stand-alone building equipment (new or replacement) and any systems that will not connect to a Central Plant requires a formal request and approval from UWF Campus Energy, Utilities, and Operations (CEUO).
- c. Analysis Tools:
- i. The [State’s Life Cycle Cost Tool \(LCCT\)](#)³ shall be used to conduct an LCCA and an ELCCA. Greenhouse gas emissions analysis are built into the LCCT and must be included as part of the analysis.
- b. For all other projects types, the LCCT is strongly encouraged even if it is not required as part of this UW LCCA Standard.

6. PROCEDURES

- a. Please refer to the LCCA procedures in Appendix A of this document.

7. PROCESS

- a. The Design Team is responsible for completing and submitting the [LCCT](#) to the UW Project Manager no less than 4 weeks prior to a decision needing to be made on the energy consuming equipment, system design, etc. as referenced in Section 5(b)ii above.
- b. The Project Manager will request an LCCA review from Campus Energy, Utilities, and Operations (CEUO), allowing for 4 weeks review process.

³ WA State LCCT: <https://ofm.wa.gov/sites/default/files/public/budget/forms/2023-25/EvalLifeCycleCostToolJune2022.xlsm>

- c. The Design Team is responsible for engaging the Project Management Team (PMT) as needed and, at minimum, during the Project Definition phase of the process.
- d. The Project Governance structure will drive the review and approval process. The PMT will make recommendations to the Project Executive Committee (PEC) for an approved direction.
- e. LCCA Documents shall be saved on the PDG I drive project folder (or general project folder if PDG is not involved). If a variance from this LCCA requirement is requested and approved, the UW PDG project manager will add it to the Variance Log.
- f. The UW Project Manager will send all LCCA Documents to UWF stakeholders (i.e. ES, CEUO, FMC, Sustainability, CAP, EHS, Finance, etc.) for review and approval.
- g. Once the LCCA Documents are reviewed by UWF stakeholders the document will be taken to the PEC for review and resolution.
- h. UW Project Manager is responsible for notifying the Design Team when a decision is made.
- i. The Project Manager is responsible for submitting the LCCA Documents as part of the Closeout Document process.

8. STIPULATIONS

- a. An LCCA is one data point of many in the decision-making process on whether an item is included in a project. The University could choose a higher lifecycle cost option, but that outcome should be carefully considered by the PEC and Variance Committee at an early phase of project analysis. If the Project Executive Committee (PEC) and Variance Committee agree to a higher lifecycle cost option, the Project Manager shall document this discussion and decision, and include it in the project file. An example could be the choice of a cross-laminated timber (CLT) structure in lieu of more conventional steel or concrete. There is a first cost premium (as of 2022) that is unlikely to be offset by operational cost savings, but the University has chosen CLT on projects for reasons including helping to foster a forest products industry in the state, character/aesthetics, and lower embodied carbon to produce the material compared to the alternatives.

9. LINKS TO RESOURCES

- a. OFM Budget Instructions (for Higher Education): summary in the [OFM capital budget instructions](#)
- b. OFM LCCT <https://ofm.wa.gov/budget/budget-instructions/capital-budget-instructions-forms>
- c. DES ELCCA Guidelines <https://des.wa.gov/services/facilities-and-leasing-management/energy-program/energy-life-cycle-cost-analysis>
- d. ELCCAT <https://ofm.wa.gov/sites/default/files/public/budget/forms/2023-25/EvalLifeCycleCostToolJune2022.xlsx>

APPENDIX A: University of Washington LCCA Procedures

These procedures are to be used for compliance with **LCCT Tool**. For questions regarding Procedures and/or rates in this Appendix A, please contact: UWF Finance Team and/or Andrew Frenzl

This Appendix A will be updated annually in MARCH.

PROCEDURES:

- a. Go to the State Office of Financial Management (OFM) website, and use the State Life Cycle Cost Tool, LCCT, form: <https://ofm.wa.gov/budget/budget-instructions/capital-budget-instructions-forms>
- b. Assumptions:
 - i. Key Variables: Select “OFM”
 - Do not select anything for “Finance 1st Purchases for”
 - ii. Use the following reference for useful life:
 - RS Means Facilities Maintenance and Repair Costs Data
 - iii. Use the following for rates:
 - Natural gas – Seattle Campus
 - Seattle Campus - Use the latest PSE [rate schedule](#)
 - Power Plant Schedule 87
 - < 10k Therms/meter Schedule 31
 - > 10k Therms/meter Schedule 41
 - Bothell Campus - Use the latest PSE rate schedule for Schedule 41
 - Tacoma Campus - Use the latest PSE rate schedule for Schedule 41
 - Water
 - Seattle Campus - <http://www.seattle.gov/utilities/your-services/accounts-and-payments/rates/water/commercial-water-rates>
 - Bothell Campus - <https://www.bothellwa.gov/1523/Utility-Rates>, use Commercial
 - Tacoma Campus - <https://www.mytpu.org/payment-billing/rate-information/water-rates/>, use Commercial General
 - Sewer
 - Seattle Campus - <http://www.seattle.gov/utilities/your-services/accounts-and-payments/rates/sewer>
 - Bothell Campus - <https://www.bothellwa.gov/1523/Utility-Rates>, use Commercial
 - Tacoma Campus - https://www.cityoftacoma.org/government/city_departments/

[environmentalservices/rates/wastewater_rates](#), use

Commercial General

- Electricity
 - Seattle Central Campus and Seattle Non-Central Campus: <https://www.seattle.gov/city-light/business-solutions/business-billing-and-account-information/business-rates#seattlerentonandkingcountybusinesses>
 - Bothell Campus - <https://www.snopud.com/account/about-my-bill/rates/electric/>, use “Largest Business Rates”
 - Tacoma Campus - <https://www.mytpu.org/payment-billing/rate-information/power-rates/power-rates-schedule/>, use Schedule G or HVG
 - Steam – Central Campus
 - FY23 average rate: \$11.42/ 1,000 pounds
 - Central Cooling Water (UWF)
 - Seattle Campus – Contact UWF Finance and Andrew Frenzl for current rate.
 - Diesel and gasoline <https://gasprices.aaa.com/?state=WA>, price dependent on location of project.
- iv. For labor rates use <https://facilities.uw.edu/services/rates/labor>
 - v. Estimated labor costs should be the labor rate * (average of RS Means Facilities Maintenance and Repair Costs Data and The Whitestone Building Maintenance and Repair Cost Reference equipment costs) * 2
 - vi. First year maintenance to include but is not limited to preventative maintenance (e.g. regular equipment walk thrus, building walk thrus, etc.), software licensing, etc.
 - vii. Include intermediate major overhaul costs in maintenance/repair costs (e.g. chiller bearing replacement, or VFD replacements)
 - Installed cost to include items but not limited to commissioning cost, additional design fees (internal and external), proprietary software, IT infrastructure costs (e.g. servers, database maintenance, etc.)
 - viii. Carbon emission factors
 - \$52.20 per MgCO2e current auction rate
 - ix. Incorporate residual value (e.g. salvage value) at end of LCCA time period