

2022 PROJECT PROPOSAL CHECKLIST
2023-25 Biennium Four-year Higher Education Scoring Process

INSTITUTION	CAMPUS LOCATION
380 - Western Washington University	Bellingham
PROJECT TITLE	OFM/CBS Project #
Heating Conversion Project - Phase 1	Click or tap here to enter text.
PROJECT CATEGORY	FPMT UNIQUE FACILITY ID # (OR NA)
Infrastructure	Click or tap here to enter text.
PROPOSAL IS	
New or Updated Proposal (for scoring)	Resubmitted Proposal (retain prior score)
<input checked="" type="checkbox"/> New proposal <input type="checkbox"/> Resubmittal to be scored (more than 2 biennia old or significantly changed)	<input type="checkbox"/> Resubmittal from 2018 (2019-21 biennium) <input type="checkbox"/> Resubmittal from 2020 (2021-23 biennium)
CONTACT	PHONE NUMBER
Brian A. Ross	360.650.6539

Proposal content

- Project Proposal Checklist: this form; one for each proposal
- Project Proposal Form: Specific to category/subcategory (10-page limit)
- Appendices: templates, forms, exhibits and supporting/supplemental documentation for scoring.

Institutional priority

- Institutional Priority Form. Sent separately (not in this packet).

Check the corresponding boxes below if the proposed project meets the minimum threshold or if the item listed is provided in the proposal submittal.

Minimum thresholds

- Project is not an exclusive enterprise function such as a bookstore, dormitory, or contract food service.
- Project meets LEED Silver Standard requirements.
- Institution has a greenhouse gas emissions reduction policy in place in accordance with RCW 70A.45.050 and vehicle emissions reduction policy in place per RCW 47.01.440 or RCW 43.160.020 as applicable.
- A complete ~~pre-design~~ Feasibility Study was submitted to OFM by July 1, 2022 and approved.
- Growth proposals: Based on solid enrollment projections and is more cost-effectively providing enrollment access than alternatives such as university centers and distance learning.
- Renovation proposals: Project should cost between 60 – 80% of current replacement value and extend the useful life of the facility by at least 25 years.
- Acquisition proposals: Land acquisition is not related to a current facility funding request.
- Infrastructure proposals: Project is not a facility repair project.
- Stand-alone, infrastructure and acquisition proposals is a single project requesting funds for one biennium.

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Required appendices

- Project cost estimate: Excel C-100
- Degree Totals and Targets template to indicate the number of Bachelors, High Demand and Advanced degrees expected to be awarded in 2023. (Required for Overarching Criteria scoring criteria for Major Growth, Renovation, Replacement and Research proposals).
- Availability of Space/Campus Utilization template for the campus where the project is located. (Required for all categories/subcategories except Infrastructure and Acquisition proposals).
- Assignable Square Feet template to indicate program-related space allocation. (Required for Growth, Renovation and Replacement proposals, all categories/subcategories).

Optional appendices

Attach supplemental and supporting project documentation, *limit to materials directly related to and needed for the evaluation criteria*, such as:

- Degree and enrollment growth projections
- Selected excerpts from institutional plans
- Data on instructional and/or research space utilization
- Additional documentation for selected cost comparables (acquisition)
- Selected materials on facility conditions
- Selected materials on code compliance
- Tables supporting calculation of program space allocations, weighted average facility age, etc.
- Evidence of consistency of proposed research projects with state, regional, or local economic development plans
- Evidence of availability of non-state matching funds
- Selected documentation of prior facility failures, high-cost maintenance, and/or system unreliability for infrastructure projects
- Documentation of professional assessment of costs for land acquisition, land cleanup, and infrastructure projects
- Selected documentation of engineering studies, site survey and recommendations, or opinion letters for infrastructure and land cleanup projects
- Other: Feasibility Study

I certify that the above checked items indicate either that the proposed project meets the minimum thresholds, or the corresponding items have been included in this submittal.

Name: Brian A. Ross Title: Associate Director, Capital Budget

Signature: Electronic Signature Date: 8.8.2022

INSTITUTION	CAMPUS
Western Washington University	Bellingham
PROJECT TITLE	
Heating Conversion Project – Phase 1	

Summary narrative

- **Problem statement**

Western Washington University (Western) relies on an over 75-year-old gas-fired central steam plant and distribution system to heat most of its facilities. The plant accounts for approximately 97% of Western's greenhouse gas (GHG) emissions. This is exacerbated by the fact that approximately 30% of all heat generated by the Steam Plant is unavoidably lost in distribution.

The current plant uses antiquated systems to run the boilers. These systems require substantial upkeep and frequent replacement of parts. Finding replacement parts and technicians to perform repairs has become increasingly difficult as these systems continue to age and become obsolete. If Western is unable to maintain and fix these systems, the Steam Plant will be at risk of shutting down, thus shutting down University operations.

The Steam Plant requires, per State law, an operator to be on-site 24 hours a day. Western has experienced increasing difficulty recruiting operators qualified to run steam plants. For example, Western began recruitment for a Steam Plant Operator position in October 2021 that remains unfilled. As a result, Western has fewer operators than ideal for the plant, posing staffing challenges and increasing the risk of system interruption and undermining routine maintenance.

Additionally, the system is fueled by natural gas which has become increasingly volatile in price. This trend is going to continue as the Climate Commitment Act and legislation associated with the cap and invest carbon markets become effective.

Most campus buildings lack cooling, which creates significant operational challenges on increasingly frequent peak heat days. Excessively warm classrooms and labs make teaching and learning difficult, and students must adjust lab procedures because high temperatures can corrupt results. Performances in assembly spaces must either be cancelled due to excessive heat or supported with rented chillers. The campus also experiences heat related equipment failures. In addition to the challenges posed by high temperatures, wildfire smoke can make air quality bad enough to preclude the use of natural ventilation.

- **Project Description**

The Heating Conversion Project – Phase 1 will provide several independent plants (Nodal Option), each serving a different portion of the campus, that use a combination of heat pumps, heat recovery chillers, and air-cooled chillers to provide heating and chilled water. Natural gas boilers are included in the nodal plants to achieve the high temperature water required by older buildings on peak heating days as well as provide

added resiliency.

The project also includes a four-pipe distribution system with supply and return piping for both heating and/or chilled water that is delivered to energy transfer stations serving the academic buildings on campus. A geo-exchange field will also be paired with each of the nodal plants to efficiently store thermal energy. The project does not include retrofitting each building. The retrofits within the buildings will be completed under Heating Conversion Project - Phase 2 or during major building renovations that are funded with separate appropriations. The retrofits are not necessary to decommission the Steam Plant and use the new infrastructure but will be needed to maximize the value of the new plants and further reduce Western's overall GHGs.

This project will require multi-biennia to complete. Western is requesting \$10 million in the 2023 – 2025 capital budget for schematic design, scope detail, testing (ground surveys, soil boring, preliminary distribution engineering, detailed load analysis), drawings and specifications, phased implementation scenarios, detailed financial analysis, and completion of full design of the first nodal plant and associated distribution system. The location of the first nodal plant and distribution system will be determined during the planning stage but will likely be in north or south academic zones. Western plans to submit funding requests in the four subsequent biennia in the estimated amount of approximately \$35 million per biennium for the remainder of design and construction of the project. Funding for the Heating Conversion Project – Phase 2 will be requested after the first nodal plant and associated infrastructure is complete.

- **History of the project**

The 2021-23 Capital Budget included a \$450,000 grant from the Department of Commerce to explore the feasibility of converting our central steam to a more sustainable approach to heating our facilities. The study was completed in July 2022 and analyzed the economic and engineering requirements of such a conversion. Feasible low carbon options for new central plant configurations were developed and their relative advantages identified. Energy and carbon savings and other operational costs were estimated and balanced against the initial costs of construction using a total cost of ownership (life cycle cost) model. The financial analysis also considered the increasing need for major renewal and replacement of the steam system over the coming years, as well as the eventual renewal and modernization of heating and cooling systems in all buildings. Based on the financial and technical analyses completed, a Nodal Option was identified as the preferred alternative.

Per the study, the Nodal Option is one of the better options from a carbon reduction standpoint with the complementary use of heat pumps and the geo-exchange. The Nodal Option also provides more implementation flexibility. Each node can be implemented independently of the others, providing more manageable projects that may better match the availability of funds. Overall campus disruption during construction is also limited at any one time to the area of campus served by the node and distribution piping being installed. A link to the study is included in the Appendix below.

- **University programs addressed or encompassed by the project**

This project will provide the necessary infrastructure to heat and cool the majority of Western's facilities in a sustainable and efficient manner. All academic facilities on Western's Bellingham campus will benefit from this project, especially with the ability to efficiently heat and cool teaching spaces, including research and instructional labs. Additionally, this project, particularly the SD phase, will become a case study for the Institute for Energy Studies.

General category scoring criteria

1. Significant health, safety, and code issues

- A.** This project will reduce Western's greenhouse gas (GHG) emissions by approximately 50% and has the potential to reduce GHG by 90% once all the buildings are fully retrofitted. This meets State and National goals of reducing carbon emissions and Western's impact to climate change.

- B.** By replacing the existing Steam Plant, this project will transition to an inherently safer lower pressure and lower temperature water distribution system. Additionally, the pipe insulation at the Plant and in the distribution system has asbestos. While Western is containing the asbestos per code, employees maintaining the Steam Plant and associated network still have potential for exposure. Thus, it is best to eliminate the asbestos completely.

2. Evidence of increased repairs and/or service interruption

To maintain the entire steam system, an annual two-week shutdown is required for preventative maintenance. This shutdown occurs during intersession when the campus population is at its lowest; however, backup heating systems are still required for critical needs such as cooking facilities, year-round residence hall domestic hot water, and research in the vivarium. The other important preventative task is steam traps in the system need annual inspection, costing approximately \$15,000 per year to ensure heat loss into the condensate return system is minimized. Within the Steam Plant proper, the boiler feedwater pumps require regular rebuilding, and the numerous fans and other motors need regular inspection and lubrication. This year, two large deaerator tanks are due for inspection and repair if any cracked welds are discovered.

The campus wide distribution system encompassing both steam supply and condensate return is at the end of its expected life. Condensate return pipes are prone to corrosion, and two major buildings have had their underground return pipes break, forcing condensate water and its energy content to be dumped down the sewer and creating a make-up water need at the central plant. Most of the distribution network travels through tunnels and trenches. These are beginning to crack, allowing ground water infiltration that causes flooding and requiring mitigations to channel the water away.

The steam supply piping is subject to expansion and contraction movement of several inches throughout the system. Specialized expansion joints are required to allow the movement but still hold pressure. These are also at the end of their useful life and beginning to leak, causing isolated system shutdowns for repairs.

See Appendix A for service repair history and Appendix B for commodity use and cost history.

3. Impact on institutional operations without the infrastructure project

The existing steam system is a mid-20th century design that is beyond its planned service life; its condition is deteriorating, and it requires substantial upkeep. Beyond the physical condition of the plant, operators and vendors qualified to operate and repair the systems are increasingly difficult to

locate. These circumstances put all campus-wide operations at risk as all functions are dependent on reliable heat.

Additionally, this project is proposing to add cooling to reduce our operational challenges on increasingly frequent peak hot days. Without cooling, the following are some of the challenges the campus will continue to experience:

- Excessively warm classrooms and labs, making teaching and learning difficult
- Research efforts, which are often scheduled during summer months due to lab availability, are impeded by high temperatures
- Performances in assembly spaces are either canceled due to excessive heat or supported with costly and inefficient rented chillers
- Heat related equipment failures, particularly in the data communications system
- Increased ineffectiveness of historical “free cooling” strategies due to wildfire smoke and increased summertime instruction on campus

The ten-year capital plan includes renovation of three prominent academic facilities. Without funding to proceed to schematic design, those renovations will need to consider alternative heating and cooling systems, including connection to the antiquated steam plant.

4. Reasonable estimate

The feasibility study included a detailed cost estimate (see link below). The estimate was based on industry standards, market conditions, the size and complexity of the project, and the size and complexity of Western’s campus. The cost estimate for the Heating Conversion Project – Phase 1, per the study, is currently estimated to be \$149 million. This includes the plants, distribution system, geothermal fields, and replacement of heat exchangers. However, this excludes the retrofits within the buildings to optimize the heating and cooling created from the new infrastructure. This scope of work is envisioned to be done in phases and, when complete, will eliminate the need for the Steam Plant and aging distribution system. This would also reduce Western’s total GHG emissions by approximately 50%. However, the project’s goal of reducing Western’s GHG emissions by 90% would not be realized until all the retrofits within the buildings are completed (Phase 2). This is because heavier usage of the backup natural gas boilers in each plant would be required on the colder winter days until those retrofits are complete.

Per the study, the retrofits within the buildings are estimated to cost \$314 million. These improvements will be implemented under the Heating Conversion Project - Phase 2 project or during major building renovations that are funded with separate appropriations. These improvements will be completed after the new plants are operational.

The scope of work planned in 2023-25 includes further refinement of the cost estimates as well as optimizing the phasing of each nodal plant and the buildings. The results of the Schematic Design phase will also inform Western which buildings are in most urgent need for conversion.

5. Engineering study

The feasibility study analyzed the economic and engineering requirements of converting our Steam Plant to a water-based heating and cooling system. The study analyzed several alternatives and did a comprehensive analysis of four most viable options, as well as business as usual, and made a

recommendation of the Nodal Option based on those results. The results of the study can be found in the link below.

The next phase, partial design, will provide scope detail, testing (ground surveys, soil boring, preliminary distribution engineering, detailed load analysis), drawings and specifications, phased implementation scenarios, and detailed financial analysis, as well as full design of one of the nodal plants.

6. Support by planning

A. Campus/facilities master plan

The 2017 Utilities Master Plan identified the liabilities of the existing steam heating system and recommended reviewing alternative low temperature, high efficiency heating. Additionally, the plan identifies the lack of cooling on campus as a challenge to our operations. This project is following the recommended next steps of the Utility Master Plan and the Heating Conversion Feasibility Study. A link to the Utilities Master Plan is in the Appendix below.

Western's Sustainability Action Plan calls for carbon neutrality. This project is necessary step in achieving this goal. A link to the Sustainability Action Plan is listed below.

B. Ongoing academic and/or research program need and strategic plan

Western is considering offering summer courses to reduce time to degree and offer flexibility to students. Additionally, student-faculty participatory research will also be increased during the summer months to provide additional learning opportunities. The cooling component of this project will assist in allowing this course work to occur without compromise or interruption.

7. Resource efficiency and sustainability

Steam district heating systems have built-in inefficiencies because the distribution network needs to be kept at constant pressure and temperature to work effectively. Even in summer when demand drops off to a small percentage of the winter peak, the distribution must be kept at the same temperature. The required high temperature (340F) and pressure (100 psi) is sustained by a natural gas combustion process that has an annual maximum efficiency of only 56%, which means a significant portion of the heat generated is lost in transmission. This process accounts for 97% of the GHG emitted on Western's main campus.

The proposed system utilizes relatively low (140F) water distribution temperatures. These are achieved by concentrating ambient energy from the air and ground sources with heat pumps that deliver four units of heat for each unit of electrical energy delivered to the heat pump (a 400% efficiency). This reduces the fossil fuel dependency to only the very coldest days of the year or when emergency backup is needed during a rare power outage. The GHGs are reduced by nearly 90%, once all the buildings are retrofitted, since the primary external energy for heating switches to renewably generated electricity from Western's "Green Direct" power purchase agreement with Puget Sound Energy.

Appendix

- A. Service Repair History
- B. Commodity Use and Cost History
- C. Project Cost Summary/C100
- D. Short Plant History Excerpted from the Utility Master Plan

Office of Financial Management

June 2022

Links

[Heating Conversion Feasibility Study](#)

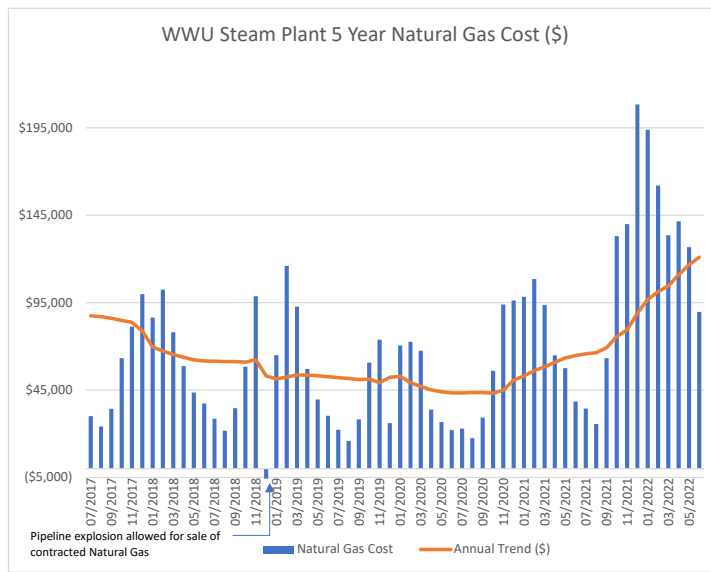
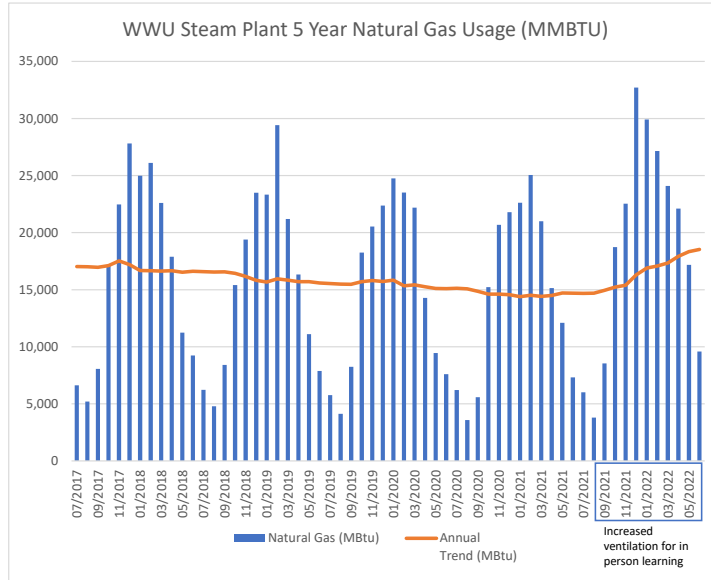
[WWU Sustainability Action Plan](#)

[Utility Master Plan Chapter Five District Heat](#)

Appendix A

Appendix B

Fiscal Year	Month	Natural Gas (MBtu)	Annual Trend (MBtu)	Natural Gas Cost	Annual Trend (\$)
FY 2018	07/2017	6,626	17,028	\$30,035	\$87,398
FY 2018	08/2017	5,203	17,013	\$24,168	\$87,038
FY 2018	09/2017	8,059	16,959	\$34,296	\$85,987
FY 2018	10/2017	17,088	17,114	\$63,211	\$84,825
FY 2018	11/2017	22,463	17,524	\$81,271	\$83,752
FY 2018	12/2017	27,812	17,186	\$99,807	\$78,835
FY 2018	01/2018	24,984	16,680	\$86,426	\$69,636
FY 2018	02/2018	26,108	16,659	\$102,489	\$67,317
FY 2018	03/2018	22,594	16,630	\$78,041	\$65,315
FY 2018	04/2018	17,891	16,658	\$58,741	\$63,733
FY 2018	05/2018	11,237	16,535	\$43,635	\$62,278
FY 2018	06/2018	9,243	16,609	\$37,294	\$61,618
FY 2019	07/2018	6,234	16,576	\$28,555	\$61,494
FY 2019	08/2018	4,779	16,541	\$21,813	\$61,298
FY 2019	09/2018	8,416	16,571	\$34,642	\$61,327
FY 2019	10/2018	15,401	16,430	\$58,391	\$60,925
FY 2019	11/2018	19,392	16,174	\$98,696	\$62,377
FY 2019	12/2018	23,494	15,814	(\$11,422)	\$53,108
FY 2019	01/2019	23,337	15,677	\$64,981	\$51,321
FY 2019	02/2019	29,422	15,953	\$116,092	\$52,455
FY 2019	03/2019	21,195	15,837	\$92,711	\$53,677
FY 2019	04/2019	16,333	15,707	\$57,130	\$53,543
FY 2019	05/2019	11,103	15,696	\$39,645	\$53,211
FY 2019	06/2019	7,885	15,583	\$30,352	\$52,632
FY 2020	07/2019	5,760	15,543	\$22,269	\$52,108
FY 2020	08/2019	4,120	15,488	\$15,911	\$51,616
FY 2020	09/2019	8,238	15,473	\$28,226	\$51,082
FY 2020	10/2019	18,256	15,711	\$60,695	\$51,274
FY 2020	11/2019	20,541	15,807	\$73,849	\$49,203
FY 2020	12/2019	22,362	15,713	\$26,067	\$52,327
FY 2020	01/2020	24,755	15,831	\$70,519	\$52,789
FY 2020	02/2020	23,510	15,338	\$72,624	\$49,167
FY 2020	03/2020	22,180	15,420	\$67,456	\$47,062
FY 2020	04/2020	14,280	15,249	\$33,876	\$45,124
FY 2020	05/2020	9,449	15,111	\$26,743	\$44,049
FY 2020	06/2020	7,595	15,087	\$22,068	\$43,359
FY 2021	07/2020	6,211	15,125	\$23,011	\$43,420
FY 2021	08/2020	3,578	15,080	\$17,440	\$43,548
FY 2021	09/2020	5,579	14,858	\$29,247	\$43,633
FY 2021	10/2020	15,226	14,606	\$55,983	\$43,240
FY 2021	11/2020	20,685	14,618	\$93,896	\$44,911
FY 2021	12/2020	21,783	14,569	\$96,208	\$50,756
FY 2021	01/2021	22,611	14,391	\$98,387	\$53,078
FY 2021	02/2021	25,055	14,519	\$108,477	\$56,066
FY 2021	03/2021	20,990	14,420	\$93,650	\$58,249
FY 2021	04/2021	15,141	14,492	\$64,859	\$60,831
FY 2021	05/2021	12,098	14,713	\$57,551	\$63,398
FY 2021	06/2021	7,315	14,689	\$38,560	\$64,772
FY2 2022	07/2021	6,014	14,673	\$34,416	\$65,723
FY2 2022	08/2021	3,793	14,691	\$25,573	\$66,401
FY2 2022	09/2021	8,539	14,938	\$63,268	\$69,236
FY2 2022	10/2021	18,734	15,230	\$132,997	\$75,653
FY2 2022	11/2021	22,529	15,384	\$139,892	\$79,486
FY2 2022	12/2021	32,705	16,294	\$208,342	\$88,831
FY2 2022	01/2022	29,917	16,903	\$193,905	\$96,791
FY2 2022	02/2022	27,146	17,077	\$161,939	\$101,246
FY2 2022	03/2022	24,093	17,335	\$133,497	\$104,566
FY2 2022	04/2022	22,113	17,916	\$141,548	\$110,957
FY2 2022	05/2022	17,170	18,339	\$126,695	\$116,719
FY2 2022	06/2022	9580	18,528	89,674	\$120,979



Appendix C

STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated June 2022

Agency	Western Washington University
Project Name	Heating Conversion Project - Phase 1
OFM Project Number	

Contact Information

Name	Brian Ross
Phone Number	360.650.6539
Email	brian.ross@wwu.edu

Statistics

Gross Square Feet		MACC per Gross Square Foot	
Usable Square Feet		Escalated MACC per Gross Square Foot	
Alt Gross Unit of Measure			
Space Efficiency		A/E Fee Class	A
Construction Type	Heating and power plant	A/E Fee Percentage	9.54%
Remodel	Yes	Projected Life of Asset (Years)	50

Additional Project Details

Procurement Approach	DB-Progressive	Art Requirement Applies	No
Inflation Rate	4.90%	Higher Ed Institution	No
Sales Tax Rate %	8.80%	Location Used for Tax Rate	Bellingham
Contingency Rate	10%		
Base Month (Estimate Date)	July-22	OFM UFI# (from FPMT, if available)	
Project Administered By	Agency		

Schedule

Predesign Start	October-21	Predesign End	July-22
Design Start	July-23	Design End	June-26
Construction Start	July-26	Construction End	June-33
Construction Duration	83 Months		

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Project Cost Estimate

Total Project	\$113,874,236	Total Project Escalated	\$148,999,806
		Rounded Escalated Total	\$149,000,000

Cost Estimate Summary

Acquisition

Acquisition Subtotal	\$0	Acquisition Subtotal Escalated	\$0
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Consultant Services			
Predesign Services	\$428,980		
Design Phase Services	\$5,394,441		
Extra Services	\$4,360,000		
Other Services	\$2,423,589		
Design Services Contingency	\$1,260,701		
Consultant Services Subtotal	\$13,867,710	Consultant Services Subtotal Escalated	\$16,687,991

Construction			
Maximum Allowable Construction Cost (MACC)	\$74,500,000	Maximum Allowable Construction Cost (MACC) Escalated	\$97,198,700
DB-Progressive Risk Contingencies	\$1,490,000		\$2,129,359
DB-Progressive Management	\$2,980,000		\$4,258,718
Owner Construction Contingency	\$7,450,000		\$10,646,795
Non-Taxable Items	\$0		\$0
Sales Tax	\$7,604,960	Sales Tax Escalated	\$10,052,554
Construction Subtotal	\$94,024,960	Construction Subtotal Escalated	\$124,286,126

Equipment			
Equipment	\$100,000		
Sales Tax	\$8,800		
Non-Taxable Items	\$0		
Equipment Subtotal	\$108,800	Equipment Subtotal Escalated	\$155,487

Artwork			
Artwork Subtotal	\$0	Artwork Subtotal Escalated	\$0

Agency Project Administration			
Agency Project Administration Subtotal	\$3,476,765		
DES Additional Services Subtotal	\$0		
Other Project Admin Costs	\$0		
Project Administration Subtotal	\$3,476,765	Project Administration Subtotal Escalated	\$4,968,646

Other Costs			
Other Costs Subtotal	\$2,396,000	Other Costs Subtotal Escalated	\$2,901,556

Project Cost Estimate			
Total Project	\$113,874,236	Total Project Escalated	\$148,999,806
		Rounded Escalated Total	\$149,000,000

Funding Summary

	Project Cost (Escalated)	Funded in Prior Biennia	New Approp Request 2023-2025	2025-2027	Out Years
Acquisition					
Acquisition Subtotal	\$0				\$0
Consultant Services					
Consultant Services Subtotal	\$16,687,991		\$8,113,000	\$2,213,000	\$6,361,991
Construction					
Construction Subtotal	\$124,286,126			\$30,000,000	\$94,286,126
Equipment					
Equipment Subtotal	\$155,487				\$155,487
Artwork					
Artwork Subtotal	\$0				\$0
Agency Project Administration					
Project Administration Subtotal	\$4,968,646		\$1,037,190	\$1,037,190	\$2,894,266
Other Costs					
Other Costs Subtotal	\$2,901,556		\$850,000	\$750,000	\$1,301,556
Project Cost Estimate					
Total Project	\$148,999,806	\$0	\$10,000,190	\$34,000,190	\$104,999,426
	\$149,000,000	\$0	\$10,000,000	\$34,000,000	\$104,999,000
			7%		

What is planned for the requested new appropriation? (Ex. Acquisition and design, phase 1 construction, etc.)

Insert Row Here

What has been completed or is underway with a previous appropriation?

Insert Row Here

What is planned with a future appropriation?

Insert Row Here

Cost Estimate Details

Acquisition Costs

Item	Base Amount		Escalation Factor	Escalated Cost	Notes
Purchase/Lease					
Appraisal and Closing					
Right of Way					
Demolition					
Pre-Site Development					
Other					
Insert Row Here					
ACQUISITION TOTAL	\$0		NA	\$0	

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Cost Estimate Details

Consultant Services

Item	Base Amount	Escalation Factor	Escalated Cost	Notes
1) Pre-Schematic Design Services				
Programming/Site Analysis				
Environmental Analysis	\$416,111			
Predesign Study				
DOC Fees	\$12,869			
Insert Row Here				
Sub TOTAL	\$428,980	1.0490	\$450,000	Escalated to Design Start
2) Construction Documents				
A/E Basic Design Services	\$5,394,441			69% of A/E Basic Services
Other				
Insert Row Here				
Sub TOTAL	\$5,394,441	1.1249	\$6,068,207	Escalated to Mid-Design
3) Extra Services				
Civil Design (Above Basic Svcs)	\$1,500,000			
Geotechnical Investigation	\$285,000			
Commissioning	\$150,000			
Site Survey	\$500,000			
Testing	\$500,000			
LEED Services	\$100,000			
Voice/Data Consultant				
Value Engineering				
Constructability Review	\$350,000			
Environmental Mitigation (EIS)	\$200,000			
Landscape Consultant	\$250,000			
Travel & per diem	\$50,000			
Renderings & models	\$100,000			
Cost consultant	\$100,000			
Energy modeling	\$100,000			
Security consultant	\$25,000			
Phasing and Building evaluation	\$150,000			
Sub TOTAL	\$4,360,000	1.1249	\$4,904,564	Escalated to Mid-Design
4) Other Services				

Bid/Construction/Closeout	\$2,423,589			31% of A/E Basic Services
HVAC Balancing				
Staffing				
Other				
Insert Row Here				
Sub TOTAL	\$2,423,589	1.4291	\$3,463,552	Escalated to Mid-Const.
5) Design Services Contingency				
Design Services Contingency	\$1,260,701			
Insert Row Here				
Sub TOTAL	\$1,260,701	1.4291	\$1,801,668	Escalated to Mid-Const.
CONSULTANT SERVICES TOTAL	\$13,867,710		\$16,687,991	

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Cost Estimate Details

Construction Contracts

Item	Base Amount		Escalation Factor	Escalated Cost	Notes
1) Site Work					
G10 - Site Preparation					
G20 - Site Improvements					
G30 - Site Mechanical Utilities					
G40 - Site Electrical Utilities					
G60 - Other Site Construction					
Energy Transfer Stations	\$13,500,000				
Distribution System	\$15,500,000				
Geo-Exchange Field	\$13,500,000				

Sub TOTAL	\$42,500,000		1.2110	\$51,467,500	

2) Related Project Costs					
Offsite Improvements					
City Utilities Relocation					
Parking Mitigation					
Stormwater Retention/Detention					
Other					
Insert Row Here					
Sub TOTAL	\$0		1.2110	\$0	

3) Facility Construction					
A10 - Foundations					
A20 - Basement Construction					
B10 - Superstructure					
B20 - Exterior Closure					
B30 - Roofing					
C10 - Interior Construction					
C20 - Stairs					
C30 - Interior Finishes					
D10 - Conveying					
D20 - Plumbing Systems					
D30 - HVAC Systems					
D40 - Fire Protection Systems					
D50 - Electrical Systems					
F10 - Special Construction					
F20 - Selective Demolition					
General Conditions					
Nodal Plants	\$32,000,000				
Insert Row Here					
Sub TOTAL	\$32,000,000		1.4291	\$45,731,200	

4) Maximum Allowable Construction Cost

MACC Sub TOTAL	\$74,500,000	\$97,198,700
	<i>NA</i>	<i>NA per 0</i>

5) GCCM Risk Contingency

GCCM Risk Contingency	\$1,490,000		
Other			
Insert Row Here			
Sub TOTAL	\$1,490,000	1.4291	\$2,129,359

6) GCCM or Design Build Costs

GCCM Fee	\$2,980,000		
Bid General Conditions			
GCCM Preconstruction Services			
Other			
Insert Row Here			
Sub TOTAL	\$2,980,000	1.4291	\$4,258,718

7) Owner Construction Contingency

Allowance for Change Orders	\$7,450,000		
Other			
Insert Row Here			
Sub TOTAL	\$7,450,000	1.4291	\$10,646,795

8) Non-Taxable Items

Other			
Insert Row Here			
Sub TOTAL	\$0	1.4291	\$0

9) Sales Tax

Sub TOTAL	\$7,604,960	\$10,052,554
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CONSTRUCTION CONTRACTS TOTAL	\$94,024,960	\$124,286,126
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Green cells must be filled in by user

Cost Estimate Details

Equipment

Item	Base Amount		Escalation Factor	Escalated Cost	Notes
1) Equipment					
E10 - Equipment	\$50,000				
E20 - Furnishings	\$50,000				
F10 - Special Construction					
Other					
Insert Row Here					
Sub TOTAL	\$100,000		1.4291	\$142,910	
2) Non Taxable Items					
Other					
Insert Row Here					
Sub TOTAL	\$0		1.4291	\$0	
3) Sales Tax					
Sub TOTAL	\$8,800			\$12,577	
EQUIPMENT TOTAL					
	\$108,800			\$155,487	

Green cells must be filled in by user

Cost Estimate Details

Artwork					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
1) Artwork					
Project Artwork	\$0				0.5% of total project cost for new construction
Higher Ed Artwork	\$0				0.5% of total project cost for new and renewal construction
Other					
Insert Row Here					
ARTWORK TOTAL	\$0		NA	\$0	

Green cells must be filled in by user

Cost Estimate Details

Project Management					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
1) Agency Project Management					
Agency Project Management	\$3,476,765				
Additional Services					
Other					
Insert Row Here					
<i>Subtotal of Other</i>	<i>\$0</i>				
PROJECT MANAGEMENT TOTAL	\$3,476,765		1.4291	\$4,968,646	

Green cells must be filled in by user

Cost Estimate Details

Other Costs

Item	Base Amount		Escalation Factor	Escalated Cost	Notes
Mitigation Costs					
Hazardous Material Remediation/Removal	\$451,000				
Historic and Archeological Mitigation					
Document reproduction	\$15,000				
PW Assist	\$500,000				
Advertising	\$15,000				
On-Site Representatives	\$1,415,000				
OTHER COSTS TOTAL	\$2,396,000		1.2110	\$2,901,556	

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STATE OF WASHINGTON
AGENCY / INSTITUTION PROJECT COST SUMMARY

Updated June 2022

Agency	Western Washington University
Project Name	Heating Conversion Project - Plants and Distribution System
OFM Project Number	

Contact Information

Name	Brian Ross
Phone Number	360.650.6539
Email	brian.ross@wwu.edu

Statistics

Gross Square Feet		MACC per Gross Square Foot	
Usable Square Feet		Escalated MACC per Gross Square Foot	
Alt Gross Unit of Measure			
Space Efficiency		A/E Fee Class	A
Construction Type	Heating and power plant	A/E Fee Percentage	9.54%
Remodel	Yes	Projected Life of Asset (Years)	50

Additional Project Details

Procurement Approach	DB-Progressive	Art Requirement Applies	No
Inflation Rate	4.90%	Higher Ed Institution	No
Sales Tax Rate %	8.80%	Location Used for Tax Rate	Bellingham
Contingency Rate	10%		
Base Month (Estimate Date)	July-22	OFM UFI# (from FPMT, if available)	
Project Administered By	Agency		

Schedule

Predesign Start	October-21	Predesign End	July-22
Design Start	July-23	Design End	June-26
Construction Start	July-26	Construction End	June-33
Construction Duration	83 Months		

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Project Cost Estimate

Total Project	\$113,874,236	Total Project Escalated	\$148,999,806
		Rounded Escalated Total	\$149,000,000

Cost Estimate Summary

Acquisition

Acquisition Subtotal	\$0	Acquisition Subtotal Escalated	\$0
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Consultant Services			
Predesign Services	\$428,980		
Design Phase Services	\$5,394,441		
Extra Services	\$4,360,000		
Other Services	\$2,423,589		
Design Services Contingency	\$1,260,701		
Consultant Services Subtotal	\$13,867,710	Consultant Services Subtotal Escalated	\$16,687,991

Construction			
Maximum Allowable Construction Cost (MACC)	\$74,500,000	Maximum Allowable Construction Cost (MACC) Escalated	\$97,198,700
DB-Progressive Risk Contingencies	\$1,490,000		\$2,129,359
DB-Progressive Management	\$2,980,000		\$4,258,718
Owner Construction Contingency	\$7,450,000		\$10,646,795
Non-Taxable Items	\$0		\$0
Sales Tax	\$7,604,960	Sales Tax Escalated	\$10,052,554
Construction Subtotal	\$94,024,960	Construction Subtotal Escalated	\$124,286,126

Equipment			
Equipment	\$100,000		
Sales Tax	\$8,800		
Non-Taxable Items	\$0		
Equipment Subtotal	\$108,800	Equipment Subtotal Escalated	\$155,487

Artwork			
Artwork Subtotal	\$0	Artwork Subtotal Escalated	\$0

Agency Project Administration			
Agency Project Administration Subtotal	\$3,476,765		
DES Additional Services Subtotal	\$0		
Other Project Admin Costs	\$0		
Project Administration Subtotal	\$3,476,765	Project Administration Subtotal Escalated	\$4,968,646

Other Costs			
Other Costs Subtotal	\$2,396,000	Other Costs Subtotal Escalated	\$2,901,556

Project Cost Estimate			
Total Project	\$113,874,236	Total Project Escalated	\$148,999,806
		Rounded Escalated Total	\$149,000,000

Funding Summary

	Project Cost (Escalated)	Funded in Prior Biennia	New Approp Request 2023-2025	2025-2027	Out Years
Acquisition					
Acquisition Subtotal	\$0				\$0
Consultant Services					
Consultant Services Subtotal	\$16,687,991		\$8,113,000	\$2,213,000	\$6,361,991
Construction					
Construction Subtotal	\$124,286,126			\$30,000,000	\$94,286,126
Equipment					
Equipment Subtotal	\$155,487				\$155,487
Artwork					
Artwork Subtotal	\$0				\$0
Agency Project Administration					
Project Administration Subtotal	\$4,968,646		\$1,037,190	\$1,037,190	\$2,894,266
Other Costs					
Other Costs Subtotal	\$2,901,556		\$850,000	\$750,000	\$1,301,556
Project Cost Estimate					
Total Project	\$148,999,806	\$0	\$10,000,190	\$34,000,190	\$104,999,426
	\$149,000,000	\$0	\$10,000,000	\$34,000,000	\$104,999,000
Percentage requested as a new appropriation			7%		

What is planned for the requested new appropriation? (Ex. Acquisition and design, phase 1 construction, etc.)

Partial Design including studies, surveys, and testing

Insert Row Here

What has been completed or is underway with a previous appropriation?

Feasibility Study

Insert Row Here

What is planned with a future appropriation?

Remainder of design and construction (over 4 subsequent biennia)

Insert Row Here

Cost Estimate Details

Acquisition Costs

Item	Base Amount		Escalation Factor	Escalated Cost	Notes
Purchase/Lease					
Appraisal and Closing					
Right of Way					
Demolition					
Pre-Site Development					
Other					
Insert Row Here					
ACQUISITION TOTAL	\$0		NA	\$0	

Green cells must be filled in by user

Cost Estimate Details

Consultant Services

Item	Base Amount	Escalation Factor	Escalated Cost	Notes
1) Pre-Schematic Design Services				
Programming/Site Analysis				
Environmental Analysis	\$416,111			
Pre-design Study				
DOC Fees	\$12,869			
Insert Row Here				
Sub TOTAL	\$428,980	1.0490	\$450,000	Escalated to Design Start
2) Construction Documents				
A/E Basic Design Services	\$5,394,441			69% of A/E Basic Services
Other				
Insert Row Here				
Sub TOTAL	\$5,394,441	1.1249	\$6,068,207	Escalated to Mid-Design
3) Extra Services				
Civil Design (Above Basic Svcs)	\$1,500,000			
Geotechnical Investigation	\$285,000			
Commissioning	\$150,000			
Site Survey	\$500,000			
Testing	\$500,000			
LEED Services	\$100,000			
Voice/Data Consultant				
Value Engineering				
Constructability Review	\$350,000			
Environmental Mitigation (EIS)	\$200,000			
Landscape Consultant	\$250,000			
Travel & per diem	\$50,000			
Renderings & models	\$100,000			
Cost consultant	\$100,000			
Energy modeling	\$100,000			
Security consultant	\$25,000			
Phasing and Building evaluation	\$150,000			
Sub TOTAL	\$4,360,000	1.1249	\$4,904,564	Escalated to Mid-Design
4) Other Services				

Bid/Construction/Closeout	\$2,423,589			31% of A/E Basic Services
HVAC Balancing				
Staffing				
Other				
Insert Row Here				
Sub TOTAL	\$2,423,589	1.4291	\$3,463,552	Escalated to Mid-Const.
5) Design Services Contingency				
Design Services Contingency	\$1,260,701			
Insert Row Here				
Sub TOTAL	\$1,260,701	1.4291	\$1,801,668	Escalated to Mid-Const.
CONSULTANT SERVICES TOTAL	\$13,867,710		\$16,687,991	

Green cells must be filled in by user

Cost Estimate Details

Construction Contracts

Item	Base Amount		Escalation Factor	Escalated Cost	Notes
1) Site Work					
G10 - Site Preparation					
G20 - Site Improvements					
G30 - Site Mechanical Utilities					
G40 - Site Electrical Utilities					
G60 - Other Site Construction					
Energy Transfer Stations	\$13,500,000				
Distribution System	\$15,500,000				
Geo-Exchange Field	\$13,500,000				

Sub TOTAL	\$42,500,000		1.2110	\$51,467,500	

2) Related Project Costs					
Offsite Improvements					
City Utilities Relocation					
Parking Mitigation					
Stormwater Retention/Detention					
Other					
Insert Row Here					
Sub TOTAL	\$0		1.2110	\$0	

3) Facility Construction					
A10 - Foundations					
A20 - Basement Construction					
B10 - Superstructure					
B20 - Exterior Closure					
B30 - Roofing					
C10 - Interior Construction					
C20 - Stairs					
C30 - Interior Finishes					
D10 - Conveying					
D20 - Plumbing Systems					
D30 - HVAC Systems					
D40 - Fire Protection Systems					
D50 - Electrical Systems					
F10 - Special Construction					
F20 - Selective Demolition					
General Conditions					
Nodal Plants	\$32,000,000				
Insert Row Here					
Sub TOTAL	\$32,000,000		1.4291	\$45,731,200	

4) Maximum Allowable Construction Cost

MACC Sub TOTAL	\$74,500,000	\$97,198,700
	<i>NA</i>	<i>NA per 0</i>

5) GCCM Risk Contingency

GCCM Risk Contingency	\$1,490,000		
Other			
Insert Row Here			
Sub TOTAL	\$1,490,000	1.4291	\$2,129,359

6) GCCM or Design Build Costs

GCCM Fee	\$2,980,000		
Bid General Conditions			
GCCM Preconstruction Services			
Other			
Insert Row Here			
Sub TOTAL	\$2,980,000	1.4291	\$4,258,718

7) Owner Construction Contingency

Allowance for Change Orders	\$7,450,000		
Other			
Insert Row Here			
Sub TOTAL	\$7,450,000	1.4291	\$10,646,795

8) Non-Taxable Items

Other			
Insert Row Here			
Sub TOTAL	\$0	1.4291	\$0

9) Sales Tax

Sub TOTAL	\$7,604,960	\$10,052,554
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CONSTRUCTION CONTRACTS TOTAL	\$94,024,960	\$124,286,126
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Green cells must be filled in by user

Cost Estimate Details

Equipment					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
1) Equipment					
E10 - Equipment	\$50,000				
E20 - Furnishings	\$50,000				
F10 - Special Construction					
Other					
Insert Row Here					
Sub TOTAL	\$100,000		1.4291	\$142,910	
2) Non Taxable Items					
Other					
Insert Row Here					
Sub TOTAL	\$0		1.4291	\$0	
3) Sales Tax					
Sub TOTAL	\$8,800			\$12,577	
EQUIPMENT TOTAL					
	\$108,800			\$155,487	

Green cells must be filled in by user

Cost Estimate Details

Artwork					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
1) Artwork					
Project Artwork	\$0				0.5% of total project cost for new construction
Higher Ed Artwork	\$0				0.5% of total project cost for new and renewal construction
Other					
Insert Row Here					
ARTWORK TOTAL	\$0		NA	\$0	

Green cells must be filled in by user

Cost Estimate Details

Project Management					
Item	Base Amount		Escalation Factor	Escalated Cost	Notes
1) Agency Project Management					
Agency Project Management	\$3,476,765				
Additional Services					
Other					
Insert Row Here					
<i>Subtotal of Other</i>	<i>\$0</i>				
PROJECT MANAGEMENT TOTAL	\$3,476,765		1.4291	\$4,968,646	

Green cells must be filled in by user

Cost Estimate Details

Other Costs

Item	Base Amount		Escalation Factor	Escalated Cost	Notes
Mitigation Costs					
Hazardous Material Remediation/Removal	\$451,000				
Historic and Archeological Mitigation					
Document reproduction	\$15,000				
PW Assist	\$500,000				
Advertising	\$15,000				
On-Site Representatives	\$1,415,000				
OTHER COSTS TOTAL	\$2,396,000		1.2110	\$2,901,556	

Green cells must be filled in by user

Appendix D

energy usage through enhanced production efficiency, reduction in losses, and ability to recover sources of waste heat that would be lost in a distributed generation system. This consolidation also reduces costs associated with renewal and maintenance due to fewer pieces of equipment required as opposed to a distributed system. It also provides the ability to incorporate and transition to renewable sources as they become economically and technically viable in an effective and efficiency manner.

5.1.1. Heating Production Plant Overview

The existing Steam Production Plant was originally constructed in 1946 and is centrally located on the east side of the campus next to the Arboretum Forest. The building is two story and covers 11,000 sq. ft. In 1969 a major building expansion added space for boilers #5, #6, and a chilled water plant with an outdoor cooling tower. The chilled water equipment has since been removed and the space is used for the facility repair shop and district compressed air system. District compressed air is distributed to various buildings throughout campus for controls and process usage.

Existing Plant Equipment

The Steam Production Plant produces steam utilizing five water tube boilers of various sizes. The total installed steam capacity is 260,000 lb/hr. Each boiler has a single stage economizer that utilizes waste heat from the stack exhaust gas to preheat boiler feed water.

Steam Production Plant – Installed Capacity

Name	Year Installed	Nominal Output (lb/hr)	Fuel Type
Boiler #2	1946	15,000	N. Gas/Oil
Boiler #3	1959	25,000	N. Gas/Oil
Boiler #4	1966	40,000	N. Gas/Oil
Boiler #5	1970	100,000	N. Gas/Oil
Boiler #6	1995	75,000	N. Gas