Institution			Agency Code
WASHINGTON STATE UNIVERSITY			365
Project Title		Category of Project	Project Number
CLEAN TECHNOLOGY		DESIGN: RESEARCH	30000069
County	City		Legislative District
WHITMAN	PULLMAN		9
Was this project included in a prior 10-year capital plan? If yes, when?			Previous Project Number
YES; 2009-2011			NA
Prepared By:	Phone Number		Analysis Date:
Deborah Carlson, Budget Office	509-335-3344		

1. Project Schedule:

	Start Date	Complete Date
Predesign	7/2009	9/2009
Design	7/2011	4/2013
Bid	5/2013	6/2013
Construction/Occupancy	7/2013	6/2015

2. Problem Statement (short description of the project – the needs and the benefits)

This design request for a major capital construction project for the University's College of Engineering and Architecture (CEA) will replace 60-year-old facilities with high-technology laboratories to address state research and instruction priorities in renewable energy, biofuels, and the environment. The research conducted in the Clean Technology Laboratory (CTL) will include clean power; renewable energy; and air and water quality engineering.

Existing research facilities, with the exception of the Engineering Technology Research Laboratory (ETRL, built in 1998), contain significant life safety issues such as compromised fire ratings of walls and lack of fire protection systems in the building and inadequately protected vertical exiting enclosures. Access into, and within, many of the existing facilities does not meet current Americans with Disabilities Act (ADA) guidelines. Moreover, due to the growth in research activities and graduate student enrollment, and the need to accommodate both graduate and undergraduate students in these areas, there is increased need for modern facilities.

The space available for faculty researchers is limited and poorly suited for accommodating the safe and efficient conduct of modern engineering research. Attracting and retaining a world-class faculty to our signature areas in energy and the environment has been negatively impacted by the poor quality of current space in which these programs are housed.

The Clean Technology Laboratory project will address both the shortage and poor quality of existing space. It will house the research facilities for faculty and students in key interdisciplinary areas of power engineering, renewable energy, and air and water quality engineering. In addition to state-of-the-art research facilities, common support areas, specialized core laboratories, offices, and conference areas will be located in this building.

The State of Washington will benefit from enhanced engineering education specifically as it is applied to energy and the environment, and from increased basic and applied engineering knowledge that leads to the development of new technologies that reduce our dependence on foreign oil, reduce greenhouse gas emissions, and improve air and water quality. This will, in turn, lead to economic benefits through the transfer and commercialization of these technologies. WSU will benefit from increased research productivity and graduate student training.

3. History of the project or facility

The WSU Pullman College of Engineering and Architecture (CEA) precinct consists of nine major buildings and several small utility storage facilities totaling approximately 355,000 assignable square feet. The age of existing facilities ranges from 10 to 92 years. The majority of the space assigned to the college is outdated and requires replacement in order to provide the proper infrastructure for technological advances in modern engineering research and education. Moreover, approximately half of the space is in extremely outdated buildings that do not meet the current infrastructure needs for engineering research, including adequate plumbing, electrical and mechanical and ventilation systems. Nearly a quarter of the space in the college is in buildings that do not provide access for people with physical disabilities, are not easily accessible, and are poorly lit both inside and out so that student and faculty safety are of concern. The core need for any research-oriented engineering college is high quality research space. Future research space for the college must ensure that research can be appropriately supported, thus facilitating the retention and recruitment of top level faculty, undergraduate and graduate students.

The requested project deviates from the older plans which were to remodel Dana Hall (1949) into a modern research-intensive facility. Because of its age and condition, more recent plans call for renovating Dana Hall at a later date for less HVAC-intensive uses. The research housed in Dana will be moved into the CTL when the building is complete.

4. University programs addressed or encompassed by the project

The primary University programs addressed by the Clean Technology Laboratory project are: **The Power Engineering Program**, led by National Academy of Engineering member Dr. Anjan Bose, an internationally known expert in safety and reliability of the power grid; **The Center for Environmental Research, Education and Outreach (CEREO)** an interdisciplinary effort involving researchers from numerous colleges across campus that undertakes research at the cutting-edge of detecting and understanding the role of contaminants in the environment; the **Laboratory for Atmospheric Research (LAR)**, one of the oldest air-pollution research laboratories in the United States; **Center for Biofuels and Bioproducts (CBB)** researchers in Pullman, and **Advanced Materials for Renewable Energy** researchers, including Dr. Grant Norton (co-founder of GoNano, a start-up company that has developed nanomaterials for use in catalysis for renewable energy and carbon capture for greenhouse gas mitigation).

The quality of the laboratory environment in which much of this research is conducted significantly impacts the quality and significance of the data generated..

Much of the Clean Technology research also involves researchers from other colleges in the university, in addition to engineering faculty. Some of these researchers would also be housed in this proposed building. In the biofuels area, faculty researchers are involved not only from the College of Engineering and Architecture, but also from the College of Agricultural, Human and Natural Resource Sciences. Core laboratory facilities are needed to further facilitate collaborations between chemical engineering and biological systems engineering faculty and leverage their complementary interests and skills. For example. creating a common research and education facility for these research programs in power, biofuels, advanced materials for renewable energy, and the environment will increase the synergy between the research groups.

5. Integral to Achieving Statewide Policy Goals:

The Clean Technology Laboratory project directly addresses four stated priorities of Governor Gregoire:

1. *Educating to compete – educating the best-prepared, highly skilled workforce for the state;*
2. *Building prosperity through faculty-industry interactions and technology transfer;*
3. *Reducing dependence on foreign oil; and*
4. *Concern for our environment.*

The Clean Technology Laboratory project also addresses three primary strategic Priorities of Government (POG)[1]: (1) "Postsecondary Learning;" (2) "Economic Vitality;" and (3) "Natural Resources." The POG are intended to focus state investments in those areas in which the citizens expect results.

During the past legislative session SSB 5291 created the Clean Energy Leadership Council which is charged with preparing a strategy for growing the clean energy technology sector in Washington state. The Council has contracted with Navigant to begin their efforts. A copy of the initial strategy report from Navigant is attached as Appendix A. This document has already discussed the relevance of this project to the priorities around energy and the environment.

This project specifically improves the value of postsecondary learning and contributes to the economic vitality of the state by expanding opportunities for Washingtonian students in the new economy (as measured by degrees conferred in high demand areas, including engineering); and improving the linkage between university research and Washington's economy (as measured by the number of technology transfer licenses or option agreements executed). As noted above, in the first case (i.e., expanding opportunities for Washingtonian students in high demand fields), the focus on clean technology significantly helps in our efforts to recruit engineering undergraduate as well as graduate students, as students find the signature themes in energy and environment very compelling.

In fact, engineering (and other high demand) enrollments at both the baccalaureate and graduate levels have been increasing significantly over the last seven years, and we are currently at our highest ever enrollment levels in engineering at WSU (see Figures 1 and 2 in Appendix B). We attribute these recent, very significant increases in enrollment to a number of our recent initiatives including: our focus on clean technology, which attracts students to engineering; our recent retention efforts that include more hands-on experiences such as research experiences for undergraduates; our science and engineering dormitory; and our increasing faculty productivity in terms of research and graduate education activities.

A conservative estimate of <u>increased number of degrees</u> for high-demand undergraduate degrees is 40 and for high-demand advanced degrees the estimate is 20 (see Appendix C). These estimates are based upon improved retention at the undergraduate level and improved research and graduate education productivity among the faculty, particularly as new faculty members are hired.

This project will also <u>increase economic development through both theoretical and applied research</u>. As an example of how WSU engineering graduates have increased economic development through

[1] http://www.ofm.wa.gov/budget/pog/finalreport2009-11.asp

applied research, the technology website "The Daily Beast" recently ranked WSU 22nd among the nation's colleges for producing technology leaders, specifically citing Joe Langevin (electrical engineering student and founder of Insttant), and Gerri Martin-Flickinger (computer science alumnus and Senior Vice President of Adobe) as examples. Other notable engineering alumni that have gone on to contribute to economic development through their applied research have included Ed Schweitzer, founder and CEO of Schweitzer Engineering Laboratory. WSU engineering faculty have also increased economic development – a notable example is Dr. Grant Norton, a professor of materials engineering and co-founder of GoNano, a start-up company that has developed nanomaterials for use in catalysis for renewable energy and carbon capture for greenhouse gas mitigation.

Finally, the research emphases of these collaborating programs in air quality, materials science and chemical engineering also strongly support the statewide emphasis on *Life Science Development* as part of a broader statewide strategy of increased support for the research needed to drive a technology-based economy. Numerous statewide policy documents highlight this strategy for the future of Washington (see, for example the Bio 21 report of the WA Technology Alliance and the resulting Life Science Discovery Fund[2], *The future of Life Sciences in Washington* prepared by the Washington Biotechnology and Biomedical Association[3], *The HEC Board 2008 Strategic Master Plan*[4], *Enhancing Washington State's Economic Future*, prepared by the Washington Economic Development Commission[5], and *The Next Washington* prepared by Governor Gregoire's office[6]). The *Next Washington* also highlights the importance of the globalization of educational programs as a driver of Washington's economy. These policy and planning documents also highlight the need to increase the pipeline of trainees to meet growing demand for a larger and more capable life science workforce.

The project, due specifically to the planned use as a research facility primarily for sponsored experimentation, research, and/or training in research methods, is exempt from the requirements of Chapter 39.35D RCW High Performance Public Buildings (LEED Silver). However, the new proposed project will incorporate new energy-efficient technologies while minimizing operating and capital costs.

6. Greenhouse Gas Emissions Reductions:

WSU's Sustainability Initiative, Executive Policy #24 (Appendix D), affirms WSU's commitment to sustainability policies and programs on its campuses. Implementation of EP24 is guided by the Sustainability/and Environment Committee (SEC).

The SEC has developed Climate Action Plans for all WSU campuses which embody specific goals which WSU will attain. These goals include meeting the Washington Department of Ecology greenhouse gas and climate change regulations. WSU has adopted four strategies to achieve its greenhouse gas (GHG) reduction goals: green development, energy conservation, transportation, and carbon offsets. For more information and reference sites, see Appendix E.

This project will have no effect on WSU vehicle mile reduction goals.

[2] http://www.technology-alliance.com/documents/bio21reportp2.pdf
[3] http://www.wabio.com/econ_dev_reports/WA_Growth_Strategy_2006.pdf
[4] HECB Master Plan: http://www.hecb.wa.gov/Research/masterplans/documents/2008MasterPlan-fromPRT.pdf
[5] http://www.cted.wa.gov/DesktopModules/CTEDPublications/CTEDPublicationsView.aspx?tabID=0&ItemID=3320&MId=1250&wversion=Staging
[6] http://www.governor.wa.gov/priorities/economy/next_wa_final.pdf

7. Integral to Institution's Planning and Goals:

This project is clearly identified in the WSU Campus **Master Plan**[7] as the highest building priority for the College of Engineering & Architecture with interdisciplinary ties to other colleges on campus. The CEA's facilities have reached a point where the physical deterioration and limitations of existing buildings have begun to have a negative effect, not only on day-to-day operations of the CEA, but more importantly, on the CEA's mission to serve as a premier research and teaching institution. As the CEA is tasked to meet State of Washington undergraduate and graduate enrollment targets over the next decades, strategic master planning for future growth serves as a vital element necessary to responsibly ensure the future vitality of the CEA's research and teaching objectives.

The Precinct Master Plan describes the 30 year, phased physical plan for the engineering sector of campus. The physical square footage projections are based on estimated undergraduate and graduate enrollments and the faculty and associate research laboratory growth rates. Recommendations included, for example:

- Replacing the Thermal Fluid Research Building, the Engineering Laboratory Building, Albrook Hydraulics Laboratory and Sloan Hall as phased building projects for three buildings to support Advance Energy Technologies research, the first of which is the CTL,
- Renovation of Dana Hall for office and classroom space and updating and reclaiming unused space in Albrook Hydraulic Lab to be used as surge space during Dana Hall Renovation.

This project begins to replace spaces in outdated 1940's engineering buildings that have very poor facility condition scores and include Thermal Fluids Res Lab (1946), Engineering Laboratory (1947) and Dana Hall (1949), Albrook Hydraulics (1956), and Sloan Hall (1962). The condition scores for these engineering buildings being replaced or related to this project all rank as "4"s in the 2010 HECB Comparable Framework Refresh. Old buildings like these with some major systems failing, significantly restrict continued use.

Clean technology is one of the top research priorities for WSU, and it is the highest research priority for the College of Engineering and Architecture. Washington State University was recently ranked 10th in the nation by a prominent sustainability website for its developments in clean technology (http://cleantech.com/news/5384/top-10-cleantech-universities-us), which cited WSU's power and applied engineering programs, our partnership with Boeing on biofuels development, and several technology spin-off companies as some of the university assets leading to this distinction. This list also included Massachusetts Institute of Technology, UC Berkeley, the University of Texas, Stanford University, the University of Michigan, the University of Colorado, University of Wisconsin, Cornell, and Georgia Tech.

This facility will greatly contribute to **WSU's Strategic Plan**[8]:

> Goal 1, "*to achieve national and international preeminence in innovation, discovery and creativity*." Specifically, this goal calls for "*investing in and promoting identified and emerging areas of preeminence and supporting interdisciplinary programs that foster integrative and*

[7] WSU Pullman 2010 Master Plan, pg. 49: http://www.cpd.wsu.edu/masterplan/PlanReports/Pullman/Plan.pdf

[8] WSU Strategic Plan: http://strategicplan.wsu.edu/

collaborative scholarship." As stated above, the research programs to be moved into the CTL are mostly interdisciplinary programs in biofuels, electric power, advanced materials, and the environment.

Goal 2, "*to provide a premier education and transformative experience that prepares students to excel in a global society*," is also strongly supported by the programs housed in this building; specifically in the area of "*developing and supporting outstanding graduate programs and providing high-impact learning experiences that engage students*."

Goal 3 is to "*lead in relevant local, national, and global outreach and engagement*." These programs align with this goal specifically in their ability to "*market our premier education to a diverse and global audience, to consult with, assist and learn from Washington and international businesses and organizations, and to fuel the new economy with innovative ideas*."

The WSU CEA has the second largest undergraduate enrollment of engineering students within the State of Washington. It is a critical WSU academic program that not only provides undergraduate and graduate education, but is also dedicated and committed to advanced research and development. Its programs are growing significantly, and since 2005 CEA has seen an increase in the overall number of undergraduate student FTEs of about 13%, and graduate student FTEs of about 80%.

Currently, approximately 40 undergraduate students and 60 graduate students work in the offices and laboratories of the programs identified for moving to the CTL. The programs conduct highly-recognized research receiving approximately $3,500,000 per year in sponsored research as of fall 2009, and these specific research programs are growing significantly. For example, the electric power program has obtained over $7,000,000 of new research funding in the last year, for work on the safety and reliability of the nation's power grid.

b. Identify whether the proposed project is the institution's first, second, or third priority for state funding among all of the Design Requests the institution is proposing for the 2011-13 biennium.

✓ **FIRST PRIORITY –** Among WSU's scored proposals for the categories of Growth, Renovation, Replacement, and Research, the Clean Tech Laboratory Bldg is the "1st" priority.

8. Impact on Economic Development:

a. Support of economic development plans

This project directly supports state, regional, and local development plans to Energy and Environment articulated in both the Governor's Priorities in energy, environment, education, and innovation (see ref. doc. pgs. 19-21),[9] as well as the Priorities of Government. The Clean Energy Leadership Council was created with the passage of SB 5921 this past legislative session. It will focus on getting Washington's energy policies, technologies and capital aligned to ensure Washington continues to be a leader in clean energy development as well as formulate a clean energy strategy and recommendations by December 1, 2010. Programs planned for the Clean Technology Laboratory (Electric Power Engineering; the Center for Environmental Research, Education and Outreach (CEREO); the Laboratory for Atmospheric Research (LAR); Pullman-based Center for Bioproducts and Biofuels (CBB) activities; and Advanced Materials for Renewable Energy) are strategically responsive to the goals of the state as well as corporations and institutions

[9] [9] http://www.governor.wa.gov/priorities/economy/next_wa_final.pdf

of interest to the state of Washington, including the Boeing Company, the various public and private electric utilities, and companies in the Clean Tech sector. It also meets key components of the WSU strategic plan and areas of research emphasis for the College. These are areas of significant research activity and growth as measured by publications, citations, graduate student participation, and research grant funding. These signature areas in power, renewable energy, and the environment have already been identified as strategic areas for investment by the State of Washington (see Item No. 5, above).

b. Federal or private funding

Energy and environment represent some of society's most pressing, grand challenges for engineering, as identified by the National Academy of Engineering (http://www.engineeringchallenges.org/cms/8996/9221.aspx). Federal research funding opportunities are available from a number of federal agencies including, but not limited to, the Department of Energy, the National Science Foundation, the Environmental Protection Agency, the Department of Homeland Security, National Aeronautics and Space Administration (NASA), National Oceanic and Atmospheric Administration (NOAA), and US Department of Defense. Federal funding for research, especially for those areas that address energy and environment (as well as health and security) continues to increase, despite the current economic considerations. (http://www.aaas.org/spp/rd/presentations/aaasrd20100111.pdf). Given the national and global importance of energy and the environment, along with increasing global population and increasing quality of life globally, sustainability of energy and natural resources will continue to be a national and global challenge for years to come. It is highly unlikely that federal research funding for research in clean technology will decrease in the foreseeable future.

New grant awards to faculty in the College of Engineering and Architecture have doubled over the last 4 years, from $10.4 million in FY 2007, to nearly $22 million in FY 2010 (Appendix F).

c. Economic benefits of the project

Research identified to move to the Clean Technology Laboratory building was receiving approximately $3,500,000 per year in sponsored research as of fall 2009 and involves 40 undergraduate and 60 graduate students.

WSU has been working to build partnerships with the clean tech sector in the state, around the region, and beyond, in order to find solutions for supplying energy and improving overall environmental quality, and creating economic opportunities in the process. WSU is one of several partners working on a feasibility study with AltAir Fuels for an aviation biofuels project which will eventually replace approximately 10% of petroleum-based fuel consumed at Seattle-Tacoma International Airport, thus reducing carbon emissions by about 14 billion pounds over 10 years. Also, WSU researchers are working with Avista on a $38 million project funded by the US Department of Energy which would make Pullman the first Smart-Grid community in the region.

The PEW Charitable Trusts found that between 1998 and 2007, jobs in the clean energy economy grew at a national rate of 9.1 percent, compared to growth of 3.7 percent for traditional jobs. Research done for the American Solar Energy Society shows that the renewable energy (RE) and energy efficiency (EE) industries created more than nine million jobs (direct and indirect) in 2007. It predicts that by 2030 up to one in four workers in the United States will be employed in RE or EE industries. These 37 million jobs extend beyond engineering to include millions of positions in manufacturing, accounting and management. (http://www.eesi.org/files/101909_jobs_factsheet.pdf)

There are 390 companies in Washington involved in the clean technology industry, providing 3200 jobs. (http://www.enterpriseseattle.com/Clean-Technology/About.htm) The March 2010 Washington Department of Commerce quarterly trade bulletin reported clean technology exports from the state in 2009 valued at $221 million. (http://www.choosewashington.com/SiteCollectionDocuments/News%20Publications/International%20Trade%20Bulletins/Commerce%20Quarterly%20Trade%20Bulletin%20--%20March%202010.pdf) At the Seattle Chamber of Commerce Leadership Conference last year, keynote speaker Clint Wilder from Clean Edge projected that clean energy has the potential to create 63,000 jobs in the Northwest by 2025. The chart below presents specific projections for three of the five clean energy sectors.

		2025 Jobs Projection	
	Jobs Today	Low Projection	High Projection
Green Building	3,826	12,937	16,834
Sustainable Bioenergy	3,207	6,946	10,419
Smart Grid	1,280	2,669	7,212

9. Impact on Innovation: a. Explain how the research activities will advance areas of existing preeminence, or position the institution for preeminence in a field or area.

The CEA faculty members collaborate with their research colleagues across many disciplines, including Chemistry, Veterinary and Comparative Anatomy, Pharmacology and Physiology, Animal Sciences, the School of Molecular Biosciences, the Department of Physics, the School of Earth and Environmental Sciences and Biological Systems Engineering, resulting in significant grant-related expenditures. Between FY2000 and FY2008, such collaborations resulted in total (direct and indirect) grant-related expenditures of over $264,000,000. In FY2000, the total grant-related expenditures were $12,000,000; by FY2008, this number had grown to over $31,000,000. They also represent groups that have close ties to state and regional industries, such as both public and private electric utilities, REC in Moses Lake, and the Boeing Company.

These key areas of research have led to the ranking of WSU as 10th in the nation among Clean Technology (research) universities, according to Shawn Lesser, President and Founder of Sustainable World Capital (http://cleantech.com/news/print/5384):

"With legacy expertise in agriculture, power and applied engineering, WSU's Clean Technology program is rapidly growing in the cleantech-centric Pacific Northwest. Plant science is the engine behind the opening last year of the Bioproducts Science and Engineering Laboratory, Battelle's Pacific Northwest National Laboratories and the recently funded Washington State Algae Alliance. One of the main objectives is the commercialization of aviation biofuels with partner Boeing [41] Commercial Airlines. Notable cleantech spinouts: [42]GoNano, Ajuga Biosciences, BioGasol [43], Schweitzer Engineering Labs, and Integrated Engineering Solutions."

10. Availability of Research Space:

The most efficient way to accommodate graduate students is through common office space in large open areas. There is a great need in CEA for shared space where undergraduates and their faculty and graduate student mentors can interact. WSU Engineering faculty have been very successful in obtaining National Science Foundation-sponsored, highly interdisciplinary, Integrated Graduate Education Research and Training (IGERT) grants, and they have led these programs previously in

multiphase environmental research, as well as currently in environmental nitrogen cycle, and smart environments. There has also been significant growth in undergraduate research, including four National Science Foundation Research Experience for Undergraduates (REU) site programs in environmental engineering, computer science, mechanical engineering, and materials science and engineering.

As we rely on these training grants such as the IGERT and REU site program grants as well as other outreach activities as a major mechanism for recruiting outstanding United States graduate students and attracting students from minority-serving institutions, the availability and quality of laboratories in which they conduct research is critical, especially in areas such as environmental engineering, bioenergy, power, and advanced materials.

11. Adequacy of Research Space

The CEA Precinct consists of nine major buildings and several small utility storages facilities. resulting in approximately 355,000 assignable square feet. The age of existing facilities ranges from 10 to 92 years. The vast majority of the space currently assigned to the CEA is outdated and requires replacement in order to provide the proper infrastructure for the latest technological advances in modern engineering research and education. The core need for any research-oriented engineering college is high quality research space.

To promote a rich cultural environment within the CEA, certain key relationships between users should be strengthened to facilitate the interdisciplinary interaction that promotes new ideas and creative thinking. Currently, many of these basic relationships are hindered by the physical limitations of existing facilities. The planning process examined existing site and building conditions of the precinct; to understand how these existing conditions are either benefiting or impeding the current and future needs of the CEA. The following goal was acknowledged in the plan as the most significant issue to be addressed by WSU: "*Build New Research Facilities: The core need for any research oriented engineering college is high quality research space. Future research space for the CEA must be built so that research can be easily accommodated, thus supporting the retention and recruitment of top level faculty and graduate students*."

The key strategy identified to achieve the goal: "*Over time replace the outdated and marginally-utilized 1948 Thermal Fluid Research Building, 1947 Engineering Laboratory Building, and 1956 Albrook Hydraulics Laboratory with 4-5 story buildings that would contain high quality research space, faculty offices, and student activity workshops. These three existing research facilities are either beyond their useful life, never intended for the current occupancy/use, and/or have outlasted functional usefulness*."

12. Availability of Instructional Space:

The Clean Technology Laboratory will provide updated, safe, and modern laboratory instructional space for research and student training. The facility will serve as a working laboratory for both undergraduate and graduate student training although it will not add any traditional classroom space.

See Appendix G for utilization statistics and comments about HECB targets and WSU planning. The WSU Pullman campus is short of lab space, not traditional classroom space, as cited in previous HECB utilization studies and the current utilization statistics.

13. Reasonableness of Cost:

There are four completed engineering laboratory buildings identified as comparable with CTL; two are located in Pullman, one is located in the Tri-Cities, and one in Vancouver.

The cost of the Engineering Teaching Research Laboratory (ETRL) building was attributed to the fairly straight-forward mixture of space included in that building. The combination of teaching labs and research space were a natural blend and complimented by two other engineering program buildings flanking the ETRL. In contrast, the Engineering, Life Sciences Building (ELSB) in Vancouver has an even greater combination of spaces, incorporating teaching, research, computer laboratories, classrooms, K-20 facilities, animal facilities, environmental spaces, greenhouse, hazardous waste handling areas and related spaces for the Engineering and Life Sciences programs. Similarly, the Bioproducts, Science and Engineering Laboratory (BSEL) on the Tri-Cities campus is a mix of research and teaching laboratories, classrooms, and faculty and staff offices.

The recently completed Biotechnology/Life Sciences building on the Pullman campus contains research laboratories, core laboratories, common support space, conference rooms, and office space for faculty and postdoctoral students. The proposed CTL building will be planned in a similar manner.

Comparable Facility Name	Location	Gross SF	Total Project Cost	Cost per SF	Construction End Date	Inflation Adjuster Applied	Adjusted Cost per SF
Engineering Teaching Research Laboratory	WSU Pullman	123,391	$26,510,300	$215	1998	3%	$355
Engineering Life Sciences Building	WSU Vancouver	63,416	$29,674,000	$468	2001	3%	$708
Bioproducts Science and Engineering Laboratory	WSU Tri-Cities	56,844	$24,750,000	$435	2009	3%	$520
Biotechnology/Life Sciences Building	WSU Pullman	128,000	$72,650,000	$568	2009	3%	$678

All costs are adjusted to the year 2015. The CTL building is estimated at $676 per SF. This cost falls within the Summary of Expected Cost Ranges by Facility Type as published in the Washington State Office of Financial Management Higher Education Capital Facilities Financing Study.

Due to the size and complexity of the research building type and the site location WSU anticipates utilizing the GC/CM project delivery methodology.

14. Contribution of Other Funding Sources:

No other funding sources have been identified to date.