



PennState
Physical Plant

The Pennsylvania State University (PSU) LEED v4 Policy 2019 Update v 1.0

Office of Physical Plant (OPP)

Last updated 1/28/19

The Pennsylvania State University LEED Policy 2019 Update

Purpose: To present Pennsylvania State University's (PSU) approach to sustainable building methods. It is intended to serve as a guide for design and construction teams in the pursuit of sustainable features and practices that are valuable to the university and also aligned with the United States Green Building Council's **Leadership in Energy and Environmental Design® (LEED) Reference Guide for Building Design and Construction: Version 4.0.**

Focus on interaction: This document also encourages the engagement of PSU's Office of Physical Plant (OPP) individuals/expertise early in the design process to allow for the embedded experience at PSU to be introduced to the process while also helping develop the collective capabilities of PSU staff and design teams.

Expected outcomes: This approach seeks to enable the full potential of **collaboration between PSU and design teams** to be realized in the **creation of cost-effective and high-performing facilities over their full life-cycle.** This approach is also expected to facilitate the continuous development of capacity for sustainable building design and construction for PSU and all members of project teams.

Application: This policy **applies to all New Construction and/or Substantial Renovation Projects** at all PSU campus locations that **exceed a Project Cost of \$10,000,000.** If local circumstances dictate specific requirements, these are addressed in the specific description for each LEED credit. **Projects are required to achieve one of the four levels of LEED certification.**

Objectives:

The objectives of this document are to:

1. Call for an integrated, holistic approach to building design; one that yields energy-efficient, comfortable, healthy, and ecologically-responsible facilities.
2. Inform the design team of the level of achievability for each credit in consideration of the unique place and practices of PSU.
3. Inform the design team of OPP's experience-driven recommendations regarding specific credits.
4. Define additional requirements that need to be submitted to OPP; to encourage documented investigation by the design team which informs OPP about the feasibility of particular sustainable elements; to help OPP make an informed decision.
5. Promote engagement of OPP early in the design process to maximize value and knowledge exchange.
6. Promote direct communication between the design team and OPP for each credit to maximize efficiency and further collaboration.
7. Prevent wasted effort and expense in the pursuit of LEED credits that are not appropriate for the particular project or PSU.
8. Draw from LEED for Building Design and Construction (version 4.0) in the application of this policy document. This policy shall be used in conjunction with **(OPP's) Design and Construction Standards.**

The Pennsylvania State University LEED Policy 2019 Update

Evolution of this Policy:

This document was developed in a collaborative effort between OPP, sustainable building professionals, and PSU's Department of Architectural Engineering. It represents the collective perspectives of all stakeholders that could potentially add and contribute value to Penn State's sustainable building objectives.

This policy document is expected to be updated periodically. OPP encourages all stakeholders involved in the use of this document to provide immediate recommendations for its improvement to policy contacts below.

Correspondence with OPP:

Q&A: This policy documents the questions and answers that OPP personnel receives regarding certain credits.

All Submissions should be directed to the Project Leader (PL) at OPP unless otherwise mentioned.

- University Park Campus: UP
- Non- University Park Campuses: Non-UP
- Project Leader: PL

Project naming guidance:

The LEED Online Project name should start with "Penn State" followed by the name of the building.

Example:
Penn State Henning Building

Submission:

OPP challenges the design team to **achieve as many points as possible** and to demonstrate the effects on the **total cost of ownership and the overall performance of the building**.

The design team is **obligated** to review, address and submit **all additional requirements requested** in this policy, **regardless of the achievability of the associated credits/points**.

The design team should submit the certification award letter and the final score card to PL as soon as the project is awarded the certification.

For any questions about the development of this policy please contact:

- Yumna Kurdi: ybk5012@psu.edu
- John Bechtel : jrb115@psu.edu

Note to PL at OPP: the "point of contact" is the go-to if approval or decision is needed on the associated credit.

Summary of The Total Cost of Ownership and The Overall Performance of The Building

LEED levels of certification		Certified to Silver	Silver to Gold	Optional (Gold to Platinum)
Total number of Points to achieve				
First-cost increase (\$)				
Cost Savings/ Increase (\$)	Annual Energy cost savings (\$)			
	Annual maintenance and operation cost savings or cost increase (\$)			
	Other cost savings/increase and/or added benefits Examples of other benefits: Increased Thermal Comfort Better Indoor air quality			

- The Design team is required to submit the summary (above) and the Total Cost of Ownership analysis (next page) to OPP to demonstrate the increase in first cost per credit/point versus its impact on the life cycle cost and performance of the building based on the LEED recommendations and requirements of this policy. LEED Certified is the baseline for the analysis. The intent of this analysis is to help OPP make informed decisions regarding strategies and opportunities that can result in buildings with better performance.
- The design team is required to demonstrate the effect of the achievable points/credits (positive or negative) on the life cycle of the building. Example of negative effects: Strategy A that should be implemented to achieve 1 point would result in some energy savings but results in higher maintenance or operation costs.
- OPP challenges the design team to achieve as many points as possible beyond the tiers of certification.

Total Cost of Ownership and The Overall Performance of The Building analysis by point(s).

	Certified		Certified to silver					Silver to Gold					Optional Gold to Platinum									
	Number of points	added points	Strategy/ technology needed to achieve the added point/s	Increase in first cost for the added point/s (\$)	estimated Annual Energy cost savings (\$) for the added point/s	Annual maintenance and operation cost savings or cost increase (\$) for the added point/s	Other cost savings/ increase and/or added benefits	Expected payback period of first-cost increase (years)	added points	Strategy/ technology needed to achieve the added point/s	Increase in first cost for the added point/s (\$)	estimated Annual Energy cost savings (\$) for the added point/s	Annual maintenance and operation cost savings or cost increase (\$) for the added point/s	Other cost savings/ increase and/or added benefits	Expected payback period of first-cost increase (years)	added points	Strategy/ technology needed to achieve the added point/s	Increase in first cost for the added point/s (\$)	estimated Annual Energy cost savings (\$) for the added point/s	Annual maintenance and operation cost savings or cost increase (\$) for the added point/s	Other cost savings/ increase and/or added benefits	Expected payback period of first-cost increase (years)
Total																						
Integrative Process																						
Integrative Process																						
Location and transportation																						
Sensitive Land Protection																						
High Priority Site																						
Surrounding Density and Diverse u																						
Access to Quality Transit																						
Bicycle Facilities																						
Reduced Parking Footprint																						
Green Vehicles																						
Sustainable Sites																						
Site Assessment																						
Site Development- Protect or Resto																						
Open Space																						
Rainwater Management																						
Heat Island Reduction																						
Light Pollution Reduction																						
Water Efficiency																						
Outdoor Water Use Reduction																						
Indoor Water Use Reduction																						
Cooling tower water use																						
Water Metering																						
Energy and Atmosphere																						
Enhanced Commissioning																						
Optimize energy performance																						
Advanced Energy Metering																						
Demand Response																						
Renewable Energy Production																						
Enhanced Refrigerant Management																						
Green Power and carbon offsets																						
Materials and Resources																						
Building life-cycle impact reduction																						
Bldg Product disc. & optim. Envi. Pr																						
Bldg Product disc. & optim- sourcin																						
Bldg Product disc. & optim- materia																						
Construction and Demolition Waste																						
Indoor Environmental Quality																						
Enhanced IAQ strategies																						
Low-emitting materials																						
Construction IAQ management plan																						
IAQ assessment																						
Thermal Comfort																						
Interior Lighting																						
Daylight																						
Quality Views																						
Acoustic Performance																						

Integrative Process

Integrative Process

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Energy-Related Systems AND Water-Related Systems	1	1	Mandatory	<p>At least 3 Integrated Design Charrettes are required. The first Charrette should happen prior to the end of Schematic Design.</p> <p>For each Charrette Submit to the PL :</p> <ol style="list-style-type: none"> 1- Project sustainability goals. 2- Estimations of the life cycle cost impacts of potential design options. 3- Meeting minutes. <p>Charrettes must include representation of key stakeholders, especially occupants (Students, Faculty and Staff) and Operation staff including each discipline of PSU Engineering Services.</p> <p>Stakeholders Categories:</p> <ol style="list-style-type: none"> 1- Users (Grad students, Under grad students, Faculty, Staff) 2- Earth (Energy, Water, Land, Sun ...etc) (represented by experts in each area form OPP) 3- Community 4- Co-creators (Designers, Engineers, Construction managers, Trade partners) 5- Investors (Head of the department, Dean, OPP PL) <p>The design process should consider the life-cycle cost and performance of the building, especially operation and maintenance, when choosing the building’s systems and design.</p>	N/A	<p>Design and Construction Assistant Director, John Bechtel jrb115@psu.edu</p>

LOCATION AND TRANSPORTATION (LT)

Location and Transportation

Sensitive Land Protection

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option 1	0	1	Achievable	<p>It is highly likely that the project site will comply with the requirements of this credit. Please refer to the campus master plan to investigate achievability.</p> <p>At UP Campus the master plan identifies protected Environmental Resources.</p>	<p>Site selection is addressed in the context of a project, informed potentially by a college level master plan. Verify with OPP PL.</p> <p>Refer to Environmental Resources portion of the 2015 master plan</p>	<p>Energy and Engineering Services Utility Systems Engineer, Stormwater Lawrence Fennessey laf8@psu.edu</p>
or						
Option 2						

Location and Transportation

High Priority Site

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option1. Historic District	0	1	Investigate achievability based on site location	There are historic districts on UP campus. Investigate the presence of historic districts on Non-UP Campuses	Site selection is addressed in the context of a project, informed potentially by a college level master plan. Verify with OPP PL.	Planning Design and Properties University Planner Neil Sullivan nrs233@psu.edu
or						
Option 2. Priority Designation	0	1	Investigate achievability based on site location	Investigate the presence of Priority Designation Sites on all projects.		
or						
Option 3. Brownfield Remediation	0	2	Investigate achievability based on site location	If the project site happens to be contaminated or close to a contaminated site, consult with the Environmental Compliance Engineer at OPP for a proper clean up plan. Also consult with the Energy and Engineering Services.	Site selection is addressed in the context of a project, informed potentially by a college level master plan. Verify with OPP PL.	Environmental Health & Safety Environmental Compliance Engineer Lysa Holland ljh17@psu.edu Energy and Engineering Services Manager, Engineering Services Andrew Gutberlet adg112@psu.edu

Location and Transportation

Surrounding Density and Diverse uses

Number of points: 5 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option 1 And/or Option 2	0	5	Achievable	It is highly likely that the project site will comply with the requirements of this credit.	N/A	Planning Design and Properties University Planner Neil Sullivan nrs233@psu.edu

Location and Transportation

Access to Quality Transit

Number of points: 5 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
UP Campus						
All	4	5	Current transportation system at UP campus is very likely to comply with this credit.	N/A	Transportation Services	Transportation Services Ryan Givens rjg22@psu.edu
Non- UP Campuses						
All	0	5	Investigate achievability based on site location	N/A	N/A	Non-UP Campuses: Contact the transportation services at the project’s campus.

Location and Transportation

Bicycle Facilities

Number of points: 1 point

Min points required for PSU	Max possible points	LEED Requirements	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
0	1	Bicycle Network	Highly likely achievable	It is highly likely that the project site will comply with this portion of the credit requirements.	UP Bicycle master plan	Transportation Services UP: Cecily Zhu cuz19@psu.edu Non-UP: Contact the transportation services at the project's campus.
		And				
		Indoor Bicycle Storage	The best use of floor area of a project is a priority	Residential projects: highly desirable. Institutional, Commercial and Mixed use projects: Suggested based on best use of floor area	N/A	Planning Design and Properties Landscape Architect Tom Flynn tpf2@psu.edu Planning Design and Properties University Architect Greg Kufner gak21@psu.edu
		And				
Shower Rooms	Mandatory (regardless of achieving the associated credit)	Residential projects: N/A. Institutional, Commercial and Mixed use projects: Security, safety and privacy analysis report should be submitted to the OPP PL for review and approval for any shower room and changing facility*. * Changing facility: Non-LEED requirement.		Planning Design and Properties University Architect Greg Kufner gak21@psu.edu		

Location and Transportation

Reduced Parking Footprint

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
All cases	0	1	Achievable	This credit may be accomplished by implementation of comprehensive University policies dealing with parking and/or transportation at each location. It is not addressed by individual projects.	PennState Transportation Services Student Parking map Faculty and Staff Parking map	<p>Planning Design and Properties University Planner Neil Sullivan nrs233@psu.edu</p> <p>Transportation Services UP: Parking Allocation Manager David Dorman djd6@psu.edu</p> <p>Non-UP: Contact the transportation services at the project's campus.</p>

Location and Transportation

Green Vehicles

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
UP Campus						
Preferred parking for green vehicles	0	1	This credit is not to be pursued by individual projects.	Project team may want to investigate the possibility of receiving this point within the context of the campus parking plan. Efficient use of available parking spaces at PSU is a priority, designated parking spots and fuel stations should be determined at the campus parking plan level.	PennState Transportation Services Student Parking map Faculty and Staff Parking map	Transportation Services Ryan Givens rjg22@psu.edu Energy and Engineering Services Manager, Engineering Services Andrew Gutberlet adg112@psu.edu
And						
Option 1						
Or						
Option 2						
Non-UP Campus						
Preferred parking for green vehicles	0	1	Non-UP: Investigate the feasibility of either 1- installing the station or 2- providing infrastructure only.*	Non UP: submit the feasibility analysis with recommendation to PL if recommended in the feasibility analysis, submit to PL a request to add green vehicles' parking spaces and charging facilities to Energy and Engineering Services for approval. OPP may elect to include the infrastructure only for the charging station.	N/A	Contact Transportation Services at the designated project's campus Energy and Engineering Services Manager, Engineering Services Andrew Gutberlet adg112@psu.edu
And						
Option 1						
Or						
Option 2	* Non- LEED, PSU requirement.					

SUSTAINABLE SITES (SS)

Sustainable Sites (SS)

Prerequisites

- **Construction Activity Pollution Prevention**
 - Create and implement an erosion and sedimentation control plan for all construction activities associated with the project.
- **Environmental Site Assessment**
 - To protect the health of vulnerable populations by ensuring that the site is assessed for environmental contamination and that any environmental contamination has been remediated.

Sustainable Sites

Site Assessment
 Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
All	1	1	Mandatory	This credit should be pursued for all new projects.	N/A	Planning Design and Properties Landscape Architect Tom Flynn tpf2@psu.edu

Sustainable Sites

Site Development- Protect or Restore Habitat

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Preserve and protect from all development and construction activity 40% of the Greenfield area on the site (if such area exist) And Option 1: On-site Restoration	2	2	Mandatory	Soil protection and preservation from construction activities are very important for PSU. Develop a plan to restrict construction activities on planned vegetated areas within the project footprint.	Penn State uses native and adapted species. Please refer to: 1- Do not Plant List 2- Preferred Campus Plant List	Planning Design and Properties Landscape Architect Tom Flynn tpf2@psu.edu
Or						
Option 2: Financial Support	0	1	Not pursued	N/A	N/A	

Sustainable Sites

Open Space

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
30% open space, in which 25% of it must be vegetated	0	1	Achievable with current practices, Investigate all options.	<p>Highly recommended.</p> <p>It is important to maximize the efficient use of land (a finite resource). This will help with natural storm water infiltration and provide natural areas for informal use.</p> <p>Submit the LEED Boundary to PL at the end of each design phase and as part of the project closeout.</p>	N/A	<p>Planning Design and Properties Landscape Architect Tom Flynn tpf2@psu.edu</p> <p>Planning Design and Properties University Planner Neil Sullivan nrs233@psu.edu</p>

Rainwater Management

Number of points: 3 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
All	0	3	Achievable	<p>The following are concerns to be addressed in rainwater management analysis.</p> <ul style="list-style-type: none"> - Quality Control and Peak rate control are mandatory for all projects. Focus should be on management of volume, not volume increase. <p>The following concerns should be analyzed when adapting volume control and infiltration strategies:</p> <ol style="list-style-type: none"> 1- Karst: The Penn State Office of Physical Plant (OPP) has a policy prohibiting stormwater infiltration in high density campus areas. This policy is based in part on the local carbonate geology, the prevalence of karst surface features, and the associated potential for sinkhole development as a result of stormwater infiltration, thereby posing an unacceptable risk to campus infrastructure. This prohibition is also driven by the density of development presence of subsurface utilities and other infrastructure. In these high density campus areas, miles of utility lines exist which can easily redirect water into buildings or other important infrastructure. 2- The potential for groundwater contamination from surface runoff into sinkholes is another concern associated with stormwater infiltration. The University Park Campus water supply comes from local wells. Wellhead Protection Areas (WHPA's) extend under a majority of the Campus. <p>The priority at PSU for rainwater management is to meet local and state regulations.</p>	<p>Stormwater unit at OPP</p> <p>Design and Construction Standards: 33 40 00 STORM DRAINAGE UTILITIES</p>	<p>Energy and Engineering Services Utility Systems Engineer, Stormwater Lawrence Fennessey laf8@psu.edu</p>

Heat Island Reduction

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option 1	0	2	Achievable	<p>Penn State Campuses are located in a cold climate zone with more heating days per year than cooling days. From a life-cycle cost perspective, high reflectance roofs are not recommended due to energy and glare issues. Avoid installation of high reflectance roofs. From a maintenance perspective, lighter color (but not high-reflective) roofing materials are recommended over darker materials for longevity.</p> <p>TPO, EPDM roofs are not recommended.</p> <p>Vegetated roofs are acceptable. Refer to fall protection standards for roof safety requirements. Submit life-cycle cost analysis for final decision.</p> <p>If vegetated roofs are to be implemented, tray systems are preferable for the ease of maintenance and to help locate any potential leaks or deficiency in the roof .</p>	<p>OPP Design and Construction Standards: 01 30 00 ADMINISTRATIVE REQUIREMENTS 01 35 20 Safety Requirements .02 Roof Fall Protection and Prevention</p>	<p>Design and Construction, Design Services Roof and Elevator Designer Brad Haldeman blh12@psu.edu</p> <p>Energy and Engineering Services Manager, Engineering Services Andrew Gutberlet adg112@psu.edu</p> <p>Planning Design and Properties Landscape Architect Tom Flynn tpf2@psu.edu</p>
Or				<p>Option 2</p> <p>Avoid high reflectance roof, may install vegetated roof or cover with renewable energy generation system.</p> <p>Refer to fall protection standards for roof safety requirements.</p> <p>Submit life-cycle cost analysis for final decision.</p>		

Light Pollution Reduction

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
All	0	1	Can be achievable	The benefit of pursuing this credit must be based on the circumstances particular to each campus and its municipality.	OPP Design and Construction Standards: 26 56 00 EXTERIOR LIGHTING	Energy and Engineering Services Electrical Engineer Jonathan Walker jcw5009@psu.edu

WATER EFFICIENCY (WE)

Water Efficiency (WE)

Prerequisites

- **Outdoor Water Use Reduction**
 - To reduce outdoor water consumption.
- **Indoor Water Use Reduction**
 - To reduce indoor water consumption.
- **Building-Level Water Metering**
 - To support water management and identify opportunities for additional water savings by tracking water consumption.

Water Efficiency

Outdoor Water Use Reduction

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option 1: No irrigation required	2	2	Mandatory	All projects should strive for irrigation-free landscape design	Irrigation techniques with waste water reuse or rainwater use are desired. This helps minimize the use of chemicals. PSU should approve all landscape designs. Submit landscape designs to PL for approval.	Planning Design and Properties Thomas Flynn tpf2@psu.edu Energy and Engineering Services Utility Systems Engineer, Stormwater Lawrence Fennessey laf8@psu.edu
OR						
Option 2: Reduced irrigation	1	2	Achievable	Should a project require permanent irrigation, potable water should be avoided.		

Water Efficiency

Indoor Water Use Reduction

Number of points: 6 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
35% reduction	3	3	Mandatory	N/A	N/A	Energy and Engineering Services Building Operations Engineer Don Partsch DFP2@psu.edu
> 35% reduction	0	3	Achievable	Greater reductions are attainable with current technology but will require consideration of multiple water-saving strategies.	N/A	

Water Efficiency

Cooling Tower Water Use

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Up to maximum of 10 cycles	1	1	<p>UP campus: Achievable</p> <p>Non-UP campuses: Investigate achievability</p>	N/A	UP campus uses treated water with low hardness, increasing cycles of concentration to 3-4. This represents a 75% reduction in water usage. UP campus meters all makeup water to towers.	<p>Energy and Engineering Services Campus Chilled Water Utility Engineer Glenn Lelko Gal8@psu.edu</p>
Achieve a minimum of 10 cycles	0	1	Difficult to achieve	N/A	N/A	

Water Efficiency

Water Metering

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Install permanent water meters for two or more water subsystems	0	1	Not recommended	PSU currently does not recommend installation of water meters beyond what is requested in the OPP Design and Construction Standards. PSU prefers to install meters only when justifiable.	PSU requires installation of water meters on makeup water lines and on the chilled water lines coming from central plants.	Energy and Engineering Services Manager, Engineering Services Andrew Gutberlet adg112@psu.edu

Energy and Atmosphere

Energy and Atmosphere

Prerequisites

- **Fundamental Commissioning and Verification**

- The commissioning authority (CxA) must have documented commissioning process experience on at least two building projects with a similar scope of work. The experience must extend from early design phase through at least 10 months of occupancy;
- The CxA may be a qualified employee of the owner, an independent consultant, or an employee of the design or construction firm who is not part of the project's design or construction team, or a disinterested subcontractor of the design or construction team.
- For the credit, the CxA may not be an employee of the design or construction firm nor a subcontractor to the construction firm.

- **Minimum Energy Performance**

- Demonstrate an improvement of 5% for new construction, 3% for major renovations in the proposed building

- **Building-Level Energy Metering**

- Install new or use existing building-level energy meters, or submeters that can be aggregated to provide total building energy

- **Fundamental Refrigerant Management**

- Do not use chlorofluorocarbon (CFC)-based refrigerants in new systems
- Existing small HVAC&R units (defined as containing less than 0.5 pound [225 grams] of refrigerant) are exempt.

Energy and Atmosphere

Enhanced Commissioning

Number of points: 6 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option 1						
Path 1	3	3	Mandatory	N/A	PSU to retain Commissioning agent under fundamental commissioning.	Energy and Engineering Services Commissioning specialist at PSU Tom Ertsgaard tse3@psu.edu
OR						
Path 2	0	4	Investigate feasibility	By the end of Design Development Phase: Submit the strategies/steps needed for achieving this path with the estimated cost compared to the total cost of ownership and the estimated benefit . Submit the requirements above to PL and the commissioning specialist at PSU regardless of achieving the associated points.		
AND/OR						
Option 2	2	2	Mandatory	Required: BECx provider/agent needs to be hired prior to Design Development phase for the review of design documents. A building pressurized test must be performed as part of the envelop commissioning. Submit related documentation to PL.		

Optimize energy performance

Number of points: 18 points

LEED Requirements	Min points required by PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
≤ 20% of improvement in energy performance	8	8	Mandatory	<p>Review Energy Simulation Model and analysis requirements with OPP points of contact prior to project Charrettes.</p> <p>Achieve the Energy Target (EUI) in kBtu per square foot per year as defined in OPR.</p> <p>High energy performance must rely on architectural and passive features in addition to mechanical features, focus on load reduction strategies.</p>	<p>Design and Construction Standards</p> <p>01 80 00 Performance Requirements</p> <p>01 81 13 Sustainable Design Requirements</p>	<p>Energy and Engineering Services Building Operations Engineer Don Partsch DFP2@psu.edu</p> <p>Planning Design and Properties University Architect Greg Kufner gak21@psu.edu</p>
> 20% of improvement in energy performance	0	10	Achieve energy efficiency improvement higher than 20%	<p>Low maintenance and operation costs are important factors to keep in mind when choosing the HVAC systems.</p> <p>Schematic Design: Submit initial Energy Simulation model including massing, orientation, and/or major HVAC systems with sensitivity analysis, identify energy efficiency measures adapted in the design. Identify energy use percentage by system (envelop, HVAC, lighting ... etc).</p> <p>Design Development: Submit multiple parametric runs comparing options of systems and strategies as determined in the initial and/or subsequent integrated design charrettes.</p> <p>Closeout documents: Submit as-built energy model and electronic files.</p>		

Advanced Energy Metering

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
All	0	1	<p>Do not exceed ASHRAE 2013 requirements for Electrical Energy Monitoring.*</p> <p>*If using ASRAE 2013 refer to: Chapter 8.4.3. Chapter 10.4.5.</p>	<p>OPP generally does not recommend this credit due to high cost and data management requirements.**</p> <p>In order to be considered, the design team should submit to the PL a management plan for the added meters:</p> <p>The plan should:</p> <ol style="list-style-type: none"> 1- Establish energy efficiency goals that the added meters will help to achieve 2- Demonstrate that the data are to be easily interpreted with their relative importance by occupants and building operators 3- Specify the types of actions/decisions that these meters can assess to improve the energy performance of the building 4- When having multiple tenants' groups inhabit the same area covered by the system, the design team should identify the role of each group in understanding the system and their responsibility in taking action after interpreting the data. 5- Demonstrate Innovation in both engineering and management across the entire building life cycle, especially the maintenance and operations phase . <p>Submit feasibility study of implementing virtual metering as alternative option regardless of the LEED credit requirements.</p> <p>** Regardless of achieving this credit, OPP is interested in plug loads metering for high plug load demand facilities. Example: Labs facility. If feasible, submit to PL: life cost analysis, management plan and anticipated value of the system, especially on occupants behavior to reduce energy use.</p>	N/A	<p>Energy and Engineering Services Building Operations Engineer Mike Prinkey mip103@psu.edu</p> <p>Energy and Engineering Services Manager, Facility Automation Services Tim Pryor tep25@psu.edu</p>

Demand Response

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Case 1: Demand Response program available	2	2	<p>UP campus: has an existing Demand Response system</p> <p>Non- UP campuses: Investigate the availability of existing system</p>	<p>All buildings at UP campus should be connected to the Demand Response program.</p> <p>All buildings at Non-UP campuses that have existing Demand Response program should be connected to the system as well.</p>	N/A	<p>Energy and Engineering Services Manager, Facility Automation Services Tim Pryor tep25@psu.edu</p> <p>Energy and Engineering Services Continuous Commissioning Engineer Mike Prinkey mip103@psu.edu</p>
Case 2: Demand Response program not available	1	1	<p>Non- UP Campuses: All Buildings should be provided by infrastructure for the system</p>	<p>For all projects at Non-UP Campuses that don't have existing Demand Response, program must be provided by infrastructure for the system. Must consult with OPP before final decision.</p>	N/A	

Renewable Energy Production

Number of points: 3 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
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By end of Schematic Design Phase: Determine the renewable energy generation potential of the site and **Submit** the analysis to PL

Photovoltaic	0	3	Investigate Solar feasibility of Site, then Investigate financial feasibility and consult with OPP.	1- Submit Solar feasibility Study: Must be approved by OPP for each project. If the Site/ Project is feasible for Solar Installation then the infrastructure and the structure of the building must be made ready for solar panels installation. 2- Submit Financial feasibility to OPP for approval. If Project budget won't allow for Solar Panel installations, then consult with OPP for other funding sources.* * Refer to the Photovoltaic process map on the next page	N/A	Energy and Engineering Services Building Operations Engineer Mike Prinkey mip103@psu.edu
Biofuel			Might be feasible at Non-UP campuses. UP: not feasible.	Non-UP: Submit preliminary analysis for adapting Biofuel onsite to OPP. If approved by OPP then the Biofuel can be implemented UP: buildings are connected to the steam system	N/A	
Solar Thermal			Analysis required.	Submit preliminary analysis to OPP for approval. If not approved then this system will not be implemented and no further action required. Building types that have high thermal load, year-long may be a better candidate for this option. Examples include: food facilities, athletic facilities, research labs, residential, which have high DHW demand. Maintenance cost is a concern for this system. Note: PSU campuses are typically in a Cold Climate with low sun angles in winter	N/A	
Geothermal			Investigate feasibility.	Submit preliminary analysis for adopting geothermal system to OPP.	N/A	
All other systems			Hard to achieve due to the location of PSU campuses.	N/A	N/A	

Renewable Energy Production – Photovoltaic process map

Solar Energy Feasibility Analysis

Design Team

1. Does the building have good Solar exposure with minimal shading from surrounding buildings?
2. Does the building have 5000 sf or more of roof space available?
3. Does the building design allow for Solar installation?
4. Are there no other nearby opportunities that are more feasible?

Step 1

No

Submit the Analysis to
OPP

Yes

OPP must review and approve the Solar Feasibility Analysis through their own consultant

In this case infrastructure and the structure of the building must be made ready for solar panels installation.

OPP must review and approve Solar Installation

No more action required.
The credit will not be pursued

Financial feasibility/ life cycle cost Analysis

Design Team

1. Is this an appropriate life cycle decision for the project?

No

OPP Team

2. Would OPP be interested in funding the Solar Panel Installation?

Yes

OPP may provide partial Funding to build the Structure/ Foundation for Solar Panels at the time of project. Panel Installation in the future

Yes

OPP may provide funding at the time of project for full Solar Installation

No

Enhanced Refrigerant Management

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact	
Option 1	0	1	Investigate campus practices.	Analysis for this option should be submitted to PL for approval.	N/A	Energy and Engineering Services Manager, Engineering Services Andrew Gutberlet adg112@psu.edu	
OR							
Option 2 UP	1	1	At UP the central chilled water plant already complies.	Consult with OPP for documentation of credit.	A calculation documenting the central plant refrigerant management can be provided by OPP.		
OR							
Option 2 Non-UP	0	1	Non-UP: Investigate compliance case by case.	Consult with OPP on how to achieve this credit.	N/A		

Energy and Atmosphere

Green Power and carbon offsets

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
All	0	2	Not Pursued	PSU doesn't buy green power at the project level.	N/A	Energy and Engineering Services Building Operations Engineer Mike Prinkey mip103@psu.edu

MATERIALS AND RESOURCES (MR)

Materials And Resources (MR)

Prerequisites

- **Storage and Collection of Recyclables**
 - To reduce the waste that is generated by building occupants and hauled to and disposed of in landfills.
- **Construction and Demolition Waste Management Planning**
 - To reduce construction and demolition waste .

Building life-cycle impact reduction

Number of points: 5 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option 1: Historic Building Reuse	0	5	Check for feasibility	Master planning, programmatic and aesthetic decisions will take precedence regarding the scope of reuse of existing facilities.	N/A	Design and Construction Assistant Director, John Bechtel jrb115@psu.edu
OR						
Option 2: Renovation Of Abandoned Or Blighted Building	0	5				
OR						
Option 3: Building And Material Reuse	0	4				
OR						
Option 4: Whole-building Life-cycle Assessment	0	3	Achievable	Achievable but credit needs extensive documentation and needs to start at schematic design. If not achievable: Submit proof of attempt to achieve this option to PL in order for OPP to document lessons learned.	N/A	

Materials and Resources Building Product disclosure and optimization

Environmental Product declarations

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option 1	1	1	Mandatory	N/A	N/A	Design and Construction Assistant Director, John Bechtel jrb115@psu.edu
Option 2	0	1	Investigate achievability	If not achievable: Submit proof of attempt to achieve this option to PL in order for OPP to document lessons learned.	N/A	

Materials and Resources Building Product disclosure and optimization- sourcing of raw materials

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option 1	1	1	Mandatory	N/A	N/A	Design and Construction Assistant Director, John Bechtel jrb115@psu.edu
Option 2	0	1	Investigate achievability	If not achievable: Submit proof of attempt to achieve this option to PL in order for OPP to document lessons learned.	N/A	

Materials and Resources Building Product disclosure and optimization- material ingredients

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option 1	1	1	Mandatory	N/A	N/A	Design and Construction Assistant Director, John Bechtel jrb115@psu.edu
Option 2	0	1	Investigate achievability	If not achievable: Submit proof of attempt to achieve both options to PL in order for OPP to document lessons learned.	N/A	
And/or						
Option 3						

Materials and Resources Construction and Demolition Waste Management

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
All	2	2	Mandatory	N/A	N/A	Design and Construction Assistant Director, John Bechtel jrb115@psu.edu

INDOOR ENVIRONMENTAL QUALITY (EQ)

Indoor Environmental Quality (EQ)

Prerequisites

- **Minimum Indoor Air Quality Performance**
 - To contribute to the comfort and well-being of building occupants by establishing minimum standards for indoor air quality (IAQ).
- **Environmental Tobacco Smoke Control**
 - To prevent or minimize exposure of building occupants, indoor surfaces, and ventilation air distribution systems to environmental tobacco smoke.

Indoor Environmental Quality

Enhanced IAQ strategies

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option 1: Enhanced IAQ strategies	1	1	Mandatory	For both options: Do not increase mechanically conditioned ventilation to comply with this credit. Good air quality is mandated by prerequisite. Additional ventilation requires energy to condition and the benefit does not justify the effort. For option 2: Carbon dioxide monitoring and exterior contamination prevention are important to implement for PSU.	N/A	Energy and Engineering Services Building Operations Engineer Don Partsch DFP2@psu.edu
Option 2: Additional enhanced IAQ strategies	0	1	Achievable		N/A	

Indoor Environmental Quality

Low-emitting materials

Number of points: 3 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
ALL	1	3	Recommended	This is an important credit that addresses the health and well being of building occupants. Investigate achievability for all possible points. At least one point is mandatory to achieve.	OPP Design and Construction Standards: 09 68 10 Carpet Tile	Planning Design and Properties Senior Architect Douglas J. Cramer djc524@psu.edu

Indoor Environmental Quality

Construction IAQ management plan

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
ALL	1	1	Mandatory	N/A	N/A	Design and Construction Assistant Director, John Bechtel jrb115@psu.edu

Indoor Environmental Quality

IAQ assessment
 Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
ALL	1	2	Mandatory	Either the flush out or the air testing option must be built into the project schedule at the beginning of the project.	N/A	Design and Construction Assistant Director, John Bechtel jrb115@psu.edu

Thermal Comfort

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
ALL	1	1	Mandatory	N/A	N/A	Energy and Engineering Services Building Operations Engineer Don Partsch DFP2@psu.edu

Indoor Environmental Quality

Interior Lighting

Number of points: 2 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
Option 1	1	1	Mandatory	N/A	N/A	Energy and Engineering Services Electrical Engineer Jonathan Walker jcw5009@psu.edu
Option 2	0	1	Recommended	A is not recommended B and C are PSU standards Consider implementing D and E Investigate the feasibility of F,G and H. Review strategies with the Electrical Engineer and PL for approval.	N/A	

Indoor Environmental Quality

Daylight

Number of points:3 points

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
ALL	0	3	Recommended	<p>Meetings*, beginning at schematic design, should be set up with the designer, the University Architect, the Manager of Engineering Services and the Electrical Engineer at OPP (contacts listed to the right) to discuss strategies to achieve as many points as possible.</p> <p>Submit meeting minutes* to PL.</p> <p>* Meetings should coincide with Quality Views meetings</p>	N/A	<p>Planning Design and Properties University Architect Greg Kufner gak21@psu.edu</p> <p>Energy and Engineering Services Manager, Engineering Services Andrew Gutberlet adg112@psu.edu</p> <p>Energy and Engineering Services Electrical Engineer Jonathan Walker jcw5009@psu.edu</p>

Indoor Environmental Quality

Quality Views

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
ALL	0	1	Recommended	<p>Meetings*, beginning at schematic design, should be set up with the designer, the University Architect and the Manager of Engineering Services at OPP (contacts listed to the right) to discuss strategies to achieve this credit. Submit minutes of meetings* to PL.</p> <p>* Meetings should coincide with Daylighting meetings</p>		<p>Planning Design and Properties University Architect Greg Kufner gak21@psu.edu</p> <p>Energy and Engineering Services Manager, Engineering Services Andrew Gutberlet adg112@psu.edu</p>

Indoor Environmental Quality

Acoustic Performance

Number of points: 1 point

LEED Requirements	Min points required for PSU	Max possible points	Achievability	Additional information and/or requirements or documentation to be submitted to OPP	Additional PSU Standards/ Resource	For Further questions: OPP point of contact
ALL	0	1	Recommended	An analysis based on space type should be submitted to PL to evaluate the feasibility of pursuing this credit.	N/A	Design and Construction Assistant Director, John Bechtel jrb115@psu.edu