

Why not just go for Platinum?
A LEED assessment of Chubb Hall

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Introduction

The buildings we live, work, and play in account for 30-40% of global energy use and 15% of global water use (Graedel & Allenby, 2010). As the conversation of sustainability has risen in volume, “green building” has come to represent a highly visible, pragmatic and resilient approach towards engaging the uncertainties of the environmental forecast of the 21st century. Green building and sustainable engineering have placed an emphasis on holistic considerations of material, water and energy usage and a general minimization of environmental impacts for all stakeholders, both human and non-human. In many ways, green building seeks to undo the bifurcation of man from the natural environment by allowing natural and local resources to construct the buildings in which we work and live. This does not mean that green building practices can only be applied to new construction projects; in fact, major renovation projects afford numerous cultural and environmental gains. It is important to acknowledge that the initial cost of renovation may increase slightly by consciously pursuing a green building project. However, due to increased efficiency in energy and water usage, as well as increased productivity and happiness amongst occupants, most projects can still recuperate their costs quickly (Graedel & Allenby, 2010). Only to then continue to reap the benefits of a more efficient and healthier work space for the life of the building.

The U.S. Green Building Council’s Leadership in Energy and Environmental Design (LEED) program has come to be recognized by some as the embodiment of “green building” in the United States. That is not to say that one can accept the LEED program with blind faith. As with any instrument that attempts to deal with the complexity of sustainability, there are limitations. However, by undertaking the LEED certification process a commitment is made to informing those who work in and visit your buildings that you are aware of the issues facing our society in the future and are actively working towards improving that future.

The following LEED assessment of Chubb Hall was conducted as a purely academic exercise. That being said, it is the intention of the assessor to inspire critical thought regarding the buildings on the Ohio University campus, the image projection of the University and OU’s role in the greater dialogue surrounding sustainability on college campuses. Prior to conducting this assessment, I had the opportunity to meet with some of the stakeholders who oversee the departments that occupy Chubb Hall. In the hopes of creating a Chubb Hall that might act as a flag ship space representing Ohio University’s commitment to sustainability, some of these

stakeholders asked what it would take for a potential project to reach Gold certification level. The conversation that ensued during that meeting is the motivation for the facetious title of this assessment. Ohio University's commitment to attaining LEED Silver certification on all future renovation and construction projects is noteworthy. However, this exercise illustrates that the path towards Gold certification is not that arduous; and Platinum certification is within reach when a true commitment to innovative and sustainable design is embraced. There are numerous campuses in Ohio, as well as throughout the country that are making great strides towards positing sustainability as a key component of their institutions' image by pursuing numerous gold and platinum certified buildings. Keeping in mind the academic nature of this undertaking, this assessment is an attempt to outline what working towards Gold Certification for a major renovation of Chubb Hall might look like from a hypothetical standpoint. Neither the Office of Sustainability nor Facilities and Operations are sponsors of this assessment. All recommendations reflect the opinions of this assessor alone.

The initial portion of this document is organized into seven sections, following the seven criteria of the U.S. Green Building Councils' LEED 2009 Project Checklist for New Construction and Major Renovations. Under each heading, the most attainable credits are listed not only to set priority, but also to show that Gold certification is highly attainable. Each section also lists the total number of possible points and the number of points actually awarded by this hypothetical assessment.

Of a possible 110 points, in order to receive LEED Gold accreditation, a project must earn between 60 and 79 points. In order to earn LEED Silver certification, a project need only receive between 50 and 59 points. In identifying some of the "lower hanging fruit" it is the hope of this assessor that some of the recommendations might eventually be considered by the decision making bodies on campus in dictating future renovation and construction projects in Chubb Hall and other campus facilities.

All of the criteria possess prerequisites. The prerequisites are not difficult to overcome and they are acknowledged here simply because they represent a foundational commitment to the necessary intention and purpose of undertaking a green building effort.

LEED 2009 New Construction and Major Renovations

Points Possible: 110

Points Earned: 60 – Gold

Sustainable Sites

Points Possible: 26

Points Earned: 15

Credit 1: Site Selection - 1/1

An undertaking at Chubb Hall would be considered a Major Renovation project in light of the project taking place on a previously impacted site.

Credit 2: Development Density and Community Connectivity – 5/5

Chubb's proximity to residential centers and local services easily earns points. Further, the extensive system of pedestrian thoroughfares that connect Chubb to other buildings, services and residences is excellent.

Credit 4.1: Alternative Transportation - 6/6

Chubb is located within a quarter mile of a bus stop from which individuals can access broader transportation lines including air and rail. Numerous bus lines also service this stop for the University, various residential sites and municipal/regional transportation.

Credit 4.2: Alternative Transportation – 1/1

Recognizing that many of the employees of Chubb Hall are required to maintain business-professional attire and appearances, bike commuting is currently not a viable option due to lack of safe storage and access to appropriate shower/locker room facilities. This point could be earned simply by adding appropriate space for those interested in bike commuting to shower and change into previously stored clothing.

Credit 5.2: Site Development – Maximize Open Space - 1/1

So long as the large open, green space behind Chubb Hall is not impacted during or after a major renovation project of Chubb Hall, this is an attainable point.

Credit 8: Light Pollution Reduction - 1/1

Due to the current structural design and the lack of transparent and/or translucent envelope features of Chubb Hall there is already minimal light pollution from the building between the hours of 11 p.m. and 5 a.m.

Water Efficiency

Points Possible: 10

Point Earned: 3

Credit 3: Water Use Reduction – by 30% - 3/4

Retrofitting the bathrooms in Chubb Hall from old inefficient toilet fixtures and sinks to modern efficient fixtures is a readily attainable improvement. The use of signage to encourage efficient water use has also proved successful in encouraging responsible behavior in other campus buildings. A 30 % reduction is an attainable goal so long as the occupants of the building are willing to prioritize responsible water usage in the work place; especially in light of the fact that a 20% total reduction of water usage is a prerequisite for earning any points in this category. A further discussion of some less obvious techniques for water use reduction and general efficiency improvement can be found on pages 10-11.

Energy and Atmosphere

Points Possible: 35

Points Earned: 14

As mentioned in the introduction, Chubb (As representative of most buildings on campus) does not meet the pre-requisites for this category due to a lack of a fundamental commissioning of building's energy systems. It is currently not possible to isolate exactly how much energy is used in a specific building over a current time frame. This is an issue that needs immediate resolution in order to earn any points in this credit. The attainment of the credits listed below is assuming that an appropriate monitoring system is installed.

Credit 1: Optimize Energy Performance – 26% Improvement in Energy Performance -10/19

By retrofitting Chubb Hall with modern, efficient lighting options, motion sensor lighting, more user control of lighting and heating in isolated spaces vast improvements in energy efficiency can be made. The lack of comfortable and efficient climate control within Chubb causes excessive waste as habitants are forced to open windows in the window to deal with excess heat and install individual AC units in the summer to deal with insufficient cooling is a major inefficiency that could be readily addressed by improving climate control throughout the building and improving insulation, ventilation and the general thermal envelope of the building.

Credit 4: Enhanced Refrigerant Management – 2/2

These points are earned by installing, maintaining and monitoring HVAC & R equipment that minimizes/eliminates the emission of ozone-depleting and climate change causing compounds.

Credit 6: Green Power – 2/2

In order to earn these points, a two-year contract would need to be entered with AEP Ohio in which 35% of the buildings electricity (based on quantity not cost) must be sourced through “green” sources.

Materials and Resources

Points Possible: 14

Points Earned: 8

Credit 1.1: Building Reuse – Maintain Existing Walls, Floors and Roof - 2/3

In an effort to increase the product life-cycle of the existing building, a renovation project of Chubb should strive to reuse 75% of the current structure and envelope. This will prevent a vast amount of waste from entering the waste stream.

Credit 2: Construction Waste Management - 1/2

This point is earned simply by ensuring that all contracting is done through an agency that is committed to managing waste at the renovation site effectively. One point is earned simply by ensuring that 50% of the waste created is either salvaged or recycled.

Credit 3: Materials Reuse - 1/2

Similar to the above credit, simply ensuring that demolition/construction/decorating companies that will strive to ensure a 5% reuse of materials is contracted will earn another point. Material including beams, posts, furniture, bricks, doors, frames or cabinetry can all be used towards meeting this 5% (based on materials cost) re-usage level.

Credit 4: Materials Recycle – 1/2

Prioritization of recycling and the hiring of responsible firms who will work with Ohio University in meetings these goals will help to earn a point for ensuring that a minimum of 10% of building and usage materials are comprised of recycled contents.

Credit 5: Regional Materials – 2/2

With the Wayne National Forest and an historic brick industry as local resources, it seems a readily attainable goal to ensure that 20% of construction materials are locally sourced. See also a discussion of potential bamboo cultivation on page 12.

Credit 7: Certified Wood – 1/1

By ensuring that at least 50% of the wood products used in the project are certified with the Forest Stewardship Council will not only show Ohio University's commitment to sustainability, but will also earn a point.

Indoor Environmental Quality

Points Possible: 15

Points Earned: 15

Credit 1: Outdoor Air Delivery Monitoring – 1/1

Installing a monitoring system that tracks airflow levels and CO₂ concentrations in work spaces and establishing an alarm system that informs occupants when levels are outside of pre-designated limits will earn this point.

Credit 2: Increased Ventilation – 1/1

In accordance with case one of this credit, Chubb should install an outdoor air ventilation system that allows for a level of air quality 30% above the pre-requisite level as assigned by adherence to the standards of the American Society of Heating, Refrigeration and Air Conditioning Engineers.

Credit 3.1: Construction Indoor Air Quality Management Plan (During Construction) - 1/1

As mentioned above in the materials credits, careful planning, recruiting and contracting of employees and firms is a great source of credit. Working with a firm that will prioritize the indoor air quality of work spaces during construction and renovation earns a point.

Credit 3.2: Construction Indoor Air Quality Management Plan (Before Occupancy) – 1/1

By committing to a thorough flushing of all air from a finished space (14,000 ft³ of outdoor air per ft² of interior space), safety and comfort can be ensured for those re-occupying the building.

Credit 4.1: Low-Emitting Materials – Adhesives and Sealants – 1/1

Use of low volatile organic compound (VOC) sealants and adhesives is essential in allowing for occupant comfort and health in the future.

Credit 4.2: Low-Emitting Materials – Paints and Coating – 1/1

The use of low VOC paints and coatings ensures health and comfort of inhabitants and earns a point.

Credit 4.3: Low-Emitting Materials – Flooring Systems – 1/1

Using materials deemed acceptable by the Carpet and Rug Institute Green Label Plus program and maintaining low VOC levels in materials used, earns another health and comfort point.

Credit 4.4: Low-Emitting Materials – Composite Wood and Agrifiber Products - 1/1

By ensuring that none of the composite materials used in the project contain urea-formaldehyde resins earns yet another point.

Credit 5: Indoor Chemical and Pollutant Source Control – 1/1

Appropriate use of particular filters in the mechanical ventilation system and the construction of permanent entryways that allow for at least 10 feet of space between outside doors and indoor entryways earn this point.

Credit 6.1: Controllability of Systems – Lighting – 1/1

Installing individual light controls for 90% of the lighting in Chubb would earn this point, and as mentioned above would be helpful in lowering the overall energy usage of the building.

Credit 6.2: Controllability of Systems – Heating - 1/1

Individual control of heating/cooling would not only contribute to more efficient climate control, but ensuring that 50% of the systems in Chubb could be individually manipulated earns a point.

Credit 7.1: Thermal Comfort – Design - 1/1

Meeting the ASHRAE standard 55-2004, which encourages an appropriate indoor climate, earns a point and ensures comfort and productivity amongst building occupants.

Credit 7.2: Thermal Comfort – Verification - 1/1

The installation of a monitoring and tracking system of air quality and the thermal envelope of Chubb is essential in ensuring that the efforts made in creating a LEED Gold building are testable and maintainable.

Credit 8.1: Daylight and Views – Daylight – 1/1

This point would most probably be earned by pursuing option four of the LEED 2009 Rating System, which uses a combination of: 1) providing an increased amount of space that receives natural light, 2) ensuring that a minimum daylight level is met throughout the building, and 3) improves day-lighting potential throughout the building.

Credit 8.2: Daylight and Views – Views - 1/1

The purpose of this credit is to ensure that those occupying Chubb have the ability to interact with the outdoor environment through windows and vantage points. While Chubb is currently a very dissected and bifurcated building the use of windows and or atriums in a major renovation design would not only contribute to daylight level increases, but would also ensure these views earn a point.

Innovation and Design Process

Points Possible: 6

Points Earned: 1

Credit 2: LEED Accredited Professional - 1/1

Currently on the OU campus there are a number of LEED Accredited Professionals. Ensuring that one or more of these individuals is a principal member of the team that addresses major renovations in Chubb Hall would earn a point.

Regional Priority Credits

Points Possible: 4

Points Earned: 4

According to the database at www.usgbc.org/rpc there are six regional priority credits currently available for Athens, OH. The most germane credits available to a major renovations project at Chubb include:

- Site Selection: Due to the nature of this project being major renovation, credit can automatically be earned in light of the fact that no new site will be impacted.
- Building Reuse (existing walls, floors and roof): By engaging the materials and structures already standing, a great deal of waste and energy can be prevented both in the fabricating of new materials as well as the extraction and processing of existing materials.
- Daylight and Views (with a focus on Daylight): By using more day-lighting, energy consumption can be greatly reduced while occupant health and productivity can see marked increases.
- On-site renewable energy: Though this has not been previously mentioned in this report, it is brought up here because only 1 % of the energy used in the project space needs to be sourced from an on-site renewable source. That one percent could easily be met with the installation of photovoltaic cells on Chubb Hall. Currently the only visible solar energy production system is at the Eco-House. Not only is it removed from high-traffic areas of campus, where it might spark conversation, but also it is

fairly antiquated technology. Installation of a small scale photovoltaic array would not only earn this regional priority credit, but could also stand to serve as a symbol of Ohio University's stance on sustainable construction practices based on the central location of Chubb hall and its important role in the lives of students and parents who will almost certainly visit Chubb Hall before and during their time at Ohio University.

Difficult Credits

Within the criterion of Sustainable Sites, Water Efficiency, Energy and Atmosphere, and Materials and Resources there are credits not mentioned above that would be attainable with a slightly larger economic commitment and a significantly larger commitment to innovation and sustainable design.

Sustainable Sites:

Credit 4.3: Alternative Transportation – Low-Emitting and Fuel Efficient Vehicles – 3 points

Credit 4.4: Alternative Transportation – Parking Capacity - 2 points

These credits focus on the development of a supporting infrastructure for or a fleet of alternative vehicles (hybrid or electric). Understanding the limitations for parking in the vicinity to Chubb Hall, these points could still be earned if the University as a whole began endorsing the use of alternative vehicles amongst its employees both for general use as well as University specific use.

Credit 6.1: Stormwater Design – Quantity Control – 1 point

Credit 6.2: Stormwater Design – Quality Control – 1 point

Both of these credits focus on controlling impacts to the area's natural hydrological cycle; however, they also afford opportunities for innovation and creativity in decreasing total water usage and increasing water efficiency, while potentially serving as a symbol of the institution's commitment to sustainability. Vegetated Roofs and rainwater catchment systems are unique ways to meet these credit requirements while also providing benefit in other credits. For instance, creating a rainwater catchment system with a high volume cistern for collection and storage opens up opportunities for landscaping water usage reduction as well as potential gravity-fed non-potable water toilet systems, which increase efficiency and decrease usage.

Credit 7.1: Heat Island Effect – Nonroof

Credit 7.2: Heat Island Effect – Roof

Heat Island effect refers to the general heating of developed areas due to the high presence of hard-scape surfaces that trap, store and overtime transmit heat energy, thus warming the temperature and decreasing the comfort of a given area. In order to combat this in the case of

Chubb Hall, photovoltaic arrays and/or a vegetated roof would serve as the most practical and beneficial improvements for combatting this issue. Not only would these systems earn credits in regards to heat island effect, they could also earn points for storm water control and energy efficiency and/or on-site energy production.

Water Efficiency:

Credit 2: Innovative Wastewater Technologies - 2 points

While the potential development of captured rainwater as a means to improving water efficiency exists, another option can be explored here as well. In addition to the installation of more efficient sinks and toilets and the usage of rainwater in the conveyance of black water, the implementation of a grey-water cycling system would also present great opportunities for improving water efficiency. A grey-water system uses water that has been used previously (e.g. hand-washing) and captures that water to be used for another function before being piped from the building as waste. For instance, the tanks that flush toilets on the ground floor could be filled by the grey-water created by people washing their hands on the second floor. Thus, water is used multiple times before being wasted and less potable water is used for toilet flushing.

Energy and Atmosphere:

Credit 2: On-Site Renewable Energy – 1 to 7 points

This credit seeks to use on-site renewables such as photovoltaic arrays or small scale wind turbines in an effort to offset greenhouse gas emitting energy sources. By increasing the percentage of energy created in this way a project has the potential to earn 7 points if 13% of energy can be sourced on-site. In the case of Chubb Hall, an extensive structure of photovoltaic arrays would not only be possible, but desirable. Photovoltaic arrays not only create energy for use in the building but they have the potential for “energy” creation in the community as well. Due to their highly visible nature, they serve as an excellent symbol of a commitment to alternative energy production and sustainable construction.

Credit 3: Enhanced Commissioning – 2 points

This credit looks to involve an outside commissioning authority who works with the design team throughout the planning, construction and re-inhabiting process to ensure that energy usage is appropriately planned for regulated and monitored. While this credit involves a cost because this commissioning authority is to be hired from outside of the main project team, it ensures integrity and honesty though out the project as well as holding the project accountable to its commitments to energy efficiency.

Credit 5: Measurement and Verification – 3 points

In a further effort to maintain integrity and optimize energy performance, this credit seeks to develop a measurement and verification plan that will maintain the highest performance over the life of the project and structure. This credit really involves the installation of monitoring equipment at the building level so that usage can most accurately be tracked, this allowing for the continued meeting of usage goals.

Materials and Resources:

Credit 1.2: Building Reuse – Maintain 50% of Interior Non-Structural Elements – 1 point

This credit is being considered difficult to obtain simply due to the age of Chubb Hall as well as the design characteristics that currently make it a less than efficient building especially in regards to natural lighting potential. In an effort to reduce the volume of material entering the water stream, this credit strives to reuse materials such as doors, interior walls, floor coverings and ceilings. However, the assessor is aware that some of this may be both inappropriate and difficult in light of the age of Chubb Hall.

Credit 6: Rapidly Renewable Materials – 1 point

In order to earn this credit, a project must use a rapidly renewable resource for 2.5% of the total value of all building resources and materials based on cost. Typically, a product that comes from an agricultural process with a 10-year or shorter cycle is considered rapidly renewable. An applicable example that could be used for flooring through-out the building is bamboo. Not only is it aesthetically pleasing, but it is rapidly renewable and due to its weed-like properties, could even be grown locally (which would earn even more points for sourcing materials locally).

Unattainable Credits

There are two credits worth identifying that are outside of the scope of this project and therefore preclude the potential gain of two points. These credits are both under the Sustainable Sites criterion and include:

- Credit 1: Brownfield Redevelopment: Due to the nature of the project site and the surrounding campus space, the rehabilitation of a contaminated site is not applicable here.
- Credit 5.1: Site Development: Protect or Restore Habitat: Once again as a result of the location of this project on campus and the surrounding Athens' community, it is not feasible to rehabilitate the site in such a way as to encourage the re-creation and protection of natural, native landscapes.

Afterword

The above assessment was done in consideration of engaging the easiest to earn credits that would allow for a LEED Gold certification to be attained in Chubb Hall. However, in striving for Gold, it becomes apparent rather quickly that significant gains exist in the Water Efficiency and Energy and Atmosphere criterions. If improvements in these criterions were fully maximized, the potential exists for a Major Renovations project at Chubb Hall to be certified at the Platinum level with a score of 89. Therefore, while every point available does not need to be earned, there exists great potential for this project to serve as a symbol for sustainable design on Ohio University's Campus.

Under this assessment scenario, 10 out of a possible 19 points were earned from the energy usage optimization credit. One out of seven points was earned from the potential development of on-site energy production of 1% of the building's usage. By prioritizing on-site electricity generation through on-site photovoltaic arrays, a major renovation project of Chubb Hall could earn an additional 15 points. Obviously, this system would come at a cost. However, the benefits could be profound in accelerating Ohio University's position as an institution committed to sustainability.

The second major area where both points and credibility could be gained is in Water Efficiency. An additional nine points are available in water usage reduction for landscaping and interior uses (Credits 1,2, and 3 of Water Efficiency), as well as in storm water quantity and quality control (Credits 6.1 and 6.2 of Sustainable Sites). By constructing some combination of vegetated roof systems, rainwater catchment systems and minimizing or eliminating the usage of potable water in landscaping, there exists a great deal of potential in not only moving this project into the Platinum category, but also creating a building that speaks to the seriousness with which Ohio University approaches sustainability. Creatively and thoughtfully engaging on-site energy production and water management and usage into the design process also opens the door opened for five additional points under the Innovation in Design criterion.

An often cited criticism of LEED projects and projects that focus on increased energy efficiency in general, is that in light of the continued demands of operating in the information technology age, there is an inevitable increase in intensity of usage. However, it is important not to become too wrapped up in this argument. If we consider for a moment a structure that engages numerous innovative systems for energy production and efficiency, you actually create a

building in which an increased intensity of demand is a positive characteristic. If Chubb Hall were to become a highly visible, flag-ship space that represented the commitment of the university to a sustainable future there are actually benefits to increased intensity of usage. An increase in intensity of usage would be beneficial in a space that sourced a significant portion of its electricity from on-site renewables, made a commitment to green-energy sourcing from AEP Ohio and monitored and regulated efficient energy usage. Not only are individuals then able to be productive in such a way as to minimize impacts to the natural world, but a strong statement is made as to the willingness of an institution to be a strong contributor to the conversation of sustainable construction.

Ohio University is blessed with a beautiful campus comprised of classic style and scenery. However, the rise of green building, specifically in regards to the standards established by USGBC LEED program, has shown us that there is also something beautiful about a building that strives to reengage the natural world rather than establish a barrier from it. As documented above, a renovation project of Chubb Hall could be undertaken and meet LEED Gold standards without an agonizing amount of effort. However, there also exists an opportunity in this building to merge the classic and the modern. As a building that is visited by almost every members of the Ohio University community and is situated at a main entry point to campus, Chubb Hall has the potential to be renovated in such a way to be considered not only beautiful, but also innovative and perhaps even sustainable.

References

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