David L. Lawrence Convention Center

2019 Green Report

August 1st, 2020

DLCC PITTSBURGH

Sports & Exhibition Authority

When you have the time, Pittsburgh has the place.

2019 Highlights

40% of all **water** used on-site was recycled wastewater

9 tons of food was donated to local charities (page 18)

11 Green-seeking Events generated over $2 million in revenue (page 3)

The DLCC holds four LEED certifications in three categories (page 2)

53% of all **waste** (256 tons) was recycled, reused, donated or composted instead of going to the landfill (page 18)

35% of all **electricity** used on-site was certified Green-e energy (page 14)

2,653 gallons of gas saved by the use of the free EV charging stations at the DLCC garage (page 14)

99% of all food service containers and disposable food serving items were compostable (page 15)

This 2019 Green Report covers the operations within the physical boundaries of the David L. Lawrence Convention Center (DLCC) site related to environmental sustainability. Topics were chosen based upon their relevance to external stakeholders and internal operations. The information in this report is summary in nature, with detailed data presented for the 2019 calendar year. Information is provided from previous years to the extent it is relevant.

The framework for the report is based on the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) for Existing Buildings: Operations & Maintenance rating system, the Global Reporting Initiative's (GRI) Sustainability Reporting Guidelines, and the World Resources Institute (WRI) Greenhouse Gas (GHG) Protocol Initiative. A technical description of the extent to which each of these guidelines has been adopted and the determination of the reporting boundaries to which they apply is given in Appendix A.

It is important to note that the environmental performance of the DLCC is directly affected by several external factors such as seasonality, event schedules, type, and size of events, as well as the needs of attendees and event planners. These relationships are complex and are not always quantifiable. It is common for the hours and days of operation for convention centers to vary widely, not only from week to week and month to month, but from year to year, unlike a typical commercial building.

This report aims to be transparent about factors impacting performance. Where possible, qualitative and quantitative measures have been provided regarding the effects of these factors upon environmental performance, as well as the limitations or challenges they might impose. A simple view of energy consumption from one year to the next is not always an accurate measure of performance given the unique nature of the building.

A glossary defining key terms in this report is provided in Appendix B.

Table of Contents

David L. Lawrence Convention Center

Located in downtown Pittsburgh, adjacent to the Allegheny River, the 1.5 million sq. ft. David L. Lawrence Convention Center (DLCC) is a symbol of the City's economic and environmental revitalization. The DLCC opened in 2003 and is owned by the Sports & Exhibition Authority of Pittsburgh and Allegheny County (SEA). The SEA contracts with SMG a/k/a ASM Global (ASM), a professional management company, for the day-to-day operations of the facility. The DLCC was built as a public investment to attract non-resident attendees to the region and to grow tourism spending in Pittsburgh. With encouragement and support from local organizations, an additional goal was decided upon: to create an innovative and environmentally responsible facility that would showcase the benefits of sustainable building design and operations.

Pittsburgh's philanthropic community played a major role in the development of the DLCC by supporting an international green building design competition for the planning of the convention center. The $750,000 design competition was funded by the Heinz Endowments, the Hillman Foundation, the Claude Worthington Benedum Foundation, the Buhl Foundation, the Richard King Mellon Foundation, and an anonymous foundation.

In February 1999, the Southwestern Pennsylvania Convention Center Design Commission unanimously selected the design proposal of Rafael Viñoly Architects (RVA). Inspired by the "Three Sisters" suspension bridges near the site, RVA's design uses a cable support system to suspend a dramatically sweeping roof. Daylighting, natural ventilation, and water reclamation strategies were implemented throughout the facility to an extent that was unprecedented in the meeting and convention industry during that time. In addition, the DLCC was constructed on the same site as the previous convention center facility which virtually eliminated the need for the construction of additional supporting roads and utility infrastructure.

2003
LEED
GOLD
NEW CONSTRUCTION

2012
LEED
Platinum
O+M

2013
LEED
Platinum
Commercial Interiors

2017
LEED
Platinum
O+M

2018
APEX/ASTM
LEVEL II
Certified

Sustainable Certifications

LEED™

LEED was integrated into the design of the building from its inception. To further the environmental goals of the building, the Heinz Endowments provided $7 million in grants and loans, administered by the Green Building Alliance (GBA), for costs associated with green building consultation services, commissioning, and integration of green technologies.

In 2003, upon completion, the DLCC became the first convention center to be certified LEED Gold® for Building Design and Construction. The DLCC was one of only seventy-five LEED New Construction certified projects and the largest building to get LEED certification at the time.

Continuing a commitment to sustainability the DLCC has earned LEED Platinum® for Existing Buildings: Operations and Maintenance (LEED O+M). The first LEED O+M certification was earned in 2012 and the building was re-certified in 2017. Re-certification is required every 5 years to show that sustainable operations continue at the required levels.

LEED O+M requires the reporting of energy and water usage in relation to square footage and occupancy as well as looking at the comfort of occupants and the methods by which they travel to the building. It also encompasses the purchasing of recycled products, and diverting as much as possible away from the landfill and towards recycling, donation, and composting.

In 2012, the SEA completed its new interior office space, located within the DLCC. The location was previously being used for storage. The SEA Office renovation earned LEED Platinum® for Commercial Interiors in April 2013.

APEX/ASTM Sustainable Meeting Venue

APEX/ASTM® is composed of nine certification categories including: Meeting Venue, Food and Beverage, Exhibits, Destination, and Audio/Visual. The final rating for a venue is based on the points it receives which translate to four levels, with the fourth (IV) level of achievement being the highest. In January 2018, the DLCC earned Level II certification as an APEX/ASTM Sustainable Meeting Venue[1].

1 https://www.eventscouncil.org/Sustainability/About-Sustainability

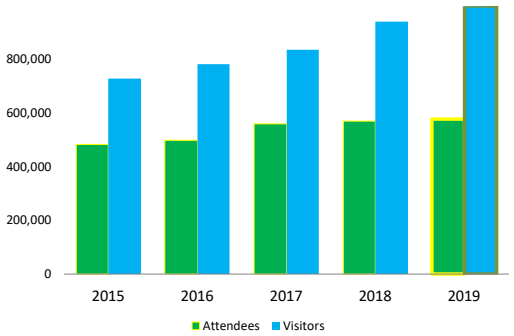


Figure 1a. DLCC attendees and visits 2015-2019

Sustainable Events

Green-Seeking Events

The building's LEED certifications and sustainable construction and operations attract event organizers who seek such facilities, known as green-seeking events.

Of the 198 events at the DLCC in 2019, 11 were green-seeking events of which 3 were major events.[1] These green-seeking events, with 19,728 attendees, accounted for $2,024,355 in gross revenues to the DLCC.

The green-seeking major events generated $11,064,751 (source: VisitPittsburgh) in direct spending to the region. Green-seeking major events have been responsible for $273 million (21.5%) in direct spending since tracking began in 2006.[2] In addition to hosting events, the DLCC provided educational green tours of the building highlighting various features from the roof to the wastewater treatment plant. Anyone can request a free sustainability tour of the DLCC. In 2019, 49 members of the public participated in sustainability tours.

Activity at the DLCC

No single measure of building utilization accounts for the diversity and variation in convention center building usage. Attendance and visits are measures of building activity used in this report. Attendance represents the total number of people attending public shows, banquets and meetings, plus the number of delegates to conventions/ trade shows. The number of visits is the same as attendance except that for conventions/trade shows, it is the number of delegates multiplied by the number of days of that event. Neither measure differentiates between event type, duration, or spaces utilitized (e.g. exhibit halls, ballroom, meeting rooms, etc.), all of which impact building operations, energy and water use differently. *Figure 1a* shows the attendance and number of visits in the past 5 years.

Green Event Spotlight: PCMA

In 2019 the DLCC hosted the Professional Convention Management Association's (PCMA) annual Convening Leaders conference.[3] The PCMA conference brings the leaders of the convention and conference industry together every year. With 7,000 members and an audience of 50,000 across 30 countries it is the global leader in teaching about the business of events.

Among the topics discussed at the 2019 conference was "Bigger than Oneself: Think social impact, sustainability and meaningful" as well as "Clear Sense of Place: Leveraging the surroundings where business events are held". Both were appropriate topics to be discussed at the DLCC. As the first convention center to have achieved a LEED recognition, the DLCC started a trend that impacted the sustainability goals of dozens of convention centers that have been constructed since and has impacted the state of sustainable building in the Pittsburgh area. The DLCC has leveraged its surroundings by incorporating direct access to the riverfront for attendees and showcasing the Pittsburgh skyline and the Three Sisters Bridges through the use of expansive windows that also bring in natural daylight.

Figure 1b. PCMA conference event in Hall A

1 Major Events are (a) larger events that typically book 18 months and further into the future, (b) require the Center's facilities (i.e. there is no other local venue that can physically accommodate the event), and (c) use a significant number of hotel rooms.

2 Source: VisitPittsburgh

3 https://www.pcma.org/engage/cl19-coverage/

GREEN AND VEGETATED SPACES

3rd Floor South Terrace Green Roof

The third floor terrace outside of the City-side meeting rooms was renovated into a green roof space and opened in May 2012. The 3rd floor South Terrace Green Roof (Green Roof) features a mix of non-invasive adapted sedum species and a "meadow" filled with native perennials, separated by a walking path and a plaza for outdoor receptions. The Green Roof plantings provide a connection to nature for visitors on the southern side of the building. In 2019, 15 events were held on or adjacent to the Green Roof, and brought nearly 23,000 attendees to the building.

Studies have shown that green roofs in Pennsylvania's climate retain 50% of rainfall on average, with up to 100% retention in the summer[1], which helps mitigate storm-water infiltration into the municipal sewer system. Through natural root intake processes, evaporation and transpiration, plants remove pollutants from the air and water. Based on research gathered by the US EPA, it is estimated that the Green Roof removes almost 680 pounds of particulate matter from the air annually, which is approximately equivalent to the annual emissions of 255 passenger vehicles.

With the addition of the Green Roof, 41,555 sq. ft. of the DLCC's site has been restored with native or non-invasive adaptive plantings, representing 8.5% of the total site area. A total of 75 different species are represented at the Green Roof, 11th Street hillside, and the Riverfront Plaza. See *Figure 2* for the locations of the green elements at the DLCC.

11th Street Hillside and Riverfront Plaza

Along 11th street, bordering the east side of the DLCC, is a 13,200 sq. ft. hillside that has been restored with native trees, shrubs, and grasses.

The Convention Center Riverfront Plaza (Riverfront Plaza) extends this natural landscape along the north side of the building. Opened to the public in May 2011, the Riverfront Plaza links two previously disconnected components of Pittsburgh's 22-mile Three Rivers Heritage Trail, providing a safe route for walkers, bikers, and joggers to travel between the City's Strip District commercial area and Point State Park.

Connected to the Plaza is the DLCC 10th Street water feature which provides pedestrian access from the City-side to the Allegheny River and trail.

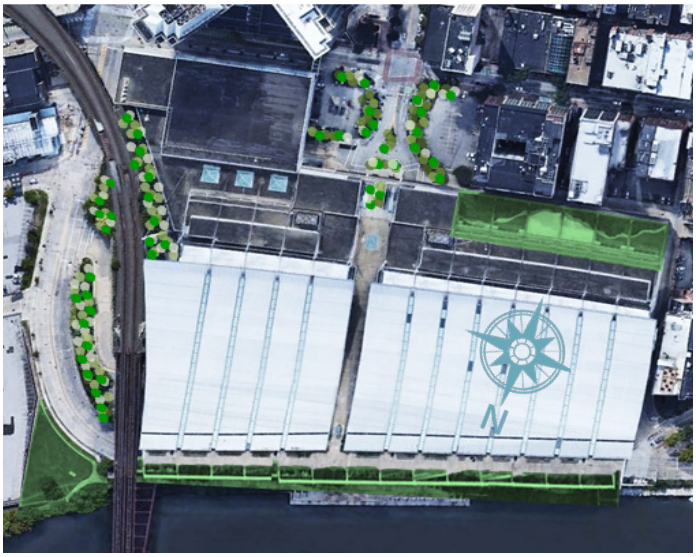


Figure 2. Aerial view highlighting green spaces

1 Penn State Center for Green Roof Research. "Stormwater Quantity." Source: https//plantscience.psu.edu/research/centers/green-roof/research

Maintenance

All landscape maintenance activity adheres to the DLCC's Integrated Pest Management, Erosion Control, and Landscape Management Plan. In accordance with this plan, landscaping and planters are hand-weeded and landscaping waste is collected for composting. Fertilizers are rarely used. When fertilizers are needed, they are organic. Irrigation is only used when necessary and some areas, such as the Green Roof, relied only on rainwater in 2019 and did not use irrigation.

4th Floor North Terrace Vegetable Gardens

The abundant sunlight that reaches the North Terrace makes the location an excellent spot for herb and vegetable gardens. Levy Premium Foodservice (Levy), the DLCC's food and beverage provider, maintains 1,200 sq. ft. of planters on the roof terrace. The planters produce organically-grown heirloom vegetables and herbs such as squash, peppers, beans, tomatoes, eggplant, and parsley, which are enjoyed by attendees during catered events. Levy uses hoop houses[1] to extend the growing season of the produce, increasing the amount of local food served to attendees at the DLCC. In 2019, Levy was able to grow enough produce to replace 2% of its food purchasing.

Rooftop Hops

Hops are grown on the DLCC rooftop that are used through an innovative local partnership to produce the DLCC's beer, branded "Rooftop Hops," which debuted in 2018. The DLCC was featured in the Pittsburgh Post-Gazette in February 2019[2]. Rooftop Hops is now also available in various restaurants downtown as well as PNC Park.

4th Floor North Terrace Monarch Waystation

In June 2012, the DLCC established a Monarch Butterfly Waystation (Monarch Waystation Registry #6071) on the North Terrace. Each fall, Monarch butterflies migrate from Canada and the United States to Central Mexico for the winter and return north in March. The Monarch population has declined from habitat loss resulting from urban sprawl and herbicide-resistant crops.[3] Monarch Waystations are planted with milkweed and other complimentary plantings, creating a habitat suitable for Monarch butterflies to lay their eggs. The butterfly larvae sustain themselves on milkweed plants until they reach adulthood.

Figure 3a. Executive Chef Dominique Metcalf picking tomatoes on the rooftop garden

Figure 3b. Hops growing on the DLCC Rooftop

1 Carnegie Mellon University Students built and donated the hoop houses as part of a class project. https://www.meetings-conventions.com/Blogs/Green-Standard/post/2017/01/25/A-Bountiful-Rooftop-in-Pittsburgh

2 https://www.post-gazette.com/life/drinks/2019/02/28/Beer-Rooftop-Hops-David-Lawrence-Convention-Center-North-Country-Brewing-cans/stories/201902190137

3 For more information on Monarch Waystations visit www.monarchwatch.org.

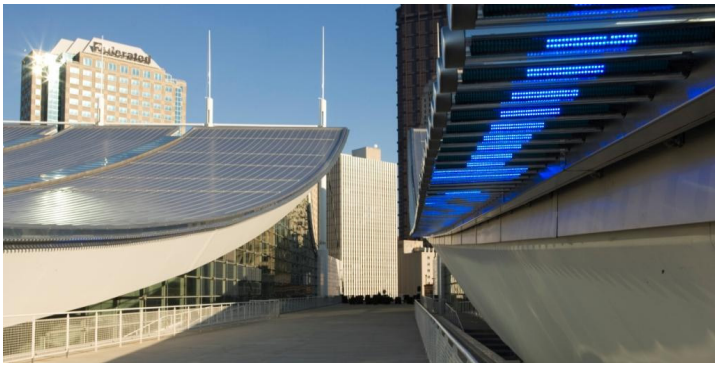


Figure 4. The highly reflective metallic roof of the DLCC is not only a major architectural feature It also helps keep the building and surrounding areas cooler.

Heat Island Mitigation

Heat island effect occurs primarily during the summer months when sunlight is absorbed by roofing and paving and then re-radiated as heat energy. This causes urban areas to be 1.8°F to 5.4°F warmer than surrounding rural areas[1] and results in increased cooling costs, air pollution, and health issues. The use of vegetation, such as a green roof, or using highly reflective surfaces can mitigate the effects of the built environment on temperature increases.

Green roofs and vegetated spaces reduce solar heat gain by naturally cooling the air through evapotranspiration. The nearby Allegheny County Office Building green roof showed a 40°F-50°F reduction in surface temperature compared with adjacent buildings whose roofs are made of conventional roofing materials and a reduction of 10-20% in heating and cooling costs.[2] The differential temperatures vary depending on the building's sun exposure and the type of roofing materials on neighboring buildings.

The urban heat island effect can also be mitigated by selecting materials with high solar reflectance index (SRI) values. Solar reflectance is the material's ability to reflect solar energy from its surface back into the atmosphere. A value of 0 indicates that the material absorbs all solar energy and radiates a great deal of heat. Higher SRI values indicate that there is reflectance, less solar energy absorption, and less heat generation. A standard black surface has an SRI of 0, while a standard white surface has an SRI of 100 (some materials may exceed these boundaries).

The DLCC reduces the contribution to urban heat island effect by using pavers on the Green Roof with an SRI value of 85, significantly reducing heat gain in comparison to conventional materials. In August 2019, the SRI value of the DLCC's 249,800 sq. ft. curving stainless steel roof was measured in-situ[3] in accordance with ASTM E 1980 [4], to be 113.9, 52% higher than the minimum required SRI for ENERGY STAR roofing materials.[5] Even on a hot day in direct sunlight, the DLCC's roof surface is only 18°F warmer than surrounding air, while surrounding buildings with conventional roofing systems may have surface temperatures 40°F to 70°F warmer than surrounding air.[6]

1 Berghage, Robert, et al. Green Roofs for Stormwater Runoff Control. US EPA, Feb 2009.

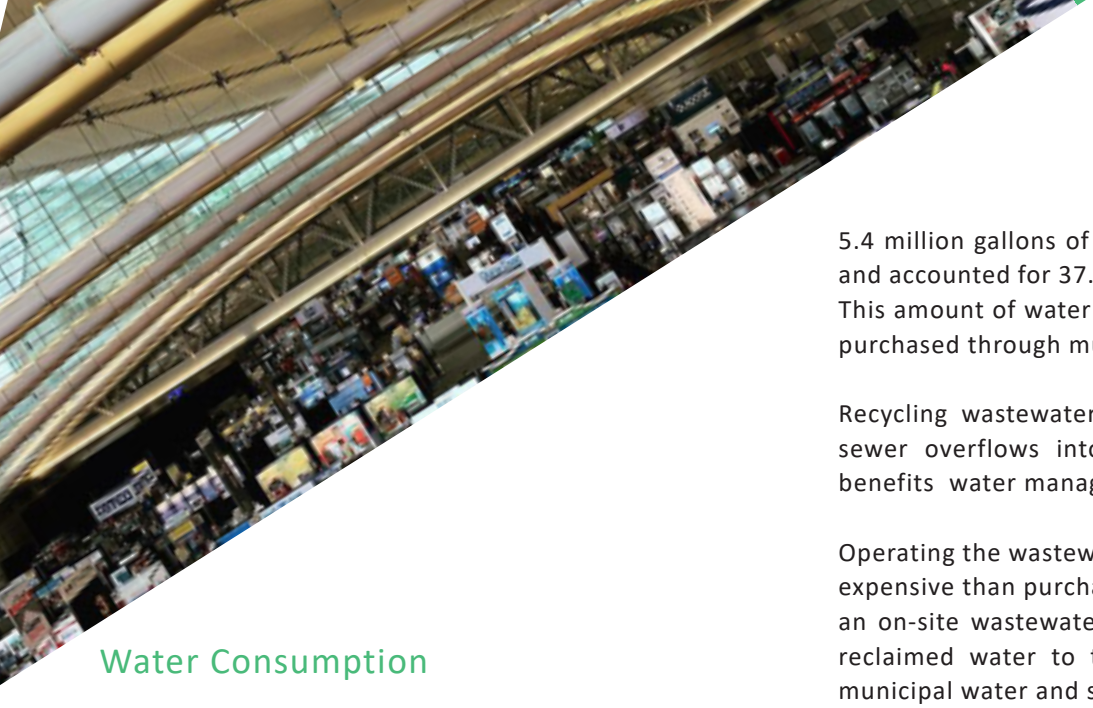
2 3 Rivers Wet Weather. "Green Roofs." *Source: www.3riverswetweather.org/storm-water-green-solutions/stormwater-bmps/green-roofs*

3 In-situ: "In place", defined as in the place where the roof was installed

4 Https://www.usgbc.org/glossary/term/5590

5 ENERGY STAR Program Requirements for Roof Products. Energy Star.gov, 2010. *Source: https://www.energystar.gov/ia/partners/product_specs/program_reqs/Roof_Products_Program_Requirements.pdf*

6 Heat Island Effect. US EPA, n.d. *Source: https://www.epa.gov/heat-islands*



Water Consumption

The DLCC, unlike a typical building, has multiple sources of water serving the needs of the building and its occupants. The DLCC uses municipal water, filtered aquifer water, and recycled wastewater. In 2019, 23.9% of the water used at the DLCC was municipal water, 39% was from the aquifer, and 37.1% was reclaimed wastewater from the on-site wastewater treatment plant (*Figure 5)*. *Figure 6* shows the end uses of the total water usage at the DLCC.

Potable Water

Potable municipal water used at the DLCC is supplied by the Pittsburgh Water and Sewer Authority (PWSA). This water is used for drinking fountains, faucets, kitchen, and laundry purposes.

All plumbing fixtures and fittings meet plumbing code requirements from the Uniform Plumbing Code (UPC) and the International Plumbing Code (IPC) which align with LEED standards. Fixtures in all restroom facilities are equipped with sensor controls and aerating faucets.

Wastewater Treatment Plant

The DLCC has a 50,000-gallon on-site wastewater treatment plant that collects and treats wastewater from sanitary and potable uses. This water is treated, and re-used for toilet flushing only. The plant's treatment components include a sump tank, aerobic digester, carbon filter system, and ultraviolet disinfection system. In 2019, the wastewater treatment plant was operated through a contract with Veolia Water North America (Veolia).

5.4 million gallons of reclaimed water were reused in 2019 and accounted for 37.1% of the building's total water usage. This amount of water would have cost the DLCC $115,923 if purchased through municipal sources.

Recycling wastewater on-site helps to mitigate combined sewer overflows into nearby streams and rivers, which benefits water management in the greater Pittsburgh area.

Operating the wastewater treatment plant is currently more expensive than purchasing water from the PWSA. Operating an on-site wastewater treatment plant, however, provides reclaimed water to the DLCC at a consistent cost while municipal water and sewage rates are steadily rising.

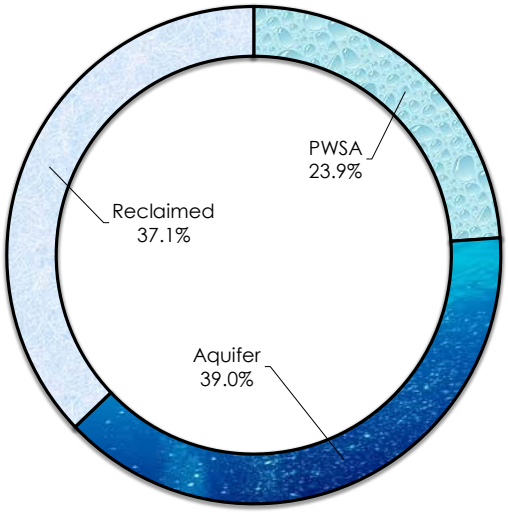


Figure 5. 2019 sources of water use

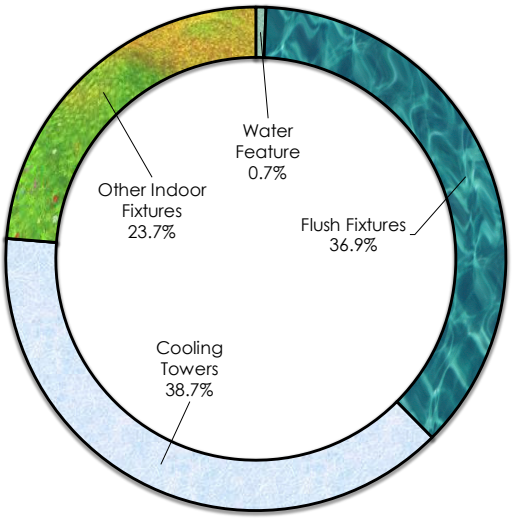
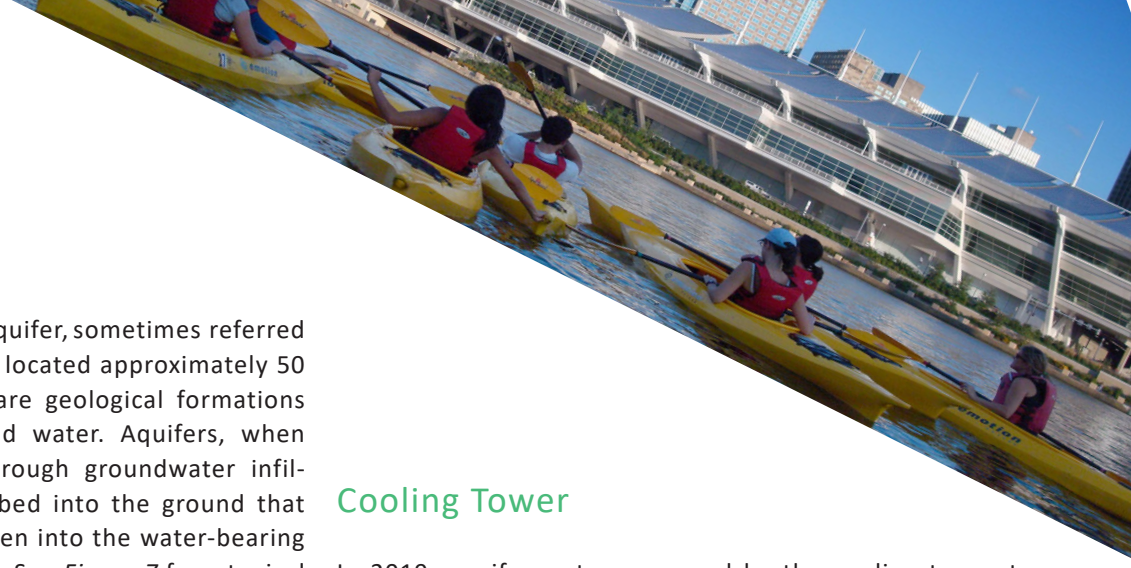


Figure 6. 2019 total building water end uses



Aquifer

The Wisconsin Glacial Flow is an aquifer, sometimes referred to as Pittsburgh's "Fourth River," located approximately 50 feet below the DLCC. Aquifers are geological formations containing or conducting ground water. Aquifers, when correctly managed, recharge through groundwater infiltration from precipitation absorbed into the ground that passes through soil layers and then into the water-bearing rock layers making up the aquifer. See *Figure 7* for a typical cross section that represents the aquifer.

The use of the aquifer conserves municipal water. Every effort is made to withdraw water from the aquifer in a responsible way that allows for adequate replenishment through groundwater infiltration. The effort includes no overdrawing and, during any drought events, switching to municipal water or turning off the water feature.

The aquifer normally provides water for the cooling tower, and the 10th Street water feature[1]. And, on rare occasions, provides water for irrigation of the 3rd Floor South Terrace Green Roof and 11th Street planted hillside area.

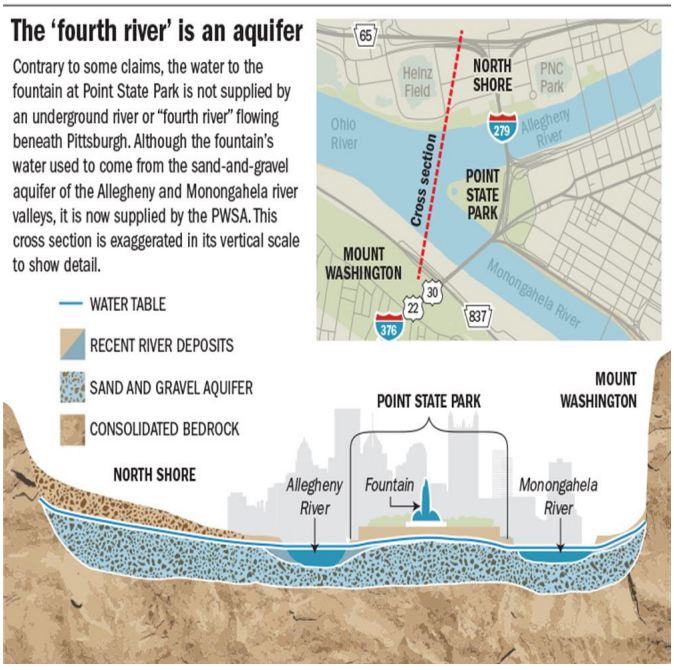


Figure 7. Cross section of the aquifer serving the DLCC
Source: Pittsburgh Post Gazette January 14, 2019.

Cooling Tower

In 2019, aquifer water was used by the cooling tower to provide water for the chiller plant, representing 28.9% of the DLCC's total water usage. Because the 10th Street water feature was not in operation in 2019 the aquifer water used by the cooling tower accounted for nearly all of the water drawn by the DLCC from the aquifer. Using the 2019 average effective rate charged for municipal water, the use of aquifer water saved the DLCC an estimated $85,224 in municipal water costs.

10th Street Water Feature

The aquifer provides water with a high concentration of impurities due to the minerals that dissolve in the water as it travels down from ground level through permeable rock and soil layers. These impurities were staining the walls of the water feature. To address the staining issue the water undergoes an iron filtration process before being used in the water feature.

3rd Floor South Terrace Green Roof

Moisture sensors continually monitor the Green Roof's growing medium and control a high-efficiency drip irrigation system that draws filtered aquifer water. These sensors relay data (surface and subsurface soil temperature, soil moisture, and rainfall data) to a web-based monitoring system. This system allows the irrigation cycle to automatically shut off when irrigation is not needed. The Green Roof did not require irrigation in 2019, and relied entirely on rainwater.

11th Street Vegetated Hillside

It is the DLCC's policy to use the irrigation system serving the 11th Street hillside only in extreme or prolonged drought conditions. In 2019, the 11th Street irrigation system, which draws filtered aquifer water, was not used. The native and adaptive species thrive under normal site conditions, minimizing the need for irrigation and fertilizers.

1 Water Feature was not in use during 2019 due to the setup of construction equipment

SYSTEMS: LIGHT AND HVAC

Daylighting

The DLCC was the first convention center in the world to implement daylighting on such an extensive scale, departing from the typical “black box” convention center model. 85% of the regularly occupied spaces in the building are capable of providing natural daylighting, reducing the need for artificial lighting. For example, Exhibit Halls A, B, and C can be lit entirely by daylight during daytime hours.

Figure 8. One of the expansive windows bringing light into Halls A, B, and C

Space Conditioning: Heating

The building is heated by steam from the Pittsburgh Allegheny County Thermal (PACT) district steam heat system. PACT pumps steam to the DLCC and other connected buildings. When the DLCC recieves the PACT steam it is cycled through the building heates air which is released through the air handling units. As the heat is utilized the steam condenses into liquid-condensate and returns through the system to be reheated and re-circulated. The DLCC is equipped with a pump system to return 170°F-180°F condensate water back to PACT, increasing the efficiency of the PACT facility by providing hot water for its processes.

Space Conditioning: Cooling

Cooling in the building is provided by an on-site chiller plant that is operated through a contract with Veolia. Water cooling is delivered to spaces through cooling coils in the air handling units. The building’s HVAC system uses low-temperature cooling equipment, which enables higher efficiencies. The plant equipment consists of two 1,500 ton centrifugal chillers, a 750 ton centrifugal chiller with a variable frequency drive, and two 6,000 gallon capacity cooling towers.

Ozone Depleting Substances

The DLCC does not use equipment containing chlorofluorocarbons (CFCs), which are known to damage the ozone layer. Chilling equipment, primarily for food and beverage, uses hydro-chlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs), which are less damaging and balance potential environmental impact with efficiency. The DLCC’s weighted average refrigerant impact, a measure used by LEED to determine the balance between refrigeration power and refrigerant toxicity,

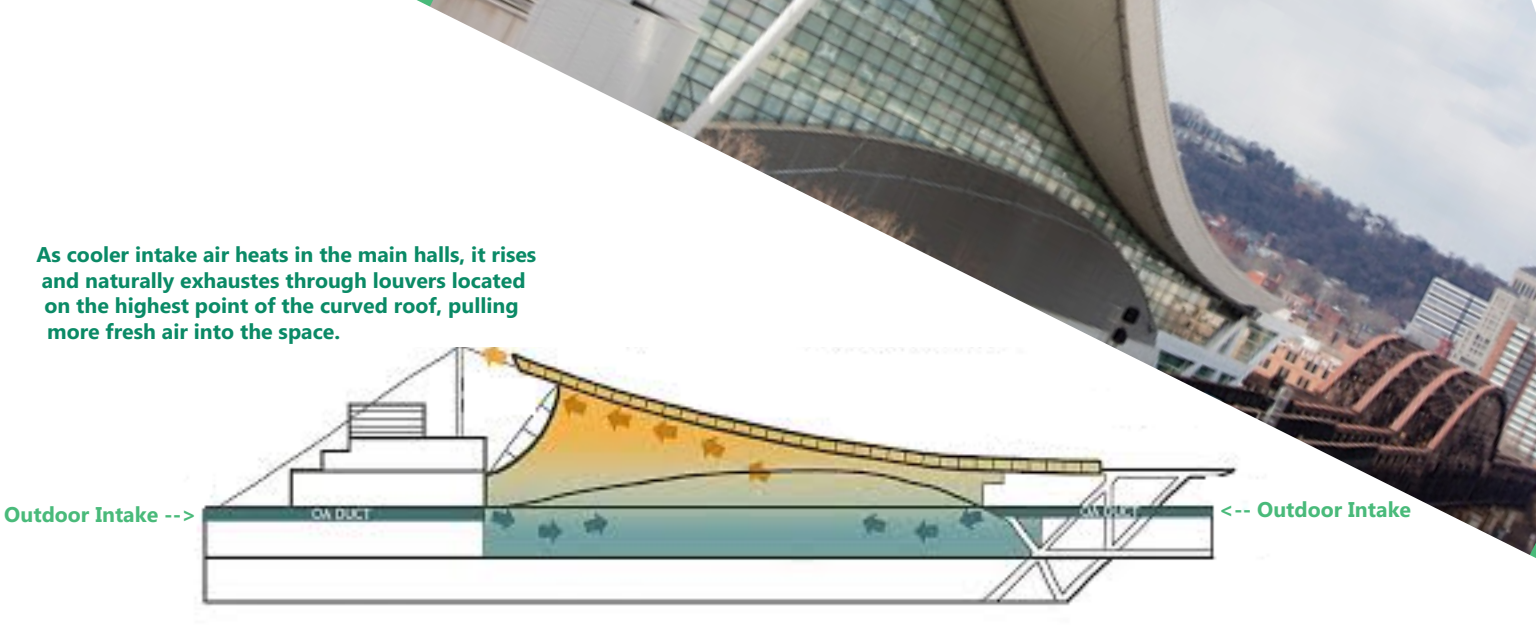


Figure 9. DLCC Natural Ventilation Diagram - Main Exhibit Halls

SYSTEMS: VENTILATION

Ventilation is essential to maintain indoor air quality (IAQ) levels, which improve occupant comfort, increase productivity, and promote general well-being.[2] Increasing ventilation eliminates indoor air contaminants, preventing the IAQ-related health issues associated with "sick building syndrome."

Natural Ventilation

The natural ventilation system delivers outdoor air to Exhibit Halls A, B, and C when weather conditions are suitable. Operable intake louvers are located along all four walls of the building between the second and third floor level. Cooler outdoor air is directly ducted to the exhibit halls at floor level and released through exhaust louvers at the higher end of the building's curved roof letting warmer air flow out with the resulting lower pressure at floor level causing outside air to flow into the building. This process is commonly referred to as the "chimney effect" or "stack effect." When the natural ventilation system is in operation, airflow and building pressure are automatically recorded by the Building Automation System (BAS). Mobile CO_2 monitors that communicate with the BAS system (placed directly in the breathing zone and moved to accommodate each event layout) are used with the natural ventilation system to ensure IAQ standards are maintained.

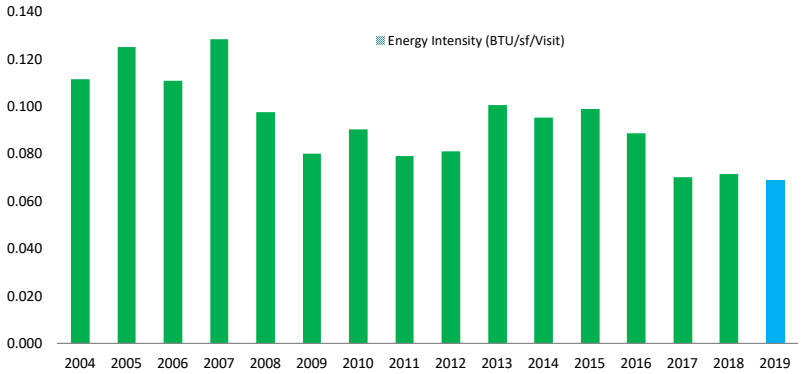
The natural ventilation system is coordinated with the DLCC's HVAC system through the BAS controls. Natural ventilation is used when the outside air temperature is between 45°F and 64°F, and during move-in/ move-out days when the loading dock garage doors are open. In 2019, the natural ventilation system was utilized for 11 event days in addition to 126 move-in/move-out days. Using the natural ventilation system, when conditions allow, conserves energy by eliminating the need for mechanical heating and cooling.

Mechanical Ventilation

All mechanical air-handling units are tested regularly to verify that they meet ANSI/ASHRAE Standard 62.1-2007: Ventilation for Acceptable Indoor Air Quality. Each air handling unit undergoes maintenance every 3,000 hours' runtime to keep all components working properly. Key IAQ-related factors such as CO_2 levels and temperature are continually monitored by the centralized BAS, and can be adjusted in real-time to maintain the temperature set-points needed for the event. If contaminants exceed acceptable levels, 100% outside air is brought into the system until IAQ is restored.

2 US Green Building Council LEED for Existing Buildings: Operations and Maintenance v2009 Reference Guide, page 330

Figure 10. Energy consumption BTU per square foot per visitor (Energy Use intensity per visitor)



Energy Usage

The DLCC is subject to variations in occupancy and energy demand on a daily basis. Occupancy may range from a few visitors in a meeting room to thousands occupying all five exhibit halls. The energy usage profile of the building also varies greatly from year to year. DLCC technicians minimize energy waste by carefully programming HVAC and lighting schedules through the BAS to match each client's needs. High-resolution HVAC zoning capabilities and the use of variable fan drives allow HVAC levels to be adjusted incrementally. Lighting systems in controllable groupings are customized to event and safety needs.

Energy Performance

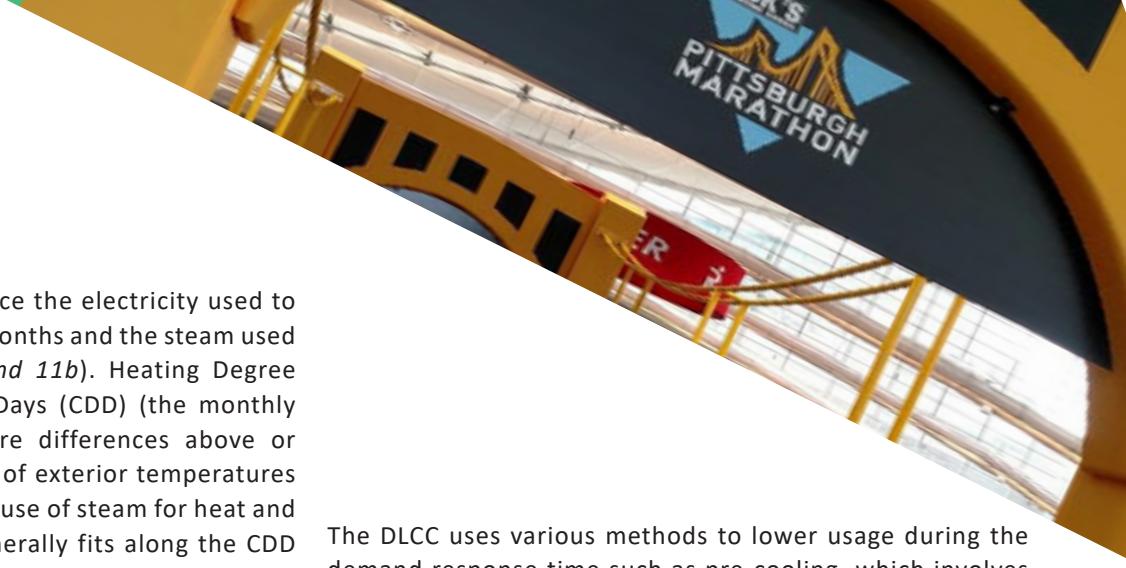
Energy performance is measured by Site Energy Usage Intensity (EUI) (the total energy consumed by a building relative to its size in kBtu per square foot). Because the population of the building fluctuates it is also useful to utilize the BTU per square foot per visitor in order to see how population and energy usage correspond. See *Figure 10* above for the historical EUI performance. While overall energy usage may increase, the increase in building usage with an increase in visitors shows that accommodating more visitors can be done in an energy efficient manner that sees consistent per capita usage and oftentimes greater efficiencies as attendance numbers rise.

Energy Use Types

- 2% Natural Gas (used for cooking)
  - 1,013 Mcf (1.04 x 10^6 kBTU)
- 37% Steam (used primarily for heating the building)
  - 31,341 kLB (37.4 x 10^6 kBTU)
- 61% Total Electricity (used for plugged in items, lighting, operating the cooling and heating systems, and everything else)
  - 14,384,570 kWh (49.1 x 10^6 kBTU)
  - 11.2% of the electricity is used for the chiller plant operation
  - 89.8% of the electricity is used for everything else

Baseline and 2019 Usage

- DLCC EUI of energy usage per square foot is 66.9 (kBtu/sf)
- 30.5% reduction from the DLCC's baseline year in 2004
- DLCC energy usage per visit per square foot is .069 Btu/sf/visit
- A 64 % reduction over the 2004 baseline per-visit energy intensity
- An increased number of visits results in higher overall energy usage, but lower per visit energy usage



Seasonality

Seasonal changes typically influence the electricity used to produce chilled water in warmer months and the steam used in colder months (*Figures 11a and 11b*). Heating Degree Days (HDD) and Cooling Degree Days (CDD) (the monthly sum of daily average temperature differences above or below 65°F) help track the impact of exterior temperatures on indoor energy usage. While the use of steam for heat and electricity for air conditioning generally fits along the CDD and HDD fluctuations, there are also some months where the degree-days don't line up with energy usage, especially in border months that have both cool and warm weather. In these cases an especially warm day may spike electricity usage for an otherwise cooler month if it coincides with high building usage.

Green Energy

Since 2012, the SEA, City of Pittsburgh, Allegheny County, PWSA, and others (referred to as the Western PA Electricity Consortium), have entered into aggregated electricity procurement agreements which stipulate that a percentage of the electricity purchased is to be derived from Green-e certified sources. In 2019, the DLCC continued purchasing energy through a contract with Direct Energy, a retail electricity provider, that provides for 35% electricity from Green-e certified sources, an increase from 30% of electricity from Green-e sources in the previous contract from 2016.

Demand Response

The Center participates in two separate "demand response" programs. Demand response programs aim to lower electricity consumption during high usage days. In the summer months, the increased electricity load due to air conditioning overwhelms the power grid and can cause brown- and black-outs. Through financial incentives, large scale users of electricity are asked to cut down on electricity usage (including for cooling) during key hours of peak usage days.

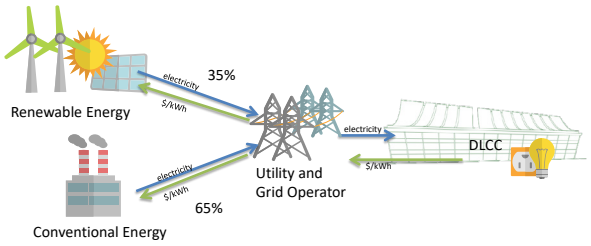


Figure 12. Flow of Conventional and Renewable Energy for the DLCC

The DLCC uses various methods to lower usage during the demand response time such as pre-cooling, which involves increasing cooling before the demand response event, together with significant restriction of cooling during the demand response event.

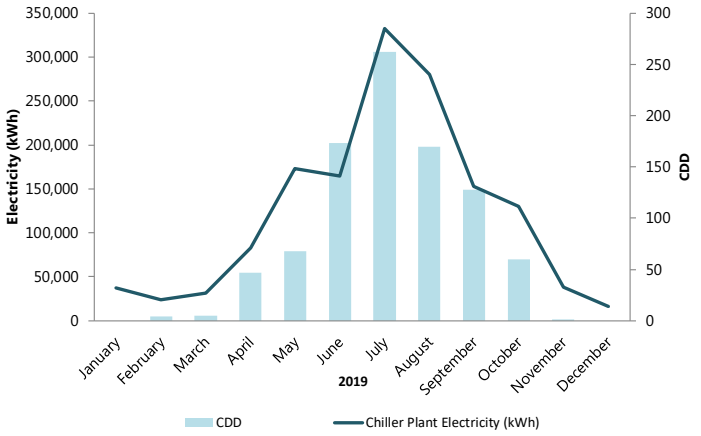


Figure 11a. 2019 Cooling Degree Days (CDD) and chiller plant electricity usage

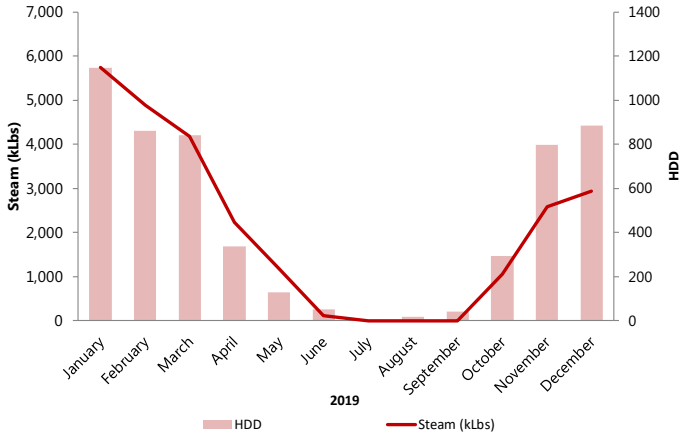


Figure 11b. 2019 Heating Degree Days (HDD) and PACT steam usage

Energy Performance Verification

The original commissioning of the building was completed by Burt Hill Kosar Rittelmann Associates ("BHKR"). In July 2006, BHKR reviewed operations, estimated energy utilization, and concluded that the DLCC was performing as originally intended with respect to energy consumption.[1]

The DLCC was the subject of the David L. Lawrence Convention Center: A Building in Operation (BiO) Case Study in 2011. The BiO case study was a post occupancy analysis managed by the Green Building Alliance (GBA) and funded by the Heinz Endowments. The 2006 BHKR commissioning review was used a source for the BiO case study. The BiO case study concluded that actual performance of the DLCC is exceeding the energy savings forecasted in the 2006 BHKR report.[2] The BiO case study also recommended some specific energy efficiency improvements, the majority of which have been implemented.

Based on the data presented in the reports the DLCC has saved 163,875,867 kBTU in annual cumulative energy in comparison to the 2004 baseline.[3]

A 2016/2017 ASHRAE Level energy audit conducted by CJL engineering as part of the LEED re-certification process provided insight into the performance of the DLCC and suggested improvements that could be pursued due to evolving technologies. The DLCC was able to use this information to plan out future upgrades to systems and calculate their returns on investment. Some improvements have been completed, such as the 10th St/Ft. Duquesne Blvd lighting improvements that were discussed in last year's report, others are still being considered.

Energy Efficiency Incentives

When determining whether to undertake energy efficiency improvements, special consideration is given to projects that qualify for rebates such as the PA Act 129 incentive funds. Under PA Act 129 Duquesne Light provides a rebate for certain projects that provide electricity savings. (PA Act 129 requires electric distribution companies in Pennsylvania to reduce energy consumption across their service territory.) The DLCC also participates in a PJM[4] based program that gives rebates for projects that result in a permanent load reduction. Duquesne Light and PJM have provided partial reimbursement for the folowing DLCC projects:

- Wastewater treatment plant control system upgrade
- Building automation system upgrade
- Chiller plant reconfiguration
- DLCC parking garage LED lighting upgrade
- Water feature lighting upgrade
- Local cooling units
- Lighting upgrades
- Natural ventilation system repairs
- 10th Street and Ft. Duquesne Blvd Roadway Lighting
- Air Compressors

Sub-meters

The DLCC has implemented the use of sub-meters for electricity and water use in the building. These sub-meters help provide the DLCC with a record of energy, water, and cost savings resulting from building investments.

Energy Sub-meters:

- Chiller Plant (800amp/400amp)
- Water Feature motors
- AT&T cellular tower equipment
- Electric vehicle charging stations
- Retail spaces
- Waste Water Treatment Plant
- SEA Office
- DLCC parking garage lighting
- 10th Street and Ft. Duquesne Blvd Roadway Lighting

Water Sub-meters:

- Cooling tower make-up (aquifer water)
- Water Feature (aquifer/municipal water)
- 11th Street irrigation (aquifer water)
- South Terrace Green Roof irrigation (aquifer water)
- SEA Office
- Retail spaces (reclaimed water/municipal water)

1 See BHKR Associates (2006), David L. Lawrence Convention Center Energy Study for the Sports and Exhibition Authority.

2 See the *David L. Lawrence Convention Center: A Building in Operation [Bio] Case Study* (2011), Section 2.1 Benchmarking for more information.

3 As of 2018, energy saved from 2004 has been adjusted to reflect the actual annual utility rates and annual energy mix for electricity and steam on a year to year basis to provide for a more accurate estimation of savings.

4 A regional transmission organization

EMISSIONS

2019 Emissions

The DLCC calculates annual greenhouse gas (GHG) emissions resulting from building energy consumption using the GHG Protocol Initiative methodology.[1] The DLCC strives to reduce impact by reducing total emissions.[2]

Annual Energy Performance Statistics:

- The originally predicted performance in the BHKR energy model: 15,814 $MtCO_2e$
- 2004 actual usage (set as a baseline): 15,399 $MtCO_2e$.
- 2019 total DLCC emissions: 12,706 $MtCO_2e$, a 17.5 % reduction over the 2004 baseline.

2019 Emissions break down as follows:

- 10,178 $MtCO_2e$ from electricity
- 2,474 $MtCO_2e$ from steam
- 54 O_2e from natural gas

The DLCC has saved an accumulated total of 55,561 $MtCO_2e$ since 2004.

Emissions Intensity

Total building emissions relative to size and attendance is a method of looking at how the emissions are affected by the DLCC's activity. In 2019, the emissions per attendee based on building size is 4.06×10^{-5} pounds of carbon dioxide of emissions per square foot per attendee (CO_2e/sf/attendee). *Figure 13* shows the historical emissions intensity based on attendees and building size compared to overall attendee numbers.

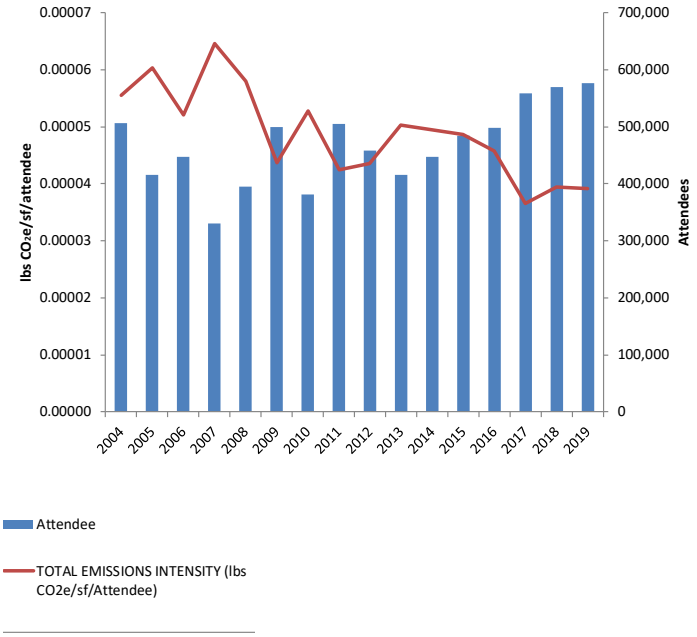
Net Emissions

The purchase of green power and carbon offsets help to mitigate the effects of emissions resulting from building usage. The measureable net DLCC carbon emissions from energy usage in 2019 were 9,144 $MtCO_2e$ (metric tons of carbon dioxide equivalent), which takes into account the carbon mitigation realized from the purchase of 35% of our electricity from certified Green-e climate sources. No carbon offsets were purchased in 2019. Through the purchase of certified green energy, and carbon offsets the DLCC has mitigated 109,861 $MtCO_2e$ since 2004.

Electric Vehicle Charging Stations

In 2012, the DLCC installed in its garage the first two free publicly accessible universal EV charging stations in Downtown Pittsburgh. In October 2018, the DLCC installed four Tesla chargers, and two additional universal EV charging units at the garage. The DLCC EV stations are listed on the registry of EPA Alternative Fuel Data Center vehicle chargers, which is used by most mapping systems that assist EV drivers in finding charging stations.

In 2019, 29,802 kWh of electricity was used by the charging stations. Based on the fuel economy of a 2019 Nissan Leaf,[3] this charging activity at the DLCC provides 87,800 miles of travel for electric vehicle.[4] The electricity for the charging stations cost the DLCC $2,987 in 2019. However, this service was offered free of charge to patrons of the DLCC garage.



1 The GHG Protocol is the most widely used and accepted emissions accounting methodology. More information may be found at ghgprotocol.org

2 Actual emissions produced as a result of on-site activities and net emissions (total emissions less carbon offset strategies).

3 "Find and Compare Cars: 2017 Nissan Leaf" Fuel Economy. US Department of Energy. Www.fueleconomy.gov/feg/noframes/38428.HTML

4 Data used: 2019 Nissan Leaf 31 mpg city/highways from www.fueleconomy.gov/feg/bymodel/2019_Nissan_leaf.html

CLEANING AND PURCHASING

DLCC cleaning and purchasing decisions aim to decrease the environmental impact of maintaining the facilities while promoting a healthy indoor environment. This includes reducing packaging, recycling, and purchasing materials that have sustainable qualities.

Indoor Air Quality

Indoor Air Quality (IAQ) is affected by the products used at the DLCC. The DLCC focuses on only using products and equipment that do not emit toxic compounds that become part of the occupants' breathing space.

The IAQ management process involves reducing air pollutants at their sources. Volatile organic compounds (VOCs), commonly found in paints, adhesives, and furniture, are a source of IAQ-related health issues.[1] During the DLCC's construction, materials with low VOC concentrations were installed to prevent the accumulation of harmful chemicals. In accordance with LEED and as a continuation of the commitment to a low VOC environment, DLCC's Sustainable Purchasing Policy requires all products, such as paint, used during facility maintenance adhere to the VOC limits set forth by the South Coast Air Quality Management District (SCAQMD)[2].

Sustainable Purchasing by Category

The DLCC's Sustainable Purchasing Policy sets purchasing practices and minimum standards for all purchases whenever possible. The standards are based on sustainability criteria for each purchasing category aligning to LEED standards.[3] The policy covers all purchases necessary for the DLCC including office supplies, furniture, electronics, lighting, and cleaning products. Criteria for each category, along with 2019 performance, are listed in *Figure 14*.

The 2019 key metrics from Levy purchases, which are tracked separately, are as follows: 86% of Levy's cleaning products were ecologically friendly; and 99% of the disposable serve-ware used was compostable, exclusive of bottled water and juices.

CATEGORY	CRITERIA	GOAL*	2019
ON-GOING	•Contain at least 10% post-consumer and/or 20% post-industrial content •Contain at least 50% rapidly renewable material •Contain at least 50% materials harvested and extracted within a 500-mile radius •Contain at least 50% Forest Stewardship Council (FSC)-certified paper products •Contain rechargeable batteries	50%	93%
FURNITURE	•Contain at least 10% post-consumer and/or 20% post-industrial content • Contain at least 70% salvaged materials•Contain at least 50% rapidly renewable materials•Contain at least 50% materials harvested, extracted, and processed within a 500 mile radius •Contain at least 50% FSC-certified products	40%	92%
ELECTRONICS	•Energy Star-labeled products, when available •Electronic Product Environmental Assessment Tools (EPEAT) bronze-rated products or better • Maintenance equipment and vehicles which replace conventional gas-powered equipment	40%	89%
CLEANING PRODUCTS	•Meet the applicable Green Seal standard for the product •Meet the applicable Environmental Choice standard for the product•Follow the EPA's Comprehensive Procurement Guidelines•Are USDA Certified Bio-based products•Do not exceed the maximum volatile organic compound (VOC) limit specified by the California Code of Regulations	60%	81%
CLEANING EQUIPMENT	•CRI Green Label or Seal of Approval, as applicable •Operating sound levels less than 90 dBA (70 dBA for vacuum cleaners)•Equipped with filters for capturing fine particulates •Uses gel batteries	100%	100%
FACILITY	•Paints and sealants meeting the applicable Green Seal standard or VOC limits set by the South Coast Air Quality Management District•Contain at least 10% post-consumer and/or 20% post-industrial content•Contain at least 70% salvaged materials•Contain at least 50% rapidly renewable materials•Contain at least 50% materials harvested, extracted, and processed within a 500 mile radius•Contain at least 50% FSC-certified products	50%	100%

Figure 14. Sustainable purchasing by category
*Each goal is based on the percentage of annual purchases within the purchasing category that meet at least one of the applicable sustainability criteria
**On-going consumables are defined as goods regularly used and replaced through the course of business. These materials include paper (printing or copy paper, notebooks, notepads, envelopes), toner cartridges, binders, batteries and desk accessories. Food and beverages are excluded from this category.

1 "Volatile Organic Compounds." An Introduction to Indoor Environmental Air Quality (IAQ). US EPA, 03 May 2012.

2 Http://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book

3 Per the DLCC's LEED for Existing Buildings: Operations and Maintenance (O+M) certification, up to 10% of the building's square footage can be exempt from the Sustainable Purchasing credit as the facility includes outside vendors whose purchases are not controlled through SMG.

Local Purchasing

Whenever practical, the DLCC purchases goods that are manufactured within a 100 mile radius of the DLCC in order to support the local economy and reduce transportation emissions. During the event planning process, clients are also encouraged to use local suppliers in order to reduce the environmental impact from their operations.

Cleaning Products and Equipment

The DLCC's Green Cleaning Policy and Plan specifies the use of sustainable cleaning products, including those which meet applicable Green Seal standards,[4] that are made of bio-based and biodegradable content, and have low/no VOC concentrations. Green Seal provides standards that are based on life cycle research of environmental impacts and are recognized by LEED.

To protect the health of staff, sustainability standards are followed for all cleaning equipment as well. 100% of the cleaning equipment purchases meet one or more sustainability criteria such as dust-capturing filters, operating on electricity versus gasoline, among others. All cleaning equipment is serviced regularly to ensure that the equipment continues to operate at optimal safety and efficiency as well as to maximize life-span.

One of the most innovative pieces of equipment at the DLCC is the Orbio machine. The Orbio unit, which is located on-site, makes a scent-free and VOC-free solution of sodium hydroxide in water by passing electric current between two electrodes through a medium of tap water and sodium chloride (salt). The DLCC uses the Orbio solution to clean glass, carpet, counters, stainless steel, laminate, fabric surfaces, and tile as well as sidewalks near the entryway.[5]

Food and Beverage

Levy tries to use sustainable food and beverage products and to employ sustainable practices for DLCC events. Sustainable food and beverages are those that are organic, produced within a 100-mile radius of the site, and/or meet equitable harvesting standards.[6] The large volume of food purchases required, the variability of the types of food being served, as well as Pittsburgh's geographic location and seasonality pose a challenge to sourcing local food. In 2019, 42% of all food and 75% of all beverage purchases were local. Levy maintains rooftop planters growing herbs and vegetables served during catered events (*see pg. 5*)

The DLCC food service provided by Levy is designated as a Platinum Plate Sustainable Pittsburgh Restaurant for its commitment to sustainability.[7]

Figure 15. Prickly Pear Cactus and Eggplants growing on the DLCC Rooftop

4 Green Seal provides environmental certification standards to help manufacturers, purchasers and consumers make responsible product choices. To learn more about Green Seal Standards, visit http://www.greenseal.org/AboutGreenSeal.aspx.

5 https://www.tennantco.com/content/dam/resources/orbio/case-studies/Case%20Study%20SMG.pdf

6 Standards include: Food Alliance Certified, Protected Harvest Certified, Fair Trade, or the Marine Stewardship Council's Blue Eco-Label.

7 As a program developed by Sustainable Pittsburgh, a Sustainable Pittsburgh Restaurant demonstrates a commitment to managing the social and environmental impacts of its operations as central to its strategy for business success.

WASTE AND RECYCLING

Reducing, re-using, and recycling is a cornerstone of the DLCC's sustainability efforts.

Diversion rate is the percentage of total refuse leaving the building that goes to a non-landfill facility, such as recycling, donation, or composting. On-going improvements to the recycling plan and the capabilities of local recycling entities have increased diversion rates. Since the program's inception the DLCC has diverted 2,888 tons of recyclable, compostable, and donation worthy waste from landfills. *Figure 17* (see following page) shows the historical diversion rates for the DLCC.

Waste is collected at stations throughout the DLCC and brought to a single point to be sorted into compost, recycling, and landfill. This ensures that waste diversion tracking is accurate, and that no waste leaves the building in uncontrolled methods. All recycling, and composting facilities utilized by the DLCC are located within a 12 mile radius of the building.

DLCC management communicates with the recycling entities, and has conducted on-site visits to confirm that waste management practices meet the DLCC's sustainability standards.

Waste Reduction and Prevention

Source reduction, or waste prevention, is purchasing with an eye towards less packaging and less overall potential for waste, as well as the use of more durable goods.

The DLCC's food and beverage operations make a practice of buying in bulk and requiring reduced packaging options for products. Practices such as serving water in pitchers instead of individual bottles further reduce the waste generated by events and building operations.

Event organizers have the option to use either reusable china, and/or disposable serve-ware. Disposable serve-ware used for events is made from compostable materials, the use of which eliminates the need to sort organic waste from the plates, trays, cups, and utensils.

In 2019, the DLCC produced an average of 0.78 pounds of landfilled waste per attendee, which is 61% lower than the 2005 benchmark of two pounds per attendee.

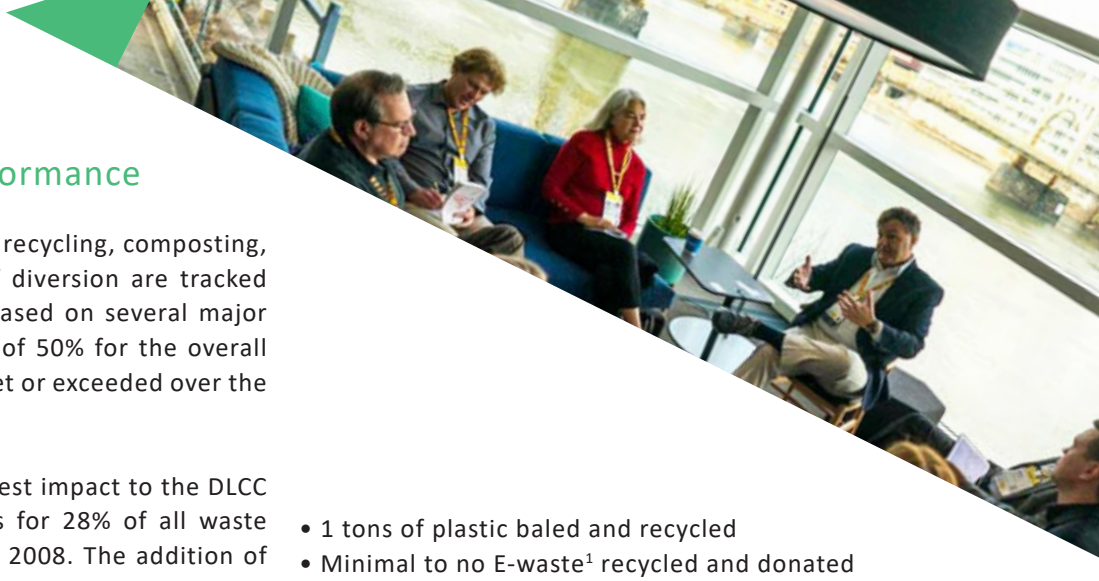
In order to meet recycling and composting goals, careful planning on both sides of the client-facility relationship are required. Diversion rates are dependent on the volume and type of waste generated at each event. During pre-event meetings, event planners are encouraged to include reusable and/or recyclable materials in their own purchasing and operating decisions.

Public shows and trade shows with unusual waste streams pose the greatest challenge to the waste diversion program. Proper planning for diversion methods and for adequate labor is required. Strategies for diverting unusual materials must be considered prior to the event in order to be successful.

Building improvement projects undertaken during the year also impact the diversion rate dependng on the materials used for a project, their quantitites, and their ability to be recycled.

DLCC Recycling, Composting, and Donation Entities

Agrecycle: Compostable items such as food scraps, serve-ware, paper, and landscaping waste
Construction Junction and Habitat for Humanity: Usable construction waste, furniture, reusable lighting, carpet scraps, surplus building supplies, furniture
BatteriesPlus: Small electronics and batteries from East lobby collection point
Evolution E-Cycling: Computers and monitors
Greater Pittsburgh Community Food Bank, 412 Food Rescue, and Jubilee Soup Kitchen: Surplus prepared food
Largent: Pallets
New Market Waste Solutions: Cooling oil
Roadrunner Waste Management: Baled plastic films, Non-contaminated linear low-density polyethylene (LLDPE) and low/high density polyethylene (LDPE, HDPE). Baled clean cardboard.
Scott Electric: Light bulbs



2019 Waste Diversion Performance

Waste is diverted from the landfill to recycling, composting, and donation facilities. The rates of diversion are tracked throughout the year and reported based on several major categories. The DLCC has set a goal of 50% for the overall annual diversion rate, which it has met or exceeded over the past ten years.

Composting has made the single largest impact to the DLCC diversion rate. Composting accounts for 28% of all waste diverted since the program began in 2008. The addition of composting and the significant change it created led to the moving of the waste management baseline year from 2004 to 2008.

In 2019, 229 tons of waste was sent to landfill and 256 tons of waste was diverted away from landfill resulting in a diversion rate of 53%. See *Figure 17* for historical diversion rates, and *Figure 16* shows the breakdown for diversion and landfill. By weight, diverted materials in 2019 were as follows:

- 65 tons of cardboard baled and recycled
- 1 ton baled plastic
- 57 tons of commingled glass /plastic /aluminum recycled
- 11 tons of wood pallets donated/reused/recycled
- 93 tons of organic waste composted
- 13 tons of building material and scrap metal
- 9 tons of food donated to local food banks
- 4.6 tons of cooking oil donated for biofuel
- 0.3 tons of batteries recycled

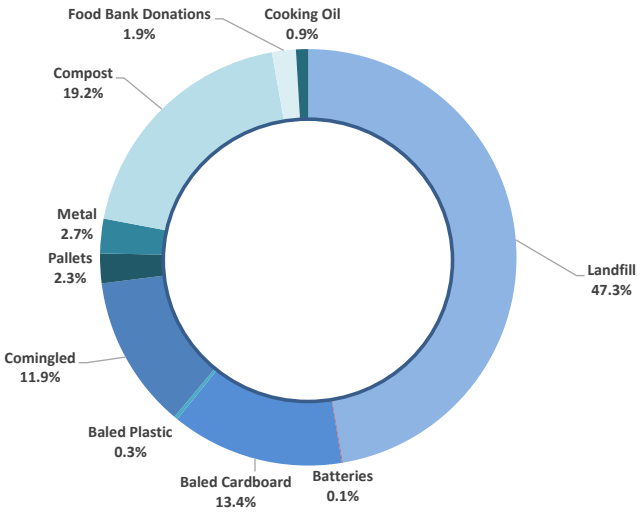


Figure 16. 2019 diverted waste

- 1 tons of plastic baled and recycled
- Minimal to no E-waste[1] recycled and donated

Although the full scope of the environmental impacts associated with the recycling program cannot be accurately tracked at this time, the energy saved by manufacturers and total emissions mitigation as a result of recycling activities can be estimated using the EPA's Waste Reduction Model (WARM). The factors used in WARM are based upon comparisons between typical lifecycle impacts of manufacturing processes using raw materials and of those using recycled content.[2] In 2019 the diversion of cardboard, paper, glass, plastic, aluminum, and compost was responsible for an estimated savings of 378 $MtCO_2e$. An estimated total of 5,614 $MtCO_2e$ has been avoided since recycling began in 2005.

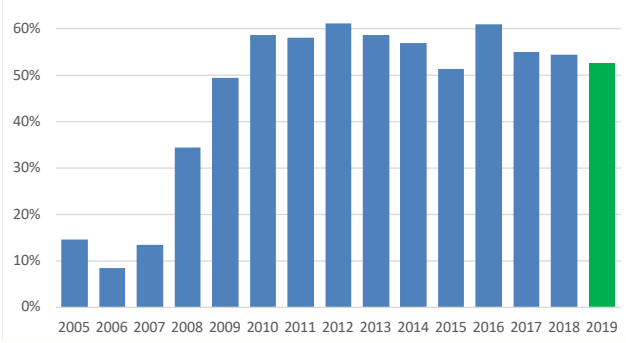


FIgure 17. Waste Diversion Rate 2005 to 2019

FIgure 18. Sectioned Recycling/Compost/Landfill Receptacles

1 "E-waste" or electronic waste, is a term to describe used electronics that are at the end of their useful life that can be recycled. Examples of e-waste include: computers, monitors, TVs, printers, scanners, cell phones and other electronic devices.

2 Emissions impact includes transportation by hauler to the recycling facilities. In the interest of consistency, the DLCC has estimated impacts from only those products included in WARM. Other components of the DLCC's waste stream have not been included in these impacts. For more information on the model and its methodology, visit epa.gov/warm.

PITTSBURGH 2030 DISTRICT

Green Building Alliance

2030 DISTRICT GOALS

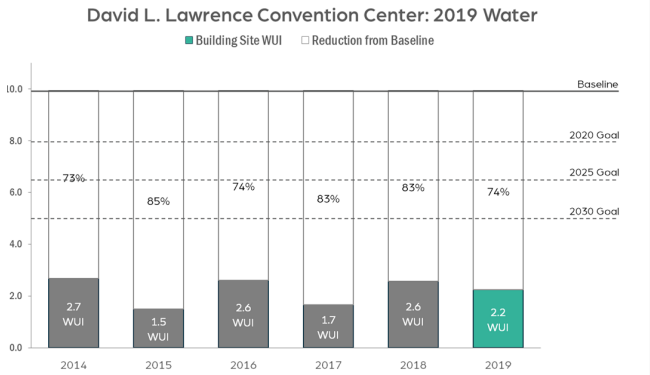


Figure 19. DLCC Water data from the 2030 District Report in GALLONS/SQFT per year

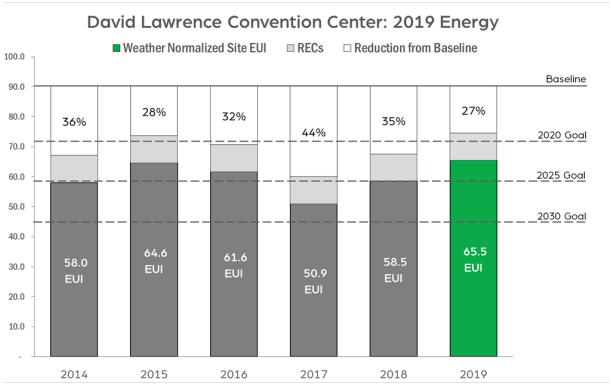


Figure 20. DLCC Energy data from the 2030 District Report in EUI KBTU/SQFT per year

The Pittsburgh 2030 District is a collaboration of building owners in Downtown Pittsburgh, Oakland, and Northside that commits to reduce energy and water consumption by 50% by the year 2030, reduce emissions from transportation, and improve indoor air quality. The 2030 District is facilitated by the Green Building Alliance (GBA). The SEA, as building owner of the DLCC, is a founding partner of the 2030 District.

The 2030 District uses site EUI as a gauge of performance. The GBA established the energy use baseline for the DLCC at 90 kBtu/sq. ft., which is the actual performance of the DLCC in 2004. The site EUI for the DLCC in 2019 was 65.5 kBtu/sq. ft., a 27% reduction from the baseline[1] which exceeds the 2020 goal and approaches the 2030 goal.

The 2030 District uses site Water Use Intensity (site WUI) to gauge water usage. Site WUI is similar to site EUI in measuring a building's annual water usage per square foot. GBA established the Water Use baseline for the DLCC at 9.9 gal/sq. ft., representing the actual performance in 2006, the first full year that the wastewater treatment plant was in operation. The Site WUI for the DLCC in 2019 was 2.2 gal/sq. ft., a 74% reduction from the baseline which exceeds the 2030 goal.

Visit www.2030districts.org/pittsburgh for more information regarding the Pittsburgh 2030 District initiative.

1 This adjusted EUI considers the DLCC's renewable energy purchases. The DLCC currently is getting 35% of their annual electricity from Green-e certified sources per the current agreement with the energy consortium.

APPENDIX A: REPORTING SCOPE

ORGANIZATIONAL BOUNDARIES

Reporting boundaries typically follow the site boundary of the building. Decisions by planners and attendees are difficult to quantify in most cases, they are discussed but not generally included in building statistics.

The DLCC encourages each event to adopt relevant sustainable practices, however, the DLCC cannot reasonably account for the impact of event purchasing, attendee transportation choices, and other externalities. Practices which do not directly affect the building's environmental performance have not been measured and included in this report.

BASELINES, METRICS, AND GOALS

To measure performance in a broadly accepted and translatable manner, the DLCC adopted the metrics and methodologies of LEED for Existing Buildings: O+M; the goals of the Pittsburgh 2030 District; and some performance indicators from the Event Organizers Sector Supplement of the Global Reporting Index G4 Sustainability Reporting Guidelines.[1] Multiple metrics are tracked in absolute values and in per-attendee intensity. It is important to note that the activity level and building demands at the DLCC are affected by externalities such as weather, event schedules, and event needs, type, and size.

2004 was the first full year of operations and data measurement and was generally adopted as the DLCC's baseline year. Baseline years are adjusted to reflect changes that significantly shift performance as follows:

- Water – The DLCC uses 2010 as a baseline year for internal tracking due to the change in water types used in building operations (filters were installed to allow aquifer water to replace potable water in the 10th Street Water Feature, reducing municipal water needs). The 2030 District uses 2006 as a baseline year due to the wastewater treatment plant coming online (it reflects a significant change in overall water consumption consistent with their program parameters).

- Waste – The DLCC uses 2008 as the baseline year, due to a composting program that was added in that year (significantly increasing the diversion rate).

GREENHOUSE GAS INVENTORY METHODOLOGY

The DLCC quantifies annual Greenhouse Gas (GHG) emissions according to the methodology of the GHG Protocol Initiative[2] and the ENERGY STAR Portfolio Manager program. This methodology separates emissions into three different scopes according to the relationship between the emission's origination and the level of control over those emissions.

SCOPE I

Scope I emissions, known as direct emissions, result from on-site emissions-releasing activities. The largest Scope I source at the DLCC is the combustion of natural gas used by the kitchen equipment, which only comprises 1% of the building's total emissions. All other Scope I emissions are considered de minimus, and are not directly tracked at this time.[3]

SCOPE II

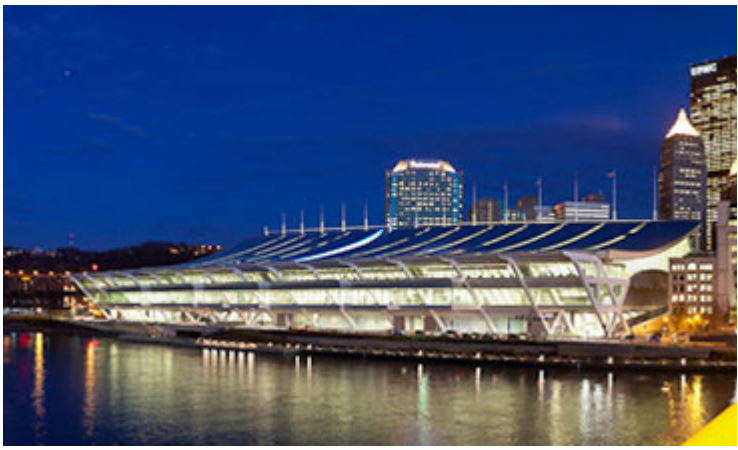
Scope II is the carbon footprint of the facility that consists of emissions from the purchase of electricity and steam. Emissions resulting from electricity consumption are calculated based upon the most recent grid-specific factors reported to the US EPA. Emissions from district steam consumption are based on a national average reported by the Portfolio Manager program.

SCOPE III

Scope III emissions are from sources outside the direct control of the reporting organization, but may still be influenced by the organization's decisions or activities. Under the GHG Protocol, these emissions are optional to track because they do not fall within the organization's direct responsibility.

At the DLCC, Scope III emissions include those associated with purchased materials, waste management, and transportation of visitors. It is currently beyond the organization's capabilities to accurately track these emissions. The uncertainty associated with Scope III emissions would reduce the integrity of the DLCC's formal carbon footprint, therefore they are not included with Scope I and II emissions.

The carbon footprint given in the emissions section of this report represents only the facility footprint (i.e. the emissions associated with the use of the physical building and its systems).



1 The GRI is a nonprofit organization that develops and provides broad and consensus-based sustainability reporting guidelines. For more information, please visit globalreporting.org.

2 The GHG Protocol Initiative is the most widely used and accepted emissions accounting methodology and is administered by the World Resources Institute and the World Business Council for Sustainable Development. More information may be found at ghgprotocol.org.

3 Defined by California Climate Registry as emissions comprising less than 5% of total footprint, de minimus emissions aren't tracked in an inventory unless deemed otherwise significant.

APPENDIX B: GLOSSARY

Act 129 Rebate Program	PA Act 129 requires electric distribution companies in PA to develop plans to reduce energy consumption. Electricity distributors often offer monetary incentives such as rebates to clients that make qualified energy savings upgrades.
aerating faucets	Controls faucet flow and regulates its pressure by adding air to the water flow.
Air-Handling Units (AHUs)	Device used to regulate and circulate air as part of a heating, ventilating, and air-conditioning (HVAC) system.
APEX/ASTM Sustainable Meeting Venue	A third-party certification that is specific to the meeting and events industry. APEX/ASTM is a collaboration between APEX and ASTM.
APEX	The Accepted Practices Exchange
ASTM	American Section of the International Association for Testing Materials
aquifer	Geological formation containing or conducting ground water.
ASHRAE	The American Society of Heating, Refrigerating and Air-Conditioning Engineers.
biofuel	A fuel derived directly from living matter.
Building Automation System (BAS)	A comprehensive tracking and controlling system that can monitor conditions inside the DLCC, like building pressure and air flow, and set activation parameters for building elements. It is designed to simultaneously help keep guests comfortable and reduce the unnecessary use of energy.
built environment	The man-made spaces in which we all live, including buildings, developed open spaces, and transportation infrastructure.
carbon offset	A reduction in emissions of carbon dioxide in order to offset an emission made elsewhere. The reduction can be sold through certified agencies in order to allow others to compensate for their emissions.
centrifugal chiller	Removes heat from chilled water lowering its temperature in the process
compostable	Organic substances that may be used to fertilize soil, like leaves, unused food, or paper and cardboard products.
Cooling Degree Days (CDD)	Days with an average temperature exceeding 65 degrees Fahrenheit, such days increase the strain on and use of building cooling systems. Taken in a year, the number of CDDs help put cooling-related energy usage into perspective.
cooling tower	Device that rejects waste heat to the atmosphere as a result of cooling a water stream to a lower temperature.
daylighting	The utilization of windows and other portals for natural light. This reduces electricity usage and improves the atmosphere of a building.
demand response curtailment	A program through which businesses receive payments for voluntarily reducing their electricity usage when heavy demand threatens the reliability of the region's electricity grid.
direct spending	Spending by attendees, exhibitors and organizers based on hotel-room consumption and other spending. VisitPittsburgh utilizes the Destination Marketing Association International (DMAI) economic impact calculator to measure direct spending. The method is considered to be conservative in that it counts only direct spending for major events and uses actual Pittsburgh rates and prices rather than national averages.

diversion rate	The rate at which materials are diverted from landfill by “reducing, reusing, and recycling”.
emissions intensity	The total emissions of a building relative to its size measured in CO_2e/sqft or, for cross-year comparison including the relative intensity related to attendance levels, CO_2e/sqft/attendee is used.
Energy Star Portfolio Manger	A web-based energy management tool developed by the U.S. EPA and the U.S. Department of Energy as a component of the ENERGY STAR energy performance rating system.
evapotranspiration	The process by which water and moisture are moved from the soil to the air through both the ordinary heating of water into vapor and the escape of water through the porous leaves of plants.
Green Building Alliance (GBA)	A regional non-profit that has been promoting sustainable practices in Western Pennsylvania since 1993.
Green-e Certified	A clean energy certification that ensures that green energy purchases are regulated and conform to standards.
Greenhouse Gases (GHG)	Any gas that absorbs infrared radiation from the sun and re-radiates it, like carbon dioxide or chlorofluorocarbons. These substances are associated with climate change and the greenhouse effect.
green-seeking events	Events that request or inquire about sustainable features during the sales process, or ask for green information in their request for proposals. Green-seeking events include those hosted by environmental organizations as well as a wide variety of clientele who value sustainability regardless of their industry.
heat island effect	The increased temperatures experienced in urban areas when sunlight is absorbed by roofing and paving materials and the light is re-radiated as heat energy, causing built up and paved areas to be significantly warmer than rural and undisturbed areas.
Heating Degree Days (HDD)	Days with an average temperature below 65 degrees Fahrenheit. Such days increase the strain on and use of building heating systems. Taken in a year, the number of HDDs help put heating-related energy usage into perspective.
Indoor Air Quality (IAQ)	The the air quality within and around buildings and structures, especially as it relates to the health and comfort of building occupants
Integrated Pest Management, Erosion Control, and Landscape Management Plan	A DLCC management plan mandating landscaping and planters to be hand-weeded, and landscaping waste collected is composted. Fertilizers are to be used rarely, and when used, must be organic.
LEED (Leadership in Energy and Environmental Design) certification	Issued by the U.S. Green Building Council which is a globally recognized symbol of sustainable achievement in the built environment.
Major Events	Major Events are (a) larger events that typically book 18 months and further into the future, (b) require the Center’s facilities (i.e. there is no other local venue that can physically accommodate the event), and (c) use a significant number of hotel rooms.

net emissions	The difference of total emissions less the emissions mitigated through carbon offset strategies.
payback period	A common measure of a project's financial viability. The cost is divided by the annual expected returns which results in the amount of time it will take for the project to pay for itself.
sick building syndrome	Health related effects on people occupying buildings with poor indoor air quality. Those who spend too much time in buildings with poor ventilation or chemical contaminants may experience headaches, eye/nose/throat discomfort, difficultly concentrating, or nausea.
Site Energy Usage Intensity (Site EUI)	The total energy consumed by a building relative to its size. An output from the EPA's ENERGY STAR Portfolio Manager, this measure takes the building's annual energy performance over its gross square footage.
Site Water Usage Intensity (WUI)	A similar measure to Site EUI, this measure takes the building's annual water performance over its square footage.
SCAQMD	South Coast Air Quality Management District, the air pollution agency responsible for regulating stationary sources of air pollution in the South Coast Air Basin, in Southern California. The regulations are used throughout the country.
stack effect	Also called the "chimney effect," this is the phenomenon of natural, cyclical ventilation and cooling that occurs when cool air enters a building to replace the warm air escaping upward.
sub-meters	Meters that measure water or energy usage in a sub-section or component of a building.
Thousand British Thermal Units (kBtu)	A common standard unit for energy performance, used to ensure consistency and comparability across electricity, steam, and natural gas usages.
Variable Frequency Drives (VFDs)	Effective method of reducing the energy and operational costs of motors in air-handling units and allows HVAC systems to better adjust to changes in demand.
Volatile Organic Compounds (VOCs)	Components of many household and office products, like paint, adhesives, or furniture, that concentrate much more heavily inside than outside of buildings and may have adverse health effects that range from simple eye/nose/throat discomfort to the long-term threat of cancer, depending on the chemical in question.
Waste Reduction Model (WARM)	Created by the EPA to estimate recycling-related energy savings. Compares the typical lifecycle impacts of manufacturing processes that employ raw materials to those that use recycled materials.
wastewater	Any water that has been affected by human use.

APPENDIX C: 2019 PROJECTS

Air Handling Unit Variable Frequency Drive Upgrade

Design of the replacement of the drives in the Air Handling Units (AHU) with Variable Frequency Drives (VFD) continued from 2017 into 2018 with installation in 2019. VFDs are an effective way to manage energy by reducing operational cost of motors by varying torque loads for the AHUs and other HVAC operations. Motors account for 20% of energy used in buildings and 95% of the life cycle cost is in maintenance and repairs.[1] Instead of running the motor at full output for all uses, it can switch to a lower output and save energy when conditions allow. The ability to throttle down the intensity of the motor also results in less wear and tear on the gears, thereby reducing maintenance costs. A small investment in a VFD results lifetime savings.

The estimated energy savings is 66% over the current motors. This is achieved through a constant speed reduction of 30% (70% of maximum speed). Actual results may vary, as the drives will operate at a variety of speeds depending on demands throughout the year. The payback period is between eight months and 36 months for the VFD replacement, the upgrade qualifies for PA Act 129 rebates.

4th Floor Terrace Phase 1 Improvements

The Fourth Floor Terrace, with access to some of the most beautiful views in Pittsburgh started the first of two phases of improvement. The Roof deck was in need of replacement and with the replacement came an upgrade to the functionality and green roof square footage of the building. The previous terrace was an expanse of concrete pavers, whil the new Terrace will feature alternating planters, benches, and walking paths. Not only will this provide for more dynamic event planning at the DLCC it also increases the amount of green space at the DLCC. Construction started in Summer of 2019 and will end with plantings in Spring of 2020.

Ballasted Roof Replacement Design

The DLCC will also be replacing the ballasted roof on the eastern side of the building with a combination of roofing materials including an upgrade to a green roof in the areas visible to the third floor conference rooms. This will add 7,990 square feet of green space to the DLCC. The roofing surrounding the skylights outside of the ballroom will be an assortment of native and adaptive sedum that should thrive with no watering and little upkeep once established. Design took place in 2019 and construction will begin in 2020.

Figure C1. Artist's rendering of the Boulevard section of the Phase I Roof Terrace renovation facing South towards Pittsburgh

[1] Https://www.buildings.com/article-details/articleid/9345/title/roi-from-vfds-cutting-costs-with-variable-frequency-drives

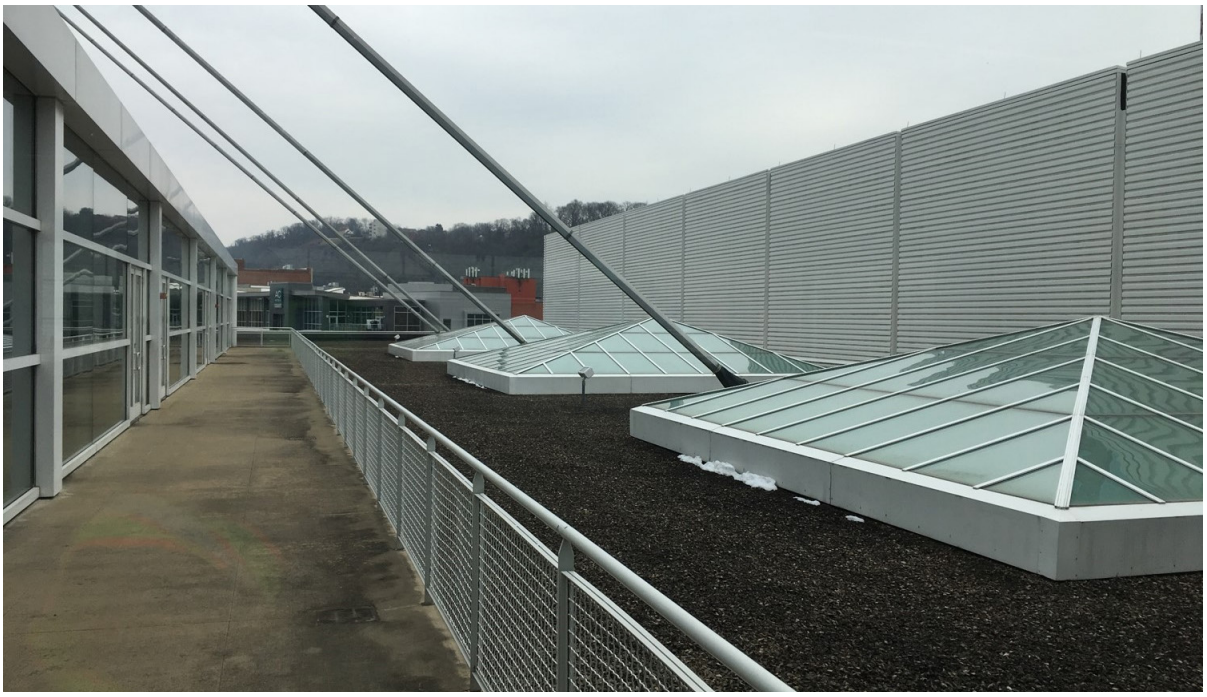


Figure C2. Top: Current ballasted Roof
Figure C3. Bottom: Artist Rendering of the new green roof replacement in 2020

APPENDIX D: Improvements Timeline