

The CSL building is seen beside its onsite lagoon, a central component of water capture and reuse. The sustainable landscape and energy-efficient Tropical Forest Conservatory are also visible.




2013 GREEN DOT AWARDS NOMINATION

THE SUSTAINABLE EVOLUTION OF PHIPPS

For Phipps, the Center for Sustainable Landscapes (CSL) marks a new plateau in an evolution 120 years in the making. Built in 1893 by philanthropist and steel magnate Henry W. Phipps, and gifted to the City of Pittsburgh as a source of instruction and pleasure, the original Victorian glasshouse of Phipps Conservatory was constructed at a time when people thought that there was no limit to the amount of natural resources that could be consumed or pollution that could be produced. Against this backdrop, Phipps established itself as a showcase for horticultural display and education, a distinction it holds today, but it was not until 1993, when the Conservatory was transferred from city to nonprofit management, that a new era began — one in which the garden's mission expanded to communicate not only the beauty but also the importance of the natural world. Today, Phipps sets the pace globally for green building and operations, sustainable development and environmental outreach.

In 2003, Phipps' green evolution gained momentum with the creation of a master plan that led to the 2005 opening of the first LEED®-certified visitor center in a public garden, a facility incorporating an array of power-saving elements with an innovative earth-sheltered design. In early 2006, Phipps then followed up the Welcome Center with 36,000 square feet of production greenhouse space outfitted with a state-of-the-art open-roof system and computer-controlled temperature, light and humidity levels which reduce energy usage by 24 percent as compared to similar facilities. (These structures later earned LEED Platinum for Existing Buildings: Operations and Maintenance in 2012, becoming the first greenhouses to earn LEED.)

Phipps continued to push the envelope by changing traditional conservatory design in 2006 with a new Tropical Forest Conservatory. This remarkable 12,000-square-foot structure now stands as the most energy-efficient conservatory in the world. In this facility, massive roof venting, earth tubes, two-stage shading and fogging systems result in internal temperatures that are always six to eight degrees cooler inside than out and use virtually no energy. Additionally, thermal massing, selective use of double-insulated glass, energy blankets and root zone heating result in a building with less than half the heating requirements of a typical conservatory. When it opened, it was the only conservatory in the world that used an on-site fuel cell for electricity.

An aerial photograph of the Phipps campus, showing various greenhouses and buildings. Callouts A through E are placed over specific structures. A is a modern building with a green roof. B is a large, multi-sectioned glass greenhouse. C is a curved glass structure. D and E are other glass greenhouses of different shapes and sizes. The campus is surrounded by lush greenery, a parking lot, and a road.

An aerial view of the Phipps campus, including:
A) the Center for Sustainable Landscapes; B) the LEED-EBOM Platinum Production Greenhouse; C) the energy-efficient Tropical Forest Conservatory; D) the original 1893 glasshouse; and E) the LEED Silver certified Welcome Center.

As green buildings began to appear on its campus, Phipps also began to embrace a greener operational protocol, from employing organic landscape strategies and integrated pest management in its garden maintenance programs to operating a Green Restaurant Certified® café. The result is an institutional evolution that prompted the White House to select Phipps as the host site for several Pittsburgh G-20 World Leader Summit events in 2009.

AN UNPRECEDENTED IMPACT

The CSL makes its impact in several unprecedented ways. Its 24,350-square-foot structure and surrounding landscape is the first project to pursue all three of the highest sustainable architecture and landscape standards: the Living Building ChallengeSM of the International Living Future Institute, Sustainable Sites Initiative[™] (SITES[™]) certification for landscapes and LEED Platinum. To accomplish this rigorous goal, Phipps must monitor the CSL's performance, demonstrating that the facility operates as predicted and achieves net-zero energy and water consumption.

Recognizing early on that a revolutionary building required a revolutionary planning process, Phipps and its partners utilized an integrated design methodology requiring participants to work together to create systems informed by one another and operating in tandem. In contrast to fragmented, conventional design processes, the entire CSL team met for regular charrettes to find and develop synergistic opportunities. This unique approach proved more time consuming than conventional methods, but its worth is evident in the seamless integration of the CSL's technologies and strategies.

The sheer number of sustainable technologies and strategies on display at the CSL is also a point of distinction. A visit affords guests a look at photovoltaic arrays, a vertical axis wind turbine, geothermal wells, a rooftop energy recovery unit, a green roof, a computer-controlled building management system with touchscreen interface, solar-powered water distillation, phase-change materials, mechanically controlled windows, rainwater harvesting, a lagoon and constructed wetlands, rain gardens and permeable paving — all operating together at a single site. The visitor also learns about passive strategies — from a high-performance building envelope to daylight autonomy — that help Phipps meet its net-zero energy and net-zero water goals.



Education programs for all ages utilize the CSL as a working model to illustrate the important connections between people, plants, the planet, health, and beauty.

While the CSL building and landscape are revolutionary, the project's true impact comes through community engagement. The CSL is a testament to the determination, innovation and spirit to be found in its region: Faculty and students from nearby universities and organizations formed the core of the development and design teams; the primary architects and engineers were required to be from Pittsburgh, and the entire design team was from Pittsburgh and Pennsylvania; almost all of the funding for the project came from local sources, as did the vast majority of building materials and products — including wood from dilapidated Pennsylvania barns that constitutes the skin of the building and speaks to the heritage of the region.

Adjacent to the CSL stands Phipps' 1893 glasshouse — a structure of great architectural and historical significance that serves as one of Pittsburgh's most renowned cultural institutions, but is among the world's least sustainable structures. The juxtaposition of this glasshouse and the CSL demonstrates an evolution of architectural engineering, and technologies used at the CSL are being examined in the hopes of adapting them for use in the historic conservatory to preserve and renew the building.

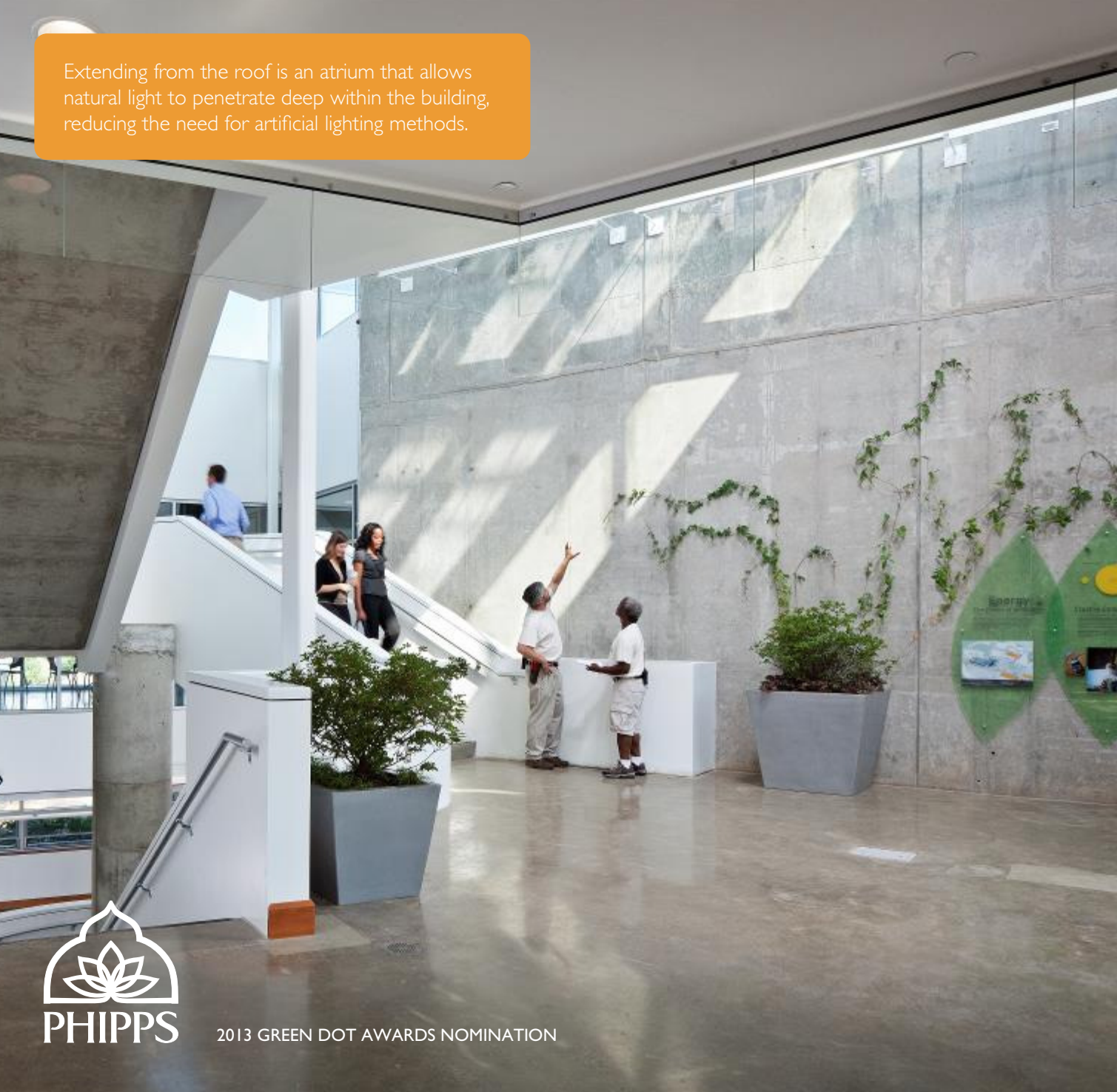
SERVICE TO THE COMMUNITY

As an addition to the guest experience at Phipps, which already welcomes more than 250,000 visitors annually, the Center for Sustainable Landscapes (CSL) is uniquely positioned to demonstrate a measurable civic benefit by maximizing public interaction. Through talks and presentations, docent-led tours and dynamic science education programs, Phipps reinforces the importance of human-environment interactions with particular emphasis on green space in the city, urban gardening, healthy food initiatives and urban-based sustainable building practices. Phipps' science education and research team will also conduct research on the effectiveness of art and communication as tools for changing the way that people interact with the world. As increasing numbers of people discover the visionary concepts at work at the CSL, they will be encouraged to mount similar projects at the home, business and community levels. Additionally, in the CSL's dedicated indoor and outdoor classroom spaces, Phipps gives area children a chance to connect to nature, instilling in them a sense of wonder and fostering the growth of tomorrow's environmental stewards.



2013 GREEN DOT AWARDS NOMINATION

Extending from the roof is an atrium that allows natural light to penetrate deep within the building, reducing the need for artificial lighting methods.



In order to develop such multidisciplinary science-based education programs from the CSL, Phipps conducted a national search for a new science education and research principal. Through the creation of educational outreach strategies tailored to a broad age and societal spectrum, Phipps is now connecting themes of sustainable living to daily choices visitors can incorporate into their lives and habitats.

The overall goal of the CSL is to help visitors to rediscover the beauty of humanity living in harmony with nature; to provide a site for revolutionary green building and landscape performance research that can be applied elsewhere and used to transform the way that people relate to the environment; and to inspire visitors to become agents of sustainable change.

RESEARCH AND REPLICATION

Because the CSL is still a very new facility — officially opened in December 2012 — performance data is still in its early stages. As the computer-controlled building management system collects information on the energy- and water-saving technologies throughout the building, Phipps and its partners will conduct research with an eye for increasing efficiency wherever possible. Of equally important measure is the effect the building has on its occupants and visitors. With the help of an outside consulting firm, Phipps' Director of Science Education and Research will conduct studies to help gauge the psychological health benefits of the site and its ability to influence the public to adopt more sustainable lifestyles.

It is one matter to speak the language of green; it is another to live it. Transparency is necessary if one aspires to affect even greater innovation. To continually improve the CSL's performance, then, Phipps has engaged collaborative partners from neighboring universities and organizations, including Carnegie Mellon University, University of Pittsburgh and the U.S. Department of Energy's National Energy Technology Laboratory. Utilizing data collected by a state-of-the-art building and landscape management system, thought leaders from these institutions are now conducting original research to assess the efficiency of each CSL component, establishing a model for building even more efficiently in the future. The contributions their findings will make to the fields of architecture, design, planning and construction will be profound.



The CSL's green roof, a central component of the landscape, flourishes with native plants.



Additionally, the lessons that the CSL has to share will penetrate the commercial building arena. Through the newly established Studio Phipps, a sustainable design team that offers fee-based consultation services to healthcare facilities, organizations, businesses and other institutions looking to integrate the natural and built environments, and find workable solutions to sustainability challenges in the workplace, Phipps will put the lessons of the CSL to work in commercial installations within its region and beyond.

In keeping with Phipps' tradition as a teaching institution, the CSL will also serve thousands of families each year as an education and demonstration site intended to galvanize sustainability efforts — in addition to hosting visitors from around the world who wish to learn more about green living and building. These programs will be available for replication at museums and other institutions worldwide too, broadening the scope of their impact even more. Discoveries made in the research lab will play an integral role in furthering ambitious CSL-based education and outreach efforts as well and involve interactive, nature-centered programs for both public and school groups that demonstrate the importance of plants, science and sustainability.

During this same period, summative evaluations of visitors and program participants will be conducted to gauge the effectiveness of Phipps' education efforts related to the CSL. These user responses will then be utilized to further refine techniques to ensure that the building, and its operational efficiencies and ramifications for the future, are well understood by, and result in behavior change with, those who encounter the space.

Lastly, as a significant step in showcasing the CSL as a model for replication, Phipps has worked with Ecotone Publishing (a project of the International Living Future Institute) to produce *Building in Bloom: The Making of the Center for Sustainable Landscapes*, which was released in April 2013. This book traces the story of the CSL through testimony, photographs and narrative, recounting decisions made in the design, planning and construction phases. As the inaugural case study on a Living Building Challenge project, *Building in Bloom* will prove an invaluable resource for construction firms, communities, homeowners and others who wish to learn how and why to adopt green practices. It is Phipps' hope that this transparency lays the groundwork for others to meet and exceed the CSL's accomplishments in the years to come.



2013 GREEN DOT AWARDS NOMINATION