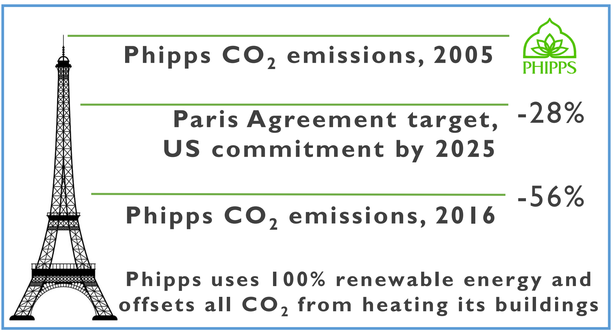
A Case Study to Maximize Human and Environmental Health in the Built Environment

PRESENTER: **Sarah States, Ph.D.**
sstates@phipps.conservatory.org
CO-AUTHOR: **Richard Piacentini**
rpiacentini@phipps.conservatory.org

INTRO: Phipps Conservatory is a 126-year old botanical garden in Pittsburgh, PA that prioritizes the interconnections between humans and ecosystems through action, education and research. Our Center for Sustainable Landscapes, the "greenest building in the world," demonstrates how technology and building design can reduce carbon emissions while maximizing human and environmental health.

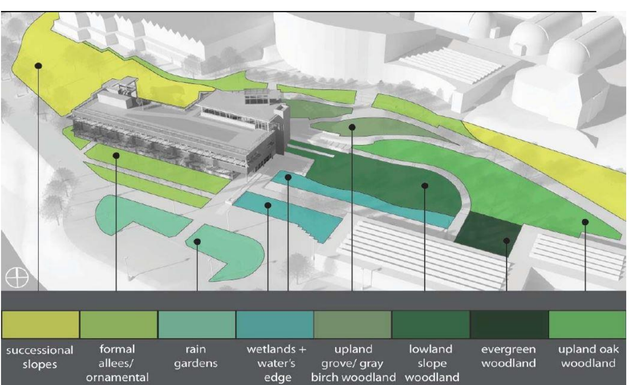
ENERGY: Reducing CO_2 emissions

- Produces its own renewable energy on-site from sun and wind
- Electricity generated annually can power 12 homes
- Uses 75% less energy than a typical office building (EUI=18)
- Since 2005, Phipps reduced its CO_2 emissions by 56%, double that of the US commitment in the Paris Agreement.

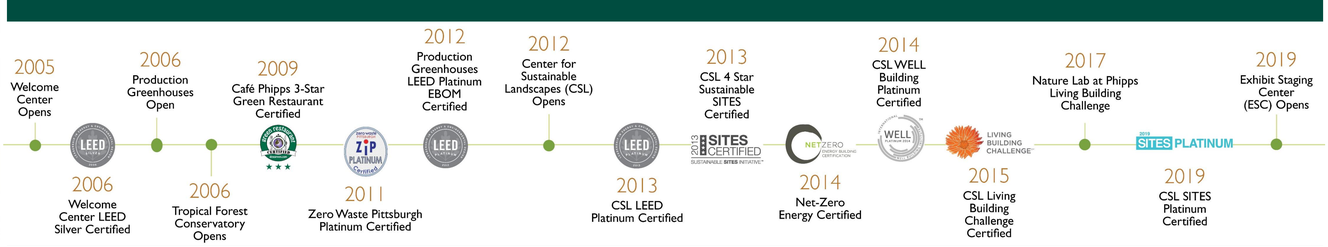


ECOSYSTEM: Regenerating native landscapes from a brownfield

- Features over 100 native plant species
- Remediated brownfield now provides food sources and shelter for local wildlife.

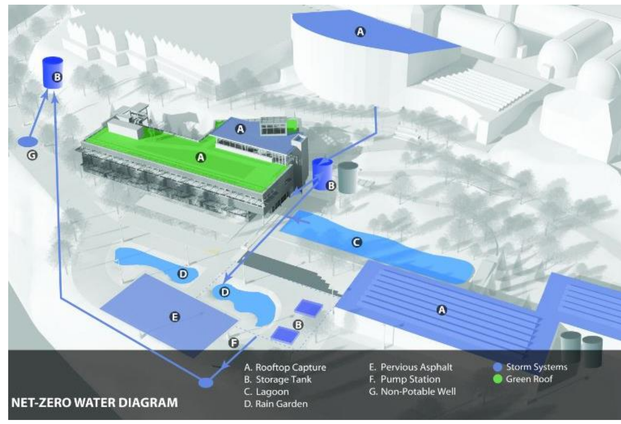


Operate like nature: Phipps Conservatory considers the whole when approaching energy, environment and health.



WATER: Reducing stormwater and water treatment

- Manages 3.25 million gallons of storm water per year
- Sanitary water cleaned by constructed wetlands = 79,000 gallons per year
- Uses 90% less potable water than a typical office building



MATERIALS: Creating a healthy indoor environment

- 96.74% of construction waste diverted from landfill
- Wood was salvaged, reclaimed or FSC certified
- Building materials are free of toxic red list chemicals:

Living Building Challenge Red List chemicals

- Alkylphenols
- Asbestos
- Bisphenol A (BPA)
- Cadmium
- Chlorinated Polyethylene and Chlorosulfonated Polyethylene
- Chlorobenzenes
- Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs)
- Chloroprene (Neoprene)
- Chromium VI
- Chlorinated Polyvinyl Chloride (CPVC)
- Formaldehyde (added)
- Halogenated Flame Retardants (HFRs)
- Lead (added)
- Mercury
- Polychlorinated Biphenyls (PCBs)
- Perfluorinated Compounds (PFCs)
- Phthalates
- Polyvinyl Chloride (PVC)
- Polyvinylidene Chloride (PVDC)
- Short Chain Chlorinated Paraffins
- Wood treatments containing Creosote, Arsenic or Pentachlorophenol
- Volatile Organic Compounds (VOCs) in wet-applied products

EDUCATION: Science and climate outreach to the public

- Over 4500 visitors have switched to renewable household energy through Phipps' membership incentive.
- Online education guides: Easy Steps with Big Impact for Climate Change and Eco-Friendly Pest Management Guide
- Science communication workshops for local scientists.
- One Health One Planet symposium unites scientists and professionals to discuss intersection of human, animal and environmental health
- Research on: 1) switching to household renewable energy and 2) Americans' perceptions of high-impact, low carbon behaviors (see Dr. Katilyn Mascatelli's poster)

Take a picture to link to Phipps' website to learn more about our innovative green practices!