



The Planeteers

ASHRAE LowDown Showdown

2021 Building Performance Analysis Conference

Building Type: Residential Care Center

Total Floor Area: 75,000 ft²

Location: Puerto Rico

Total Site Energy Usage

1,555,372 kBtu

Site EUI

21 kBtu/ft²

Source EUI (with PV)

-13.4 kBtu/ft²

Total Operational Carbon (with PV)

-1 kgCO₂e / ft²

Total Energy Storage Capacity

1,700 kBtu

Annual Water Usage

2,500,000 Gallons

Annual Energy Costs

-\$1.16 \$ / ft²

Annual Water Costs

\$0.45 \$ / ft²

Total Annual Costs

-\$0.71 \$ / ft²

Total Energy Generation

1,915,000 kBtu

Team

Project Lead, PAE
Forest Tanier-Gesner

Architect, SHoP
Chris Sharples

Team Coach, PAE
Alan Shepherd

Architect, SHoP
Annie Kwon

Design/Energy Modeler, PAE
Kirsten Robinson

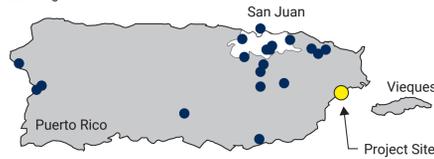
Designer, SHoP
Jessie Li

Environmental Design, SHoP
Berardo Matalucci



SITE LOCATION

Existing Senior Care Centers



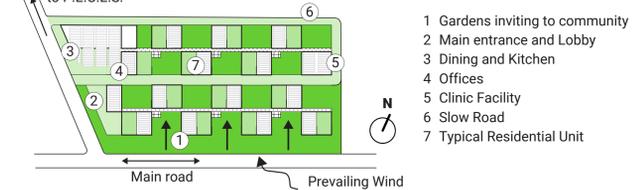
CONTEXT

Town of Punta Santiago



COMMUNITY ENGAGEMENT

to P.E.C.E.S.



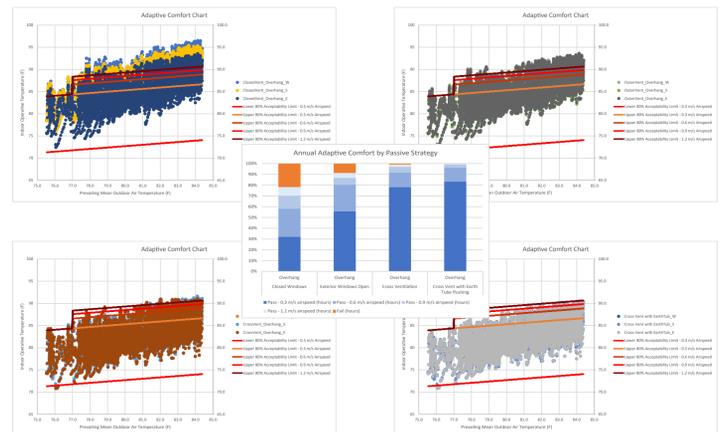
PROJECT DESCRIPTION

There are four foundational goals for this proposal: 1) minimize the carbon footprint for the development both from the construction and operational side; 2) maximize the use of passive design strategies to increase the thermal, visual, and air quality experience of the space; 3) use of next-generation materials to develop low-maintenance, resilient solutions; 4) use of landscape and building articulation to engage with the community at large.

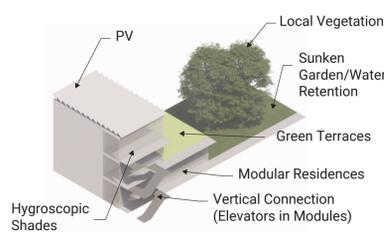
CARBON FOOTPRINT

The project employs integrated design strategies and advanced materials to deliver a high-quality environment. The exterior shading elements are designed to reduce direct solar gains and are made from an innovative nanofiber membrane, which acts as moisture pump. Activated by solar energy, the membrane is highly hygroscopic and has the potential to bring Relative Humidity from 90% to 60% range. Thermal mass is used through earth tubes which lower the operative temperature during the day. The use of concrete has been limited to few applications, and it relies on future developments of carbon-sequestering materials.

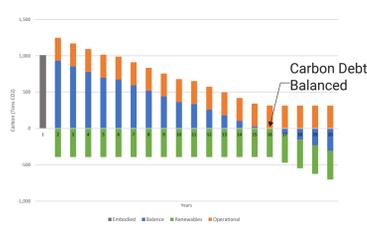
PASSIVE DESIGN APPROACH (ASHRAE ADAPTIVE COMFORT)



MODULAR COURTYARD APPROACH

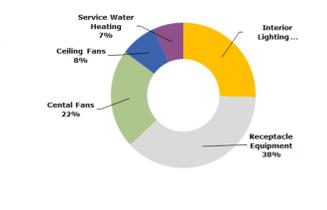


CUMULATIVE CARBON EMISSIONS



OPERATIONAL ENERGY BREAKDOWN

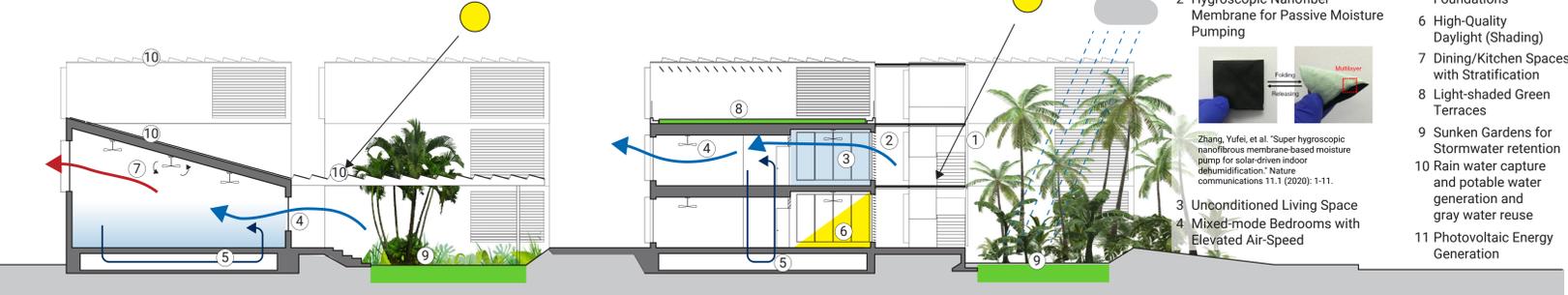
EUI = 20.5 kBtu/sf-yr without PV



WATER BALANCE



ENVIRONMENTAL APPROACH



PREFABRICATION OF SYSTEMS



ENTRANCE VIEW



VIEW OF THE COURTYARDS

