



# Shunya Power

## ASHRAE LowDown Showdown

### 2021 Building Performance Analysis Conference

Building Type: Residential Care Center

Total Floor Area: 75,000 ft<sup>2</sup>

Location: Puerto Rico

Total Site Energy Usage

**2003800** kBtu

Site EUI

**28** kBtu/ft<sup>2</sup>

Source EUI

**82.6** kBtu/ft<sup>2</sup>

Total Operational Carbon

**0** kgCO<sub>2</sub>e/ft<sup>2</sup>

Total Energy Storage Capacity

**000** kBtu

Annual Water Usage

**1022000** Gallons

Annual Energy Costs

**1.9** \$/ft<sup>2</sup>

Annual Water Costs

**1.6** \$/ft<sup>2</sup>

Total Annual Costs

**3.6** \$/ft<sup>2</sup>

Total Energy Generation

**2422000** kBtu

#### Team

Captain/Engineer Pinaki Acharya Architectural Designer Daniel Cordon

Energy Modeler Jagadish Reddy Mechanical Engineer Rajesh Kaul

Electrical Engineer Josh Meier Mechanical Engineer Aaron Stidolph



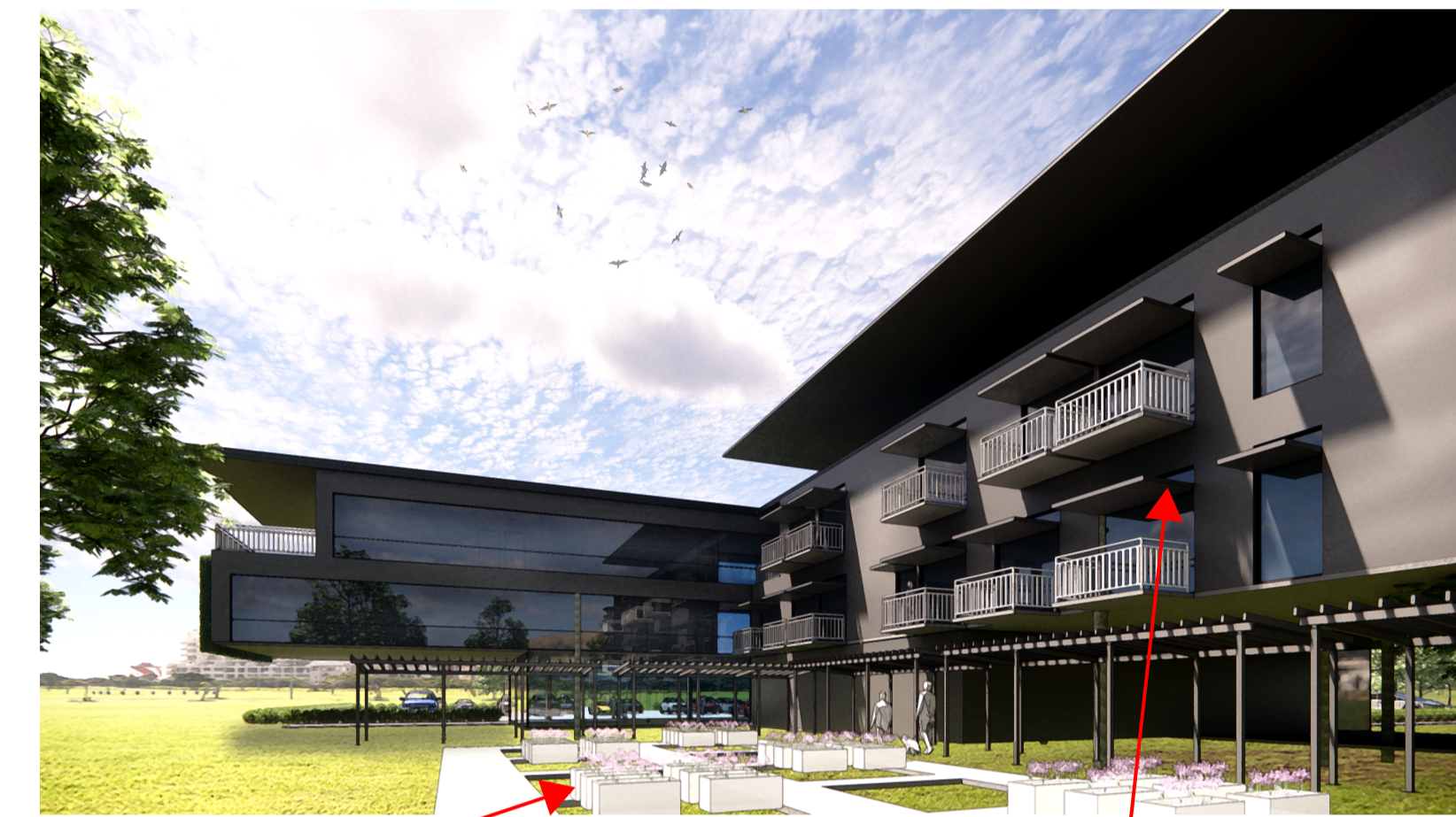
#### Design Description

The 3-story residential care building is located in San Juan, Puerto Rico. The building is divided into four wings with a central connector between the four wings. Active and passive energy saving measures were utilized to achieve a net zero energy building while ensuring occupant comfort levels were attained. The building was designed to provide a comfortable living space with library, media, tech rooms, restaurant, and PT spaces in the building.

#### Energy Savings Strategies

Passive energy saving strategies are employed such as: improved envelope construction, double roof to provide building shading; partial green roof and window shading to reduce loads; Biochromatic windows for improved daylighting and insulation; Solar panel fins provide shade and generate electricity. Provisions for natural ventilation with open corridors; skylights for corridors to reduce lighting loads.

Active energy saving measures such as: DOAS Air Handling Units with Total Energy Recovery Wheels to pre-condition outside air; Heat Recovery chillers to heat domestic water along with heat pump water heater as an auxiliary heater; Chilled water reset; Cooling systems designed for high part load efficiency. High Efficiency fan coil units for apartments; Lobby with elevated temperature setpoints and high-volume ceiling fans for expanded comfort region. High efficiency solar panels on the roof and parking lot provide all the onsite power.



Outdoor Seating Window Overhangs and Light Shelf

