

Team Daytona Beach Audiovisual Presentation, Solar Decathlon 2017

<https://youtu.be/F6oqPLLqV9A>

Text version:

Team Daytona Beach's entry into the Solar Decathlon 2017 is the Beach House.

Beach, an acronym for Building Efficient, Affordable, and Comfortable Homes was the guiding principle throughout our team's design process. The team was inspired by its home city, Daytona Beach Florida. Daytona Beach is a tourist community nestled just north of Cape Canaveral on Florida's East coast. This city, like many tourist communities, was hit hard by the recent economic recession. This, coupled with an already aged infrastructure led to the dilapidation of the historic downtown areas.

In recent years, city leaders have started a revitalization of the town by developing retail and entertainment centers and expansive senior living communities. The demand for senior friendly single-family homes has increased as the baby boomer generation moves away from traditional senior housing. Generation X is expected to follow the same trend as they move in to retirement. The beach house provides an energy efficient and sustainable solution for this housing boom by combining forward thinking, age in place design with passive energy saving technology along with an old Florida architecture.

The architectural design of the beach house is inspired by the eclectic styles that can be found in Key West, Florida, particularly, the iconic Hemingway house. The beach house is a forever home. A unique approach to an age-in-place design that allows the homeowner the freedom to grow and stay in their home as long as they wish.

The beach house features several passive energy savings technologies. All windows are deeply shaded to prevent direct solar heat gain in the summer months. On the south deck, all glazing is able to receive some solar heat gain in the cooler winter months. North facing clerestory windows provide ample daylighting without direct solar heat gain. These windows are also automated to allow the hot and humid air that collects at the top of the ceiling to vent out of the house.

The exterior walls of the beach house have a staggered stud wall construction. This allows for our higher R-value wall in a smaller foot print by reducing thermal bridging between the indoor and outdoor temperatures.

The floorpan of the beach house is a modern take on the classic cracker style house. There is a large public area in front that includes the kitchen, the living room, and the dining room. On the west side of the house is the private area of the house that includes both bedrooms and the bathroom. The master bedroom incorporates a semi-private porch off the south deck that connects to the larger south deck off the kitchen. The south deck also houses the team's hydroponic garden. This garden is fed by rainwater off the south roof and gets combined with compost that the owners can supply from their own food scraps.

The beach house has a 9.3 kilowatt photovoltaic solar array housed on its south roof. This array can power the entire beach house throughout the day. If there is a time when the power demand is high, the energy storage system of the Tesla power wall 2 is able to help meet the high demand. The house is also a grid-tied system. So if the solar array nor the battery are able to provide power the grid can.

The beach house includes a zone air conditioning system. Mini-split units are used in each of these zones to control the indoor temperature and humidity at the desired level. This type of system results in lower energy use, because the homeowner can have varying temperatures in rooms that are being used or unused at the moment.