

## Solar Decathlon 2013 Team Talking Points for Volunteers

### Arizona State University and The University of New Mexico



- From Decathlete Way, you can see the independent solar canopy composed of 36 high-efficiency mono-crystalline photovoltaic panels. The solar canopy has two important roles: it provides the house's main source of energy, and it provides shade, a necessity in the desert climate. In this case, one square foot of solar equals one square foot of shade.
- The landscape of SHADE demonstrates the beauty of desert environments. It includes a hummingbird and butterfly garden to invite pollinators who help shape a complete ecosystem.
- This house features a variety of outdoor spaces directly adjacent to living space—including an indoor/outdoor theater.

## Czech Technical University



- This house reflects a unique type of unorthodox, folk architecture that developed from 1948 to 1989 in socialist Czechoslovakia. Influenced by the American Wild West and romantic imagery from movies, the AIR House incorporates do-it yourself ethics and a style evoking dreams of previous generations.
- AIR House is a “house within a house” that works on a principle of two skins. The first skin, which surrounds the living area, is made of massive wooden panels in combination with natural wood fiber thermal insulation. The second skin, a solar wooden canopy, protects the first skin from sun and wind, and generates electric energy and hot water via photovoltaic and solar-thermal panels attached to the canopy’s structural elements.
- The house’s terrace includes a do-it-yourself facade. These blackboard-painted wall panels enable the occupants to share messages, write a grocery list or post a favorite recipe and share it with the neighbors who come for a visit.

## Middlebury College



- InSite's mechanical chimney contains all of the house's active systems and is the only modular component of the house. The rest of InSite consists of 6 floor panels, 6 roof panels, and 21 wall panels.
- InSite traveled from Middlebury, VT, to Irvine, CA, by train instead of by truck. Trucks would burn 2,000 more gallons of diesel fuel than the train, so by choosing rail transportation, the team avoided emitting 19.5 tons of CO<sub>2</sub>.
- The Middlebury College team is made up of liberal arts students, not engineering and architecture students (like most Solar Decathlon teams). The team's grassroots, self-taught approach to design and engineering allowed them to imagine unconventional solutions and collaborate with experienced professionals who helped turn the team's ideas into reality.

## Missouri University of Science and Technology



- MS&T has competed in five of the six U.S. Department of Energy Solar Decathlons. Their past houses are installed in a village on the university campus, where students can live and educate the local community about the benefits of sustainable living.
- Chameleon House's kitchen has two upper cabinets that move along a track system so the resident can move the cabinets to wherever he or she needs them – such as right above the dishwasher when putting away dishes.
- Like a fireplace in a typical home, the grid unit system acts as the focal point of the living area. It's composed of a grid of cubes that can be removed from the wall to be used as seating, end tables, coffee tables, or stacked to create shelving. The other side of the grid system looks the same as the front, but its entire face opens as a door to a coat or broom closet.

## Norwich University



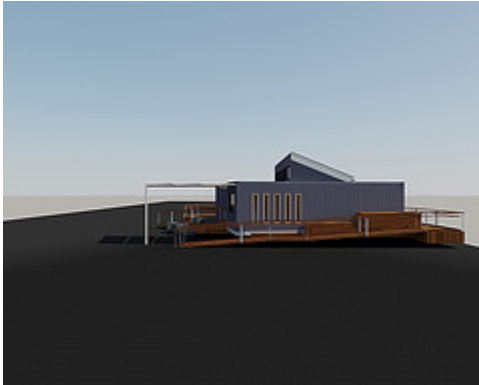
- Norwich University's Delta T-90 House is a 996-square-foot, two-bedroom house that comprises two modules. The east module includes an entry space, kitchen, bathroom, and bedroom. The west module includes the living space, office space, and master bedroom.
- This modular home can be mass-produced in a factory environment, assuring quality construction for the homeowner, in less than three weeks.
- Approximately 82% of households in Vermont earn less than \$41,000 per year. In addition, Vermont ranks sixth highest in the United States in terms of annual heating demand. The Norwich team's house addresses these challenges and makes it economically feasible for lower-income households to enjoy the economic benefits of solar-powered.

Team Ontario: Queens University, Carleton University, and Algonquin College



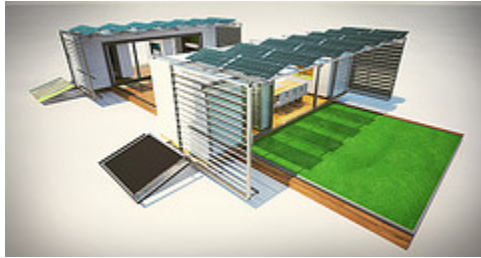
- ECHO is an ecological home built for the next generation of homeowners – the “ECHO Boomers.” This house empowers and inspires young, prospective homeowners to demand change and ultimately revolutionize the housing market.
- In recognition of the long distance between Ontario and California, ECHO consists of two modules, each of which fits on a truck. Minimizing the number of trucks required reduces the carbon emissions associated with transportation. In addition, the house’s rectangular form allows for easy disassembly, transportation, and reassembly at the competition site.
- Through a combination of improved energy efficiency, an advanced building envelope, solar thermal energy utilization and heat recovery, the annual energy consumption of ECHO is estimated to be 25% of a typical Canadian house.

## Santa Clara University



- The interior of Radiant House is a modern, timeless California style that seamlessly integrates the natural materials and innovative technologies used throughout the house. The sloped roof and ceiling, which host the solar array and radiant heating and cooling system, help create the large and open great room that is the heart of Radiant House.
- The house features steel siding, which is very recyclable, is built to last with minimal maintenance, and provides a cool, sleek, yet natural appearance.
- The joist and wall components of the house were designed and built by Santa Clara team members from mostly raw and unrefined bamboo. If produced on a wide scale, bamboo has the potential to provide an inexpensive, eco-friendly, and elegant alternative to traditional building materials. As a grass, bamboo grows more quickly, produces 30 percent more oxygen, and has higher strength per pound than lumber.

## Southern California Institute of Architecture and California Institute of Technology



- At the push of a button, the two modules of DALE can move, expanding from a 600-square-foot house to a large, hacienda-style arrangement that lets the exterior in while increasing the house's square footage by three times.
- The team paid great attention to ensuring that the moving modules are safe. Movement sensors and cameras on the exterior facades track and notify the user when the movement is taking place. Video cameras are located on the top of each module and provide live feeds before and during movement, allowing the homeowner to check that the path is clear. Rubber flaps located along the lower edges of the modules prevent small items and appendages from getting underneath the house. If anything interrupts the path where the modules open or close, the system immediately stops moving. Finally, each module contains a manual emergency stop button in an easy-to reach location.
- DALE is constructed from sustainable materials. All the steel is fully recycled and locally sourced. The decking is reclaimed from an abandoned building in East Los Angeles. And the entire solar array is completely recycled—these are the exact panels used on the team's Solar Decathlon 2011 project.



## Stanford University



- The Start.Home team is completely student-driven, with 50 undergraduate and graduate students broken into 11 subteams. The team is supported mentors and sponsors, who range from faculty members and volunteers to company sponsors and professionals. Students make all final decisions. There are over 200 members of the Start.Home family.
- This house's wood finishes are all reclaimed—from the exterior redwood siding to the Douglas fir flooring and interior trim.
- The architectural goal of the Start.Home is to make sustainable living choices synonymous with convenience.

## Stevens Institute of Technology



- The multi-disciplinary Stevens Solar Decathlon team involves every school and department at Stevens except Ocean Engineering! The team includes 48 undergraduates from eight different departments and 13 graduate students from the Product Architecture and Engineering program.
- The entry porch of Ecohabit features an exquisitely built, open-louver rainscreen designed to modulate the abundant California sunshine at different points of the day at different times of the year. Continuous louvered clerestories along the front north facade modulate and wash the living room and flex room with ambient and indirect daylighting.
- The team's slogan is "Live. Learn. Grow," inspired by Benjamin Franklin's quote, "Tell me and I forget. Teach me and I remember. Involve me and I learn." Ecohabit invites everybody to live along with the home, learn about sustainable living, and grow together toward a more sustainable future.

The Catholic University of America, George Washington University, and American University  
(Team Capitol DC)



- After Solar Decathlon 2013, HARVEST HOME is being donated to Wounded Warrior Homes in San Diego, CA. The team designed the house for a U.S. military veteran returning from war with life-altering physical disabilities or post-traumatic stress disorder. The house is ADA accessible and designed to help this individual heal and transition to civilian life.
- HARVEST HOME has a portable garden. Using recycled milk crates and tower planters, the gardens can be rotated and planted seasonally, responding to the needs of the occupant. The portable garden concept has great potential for bringing gardens to urban areas, rooftops, and other places where growing plants might not otherwise be possible.
- A small corridor off of the kitchen leads to a separated bedroom that provides a private retreat for our U.S. military veteran. While the private bedroom serves as an introspective refuge, the morning deck to the east and the adjacent Harvest garden continue to encourage interaction with nature and continue to foster healing.

## The University of North Carolina at Charlotte



- UrbanEden blurs the line between inside and out by connecting a private, plant-filled exterior living space to the interior. When the residents are outside, they're not inside burning energy to heat, cool and light the space. So, the outside space saves energy.
- At 822 square feet, the interior of the house comfortably accommodates a single occupant or couple. The outdoor space doubles the house's size to 1,644 square feet. This relatively inexpensive outdoor space lowers the overall square-foot cost of the building while considerably increasing its livability and appeal.
- After the competition, UrbanEden will return to the University of North Carolina at Charlotte Campus where it will serve as a living/learning laboratory, allowing for further research and testing of the house's innovative technologies.

The University of Texas at El Paso and El Paso Community College (Team Texas)



- Although the ADAPT house is tailored in metallic qualities, the accents of color and light give the house a warm Southwestern feeling that conveys the influences of Spanish, Native American, Mexican, and European heritage of El Paso, Texas.
- The house is portable and designed to be moved to almost any location. The house comprises three pods, each of which can fit on a commercial semi-truck without exceeding the size limits.
- After the Solar Decathlon, the ADAPT house will be transported back to the University of Texas at El Paso campus where, as part of the University's Centennial Celebration, it will host educational and social events for students, faculty, staff, alumni, and community members. As the celebration draws to a close at the end of 2014, the house will be moved to either a permanent location on campus or to an adjacent community property to be used as an educational resource and science center for students.

## University of Calgary (Team Alberta)



- Borealis is a fully transportable, prefabricated house. While it is meant to stay in one location for extended periods of time to service a community or industry, the owner could move the house to a new location very easily and cost effectively.
- The alternating angles of the roofs allow for an interesting variety of volumes within the house. The high ceiling in the kitchen and dining area creates a large volume for social activities, while the same high ceilings in the bedrooms give balance and proportion to the smaller floor area. The lower ceilings in the living areas create a more comfortable and intimate space to relax or work.
- Generous decks on either end of the house provide private outdoor spaces that accommodate two residents who may not be familiar with each other, but who might require privacy for work and leisure, indoors and out.



- The Phoenix House is designed to provide a permanent solution to disaster relief housing—and is more durable, energy-efficient, and structurally sound than the average stick-built home. The house is a prefabricated system that can be rapidly assembled in tornado-prone areas, like Kentucky and Indiana.
- The safest room in The Phoenix House is the bathroom. A steel door, a small shatterproof glass window, a reinforced ceiling and thick walls provide greater durability and an assurance of comfort and security to the disaster relief client.
- Each year an average of 1,300 tornadoes touch down in the United States. The destruction left behind can take months and even years to repair. The Phoenix House is designed to be ready in less than 4 weeks from production to move-in.

## University of Nevada Las Vegas



- The desert is also particularly unforgiving to synthetic materials and coatings. That's why DesertSol is made of natural, durable materials that age well in the desert (such as steel that rusts gracefully). The house's architecture contrasts the aged, rugged exterior with polished, detailed interior finishes.
- This 754-square-foot house is designed as a vacation home that can be monitored and controlled from a smart tablet when the owners are away. For instance, at the touch of a finger, owners can change the lighting or play music, giving their vacation home an extra layer of security and protection.
- After the Solar Decathlon, DesertSol will be permanently located at the Las Vegas Springs Preserve—180 acres of natural exhibits, botanical gardens, hiking trails, and desert-living educational facilities. More than 280,000 visitors a year will be able to visit the house and learn more about sustainable living in the desert environment.



## University of Southern California



- Designed for a family of four, the 960-square-foot fluxHome draws upon regional precedents such as the courtyard-patio house and craftsman bungalow while establishing a model for smart growth and sustainable living in the 21<sup>st</sup> century.
- fluxHome features two bedrooms, two bathrooms, three porches (each with a vertical garden) and an EV charging station.
- The final plan for fluxHome is to permanently relocate the house in downtown or South Los Angeles on a single-family residential lot. The entire USC Solar Decathlon Team, across many departments and schools at USC, will help to formulate the process of selecting the permanent residents for the house.

## Vienna University of Technology (Team Austria)



- LISI (which stands for “Living Inspired by Sustainable Innovation”) was designed as an economical solution for replacing deteriorated cottages commonly still found on small garden lots in Vienna.
- This house features an energy-recovering shower tray that recovers up to 32% of the thermal energy otherwise lost in drain water from the shower.
- After the Solar Decathlon, LISI will be featured in Austria’s biggest and best-known model home exhibition. Afterward, LISI will be available for further research and studying by architecture and engineering students.

## West Virginia University



- West Virginia University's Solar Decathlon 2013 entry is a collaborative effort with the University of Rome tor Vergata. This collaboration took the form of student and faculty exchanges, resulting in a strong communication link between the two schools.
- PEAK—Preserving Energy with Appalachian Knowledge—connects the geographical similarities of both West Virginia and central Italy. The PEAK logo depicts a tree trunk in colors associated with the sun and fall foliage, both in abundance in central Italy and West Virginia.
- Based on PEAK, the National Science Foundation (NSF) this spring awarded West Virginia University a grant to develop a program to educate undergraduate students about the enabling role of nanotechnology in developing sustainable, healthy, and smart indoor environments.