SOLAR DECATHLON

For the first time, UC Davis has been selected to participate in the US Department of Energy's (DOE) Solar Decathlon, an intense 2-year design competition. Students are tasked with designing and building solar-powered, energy-efficient, cost-effective, and market-appealing houses as part of a rigorous competition with 20 participating universities. The winner is the team that creates the best balance of energy production and efficiency, affordability, market appeal, and aesthetic design. The Solar Decathlon is widely recognized as showcasing innovation in energy efficiency, renewable energy, and sustainable design.

The 2015 Solar Decathlon competition is set for October at the Orange County Great Park in Irvine, California. The competition involves university teams developing the full architectural and engineering design of a house and constructing the structure on their respective campuses. The structures are then disassembled and transported to the competition site. The in-person competition will take place over four weeks – one week to construct the houses on the competition site, two weeks of competing, and another week to decommission the houses. The 2-weeks of rigorous competition will include judging 10 different areas including architecture, market appeal, engineering, communications, comfort, affordability, appliances, home life (demonstrating the functional ability of the house), commuting (incorporating generating energy for and using an electric vehicle), and energy balance (where the house must achieve zero-net energy use). The houses will be on display to the public during the competition to provide education and insight on methods of renewable energy generation and energy efficiency.

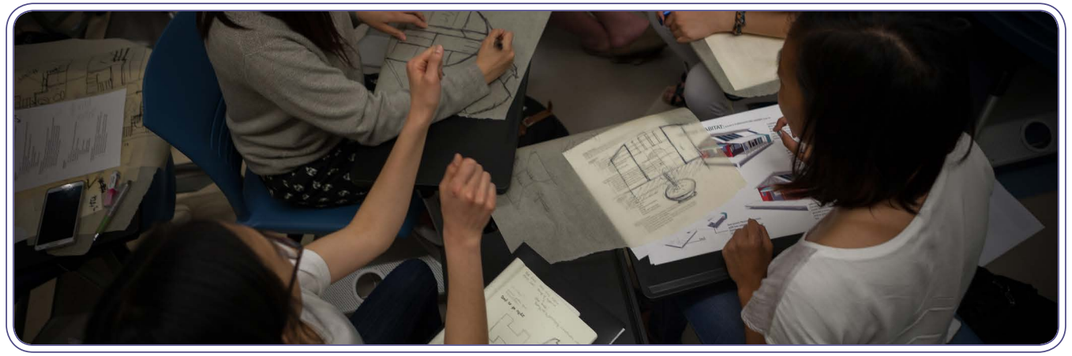
The DOE developed the Solar Decathlon to achieve three primary objectives -1) providing the public with tools and ideas for reducing residential energy use by showcasing renewable energy and innovative design strategies, 2) showing through example that energy efficiency and renewable energy systems can provide equal comfort and style to a typical modern home and at a reasonable price, and 3) fostering capable design and engineering students to lead the nation in clean-energy solutions.

MEET THE UC DAVIS TEAM - AGGIE SOL

The Center for Water-Energy Efficiency is leading the UC Davis student team "Aggie Sol" and managing the design, construction, and fundraising for the competition. Aggie Sol is working to create a marketable, sustainable, zero-net energy (ZNE) home at a cost far below market value for ZNE homes. The team's long-term goal is to drive innovation in the residential housing market to make ZNE housing affordable to those with incomes less than the median value in the United States. Their short-term goal is to use the 2015 Solar Decathlon as an opportunity to design and build a residential housing model for American farmworkers – Aggie Sol's target market. To be successful, their design will address the numerous health, living, and cost concerns associated with the majority of current farmworker housing conditions.

Aggie Sol Team.

Rendering of Aggie Sol's design.



Aggie Sol students working up Zero Net Energy housing designs.

"We're trying to drive down the price point of zero-net-energy housing to help the housing market understand that you can have affordable, nice homes that are zero net energy."
- Dr. Frank Loge

To meet their goals, team Aggie Sol is researching and incorporating low-cost efficiency technologies and materials, focusing on passive solar design, and learning how to balance quality and attractiveness with affordability. The house will demonstrate cutting-edge energy efficiency research from the Energy Efficiency Center focusing on "smart home" innovations that will manage energy inputs and losses. High-efficiency lighting, heating, cooling, ventilation, hot water, and other appropriate technologies, will be driven by grid-tied photovoltaic panels. Since much of California's agricultural land is arid, the design will also include water efficiency and conservation technologies.

The team believes that creating attractive, affordable, dignified worker housing will serve the interests of local governments as well as those of farm laborers by making areas with enhanced housing stock more attractive to workers. This is especially important at a time when farmers are reporting increasing difficulty finding sufficient labor to harvest their crops. Against this backdrop, the availability of decent housing will provide value, as it will enable growers in farm regions to compete for workers based not only on money, but also on quality of living conditions.

UC Davis students and staff from the Colleges of Agriculture & Environmental Sciences, Letters & Sciences, Engineering, and the Energy Efficiency Center as well as private local firms are contributing to the Aggie Sol team's research and design efforts. Students have explored the issues related to farm worker housing to customize the design to their target market. The design and engineering teams are working on demonstrating a cutting-edge sustainable dwelling that offers ZNE accommodations and will serve workers at a price point local, county, state, and private housing providers can afford. Meanwhile, the fundraising and communications teams are working diligently for donations to fund the project and marketing their efforts through social media and website development.

As of November 2014, Aggie Sol has submitted 80% design development construction drawings to the DOE and is awaiting their comments. The team just finished a design critique and charrette with UC Davis staff and local industry mentors to refine and further develop their design. Final construction drawings are due in February and construction on the UC Davis campus will begin shortly after.