

FINAL TECHNICAL REPORT: SOLAR DECATHLON 2015
TEAM MASSACHUSETTS AND CENTRAL AMERICA (MASSCA)

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Overall summary:

Our team was Team MASSCA (Massachusetts and Central America), which was a partnership of Western New England University (WNE) located in Massachusetts USA, The Technological University of Panama (UTP), and Central American Technological University (UNITEC) of Honduras. Together we had a group of 6 faculty members and approximately 30 undergraduate students.

Our house is 'The EASI' House, which stands for Efficient, Affordable, Solar Innovation. The EASI house is rectangular with two bedrooms and one bath, and offers a total square footage of 680. Based on competition estimates, The EASI house costs roughly \$121,000. The EASI house has a 5kW solar system.

Faculty and students from all three institutions were represented at the competition in Irvine California. Team MASSCA did well considering this was our first entry in the Solar Decathlon competition. Team MASSCA won the following awards:

- First Place – Affordability Contest
- Second Place – Energy Balance Contest.

The competition provided a great experience for our students (and faculty as well). This competition provided leadership, endurance, and technical knowledge/skills for our students, and was the single most important hands-on experience during their undergraduate years. We are extremely pleased with the awards we received. At the same time we have learned from our efforts and would do better if we were to compete in the future.

Furthermore, as a result of our team's Inter-Americas collaborative effort, UTP and WNE have partnered to form Team PANAMASS (PANAMA and MASSachusetts) and have developed The

SMART House for the inaugural Solar Decathlon Latin America & Caribbean competition held in Colombia.

Discussion of fundraising activities:

Our team made a very strong effort in fundraising activities. Being a small private university with a student population just over 3,000, we knew from the beginning that fundraising would be a tremendous challenge – and it certainly was. Nevertheless, we were able to secure some cash, material, and other donations from local industry. Western New England University ended up supporting the remaining cost share funds. Our university is located in Western Massachusetts, which was the farthest team from the competition site in Irvine, California. As a result of our funding availability and consideration in transportation costs, our team had to change the initial design to a rather simple-shaped house with affordability as the top priority. We were able to reduce the transportation needs from the estimated 3 semi-trucks of the original design to just 1 semi-truck of the modified design. The round-trip transportation cost per semi-truck from Massachusetts to California is approximately \$50,000. We further reduced the total house construction cost by half to roughly \$120,000. Without these reductions our team simply didn't have the necessary funding to compete.

As for our partners in Central America, travel expenses for students and faculty from Technological University of Panama were funded by their university, and travel expenses for students and faculty from UNITEC (Honduras) were funded primarily through the Honduran Embassy in the United States.

If our team were to do this competition again, we would focus on an even smaller house to increase efficiency and to reduce the overall costs. The cost savings could be used to support more students at the competition. We would also put more emphasis on fundraising much earlier.

Results of media-outreach activities:

The WNE marketing department sent out press releases and our team was featured in numerous publications including:

BusinessWest Magazine
The Republican
Masslive.com
Architect Magazine
National Geographic
Contractormag.com
Pv-magazine.com
Today's Energy Solutions

Student Decathletes were also featured in their hometown newspapers. Our team was featured in the UTP website as well as the Honduran Embassy website.

Result of on-site exhibition activities:

It was difficult to pinpoint the number of visitors to our house as we did not keep track. But the number is likely low as compared to other houses. This was partly due to the non-ideal location of our house. However, in general, visitors had positive comments on our house. As The EASI House is smaller compared to other houses, the exhibition tour was shorter and people waited less time to visit our house. For most visitors this was positive as they had limited amount of time to visit as many houses as possible.

We could have done a better job with marketing and communication of our house. Given that this was our first time in the competition we were still learning, hopefully we would do much better in the future.

Evaluation of the team's website:

We could have improved our website design (easihouse.com). We didn't have an expert on web development on the team nor did we have the budget to hire a web designer. So while the website is functional, it lacks the attention-grabbing features of a modern website. The number of hits were relatively low and the website was not continuously updated. For future competitions we would incorporate a diverse group of students not just from engineering and architecture, but also from arts, sciences, and business.

Team perspective on the effectiveness of the organizers' communication efforts with both the teams and public:

The organizers' communication efforts were excellent. We would not change a thing. Kudos to Joe Simon, Sara Farrar, and the entire DOE/NREL team!

Description of future plans for the house:

The EASI house is currently on the campus of Western New England University right behind our College of Engineering (see photo). We have finished reconstruction of the exterior of the house and are in the process of reconstructing the interior. The public can currently view the exterior of the house. The house traveled over 2,900 miles from California to Massachusetts, and on its way the house lost numerous roof tiles as well as a good portion of the siding. There was significant interior and water damage as well. The current plan for the house is to use it for

public outreach as well as for research and a model for future decathlon events. We are open to partnering with NREL to use the house for follow-up collaborative research and outreach projects.



The EASI house on the WNE campus (photo taken April 27, 2016)

Short description of each team officer's future plans:

The MASSCA team is an all-undergraduate team. All WNE senior Decathletes (those graduating May 2016) have either found full-time employment or are heading for graduate school. We should also note that Decathletes were the first students obtaining full-time employment and most Decathletes had multiple employment offers. The junior and sophomore Decathletes are planning to participate in future solar decathlon events.

Suggested competition improvements:

More seed money. Or at least a portion of the seed money should be based on distance from the competition location.

Any other helpful information to organizers or future teams:

For future teams: We find it important to seek out reputable transportation companies as well as on-site support companies (e.g. crane), and to obtain numerous quotes as pricing will vary significantly. Always have a backup plan in case a particular company fails to meet its obligations. Furthermore, we recommend that all participating students be required to take a mandatory class on Solar Decathlon (class should be offered by a faculty member). The class should cover all competition categories. This will increase student understanding of the competition and help prepare students for the intensive work involved. The class will also provide students with much deserved credits and increase camaraderie among the students.