Solar Decathlon – RevoltHouse

Sustainability as key architectural design driver

Prof. Dr.-Ing. Patrick Teuffel
Chair of Architectural Engineering
Solar Decathlon
Solar Decathlon: 10 Contests

Each house is evaluated during the course of the ten days long event according to ten contests – the Decathlon:

- Architecture
- Engineering and Construction
- Solar Systems and Hot Water
- Energy Balance
- Comfort Conditions
- Appliances and Functionality
- Communication and Social Awareness
- Industrialisation and Market Viability
- Innovation,
- Sustainability
Solar Decathlon

The Solar Decathlon competition has four main objectives:

1. To educate
   ... educate the general public ... raise society’s awareness ...
2. To encourage
   ... use of solar technologies ... architectural attractive ...
3. To raise awareness
   ... awareness of students participating ... renewable energy
4. To clearly demonstrate
   ... built without sacrificing comfort ... attractive and affordable

Solar Decathlon Europe won the “Sustainable Energy Europe Award Competition 2011” prize in the category of “Communication”, one of the most important international sustainable energy awards.
Solar Decathlon Europe is not “only” a European competition, but actually it is the most internationally ever ... (in 2012 20 teams from 15 countries/ 4 continents)
TU Delft Team

Core team includes

- Building Technology Department, Faculty of Architecture
- Energy Club
- Delft Energy Initiative

> Team of approx. 30 students and faculty members

Campus collaborators include

- Delft Environmental Initiative
- Delft Institute of Microsystems and Nanoelectronics
- ... and more in the future
TU-Delft Team

Approx. 30 students from various faculties
Solardecathlon 2012

**It’s Dutch!**
There’s extra-credit in using ideas that come from the university’s home culture, tradition and know-how. The typical Dutch boathouse could be a sustainable approach to future dwelling.

**It’s Futuristic!**
Rules of the competition require a design of a single house, which would occupy land in low, unsustainable density. By building on water we offer an alternative that wastes no land, and could be a part of a large scale thinking of a floating extension of the city.

**It’s FutureProof!**
With the ongoing rise in sea level, the boathouse offers the ultimate solution, always floating above it.

**It’s Mobile!**
The boathouse could rotate towards the sun to maximise power conversion. It could also be tagged and moved from one place to the other.

**It’s Twice the Sun!**
Using the sun’s reflection on the water would enable us to get more sunlight for all purposes - Lighting, heating and electricity.

**It’s More Temperate!**
Water bodies maintain a relatively fixed and comfortable temperature. They could be used during summer to cool and during winter to warm the house to some extent. If the house would be partially submerged, the envelope area would decrease, making the house more efficient.

**It’s Passively Ventilated!**
Drawing cool air at water level could create an effective passive cooling system, supplying fresh air to the house.

**It Gives You a New Perspective!**
The view from water level is unusual and could create intriguing architectural situations to be explored in the design.
Solardecathlon 2012

ROTATION IN SUMMER

ROTATION IN WINTER
Solardecathlon 2012

- Lightweight
- Easy Assembly
- One-Piece possibility
- Water Resistant
- Low Thermal conductivity
- Low Maintenance
- Innovative

- High constructions cost
- High EE

<table>
<thead>
<tr>
<th>Material</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Roof structure</td>
<td>1216.00 Kg</td>
</tr>
<tr>
<td>Weight Wall structure</td>
<td>967.60 Kg</td>
</tr>
<tr>
<td>Rest weight (constant)</td>
<td>10.378.00 Kg</td>
</tr>
<tr>
<td><strong>Total weight</strong></td>
<td><strong>12.561.60 Kg</strong></td>
</tr>
</tbody>
</table>
Solardecathlon 2012
Solardecathlon 2012
Solardecaathlon 2012

Other aspects

- Health and Safety
- Transport and Site Logistics
- Dinner for other teams
- ...

TUDelft
Solardecathlon 2012

Schedule

- Summer 2010
- October 2010
- November 2010
- December 2010
- Spring 2011
- Autumn 2011
- Winter 2011/12
- Spring 2012
- September 2012

- Preparing proposal and visit to Madrid
- Technical proposal submitted
- Student competition (TUD internally)
- Decision about acceptance
- Design development
- Final design
- Construction documents
- Production and manufacturing
- Competition in Madrid
**Sponsorship**

**BENEFITS**

The Solar Decathlon is a unique event similar to the World Solar Challenge where the TU Delft with their Nuna race car participated and won several times. The Solar Decathlon however addresses peoples' most basic need namely habitation. In addition parties who support the TU Delft Solar Decathlon efforts will be associated with the following intrinsic key values:

**Sustainability** – Being aware that resources are not infinite thus becoming proactive is a necessity.

**Future generations** – Supporting the students of today who will become the experts and leaders of tomorrow.

**Innovation** – Contributing to an outstanding design which in every aspect is advanced and “thought out of the box”

In order to disseminate these key values within a greater public, a series of opportunities for exposure are available for the supporting parties where direct links to the ReVolt House can be traced via logos, banners, personal presence, etc.

**Events** – Solar Decathlon contest, fare, concerts, symposia, lectures.

**Internet** – Homepage, facebook, linkedin, youtube, newsletters, blog, twitter.

**Publications** – Press, books, brochures, panels.

**ReVolt House** – After the contest in Madrid, the building will be placed in a permanent location in the Netherlands.

**SPONSOR LEVELS**

<table>
<thead>
<tr>
<th></th>
<th>Main &gt;250.000 euro</th>
<th>Platinum &gt;100.000 euro</th>
<th>Gold &gt;30.000 euro</th>
<th>Silver &gt;6.000 euro</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logo on the mockup house during the ReVoltTours</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Logo of the company at the ReVoltHouse at the Dutch location</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invitation to Public Unveiling Exhibition and speaking engagements as speakers in Netherlands</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>VIP Tour of Construction site at Villa Solar</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Company logo on member t-shirt</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Promotional Model of the solar house</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invitation to reception with students and VIPs in Spain</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Company logo on construction site banner</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Company logo at promotional videos</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Invitation to Sponsor’s Recognition Dinner with student team</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Promotion/demonstration of products (home appliances, sanitary, kitchen, and furniture/fixtures placed at the solar house) related to house and competition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presentations</td>
<td>1x Professor 2 x Team Members</td>
<td>1x Professor 1 x Team Members</td>
<td>2 x Team Members</td>
<td>1 x Team Members</td>
</tr>
<tr>
<td>Display of products related to solar house building on social networks such as Archello</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Use of the TU Delft Solar Decathlon and ReVoltHouse team trademarks for promotional reasons</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Company logo included on all mass distributed printed materials and publications</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Company logo at social network pages</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Invitation to project events, collaborations, and celebrations related to solar house</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Graphic web link from ReVolt House website</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

We also offer Friends sponsorship scheme for companies and individuals who donate above 100 euro. Donation in kind are considered as 50% of their market value.
Events

Project was and will be shown at various events:

- Bouwbeurs in Utrecht February 2011 and 2013
- PV Power Plants in Paris in March 2011
- Exhibition at Delft Science Center
- Construmat in Barcelona in May 2011
- Intersolar in Munich and KIVI NIRIA in The Hague in June 2011
- Llowlab at LowLands Festival in August 2011
- Dutch Green Building Week in September 2011
- Workshop Madrid in October 2011
- Nationale Staalbouwdag in October 2011
- Building Holland in April 2012
- Museum Boerhaave in Leiden
- and many more ...
Llowlab @ Lowlands in August 2011
Covered in De Telegraaf, Het Financieele Dagblad and De Volkskrant ...
“After Life”

Possibilities include

- TUD campus
- RDM campus
- Main sponsor’s site
- ...

TU Delft
Madrid 2012

Please follow us on www.revolthouse.com for further news!