Solar Decathlon 2021
Competition Presentation
Meet the Team

• Heather Pecho - Team Lead, B.S. Chemical Eng, M.E. Environmental Eng
• Chris W Hurlbut - M.Eng. Architectural Eng
• Donghyun Lee - PhD Architecture
• Tian Li - PhD Architecture
• Kohl Linder - B.S. Architectural Eng
• William Polenc-Busby - B.S. Architectural Eng, M.E. Structural
• Margarita Ramirez-Rodriguez - B.S. Arch. Eng, M.E. Building Systems
• Alouki Shah - B.S. Arch. Eng ME Building Systems
• Jacob D. Sorenson - B.S. Architectural Eng - Building Systems
Site Analysis
Occupant Experience

Community

Literature

The Nook

Arts + Crafts

STEM

Net Zero Building
Architecture
Architecture

Retail Space
20400 S.F.

Office Block
2100 S.F.

Storage
4000 S.F.

Atrium
7500 S.F.

Cafe & Kitchen
3200 S.F.
Architecture

Upper Atrium
5500 S.F.

Multipurpose
2 x 2100 S.F.
2 x 2300 S.F.

Gallery
9000 S.F.
Architecture
Architecture
Integrated Performance
Engineering

Vapor barrier wraps behind concrete slab

Bare Naked T-Stud W/ Eco-Spray Insulation

Gypsum Wall Board

T-Stud W/ Hemp Wool

Gutex Multitherm 60mm Rigid Insulation thermal break

Bare Naked T-Stud W/ Eco-Spray Insulation

Sheathing with Water screen

2" exterior cladding
Engineering
Engineering

First Floor

Second Floor
Energy Analysis

Building Area: 86,000 S.F.
Site EUI: 25.63 kBtu/S.F./year
Total Energy Consumption: 2,100,000 kBtu
Total Energy Production: 2,210,000 kBtu
## Embodied Environmental Impact

<table>
<thead>
<tr>
<th>Cradle to grave (A1-A4, B4-B5, C1-C4)</th>
<th>kg CO₂e/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>(&lt; 200) A</td>
<td></td>
</tr>
<tr>
<td>(200-280) B</td>
<td></td>
</tr>
<tr>
<td>(280-360) C</td>
<td></td>
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<tr>
<td>(360-440) D</td>
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<tr>
<td>(440-520) E</td>
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<tr>
<td>(520-600) F</td>
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<tr>
<td>(&gt; 600) G</td>
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</tbody>
</table>

**Graph:**
- A1-A3 Materials: 84%
- A4 Transportation: 10%
- B4-B5 Replacement: 2%
- C1-C4 End of life: 5%
Comfort and Environmental Quality
Durability and Resilience
Market Analysis

Line Item Estimate
$13.9 million

$170 per S.F.
Thank you!

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