Egg Harbor Residence

Sunburst Solar
University of Wisconsin-Madison
University of Wisconsin-Milwaukee
Client/Location

- Family home designed with mass production opportunities
- Egg Harbor, WI and Milwaukee, WI
- Climate Zone: 6A
NET-ZERO STRATEGIES

- 5 Passive Design Solutions
- Environmentally-friendly materials
- Natural resource collection
- Factory production
A double stud, cavity wall construction is used to increase distance between the interior and exterior.
Occupant Experience
Occupant Experience

Smart System Integration

- Lutron Smart Systems
- Temperature and shading automation

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MODULARITY

Multitude of Customer Choices

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Catalog of designs by UWM team

These designs created by our UWM Architecture team begin to generate a catalog of prototypes viable for factory production.
The City of Milwaukee has allotted funds of nearly $1 million to research and prototype a catalog of net zero designs that can be factory produced. The plan includes building the factory in the community, providing much needed jobs and affordable housing in Milwaukee.
Photovoltaic Solar System

**Array Size**: 10,088 kWh

**Panels**: 21

**Roof Pitch**: 9/12

**Payback Period**: 14.3 Years

**Monthly Energy Production**

<table>
<thead>
<tr>
<th>Month</th>
<th>kWh</th>
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<tbody>
<tr>
<td>Jan</td>
<td>500</td>
</tr>
<tr>
<td>Feb</td>
<td>600</td>
</tr>
<tr>
<td>Mar</td>
<td>800</td>
</tr>
<tr>
<td>Apr</td>
<td>1000</td>
</tr>
<tr>
<td>May</td>
<td>1100</td>
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<td>Jun</td>
<td>1000</td>
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<td>Jul</td>
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<td>Aug</td>
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<td>Sep</td>
<td>900</td>
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<tr>
<td>Oct</td>
<td>700</td>
</tr>
<tr>
<td>Nov</td>
<td>600</td>
</tr>
<tr>
<td>Dec</td>
<td>500</td>
</tr>
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Energy Analysis

HERS Score: W/o Solar

27

HERS Score: W/ Solar

-11

34.1 MMBtu/yr consumed

34.2 MMBtu/yr produced by solar
Energy Analysis

Goal: Create airtight envelope and lower infiltration

Windows
- U: 0.2
- SHGC: 0.45 (South Facing)
- SHGC: 0.25 (Non-South)
- Low e coating

Walls
- R-29
- Double stud
- Cellulose insulation
MECHANICAL SYSTEMS

Attic

HVAC
MECHANICAL SYSTEMS

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Rheem Water Heater

PEX Piping

Multiport tee

14-port Manifold

Plumbing

2
MECHANICAL SYSTEMS

Hot Water

Main Level

2nd Level

Cold Water

2nd Level

KEY
- Supply line
- PEX pipe, cold water supply
- PEX pipe, hot water supply
- Copper pipe, Blackwater drainage
- Copper pipe, Greywater drainage
- Piping goes into page (down a level)
- Piping goes out of page (up a level)
- Appliance receives almost immediate hot water
- Multi-port tee
- Manifold
- Water heater
- Three way valve

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MECHANICAL SYSTEMS

Black/Grey Water

Main Level

2nd Level

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Estimated Home Cost

$296,028

<table>
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<th></th>
<th>Cost per/sf</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg Harbor Residence</td>
<td>$158.75</td>
<td>$296,028</td>
</tr>
<tr>
<td>Door County Median</td>
<td>$217</td>
<td>$324,500</td>
</tr>
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</table>
Factory Production

5-15% Savings

Once production reaches full capacity and consistent volume, home prices will lower

2-3 Years

Needed in order to break even on production costs vs. startup costs

Quality Control

Fabricating modular homes in a factory allows for better control over the building process versus traditional on-site construction
EMBODIED ENVIRONMENTAL IMPACT

1. Factory Built
   Reduce material waste and transportation

2. Local Sourcing
   Local suppliers for lumber and concrete

3. Greywater Usage
   Laundry to Landscape

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Grey Water & RainWater

- Laundry-to-landscape and rainwater collection systems
  
  **Indoor vs. Outdoor Water Use**
  
  - Indoor 70%
  - Outdoor 30%
  
  [1]

- Potential to save 74,000 gal/year [2]
EMBODIED ENVIRONMENTAL IMPACT

- 256,151 kg CO₂e over lifetime (60 yrs.)
- 4.686 kg CO₂e/year vs. average US home: 6,800 per year
- 159 vs 180 kg CO₂e/SF
- Proportional, with improvement for thermal/moisture protection
The embodied environmental impact of the building includes:

- **256,151 kgCO2e over lifetime (60 yrs.)**
- **4.686 kgCO2e/year vs. average US home: 6,800 per year**
- **159 vs 180 kgCO2e/SF**
- Proportional, with improvement for thermal/moisture protection
It Doesn't End Here

Our clients are elated with our progress on their home and want to keep working with our team in order to help make their dream a reality.

The City of Milwaukee has laid out an Urban Equity strategy in which we will work together with officials and private contractors to do our part in helping Milwaukee’s housing crisis.
THANK YOU!!!
References