Otak Signed the AIA 2030 Commitment in 2011

Formed Green Otak (GO) Committee

GO Operations
- Office Energy Use
- Waste Reduction and Supplies
- Transportation

GO Training
- Promoting Staff Accreditation
  - LEED
  - WELL
  - ECO Districts
  - Envision

GO Practice
- Improving Design Process To Make “Greener” Work
- AIA 2030 Design Data Exchange

- Net Zero Emerging Leader (NZEL)

Amy Scheckla-Cox
ARCHITECTURE

Zaq Dohallow
ARCHITECTURE
Net Zero Emerging Leaders 2020 Report

Agenda

• Energy Modeling Software
• Preparing Architectural Model
• Method for Energy Modeling
• MEP Integration/Advanced Analysis
• The Road Forward...
Why Revit?

- BIM Management
- EnergyPlus/Insight Energy Modeling
- Widely Used
- Future Standards Integration Potential
- MEP Integration
Preparing Architectural Model for Energy Modeling

- Join wall assemblies to roof and floor
- Add slab edge assemblies
- Correct building location and orientation
- Make sure proper BIM model information is loaded
Method For Energy Modeling
R-Value Creation

Assembly

![Image of building with blue and white sections indicating energy modeling layers]

<table>
<thead>
<tr>
<th>Function</th>
<th>Material</th>
<th>R Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finish 2 [5]</td>
<td>Siding - Board &amp; Batten 12”</td>
<td>0’ 1 1/16</td>
</tr>
<tr>
<td>Finish 1 [4]</td>
<td>Wood - Furring</td>
<td>0’ 0 3/4”</td>
</tr>
<tr>
<td>Membrane Layer</td>
<td>WRB (Weather Resistant Barrier)</td>
<td>0’ 0”</td>
</tr>
<tr>
<td>Substrate [2]</td>
<td>Wood - Sheathing - Plywood</td>
<td>0’ 0 5/8”</td>
</tr>
</tbody>
</table>

Core Boundary Layers Above Wrap
- Wood - Stud Layer with Batt Insulation
- Gypsum Wall Board

Core Boundary Layers Below Wrap
- 0’ 0”
- 0’ 0 5/8”
Input thermal values for walls, windows, doors, roofs, etc.

• Thermal Values can be generated using Revit’s custom options or by using a BIM manager to create assemblies.
• Check all assemblies in structure. Do not assume Revit default values are correct.
• Always compare with as many data sources as possible.
Before and After Thermal Input – R Value Generated

Create R-Values for all thermal elements and generate energy model.
Loading Energy Model To Insight Database
Insight provides a visual aid analysis tool that allows for easy data analysis and variable manipulation.
Just a few of the variables you can change with Insight:

- HVAC
- Lighting Efficiency
- Plug Load Efficiency
- Roof, Wall, Window Insulation
- Orientation
Create Custom Scenarios
- AIA 2030
- Net Zero
- Local Requirements

Insight will automatically change insulation values, orientations, HVAC, etc. in order to provide a closest possible match to custom scenarios.
AIA 2030 Design Data Exchange

- **DDX allows for Energy Modeling Tool data entry**
- **Define source and enter predicted EUI from energy modeling software**
- **Very small percentage of data so far has been generated using Energy Models**
MEP Integration/Advanced Analysis

• Increase communication with MEP teams

• Allows for early design changes

• Faster COMcheck

• State/Federally accepted energy modeling reports
Detailed Report Example Data

Window-Wall Ratio

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>North (315 to 45 deg)</th>
<th>East (45 to 135 deg)</th>
<th>South (135 to 225 deg)</th>
<th>West (225 to 315 deg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Wall Area [ft²]</td>
<td>3378.42</td>
<td>823.48</td>
<td>853.66</td>
<td>968.48</td>
<td>612.79</td>
</tr>
<tr>
<td>Above Ground Wall Area [ft²]</td>
<td>3378.42</td>
<td>823.48</td>
<td>853.66</td>
<td>968.48</td>
<td>612.79</td>
</tr>
<tr>
<td>Window Opening Area [ft²]</td>
<td>727.92</td>
<td>334.52</td>
<td>286.58</td>
<td>52.93</td>
<td>53.91</td>
</tr>
<tr>
<td>Gross Window-Wall Ratio [%]</td>
<td>21.56</td>
<td>36.22</td>
<td>33.57</td>
<td>5.37</td>
<td>8.80</td>
</tr>
<tr>
<td>Above Ground Window-Wall Ratio [%]</td>
<td>21.56</td>
<td>36.22</td>
<td>33.57</td>
<td>5.37</td>
<td>8.80</td>
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</tbody>
</table>

Electricity Peak Demand (kW)

![Graph showing electricity peak demand for different months and categories]
The Road Forward

• Increased collaboration on federal, state and local levels
• Standardization of energy modeling practice
• Increased regulation and implementation of energy code
• Demand from tenants will play a huge role