2014 AIA 2030 COMMITMENT RESULTS

- Only 4 of 16 retail projects met or exceeded the 25% reduction threshold
- 12 of 16 food service-type projects exceeded the target, with 4 hitting more than a 55% reduction
- 1 office project exceeded the target reduction
FAST FORWARD TO 2015

Lighting Power Density – (LPD): What It Is, Why It Matters and How It’s Calculated

May 19, 2015
AND THEN TO 2016

Using the DDx for AIA 2030 Reporting: A How-to Guide

February 2016
2015 AIA 2030 COMMITMENT RESULTS – WHAT HAPPENED???

18.4%
2015 AIA 2030 COMMITMENT RESULTS – WHAT HAPPENED???

• Only 17 of 48 interiors projects met the 25% reduction threshold

• 6 of 27 retail projects met the 25% reduction threshold

• All 4 food service-type projects exceeded the target

• 1 office project and 1 dormitory project exceeded the target
A POSSIBLE SOLUTION?

USING REVIT TO CALCULATE LPD TO CREATE MORE EFFICIENTLY LIT SPACES IN ORDER TO MEET THE AIA 2030 COMMITMENT TARGET

July 2016
A POSSIBLE SOLUTION?

1. Setup “spaces” to define areas for LPD calculations
2. Utilize schedules to calculate LPD
3. Adjust parameters in light fixtures to calculate LPD
4. Alter lighting layouts to be more energy efficient
5. Meet and exceed the 2030 target reduction!
A POSSIBLE SOLUTION?

ELECTRICAL PARAMETER SETTINGS

You will need to do this for EVERY LIGHT FIXTURE in the project.

- Edit the Light Fixture Family
- Change the Project Units.
- Change the Discipline to “Electrical”
- Change the units for Apparent Power.
- Change the Units to “Watts”.
- Click “OK”.

[Diagram showing project units settings with red highlights on the Apparent Power and Watts settings]
A POSSIBLE SOLUTION?

- Add the Electrical Connector.
- The default placement is face based. Place the green symbol on the face that hosts your fixture (ceiling, wall, etc.).
- Shorten any reference planes that extend far beyond the light fixture.
## A POSSIBLE SOLUTION?

### CALCULATING THE LPD

**Case Study #1**

<table>
<thead>
<tr>
<th>No.</th>
<th>Room</th>
<th>Area</th>
<th>Unbounded Height</th>
<th>Actual Lighting Load</th>
<th>LPD</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>101</td>
<td>Sales</td>
<td>1702 SF</td>
<td>24' - 10&quot;</td>
<td>4422 W</td>
<td>2.60 W/ft²</td>
<td>First Floor</td>
</tr>
<tr>
<td>102</td>
<td>Exam 1</td>
<td>157 SF</td>
<td>24' - 10&quot;</td>
<td>90 W</td>
<td>0.57 W/ft²</td>
<td>First Floor</td>
</tr>
<tr>
<td>103</td>
<td>Pre-Exam</td>
<td>196 SF</td>
<td>24' - 10&quot;</td>
<td>120 W</td>
<td>0.61 W/ft²</td>
<td>First Floor</td>
</tr>
<tr>
<td>104</td>
<td>Exam 2</td>
<td>157 SF</td>
<td>24' - 10&quot;</td>
<td>90 W</td>
<td>0.57 W/ft²</td>
<td>First Floor</td>
</tr>
<tr>
<td>105</td>
<td>Utility</td>
<td>55 SF</td>
<td>24' - 10&quot;</td>
<td>33 W</td>
<td>0.60 W/ft²</td>
<td>First Floor</td>
</tr>
<tr>
<td>106</td>
<td>Men's Restroom</td>
<td>48 SF</td>
<td>24' - 10&quot;</td>
<td>33 W</td>
<td>0.69 W/ft²</td>
<td>First Floor</td>
</tr>
<tr>
<td>107</td>
<td>Women's Restroom</td>
<td>48 SF</td>
<td>24' - 10&quot;</td>
<td>33 W</td>
<td>0.69 W/ft²</td>
<td>First Floor</td>
</tr>
<tr>
<td>108</td>
<td>Stock</td>
<td>152 SF</td>
<td>24' - 10&quot;</td>
<td>99 W</td>
<td>0.65 W/ft²</td>
<td>First Floor</td>
</tr>
<tr>
<td>109</td>
<td>Breakroom</td>
<td>302 SF</td>
<td>24' - 10&quot;</td>
<td>249 W</td>
<td>0.83 W/ft²</td>
<td>First Floor</td>
</tr>
<tr>
<td>110</td>
<td>Corridor</td>
<td>185 SF</td>
<td>24' - 10&quot;</td>
<td>48 W</td>
<td>0.26 W/ft²</td>
<td>First Floor</td>
</tr>
<tr>
<td></td>
<td><strong>Grand total:</strong></td>
<td><strong>3000 SF</strong></td>
<td></td>
<td><strong>5217 W</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Target LPD = 1.125
Allowed Wattage = 1.125 * 3000sf = 3375W

Additional Allowed LPD = 1.0
Additional Allowance = 1.0 * 1702sf = 1702W

Total Allowed Wattage = 5077W

5217W > 5077W

Proposed Watts
Allowed Watts
A POSSIBLE SOLUTION?

Case Study #1

5217W > 5077W

Proposed Watts > Allowed Watts

1.15W/sf > 1.125W/sf

Proposed LPD > Target LPD

Missed Target
13.7kBtu/sf/yr 10.0kBtu/sf/yr

4.5kBtu/sf/yr 23.0kBtu/sf/yr

8.8kBtu/sf/yr 6.3kBtu/sf/yr

9.8kBtu/sf/yr

NESEA BUILDING ENERGY BOSTON
-50%
**PROJECT MAKEUP**

- **Single Family**: 80%
- **Multifamily**: 20%

- **Single Family**: 70%
- **Multifamily**: 10%
- **Mixed Use**: 20%
2030 PROGRESS

% pEUI Reduction

- 2010
- 2011
- 2012
- 2013
- 2014
- 2015

ZED  AIA  2030 Reduction Target

NESEA BUILDING ENERGY BOSTON
NORTHEAST SUSTAINABLE ENERGY ASSOCIATION
COMPARABLE PROJECTS

Data Filters
- Reporting Year: all
- Gross Floor Area: 0-10,000 sf
- Use Type: Single Family – Detached
- Climate Zones: 4, 5 & 6
In house energy model: Passive House Planning Package (PHPP), occasionally RemRate

- 1 modeler
- 4/6 design professionals = CPHC = understand PHPP
- 100% projects modeled in 2015
Predicted vs. Actual Usage (kWh/yr)

- **Heating**: Predicted Use (4000 kWh/yr) vs. Actual Use (3500 kWh/yr)
- **Cooling**: Predicted Use (1000 kWh/yr) vs. Actual Use (800 kWh/yr)
- **Lighting**: Predicted Use (500 kWh/yr) vs. Actual Use (450 kWh/yr)
- **Domestic Hot Water**: Predicted Use (6000 kWh/yr) vs. Actual Use (5500 kWh/yr)
- **Appliances**: Predicted Use (5000 kWh/yr) vs. Actual Use (4000 kWh/yr)
A CONVERSATION
DISCUSSION
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