Summer Series of Webinars

Second Thursday of each month, from 1 - 2pm

June 9
Solar 101 + Financing and Contracting
Great for Developers

July 14
Solar Design for New Construction
Great for Architects and Developers

August 11
Zoning & Certifications
Great for Architects and Developers
Agenda

1. Introductions
2. Solar Financing Models
4. Structural / Racking Solutions
5. Battery Storage
6. How to Work with Resonant
Who We Are

- **Mission:** To expand access to clean energy in underinvested communities
- **About:** Boston-based development company building projects in MA, NY
- **Focus:** Affordable Housing, Nonprofit, Small Commercial
- **Mechanics:** Aggregating solar projects for low-cost, high quality installations and impact financing
Leader with Nonprofits & Affordable Multifamily

MPDC - Roxbury MA: 17 SITES

SBNDC - Boston MA: 15 Sites

Dorchester Bay EDC - Boston MA

Temple Emunah - Lexington MA
Example New Construction
Clients We’ve Worked With:

1. The Community Buildings
2. Trinity Financial
3. Neighborhood of Affordable Housing (Noah)
4. The Neighborhood Developers
5. Dakota Partners
6. Hebrew Senior Life
7. Dorchester Bay EDC
8. Urban Edge
9. Main South CDC
10. Housing Corporation of Arlington
11. Lawrence Community Works
12. Madison Park Development Corporation
1. Solar Financing Models
## Solar Financing Models

### Most Common

<table>
<thead>
<tr>
<th>TYPE</th>
<th>FEATURES</th>
<th>BEST OPTION WHEN...</th>
</tr>
</thead>
</table>
| **Direct Ownership** (UPFRONT COST) | ● Client pays 100% of upfront cost.  
● Client gets tax credits, depreciation, & incentives.  
● Best if planned for early and included in budget, with savings/revenue underwritten by SR Lender | **New Construction**, Refinancing  
● Property has a tax-eligible partner to monetize solar tax benefits w/ LIHTC  
● Property has a tax-exempt bond, which can complicate 3rd party ownership models |
| **Power Purchase Agreement (PPA - NO COST)** | ● Financier provides 100% of upfront and ongoing costs (insurance, maintenance)  
● 25-year initial term, with buyout options.  
● Client buys all electricity produced for onsite usage and receives 20-50%+ discount with a locked in 1-2% escalator. | **New Construction**, Y1-Y10  
● New: Tax partners / lenders don’t want to take on upfront cost of solar.  
● Y1-Y10: Project is A) under LIHTC restrictions and needs no-cost option and B) Roof is <= 10 yrs old for solar suitability. |
# Solar Financial Models

## Less Common

<table>
<thead>
<tr>
<th>TYPE</th>
<th>FEATURES</th>
<th>BEST OPTION WHEN...</th>
</tr>
</thead>
</table>
| Site Lease (Community Solar)      | ● Financier provides 100% of upfront and ongoing costs (insurance, maintenance)  
                                         ● 20-year initial term, with buyout options.  
                                         ● Client receives 10-15% of the output as “free” electricity credits in lieu of a cash lease payment.  
                                         ● Rest of power sold at a 10-20% discount to offsite customers in same utility territory. | New Construction, Y1-Y10  
                                         ● New: Tax partners / lenders don’t want to take on upfront cost of solar  
                                         ● Y1-Y10: Project is A) under LIHTC restrictions and needs no-cost option and B) Roof is <= 10 yrs old for solar suitability. |
2. Estimating Energy Usage
Estimating Energy Usage

- **Key Considerations**
  - Solar size (kW-DC) relative to common area usage
  - Utility rate class
  - Single vs. 3 phase service, & net metering rules

- **Techniques:**
  - HERS modeling, or other usage modelling
  - Using load assumptions to estimate building’s annual electric usage
<table>
<thead>
<tr>
<th>Building Type*</th>
<th>Est Common Usage (kWh/yr)</th>
<th>% Solar PV Can Cover*</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Townhouse or Scattered Site</td>
<td>&lt; 15,000</td>
<td>300%+</td>
<td>Typically just exterior lighting. In rural settings, sometimes septic or water pumps.</td>
</tr>
<tr>
<td>3 Story+: Low Common</td>
<td>60,000 - 80,000</td>
<td>70-100%</td>
<td>Often includes elevators, HRVs, common laundry, and lighting + HVAC for hallways and common spaces.</td>
</tr>
<tr>
<td>3 Story+: High Common</td>
<td>300,000 - 400,000</td>
<td>20-40%</td>
<td>Includes heating/cooling load on house meter, typically as a VRF system.</td>
</tr>
</tbody>
</table>

Resonant Usage Estimating Blog Post Link
**Example Engineer’s Estimate**

### Load Information

Fill section below with **new** load for any 3ph service or 1ph greater than 200 amps

For each line below provide connected load in **Total kW** or HP (do not duplicate)

**Note:** If there are multiple buildings, please submit a separate Load Sheet for each.

**SERVICE SIZE**  
1200 amp  
120/208 volt  
3 phase

**SQUARE FOOTAGE**  
55,600

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>kW</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSIDE LIGHTING</td>
<td>55.6</td>
<td>4388 hrs/year</td>
</tr>
<tr>
<td>OUTSIDE LIGHTING</td>
<td>5.0</td>
<td>4388 hrs/year</td>
</tr>
<tr>
<td>ELECTRIC HEATING</td>
<td>20.0</td>
<td>6552 hrs/year</td>
</tr>
<tr>
<td>AIR CONDITIONING</td>
<td>253.0</td>
<td>6552 hrs/year</td>
</tr>
<tr>
<td>WATER HEATING</td>
<td>5.0</td>
<td>6552 hrs/year</td>
</tr>
<tr>
<td>REFRIGERATION</td>
<td>50.4</td>
<td>4388 hrs/year</td>
</tr>
</tbody>
</table>

**Additional Equipment**

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>kW</th>
<th># of Units</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receptacles</td>
<td>174.8</td>
<td></td>
<td>2912 hrs/year</td>
</tr>
<tr>
<td>Range</td>
<td>304.0</td>
<td>38</td>
<td>3276 hrs/year</td>
</tr>
<tr>
<td>Dryer</td>
<td>30.0</td>
<td>8</td>
<td>4388 hrs/year</td>
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</tbody>
</table>

**Motors**

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>HP</th>
<th># of Units</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevator</td>
<td>25</td>
<td>1</td>
<td>1456 hrs/year</td>
</tr>
</tbody>
</table>

**Total Connected Load**  
922.8 kW

**Total Diversified Load**  
384.43 kW
3. Structural / Racking Solutions
## Common Racking Solutions

### Most Common

<table>
<thead>
<tr>
<th>Racking Design Choice</th>
<th>Roof Type</th>
<th>Weight</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Attachments</td>
<td>Sloped (Always)</td>
<td>2-3 lbs/sf.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Flat (Sometimes)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: sometimes designs can be both where it’s mostly ballasted, but requires a few penetrations to meet wind loading requirements.
# Special Racking Solutions

<table>
<thead>
<tr>
<th>Racking Design Choice</th>
<th>Roof Type</th>
<th>Weight</th>
<th>Additional Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelet Racking</td>
<td>Flat</td>
<td>7-10 lbs/sf.</td>
<td>Heaviest solution due to density. It is the most dense way to install panels on a flat roof with viable sunlight access.</td>
</tr>
</tbody>
</table>

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*Image: Solar panels installed on a flat roof.*
Battery Storage

- **Benefits**: Resiliency
- **Tradeoffs**: Low financial incentives (minimal increase to NOI)

- Battery storage doesn’t always work well with 3rd party financier models
- Permitting and siting continues to be a hurdle.
- CEG Grant provides $7,500 TA budget / site via Kresge.
Reference Photo for Battery Size

Example Site: Methuen, MA
Example Size: 1092 kWh
How to Work With Resonant
How to Work with Resonant

1. Provide Intake Info + Drawings
2. Review Feasibility Analysis (No Cost) + 2 Wks
3. Sign Letter of Intent (LOI) with design retainer
4. Sign Contract + 3-4 months
5. Resonant delivers solar PV solution at a timeline that works for the client
   a. time sensitivity on Fed Tax Credit and first-come-first-serve MA SMART program.
6. Note: Installation is typically at very end of construction after all roof, HVAC, Plumbing work is complete + permanent power brought to site
New Project Intake Process

New Construction - Key info:

1. Groundbreaking date (estimated)
2. Project tax credits (LIHTC, Historic), and whether financing is closed or still pending.
3. Target building certification(s)
4. Electric service (3 phase vs. single phase)
5. Target solar output (kWh/year)
6. Common-area electricity usage (est.)
7. Drawing sets (roof 1st; then structural & electrical)

Visit New Construction Webpage - for intake sheet and submission process.
Thank You

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