



RESONANT ENERGY



*Solar PV for Affordable
Housing New Construction*

June 9, 2022

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*

LISC BOSTON

40  **MACDC**
Celebrating 40 years

Agenda

- 1. Introductions**
- 2. Solar Financing Models**
- 3. Estimating Energy Usage for New Construction**
- 4. Structural / Racking Solutions**
- 5. Battery Storage**
- 6. How to Work with Resonant**

Who We Are

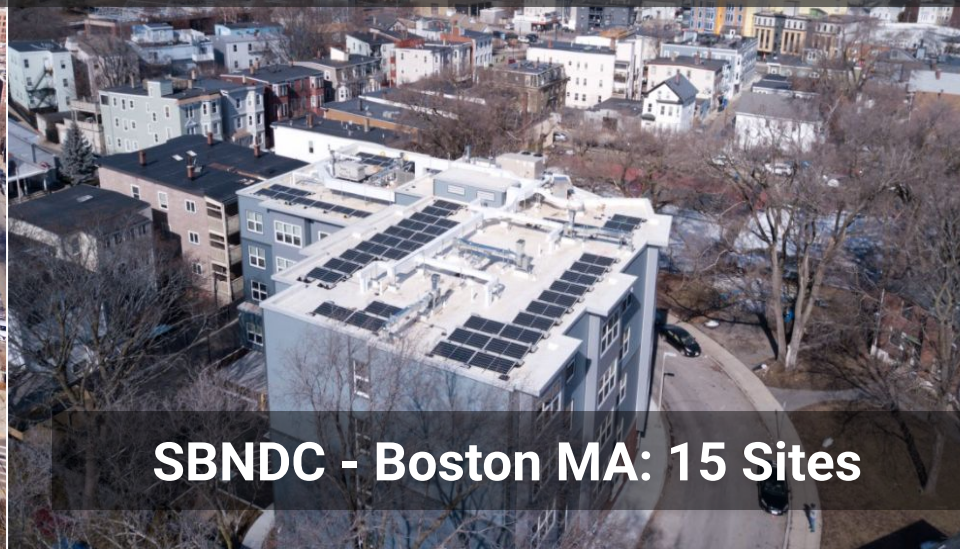
- **Mission:** To expand access to clean energy in underinvested communities
- **About:** Boston-based development company building projects in MA, NY
- **Focus:** Affordable Housing, Nonprofit, Small Commercial
- **Mechanics:** Aggregating solar projects for low-cost, high quality installations and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

An aerial photograph of a town featuring a prominent white clock tower with a green dome. The tower has two circular clock faces and is topped with a bell tower. In the foreground, a grey roof is covered with a grid of solar panels. The surrounding town includes various buildings, some with solar panels on their roofs, and a parking lot with several cars. The sky is blue with scattered white clouds.

Solar Financing Models

Most Common

TYPE	FEATURES	BEST OPTION WHEN...
Direct Ownership (UPFRONT COST)	<ul style="list-style-type: none"> • 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 	<p>New Construction, Refinancing</p> <ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • Financier provides 100% of upfront and ongoing costs (insurance, maintenance) • 25-year initial term, with buyout options. • Client buys all electricity produced for <u>onsite</u> usage and receives 20-50%+ discount with a locked in 1-2% escalator. 	<p>New Construction, Y1-Y10</p> <ul style="list-style-type: none"> • 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

TYPE	FEATURES	BEST OPTION WHEN...
Site Lease (Community Solar)	<ul style="list-style-type: none">• 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 <u>offsite</u> customers in same utility territory.	New Construction, Y1-Y10 <ul style="list-style-type: none">• 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**

- Going All Electric? Heating & Cooling + Landlord / Tenant Split Incentive Issues.
- 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

Common Energy Profiles

Building Type*	Est Common Usage (kWh/yr)	% Solar PV Can Cover*	Notes
Townhouse or Scattered Site	< 15,000	300%+	Typically just exterior lighting. In rural settings, sometimes septic or water pumps.
3 Story+: Low Common	60,000 - 80,000	70-100%	Often includes elevators, HRVs, common laundry, and lighting + HVAC for hallways and common spaces.
3 Story+: High Common	300,000 - 400,000	20-40%	Includes heating/cooling load on house meter, typically as a VRF system.

[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 amps 120/208 volts 3 phase

SQUARE FOOTAGE* 55,600

Equipment Type	kW		Usage	
INSIDE LIGHTING	55.6	for	4368	hrs/year
OUTSIDE LIGHTING	5.0	for	4368	hrs/year
ELECTRIC HEATING	20.0	for	6552	hrs/year
AIR CONDITIONING	253.0	for	6552	hrs/year
WATER HEATING	5.0	for	6552	hrs/year
REFRIGERATION	50.4	for	4368	hrs/year
Additional Equipment	kW	# of Units	Usage	
Receptalces	174.8		for	2912 hrs/year
Range	304.0	38	for	3276 hrs/year
Dryer	30.0	6	for	4368 hrs/year
			for	hrs/year
			for	hrs/year
			for	hrs/year
			for	hrs/year
Motors**	HP	# of Units	Usage	
Elevator	25	1	for	1456 hrs/year
			for	hrs/year
			for	hrs/year
			for	hrs/year

Total Connected Load	922.8	kW
Total Diversified Load	384.43	kW

An aerial photograph of a historic white clock tower with a green dome. The tower shows significant structural damage, particularly in the upper sections. The roof of the building is covered with solar panels. The surrounding area includes a parking lot with several cars, a street with a few pedestrians, and various buildings and trees in the background under a blue sky with scattered clouds.

3. Structural / Racking Solutions

Common Racking Solutions

Most Common

Racking Design Choice	Roof Type	Weight	Additional Notes
Ballast Mounted	Flat	6-9 lbs/sf.	No penetrations - easy / cost effective solar install. Heaviest solution.
Mechanical Attachments	Sloped (Always) Flat (Sometimes)	2-3 lbs/sf.	

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

Special Racking Solutions

Racking Design Choice	Roof Type	Weight	Additional Notes
Wavelet Racking (Ballast)	Flat	7-10 lbs/sf.	Heaviest solution due to density. It is the most dense way to install panels on a flat roof with viable sunlight access.



Battery Storage



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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