

Zero Net Carbon

Building Zoning

On-site Renewable Energy

TAG Meeting #1

Presentation and Discussion Notes



Zoom Meeting Guidance

The BPDA will record this meeting and post it on BPDA's Zero Net Carbon Building Zoning webpage. The recording will include the presentations, discussions and a transcript of Q&A / Chat comments.

It is possible that participants may be recording this meeting as well.

If you prefer not to be recorded during the meeting, please turn off your microphone and camera.

Zoom Meeting Guidance

- Help us ensure that this conversation is a pleasant experience for all.
 - Please mute your mics during the presentation to avoid background noise.
 - It's great to see you! Participant video can be on during the meeting.
 - **Use the Chat** feature for questions and comments during the presentation.
 - Use the Raise Hand feature during the discussion segment.
 - Please be respectful of each other's time.
- As always please feel free to reach out to me directly!
John Dalzell, AIA, LEED Fellow at John.Dalzell@Boston.gov

COVID-19 Resources

Stay up-to-date with COVID-19 related announcements, City of Boston reopening plans, and resources for you and your community at:

boston.gov/coronavirus



The screenshot shows the City of Boston website header with the logo, Mayor Martin J. Walsh's name, and navigation links for 'PAY AND APPLY' and 'PUBLIC NOTICES'. The main heading is 'CORONAVIRUS DISEASE (COVID-19) IN BOSTON'. Below the heading is a paragraph: 'The state has updated guidance on the Reopening Massachusetts website. We also continue to update City-specific guidance for Boston on our reopening website.' The date 'July 12, 2020' is shown. A 'PUBLISHED BY: PUBLIC HEALTH COMMISSION' logo is present. A 'MULTILINGUAL CONTENT' section lists various languages: العربية (Arabic), Kriolu (Cabo Verdean creole), 中文 (Chinese), Français (French), Kreyòl ayisyen (Haitian Creole), Português (Portuguese), and Русский (Russian). At the bottom, it says 'TOPICS COVID-19 UPDATES LATEST PRESS CONFERENCE' and 'BOSTON (AS OF FRIDAY, JULY 10) 13,673 CASES | 9,683 RECOVERED'.

AGENDA

1. Welcome and Introductions (10 min)
2. ZNC Overview & Update (5 min)
3. Solar PV Projects and Practices (5 min)
4. Solar Ready vs. Solar Optimized (15 min)
5. Key Considerations: (40 min)
6. Share resources (5 min)
7. Next Steps (5 min)

GOALS

- Expand on-site renewable energy generation in the City of Boston
- Establish minimum standards for installation of on-site renewable energy systems
- Reward innovation

INTRODUCTIONS

CONSULTING AND CITY TEAM

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TAG MEMBERS

Ben Myers, Boston Properties

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Chris Gray, RENU Communities

David Eisenbud, Distributed Solar Development, LLC

Cynthia Cresswell Cook, Earth Energy LLC

Emily Jones, LISC

Isaac Baker, Resonant Energy

James Liebman, HMFH Architects

James Manzer, ReVision Energy

Patrick Haswell, Vicinity Energy

Scott Johnstone, VHB

Scott McBurney, Vicinity Energy

OVERVIEW & UPDATES

3 | STRENGTHEN GREEN BUILDING ZONING REQUIREMENTS TO A ZERO NET CARBON STANDARD

Article 37 Green Buildings - Currently

- Projects > 50k SF
- LEED minimum “Certified” level
- Carbon Neutral Building Assessment
- Smart Utilities Standards

ZNC Standard and Updates:

- Establish ZNC Framework & Standards
- Revise SF Threshold to > 20k SF
- Revise minimum LEED Outcome
- Update Review Process
- Align with BERDO Standards



ZNC Building Zoning

POLICY FRAMEWORK

- **Low Carbon Building**
Establish attainable reach emission targets
- **On-site Renewable Energy**
Optimize Generation within limitations
- **Renewable Energy Procurement**
Establish weighted affordable and meaningful options and standards

PRACTICE & REPORTING

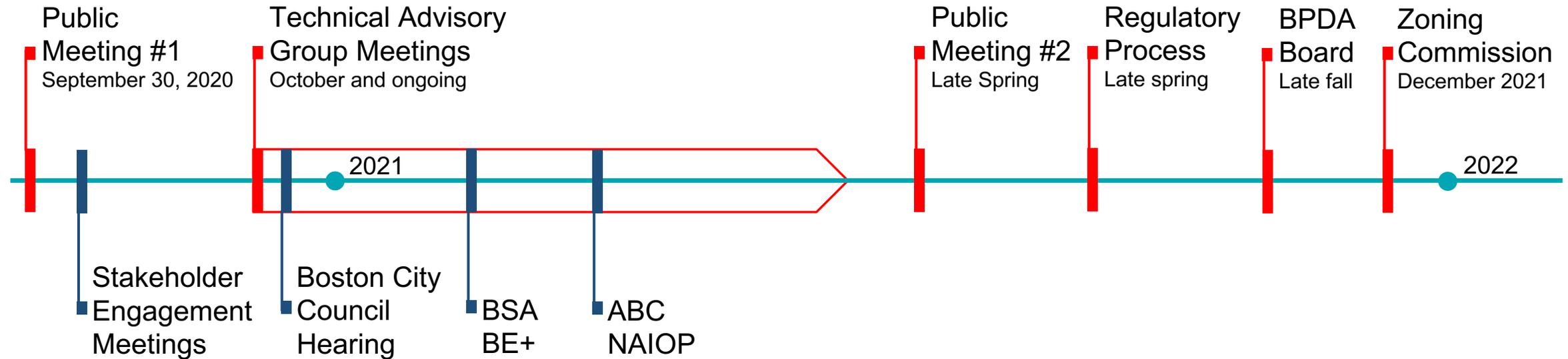
- **Utilize Industry Best Practices**
Work with existing & emerging standards
- **Update Review / Reporting Procedures**
Align ZNC and BERDO standards and coordinate metro area policies

PRINCIPLES & VALUES

- **Leadership** - recognize & reward excellence
- **Feasibility** - we can do good and do well!
- **Balance** - varying success across strategies
- **Innovation** - encourage new practices
- **Transformation** - accelerate pace and breadth of change throughout the industry

ZNC Building Zoning

PUBLIC PROCESS TIMELINE



- Open House and Office Hours events - *to be schedule*
- Organizational Meetings – *as requested*

ZNC Buildings

Bunker Hill Housing Building F

Modeled performance:

271,844 sf

- EUI 19.1 kBtu/sf/yr
- CEI 1.48 kg CO₂e/sf/yr
- Solar PV 81.9 kW

CO₂e Emissions (tons/yr)

Building	445.
On-site RE	36. (less)
<u>RE Procure</u>	<u>409. (less)</u>
Zero Net	0.



ZNC Buildings

BU Data Sciences Building

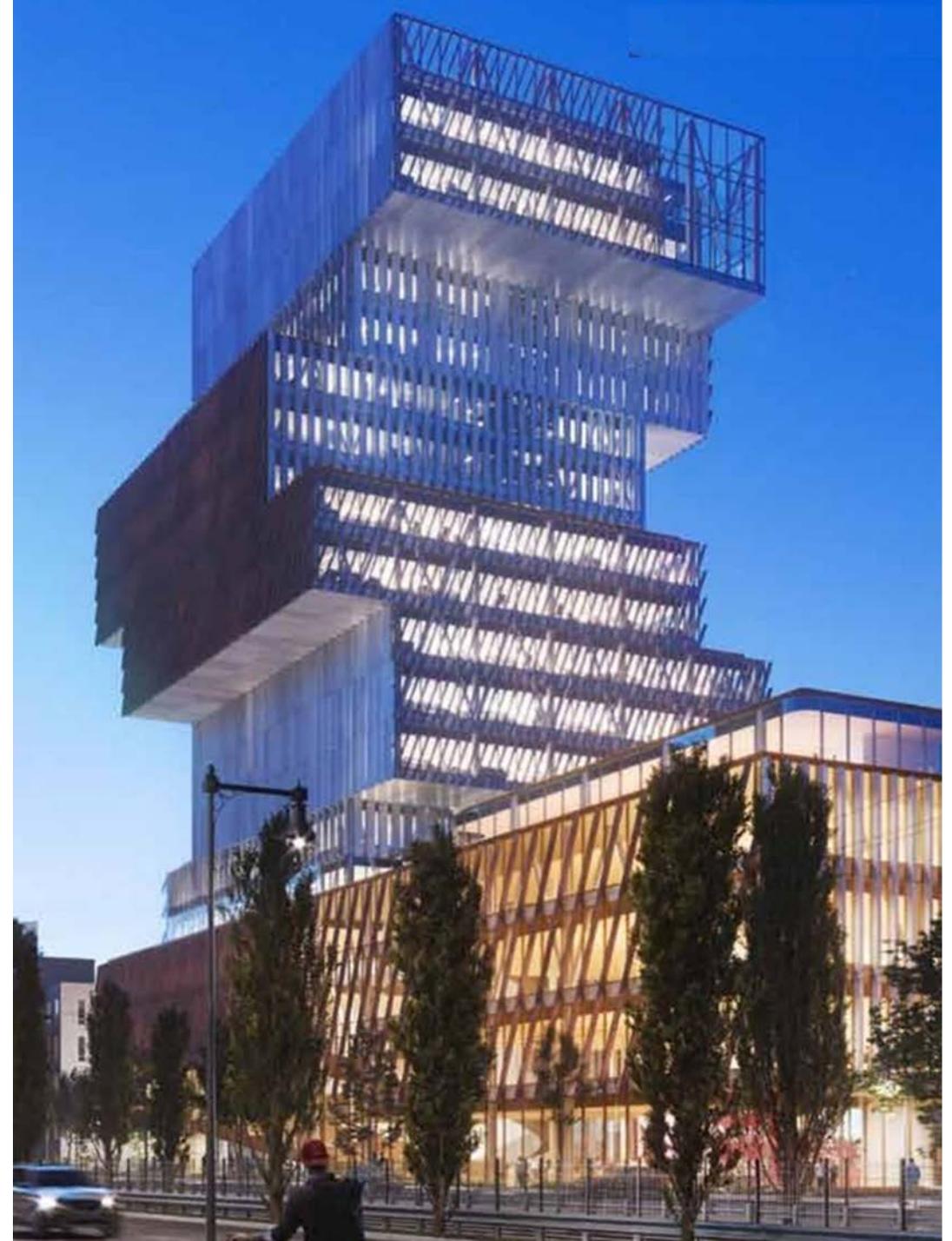
Modeled performance:

316,000 sf

- EUI = 39 kBtu/sf/yr
- CEI = 2.9 kg CO₂e/sf/yr
- Solar PV 964 kWh (campus)

CO₂e Emissions (tons/yr)

Building	1,090.
On-site RE	278. (less)
RE Procure	812. (less)
<hr/>	<hr/>
Zero Net	0.



ZNC Buildings

15 Necco Street

Modeled performance:

316,000 sf

- EUI = 116 kBtu/sf/yr
- CEI = 9.9 kg CO₂e/sf/yr
- Solar PV 300 kW

CO₂e Emissions (tons/yr)

Building	44,000.
On-site RE	117. (less)
<u>RE Procure</u>	<u>43,883. (less)</u>
Zero Net	0.



**boston planning &
development agency**



On-site Renewable Energy

15 Necco Street

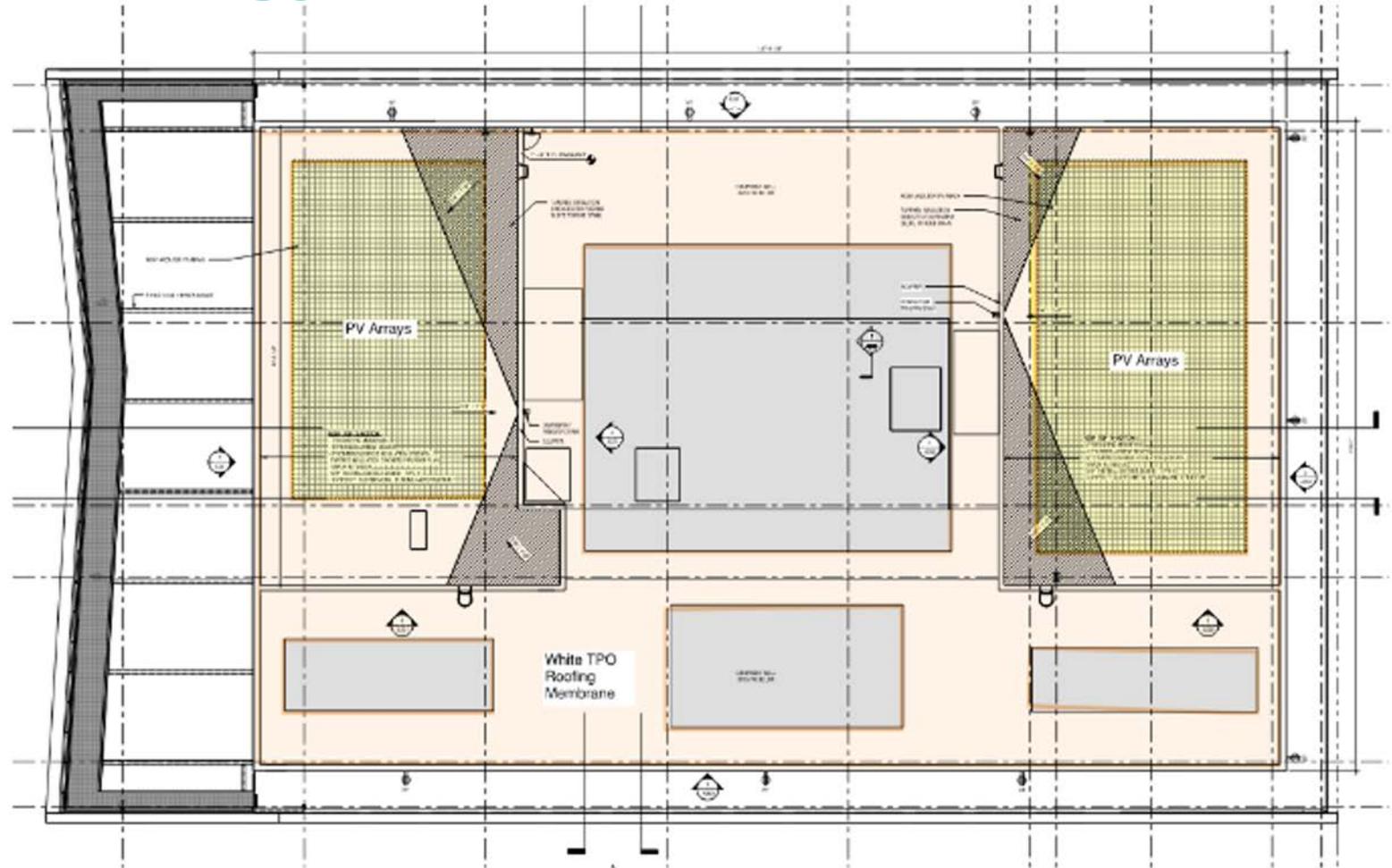
Modeled performance:

316,000 sf

- EUI = 116 kBtu/sf/yr
- CEI = 9.9 kg CO₂e/sf/yr
- Solar PV 300 kW /
320 kWh/yr

CO₂e Emissions (tons/yr)

Building	44,000.
On-site RE	117. (less)
RE Procure	43,883. (less)
Zero Net	0.



On-site Renewable Energy Installation

Madison Park Development Corporation



Solar Portfolio Summary

Solar PV Projects	17
Total kW DC	580
Household Equivalent	113
Panel Count	1,470
Est. Year 1 Output (kWh)	693,565
Acres of Forest Preserved	608
Est. Portfolio Year 1 Savings	\$48,940*
Est. Portfolio 25-Year Savings	\$867,046

**includes a \$30,000 one-time payment to Beryl Gardens to help offset its roof replacement costs*

RESONANT ENERGY

2

Solar Ready vs. Solar Optimized?

Debra Perry, Senior Associate

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CADMUS



On-Site Renewable Energy

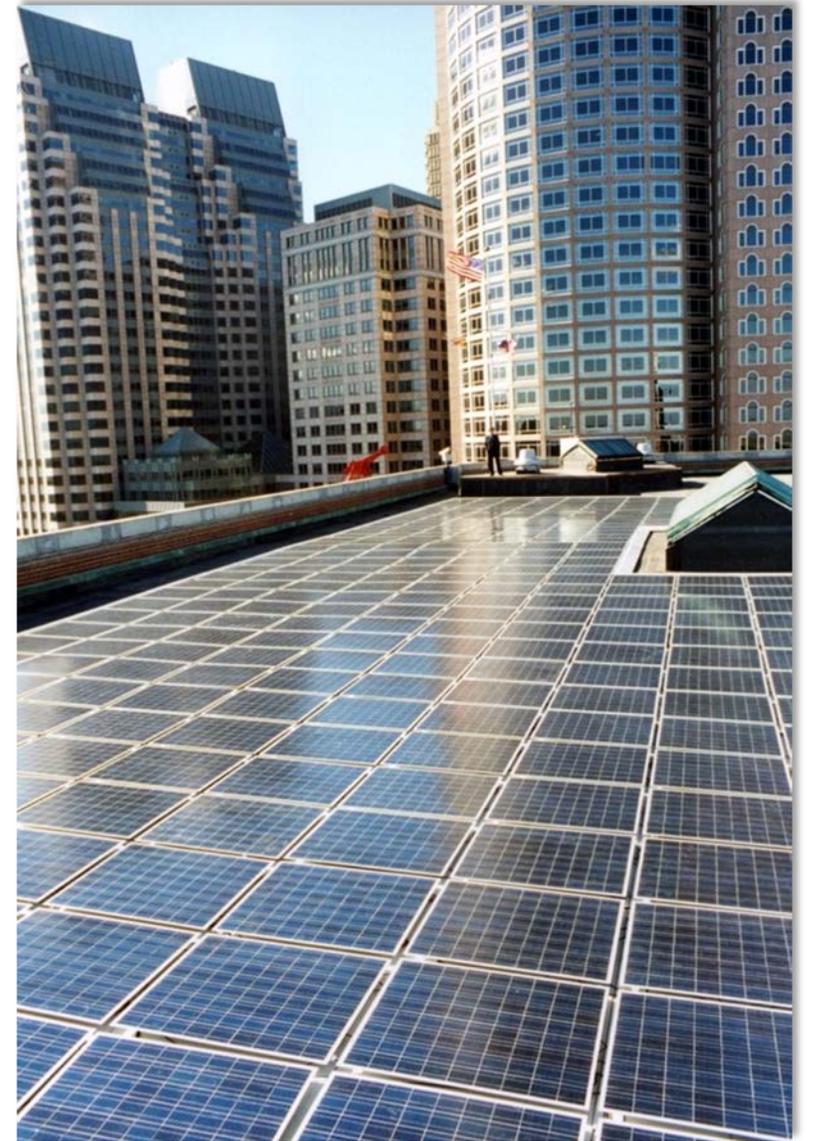
Most common urban renewable energy sources:

- Solar Photovoltaic Systems - generates electricity
- Ground Source (Geothermal) Heat Pump Systems - generates thermal energy
- Air Source Heat Pump Systems - generate thermal energy

On-site Renewable Energy Sources are located on building roof(s), facades (building integrated), on the ground, and in the ground.

Boston – SolSmart

Through [SolSmart designation](#), Boston is recognized for its efforts to reduce local barriers to solar energy and is eligible for technical assistance to foster the growth of stronger solar market.



Optimizing On-Site Generation

Net Zero Carbon buildings optimize on-site renewable energy production.

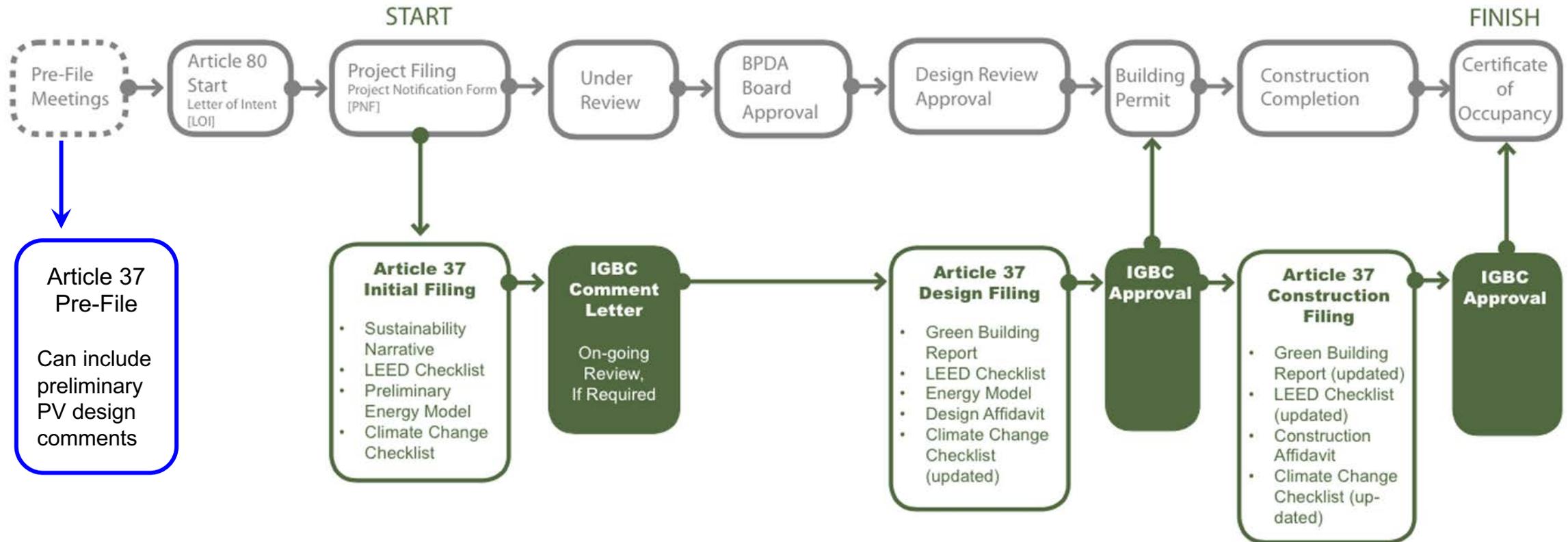
- **Early Design Integration**
Site, building form and orientation
- **Multiple Opportunities**
Canopies, facades / BIPV, rooftops
- **Maximize Generation**
Multiple systems, reduced GHG emissions, increased resiliency



Photo by Atlantis Energy, NREL 13999

Article 37 Design Review Process

Potential to introduce early solar PV design integration



Benefits of Local Generation

Emission Reductions

Electric Grid Management

Local Job & Business Creation

Public Health

Building Resiliency



E+ 232 Highland, Credit: Studio G Architects

Precedent for Requiring On-Site Generation?

Watertown, MA

8.05(a) Definitions

- Defines a “solar energy system,” including ground-mounted and roof-mounted definitions.
- Defines the “solar-ready zone,” as 50% of the roof area that is either flat or oriented between 110 degrees and 270 degrees of true north, exclusive of mandatory access or set back areas as required by the MA Fire Code.

8.05(b) Requirements

- Development requiring site plan review approval (Residential and Non-Residential Developments specific to Watertown), that is greater than 10,000 gross square feet **shall include a solar energy system that is equivalent to a minimum of 50% of the roof area of all buildings.**
- In cases where a site includes an **uncovered parking structure** the structure shall also have a **solar energy system installed to cover a minimum of 90% of its top level.**

Precedent for Requiring On-Site Generation?

Watertown, MA - continued

8.05(c) Solar Energy System Assessment

- A solar assessment shall be submitted and must include:
 1. A solar energy system analysis for the site, detailing layout and annual production
 2. The maximum feasible solar zone area of all structures
 3. An initial solar energy system assessment, submitted for site plan review
 4. A final solar installation plan to be reviewed and approved, prior to building permit being issued

8.05(d) Exemptions

- Details exemptions to the solar requirement, such as significant shading or the location is deemed otherwise unviable.

8.05(e) Safety and Locations Guidelines

- Emergency Access to the roof per MA Fire Code
- Safety of array design (setbacks)

Discussion Notes

How can the City move from Solar Ready to Solar Optimized?

- Important to consider what “optimized” means to different building types and how to address unique issues. For example, when working on affordable housing projects, finding that the locations of drainage, pipes, HVAC, and other roof impediments to solar, are not planned for far enough in advance and often infringe on the area planned for solar. This jeopardizes financing opportunities, resulting from uncertainty created by repeated solar PV array design changes throughout the development process.
- Deploying a “Define and Defend” strategy for the solar zone could be the best approach for addressing building type-specific issues as they arise during planning and construction.
- Requirements should be mandatory but must be nuanced enough to provide for a number of exemptions and exceptions to ensure viable projects are not excluded and alternatives can be figured out on an as-needed basis. The expectation should be set at the outset to meet requirements for on-site RE whenever possible, but flexibility should be built in to help developers achieve these targets and maximize impact.
- On-Site generation should be prioritized over off-site procurement. Must balance project economics and “optimization” of solar development.
- Optimization as a standard and minimum requirements will need to be defined clearly; developers will want clear guidance. Should consider the possibility of incentivizing developers to exceed the minimum standards as well and to protect against developers seeking to do the bare minimum.
- Must also consider the potential for buildings with low common area electricity load and how they will be treated/directed to deploy any energy generation on-site. Should also consider incentivizing developers to incorporate common area loads into their plans.

Key Considerations

- **Physical Feasibility:** Shading, roof uses, setbacks/access, etc.
- **Regulatory Feasibility:** Utility interconnection, zoning code, building code, etc.
- **Financial Feasibility:** Costs, incentives, credits and electricity rates (savings, virtual net metering), and ownership models

What factors need to be accommodated in potential zoning?

Discussion Questions

- What are the pros and cons of SMART program funded projects where the RECs are retained by the utilities?
- How can the City manage fluctuations in costs, benefits, and evolving regulations?
- How can the City engage with building developers on the topic of financial feasibility? (ie, how to establish a shared understanding of what constitutes a financially feasible project?)

Discussion Notes

What are the pros and cons of SMART program funded projects where the RECs are retained by the utilities?

- The SMART program is heading toward the later stages as remaining capacity is continuing to fill up relatively quickly. However, recent RPS extension in new MA Climate Bill opens the door for more discussion on RECs and who ultimately holds the green attributes.
- Guidance needs to be clear how SMART projects and RECs will be treated. If SMART projects are accepted, they need to be treated differently than other projects that do retain the RECs. Could define “SMART Energy” to acknowledge the benefits/additionality of on-site renewable energy, which goes beyond the benefits of retaining RECs.
- SMART program participation offers long-term certainty that contributes to financial viability. On-site RE generation has a system-wide positive impact on the local grid, contributes to carbon reductions, among other benefits that go beyond and are not contingent upon REC ownership.
- TAG needs to be careful and intentional in how terms are defined, being very clear about the differences between distinct project types (including SMART vs. Non-SMART program projects). Need to recognize the financial challenges of incentivizing on-site renewable generation in Boston, so don't want to limit options for development by excluding any options that could help make a project technically or financially viable.
- Some project types (small commercial) are reliant on SMART program for financial viability. May need to consider a multiplier that values on-site generation at a higher value than off-site generation, as it is much harder to do. There is also a pathway to low-cost generation/efficiency for all building sizes that should enable the City to reduce/remove the requirement of roof size, no financial need to limit the solar requirements to only the larger roofs in Boston.
- Involving solar developers in the development process early on helps solve many issues associated with solar PV development, while also making it cheaper.
- General consensus that the ZNC code should allow building owners to take advantage of the financial benefits of SMART program or other means of realizing the value of RECs

Discussion Notes

How can the City manage fluctuations in costs, benefits, and evolving regulations?

- Requirements must slide in line with the incentives available to developers at the time.
- The City must also consider how to treat projects that get approved under this new process, and then are adversely impacted by a regulatory change down the line. Could be solved by setting the minimum thresholds for financial feasibility and allowing individuals to opt out if their project no longer pencil's out financially.
- The City also needs to consider the possibility of developers using any caveat that would allow them to be exempt from the requirement if the system was not “financially viable” to circumvent the requirements even if a renewable generation project was possible at the site.
- The City’s capacity to analyze the reality of the project's feasibility may need to be expanded to ensure adequate review
- City could accommodate fluctuations by allowing some flexibility on when you need to comply- perhaps allowing developers additional time to meet the standard (ie, allowing them to wait until incentives or regulations are more favorable).
- Main economic drivers that can change significantly over the short-term include the SMART program, Federal ITC, cost fluctuations (hardware), and interconnection permitting and associated costs.
 - How will the City help developers evaluate other ways to meet expectations if solar PV doesn't appear to be the best route at first?
 - Can we also consider other ways to support these initiatives with the existing building stock?

Discussion Notes

How can the City engage with building developers on the topic of financial feasibility? (ie, how to establish a shared understanding of what constitutes a financially feasible project?)

- Getting renewable energy developers involved in the building design process as early as possible is key. This helps direct the project in a way to maximize on-site generation potential and minimize overall costs. Requiring building developers to consult with PV and other renewable developers/planners from the outset will help significantly in the success of a potential solar requirement. This can include a high-level production estimate and pro-forma (acknowledging it will change over time), that can be used to show NPV, IRR, or other metrics of a potential project (C-PACE has some definitions on this already developed).
- Third-party ownership should not be taken off the table. Getting the design process established will help remove hesitation from real-estate investors.
- Long-term value of the PV system is a benefit to the building owner that should also be considered and highlighted. Building developers should not view the solar mandate as a burden, but rather an opportunity to maximize the short and long-term value of their projects.
- One exception, on the solar feasibility front, is that the City must consider the area networks, which have generated a hard “no” from the utility in the past regarding solar development in areas including some of Cambridge, Downtown Boston, and South Boston. Utility likely can tolerate some amount of export, but it is a fairly complicated process that impacts a small number of buildings in MA so the issue has not been prioritized by PUC and others. (Large buildings with high load/demand and small roofs may not be much of an issue and not enough reward to worry about at this time.) Storage could help with this zero-export problem, allowing solar to get done with storage could eliminate grid impacts but also benefits.

Discussion – Chat Notes

- David Eisenbud - DSD: Exemption criteria is important to discuss
- Isaac Baker - Resonant Energy: One other item is fall protection - which may be worth discussing
- Cammy Peterson, MAPC: Good point - def need to balance benefits of density with solar optimization.
- Isaac Baker - Resonant Energy: absolutely
- Cammy Peterson, MAPC: Agree - would love to see smaller bldgs included too
- Cammy Peterson, MAPC: For next time on financial feasibility — it might make sense to think about whether encouraging aggregating rooftops for solar development could be worthwhile, to activate economies of scale and reduce barriers, etc
- Vincent Martinez, Hon. AIA, Architecture 2030, COO (he/him/his): Hi Debra, One of the things we are trying to put together for the RE Procurement TAG is general examples of what kind of projects might be included to pursue particular procurement option. Particularly we'd be interest who would be included to use the SMART program.