Zero Net Carbon Building Zoning

On-site Renewable Energy

TAG Meeting #2

Presentation & Discussion Notes

boston planning & development agency

April 20, 2021

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.

AGENDA

1. Welcome and Introductions (5 min)
2. Meeting 1 Recap (5 min)
3. Goal Statement (5 min)
4. Building Solar RE Design Optimization (50 min)
    - Definitions
    - Guidance
    - Physical Exemptions & Exclusions
    - Solar minimums
    - Submittals
1. RECs & Financial Feasibility (20 min)
2. Next Steps (5 min)

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INTRODUCTIONS

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Issues discussed in Meeting #1

- Support for goal of optimizing on-site generation
- “Define & Defend” Strategy
- Can we define a minimum area for solar and incentivize going beyond the minimum?
- General support for allowing developers to take advantage of the value of RECs- recognition of the value of local, on-site generation
- Identified potential strategy of “grace period”
  - PV must be installed within “x” years

Goal Statement

- To ensure NZC buildings reduce carbon emission through the use of on-site renewable energy resources by establishing minimum standards for installation of on-site renewable energy systems;
- To reward innovation;
- To maximize the deployment of renewable energy in the City of Boston in order to fully realize the benefits of local energy generation (i.e., resilience, jobs, air quality, grid services);
- To ensure accountability and transparency in compliance with NZC Regulations.

Definition: On-Site Generation

On-site renewable energy is located on:

- the building,
- the property upon which the building is located,
- a property that shares a boundary with and is under the same ownership or control as the property on which the building is located, or
- a property that is under the same ownership or control as the property on which the building is located and is separated only by a public right-of-way on which the building is located.

Discussion: Goals and definition of On-Site

Notes:

- The City should consider emerging racking innovations that are increasingly popular, especially in NY and DC where they are incentivized. This includes installing canopies over HVAC equipment and other solutions that allow for more solar PV on rooftops, which isn't currently seen in MA but opportunity to expand in MA is there.
- Consider zoning implications of definitions and potential to leverage zoning to increase solar PV potential, including height exemptions, or by building types (flat roof vs. garage).
- Need to be aware that building ownership/control can include different arrangements, particularly related to affordable housing and make sure definition accommodates different ownership / control arrangments.
- Re: grace period: The City will need to clearly define what the triggers are for qualifying for the grace period.
    - City will need to ensure that certain conditions limiting solar PV development are met before an applicant would be able to pursue the grace period to push their solar PV installation/RE procurement requirement out via the grace period pathway.
    - The City will also need to decide what to do if there is still no PV installed after the grace period has expired.
    - Interconnection is an issue that isn't likely to be fixed during a grace period, so should those facing interconnection issues be granted the grace period or pushed to other alternative solutions by the City?
    - Re: SMART Incentives, grace period could be useful in some instances, but given relative slow deployment of solar in Boston relative to rest of State, a grace period may not be the optimal solution for this scenario either.
    - There is potential for a grace period to help with addressing project ark between when RE commitments are made and when developers would actually be able to construct the system. Possible incentive changes may occur in that timeframe as well.
    - For new construction, Eversource currently not allowing interconnection to be considered until meter is installed after building is constructed. This limits developer's ability to consider risk and ability to secure project financing (significant barrier).
        - There was a potential workaround to this issue previously, by installing temporary meter for interim service and interconnection purposes, but this doesn't appear to be a viable option any longer.

Guidance for Building Design

“Solar Optimized” - the Proposed Project shall be planned and designed to maximize the amount and performance of on site, on building, building integrated, and ground mount canopy Solar Energy Systems. Solar optimization and building and urban design options and priorities will be equally considered.

To best realize opportunities for solar, the City should engage project teams at the earliest stages of project planning and require building designs to:

- Maximize south facing solar opportunities on building roofs, facades, and sites
- Layout roof to maximize space free of obstructions (including minor MEP)
  - Consolidate mechanicals equipment and vents
  - Consider complementary uses (solar as shading for roof deck)

Definition “Solar Zone”

“the building and site area(s) suitable for the Solar Energy System(s)”

The Solar Zone effectively identifies the maximum area available for solar. The applicant will identify the Solar Zone during the preliminary review.

Exceptions:

The following conditions may allow the required Solar Zone(s) to be partially or entirely reduced in size:

- Roof areas where building mechanical and structural systems restrict the available Solar Zone(s).
- Roof, building, and ground plane areas where the Solar Zone(s) is shaded for more than 50 percent of daylight hours annually.
- The total Solar Energy System(s) of a project need not exceed 120% of the annual energy loads of the project.
- Historic Building Preservation requirements including standards for additional setbacks or other aesthetic exceptions as determined by the Historic Preservation Commission.

Exclusions

- the Solar Zone(s) may be partially or entirely reduced in size or modified in configuration to accommodate mandatory access and set back areas required by relevant historic preservation, building, and fire codes and regulations.
- the Solar Energy System(s) may be partially or entirely restricted in energy output due to utility electrical distribution system constraints.*
- Solar Energy Systems shall be configured and located so as to ensure the following:
  - Provision of emergency access pathways to and from the roof(s) and roof area(s) required for smoke ventilation as required by building and fire codes. 527 CMR.
  - Snow and ice does not shed into unprotected pedestrian travel area(s).

*How do we introduce potential grace period?

Defining Minimum Area for Solar

A ZNC Building shall be planned, designed, engineered, and constructed with an Solar Energy System(s) equal to but not less than:

- 50% of the building roof area(s) that is either flat or oriented between 110 degrees and 270 degrees of true north
- 90% of the parking structure deck(s) uncovered
- 50% of the surface parking area(s)
- Less area reductions due to Solar Exemptions and Solar Exclusions

Proposed Submittals

As part of the BPDA Urban Design and Article 37 Review process projects would provide plans, diagrams, descriptions, and analysis to demonstrate that the Proposed Project has optimized the potential for solar energy production, identified the maximum Solar Zone(s), is planned, designed, and engineered to support the proposed system(s), and that the Solar Energy System(s) is installed and fully operational at construction completion:

- Site and building plans illustrating the maximum feasible Solar Zone(s) for all structures and all ground plane areas including details on any Solar Exceptions, Solar Exclusions, and Electrical Energy Restrictions.
- Solar Energy System(s) description including layout, configuration, system type, size, energy output, controls, storage, and ownership model.
- Post installation Solar Energy System(s) commissioning reports and certificates.
- Other related information deemed supportive or necessary to understanding project and system planning, design, and installation.

Construction

At construction completion the applicant is to provide Installed Solar documents demonstrating that the Solar Energy System(s) have been installed, commissioned, and certified operational. The Solar Installed documents must be reviewed and approved prior to the issuance the final Certificate of Occupancy.

Recognizing that utility regulations and solar incentives can impact solar project feasibility, the City could offer a X year grace period for projects encountering reasonable feasibility challenges. During this period, NZC buildings must purchase their renewable energy from off-site sources.

Discussion

What additional guidance could be offered to optimize solar opportunities in building design?

- City should consider and anticipate the question from developers, “we can’t do solar PV on this building/garage/parking lot for X reason, are we allowed to provide other benefits or pursue a different creative pathway to compliance?”
- What about use of roofs for green roofs or other stormwater management?
- Newton is now requiring fire suppression to serve the roof when there is PV. No one is aware of other precedent for this requirement. If Boston requires fire suppression is will be more cost effective for installers to add this to the project during PV installation rather than retroactively, and alerting developers this is coming in Boston prior to a big push for new solar installations would be very important/helpful to the effort.
- Part of this requirement should incentivize people to design buildings that are flat and/or south facing. Catch designs that are not prioritizing solar PV early in the design process, when they can be adjusted for the lowest cost and make sure the features of the building will accommodate the most amount of solar PV possible
- In preliminary review should discourage buildings with multiple roof angles or design features that are prohibitive to solar PV development.

What additional factors might influence sizing of the Solar Zone?

- Garage: stairwells/elevators.
- Should solar + storage be considered at this stage, and would the additional benefits these systems create lower the solar PV mandates at all?
- How to treat storage equipment that is collocated with PV. Is it to be considered the same as an HVAC equipment exclusion?

Do these minimum requirements make sense for Boston?

- Shading percentage (currently set at 50%) needs to be considered further. It would likely be difficult to mandate solar PV development be pursued by a building owner/developer if a project is shaded 49% of the time, falling just below the threshold defined, as this significantly impacts overall financial modelling.
- Garage 90% solar PV coverage mandate could be reduced to allow for efficient structural design. Could also define this further so stairwells etc. are counted as exclusions outside of the 90% coverage mandate.
- On parking lots 50% feels right
- Would be beneficial to the City to include water control mandates to go along with canopy mandates. However, as specified by Mr. Dalzell, existing water control measures and mandates would still apply to these structures with or without PV.

Discussion: Ground Mounted Solar

- Beyond surface parking area(s), should the City have a minimum % area for ground mounted solar?
  - Is a ground-mounted PV mandate worth it in Boston given already limited green space? Certain percentage of this space is highly-shaded as well.
  - If you can't meet the roof-mounted PV minimum, maybe ground-mounted PV is an alternative pathway to compliance. This introduces the idea that there is a minimum solar PV requirement for the site, allow the building owner the freedom to decide how they reach those minimum standards (incentivizes innovation and unique procurement pathways).
  - Should there be a minimum requirement that considers green space benefits?
    - Maybe lots of a certain size should have a requirement for PV?
    - How will campuses be treated? Is this whole area to be considered towards that minimum, or would it be evaluated parcel-by-parcel?
    - Need to be aware of context- if the lot is in a high density area or provides greenspace in a low income community, etc.
    - Potential to connect this to the heat resilience work that is ongoing in the City. May not want to incentivize solar over green space if it negatively impacts other initiatives, but could incentivize strategies that accommodate more than one initiative and compliment each other.
- Exceptions for ground mounted solar would include shading, mature trees, emergency access, and mechanicals.

- Additional Discussion: Area Network
  - Updated Area Network Map provided by Eversource
  - Currently, some roof-mounted PV systems in these network areas are only allowed if their on-site usage is so large that there is no potential for PV to export energy onto the grid. This restriction limits PV development on other building types significantly. This could become an issue with garage canopies as well, to large generation potential and low load, but could also be remedied by storage if it is allowed by the utility.

Financial Feasibility

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SMART Program & NZC

- Recognize that the SMART Program is key to the financial feasibility of many projects but program retains RECs for the utility
- Recognize the value of getting more local generation installed in Boston (i.e., resilience, air quality, solar jobs, grid services)
- NZC needs to provide guidance related to SMART Program participation and accounting through BERDO

REC Ownership

A ZNC Building must

- optimize on-site energy generation
- utilize 100% renewable energy (RECs owned)

To meet these requirements building can either:

1. Optimize on-site solar, keep RECs, and procure off-site RE as needed
2. Optimize on-site solar, participate in the SMART Program (i.e., generate “Smart Energy”), and procure off-site RE as needed.

Defining “SMART Energy”

SMART Energy: Energy generated at a ZNC Building by where RECs are not owned by the building owner due to participation in SMART program or other REC sale agreement.

Discussion

- Would SMART Energy be treated the same as on-site generation where RECs are retained?
  - Would RECS have to be Class 1? Offsite Procurement TAG is working on this. Likely will require Class 1 MA RECs with VPPA exception for RECs generated on grid dirtier than MA to ensure additionality is achieved.
- Could SMART Energy be treated like an efficiency measure (in BERDO accounting) which reduces your requirement to purchase off-site RE?
- Is there a mechanism to incentivize REC ownership?
- How would SMART energy be accounted for by BERDO?
- Should this be specific to the SMART Program? Is there a way of describing this that is more “future proof”?
  - RECs feels like the right mechanism to consider with new Climate Bill considered. SMART or successor program will likely remain in some form (continuing to assign RECS to the utility), may just incentivize solar development on different building types, sizes, etc., which wouldn’t impact this method of REC accounting for our purposes.
  - Rather than name the SMART Program could say “State incentive program which requires assignment of RECs to the utility.”
  - Passive House example
    - Ownership: Currently Passive House assumes system retains RECs, though this is not the reality in MA given SMART.
    - PPA: assume building owner does not retain RECS, requiring 5-1 RE purchase offset.

Developing Financial Case Studies

To support BPDA in “making the case” for on-site generation, Cadmus will develop two case studies to demonstrate the costs and benefits of potential solar systems, including exploration of different ownership models.

- What type building types would be most beneficial to model? What helps to illustrate the paths to compliance for future presentations to stakeholders?
  - Currently there exists a small network of commercially oriented installers in MA. Residential-focused installers may not have the financing solutions or expertise in place to tackle small commercial market. Building owners may struggle to find a company that can provide them financing, particularly for small commercial projects. The City of Boston could play an important role making connections, publishing information about completed projects, etc.
- Potential ownership models: direct ownership, third party
  - The primary options are Cash/Own/PPA/Lease.
- Potential metrics: Cash flow, NPV, IRR, ROI
  - Cashflow estimates typically includes financing, and is indicative of individuals are actually trying to figure out how to install a PV system and make it work financially.
  - Simple ROI is often used by those who are less convinced about viability of solar, so they use this metric to show why the project cannot be viable, making it difficult to change people’s minds despite actual viability of solar PV. Perhaps mandating a certain level of expertise or a trained professional to evaluate solar PV potential and financial viability would enable a standard to be set and enforced consistently.
- Assumption about cost of off-site RE procurement?
  - Need to remember that the avoided cost/financial viability of the PV system should not be calculated assuming business as usual electricity purchases from the utility. Cost of procuring off-site RE in compliance with regulation needs to be accounted for in these calculations.

NEXT STEPS

Today's TAG Meeting Presentation & Discussion will be posted to the ZNC web page

The Initiative Team will be documenting and complying recommendations and will follow up with any potential clarifications.

Later this spring, the BPDA / City of Boston will host a ZNC Building Zoning Public Meeting to present final recommendation for public comment.

Contact:

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Visit:

Boston Zero Net Carbon Building Zoning

Please sign up on our contact list!

Public and Stakeholder Engagement

Please let us know of Organization and Association Meeting opportunities.

We will be hosting Open Houses and Office Hours late spring / summer

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