DECEMBER 16, 2020

ZNC - Low Carbon Building TAG Meeting #2

Boston Planning & Development Agency

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BRA+

Thornton Tomasetti

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

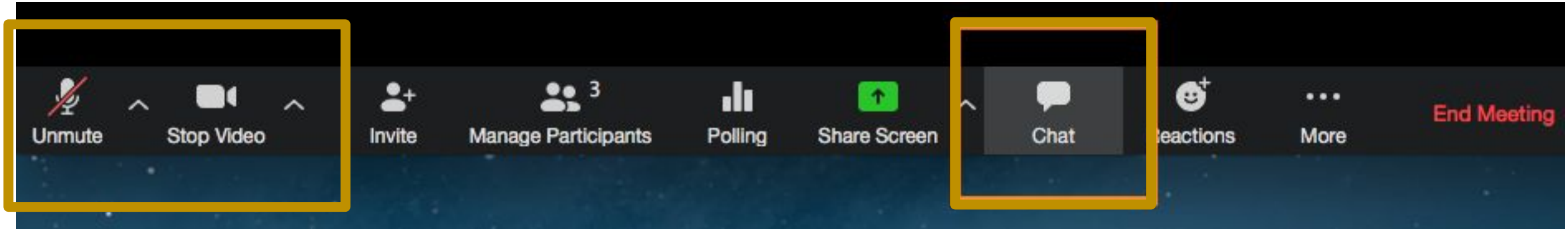
- Help us ensure that this conversation is a pleasant experience for all.
- Please mute your mics during the presentation to avoid background noise.
- It's great to see you! Participant video can be on during the meeting.
- **Use the Chat** feature for questions and comments during the presentation.
- Use the Raise Hand feature during the discussion segment.
- Please be respectful of each other's time.

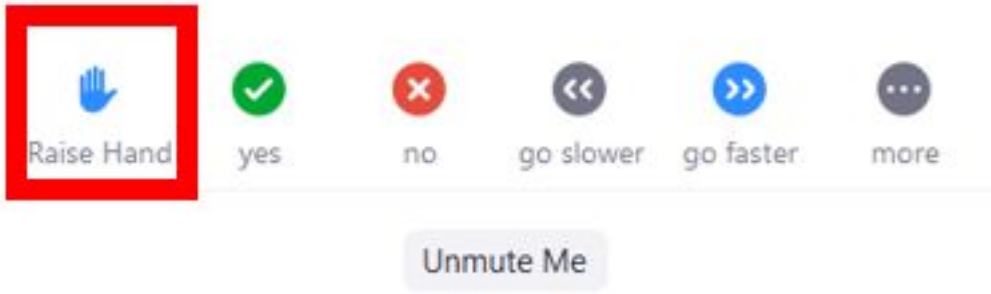
- As always please feel free to reach out to me directly!
  John Dalzell, AIA, LEED Fellow at John.Dalzell@Boston.gov

Zoom Tips

Your controls should be available at the bottom of the screen.

Clicking on these symbols activates different features:





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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

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AGENDA

1. Introductions (5 min)
2. Process (5 min)
3. Progress Summary (5 min)
4. Pathways & Targets (20 min)
5. Discussion (50 min)
6. Next Steps (5 min)

AGENDA

1. Introductions
2. Process
3. Progress Summary
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6. Next Steps

INTRODUCTIONS

CONSULTING AND CITY TEAM

Alejandra Menchaca, Ph.D., LEED AP, WELL AP
Vice President, Thornton Tomasetti

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Deputy Director, BPDA

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Sr. Land Use Planner / Sustainability Specialist, BPDA

Alison Brizius
Director of Climate and Environmental Planning
City of Boston

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ZNC BUILDING ZONING UPDATE

Boston Carbon Neutral 2050 – Climate Action Plan

"Strengthen Article 37 Green Building Zoning requirements to a zero net carbon standard"

Policy Framework

Zero = Bldg Emissions – On-site and Procured Renewable Energy

Low Carbon Buildings (this TAG)

Establish Emission Targets and Pathways

On-site Renewable Energy

On-site Energy Generation Standard

Renewable Energy Procurement

Determine Options & Reporting

ZNC BUILDING ZONING UPDATE

PUBLIC PROCESS AND SCHEDULE - 2020 - 2021

- Outreach – August and September
- Public Meeting #1 – September 30th
- Stakeholder and Public Engagement – October and onward
- Technical Advisory Groups – October and onward
- Public Meeting #2 – late winter / early spring
- Public Regulatory Meetings – spring 2021

TEAM

- Thornton Tomasetti
- Cadmus Group / SolSmart
- Architecture 2030
- City / BPDA Staff

TAG GOALS

Low Carbon Building TAG

Establish Emission Targets and Pathways:

- Establishing means for prioritizing low carbon building performance
- Identify pathways for small (20,000sf+) and large buildings and all use typologies
- Reward innovation and high performance

Key Considerations

- Focus on carbon and emissions reduction – Carbon Emission Intensity (CEI)
- Align with industry best practices, utility incentives, and market drivers
- Compliance process efficiency (leverage familiar third-party frameworks)
- Compatible with upcoming BERDO v2 emissions performance standards

PROCESS

TAG Meetings

- **Meeting 1** - Framework and Pathways
- **Meeting 2** - Emissions Targets **(today)**
- **Meeting 3** - Practice Transformation and Regulations
- **Meeting 4** - Finalizing Recommendations

Today's Meeting Outcomes:

- **Refine compliance pathways and metrics**
- **Building Carbon Emission Intensity Targets**

PROCESS

TAGs and Additional Policy Development

Cross TAG and general policies considerations

- Lowering compliance threshold to Article 80 Small Project Review (projects > 20k sf)
- Increasing minimum LEED outcome - presently “certified”
- Consideration of requirements for specific LEED credits
- Consideration of Embodied Carbon
- Updating project submission and review procedures

Regulatory Process

Reflecting the final recommendations and guidance of the ZNC Building Zoning process the City / BPDA will develop specific zoning standards that will be shared and made available for public response and feedback prior to proposing to BPDA Board and the Boston Zoning Commission.

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PROGRESS TO DATE

- Precedents - what other cities are doing
- Four possible pathways outlined
    1. Percent Carbon Reduction - savings from modeled baseline
    2. Carbon Performance Targets – Carbon Emission Intensity (“CEI”) by archetype
    3. Prescriptive Load Reduction - building and system design standards based on predicted CEI
    4. Third Party Certification - exception for high performance building certification
- Meeting discussion and feedback, and survey responses gathered
- Focus on two hybrid pathways and CO2e metric

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FEEDBACK FROM TAG

1. Percent Carbon Reduction - savings from baseline
   + Flexible for various building uses, aligned with current building practices
   - Not an absolute goal, “better than what”?

2. Carbon Performance Targets – Carbon Emission Intensity (“CEI”) by archetype
   + Flexible for various building uses, aligned with current building practices
   - Consider /ppl, (how not to reward large empty buildings?), weak spot for unique typologies (labs), real CEI dependent on usage

3. Prescriptive Load Reduction - building and system design standards based on predicted CEI
   + Great for small projects, avoids models, eliminates gaming, paired with high perf building inspectors
   - Significant effort to develop, prescriptions for each typology?

4. Third Party Certification - exception for high performance building certification
   + Simple, comprehensive, added market value, aligns with Somerville
   - Concerns about timing with permitting, PH not ideal for all building types, PH not fossil-fuel free

PROPOSED PATHWAY #1

1. Percent Carbon Reduction + CEI Targets

Percent carbon reduction compared to ASHRAE 90.1 baseline

+

CEI minimum targets for common building typologies

- **% Carbon Emissions Reduction from ASHRAE 90.1**
  - Applies to all building typologies
  - Refers to 3rd party performance modeling to prove reduction
- **CEI Target**
  - Provides absolute targets for building typologies that are most common and uniform
  - Projects with unique conditions will have an opportunity to make a case

PROPOSED PATHWAY #1

1. Percent Carbon Reduction + CEI Targets for Commercial Typologies

Sample Performance Targets

Building Type	MA Code EUI [kBtu/sf/yr]	MA Code CEI [kg/sf/yr]	ZNC Target EUI [kBtu/sf/yr]	ZNC Target CEI [kg/sf/yr]
High-Rise Apartment (20 stories)	52	4.55	**31**	**2.71**
Secondary School	35	3.06	**24**	**2.10**
Medium Office	33	2.89	**25**	**2.19**
Large Office*	70	6.13	**34**	**2.98**
Large Hotel	84	7.35	**78**	**6.83**
Physical Laboratory	-		80	
Chem/Bio Laboratory	-		140	

NBI - Building Performance Targets and Building Prototypes Profiles for Boston (modified with CEI)

Notes:
CEI calculations based on all electric energy and ISO NE 2018 Emissions Factors of 658 lbs/MWh = 87.5 kg/MBtu.

Large Office* prototype includes a data center, which significantly increases predicted energy use.

While performance targets are proposed by NBI for Lab buildings, we do not anticipate a target CEI for labs or healthcare typologies.

PROPOSED PATHWAY #1

1. Percent Carbon Reduction + CEI Targets for Residential Typologies (DND ZEB)

Sample Performance Targets

Building Type	MA Code EUI [kBtu/sf/yr]	MA Code CEI [kg/sf/yr]	ZNC Target EUI [kBtu/sf/yr]	ZNC Target CEI [kg/sf/yr]
Small Multifamily**	24	2.10	**18**	**1.58**
3 Story Multifamily**	34.2	2.99	**26**	**2.28**
4 - 5 Story Multifamily**	25.5	2.23	**21**	**1.84**
6 Story Multifamily**	26.8	2.35	**18**	**1.58**

DND Zero Emission Building Guidebook - building prototype targets and with the addition of CEIs

Notes:
CEI calculations based on all electric energy and ISO NE 2018 Emissions Factors of 658 lbs/MWh = 87.5 kg/MBtu.

Multifamily Targets reflect 0.77 tons CO2e / per person budget.

PROPOSED PATHWAY #1

1. Percent Carbon Reduction + CEI Targets

Percent carbon reduction compared to ASHRAE 90.1 baseline

+

Establish CEI targets for most common building typologies

- **% Reduction**
  - Applies to all building typologies
  - Refers to 3rd party energy modeling to prove reduction
- **CEI Target**
  - Provides absolute targets for building typologies that are most common and uniform
  - Projects with unique conditions will have an opportunity to make a case

Next steps (for discussion)

- Refine building typologies with CEI target
- Recommend % Reduction and CEI Targets
- Recommendations for grid electricity emission factors and consideration for future forecasting

PROPOSED PATHWAY #2

2. ZNC prescriptive guidelines

Buildings following high performance prescriptive guidelines, such as DND ZEB guidelines.

- Simpler prescriptive approach for smaller buildings
- Allowed for small building typologies (<50,000 sf), but potentially for larger buildings of limited typology
- A prescriptive Wh/sf/yr generation will be prescribed for project not doing an energy model

Next steps (for discussion)

- Identify other potential typologies
- Alignment with HERS modeling

RECOGNIZING INNOVATION

Outstanding Certification Paths

Building pursuing exceptional levels of low carbon building certification, including but not limited to Passive House pre-certification.

- Rewards innovation in high performance
- Supports third party certification

Next steps (for discussion)

- Which other certification paths?
- Timing and potential for pre-certification
- Clarify - fossil fuels and PH

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DISCUSSION - PATHWAY #1

1. Percent Carbon Reduction + CEI target
% reduction - same for all typologies?
CEI targets - aim for exemplary performance?

Applicability

- % reduction applicable to all lab types
- Encouragement to consider absolute targets for labs (particularly commercial spec)
- High rise mixed use typologies, make sure these are adequately covered

Challenges

- Model vs actual performance - disconnect? How to ensure models represent to the best of their ability future performance? BERDO is key “measuring stick”.
- How to deal with “obviously wrong” models? Modeling certifications for those submitting models, like BEMP / PE?
- Use this process to close the gap between predicted performance and actual performance.
- Could EC be considered as a way to prevent large buildings with low occupancy?

- Focus on regulating carbon
- Aligned with utility incentive and industry practice process, market-friendly
- Simple to review (ideally rely on third party frameworks)
- Compatible with upcoming BERDO emissions performance standard

DISCUSSION - PATHWAY #2

2. ZNC prescriptive guidelines

Applicability

- Most resi buildings in the 20k-50k scale should have a model (HERS).
- Resi large enough to not need HERS but small enough to need a code model.
- Metric - total heating and cooling demand. System efficiencies. Offsets.

Challenges

-

- Focus on regulating carbon
- Aligned with utility incentive and industry practice process, market-friendly
- Simple to review (ideally rely on third party frameworks)
- Compatible with upcoming BERDO emissions performance standard

DISCUSSION - REWARDING INNOVATION

Innovation for Exemplary Performance
How important is it to value certification?

Applicability

- Consider outstanding strategies (particularly ventilation for labs). Easier to administer with clear thresholds (e.g. achieve 75% reduction as opposed to 50%). This would allow to build precedents.
- Could one offer more buildable space, or expediency through process?
- ILFI Zero Carbon (used by Somerville)
- GSA - design strategies library.
- Reward 100% on-site generation

Challenges

-

- Focus on regulating carbon
- Aligned with utility incentive and industry practice process, market-friendly
- Simple to review (ideally rely on third party frameworks)
- Compatible with upcoming BERDO emissions performance standard

DISCUSSION - GRID ELEC. EMISSION FACTORS

Current ISO New England Reporting is for 2018.

- Should CEI Targets reflect time of occupancy (e.g. 2021 Initial Filing + 1 yr permitting = 2 yrs construction = 2024)?
- Should Analysis include near term performance and emission factors (e.g. 2035)?

- use middle of life of chiller /MEP systems to set CEI multipliers
- California using marginal change over 15 years
- use date of occupancy to set mult.
- 2035 400 lb/mwh- nat. gas equivalency
- challenge: handling potential mis-match between asking for X renewable energy but quantifying carbon emissions of future factors.

-

- Focus on regulating carbon
- Aligned with utility incentive and industry practice process, market-friendly
- Simple to review (ideally rely on third party frameworks)
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NEXT STEPS

- Follow up Survey
- Incorporate TAG feedback
- Develop compliance path structure
- Prepare thresholds for each pathway
- Re-visit with TAG on Meeting 3

ZNC ZONING MATERIALS AND CONTACTS

For information, materials, updates and submitting comments, please visit the "Zero Net Carbon Building Zoning Initiative" webpage: bostonplans.org/ZNCBuildingZoning

- Comments may be submitted directly from project webpage or emailed to John.Dalzell@Boston.gov
- Meeting presentations and recording will be uploaded to the project webpage in the next two days.

CHAT TEXT

From Ben Silverman to Everyone: 02:39 PM
Has there been analysis on what the % reduction numbers look relatively to the proposed BERDO emissions targets
From Kristen Fritsch to Everyone: 02:40 PM
In addition to labs, the other building type we usually have challenges in regards to EUI goal normalization are student housing projects - due to the various uses on the main floor - student dining, classrooms, etc..
From Julie Janiski, Buro Happold to Everyone: 02:41 PM
I agree on the commercial spec lab - these are safely in categories
From Claire McKenna to Everyone: 02:41 PM
I am wary of super high performance because it might create ripples of unintended consequences in the market. Alternatively, like Matt is saying for labs, maybe you could make the high performance the standard and ask the project teams to justify achieving the standard high performance target.
From Rebecca Hatchadorian Arup to Everyone: 02:42 PM
I think you have to look at differentiation of the % reduction otherwise you let some building types off the hook, especially labs that are seeing higher % reduction than other types
From Julie Janiski, Buro Happold to Everyone: 02:44 PM
Rebecca - agreed - the baseline for labs is much higher than offices, for comparison, and a % reduction is therefore higher in all our lab projects
From Shirine Boulos Anderson to Everyone: 02:48 PM
Is it possible to create a current resource to establish baselines for the different lab types? We have been using CBECs and Labs 21 for ever…
From Julie Janiski, Buro Happold to Everyone: 02:50 PM
In addition to credentials, there might be an opportunity for the City to pre-qualify firms/people that can either be hired to do the full analysis or review and certify. This seems onerous, but would provide a higher level of QAQC than just allowing a BEMP/PE/etc
From Rebecca Hatchadorian Arup to Everyone: 02:52 PM
You could do this by "requiring" new buildings reporting to BERDO be in the top 25th percentile (or whatever percentile is defined). Requires more tracking/continuity through the City system but could lead to better outcomes
From Andrea Love to Everyone: 02:54 PM
I agree on the suggestions for connecting BERDO to modeling
From Jeff Rios to Everyone: 02:55 PM
I agree with Jacob's comment that ultimately BERDO could be the criteria with which all designs are judged. Setting the threshold for a new building that must be measured and met would put the responsibility on the designer and modeler and limit any "gaming"... Aligning the BERDO and code CEI is a effective approach.
From Adam Jennings to Everyone: 03:00 PM
How would C&S design be compared to BERDO? Would a model need to be updated for each tenant?
From Norm Lamonde to Everyone: 03:01 PM
Certainly the advanced evaluation through modeling is important to be correct and strategies validated during permitting and design. However, knowing the energy source(s) for the building and what the actual energy consumptions usage is via utility bills is the "Acid Test" to knowing how the building is operating and what percent reduction is from year to year from the baseline. Agree with Rebecca's and other's comments to connect with BERDO. C& S project do present an issue but maybe there's a way to apply a standard tenancy usage based on the proposed use.
From Jeff Rios to Everyone: 03:01 PM
Couldn't tenant fit out be addressed with prescriptive approach? (not that this would fully solve it, but would help address)
From Kate Bubriski to Everyone: 03:04 PM
there are a lot of projects from 50-100K that do not model
From Chris Schaffner to Everyone: 03:05 PM
Have folks looked at the MA Save Small buildings calculator

CHAT TEXT

CHAT CONTINUED

From Rebecca Hatchadorian Arup to Everyone: 03:05 PM
can it be as simple as no on-site combustion **excluding emergency generation? And then rely on the stretch code for energy performance.
From Ben Silverman to Everyone: 03:06 PM
Unlikely Rebecca, because that is what Brookline tried to do and it was shot down
From Rebecca Hatchadorian Arup to Everyone: 03:07 PM
it's a choice though, not the only pathway for compliance right? they have a decision to make.
From Norm Lamonde to Everyone: 03:08 PM
Good point Jacob. Maybe for the 1st phase of integration that both path's be offered and this group evaluates after 1 year of completion of buildings to compare /contrast on the method and actual performance data collected.From Kristen Fritsch to Everyone: 03:10 PM
How do existing buildings fit into this?
From Alejandra Menchaca, Thornton Tomasetti (she/her) to Everyone: 03:11 PM
Kristen - major renovations fall into this zoning
From Norm Lamonde to Everyone: 03:12 PM
How would operational hours of a building be addressed in a prescriptive path ?
From Kristen Fritsch to Everyone: 03:13 PM
I guess I mean a prescriptive path may be good option for renovations - we sometimes see challenges w/ these
From Jeff Rios to Everyone: 03:13 PM
Is it more palatable to limit the contribution of fossil / combustion? As in a fraction of the connected load or a more stringent limit for heating BTU/SF if fossil fuel? etc?
From Chris Schaffner to Everyone: 03:14 PM
Prescriptive path - would something like the prescriptive option in LEED v4.1 be legal? It basically gives points for exceeding minimum code requirements - you could create something similar and require a minimum number of points?
From Ben Silverman to Everyone: 03:16 PM
It could be allowable Chris, it is currently. But we are moving away from LEED for a reason, it's too easy to build a non-net zero building yet be LEED certified
From Chris Schaffner to Everyone: 03:18 PM
Not suggesting we use LEED. Suggesting a prescriptive energy path, where we mimic LEED's prescriptive option. Improvements in LPD, Envelope UA. HVAC efficiency etc. You could have a menu of options, and require projects to pick some number of the options.
From Rebecca Hatchadorian Arup to Everyone: 03:18 PM
Yes to Zero Carbon certification. It requires scope 3 embodied carbon reporting, establishes a cap and must offset 100% emissions too.
From Julie Janiski, Buro Happold to Everyone: 03:19 PM
https://www.gsa.gov/governmentwide-initiatives/sustainability/emerging-building-technologies/about-gsas-proving-ground-gpg
From Chris Schaffner to Everyone: 03:20 PM
Somerville is using ILFI Zero Carbon
Scroll to Option 3 https://www.usgbc.org/credits/new-construction-core-and-shell-warehouse-and-distribution-centers-new-construction?return=/credits/New%20Construction/v4.1/Energy%20&%20atmosphere
From Shirine Boulos Anderson to Everyone: 03:20 PM
Could there be recognition of on-site integrated renewable energy above a certain percentage? This might encourage BIPV facade design integration and so on

END

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THANK YOU