Zero Net Carbon Building Zoning

Virtual Public Meeting #3

Presentation with Meeting Q&A and Responses

boston planning & development agency

September 28, 2022

Zoom Meeting Guidance

It’s great to see you!

We have a large turn out tonight. To avoid background noise and visual distractions mics and video will be off during the meeting.

Please **Use the Chat** feature for questions and comments during the presentation and Q&A segment. We will respond to Chat postings as best and we can.

The BPDA will record this meeting.

The recording and presentation with the Q&A / Chat comments will be posted on BPDA’s Zero Net Carbon Building Zoning webpage.

AGENDA

1. Welcome - Devin Quirk, Deputy Chief of the BPDA
2. Leadership and Carbon Neutral Practices in Boston
   - Three Eighty Stuart - Michael Calivo, Skanska
   - The Kenzi - Sara Kudra, Greg Minott, DREAM Collaborative
   - Landmark Center Phase III Lab - Abe Menzin, Samuels
3. Zoning Updates and ZNC Policy & Standards - John Dalzell, BPDA
   - Proposed Zoning, Policies, and ZNC Framework
4. Public Engagement, and Feedback - Rich McGuinness, BPDA
   - Public Comment Period
   - Public Office Hours and Feedback Meetings
   - Posting of Comments, Updates, and Next Steps
5. Q & A and Discussion - Chris Busch, BPDA

WELCOME

Devin Quirk, Deputy Chief, BPDA

boston planning & development agency

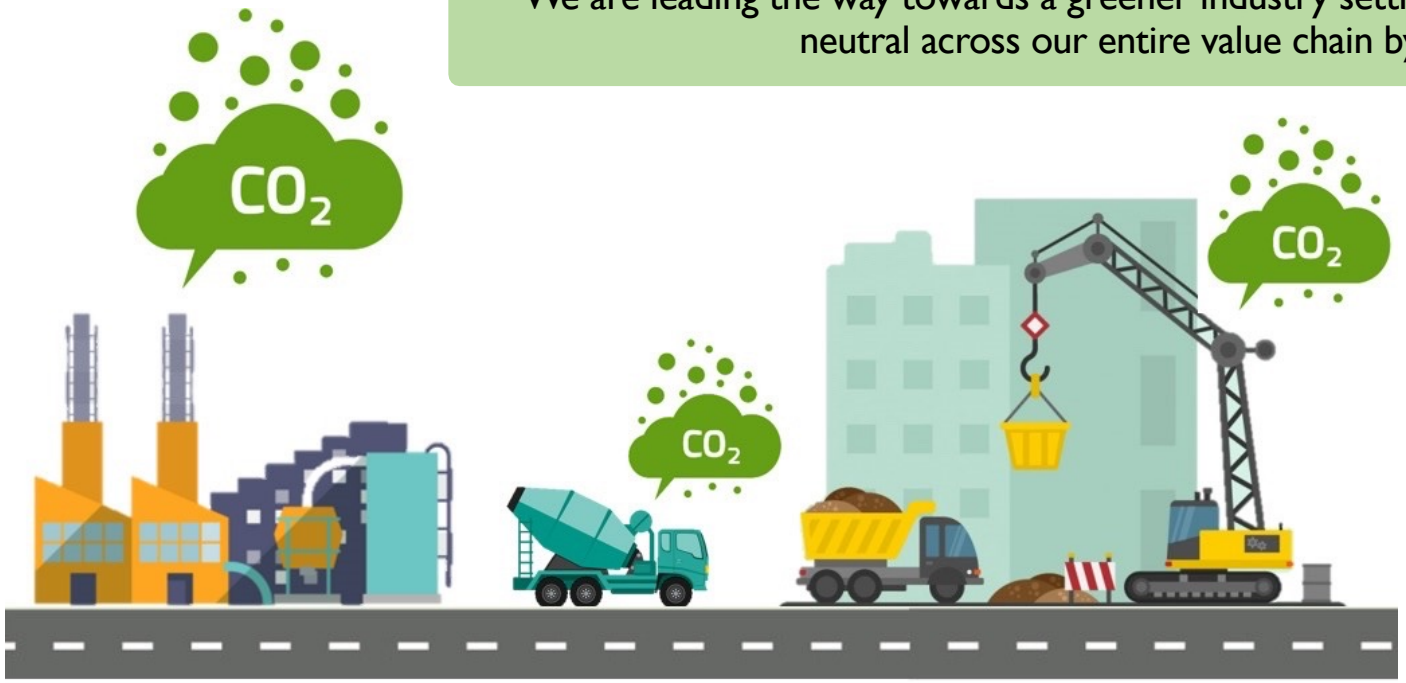
LEADERSHIP IN PRACTICE

- Three Eighty Stuart
  Michael Calivo, Skanska USA
- The Kenzi, Bartlett Station
  Sara Kudra, Greg Minott, DREAM Collaborative
- Landmark Center Phase III Lab
  Abe Menzin, Samuels and Associates

SKANSKA

Skanska is a 135-year-old global real estate development and construction company founded in Stockholm, Sweden.

We are leading the way towards a greener industry setting the goal to be carbon neutral across our entire value chain by 2045.



Embodied Carbon

Use Embodied Carbon in Construction Calculator (EC3) tool to inform material supply decisions to reduce embodied carbon

Operational Carbon

Design our buildings to minimize energy consumption and achieve meaningful reductions in carbon emissions.

THREE EIGHTY STUART

BY THE NUMBERS

- 625,000 SF Office Building
- 22 Terraces + 1 Roof Deck
- 100% Outside Air with High Efficiency Filtration
- Modeled CEI: 1.35 kgCO2e/ft2
- Modeled EUI: 25 kBTU/ft2-yr
- Zero Net Carbon from Operations

THE APPROACH

- Reduce energy consumption by maximizing envelopment performance and efficiency of systems
- Utilize heat pumps as the tool to electrify the HVAC system
- Purchase green power directly or through the purchase of RECs

DESIGN FEATURES

- High-performance envelope with triple pane glazing
- Heat recovery chiller
- Air source heat pumps
- DOAS with highly efficient energy recovery wheel
- Backup electric resistance boiler
- Chilled beams in lieu of VAVs

THE CHALLENGES

- Cost
- Systems implementation & limitations
- Green power purchase

RESIDENTIAL

Bartlett Station - The Kenzi

Bartlett Station Drive, Roxbury

Team:
Developer: POAH (Preservation of Affordable Housing)
Architect: DREAM Collaborative
MEP Engineer: Petersen Engineering Inc.
Civil Engineer: Develllis Zrein Inc.
Structural Engineer: RJ Farah
Landscape Architect: Deborah Myers Landscape Architects
Passive House Consultant: Building Evolution Corporation
Contractor: NEI General Contracting

Status: Under Construction

RESILIENCY
Extreme Temps

SUSTAINABILITY
Green Building, Carbon Reduction

RESIDENTIAL

Bartlett Station - The Kenzi

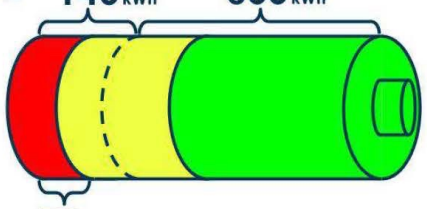
Bartlett Station Drive, Roxbury

Battery backup

System designed and permitted for emergency use and grid peak demand offset

TOTAL SYSTEM 100% **440** kWh

GRID BUY BACK 68% **140** kWh **300** kWh

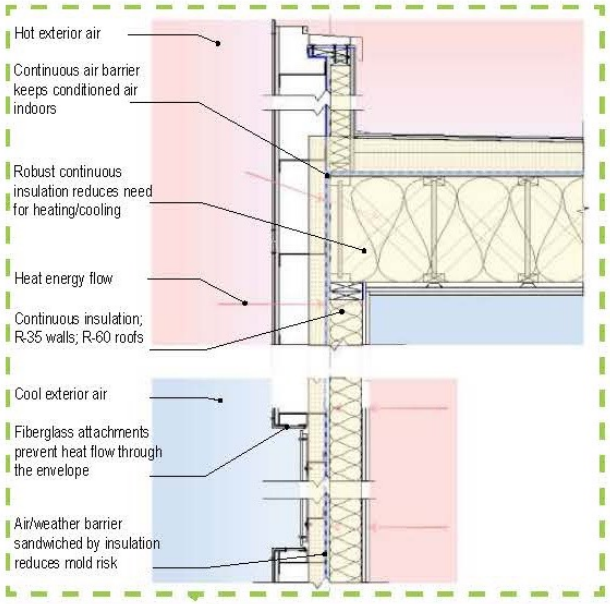


2 HR LOAD 16% **70** kWh

Glavel

Foam glass gravel used under PH boundary slabs

RESIDENTIAL

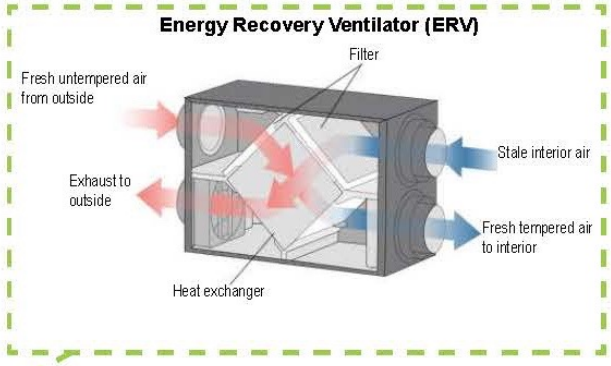


Resilient Infrastructure

- Generator/battery power on roof of building
- Passive House envelope slows any heat loss/ gain in the event of a utility outage, allowing the generator/battery to be downsized
- ~90kW of solar PV array on roof to minimize dependence on external utilities for power
- Rear of site features a bioswale to collect and filter water runoff from adjacent site above

Extreme Temps

- Passive House enclosure mitigates extreme temperature swings and will provide a healthy, efficiently conditioned interior environment.
- Habitable landscaped garage roof mitigates heat island effect, producing an oasis of cooled area on a southern exposure.



Carbon Reduction

- Aim toward lower embodied carbon materials, and much less Greenhouse Gas (GHG) emitting materials
- Operational carbon reduced via renewables on the roof and energy efficient Passive House enclosure
- High efficiency ERVs paired with air source heat pumps take advantage of existing energy in the air to control interior air and domestic water temperatures.
- Predicted EUI: 14.07 kBtu/SF/yr (75% reduction from baseline code)

Low/Net Zero Carbon Initiatives

Samuels Associates &

Parcel 12 / 101 Mass Ave

Parcel 12

First High-Rise Building in New England with Electrified HVAC (hotel component)

Selected as demonstration project in 2019.

Project Highlights:

- systems performance, envelope/glazing focus; green roofs;
- Fully electrified HVAC (VRF)

Pre/Post Electrification Results:

- Reduced reliance on fossil fuel/reduced carbon emissions
- Project achieved 25% energy savings

Considerations for future implementation:

- Technically / financially feasible approach for hotel
- Design challenges with this approach for taller buildings

Samuels & Associates

Mid-Rise Residential Projects

400+ mid-rise residential units being developed w/Electric HVAC

Highlights:
- Electrification
- Energy recovery in individual units

Pre/Post Electrification Results:
- Electrified building
- Significant energy savings

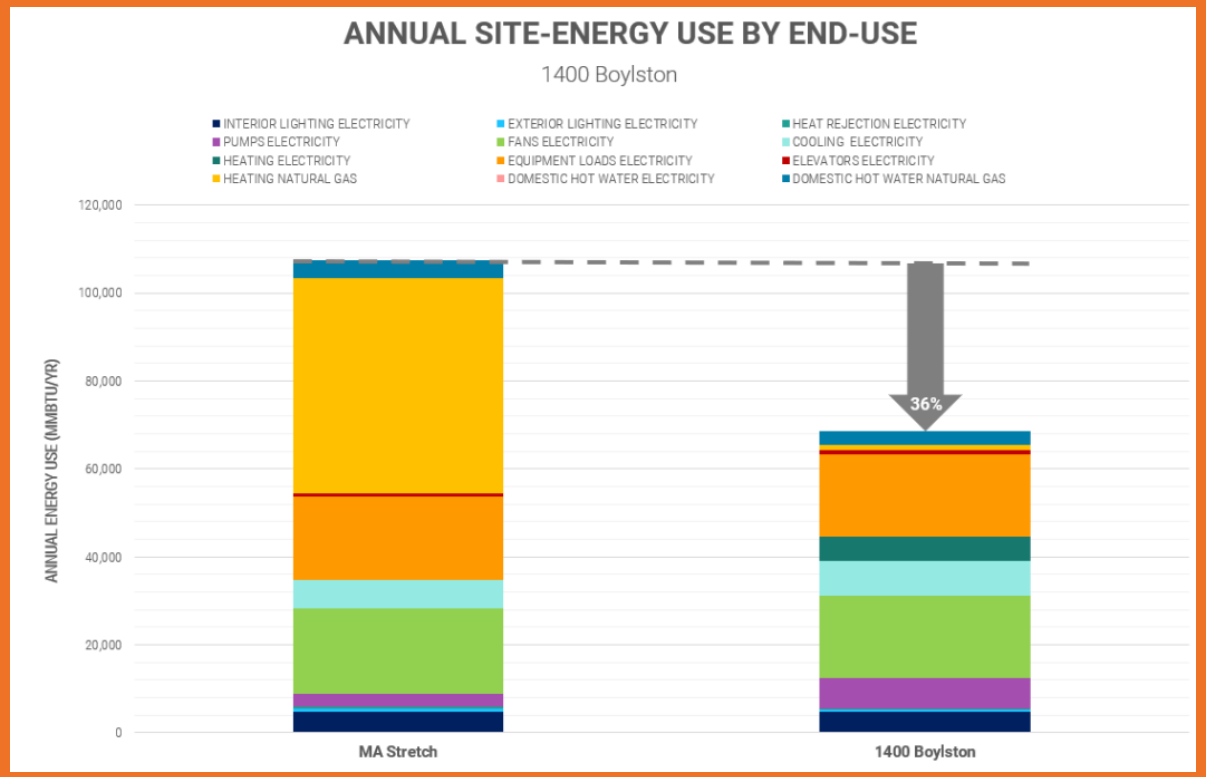
Considerations for future implementation:
- Technically / financially feasible for mid-rise residential
- Operating costs for occupants

Samuels & Associates

Net Zero Carbon BPDA Case Study

Samuels & Associates

Net Zero Carbon - Life Science Approach



Several Hybrid Electric Projects Under Development

Highlights:

- 95%+ reduction in fossil fuels; shift energy use to electric
- Carbon emissions reduction of up to 40+%
- Renewable sources/RECs
- Thermal envelope; high performance systems

Considerations for future implementation:

- Cost
- Implications for penthouse size/height

Samuels & Associates

Lessons Learned / Considerations for ZNC

- Industry standard has evolved rapidly and new products and approaches should be considered
- Procurement options – broad range of options with flexibility over time could help to mitigate price spikes in a small market for appropriate products
- ZNC encourages shift to electrification – grid resiliency study would be helpful (seeing 12%-17% increases in peak loads for these case studies)
- Flexibility with targets is important to ensure they will remain right sized to balance environmental benefit and feasibility

Samuels & Associates

OVERVIEW
ZONING, POLICY & STANDARDS

John Dalzell, BPDA

boston planning & development agency

Article 37 Updates and ZNC Policy & Standards

Proposed Zoning & Policy Changes:

- Lower Applicability Threshold to > 20k SF
- Increase LEED Outcome to LEED Gold
- Establish a ZNC Building Emissions Performance Standard for New Construction
- Align with BERDO Standards & Reporting
- Convene an Advisory Committee to assist with updates & advancing practices
- Update Review Process and Add Small Project Application & Review Standards

ZNC Policy Framework

Prioritized Practices:

1. **Low Carbon Building**
   Embodied Carbon - Identify actions & advance standards & practices
   Operational Emissions - Establish building emission targets
2. **On-site Renewable Energy**
   Set Minimum Generation Standards
3. **Renewable Energy Procurement**
   Define Acceptable Options

Bunker Hill Housing – Building F

Proposed design modeled performance (271,844 SF, EUI 19.1, Solar PV 81.9 kW = 104,500 kWh/yr)
Building CO2e = 1.48 (kg/sf/yr) emission
Solar CO2e = 0.12 (kg/sf/yr) reduction

Building	445. tons / yr
On-site RE	36. tons / yr (less)
RE Procure	409. tons / yr (less)
ZNCarbon	0.

Article 37 Zoning Updates

Proposed Zoning Changes – Part 1:

- Applicability Threshold
- LEED Gold
- Removes “Boston Green Building Credits”
- Establishes annual net Emissions performance standard of zero kg of Carbon Dioxide Equivalent (CO2e) / sf-yr.

Article 37 Zoning Updates

Proposed Zoning Changes – Part 2:

- Operational Emissions Minimization Measures
- Operational Emissions Mitigation Measures
  - Generate on-site renewable energy
  - Purchase renewable electricity
  - Alternative Compliance Payments for on-site fossil fuel emissions
- Construction Emissions Minimization Measures
  - Construction site activities
  - Building construction materials, products, and waste

ZNC Policy & Standards

Proposed Zoning Changes – Part 3:

- Modifies building height to exclude solar PV panels from building height (up to 48” above roof) and parking structures (up to 10’ plus 48” above parking deck).
- Updates the Article 80E Small Project Application & Review Standards
  - Adds Sustainability Component and references to Article 37

ZNC Policy & Standards

Minimization Building Operational Carbon Emissions

Allows two approaches and sets “targets”:

Approach 1 - Predictive Performance Comparative Analysis

Projects attain a 40% carbon emissions reduction compared to modeled performance of the Stretch Code (ASHRAE 90.1-2013 with MA amendments) or LEED baseline (ASHRAE 90.1 version used for LEED credit determination).

Except:

1. Licensed healthcare facilities that are not medical office buildings, which should meet a 30% carbon emissions reduction target.
2. Residential buildings that do NOT trigger stretch code AND the total area of any non-residential program is less than 40,000 GSF and does not exceed 50% of total GSF - these building must meet a HERS score 38 or lower.
3. Buildings committed to achieving Passive House certification via PHIUS+ or PHI.

ZNC Policy & Standards

Approach 2 - Use Specific Best Practice Performance

Projects attain the Best Practice pCEI for specific building uses. Buildings with multiple uses should calculate a blended pCEI target.

Primary Building Use Type	kg CO2e/sf-yr	Notes
Multifamily (low density)	1.1	Average Occupancy Density ≥ 500 SF/Person
Multifamily (high density)	1.6	Average Occupancy Density btw 220 to 500 SF/Person
Residence Hall	1.6	
Hotel	1.9	
K-12 School	1.3	
Office - College or University	1.6	
Office - Commercial	1.8	
Retail & Service	1.6	
Dry Lab	4.3	
Wet Lab	6.4	
Hospital	7.4	Not including medical office uses

ZNC Policy & Standards

Sets Energy Emission Factors for calculating CO2e emissions

Greenhouse Gas Emission Factors for Common Energy Sources

- 2035 Grid Electricity: 392 lbs CO2e / MWh = 177.8 kg CO2e / MWh = 52 kg CO2e / MBtu
- Natural Gas: 117 lbs / MBtu = 53.11 kg CO2e / MBtu = 5.31 kg CO2e / therm
- District Steam[3, 4]: 193 lbs / MBtu = 87.5 kg CO2e / MBtu

Notes:

1. All GHG emission factors will be reviewed on an annual basis and may be amended from time to time by the BRA.
2. The forecasted Grid Electricity emission factors are design standards.
3. As calculated by Massachusetts DOER for determining CO2e emissions from Vicinity provided District Steam to Mass General Hospital's recent building project
4. Alternative distributed thermal energy system GHG emission factors, with supporting analysis and reporting, may be consider.

ZNC Policy & Standards

Operational Mitigation Measures

1. Mitigation of electricity emissions: On-site production of Renewable Energy
   If needed as a mitigation measure, the minimum area cumulatively equals:
   - 50% of the building roof area(s)
   - 90% of the area of any uncovered parking structure deck(s); and
   - 5% of unoccupied paved or hardscaped site areas.

   With exceptions and exclusions for:
   - Building mechanical and structural systems
   - Areas are shaded for more than 30 percent of daylight hours annually.
   - Uses and/or mature trees of environmental or aesthetic value
   - Historic preservation, building, fire, or environmental requirements
   - Grid interconnection standards.

   And an Installation Time Extension for equipment supply, and changes in incentives, and interconnection standards.

ZNC Policy & Standards

Operational Mitigation Measures

2. Mitigation of electricity use emissions: Renewable Electricity Purchases
   If needed as a mitigation of electricity-use Emissions, projects shall: (a) purchasing renewable electricity, (b) purchasing Renewable Energy Certificates, (c) entering into a Power Purchase Agreement, or (d) any other Compliance Mechanism identified in BERDO.

3. Mitigation of non-electricity use emissions: Alternative Compliance Payments
   If needed as mitigation measure for non- electricity emissions, projects shall make then Alternative Compliance Payments pursuant to BERDO.

ZNC Policy & Standards

CONSTRUCTION EMISSIONS MINIMIZATION MEASURES

Reduce Construction Operation Carbon Emissions

Include best practices for mitigation measures, including:

- Temporary Lighting
- Renewable Electricity - procure 100% renewable electricity.
- Low and no-carbon emission vehicles / equipment and sequencing

Minimize Demolition, Construction & Building Materials Embodied Carbon

Recognizing the emerging status of industry and practice standards, include best practices and LEED Materials & Resources prerequisites and credits:

- Construction and Demolition Waste Management;
- Building Refrigerant Management;
- Building Life-Cycle Impact Reduction;
- Building Product Disclosure and Optimization; and
- Low embodied carbon structural designs, materials, and systems.

PUBLIC ENGAGEMENT & FEEDBACK

Rich McGuinness, Deputy Director, BPDA

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PUBLIC ENGAGEMENT & FEEDBACK

- Initial Public Comment Period
  30 Days - Comments Due October 28th
- Public Office Hours
  October 11th at 6pm and
  October 12th at 2pm
- Public Feedback Meeting
  October 19th at 6pm
- Posting of Comments, Updates, and Next Steps
  November 2022

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QUESTION & ANSWER DISCUSSION

Chris Busch, Assistant Deputy Director, BPDA

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NEXT STEPS & CLOSING

John Dalzell, BPDA

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ZNC Building Programs

BOSTON MASS TIMBER ACCELERATOR

MTA Round Two Now Open!

Second and Final Funding Round

- Buildings 9 to 18+ Stories Tall
- Info Session – 2pm October 4th
- Funding & TA to assess benefits of Mass Timber practices

boston planning & development agency

THANK YOU!

- Tonight's presentation and chat notes will be posted to Zero Net Carbon Building Zoning Initiative
- Stop in during our Office Hours & Feedback Meeting
- Submit submit online comments
- Email: John.Dalzell@boston.gov

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Public Meeting - Q&A and Responses – page 1 of 2

Questions	Asker By	Responses
Will the slides be posted?	Wesley Leung	Yes, slides will be posted early next week.
Can presenters please define acronyms being used?	Michele Brooks	CEI = Carbon Emission Intensity, EUI = Energy Use Intensity, DOAS = Dedicated Outdoor Air System, REC = Renewable Energy Certificate
VAV?	Michele Brooks	Variable Air Volume
Q for Mike: Do the RECs for this projet meet BERDO requirements?	Debra Shepard	Thank you for the questions on 380 Stuart. Please email me at mike.caliva@skanska.com and I will be happy to respond that way.
For 380 Stuart, what is/was the approximate construction cost - or budget? You mentioned Cost as an issue. Thanks-	Ken Lambert	
Thanks for describing this impressive project! This says there was a backup electric resistance boiler but did you say there is a backup fossil fuel boiler as well for the scenario where power goes out?	Roselin Osser	
Question for Mike - you mentioned backup without fossil fuels was a challenge and that you have a resistance boiler for back up. What is being used as the energy source in that?	Yve Torrie	
Question for Mike - can you share the heat pump manufacturer for the project and heating capacity per heat pump? Are these the big modular heat pumps ?	Neetu Siddarth	
For Sara - because it is all affordable, what role did subsidies play in ensuring the project could move forward?	Anastasia Nicolaou	The project is funded by both the City of Boston and State Low-income Housing Tax Credits (LIGTC). We first applied in 2018 and took many years to secure. This was typical process for afford. Housing, but we do get favorable points for high-efficiency and Passive House certification.
Glavel?	Michael Berry	Glavel is made from recycled glass (Gl…) and is used as structural gravel (…avel) placed below building concrete slabs and foundations. It can replace foam board insulation and reduces construction costs.
Landmark project: were there challenges for the existing electrical service capacity from the utility? Was there a need to expand the electrical service to support the electrical heating demand?	Martine Dion	The design of the building envelope and the efficient hybrid heating systems cut building energy loads close to 51% and lowered overall electrical loads.
Thanks Sara - did you need to seek additional funding to offset costs from passive house or were the costs negligible?	Anastasia Nicolaou	There are additional funds available for PH certified (or were when secured some years ago). The overall cost premium was negligible, but we do not have specific data to compare.
Is there criteria for who would serve on this advisory committee?	Michele Brooks	We envision the Advisory Committee providing diverse and expert perspectives but criteria has not yet been developed.
The current Zoning Code lumps all labs into a vague and broad category of Technology/Science yet their energy requirements may vary widely, which means that BERDO standards for some of them may be unreasonable. Is it possible to define labs in the Zoning Code with more specific sub-categories? Moreover labs typically require more energy/sq ft than offices. Will their proliferation in Boston strain the grid within the city?	Martyn Roetter	Within the Lab/Office category we have performance targets for "Wet" and "Dry" lab uses that reflect use specific ventilation requirements and correspondiing carbon emissino intensities. These are based on a 50/50 to 60/40 mix of Lab/Office spaces. We would welcome recommendations on addition sub-categories.

ZNC Meeting Q&A and Responses – page 2 of 2

Why is this referencing the *current* Stretch Code modeling requirements when the new version has already been rolled out as of yesterday? Projects expecting permit after July 1, 2023 are already working to comply with the new Stretch Code so this adds an additional different modeling requirement.	Roselin Osser	Roselin -further clarification on modeling can be found in the policy...*To reduce predictive modeling efforts, reference standards and corresponding reduction targets will be added and updated to align with current and future applicable codes and standards
How do these emission reduction percentages compare to the BERDO requirements? Can you clarify the intersection/overlap there?	Michele Brooks	BERDO and the proposed ZNC Zoning both set net carbon emssions from building operations. BERDO limits are for existing buildings and decline over time to zero. The proposed ZNC Zoning limit is for new construction and is zero. Projects approved under the proposed Zoning would be required to comply with BERDO but with an annual carbon limit of net zero.
Are the pCEI values based on a 2035 grid?	Maciej Konieczny	Yes. Because the proposed ZNC Zoning applies to new construction, the pCEI targets use forcasted 2035 Grid Emission Factors to better reflect initial building performance over time.
If we are using 2035 grid, is there a TMY weather file we should be using in energy models that reflects 2035 weather?	Eric Studer	That's a really good question! Not right now but that could be something the Advisory Committee considers at a future point.
Will there be any in person meetings? This forum does not lend itself to discussion or meaningful comments	Andrew DeAngelo	There are three smaller open format virtual feedback sessions scheduled on October 10th, 11th and 19th. We expect those to provide more time for open discussion and feedback.
Are any of the embodied carbon requirements and those related LEED credits mandatory to achieve or are they optional?	Michelle Lambert	The ZNC Policy anticipates the Interagency Green Building Committee set requirements for speccific LEED credits for reducing embodied carbon. Additonal comments would be welcomed.
Given the necessity to reduce embodied carbon as soon as possible, did you consider requiring project teams to achieve the Building Life-Cycle Impact Reduction Credit, Option 2, which would require the project team to at least measure the embodied carbon of their projects, with an option to demonstrate reductions?	Mark Webster	
While the CEI targets and emissions % reduction targets are focused on the 2035 grid, the electrification of heating for high energy use (Labs with high process heat loads) will impose 10 years of higher carbon emissions from the ISO NE grid, which will remain in the atmosphere for many decades. Is the on-site PV and Renewable Energy procurement enough in offsetting the carbon penalty up to 2035?	Martine Dion	The proposed ZNC Zoning would require new projects to generate or procure renewable electricity for all carbon emissions from building electricity use at the time of use and based on the current Grid emissions factor.

ZNC Meeting Attendees – page 1 of 3

First Name	Last Name	Organization
Katherine	Latoff	BPDA
Philip	Marcotty	N/A
Isabella	Gambill	A Better City
Adam	Jennings - AHA	AHA Consulting Engineers
Robert	Tumposky	350 Mass
Alex	Brooks	Epsilon Associates
Patrick	Haswell	Vicinity
Keihly	Moore	Studio G Architects
James	Michel	Boston Clean Energy Coalition
Charles	Stellberger	Vanderweil Engineers
Maura	Zlody	city of boston environment dept.
Yve	Torrie	A Better City
Eric	Reinhard	Eric Reinhard
Thomas	Chase	MassCEC
Canan	Safar	CV Properties
Jim	Newman	Linnean Solutions LLC
Rebecca	Hatchadorian	Arup
San	Bo	Alaris Construction
Jan	Henderson	MASCO/ Longwood Collective
Tom	McShane	Dewey Square Group
Mark	Ferrenz	BCAN
Maeve	Donohue	WSP
Talya	Moked	Epsilon Associates
Amy	Tetreault	Gazit Horizons, Inc
Dan	Whittet	AHA Consulting Engineers
Andee	Krasner	Greater Boston Physicians for Social Responsibility

First Name	Last Name	Organization
Bert	Gregory	Mithun
tom	paladino	Buro Happold
Carrie	Havey	The Green Engineer
Cristina	Guido	Town of Caledon - Caledon, ON
Eric	Studer	TNZ Energy Consulting, Inc.
jacqueline	royce	Boston green action
Hubert	Murray	HMAP
Emily	Jones	LISC Boston
Martine	Dion	FAIA, LEED AP BD+C, SMMA-Director of Sustainable Design
Agnes	Vorbrodt	VvS Architects & Consultants
Eunice	Jung	CBT Architects
Erik	Barth	Gensler
Dennis	Carlberg	Boston University
Erik	Ruoff	The Green Engineer, Inc.
Caroline	Shannon	Gensler
Kathryn	Raymond	Epsilon
Adrienne	Rosenblatt	Goulston & Storrs PC
steve	cockcroft	CBT
Andrew	Stebbins	The Architectural Team, Inc
katie	pedersen	BPDA
Elliott	Laffer	Neighborhood Association of the Back Bay
Irmak	Turan	Thornton Tomasetti
Tamar	Warburg	Sasaki Associates, Inc.
Tamar	Warburg	
Kamran	Zahedi	Urbanica, Inc.

First Name	Last Name	Organization
Vincent	Martinez	Architecture 2030
Charles	Eley	Architecture 2030
Mark	Webster	Simpson Gumpertz and Heger
Kate	Bubriski	Arrowstreet
Mark	walsh-Cooke	Arup
Michele	Brooks	Sierra Club
Michael	Gryniuk	LeMessurier
Steven	Vincent	SMMA
Neil	McCullagh	Boston College
Neetu	Siddarth	Boston Properties
Neetu	Siddarth	
Suzanne	Robinson	LeMessurier
Ken	Lambert	International Masonry Institute
Michael	Berry	ICF
Grey	Lee	S&P Global
Seth	Federspiel	City of Cambridge - Cambridge, MA
Dennis	Villanueva	Mass General Brigham
Samira	Ahmadi	enviENERGY Studio
Jamie	Jang	Architecture 2030
Paula	Devereaux	Pierce Atwood LLP
Zoe	Liu	Northeastern University
Zoe	Liu	
Kai	Palmer-Dunning	HEET
Grace	Howard	Riverstone Sustainability
Kristen	Homeyer	Tufts UEP Department
Griffin	Teed	JB&B
Eduardo	Martin	Dewey Square Group

ZNC Meeting Attendees – page 2 of 3

First Name	Last Name	Organization
Eduardo	Martin	Dewey Square Group
Arthur	Jemison	BPDA
Gary	Hammer	Harvard University Planning and Designh
Elizabeth	Farrell	efarrell@relatedbeal.com
Kathleen	Brill	Foley Hoag
Martyn	Roetter	NABB
Sriti	Singh	AlfaTech
dan	Wilson	omnilite illuminate
Jessica	Rodriguez	Vicinity Energy
Frank	Stone	New Ecology, Inc.
Michelle	Lambert	Lambert Sustainability
Benjamin	Silverman	Institute for Market Transformation
elsa	mullin	skanksa
Hank	Keating	Passive House Massachusetts
Peter	Alspach	NBBJ
Rickie	Harvey	Boston Clean Energy Coalition
Patricia	Burke	Soden Sustainability
Linda	Hirsch	Boston Climate Acton Network
Mary Claire	Kelly	ACE
Greg	Minott	DREAM Collaborative
Lindsey	Lawson	The Green Engineer
Logan	Campbell	ACE
Kara	Chiccarelli	Skanska
Sara	Kudra	DREAM Collaboative
Lauren	DeVoe	VHB

First Name	Last Name	Organization
Craig	Altemose	BlocPower
Katie	Moore	FPA
Mike	Caliva	Skanska Commercial Development
Kendra	Halliwell	Kendra Halliwell
Alex	Thibadoux	National Parks of Boston - National Park Service
Cassandra	Silva	Skanska USA Commercial Development
Maciej	Konieczny	New Ecology
Maciej	Konieczny	
Sabrina	Larkin	New Ecology
Colin	Hug (He/Him)	KL&A Engineers & Builders
Delaney	Morris	BPDA
Deborah	Collins	HMFH Architects
Pip	Lewis	HMFH Architects
Andrew	Dankwerth	Pembroke
Jim	Stanislaski	Gensler
Vivian	Girard	Vivian Girard
Pedro	Fagundo	RIO
Upek	Kuruppu	HYM Investments LLC
Hannah	Payne	City of Boston
Alison	Brizius	CoB
Leann	Kosior	Individual
Thomas	Gagnon	Boston Climate Action Network
Brian	Granetz	Skanska
Abu	Bhargava	Skanska
Larry	Vagnini	Skanska USA

First Name	Last Name	Organization
Luc	Chabot	Arup
Thomas	Shannon	Studio G Architects
Michael	Lorimer	Arup
Jay	Wickersham	Noble, Wickersham & Heart
Oliver	Klein	Linnean Solutions
Haylie	Walsh	Boston University
Travis	Anderson	BPDA
Barbara	Landau	Noble, Wickersham & Heart, LLP
Nancy	Gertner	NABB
Mark	McGonagle	BPDA
Kimberly	Cullinane	Eversource
Karno	Widjaja - Utile	Utile
Dianne	Phillips	Holland & Knight LLP
Jon	Alvarez	MIT
William	Stacy	Babson University
Kristen	O'Gorman	SCB
David	Franck	DREAM
Bryan	Premont	SCB Architects
Milton	Castro	SCB
Esther	Byun	Berkeley Investments
Bennet	Heart	Noble, Wickersham & Heart LLP
William	Zielinski	SKW Partners
Bridget	Murray	National Grid
Russell	DeMartino	Skanska Commercial Development
Seth	Riseman	Handel Architects

ZNC Meeting Attendees – page 3 of 3

First Name	Last Name	Organization
Scott	McBurney	Vicinity Energy
Alena	Parunina	N/a
Gary	Brock	HMFH Architects
Chris	Busch	BPDA
Richard	McGuinness	BPDA
Peter	Nagle	National Grid
Abe	Menzin	Samuels
Lacey	Rose	BPDA
Wesley	Leung	HYM Investments
Gannon	Depetris	Phase 3
Andrew	DeAngelo	Greater Boston Plumbing Contractors Association

First Name	Last Name	Organization
Torrey	Spies	Northeastern
Patrick	Murphy	Vanderweil Engineers
Roselin	Osser	AKF
Debra	Shepard	Riverstone Sustainability
Catherine	Carlock	Boston Globe
Meredith	Elbaum	Built Environment Plus
Alison	Brizius	Cob
Gabriel	Echeverria	enviENERGY Studio
Anastasia	Nicolaou	NAIOP
Jacob	Glickel	Northeastern
Jessica	Chen	WSP

First Name	Last Name	Organization
Kat	Eshel	City of Boston
ANAMARIA	CAMARGO	Retired
Justin	Brown	MTA
Jessica	Boatright	City of Boston
John	Flaherty	HRP
Steven	Lee	private citizen
Jean	Transtamar	ATO Real estate
Reuben	Kantor	BPDA
Matthew	McCarty	Handel Architects