

BEPSDC Task Force

September 15, 2020

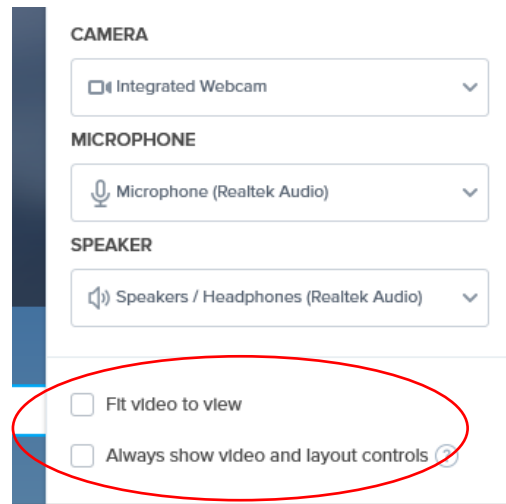
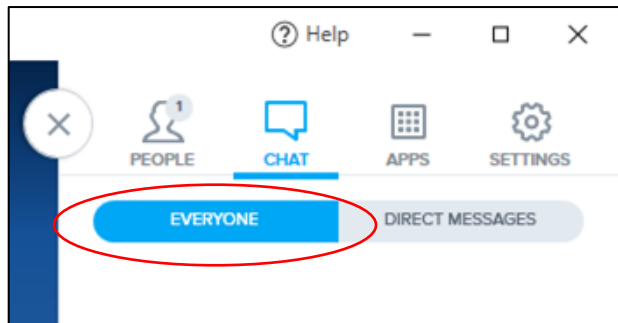
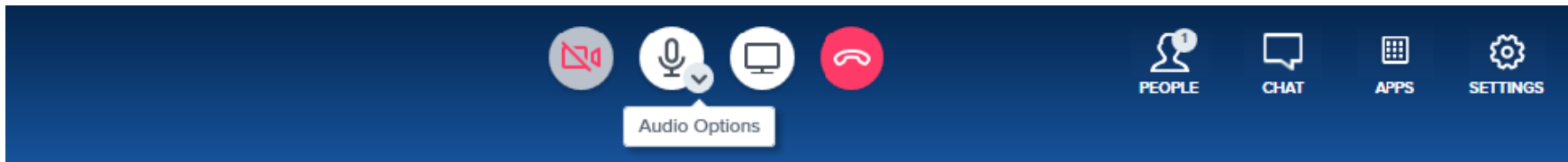


@DOEE_DC
#BEPSDC

*** DEPARTMENT
OF ENERGY &
ENVIRONMENT
GOVERNMENT OF THE DISTRICT OF COLUMBIA

WE ARE
WASHINGTON
DC GOVERNMENT OF THE
DISTRICT OF COLUMBIA
MURIEL BOWSER, MAYOR

BLUEJEANS TOUR



ONLINE MEETING ETIQUETTE

- The meeting is being recorded and will be posted to our website
- Questions and Comments throughout the meeting:
 - All attendees will control their own mute function but could be muted by the facilitator due to background noise
 - Task Force Members – can comment at any time
 - Non-Task Force Members - please use the chat box to request to talk
- Attendance
 - Non-Task Force Member – please use the chat box at this time to register your name, organization and email to “sign in”
 - Task Force Members - roll call (will also use this for voting)

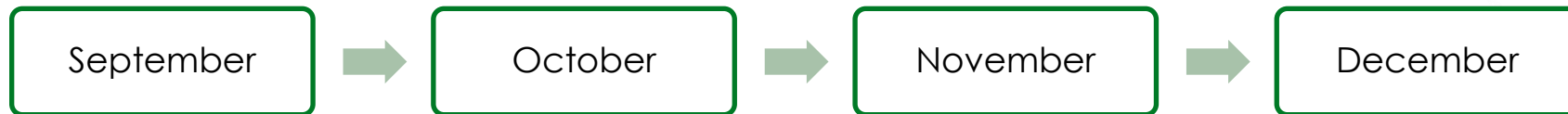
ROLE OF TASK FORCE



- Advise DOE on creation of an implementation plan for the Building Energy Performance Program;
 - Recommend amendments to proposed regulations issued by DOE;
 - Recommend complementary programs or policies.
-
- If topic needs in-depth discussion, anyone can suggest moving to a committee
 - This is an open meeting - everyone is allowed to participate



OVERALL SCHEDULE



Future Agenda Items for Discussion/Feedback

- Prescriptive pathway
- Deep Retrofit pathway
- Equity discussion
- Workforce development
- Non-DOEE policy gaps?

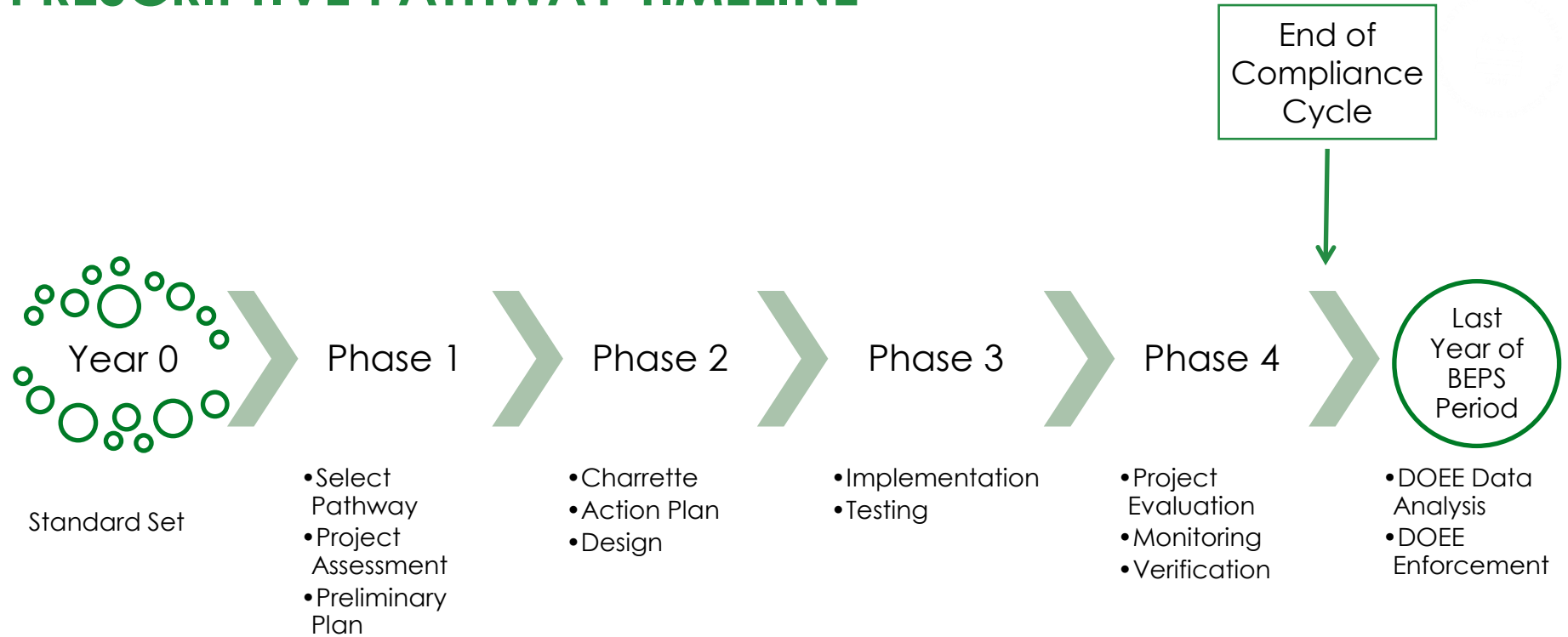
AGENDA



- Administrative Items
- Prescriptive Pathway – Part 2
 - Finish discussion on phases in process timeline
 - Building typologies
 - EEM (energy efficiency measure) structure
- Announcements



PRESCRIPTIVE PATHWAY TIMELINE



PHASE 1 – PROJECT ASSESSMENT, PRELIMINARY PLAN



- **Project Assessment**

- Select initial project team
- Complete energy audit assessment
- Conduct an owner financial assessment

- **Preliminary Plan**

- Energy audit review
- Initial EEM analysis
- Initial 3-cycle preliminary plan

PHASE 2 – CHARRETTE, ACTION PLAN, DESIGN



- **Design Charrette**
 - Expand team
 - Existing Building High Performance Energy Retrofit Charrette
 - Owner/project Goals setting
 - EEM deeper dive & Rating
 - 3-cycle preliminary Plan
- **Develop Action Plan and O&M Plan**
 - Complete Action Plan (select EEM's, create timeline, budget, etc.)
 - Complete O&M plan
- **Project Design**
 - Final EEM selections

PHASE 3 – IMPLEMENTATION, TESTING



- Final Action Plan, permit drawings, specifications, permits, CD's
- Peer review of design drawings/specifications
- Execute Action Plan
- Inspections and other documentation
- Implement O&M plan

PHASE 4 – EVALUATION, MONITORING, VERIFICATION



- Project evaluation by consultant, engineer, or designer with building owner
 - Post-implementation evaluation - EEM evaluation of effectiveness if X% savings is not realized
 - Opportunity for corrective action if necessary
 - Feedback loop for DOEE to inform refinement of prescriptive pathway in future cycles

BUILDING TYPOLOGIES PRESCRIPTIVE PATHWAY - BEPS 1

Prescriptive Pathway	No Prescriptive Pathway	
Multifamily	Worship Facility	Mixed Use
Office	Senior Care Community	Residence Hall
Hotel	Medical Office	Museum
K-12 School	Retail/Supermarket	Strip Mall
	Warehouse/Distribution	Self-storage
	Fitness Center	Social-Meeting Hall
	Fire/Police Station	Library
About 80% of bldg. population	About 20% of bldg. population	
About 84% of private bldgs.	About 16% of private bldgs.	

EEM CATEGORIES



- Lighting
- HVAC
- Envelope
- Domestic Hot Water
- Operations
- Unregulated Loads

This list will be refined
based on the results
of the cost/benefit
study



EEM FORMAT



- Abstract/Overview
- Prerequisites
- Performance Requirements
- Add-ons
- Documentation Requirements
- Reference Standards
- Resources
- Recommended EEM Sequencing
- Recommended EEM Optimized Pairing
- Considerations
- Commentary (perspective/context)

EEM FORMAT (CONT)



Abstract/Overview

- Paragraph overview of EEM purpose and applicability

Prerequisites

- Requirements to be eligible for this EEM, including existing conditions and indirect requirements

Performance Requirements

- EEM specific requirements, typically with several step options (3-5) for compliance, with a points structure based on expected savings

Add-ons

- Optional add-on items for additional points specific to this EEM

EEM FORMAT (CONT)

Documentation Requirements (submittal requirements to DOEE)

- Phase 2 – submittal requirements at design phase (at approval of scorecard)
- Phase 3 – submittal requirements at implementation phase (at permit and at final approval)

Reference Standards

- Any codes, guidelines, standards referenced in prerequisites, or performance requirements

Resources

- Relevant white papers, case studies, etc.

EEM FORMAT (CONT)

Recommended EEM Sequencing

- Brief description of how a building owner should think of sequencing this EEM with other EEMs and building upgrades

Recommended EEM Optimized Pairing

- Recommendation of other EEMs that would pair well with this EEM for various reasons: cost savings, tenant disruption, supporting or interconnected systems, etc.

Considerations

- Additional information given to help building owners prioritize decisions

Commentary

- Additional information provided for context or perspective

EEM FORMAT **EXAMPLE** (PART 1)

Multifamily: HVAC: Central Boiler Replacement

Abstract/Overview	Summary description
Prerequisite 1	Boiler must serve over 80% of conditioned spaces with heated hot water/steam within building/s for full points, and over 50%, but less than 80% for half points (or some similar partial elective)
Prerequisite 2	Existing building Use: Multifamily (different elective for business use/office buildings with boiler supplied hot water loop) currently having gas or oil boiler(s) with over xxx,000 btu/h capacity with < 85% AFUE, and at least 10 years old
Prerequisite 3	Install all HW system pipes that are currently exposed, easily accessible, or accessible during any construction/maintenance/repair work, with min 1", max .27 K-factor, pipe insulation
Prerequisite 4	New boiler and boiler components must receive commissioning by an authorized commissioning authority, and have commissioning report submitted to DCRA and DOEE prior to score card verification can be complete. Standard for CX work is ASHRAE 1.1 and ASHRAE 0.

EEM FORMAT **EXAMPLE** (PART 2)

Multifamily: HVAC: Central Boiler Replacement

Performance Requirements	Installs gas or oil boiler over 15% above federal min. efficiency	1-2 points
	Installs energy star electric boiler with over 98% E	3-4 points
	Install Heat pump boiler (air source) min COP 2.5	7 points
	Install Heat pump boiler (air source) min COP 3.2	10 points
	Install Heat pump boiler (ground source) min COP 3.2	15 points
Add-ons	VFD pumps	
	Air sealing at 3ACH-50 and 2-ACH-50	

EEM FORMAT **EXAMPLE** (PART 3)

Multifamily: HVAC: Central Boiler Replacement

Documentation Requirements

At approval of scorecard	Proposed BOD(Basis of Design) equipment & design meeting required performance requirements included on scorecard.
At approval of scorecard	Completed ASHRAE level-II energy audit, confirming existing heating system design, boiler type with distributed HW or steam, and # of systems, make, model, capacity, age, and efficiency rating of existing boiler/s.
At approval of scorecard	Minimum 3 pictures of existing boiler/s installed at building, close-up of each boiler nameplate, wide angle of it/them installed in boiler room, and secondary angle of them installed in boiler room.
At permit	DOEE BEPS reviewer to review and approve design of permit plans/submission, which include BOD, make, model, and efficiency of proposed boiler and any ancillary systems required.
At permit	Applicant shall provide make, model, efficiency rating, and manufacture spec sheet to code official/DOEE as part of permit submission.
At permit	Load sizing report for new boiler area served.
At final approval	Submission to DOEE of min 3- pictures of new boilers installed and any new ancillary systems.
At final approval	Submission of completed Commissioning report for boiler/s signed by DOEE approved commissioning authority.
At final approval	DOEE optional QA site inspection.

EEM FORMAT **EXAMPLE** (PART 4)

Multifamily: HVAC: Central Boiler Replacement

Reference Standards	xxxx
Resources	xxxx
EEM Sequencing	Consider reducing internal losses via envelope air exfiltration and thermal envelope as much as possible before replacing heating equipment. This will have a twofold effect, both providing energy savings and lower equipment sizing for heating equipment(and cooling equipment).
EEM Optimized Pairing 1	If installing a ground source heat pump for the purpose of space heating, considering pairing this with domestic hot water generation as well. Much of the cost of the Geothermal(ground source) HP system is the infrastructure(wells, pipes, pumps, etc.) which would not typically incur a significant cost to add additional capacity, if the design and ground can accommodate this additional capacity in the winter.
EEM Optimized Pairing 2	Consider installing waste heat recovery in addition to a boiler. Multi-family buildings utilize a large and consistent amount & temperature of waste water, typically ideal for installing a heat exchanger that can save additional energy costs and reduce required capacity of DHW systems.

EEM FORMAT **EXAMPLE** (PART 5)

Multifamily: HVAC: Central Boiler Replacement

Commentary 1

Geothermal, or commonly referred to as Ground-Source, Heat pump systems have the added benefit of utilizing the fairly constant temperature of the earth to extract and reject heat to and from, such that their capacity is largely unchanged depending on the season. Air source heat pumps will have reduced capacity in extreme weather, such that when it is extremely cold outside, the system capacity will be reduced when for heating you would need it the most. This results in Geothermal HP systems to be able to install smaller sized equipment and run at a higher efficiency year round, however, often have significantly higher capital installation costs and can be constrained by the site. Some urban multifamily projects may not have adequate space and/or access to the ground to allow Geothermal systems from being possible and/or cost effective.

Commentary 2

It is important to note, that HVAC upgrades are best done a) when systems are at/near/or over expected life of systems, and b) best performed after load reductions within the building have been performed. If a building replaces a boiler first, and then a few years later, replaces windows for more efficient windows and performs air sealing, the boiler is now oversized, adding extra unnecessary cost to the owner with no value. Projects doing deep energy retrofits should always consider load reduction measure before replacing HVAC systems.

EEM CONSIDERATIONS

DOEE will rank each on a 1-10 scale:
1 = sub-optimal, 10 = optimal

Potential energy savings (annual)	Added asset value for owner
Potential energy savings (life-time)	Expected lasting impact / life-cycle
Low capital cost	GHG impact
Short ROI period (return on investment)	Energy savings risk
High SIR (savings to investment ratio)	Future planning
Short effective BEPS ROI period	Advanced green economy job creation
Good effective BEPS SIR	Operating performance
Ease of implementation	Durability
Disruption to occupants/tenants	Rentability - Aesthetics - Desirability
Positive impact on occupants/tenants	

CONSIDERATIONS **EXAMPLE** (PART 6)

Scale: 1 = sub-optimal, 10 = optimal

Considerations			
Potential energy savings (annual)	8	Added asset value for owner	3
Potential energy savings (life-time)	7	Expected lasting impact / life-cycle	7
Low capital cost	4	GHG impact	8
Short ROI period (return on investment)	4	Energy savings risk	9
High SIR (savings to investment ratio)	4	Future planning	7
Short effective BEPS ROI period	7	Advanced green economy job creation	1
Good effective BEPS SIR	6	Operating performance	7
Ease of implementation	8	Durability	5
Disruption to occupants/tenants	9	Rentability - Aesthetics - Desirability	1
Positive impact on occupants/tenants	2		

NEXT MEETING



September 29, 2:30 – 4:30pm

- Complete any prescriptive pathway discussion from today
- Deep retrofit pathway – single buildings
- Affordable Housing – reflection on recommendation report

October 13, 2:30 – 4:30pm

- Campus deep retrofit pathway
- Prescriptive pathway – energy efficiency measures




MONTHLY WEBINAR UPDATE

DOEE hosting a live [monthly webinar](#) to update the public on the progress of BEPS (and associated programs) implementation

~~July 30~~
~~August 27~~
Sept 24
Oct 29
Dec 10

July 30, 2020

- [Slide Deck](#)
- [Video Recording](#) 
- Timing of video
 - 0:00 – Overview and BEPS framework
 - 12:49 – Adjustments & implementation timeline
 - 19:01 – Complementary program updates
 - 27:30 – 30 minutes of Q&A!

Social Media Post:

If you own, manage, operate, service, construct, or design buildings in DC, you need to get to know [#BEPSPDC](#)! Join DC's DOEE for a monthly update on the new Building Energy Performance Standards. Next update is September 24, 2020 at 11:00am!
<https://beps-monthly-webinar.eventbrite.com>

INTEGRAL



ANNOUNCEMENTS

