



# Building Performance Improvement Board

**11/16/2022**

Learn more at <https://www.montgomerycountymd.gov/green/energy/beps.html>

# Agenda

- **Administrative items**
- **Recap actions from previous meeting**
- **Building groups discussion and decision points:**
  - **Review exemption criteria from the law**
  - **“Special cases”**
    - **Mixed-Use Buildings**
    - **“Other” Buildings**
- **Building groups**
- **Site EUI Target Setting Basics**



## Administrative Items

# Board Purpose

## Role of Building Performance Improvement Board

1. Generally advise the Department on implementation of building energy performance standards.
2. Advise DEP on regulations for implementing the Building Energy Performance Standards
3. Recommend complementary programs or policies, with particular attention to assistance or accommodations for challenged or under-resourced sectors, such as affordable housing, non-profit organizations, and small businesses
4. (Eventually) Help make determinations about unique situations

# Team Ground Rules

- Full engagement during meetings
- Listen carefully
- Don't speak while others are speaking or interrupt others
- Let everyone speak once before you speak twice
- Follow meeting agendas and respect common ground rules
- Review action items at the conclusion of each meeting
- Value other members' time (e.g., stick to meeting times and agenda topics, avoid off-topic tangents)
- Assume positive intent
- Maintain an open mind to other perspectives than your own
- Maintain mutual respect for one another
- Engage in respectful conflict
- Critique the idea, not the person
- Don't take yourself too seriously and enjoy our time together

# Actions

- Approve meeting notes



## Previous Meeting Recap

## Action Items

- Had an in-depth discussion on building groups
- Board asked for more information about national median site EUIs and other local jurisdiction medians





## Building Groups: Special Cases

# Exemption Criteria in the Law

Certain buildings already exempt from benchmarking/BEPS requirements:

- **A building for which more than 50% of the total gross floor area is used for:**
  - Public assembly in a building without walls; or,
  - Industrial uses where the majority of energy is consumed for manufacturing, the generation of electric power or district thermal energy to be consumed offsite, or for other process loads; or,
  - Transportation, communications, or utility infrastructure.
- **A building that can document that it is a single building less than 25,000 gross square feet.**
  - For benchmarking purposes, a "building" is any single structure utilized or intended for supporting or sheltering any occupancy, except if a single structure contains two or more individually metered units operating independently that have stand-alone heating, cooling, hot water, and other mechanical systems, and no shared interior common areas.
  - Building may be exempt if it contains individually owned or leased spaces where:
    - each space is less than 25,000 gross square feet, and
    - each space does not share and is not connected by any interior space (even hallways), and
    - each space has its own energy systems (like HVAC and hot water heating) and there are no shared energy systems between spaces, and
    - each space has separate utility meters for all utilities.

# “Extensions and Adjustments”

- Law allows DEP to “grant an extension or adjustment to an interim or final performance standard for a covered building whose owner submits a request along with documentation at least 90 days before the deadline for submitting documentation of compliance with an interim or final performance standard if any of the following conditions apply:
  - 1) A demolition permit has been issued or a demolition of the building is planned before the deadline to comply with the next interim performance standard;
  - 2) The building is in financial distress under Section [18A-39](#) (g)(1);
  - 3) The building is exempt from real property taxes and the owner is able to certify by the statement of a certified public accountant or by sworn affidavit that the owner’s revenue less expenses for the previous 2 years was negative;
  - 4) The Director determines that strict compliance with those standards would be economically infeasible, as defined by regulation, due to circumstances beyond the owner’s control;
  - 5) **Other acceptable conditions as determined by the Director through regulation.**”

## Extensions/Adjustments for Under-Resourced Buildings

- Law says: The Department may establish additional criteria recommended by the Building Performance Improvement Board for qualified affordable housing, non-profit buildings, and other buildings as appropriate to modify compliance with interim or final performance standards by regulation.

# Special Cases

- **Mixed-use buildings**
- **“Other” buildings**

# Mixed-Use Buildings

- In ESPM, to be classified as a “Mixed-Use Property”, the building contains multiple property types, none of which are greater than 50% of the total Gross Floor Area (GFA), including parking GFA.
  - 30 buildings reported as “Mixed Use Property” in 2021
  - Many other buildings have one primary space >50% of floor area, but with one or more secondary spaces
    - Portfolio Manager only provides gross floor area for 3 largest space types in buildings
    - Parking SF is not included in total building floor area for site EUI calculations, but energy is included if it cannot be removed from total energy use
- **Questions:**
  - Under what circumstances to apply an area-weighted target to buildings, including those that are NOT classified as Mixed-Use Property in ESPM
  - How and whether to apply target calculation

# Mixed-Use Buildings, Other Jurisdictions

## No Weighting

- **St. Louis:** The primary property type calculated for each submission is used to define site EUI targets. A single submission receives a **single target based on the primary property use type**, without a blending of targets for mixed-use spaces
  - *Potential benefit = simplicity; City doesn't need to calculate and communicate to building owners what their mixed target is, they look up the site EUI target for the primary building type's group*

## Blended Targets

- **Denver:** Draft technical guidance: Mixed-use buildings have a **blended target based on the percentage of Gross Floor Area assigned to the largest three building types** in the 2019 benchmarking data.
- **Boston:** Buildings or Building Portfolios with more than one primary use may comply with a **blended CO2e Emissions standard**; provided, however, that a use may constitute a primary use only if it **(i) occupies at least ten percent (10%) of a Building's or Building Portfolio's square footage**, or **(ii) accounts for more than ten percent (10%) of a Building's or Building Portfolio's total annual Energy use or CO2e Emissions**.
  - *Potential benefit = blended target more reflective of building use*

# Examples Using Other Jurisdictions' Methodologies

- **Example: 57,689 gsf “Office” containing 3 space types: Office, Restaurant, Retail Store**
  - Office = 53,030 gsf; ZNC office target = 53
  - Restaurant = 3,525 gsf; ZNC food service target = 171
  - Retail Store = 1,134 gsf; ZNC Retail (other than mall) target = 45

	Mixed-Use Methodology	Target (ZNC)
St Louis	No blending for mixed-use	53
Denver	Blended target based on % of GFA assigned to 3 largest building types	60
Boston	Blended standard if space occupies at least 10% of building's GFA	53 <i>(2<sup>nd</sup> spaces not &gt;10% so no blending)</i>



# Examples Using Other Jurisdictions' Methodologies

- **Example: 65,450 gsf “Mixed-Use Property” containing 4 space types: Laboratory, Office, Parking, Restaurant**
  - Laboratory = 31,277 gsf; ZNC lab target (“other”) = 167
  - Office = 22,953 gsf; ZNC office target = 53
  - Parking = 22,130 gsf
    - Parking not considered in weighting since it doesn’t get added in to building GFA
  - As 4<sup>th</sup> largest use, ESPM does not provide restaurant GFA

	Mixed-Use Methodology	Target (ZNC)
St Louis	No blending for mixed-use	167
Denver	Blended target based on % of GFA assigned to 3 largest building types	119 (2 largest building types blended)
Boston	Blended standard if space occupies at least 10% of building’s GFA	119 (2 <sup>nd</sup> space >10% so same as Denver)

# Decision Point

- Should mixed-use targets be provided?
  - For only “mixed-use” buildings or for all buildings with secondary space?
- If so, which methodology is preferred?
  - Like Denver – 3 largest space types
  - Like Boston – largest types >10% of area
  - Other?

## “Other” buildings

- “Other” refers to buildings that do not fall within the available property use categories in Portfolio Manager.
  - PM: “Before selecting Other, it is highly recommended that you review the full list of property uses available for selection to ensure that there is not a suitable category for your property.”
- Only 8 buildings reported as “Other” in 2021, but most look like they could fit into a group and are being misreported

## “Other” buildings options

- Buildings reported as “Other – Other” contacted to report correctly or placed into a category by DEP if not clearly an “Other” CBECS property type. Building owner retains right to challenge grouping.
- Truly “other” buildings? Very challenging not to fit into one of ESPM’s 83 categories. Handle on a case-by-case basis, potentially providing:
  - Guidance on choosing an appropriate type (e.g. “Equestrian facility” not a property type in Portfolio Manager but could advise in technical guidance which ESPM option is the best suited property type)
  - The same kind of area-weighting like for any mixed-use building if building contains some uses that allow it
  - A custom target based on the building’s historical energy use and common standard-setting methodology (but this may disadvantage an already-efficient building)

# Decision Point

- Comfortable with these approaches?
  - Buildings reported as “Other – Other” contacted to report correctly or placed into a category by DEP if not clearly an “Other” CBECS property type. Building owner retains right to challenge grouping.
  - Truly “other” buildings? Handle on a case-by-case basis, potentially providing:
    - Technical guidance on choosing an appropriate property type
    - The same kind of area-weighting like for any mixed-use building if building contains some uses that allow it
    - A custom target based on the building’s historical energy use and common standard-setting methodology



# Building Groups

## Decision Point

- Covered buildings within each building type must have shared characteristics that facilitate the implementation and enforcement of this Article
- Building group methodology:
  - Group buildings with similar site EUIs
  - Where a large enough sample size exists (typically 10+ buildings), use the local median site EUI as the reference standard
  - In the absence of a large enough sample (9 or fewer), use the CBECS median site EUI and adjust to local climate where possible
- DEP may review targets as more local data becomes available, in conjunction with the Board



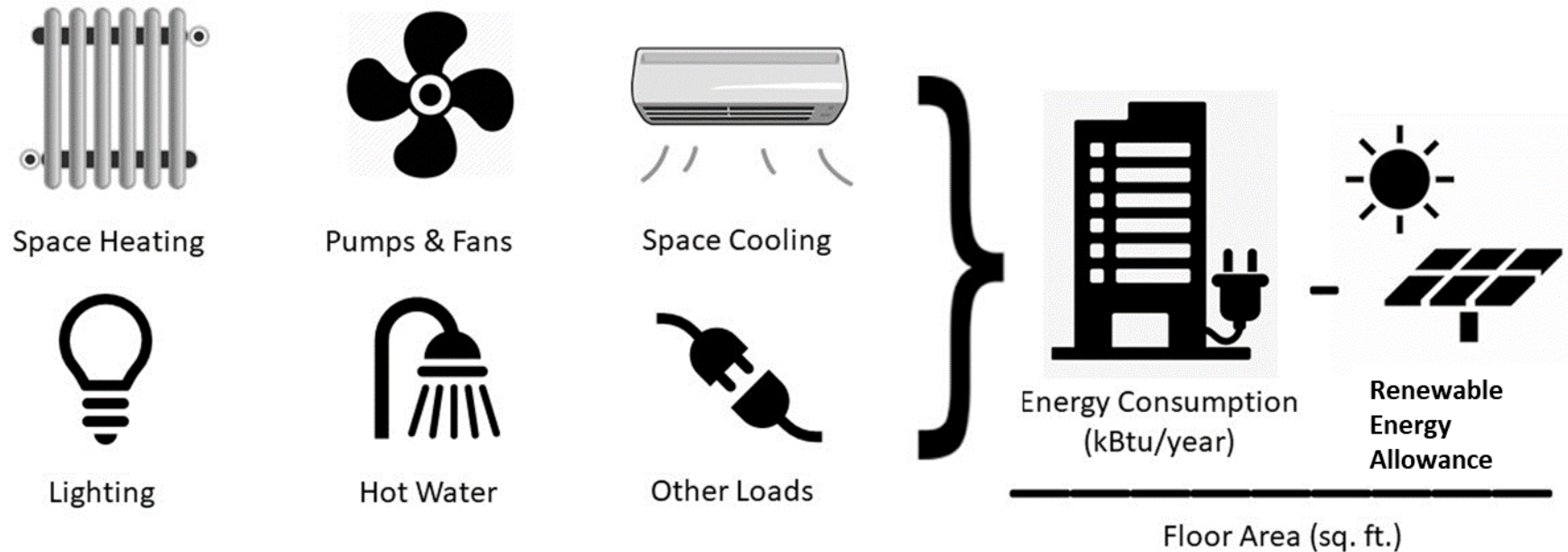
# EUI Target Setting Basics



# Basics of Site Energy Use Intensity (site EUI)

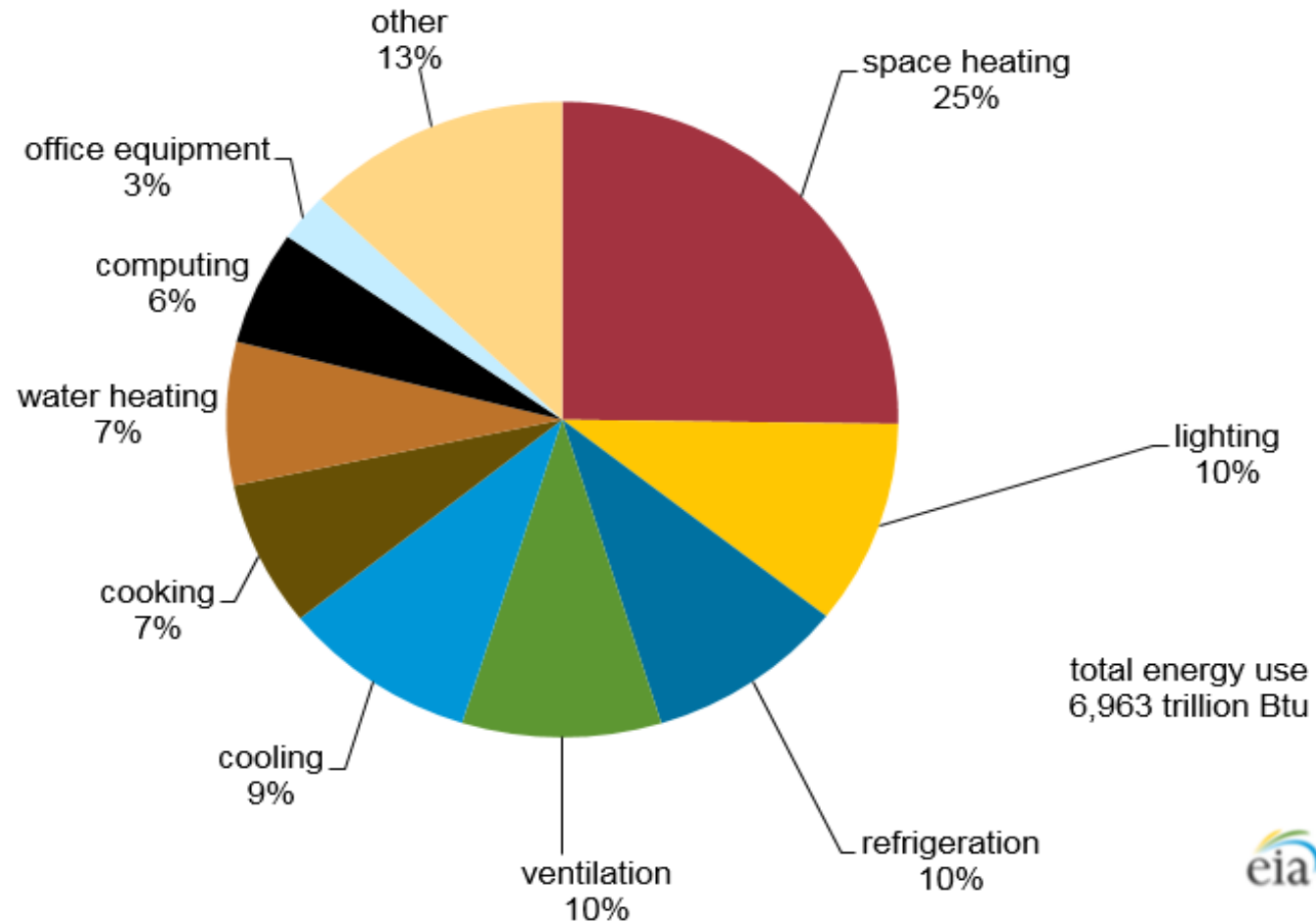
- Site energy use is calculated by dividing the total energy consumed by the building in one year (measured in kBtu) by the total gross floor area of the building (measured in square feet)
- Stakeholders favored EUI as a performance metric because it is within the building owner's control, is easy to calculate from utility bills and understand, and enables comparisons between different sized buildings
- Performance metric includes a renewable energy allowance

## Site Energy Use Intensity (EUI)



# How is energy used in buildings?

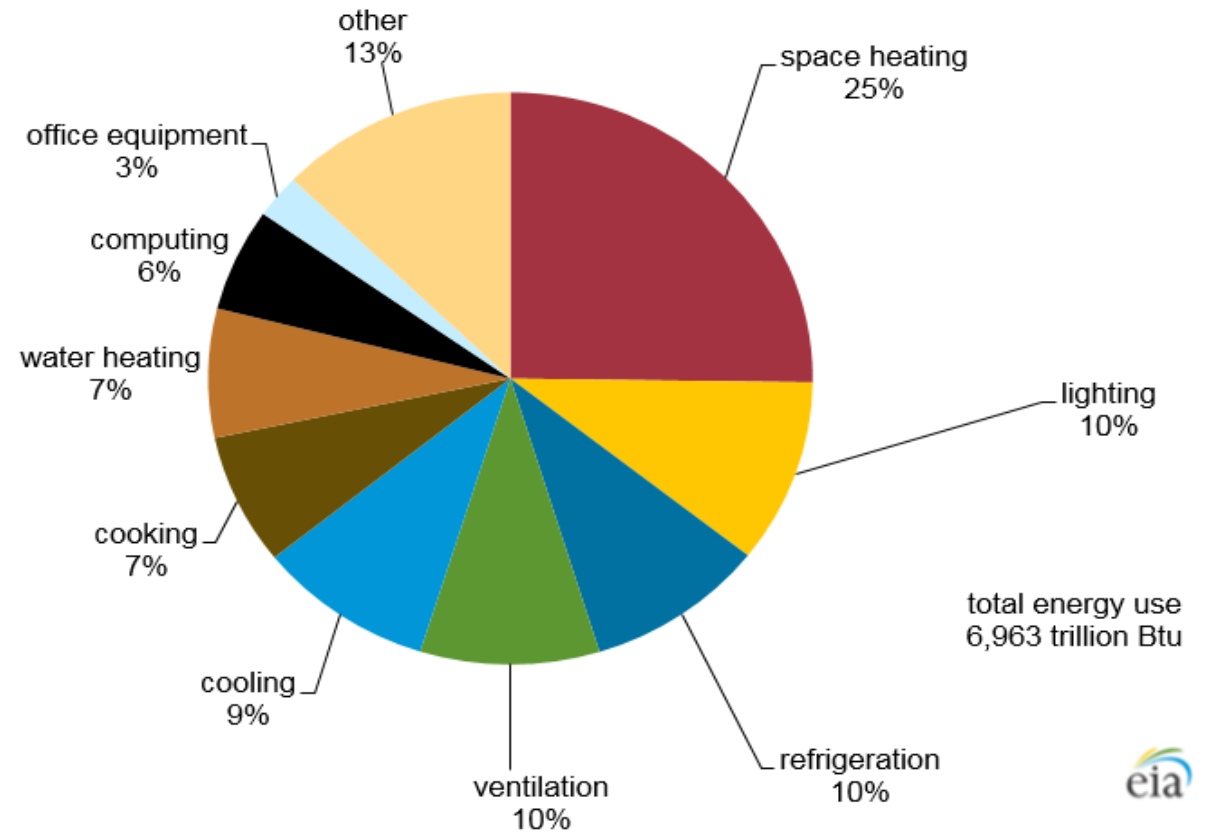
- Varies by building type, but typically, heating, air conditioning, ventilation, and refrigeration (HVAC-R) is 40-50% of the energy use...



Source: U.S. Energy Information Administration, 2012 Commercial Buildings Energy Consumption Survey.

# What types of energy power these end uses?

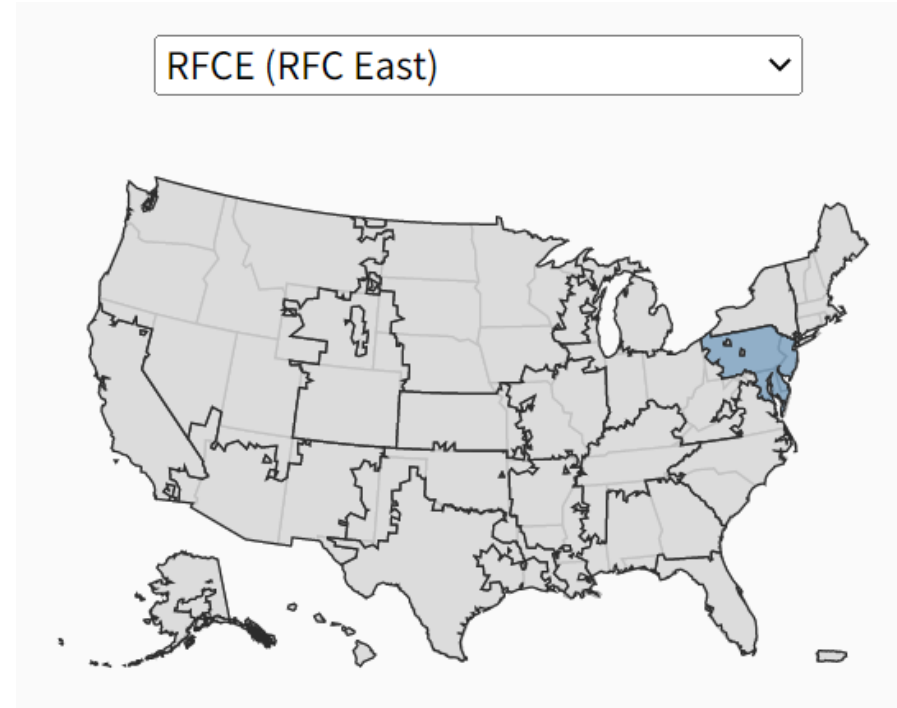
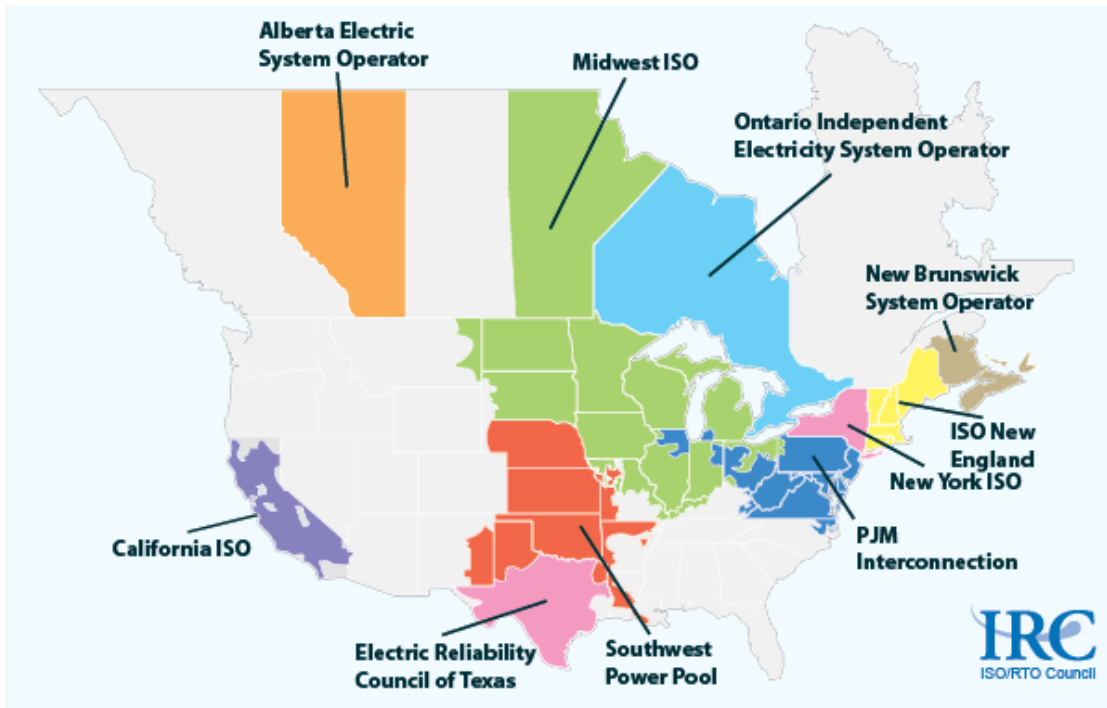
- Most all buildings use **electricity** from the grid for some end uses
  - Lighting, plug loads, cooling (usually)
  - Heating, hot water heating, and cooking can be electric as well
- Some buildings have **on-site combustion systems** that use natural gas (most commonly), fuel oil, propane, steam, etc for heating, domestic hot water heating, and cooking needs



Source: U.S. Energy Information Administration, 2012 Commercial Buildings Energy Consumption Survey.

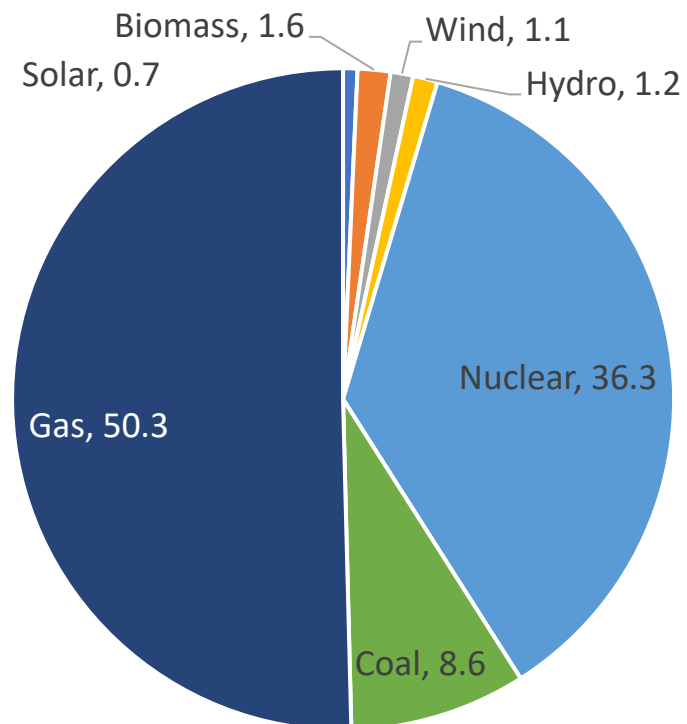
# What is an electric grid?

- An electrical grid is an interconnected network for electricity delivery from producers to consumers.
- Maryland is in the “PJM” interconnection territory - a regional transmission organization (RTO) that coordinates the movement of wholesale electricity.
- There are 27 eGRID subregions in the US. The subregions are defined to limit the amount of imports and exports across regions in order to best represent the electricity used in each of the subregions.



# How is electricity generated?

- Electricity is produced by many different sources of energy. The type and amount of emissions produced depend on how electricity is generated in the region.
- RFC East eGrid breakdown:



- Between 2005 and 2021, carbon intensity rates fell by about 35% across the PJM. PJM states continue to use cleaner, more energy efficient fuels and continue to replace older, less efficient units.
- State has “renewable portfolio standard (RPS)” goal to increase mix of renewable generation in grid to 50% by 2030. Mix relies on other states’ goals as well since we are interconnected.

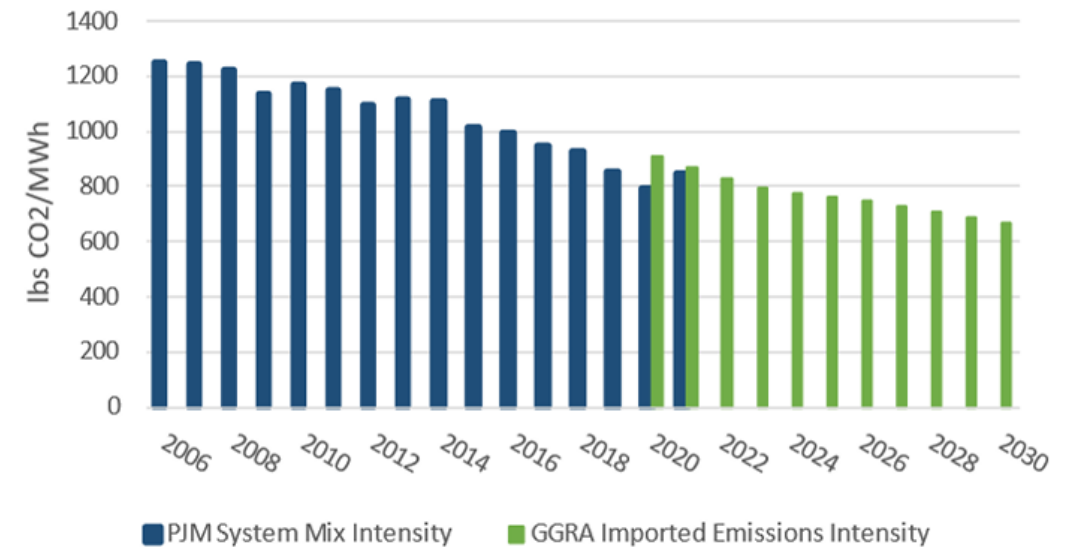
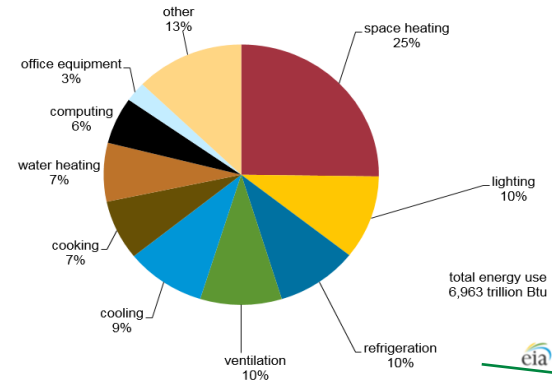


Figure 20. Historical carbon intensity of electricity in the PJM system and 2030 GGRA Plan projections. (Click figure to return).

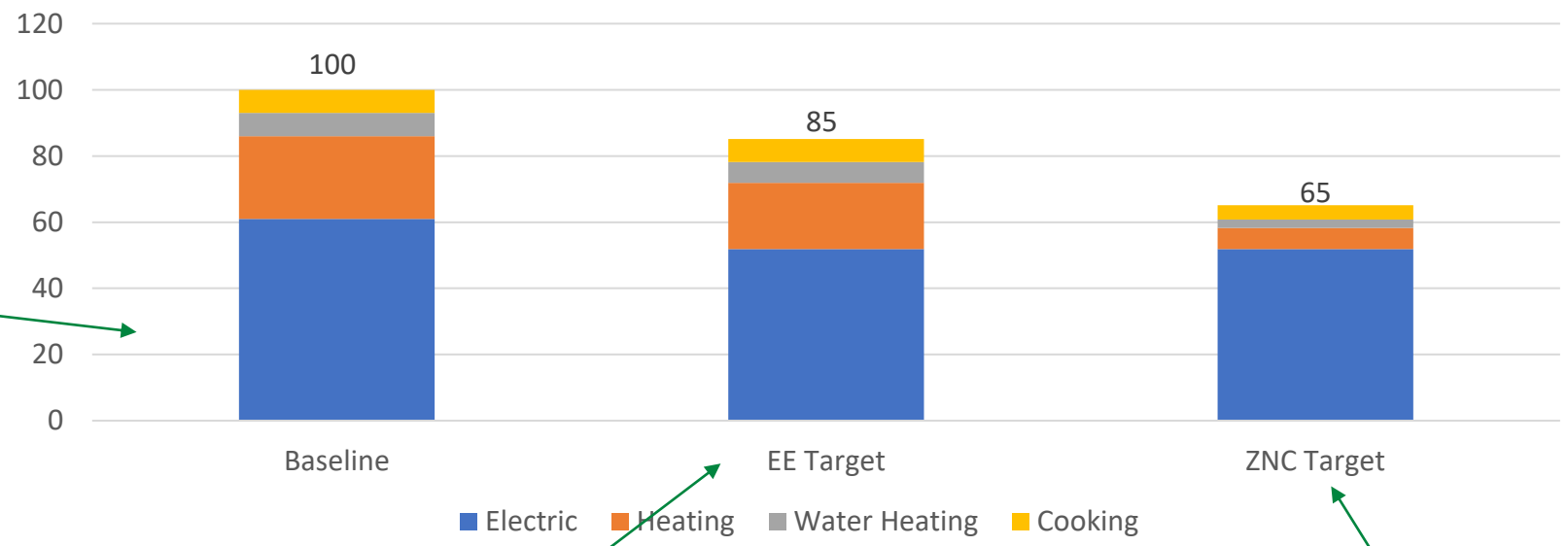
# Back to Site EUI Target Methodology

- Looking at each building type, we can estimate the energy end uses like the pie chart breakdown
- From there, apply standard reduction targets to different end uses based on what is achievable through energy efficiency (EE target) or energy efficiency + electrification (ZNC target) for each end use to arrive at whole-building site EUI targets



Source: U.S. Energy Information Administration, 2012 Commercial Buildings Energy Consumption Survey.

Example Targets



End Use	Percent reduction from the localized median EUI for EE target	Additional percent reduction starting from the EE target for ZNC target
Electricity	15%	0% (no further change)
Gas Space Heating	20%	68%, all electric (COP* 0.80 → 2.50)
Gas Water Heating	10%	59%, all electric (COP 0.90 → 2.20)
Gas Cooking	0%	39%, all electric (COP 0.45 → 0.74)
Gas Laundry/Other	0%	11%, all electric (COP 0.90 → 1.00)

# Considerations for Site EUI Target Setting

- **State and local goals/requirements**
  - State requirement for net zero direct GHG emissions by 2040
  - County climate goals (100% reduction in GHGs by 2035)
- **Technical feasibility of meeting the target**
  - Conservation and efficiency strategies
  - Efficient electrification strategies
- **Costs of reaching the target**
  - Up-front replacement costs
  - Ongoing operating costs
  - Available incentives, financing, and resources
- **Available compliance paths**
  - Inclusion of renewable energy allowance
  - Building Performance Improvement Plan option for “economic infeasibility” or other circumstances out of the owner’s control
- **Other additional background topics would be helpful to review before we start discussing site EUI targets?**

# Helpful Links

- [Benchmarking and Performance Standards Law](#)
- [Benchmarking Website](#)
- [BEPS Website](#)
- [Building Performance Improvement Board Website](#) (will include agendas, notes, and presentations)
- [BEPS Stakeholder workgroup + report](#) – completed before bill was introduced to gather stakeholder input on BEPS policy elements
- [BEPS Technical Report](#) – outlines options for site EUI targets by building type group and assesses feasibility and costs in representative case study buildings
  - [Presentation](#) of BEPS Technical Report to Council Transportation & Environment Committee
- [Allowance for Renewable Energy Technical Report and Recommendations](#) - provides information on determining how a renewable energy allowance should be defined and implemented within BEPS regulations
- On weather and business normalization:
  - [EPA technical reference guide on weather normalized energy use](#)
  - [EPA's Recommended Metrics and Normalization Methods for Use in State and Local Building Performance Standards document](#)



## Helpful Links (continued)

- [Maryland Clean Energy Center 10/25 Webinar, Solutions to Achieve Building Energy Performance Standards recording](#)

# Questions?

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## BPIB Webpage

<https://www.montgomerycountymd.gov/green/energy/bpib.html>

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