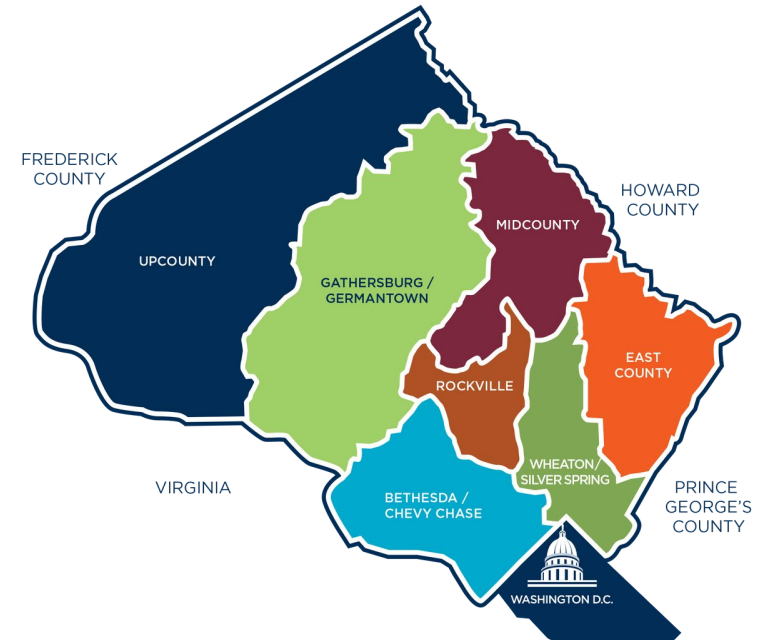




December 9, 2021

Bill 16-21: Building Energy Performance Standards



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

Proposed Agenda for BEPS Work Sessions

- **First Work Session:**
 - Overview of Bill 16-21
 - Buildings Covered by BEPS
- **Today:**
 - **Updates Since Last Work Session**
 - **Bill 16-21 vs. Regulations**
 - **Timeline & Advisory Board**
 - **Performance Metric and Electrification**
 - **BEPS Technical Analyses Purpose and Methodology**
- **Future Work Session Topics Can Include:**
 - Compliance Pathways for BEPS
 - Under-resourced Sectors and Compliance Considerations
 - Tools and Resources for Meeting BEPS
 - Regulations and BEPS Standard-setting Decision Points

Updates Since Last Work Session

- **Nov. 1, 2021:** MD Commission on Climate Change approved [Building Energy Transition Plan](#)
 - Identifies low-cost pathways for decarbonizing/electrifying residential and commercial building sectors
- **Nov. 18, 2021:** Delivered [2020 Montgomery County Benchmarking Report](#) to Council
 - 92% reporting rate in 2020; citations have been issued to non-reporters
- **Nov. 22, 2021:** [City and County of Denver BEPS Legislation](#)
 - Passed legislation unanimously
 - Rules and regulations including first interim targets by May 1, 2022
 - Utilizes the “trajectory” model developed with Montgomery County stakeholders and IMT
 - Site EUI metric with renewable energy credit
- DEP continues technical research on EUI targets and solar credit to inform Montgomery County regulations

Bill 16-21 and Future Regulations

	In Bill 16-21	To be further defined via regulations
Building Coverage	Commercial & multifamily 25k+ gsf	
Timeline	<ul style="list-style-type: none"> 3 years of benchmarking data to inform a baseline Long-term targets with interim check ins every 4 years 	Extensions or adjustments for under-resourced buildings like affordable housing, non-profit owners
Advisory Board	Establishment of Advisory Board	
Performance Metric	<ul style="list-style-type: none"> Site energy use intensity (EUI) Mention of credit for onsite solar generation towards achieving BEPS targets 	<ul style="list-style-type: none"> Numerical site EUI performance standard for each building group (<i>BEPS Technical Report</i>) Detailed guidance for onsite solar generation as a consideration for credit towards BEPS (<i>Solar Credit Report</i>)
Alternative Compliance Path	Building Performance Improvement Plan (BPIP) for circumstances outside of building owners' control	<ul style="list-style-type: none"> Format and elements required in BPIP Definition of "economic feasibility" and other parameters that would necessitate a BPIP Extensions or adjustments for under resourced buildings like affordable housing, non-profit owners

Regulations will be issued no later than **June 1, 2022** as written in current bill.

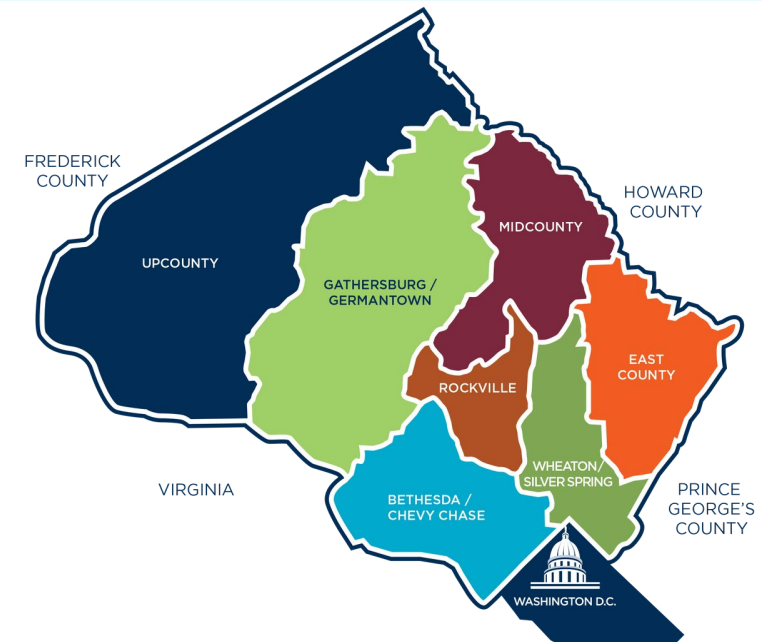
Comparison of BEPS Legislative Processes

	Montgomery County	Denver, CO	WA State	St. Louis, MO	Washington, DC	New York City	Boston
Building Coverage	Legislation	Legislation	Legislation	Legislation	Legislation	Legislation	Legislation
Advisory Board	Legislation	N/A	N/A	Legislation	Legislation	Legislation	Legislation
Performance Metric	Legislation	Legislation	Legislation	Legislation	Legislation	Legislation	Legislation
Performance Targets	Regulation	Regulation	Regulation	Regulation	Regulation	Legislation	Legislation
Timeline	Legislation	Legislation	Legislation	Legislation	Legislation	Legislation	Legislation
Alternative Compliance Pathways / Consideration for Specific Sectors	Regulation	Regulation	Regulation	Regulation	2 paths legislated; others in Regulation	Regulation	Regulation
BEPS-Specific Penalties	N/A, Pending State Legislation	Legislation	Legislation	N/A	Regulation	Legislation	Legislation



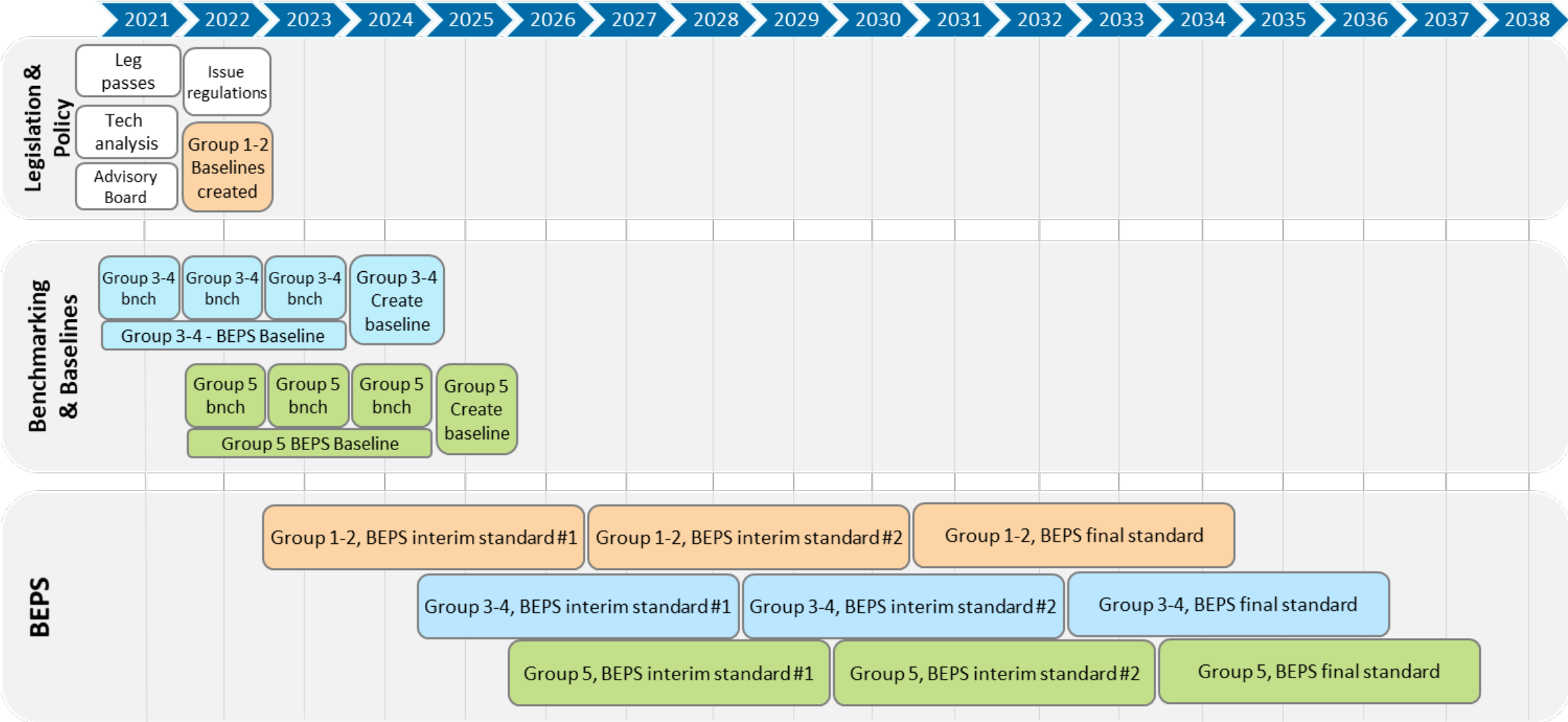
Bill 16-21: Building Energy Performance Standards

Timeline & Advisory Board



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

BEPS Timeline in Bill 16-21



Comparison of BEPS Timelines

	Montgomery County	Denver, CO	WA State	St. Louis, MO	Washington, DC	New York City	Boston
Compliance Cycle	Long-term target with 4-year interim check ins	Long-term target with 3-year interim check ins	Every 5 years	Every 4 years	Every 5 years	Annually	Annually
Standard Resetting	Long-term targets 2034-2037. Standard reset TBD.	Long-term EUI target in 2030 with interim targets in 2024 and 2027. Maintain target indefinitely.	TBD	Standard resets every 5 years based on new 35 th percentile by building type (so 65% of buildings must improve)	Standard resets every 6 years based on new median	Limits get stricter every ~5 years	Limits get stricter every ~5 years

See IMT's Comparison of U.S. Building Performance Standards: <https://www.imt.org/resources/comparison-of-u-s-building-performance-standards/>

Building Advisory Board

- Provide recommendations to the County on BEPS implementation
- Members recommended by County Executive, appointed by County Council
- 15 voting members serving two 3-year terms:
 - County leadership, building owners, utilities, energy/engineering services, finance, NGO and industry representatives
- Tasked with advising on items such as:
 - Draft regulations
 - Reviewing building performance improvement plans
 - Handling situations of change in building ownership or property use type
 - Developing guidance for unique building situations (e.g., campuses)
- Board creation pending passage of legislation

Comparison of Legislated BEPS Advisory Boards

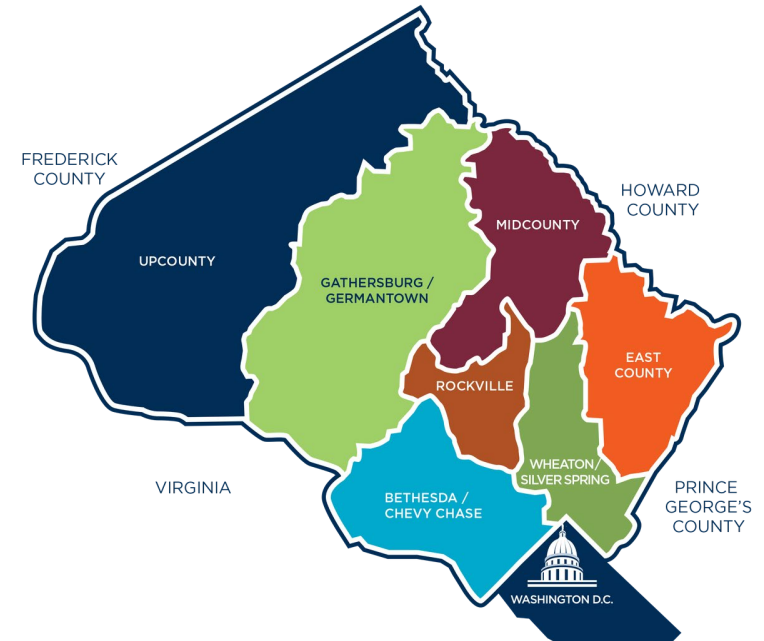
	Montgomery County	Denver, CO	WA State	St. Louis, MO	Washington, DC	New York City	Boston
Advisory Board	Yes	No	No	Yes	Yes	Yes	Yes
Membership	15-member Advisory Board with specific representation in legislation	Task Force developed BEPS recommendations – no reference to Advisory Board in legislation	TBD	9-member Board with specific representation in legislation	BEPS Task Force to advise on implementation	16-member Advisory Board with specific representation in legislation	Advisory Committee of property owners consults with Commission on regulations and amendments
Authority	Advisory	N/A	N/A	Decision-making authority	Advisory	Advisory	Decision-making authority

See IMT's Comparison of U.S. Building Performance Standards: <https://www.imt.org/resources/comparison-of-u-s-building-performance-standards/>



Bill 16-21: Building Energy Performance Standards

Performance Metric and Electrification

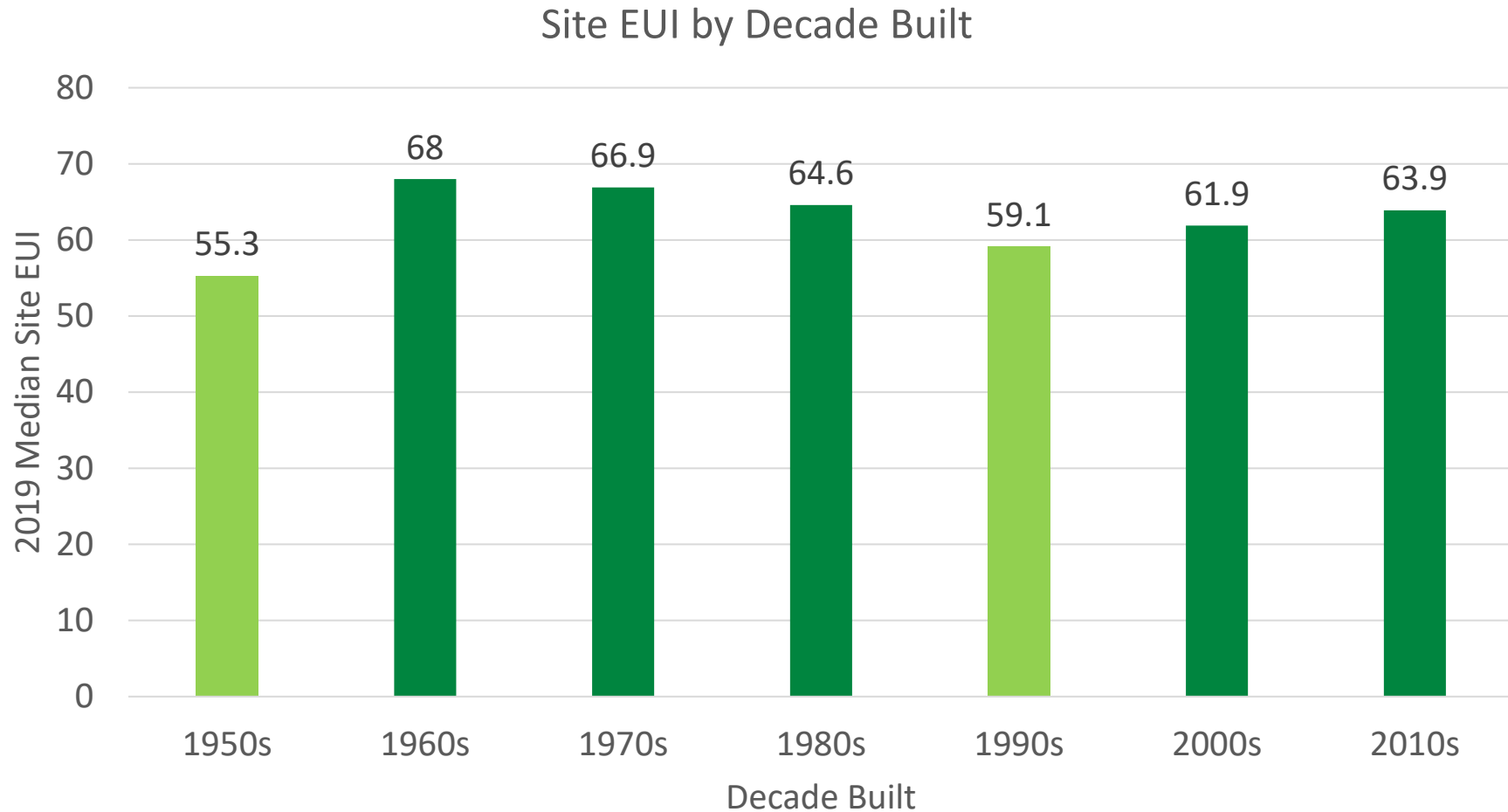


Performance Metrics Selection

- Stakeholders favored BEPS performance to be evaluated by **site energy use intensity (EUI)**:
 - Measures energy used per gross square foot per year (kBtu/GSF)
 - “Net normalized” site EUI would account for weather normalization and onsite solar
- Benefits of a Site EUI performance metric include:
 - Simple calculation directly from utility bills and floor area
 - Available for all building types, able to compare different-sized buildings in one group
 - Measures actual energy use directly controlled by the building owner and tenants
 - Easily understood by building owners and managers
 - Readily available via benchmarking data
 - **Incentivizes efficient use of electricity and encourages electrification (especially if an aggressive BEPS target is selected)**

Site EUI and Age of Building

- Offices built in the 1950s have the lowest median Site EUI of reported offices, followed by those in built in the 1990s.
- Most offices benchmarked and reported in Montgomery County were built in the 1980s.



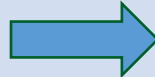
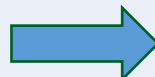
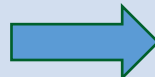
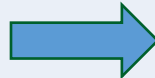
Comparison of BEPS Metrics

	Montgomery County	Denver, CO	WA State	St. Louis, MO	Washington, DC	New York City	Boston
Metric	Site EUI	Site EUI	Site EUI	Site EUI	ENERGY STAR score (or equivalent)	CO ₂ e emissions	CO ₂ e emissions
Grouping	By building type	By building type	By building type	By building type	By building type	By building type	By building type
Minimum Threshold Performance	Data-driven targets in development, to be set in regulation. Based on site EUI by building type	Set in regulation such that that 30% total energy savings across covered buildings is achieved	First target 15% below ASHRAE standard 100-2018 site EUI by building type	Standards set no lower than 35th percentile site EUI by building type (so 65% of buildings must improve)	Standards set no lower than median ENERGY STAR score (or equivalent)	CO ₂ e emissions limits on a sq. ft. basis by building type	CO ₂ e emissions limits on a sq. ft. basis by building type

See IMT's Comparison of U.S. Building Performance Standards: <https://www.imt.org/resources/comparison-of-u-s-building-performance-standards/>

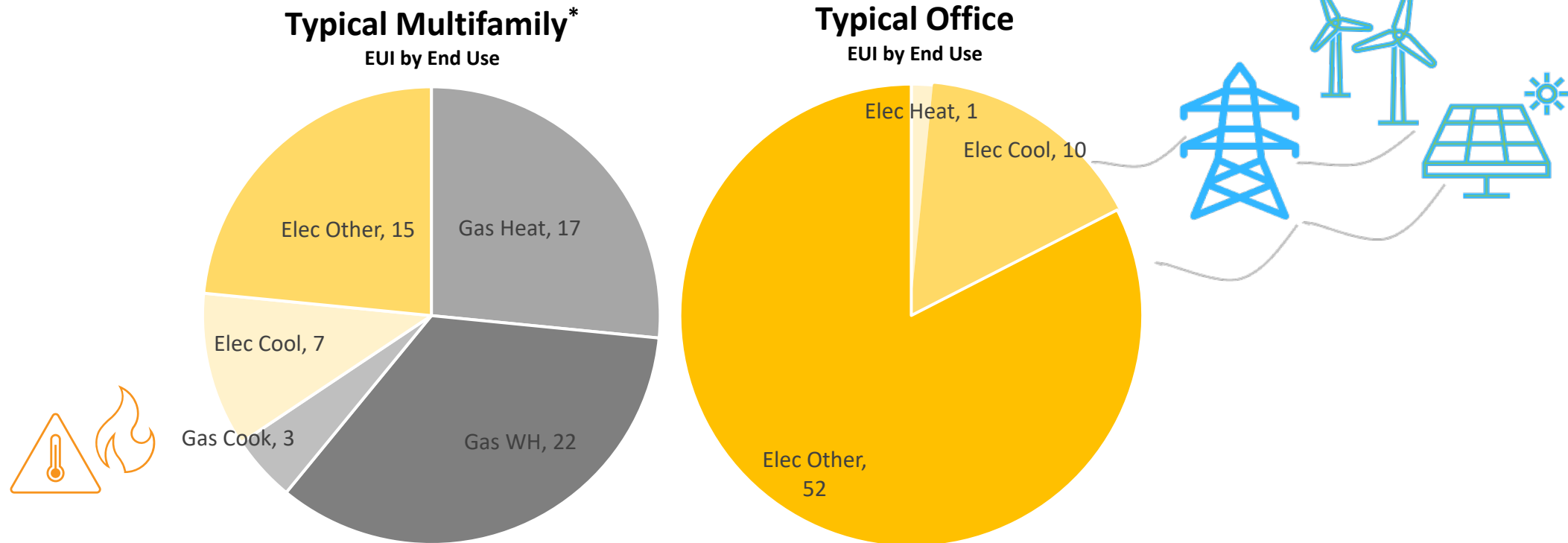
Electrification Basics for Buildings

- Buildings use carbon-based fossil fuels for on-site heating, hot water heating, cooking, and back-up power.
- On-site combustion systems can be made more energy efficient, however those systems will still use fossil fuels, release CO₂, and worsen indoor air quality.
- **Electrification** = replacing on-site combustion systems with high-efficiency electric systems that can be powered by increasingly clean and renewable electricity.

	Fuel-Fired Systems		High-Efficiency Electric Systems
Heating	Furnaces and boilers		Ground-source, air-source, or air-to-water heat pumps
Water Heating	Gas-powered water heaters		Heat pump water heaters
Cooking	Gas-powered ovens and burners		Electric ranges and induction cooktops
Back-Up Power	Diesel-powered generators		Battery storage

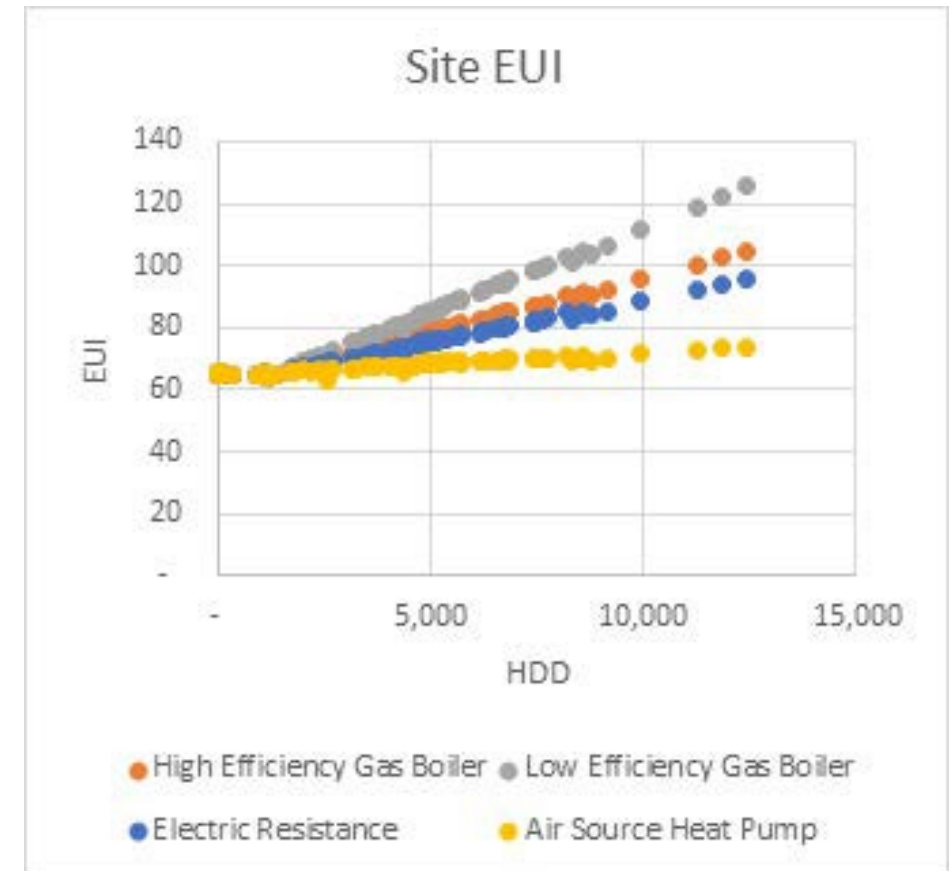
Electrification Basics and the Grid

- Some building types contain substantial amounts of on-site combustion and will be more challenged to reach net zero emissions (e.g., multifamily)
- Other building types within Montgomery County are already mostly electric and would have an easier time achieving carbon neutrality as the grid gets cleaner (e.g., offices)
- Further improving electric efficiency in eases the burden on the supply side to provide electricity from emissions-free sources



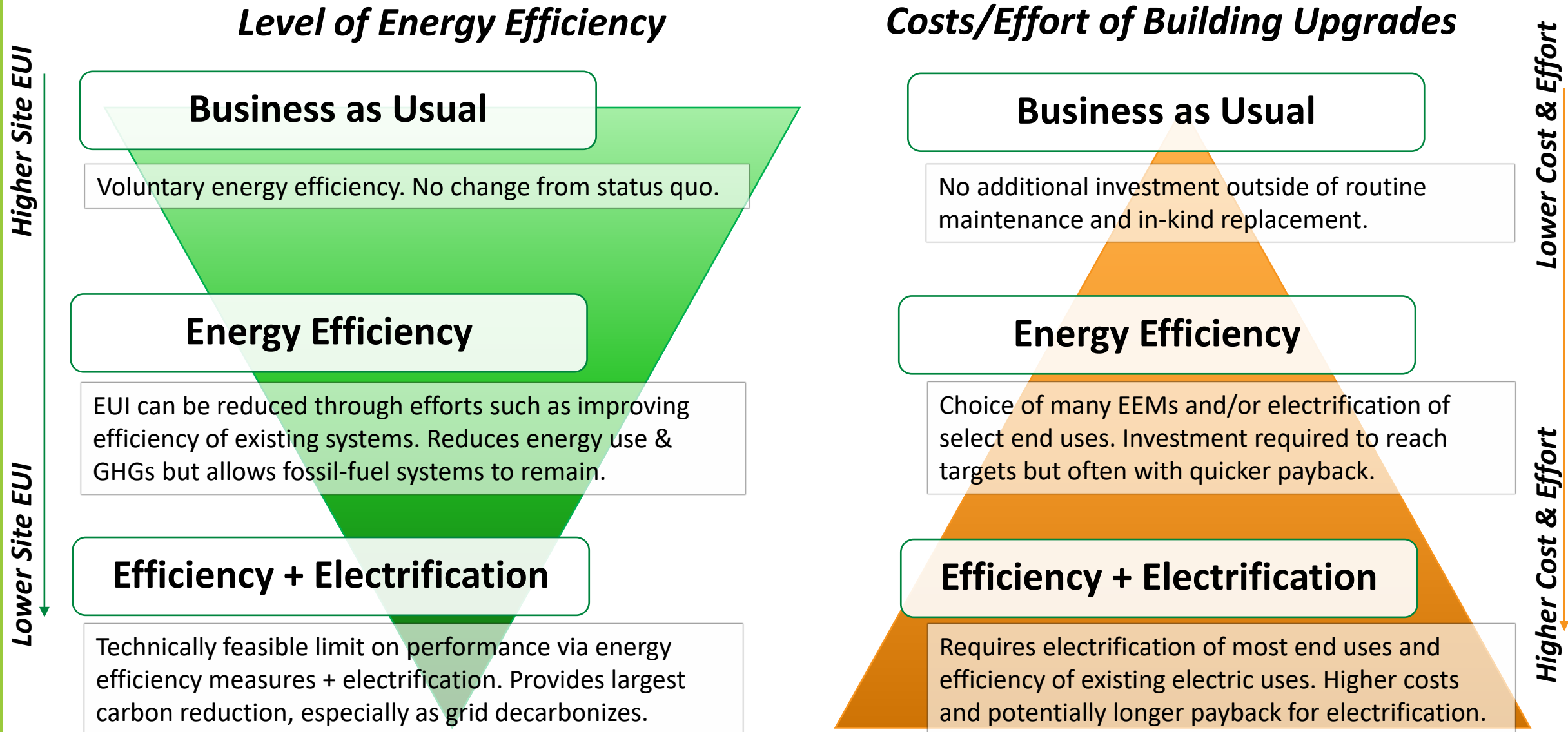
Electrification and Site EUI

- The Site EUI metric in Bill 16-21 favors electrification regardless of the efficiency of the electric technology.
- **Electrification is one of the deepest forms of energy efficiency because electric equipment operates at higher efficiency than fuel-fired equipment.**
- Setting a low BEPS site EUI target would require buildings to electrify end uses over time and improve electric efficiency.



Source: US EPA, *Understanding and Choosing Metrics for Building Performance Standards and Zero-Carbon Recognition*, May 2021

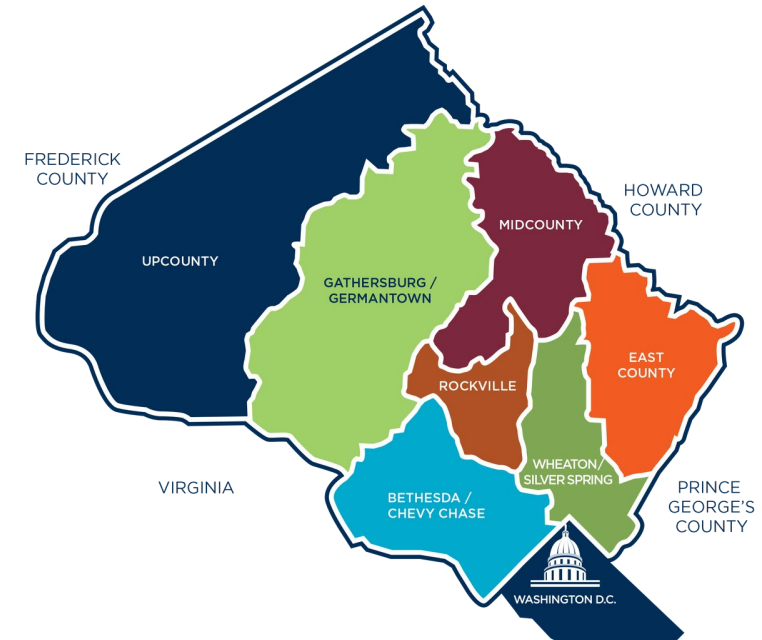
BEPS Standard-Setting Approach Options





Bill 16-21: Building Energy Performance Standards

BEPS Technical Analyses Purpose and Methodology



BEPS Technical Analyses

Purpose

- Identify potential BEPS performance target recommendations to evaluate technical feasibility, potential energy, GHG, and cost savings, and estimated costs in case-study buildings and county-wide covered buildings
- Develop recommendations for accounting for solar generation towards meeting BEPS targets as a policy tool to incentivize commercial solar installations

End Results: Two technical reports that will provide the County with guidance and recommendations on developing regulations following Bill 16-21.

High-Level Methodology of BEPS Technical Analysis

Covered Buildings

- Develop an approximate covered buildings list
- Group covered buildings into building types to evaluate a range of technically feasible site EUI targets

Standard Setting Options

- Establish a recommended method for setting building performance standards
 - Use typical energy use profiles in building types representative of buildings in Montgomery County
 - Assume retrofits using commercially available technology

County-Wide Impacts

- Model county-wide impacts of potential BEPS targets to estimate:
 - Energy savings
 - GHG reductions
 - Cost savings
 - Cost impacts

Case Studies

- Select buildings representative of primary building types that would have to meet a BEPS target
- Create retrofit packages via desk audits to:
 - Test technical feasibility of potential site EUI targets,
 - Estimate the total capital costs,
 - Estimate energy cost savings of meeting targets

BEPS Solar Credit Report Approach

- Draft recommendations for “crediting” renewable energy in the BEPS
- Develop a range of technical approach options that consider:
 - Calculation process
 - Net metering
 - REC retention
 - Available data & reporting processes
 - Linkages between solar and energy efficiency investments
- Engage stakeholders
- Translate the technical approach into policy recommendations

Proposed Topics to Cover at Future BEPS Work Sessions

- **Future Work Session Topics Can Include:**
 - Compliance Pathways for BEPS
 - Tools and Resources for Meeting BEPS
 - Regulations Preview and Decision Points
 - Under-resourced Sectors and Compliance Considerations
 - Approach to Setting the BEPS Standards (Technical Report highlights)
 - Solar Credit Recommendations