



Building Performance Improvement Board

3/15/2023

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

Agenda

- **Administrative items**
- **Recap actions from previous meeting**
- **Building Performance Improvement Plans:**
 - **Improvement Measures & Cost-Effectiveness**
 - **Verifying Implementation**
- **(if time allows) Renewable Energy Allowance Background**



Administrative Items

Actions

- Approve 3/1 meeting notes
- Finish trainings (emailed those still needing to complete ethics training)
- Cancel 3/29 meeting (due to Montgomery County Energy Summit)

BPIB Recommendation Report

- Summary report on building group recommendations emailed to Board
- Comments or thoughts on the draft?
- Working on site EUI target section



Previous Meeting Recap

Recap

- Considered qualifying scenarios for circumstances outside owners' control from other jurisdictions and ways to document those scenarios
- Discussed two-part application approval/submission process
- Discussed “economic infeasibility”
- Considered formation of building performance improvement plans and how to document measures such as energy audits, commissioning, and O&M plans



Building Performance Improvement Plans: Improvement Measures & Cost-Effectiveness

Regulations: Building Performance Improvement Plans (BPIPs)

The law says, BPIP must include:

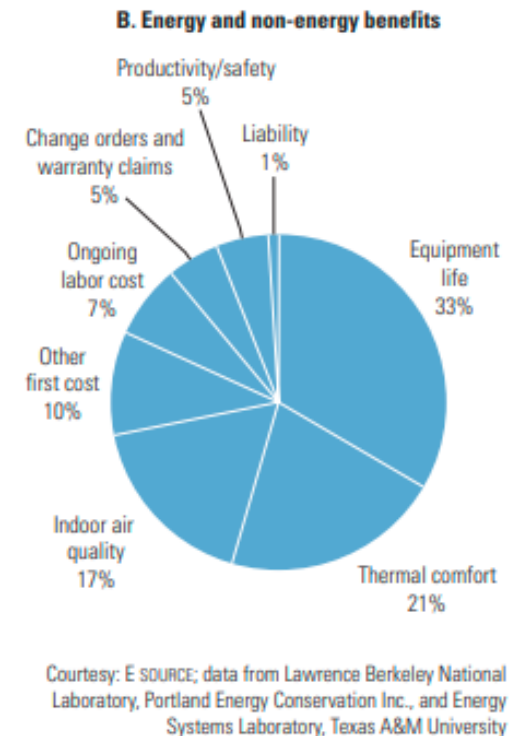
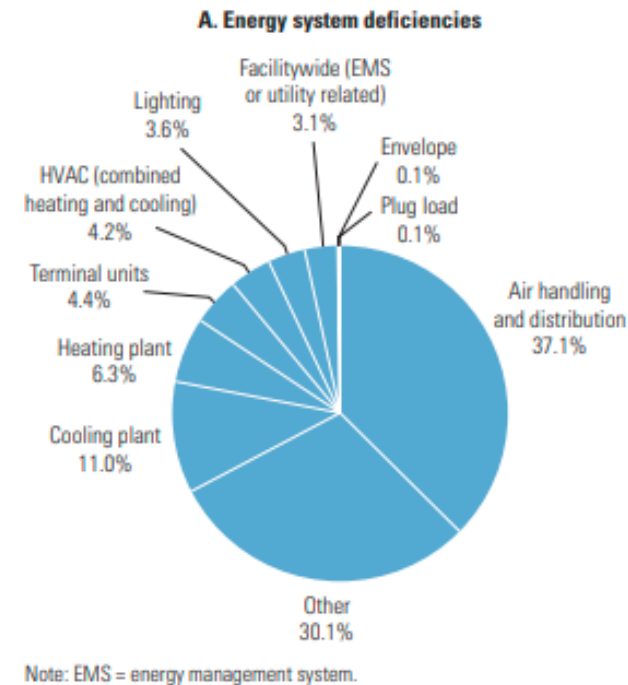
- Documentation of economic infeasibility or circumstances beyond owner's control
- List of potential improvement measures, including energy savings & cost-benefit analysis;
- Plan and timeline for achieving energy improvements to the building's performance that will provide cost-effective energy savings, including estimated savings of implementing all cost-effective measures;
- Procedures for correcting any noncompliance or deviation from the plan.

Energy Audits

- Most other jurisdictions with alternative compliance paths require ASHRAE level 2 audit (plus jurisdiction-specific fields)
- Energy audit may need to be done to document need for a BPIP (like economic infeasibility) and could then be used to document all potential measures, all cost-effective measures, and the timeline for executing those measures
- DEP could require use of vetted auditor or some parameters around credentials or being a 3rd party company
 - Most jurisdictions dictate that the auditor must be a 3rd party and hold one of several accepted credentials (PE, Certified Energy Auditor, Certified Energy Manager, etc)
- DEP could require inclusion of some fields or set uniform parameters for things like utility rates, equipment life, etc., e.g.,
 - Other jurisdictions using a DOE platform called Audit Template for collecting all required data
 - For project costs: require use of incremental cost of replacement, show all possible incentives, financing, and cash flow resources
 - For project benefits: require use of uniform projected utility rates, include maintenance savings, include other benefits like rent, tenant retention, cap rate, etc., include avoided penalties

Retro-Commissioning (RCx)

- Process of verifying that installed equipment is operating efficiently and providing the services necessary to meet the needs of the building's occupants.
- Systematic investigation that optimizes building performance by identifying and implementing relatively low-cost operational and maintenance improvements, of individual equipment and systems
- [LBNL 2009 study](#) showed average costs of \$0.30/sf, median energy savings of 16%, and a 1.1 year SPB, plus additional non-energy benefits to equipment life, comfort, IAQ, etc.
- St. Louis allows retro-commissioning (RCx) or energy audit as basis of alternative compliance plan.
 - RCx may only be done once per property in the first two BEPS Cycles. May make exceptions for properties that change ownership or Property Type during this time.



O&M Practices

- Denver and Washington State both require additional documentation that operations and maintenance (O&M) best practices are established and being followed (per ASHRAE standard 100 6.2 – 6.4)
 - Denver requires only for buildings pursuing a timeline adjustment
 - Washington State requires for all buildings
- Can help assure that sound O&M practices have been integrated into building operations to maximize no- and low-cost savings opportunities

Discussion

- Thoughts on which process or combination of “improvement plan” is most likely to result in an actionable building plan and yield demonstrable energy savings?
- Since BPIP allows building owner an alternative compliance path that that may not lead to the same performance outcomes, ensure savings are maximized. In addition to the audit, we could require an O&M plan and/or retrocommissioning/ongoing commissioning where it makes sense to ensure that operations /maintenance opportunities have been completed.
 - Option 1: ASHRAE Level II audit only
 - Option 2: ASHRAE Level II audit + O&M plan
 - Option 3: ASHRAE Level II audit where retrocommissioning (or proof of ongoing, monitoring-based Cx program) is a mandatory EEM that must be completed (if applicable for a given building)
 - Option 4: ASHRAE Level II audit + O&M Plan + RCx (or proof of ongoing MBCx program)
 - Requirement that RCx be done prior to qualifying for a BPIP (where relevant)?

Regulations: Building Performance Improvement Plans (BPIPs)

The law says, BPIP must include:

- Documentation of economic infeasibility or circumstances beyond owner's control
- List of potential improvement measures, including energy savings & cost-benefit analysis;
- Plan and timeline for achieving energy improvements to the building's performance that will provide cost-effective energy savings, including estimated savings of implementing all cost-effective measures;
- Procedures for correcting any noncompliance or deviation from the plan.

Implementing Cost-Effective Measures

- BPIP will be required to show a list of improvement measures, including energy savings & cost-benefit analysis (similar info as discussed applying for economic infeasibility)
- Few examples of defining “cost-effective” in other BEPS laws:
 - Washington State requires buildings using investment criteria for compliance to complete a life cycle cost analysis (LCCA) and implement an optimized bundle of energy efficiency measures that provide maximum energy savings without resulting in a savings-to-investment ratio (SIR) of less than one
 - $(SIR = \frac{\text{projected cost savings over the lifetime of the measures}}{\text{total installed cost of the project}})$
 - SIR < 1 measures alone unlikely to encourage an EEM package that meets state decarbonization requirements and may be subject to manipulation
 - St. Louis requires “agreed-upon ECMs” or completing its retro-commissioning within the approved timeline

Discussion

- Thoughts on cost-effectiveness metrics and criteria?
- Thoughts on tying cost-effectiveness to building-specific financials (which would require more documentation) or applying more broadly?
- Thoughts on trying to define cost-effectiveness via an objective metric, or to consider on a case by case basis (similar to economic infeasibility)



Building Performance Improvement Plans: Verifying Implementation

Regulations: Building Performance Improvement Plans (BPIPs)

The law says, BPIP must include:

- Documentation of economic infeasibility or circumstances beyond owner's control
- List of potential improvement measures, including energy savings & cost-benefit analysis;
- Plan and timeline for achieving energy improvements to the building's performance that will provide cost-effective energy savings, including estimated savings of implementing all cost-effective measures;
- Procedures for correcting any noncompliance or deviation from the plan.

If, after consulting with the Building Performance Improvement Board, the Director approves the building performance improvement plan, the owner must record the building performance improvement plan as a covenant in the County land records and deliver a certified copy of the recorded plan to the Department.

After the Director receives the certified copy of the recorded plan, the covered building will be deemed to be in compliance with the applicable interim or final performance standards as long as the owner fulfills the terms of the building performance improvement plan within the timeline specified in the plan.

Following Through on BPIPs

- Some jurisdictions validate by *monitoring performance* in subsequent benchmarking reports.
 - Denver - as timeline or target adjustments, the owner receives a new site EUI target that would result from implemented measures, or a new timeline within which to meet the standard target. The building owner must demonstrate that the new target EUI or new timeline was met in subsequent benchmarking reports
 - Washington State - Post implementation energy savings shall meet or exceed 75% of the energy savings projected in the energy audit report.
- Some jurisdictions validate by *tracking measure installation*
 - Washington DC – Prescriptive Pathway: Action-based compliance method that includes reporting milestones and implementing one or more recommended energy efficiency measures (EEMs) designed to achieve energy savings (a minimum Site EUI reduction of 20%) comparable to the Performance Pathway. Compliance under the Prescriptive Pathway is met by successfully completing specific actions and meeting reporting/verification requirements. So long as they successfully implement the specific approved EEMs and meet all reporting/verification requirements, the building will comply, regardless of its measured energy performance.
 - Owners opting for the “prescriptive” pathway must submit an Implementation Report, including 1) an Implementation Verification with supporting documentation to verify the EEMs were installed as approved, and 2) an attestation of implementation of the approved O&M program.
 - St. Louis - If the property fulfills the terms, including installing agreed-upon ECMs or completing its retro-commissioning within the approved timeline, then the property shall be in compliance with BEPS as outlined in the CACP

Discussion

- Thoughts on verifying project implementation?
- Demonstrate compliance through performance? Through reporting? A combination of both?

Failure to Follow-through on BPIPs

- Most jurisdictions subject building owners to similar BEPS penalties if they fail to carry out BPIPs
 - Denver = The earlier the application is submitted and approved; the lower possible penalty amount the building could be assessed in the future. Penalties may be higher (\$0.50/kBtu vs \$0.30/kBtu) the longer someone waits to file.
 - St. Louis = same penalties as performance pathway
 - Washington State = same penalties as performance pathway, though “conditional compliance” can be applied if the investment criteria verification requirements will not be met by the scheduled compliance date. Applicants can avoid potential penalty when Conditional Compliance is approved and requirements maintained
- County has more constraints on penalties, but are there any thoughts as to other consequences of not following-through on BPIPs?



Renewable Energy Allowance Background

Regulations: Renewable Energy Allowance

The Law says:

account for the renewable energy allowance in the performance metric

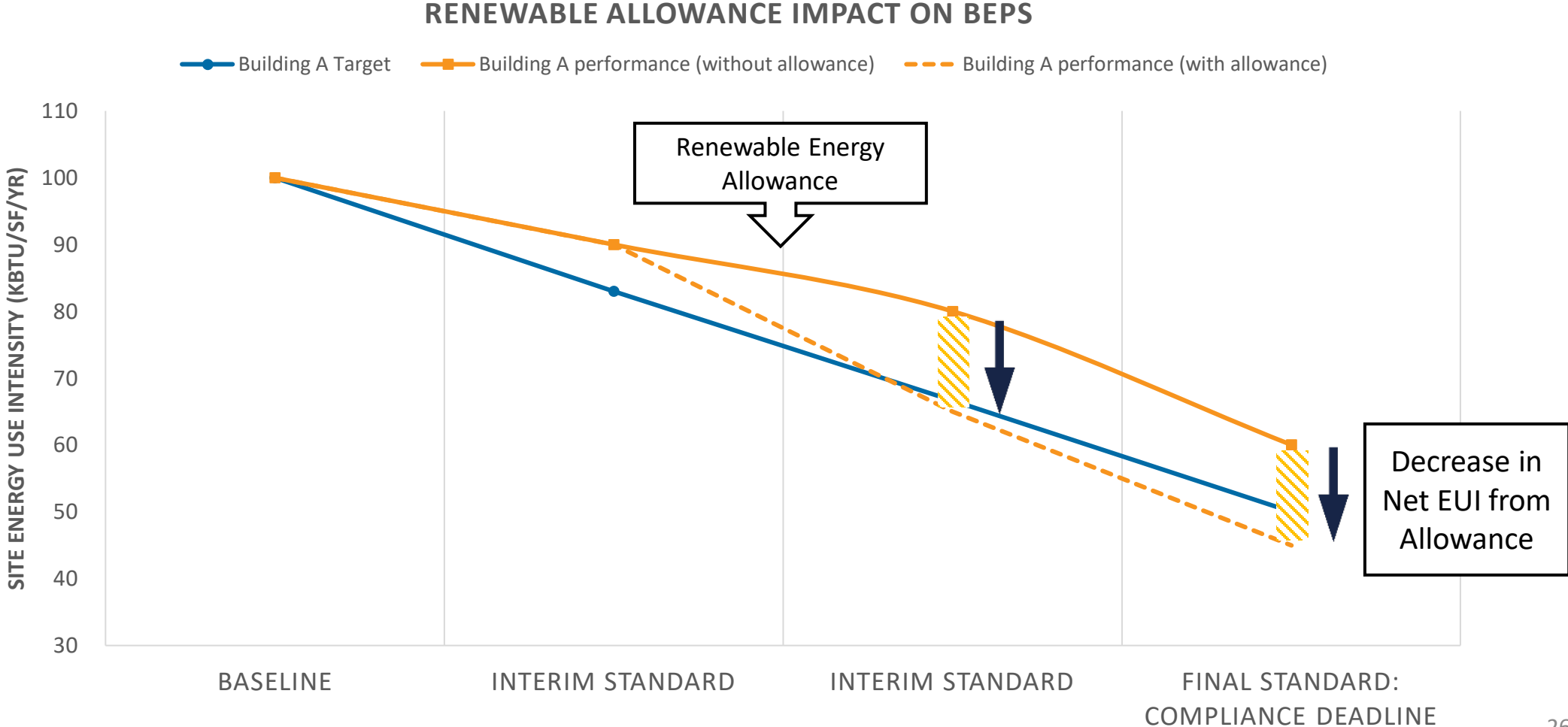
Normalized net site energy means the site energy use by the covered building normalized for weather and other characteristics within the limits of the capabilities of the benchmarking tool and normalized for other factors as determined by the Department minus energy generated from the renewable energy allowance.

Regulation Purpose:

- Define a “renewable energy allowance” that is accounted for in the performance metric
- Outline types of renewable energy and ownership structures that are allowed to be counted towards BEPS compliance

Potential Renewable Energy Allowance (REA)

Normalized Net Site EUI = (Weather-Normalized Site Energy Use – Reduction from REA)/gross square feet



Background on Renewable Energy Allowance (REA)

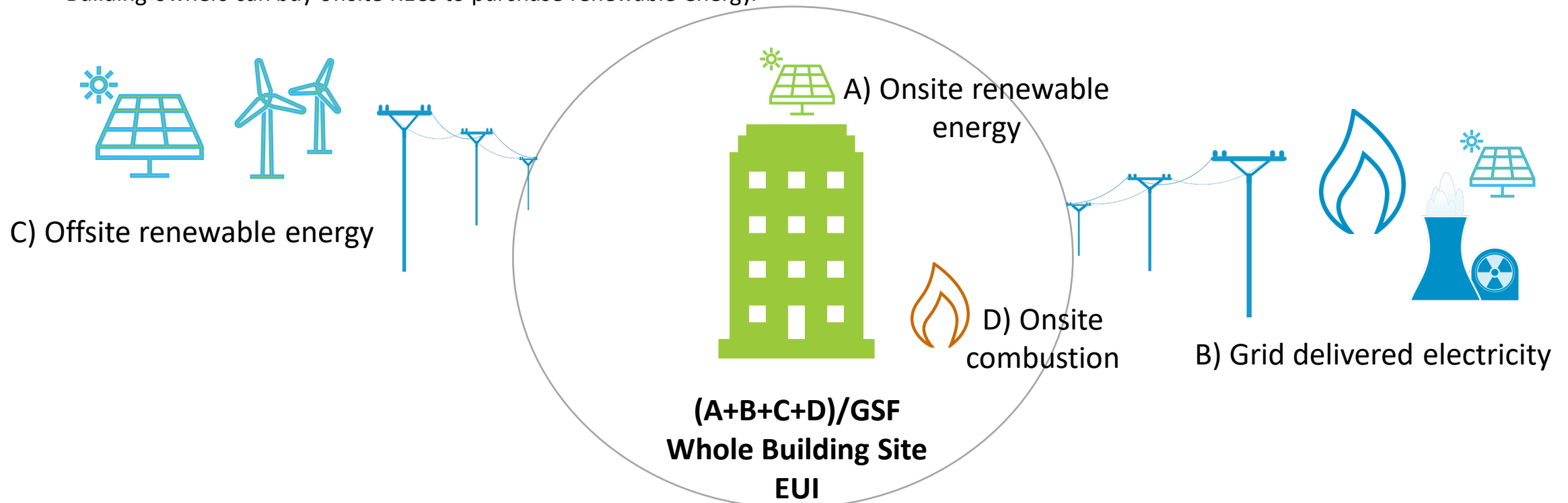
- There are no right or wrong answers and very few models for how to provide the REA (and in fact [EPA advises against using net energy metrics](#)).
- Preferred REA may change based on policy objectives:
 - Encourage energy efficiency
 - Accelerate local RE economy
 - Provide grid benefits
 - Maximize carbon reduction
 - Ease implementation (County) and submission process (building owner) + align with reporting tools
 - Align with building codes

Renewable Energy Basics

Renewable energy can be produced onsite (A: onsite renewable energy)

Any onsite production is typically supplemented with either B: grid delivered electricity, and/or C: offsite renewable energy

- Offsite renewable energy can be procured in various ways
- Renewable energy credits (RECs) are certificates that transfer the “renewable” aspects of renewable energy to the owner. One REC is generated for every one MWh (1,000 kWh) of renewable energy produced.
- RECs generated from onsite production can either be retained, sold, or “arbitraged.”
- Building owners can buy offsite RECs to purchase renewable energy.



Renewable Energy Allowances in Other Jurisdictions

Jurisdiction	BEPS Metric	Renewable Energy Allowance
City and County of Denver, CO	Weather-normalized site EUI (see 3.5 Renewable Credit)	Solar and wind; regardless of REC retention; onsite & long-term contracts (>5 years) fully credited; short-term contracts limited to up to 20% of the building's electricity usage and dropping to 0 credit by 2030
City of St. Louis, MO	Weather-normalized site EUI	No allowance
State of Washington	Weather-normalized net site EUI (building net energy calc on p. 10)	Onsite allowance, regardless of REC retention (just requires "net" energy to be reported)
Washington D.C.	ENERGY STAR score	No allowance or equivalent for renewable energy (ENERGY STAR score reflects some benefits of onsite RE in lower source EUI/higher ES score)

Renewable Energy Allowance Technical Report

- DEP contracted ICF to engage stakeholders and outline technical considerations in the [BEPS Allowance for Renewable Energy Technical Report and Recommendations](#)
- In providing a renewable energy allowance, a few key considerations:
 - How to credit onsite renewable energy
 - Whether offsite renewable energy procurement will be considered and, if so, how to factor in:
 - What renewable energy sources are eligible for an allowance
 - Where the renewable energy is generated
 - How the energy is being procured
 - The relative weighting, if any, of the above characteristics in calculating the REA

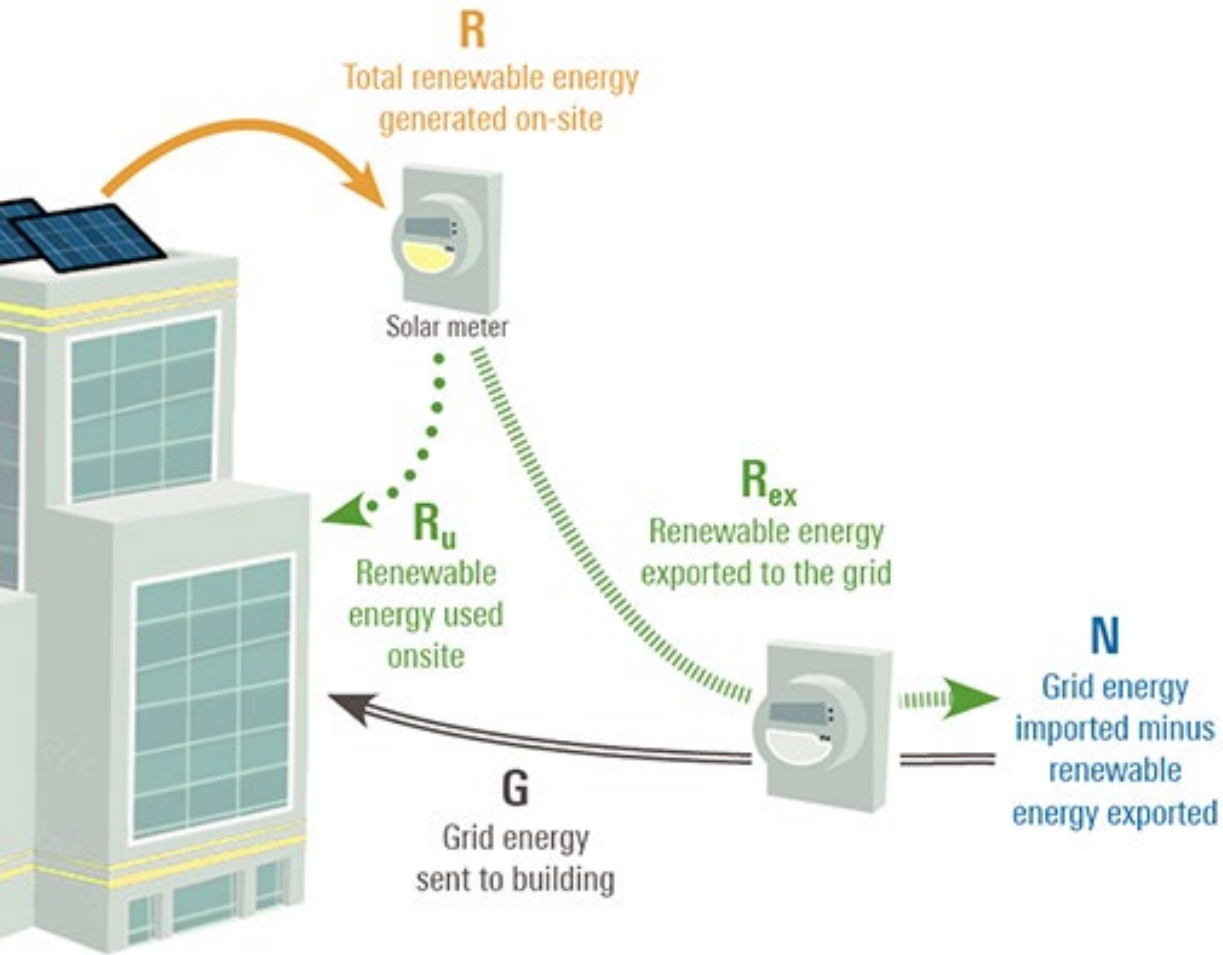
Policy Objectives: General Stakeholder Consensus

- BEPS, at its core, is about **building energy performance**: BEPS policies and regulations should incent building energy efficiency improvements irrespective of the renewable energy allowance
- The REA should encourage **more renewables within the County** to promote local environmental, economic, and electric grid benefits: the further away a renewable project is from the County, the less local impact it delivers
- REA compliance requirements should be as **simple** as feasible (for building owners and for County administrators)
- To help achieve equitable outcomes and mitigate unintended inequitable consequences, the County should provide **additional support for under-resourced buildings**



Onsite Renewable Energy Considerations

Onsite RE Tracking in ENERGY STAR Portfolio Manager



Description	Label	Data Sources	ESPM Metric Name (all values in kWh)
Total renewable energy generated onsite	R	PPA Invoices or Onsite metering	Electricity Use – Generated from Onsite Renewable Systems
Grid energy sent to building	G	Utility Invoices	Electricity Use - Grid Purchase
Renewable energy exported to the grid	R _{ex}	Some Utility Invoices or unavailable	Electricity Use – Generated from Onsite Renewable Systems and Exported
Renewable energy used onsite	R _u	Calculated from PPA invoices or onsite metering AND Utility invoices	Electricity Use – Generated from Onsite Renewable Systems and Used Onsite
Grid energy imported minus renewable energy exported	N	Provided by or calculated from Utility invoices	N/A
Total site electricity	R _u + G	Calculated from PPA invoices or onsite metering AND Utility invoices	Electricity Use - Grid Purchase and Generated from Onsite Renewable Systems

Onsite REC Tracking in ENERGY STAR Portfolio Manager

- Users can track whether they own, arbitrage, or sell/do not own RECs generated from onsite generation
 - Arbitrage = Hosts of onsite renewable energy projects who do not retain ownership of their projects' RECs may purchase offsite RECs contemporaneously in time and in the same quantities as the RECs generated by the onsite project (usually because they're cheaper).
- Benchmarking reports show one metric on RECs: **Percent of RECs Retained**
 - The percentage of Renewable Energy Certificates (RECs) that you kept/(own) compared to the total quantity of RECs associated with the onsite renewable energy you generated. It does not include RECs that you traded in REC Arbitrage.
- Pepco bills alone do not contain all the information necessary to properly benchmark onsite renewable energy use.
 - Bills only show the net electricity – grid energy minus renewable use
 - Reporters would need to refer to solar production data to see how much renewable energy was used on site
 - Example: grid delivered elec is 0, exported elec is 31,040, solar used onsite must be calculated by solar production – solar exported

Monthly Entries

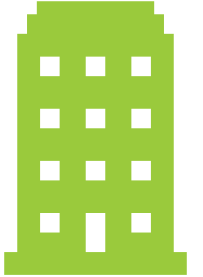
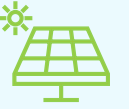
Display Year(s):

	Start Date	End Date	Energy Used On Site kWh (thousand Watt-hours)	Energy Exported Offsite kWh (thousand Watt-hours)	Total Cost (\$)	Estimation	REC Ownership	Last Upd
<input type="checkbox"/>	<input type="text" value="01/01/2023"/>	<input type="text" value="02/01/2023"/>	<input type="text" value="10,000"/>	<input type="text" value="0"/>	<input type="text"/>	<input type="checkbox"/>	<input type="text" value="Owned"/>	

[Delete Selected Entries](#)
[Add Another Entry](#)
[Learn how to copy/paste](#)

Meter Number	Current Reading	Previous Reading	Difference	Multiplier	Total Use
On-Peak Use (kWh)	999831 (actual)	999940 (actual)	109	160	-17440
Int-Peak Use (kWh)	999888 (actual)	999949 (actual)	61	160	-9760
Off-Peak Use (kWh)	000288 (actual)	000312 (actual)	24	160	-3840
On-Peak Demand (kW)	0.390 (actual)			160	62.40
Int-Peak Demand (kW)	0.380 (actual)			160	60.80
Off-Peak Demand (kW)	0.370 (actual)			160	59.20
Total use-kWh					-31040

Options and Decision Points: Onsite Renewables



Nuances to crediting onsite renewable use.

1. Should onsite renewable energy be considered as part of the REA?
 - *Yes*
 - *No*
2. If yes, should owners get credit for renewable energy *produced (R)* or *consumed (Ru)*?
 - *Option 1 (stakeholder consensus):* All onsite electricity generated will receive allowance, including exported power
 - *Option 2:* Owner gets credit only for renewable energy used onsite (**EPA feels that exported energy should never be factored into a building's energy consumption**)
3. Do owners need to retain RECs to get a REA?
 - *Option 1 (stakeholder consensus):* Allowance should apply even if onsite RECs are sold or transferred.
 - *Option 2:* Owner must retain RECs to take credit
 - *Option 3:* Some building types (affordable housing, non-profit owners) may count onsite energy regardless of REC retention, while others must retain RECs for credit

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](#)
- [Maryland Department of Environment BEPS page](#)

Questions?

Emily Curley

Building Energy Performance Programs Manager

Emily.Curley@MontgomeryCountyMD.gov

240-777-7707

BPIB Webpage

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

Stay Informed

Check BEPS website for real-time updates:

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

Sign up for [Commercial Energy Newsletter](#)



DEPARTMENT OF
**ENVIRONMENTAL
PROTECTION**