



Building Performance Improvement Board

4/12/2023

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

Agenda

- **Administrative items**
- **Recap actions from previous meeting**
- **Building Performance Improvement Plans:**
 - **Verifying Implementation**
- **Renewable Energy Allowance:**
 - **Background**
 - **Onsite renewable energy considerations**
 - **Offsite renewable energy considerations**



Administrative Items

Actions

- Approve 3/15 meeting notes

BPIB Recommendation Report

- Summary report on site EIU target recommendations emailed to Board
- Additional comments or thoughts on the first draft?
- Can also revisit opinions on site EUI targets following discussion on BPIPs and Renewable Energy Allowance before finalizing



Previous Meeting Recap

Recap

- Considered two methods of verifying that the owner has fulfilled the terms of the BPIP: performance monitoring and tracking measure installation:
 - **Performance monitoring:** DEP could recalculate a new site EUI target that would result if all of the agreed-upon measures in the plan were completed, and then track annual benchmarking data to see if the building has met (or come near) the new site EUI target
 - **Tracking measure installation:** Owners would need to report back to verify that each agreed-upon measure was implemented according to the BPIP timeline
- **Member poll:** Is performance monitoring, tracking measure implementation, performance monitoring with allowance for reporting on measure implementation, measure implementation with validation performance within a % of new target

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



Renewable Energy Allowance Background

Regulations: Renewable Energy Allowance

The Law says:

account for the renewable energy allowance in the performance metric

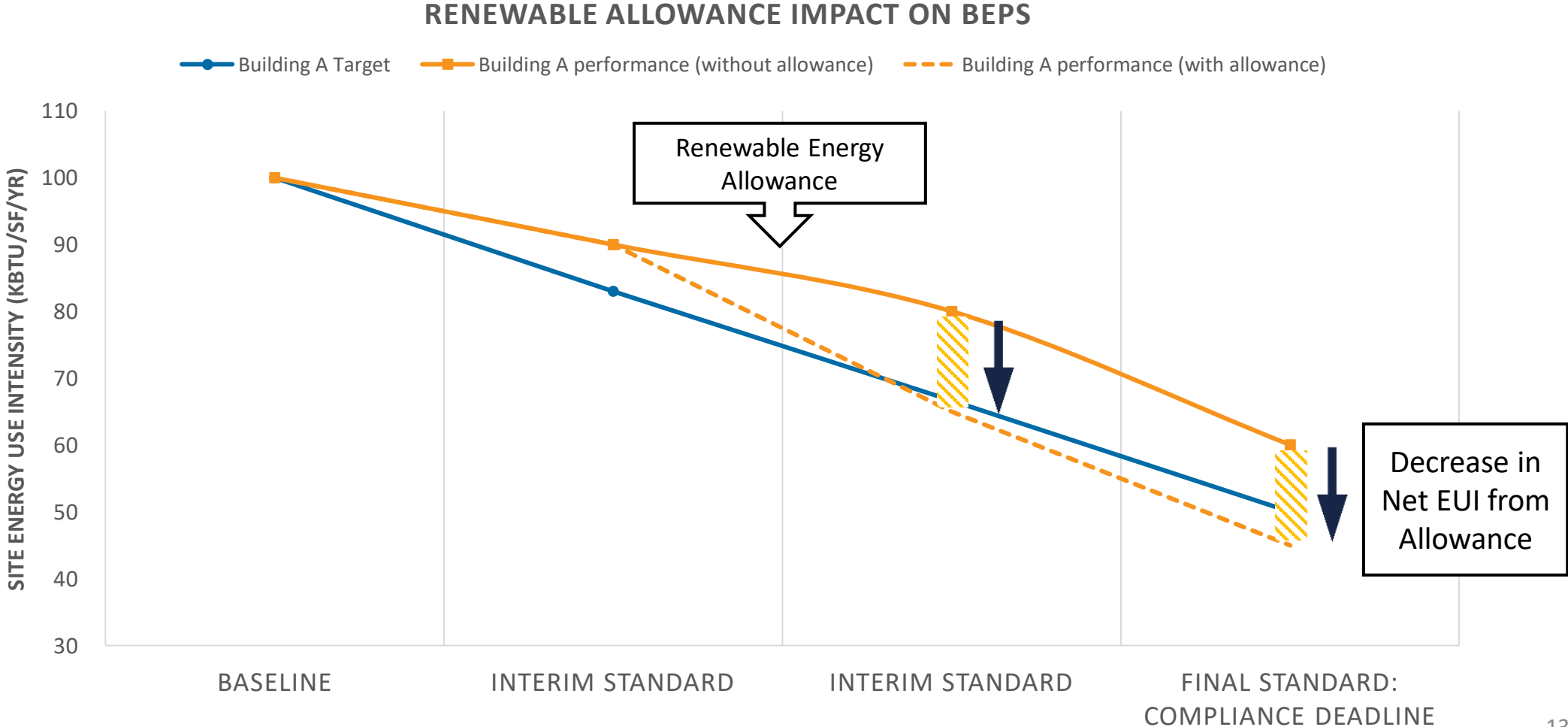
Normalized net site energy means the site energy use by the covered building normalized for weather and other characteristics within the limits of the capabilities of the benchmarking tool and normalized for other factors as determined by the Department minus energy generated from the renewable energy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

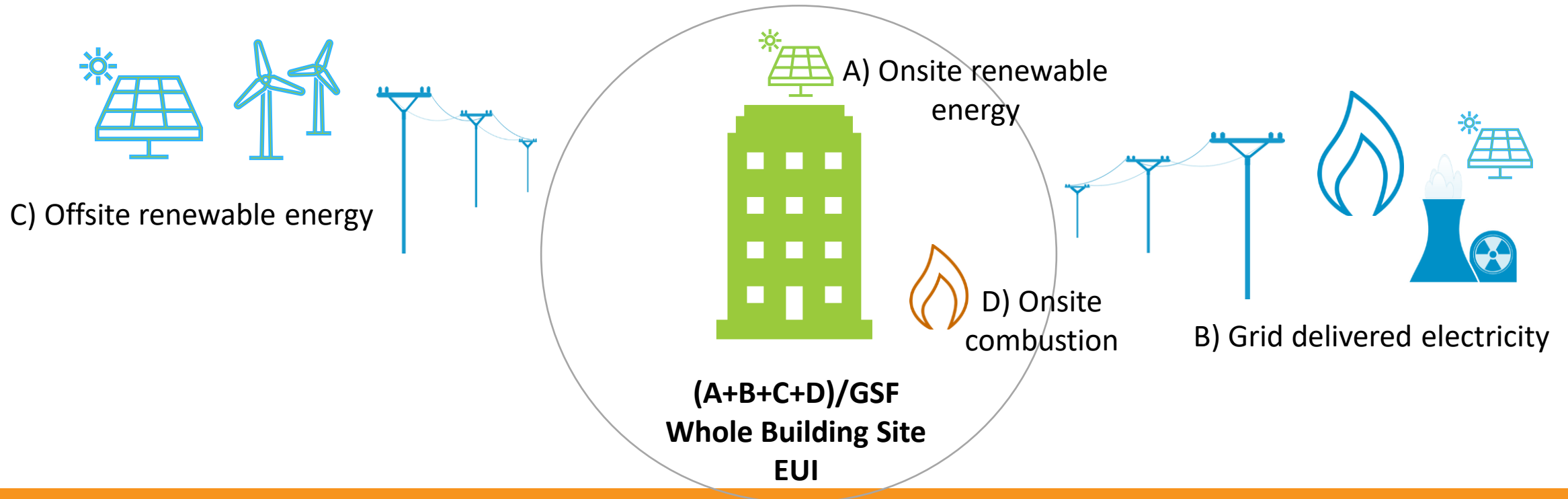
- There are no right or wrong answers and very few models for how to provide the REA (and in fact [EPA advises against using net energy metrics](#) in a BPS)
- Preferred REA may change based on policy objectives:
 - Encourage energy efficiency
 - Accelerate local RE economy
 - Provide grid benefits
 - 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 “arbitrated.”
- Building owners can buy offsite RECs to purchase renewable energy.



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

Options and Decision Points: Onsite Renewables

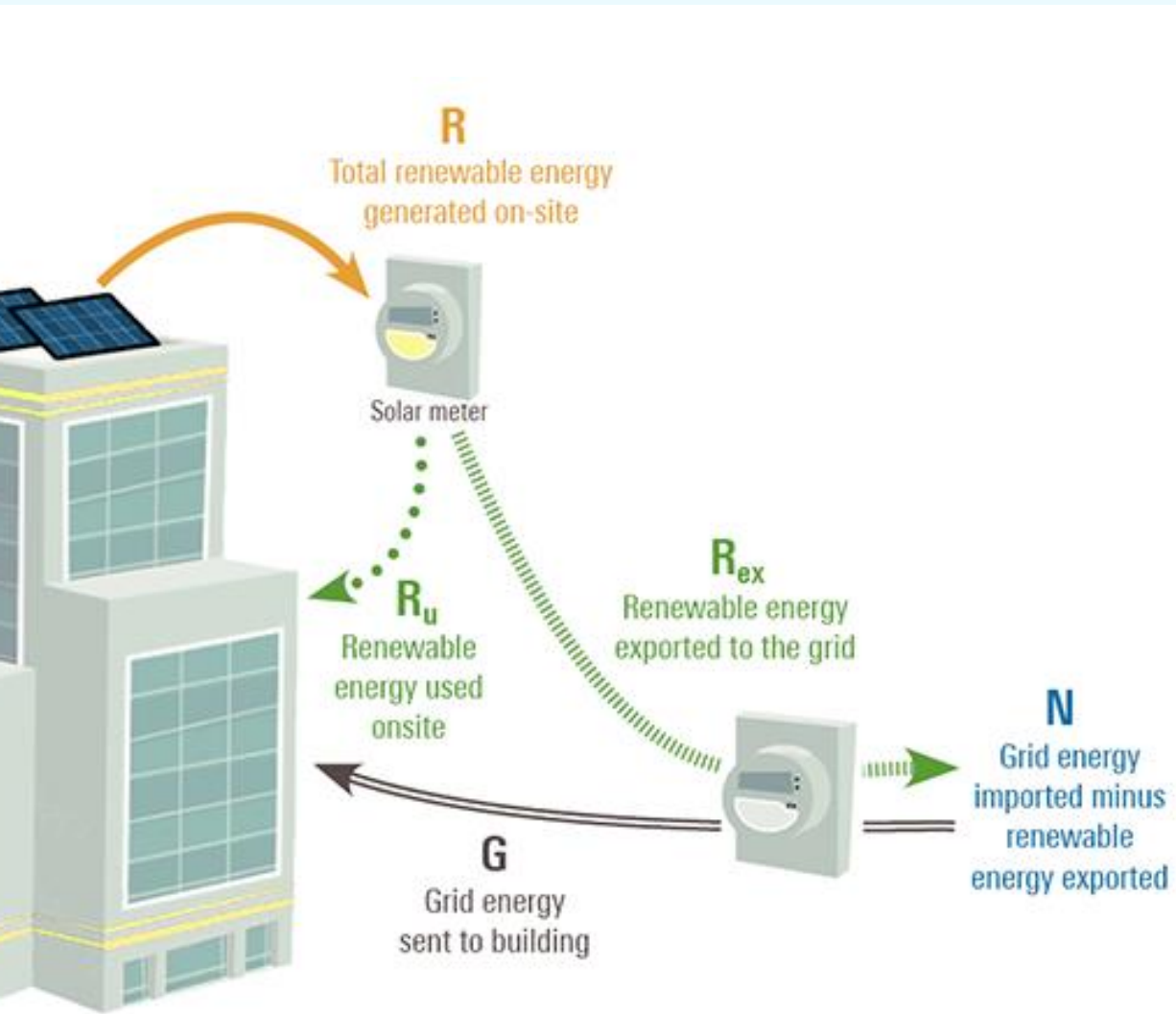


1. Should onsite renewable energy be considered as part of the REA?
2. If yes, should owners get credit for all renewable energy *produced* or just *consumed* onsite?
3. Do owners need to retain RECs to get a REA?
4. How much credit should be given for onsite renewable energy?

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)

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 production (used on site and exported, if excess generation)
 - Reporters 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 Energy Type	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



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* (R_u)?

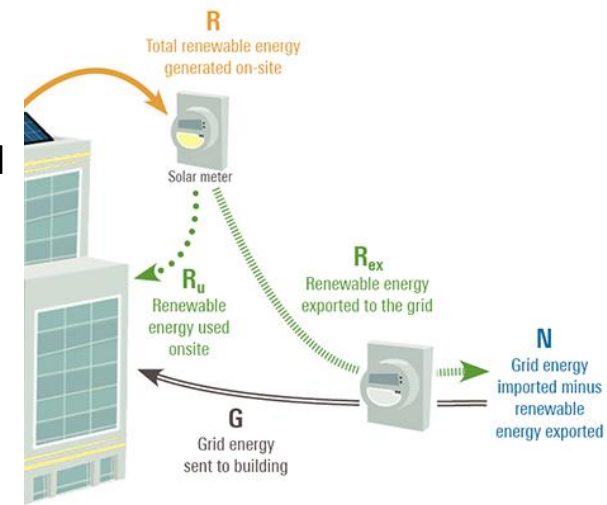
- *Option 1 (stakeholder consensus):* All onsite electricity generated will receive allowance, including exported power
- *Option 2:* Owner gets credit only for renewable energy used onsite (EPA feels that exported energy should never be factored into a building's energy performance)

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 (e.g., under-resourced buildings) may count onsite energy regardless of REC retention, while others must retain RECs for credit

4. What kind of allowance should be given for onsite renewable energy?

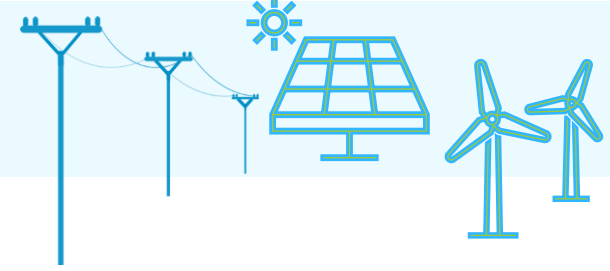
- Full credit (1 kBtu = 1 REA)
- More than full credit (1 kBtu = 1.05 REA)
- Less than full credit (1 kbtu = 0.50 REA)





Offsite Renewable Energy Considerations

Offsite Renewable Energy: Characteristics of RECs

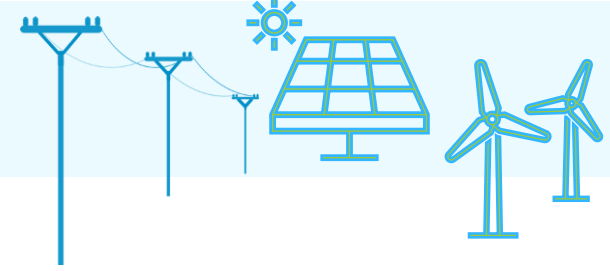


Resources/Technologies

- Many renewable energy sources can be considered eligible to create RECs
- In Maryland, the RPS includes:
 - solar (photovoltaic and solar water heating),
 - wind,
 - qualifying biomass,
 - methane from a landfill or wastewater treatment plant,
 - geothermal power,
 - certain geothermal heating and cooling systems, ocean,
 - fuel cells that produces electricity from a Tier 1 source,
 - hydroelectric power plants less than 30 megawatts (“MW”) in capacity,
 - poultry litter-to-energy, waste-to-energy,
 - refuse–derived fuel,
 - and energy from a thermal biomass system.
- **County needs to determine what resources/technologies qualify for REA**

Maryland’s Renewable Portfolio Standard (RPS) Program requires gradual increase in the amount of renewable energy electricity suppliers must procure from renewable sources to reach 50% by 2030

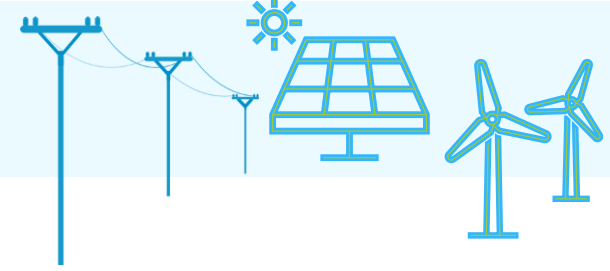
Offsite Renewable Energy: Characteristics of RECs



Locations

- RECs can be obtained from anywhere in the country (e.g. wind farm in Iowa).
- Many policies (e.g., RPS) place narrower geographic boundaries (e.g., in the same electricity market or state) on what RECs will count towards policy achievement.
- **The County will need to determine what, if any, limits to place on the location of the projects creating RECs that are eligible for the REA**

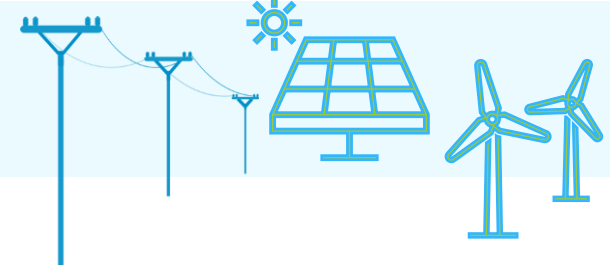
Offsite Renewable Energy: Characteristics of RECs



Vintages and Eligibility Periods

- Because RECs are an accounting instrument, not a physical unit of energy, they can be stored indefinitely in principle. There are two dimensions – when the renewable energy project was commissioned and when the individual RECs under consideration were created.
- **The County will need to determine if projects built before a certain year will receive a REA and for how long RECs will be eligible to receive an REA after they are created.**

Offsite Renewable Energy: Characteristics of RECs



Contract Type/Terms

- RECs can be procured in many ways. The contract type and duration can influence the type of benefits being conveyed.
- **County needs to determine what kind of contract types and durations are eligible for REA**

Offsite REC Tracking in ENERGY STAR Portfolio Manager


- Users can track the purchase and consumption of offsite renewable energy, including bundled green power products and unbundled renewable energy certificates (RECs)
 - Users **cannot** enter detailed information about the contract type, duration, etc.
 - DEP **cannot** see information about generation location or fuel sources in reported benchmarking data, just Green Power Offsite (kWh)
 - **If offsite renewable energy is counted, need for additional reporting/tracking outside of ESPM**

Monthly Entries

Display Year(s): 2022 x Show All Years x

	Start Date	End Date	Usage kWh (thousand Watt-hours)	Total Cost (\$)	Estimation	Green Power	Demand (kW)	Demand Cost (\$)	Last Updated
<input type="checkbox"/>	1/1/2019	1/31/2019	50,000	5,000	<input type="checkbox"/>	<input type="checkbox"/>			10/20/2022 Montgom

About the Green Power for this Entry: 01/01/2019 through 01/31/2019

Quantity: * kWh (thousand Watt-hours)  The quantity of green power must be entered in the same units as your energy usage for this time period.

Generation Location: * I know the specific plant where the energy was generated.
 I don't know the specific plant, but I know the eGRID Subregion (US) or Province (Canada) where the energy was generated.
 I don't know anything about where the energy was generated.

Fuel Source(s) - Optional: Biogas
 Biomass
 Geothermal
 Small Hydropower
 Solar
 Wind
 Unknown

Options and Decision Points: Offsite Renewables

- **Question 1 is whether offsite renewables should be considered in the REA**
- Stakeholders generally agreed on providing some REA value to offsite renewables on a sliding scale for:
 - Location of renewable energy source closer to County
 - More stable/reliable contract terms

Pros to Crediting Offsite Renewable Energy	Cons to Allowing Offsite Renewable Energy
Provides building owners with significant flexibility in complying with BEPS	May allow owners to bypass energy efficiency and still comply with a BPS while building is highly inefficient
May prompt more owners to procure renewable energy with associated carbon benefits	Tracking and calculation of offsite RE not available in ENERGY STAR Portfolio Manager. Requires more effort for County to track, verify, and calculate allowance for offsite purchases
Most stakeholders (especially building owners/managers) generally in favor of offsite REA	Requires more effort for building owners to document and report purchases
Allowance for buildings whose site configuration does not allow for significant onsite RE	Generally, makes compliance and use of EUI metric more complicated to understand
	Lower-resourced building owners may not have the means to purchase offsite green power (where there are no incentives or payback like for efficiency projects)

Offsite Renewables: Eligible Sources

IF offsite renewables are allowed, what sources are eligible for credit?

- No stakeholder consensus was found.
 - *Option 1:* All Maryland RPS Tier one sources count as qualified renewable energy sources (includes solar, wind, qualifying biomass, methane from a landfill or wastewater treatment plant, poultry litter-to-energy, waste-to-energy, and refuse-derived fuel)
 - *Option 2:* Alignment with Maryland's RPS Tier 1 sources, with exclusions (e.g., for combustion technologies)
 - *Option 3:* County-developed list of qualified renewable energy sources (e.g., only solar and wind)

Offsite Renewables: Locational Boundaries

IF offsite renewables are allowed, should location of the offsite generation matter?

- Stakeholder consensus that offsite be given a lower allowance than onsite
- Strong consensus that offsite projects closer to the County or integrated in closer contact to the County's electrical grid infrastructure be given a higher allowance than projects further away or in other grid systems
 - *Option 1:* Fixed location factor for any offsite renewable energy to discount it relative to onsite generation (e.g., offsite REC * 0.5 for half credit)
 - *Option 2:* Provide two-tiered location factor - least favorable location = within PJM, most favorable location factor = within Maryland (e.g., within PJM = 0.5 factor, within MD = 0.75 factor)
 - *Using a location factor for the County or its electric utility boundaries could create additional administrative burden since some RECs may not have that level of locational granularity easily accessible.*
 - *Option 3:* Provide three-tiered location factor – outside PJM, within PJM, within MD (e.g. outside PJM = 0.25 factor, within PJM = 0.5 factor, within MD = 0.75 factor)

Offsite Renewables: Transaction Types

IF offsite renewables are allowed, should transaction type and duration (contract length) matter?

- Strong consensus that some procurement types be allotted a higher allowance than others. Multiyear power purchase agreements and community solar commitments > unbundled RECs.
- Provide a set of “procurement factors” to serve as a discount to the allowance provided to different types of RECs
 - *Option 1:* Provide a custom set of tiered procurement factors to RECs based on the length of the agreement and the type of transaction proximity to the County or integration into the County’s electrical grid infrastructure.
 - *Option 2:* Align the procurement factors with existing 2021 International Energy Conservation Code’s Zero Energy Commercial Building Provision Procurement Factors while also choosing to not include a Location Factor, aligning County policy with code.

Table 3 Overview of 2021 International Energy Conservation Code's Procurement Factors¹⁰

Class	Procurement Factor (PF)	Procurement Options	Additional Requirements (see also Section CC103.3.2)
1	0.75	Community Solar, REIFs, Virtual PPAs and Self-owned off-site	Various depending on option selected
2	0.55	Green retail tariffs & Direct Access	The offering shall not include the purchase of unbundled RECs
3	0.20	Unbundled RECs	The vintage of the RECs shall align with the building energy use

Discussion

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>

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