Montgomery County Building Energy Performance Standard

Allowance for Renewable Energy Technical Report and Recommendations

July 2022

DEPARTMENT OF ENVIRONMENTAL PROTECTION
MONTGOMERY COUNTY • MARYLAND

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List of Acronyms

ACP	Alternative Compliance Payments
AD	Anaerobic Digestion
ANEM	Aggregate Net Energy Metering
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning
BEPS	Building Energy Performance Standard
BGE	Baltimore Gas and Electric
BTU	British Thermal Unit(s)
C&I	Commercial and Industrial
CCE	Community Choice Energy
CEO	Colorado Energy Office
CRS	Center for Resource Solutions
CS	Community Solar
DOEE	Washington D.C. Department of Energy & Environment
EIS	Environmental Information Service
EPA	U.S. Environmental Protection Agency
ESPM	ENERGY STAR® Portfolio Manager®
EUI	Energy Use Intensity
GATS	Generation Attribute Tracking System
GHC	Geothermal Heating and Cooling
GHG	Greenhouse Gas
IECC	International Energy Conservation Code
kW	Kilowatt(s)
kWh	Kilowatt-hour(s)
LED	Light-Emitting Diode
MCDEP	Montgomery County Department of Environmental Protection
MSW	Municipal Solid Waste
MW	Megawatt(s)
MWh	Megawatt-hour(s)
MWCOG	Metropolitan Washington Council of Governments
NYC	New York City
PEPCO	The Potomac Electric Power Company
PJM	Pennsylvania-New Jersey-Maryland Interconnection
PPA	Power Purchase Agreement
PSC	Public Service Commission of Maryland
REA	Renewable Energy Allowance
REC	Renewable Energy Credits
REIF	Renewable Energy Investment Fund
RNG	Renewable Natural Gas
RPS	Renewable Portfolio Standard
SF	Square Feet
SREC	Solar Renewable Energy Credits
TOU	Time-of-use
VPPA	Virtual Power Purchase Agreement
WRRF	Water Resource Recovery Facilities

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Executive Summary

Montgomery County ("the County") has long been at the forefront of municipal action to address the climate emergency.[1] With the passing of a Building Energy Performance Standard ("BEPS") into law in April 2022, the County became one of the first ten state or large local jurisdictions in the U.S. to have such a requirement for existing buildings.[2] The County is in an even more unique position by including renewable energy as a measure that can contribute to compliance with BEPS and complement or substitute for energy efficiency and electrification actions at buildings – only a few jurisdictions have done so and none have yet fully implemented their versions of BEPS. That means that the County is breaking new ground in determining how a renewable energy allowance ("REA") should be defined and implemented within its BEPS regulations. While the County included the concept of an REA in its BEPS Law to build on local renewable energy progress, more quickly reduce greenhouse gas ("GHG") emissions and provide more flexibility to local owners of buildings that are covered by BEPS, there are still many important REA implementation choices to make. There is no national best practice to draw upon for an REA and no on-the-ground lessons learned from BEPS experiences, which only recently started. The key is defining an REA that fits the County's particular policy objectives, is efficient to implement, and is well-informed by stakeholders.

For those reasons, the Montgomery County Department of Environmental Protection ("MCDEP") in coordination with the Metropolitan Washington Council of Governments ("MWCOG") engaged ICF Consultants ("ICF") to facilitate a series of County stakeholder sessions specifically on the REA and to apply its municipal energy experience to inform the County's REA decision-making. This public report is the culmination of ICF's work, with additional details from the stakeholder engagement sessions on a County webpage dedicated to BEPS.[3] ICF was ably supported by subcontractor Lion Advisors, LLC on stakeholder engagement portions of this project.

A centerpiece of ICF's work was facilitating nine REA sessions in early 2022 with different groups of County stakeholders, including private and non-profit building owners, contractors that provide building support, environmental advocates, policy experts, and local utilities. Those sessions revealed stakeholder consensus on four REA policy objectives:

- BEPS is, at its core, 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: onsite solar and other renewable generation is the gold standard, 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

[1] Resolution 18-974. https://apps.montgomerycountymd.gov/ccllims/DownloadFilePage?FileName=8727_1_4838_Resolution_18-974_Adopted_20171205.pdf

[2] "BEPS are policies that establish performance levels for buildings and drive all buildings that BEPS covers to achieve these levels in the long-term with required progress at regular intervals in the interim. A BEPS sets a minimum threshold for energy performance for existing buildings, which are based on and measured against a building's demonstrated energy performance." Montgomery County, Building Energy Performance Standard, https://www.montgomerycountymd.gov/green/energy/beps.html.

[3] Ibid.

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Those objectives, if endorsed by County officials, then need to be turned into practical components of an REA. As part of the conclusion to this report, Table C-2 (beginning on page 33) outlines such REA components and how they match a range of policy objectives and how they were perceived by stakeholders.[4] REA components that had stakeholder consensus or nearly so and those with pathways to implementation include:

- Providing the full REA value to onsite renewable projects (due to their local benefits) whether they are existing or new projects and irrespective of how much of their power output is consumed at the building or exported to the local utility and irrespective of whether the building owner retains the renewable energy credits ("RECs")[5] from the project.
- Providing some REA value to purchases from offsite renewable projects (those with which building owners contract through various mechanisms), on a sliding scale with projects geographically closer to the County and having other desirable traits (such as longer contracts) receiving higher REA values.
- Carefully reviewing what renewable energy sources should be eligible for an REA, especially those involving combustion of organic material.

There are also several technical issues associated with REA implementation to consider, including how to accurately, credibly, and efficiently handle REA reporting and integration with the U.S. Environmental Protection Agency's (EPA's) ENERGY STAR® Portfolio Manager® ("ESPM") tool. ESPM is used for building energy benchmarking in Montgomery County. This report contains sections on ESPM reporting, data collection from utility bills, REC and renewable energy transaction issues, and summaries of BEPS policies in other jurisdictions as well as appendices with more details on each of these topics.

Organization of the Report

This document outlines the background, research, and stakeholder input received as ICF, in collaboration with Montgomery County, sought to establish recommendations for an REA. It begins with an overview of BEPS and a statement of the technical challenges in defining an REA, then provides a summary of stakeholder objectives and other feedback and concludes with a set of potential REA policy choices and recommended options for County leadership to review. The document includes Appendices on BEPS considerations from other jurisdictions, an overview of available data sources and concepts and methods for recording and tracking REA, an outline of REC treatment options, and a list of acronyms used in the report.

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[4] That conclusion also describes the pros and cons of a few unifying REA approaches or principles.

[5] RECs are environmental accounting attributes associated with the renewable content of output from renewable energy systems (as distinguished from these systems' physical power output). A REC is a tradeable financial instrument conveying legal ownership of the renewable attributes of renewable electricity generation. A REC is distinct from the physical electricity products created by renewable energy generation. One REC is created for every megawatt-hour (MWh) of renewable electricity generation. For more information, see U.S. Environmental Protection Agency (EPA), Green Power Partnership, Offsets and RECs: What's the Difference?, February 2018, https://www.epa.gov/sites/default/files/2018-03/documents/gpp_guide_recs_offsets.pdf.

Under Maryland's Renewable Energy Portfolio Standards ("RPS"), all electricity suppliers are required to include a certain percentage of renewable energy in their deliveries to customers in the state, with RECs being the mechanism for measuring and enforcing that requirement. Any REA value received by a County building owner will be for renewable energy purchases beyond those already in its deliveries under the RPS. For more information on RECs and the RPS, see Appendix C.

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BEPS Background and Purpose

Montgomery County is addressing emissions from existing buildings within the County through BEPS. Emissions from residential and commercial buildings comprise 50% of county-wide emissions. To help establish BEPS, the County brought together stakeholders and developed legislation (Bill 16-21 - Environmental Sustainability - Building Energy Use Benchmarking and Performance Standards – Amendments).[6] With BEPS now passed into law, the County is among the first counties in the country with such a requirement, building on its long-standing tradition of being a leader in climate action.

The County's BEPS performance metric is based on weather-normalized site energy use intensity ("EUI"). Buildings of 25,000 gross square feet and larger are covered by the BEPS law and are segmented into groups according to their building type and size. Their compliance requirements are phased in over time. Groups will be subject to a final performance standard in the mid 2030s, depending on the group. One provision of the County's BEPS is to provide an REA to recognize the benefits of and incentivize solar installations and other renewable energy projects. This is an important action, but because standard site EUI calculations consider total building energy use regardless of use of onsite renewable energy, there are technical, data collection and reporting, policy, and communications challenges and complexities that need to be evaluated to define and implement REA. These complexities may include:

- Determining if onsite renewable installations need to retain their RECs to receive an REA.
- Distinguishing onsite renewable energy *production* from onsite electricity *consumption* to determine if and how gross and/or net consumption of electricity should be used for REA calculations, given the variety of metering and billing options.
- Deciding whether an allowance will include offsite renewable energy purchases. And if so, how the allowance will consider various technology types, vintages, and locations of offsite renewable energy and whether they should be provided a full or partial REA.
- Determining how to collect accurate data without burdening building owners/managers or the County, all while considering how existing data collection tools and systems (e.g., ENERGY STAR® Portfolio Manager®) will interact with an REA.
- Considering the value in aligning with other BEPS treatment of a REA outside of Montgomery County to generate standard metrics that provide clarity for building owners and signals for the market.

The procedures to calculate an REA need to be described, vetted with stakeholders, and ultimately written into regulations so this allowance can be applied in a manner that is credible, transparent, easily actionable, and helpful to the County's climate goals. In discussions with stakeholders, the allowance also needs to be designed in a way to incentivize differing objectives of renewable energy (such as improvements to air quality, alignment with existing codes, and the creation of jobs).

Process of Developing Renewable Energy Allowance Options

Review of Relevant BEPS Programs in Other Jurisdictions

ICF researched established and developing BEPS (and similar) programs to understand how local governments and states accounted for onsite and offsite solar or other renewable energy projects. In total, eight jurisdictions were studied. BEPS programs are relatively new, and many jurisdictions are still determining how to handle REAs (or equivalents) as they relate to program compliance. As of the publication of this report, there are no BEPS programs that have yet reached a compliance point for their covered buildings, so many of the details around achieving targets and receiving credit for purchased or generated renewable energy are still in development. A list of how renewable energy is included in other

[6] See Montgomery County, Building Energy Performance Standard, https://www.montgomerycountymd.gov/green/energy/beps.html.

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jurisdictions' BEPS is in Table 1, with longer summaries of these provisions Table 1 Summary of Jurisdictions' Renewable Energy Allowances in Building Energy Performance Standardsin Appendix A: Summaries of BEPS Policies in Other Jurisdictions.

Table 1 Summary of Jurisdictions' Renewable Energy Allowances in Building Energy Performance Standards

Jurisdiction	BEPS Metric	Renewable Energy Allowance
State of Colorado	Not yet determined, but Site EUI has been recommended	Not yet determined (Recommends credit for renewable energy generation as long as RECs are retained)
City and County of Denver, CO	Weather-normalized site EUI	Onsite and Offsite Allowance
New York City, NY	Greenhouse gas emissions	Onsite and Offsite renewable energy reflected in GHG metric
New York Power Authority	Energy use (Target is 11 TBtu of energy savings)	Onsite Allowance
City of Reno, NV	Energy and water use intensity (based on ENERGY STAR® score)	Onsite Allowance
City of St. Louis, MO	Weather-normalized site EUI	Not yet determined
State of Washington	Weather-normalized site EUI	Onsite Allowance
Washington D.C.	Site EUI metrics (various including Weather-normalized)	No Allowance or equivalent for renewable energy

This review of other jurisdictions showed that several have considered allowances for renewables (mostly onsite), but there are still widely varying approaches to how REAs could be implemented. Standards based on GHG emissions (as opposed to site EUI) are generally likely to provide an REA, since they focus on a goal of emissions reduction (to which renewable energy accounting is easily applicable), rather than calculating a metric of building energy performance.

Montgomery County Stakeholder Input

To better understand points of consensus and divergence from BEPS stakeholders with regards to the implementation of an REA, nine stakeholder sessions were held with groups representing a diverse set of community members including private-sector and non-profit building owners, contractors that provide building support, environmental advocates, policy experts, and local utilities. These sessions were intended to determine what priorities stakeholders were looking for in an REA and to identify if and where there is agreement on questions affecting REA design and implementation.

Key Stakeholder Questions

- What energy sources should qualify as renewable for the REA?
- Should credit be given to existing solar projects, or only new projects?
- How should RECs factor into the REA?
- What credit should offsite renewable energy projects be given?
- Should credit be given to power exported to the grid?
- What timescale should net energy metering account for?

At the end of the stakeholder sessions, surveys of six potential REA benefits were conducted. Survey participants ranked improved building performance and reduced carbon pollution as the highest priority benefits. Further discussion of stakeholder input along with illustrative quotations pulled from the stakeholder meetings are available in

Appendix C: Montgomery County Stakeholder Feedback Process and Outcomes, while additional written materials and a recording of a stakeholder readout webinar are available from the County.[7]

Along with the discussions on priority benefits, these discussions touched on several strong themes that became clear as either points of consensus or unresolved considerations when considering the key stakeholder questions the meetings were centered around.

Key Stakeholder Takeaways

- BEPS is an energy efficiency and building performance standard, and the REA should supplement, not replace building energy reduction projects.
- Onsite renewable generation is the gold standard; the further away from the site or the County, the less allowance the renewable energy deserves.
- Existing onsite renewable projects should count the same as new projects.
- Regarding net energy metering, property owners should receive the REA for the renewable electricity they generated on an annual basis (as opposed to only the renewable energy consumed at the building).
- The REA should be flexible and have mechanisms in place to adapt to future changes.
- The REA needs to strike a balance between being comprehensive and easy to use.
- It is not clear how the REA should treat combustion-based renewable sources (e.g., renewable natural gas).

Technical Analysis

Data Acquisition and Reporting Systems

ICF reviewed sets of data provided by the County and MWCOG as well as ENERGY STAR® data requirements for Portfolio Manager® to understand how the development of an REA might be impacted by available data. The data acquisition issues outlined below focus on onsite renewable energy installations, where reporting challenges can exist due largely to billing distinctions between renewable power consumed onsite versus exported to the electricity grid. For more information on these issues, see Appendix D: REC Treatment Options.

Utility Invoices

ICF evaluated utility bills from PEPCO for several commercial buildings with onsite solar generation and noted that information provided to commercial customers through the utility bills appears to vary by system and customer size. PEPCO utility bills provide information for onsite renewable energy generation in one of two ways:

1) PEPCO provides grid energy sent to building *and* renewable energy exported to the grid.

   OR

2) PEPCO provides a net of the grid energy provided from the utility minus any electricity generated onsite.

While portions of the County are served by the electric utilities Baltimore Gas and Electric ("BGE") or Potomac Edison, PEPCO serves the majority of the County, and the other utilities may share billing similarities with PEPCO.

[7] This information can be accessed in the "View BEPS Solar and Renewable Energy Credit information" section of the County's BEPS webpage at: https://www.montgomerycountymd.gov/green/energy/beps.html.

Onsite Metering for Renewable Energy

Onsite renewable energy projects often include a meter or meters to account for renewable energy generated onsite, either as a standalone device, or as part of the inverter[8] for the installation. These meters are separate from the utility meters and do not typically interact with the utility. Onsite meters provide the total renewable energy generated by the system. Depending on the system installed and the renewable energy project ownership structure, building owners may have direct access to this data. In some cases, they may need to rely on their renewable project developer for this data.

Onsite Power Purchase Agreements Invoices

Power purchase agreements ("PPAs") are a common contracting method for onsite renewables whereby a project developer arranges for the design, permitting, financing, and installation of a renewable system on a property at little to no cost to the host building owner. Over the course of the agreement, the project developer operates the system and sells its power to the host, usually at a fixed rate. These invoices (typically provided monthly) could be used to populate the total electricity generated by onsite systems and could be used to help calculate the total onsite consumption (along with data from the utility bills). The project developer typically owns the RECs from the system.

ENERGY STAR® Portfolio Manager® Data

EPA's ESPM tool is currently used for tracking a building's annual energy use and using a standard metric to compare the building's performance against past performance and to its peers nationwide. ESPM is the tool used for benchmarking compliance in the County and will be the system of record for data collection, analysis, and reporting for BEPS implementation in the County. Therefore, understanding how ESPM interacts with renewable energy systems is key to outlining the County's options associated with BEPS. A brief description of relevant issues is below, and more information is available in Appendix B: Review of Montgomery County Energy Data. The EPA has extensive resources which outline how clean energy interacts with ESPM including a recent report on Commercial Buildings and Onsite Renewable Energy. Using the data from utility invoices, onsite meter infrastructure, and PPA billing, building owners with renewable energy systems can gain insights into the impacts of renewable energy on their facilities through ESPM.

- **Total renewable energy generated onsite (R)** – Accounts for electricity generated by a (renewable energy) system onsite
- **Grid energy sent to building (G)** - Accounts for electricity delivered to the service address, differentiated by time-of-use (TOU) period as applicable.
- **Renewable energy exported to the grid (Rex)** - Accounts for the cumulative, prior amount of excess electricity received by the grid from the onsite generation project at the service address, differentiated by TOU period as applicable.
- **Renewable energy used onsite (Ru)** - Renewable energy generated and used onsite
- **Grid energy imported minus renewable energy exported (N)** – Shows net electricity provided by the utility company.

[8] Inverters are components of solar photovoltaic systems that convert the direct current electricity collected by the solar panels into the alternating current electricity used by the building. Inverters often track the amount of alternating current electricity produced and often allow the system host to access that data.

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Figure 1 Diagram of Clean Energy Interaction with Grid (EPA's ENERGY STAR®)

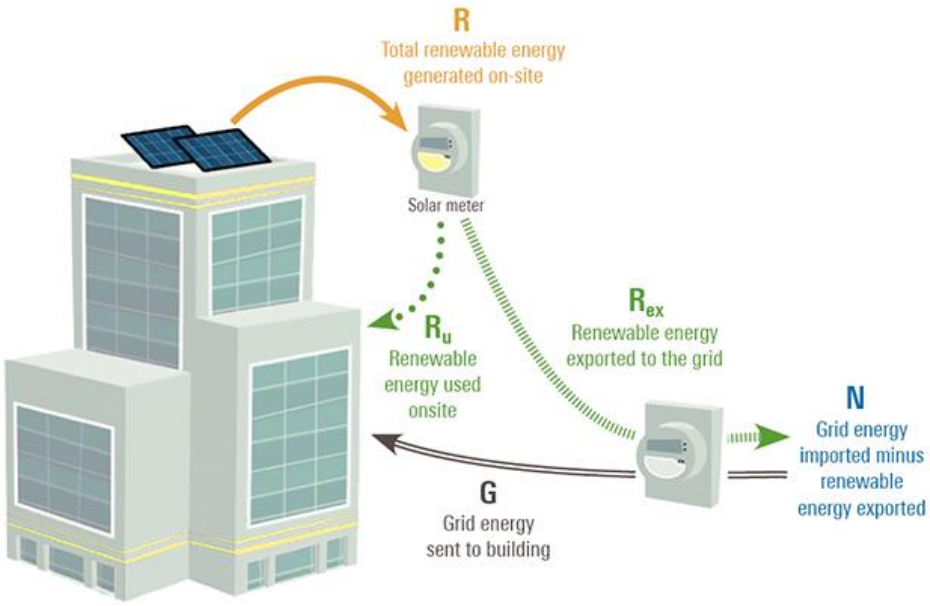

Figure 1[9] provides a visual representation of a typical clean energy system and how it interacts with the electricity grid. Using the values from utility invoices and onsite metering, a variety different metrics are either available or can be calculated as outlined in Table 2. These designations help users to correctly account for onsite and grid imported usage and using ESPM as the system of record, enables a variety of values to be employed for an REA.

Table 2 Review of Renewable Energy Data Sources for ENERGY STAR® Portfolio Manager®

Description	Figure 1 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	Rex	Some Utility Invoices or unavailable	Electricity Use – Generated from Onsite Renewable Systems and Exported
Renewable energy used onsite	Ru	Calculated from PPA invoices or onsite metering AND Utility invoices	Electricity Use – Generated from Onsite Renewable Systems and Used Onsite

[9] EPA, ENERGY STAR® Commercial Buildings and Onsite Renewable Energy, Available at: https://www.energystar.gov/buildings/about_us/datatrends_research/renewable_report

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Description	Figure 1 Label	Data Sources	ESPM Metric Name (all values in kWh)
Grid energy imported minus renewable energy exported	N	Provided by or calculated from Utility invoices	N/A
Total site energy needed to operate the building	Ru + G	Calculated from PPA invoices or onsite metering AND Utility invoices	Electricity Use - Grid Purchase and Generated from Onsite Renewable Systems

ESPM also provides a data field for energy metrics related to the retention of RECs, enabling an organization to track green power. Specifically, ESPM has data fields for "Percent of RECs Retained" and "Green Power - Onsite (kWh)". More information on RECs is in **Appendix D: REC Treatment Options.**

Together, the data sources and ESPM provide the County with significant flexibility to enable a variety of REA types, however, there are limitations on what the tools can do.

Calculating a Renewable Energy Allowance

This section briefly summarizes the generic building blocks of an REA calculation. Figure 2 describes the necessary first step to express an REA in thousand British Thermal Units (kTBU) terms.

Figure 2 Renewable Energy Allowance Conversion from kWh to kBTUs

$$\text{Renewable Energy Allowance (REA)} = \text{Qualified renewable electricity x conversion to kBTUs}$$

With the REA calculated per above and the facility site energy already provided separately, the County could then calculate the net site EUI for BEPS compliance purposes simply by subtracting a REA from site energy use and dividing by the Building Gross Square Feet as demonstrated in Figure 3 Calculation of Net Site EUI.

Figure 3 Calculation of Net Site EUI

$$\text{Net Site EUI} = \frac{\text{(Site Energy Use – Renewable Energy Allowance)}}{\text{Building Gross Square Feet}}$$

Lastly, a net site EUI would need to be compared to the building's BEPS target performance to determine BEPS compliance. A graphic representation of how an REA may affect BEPS compliance for an example building (Building A), is illustrated in Figure 4 Potential Impact of Implementing a Renewable Energy Allowance. In that graphic, the distance between the solid orange line and the dashed orange line is the effect of the REA, and it allows Building A to meet its BEPS requirements (the blue line) by the compliance deadline.

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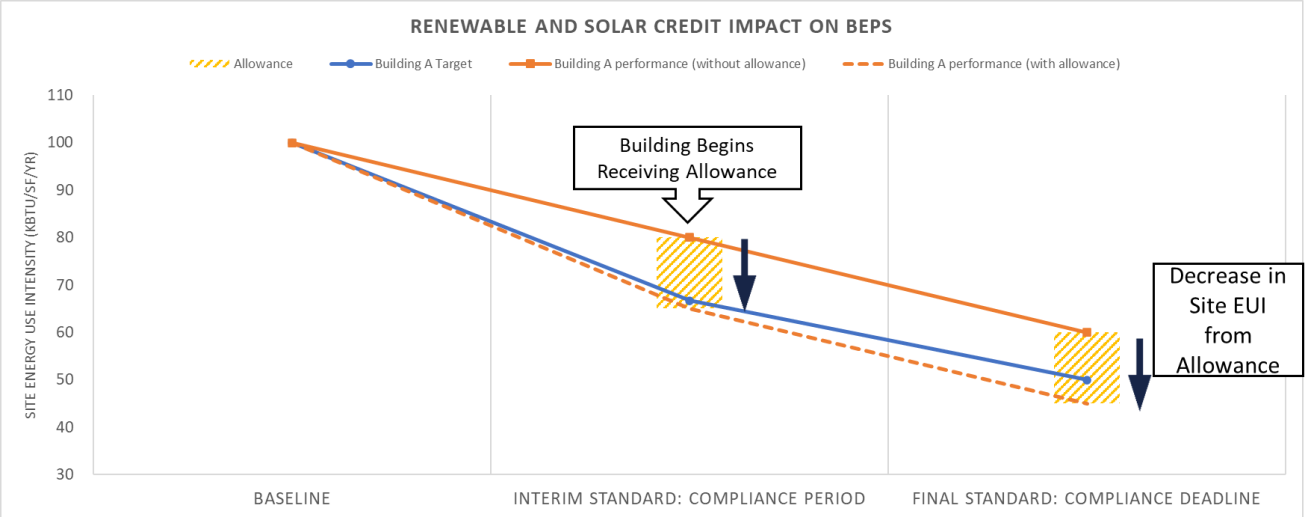
Figure 4 Potential Impact of Implementing a Renewable Energy Allowance in the Montgomery County BEPS Program



The County must also consider how these net site EUI calculations will be reflected in the BEPS system of record, ESPM. While ESPM enables users to track onsite and offsite renewable energy purchases, it does not provide easily exportable information for the REC ownership, renewable energy type, location, or vintage of offsite green power purchases. Depending on the final REA approach recommended, this could present a challenge to implement the REA through ESPM as-is, since the County may want to verify the type, location, or vintage of renewable energy being used to create the REA. Therefore, the REA would need to be applied through a straightforward, adjacent documentation process that parallels the ESPM data provided to account for renewable energy characteristics external to ESPM. Additional discussion of this issue can be found in the Implementation Considerations section below and in Appendix A: Summaries of BEPS Policies in Other Jurisdictions.

Potential Role of Renewable Energy Credits in the BEPS REA Process

Central to defining an REA is determining how RECs will be treated, as they have the potential to be central to REA calculations. RECs serve as a powerful tool for tracking renewable energy attributes and ownership that are well established and understood by professionals in the energy industry and are used extensively in GHG accounting. A core principle of REC markets is that no REC should be double-counted and only one party can claim a given REC, and it is the party that currently owns the REC. That principle may be useful as the County builds its REA rules and considers how best to synchronize them with other GHG reduction programs.

There are numerous REC dimensions to consider, and Appendix D: REC Treatment Options describes six categories and 18 sub-categories of REC considerations.

Integration of Insights to Identify and Characterize Recommended Allowance Components

In identifying REA options, ICF weighed its research on BEPS in other jurisdictions, feedback received from stakeholders, and energy market and technical experience (e.g., with ESPM, renewable transaction types, and REC treatment). Recommended REA components must both meet relevant stakeholder policy objectives and be realistic to implement given available billing and other energy data and the system requirements of ESPM. Components with strong stakeholder consensus were favored, and the five listed immediately below are recommended as part of any final REA definition:

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- The County should provide full allowance for any new or existing, onsite renewable projects, irrespective of REC retention or net energy metering exports by the building owner.
- If offsite renewable energy is included as part of a REA, the County should use RECs to enable implementation of an offsite REA.
- If offsite renewable energy is included as part of a REA, the County should provide lower allowance (i.e., only partial credit) for offsite renewable projects than onsite.
- If offsite renewable energy is included as part of a REA, the County should require RECs for offsite projects to be purchased on a minimum of five-year increments to cover each interim performance period outlined by BEPS. The vintage of RECs should align with Maryland's RPS program.
- No parties should be allowed to count RECs from statewide decarbonization of electricity utility grid (Maryland's RPS) for *both* compliance with the Maryland RPS *and* for a REA. This option could be currently available to large organizations or companies acting directly in the wholesale market participants through a PJM Subaccount or as their own Licensed Service Entity.

Qualified Energy Sources Recommended for REA

Discussions were held with stakeholders regarding which technologies should be considered qualified renewable energy sources. ICF narrowed the choices for this option to the following, based on stakeholder feedback and feasibility for implementation.

Category A: Resource and Technologies for Offsite Projects

- **Choice A-1)** All Maryland RPS Tier one sources count as qualified renewable energy sources
- **Choice A-2)** All non-combustion Maryland RPS Tier one source count as qualified renewable energy sources.
- **Choice A-3)** Only electricity generated from solar count as qualified renewable energy sources.

Choice A-2 would exclude Qualifying Biomass, Methane from a landfill or wastewater treatment plant, Poultry litter-to-energy, Waste-to-energy, and Refuse–derived fuel. Choice A-3 was included since it aligned with the original language associated with an REA.

Locational Boundaries for Offsite Projects

The locational boundaries for purchased RECs not generated at the building site were discussed extensively with stakeholders with a 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. In developing choices, ICF considered the use of a "Location Factor" (in the form of a fraction) to serve as a discount to the allowance provided to RECs as demonstrated in Figure 5.

Figure 5: Location Factor Example

$$\text{Renewable Energy Allowance (REA)} = \text{Qualified RECs x Location Factor x conversion to kBTUs}$$

Using the Location Factor as a tool, ICF narrowed the choices for this option to the following, based on stakeholder feedback and feasibility for implementation.

Category B: Locational Boundaries for Offsite Projects

- **Choice B-1)** Exclude offsite projects from receiving a REA.
- **Choice B-2)** Provide a set of tiered location factors to RECs based on their proximity to the County or integration into the County's electrical grid infrastructure. This could include two or

more types of location designations including in county, within the utility, within the state, within PJM, or any other locational boundary that represents the County's and its stakeholder's priorities.

In considering preferences for Choices B-1 and B-2, the County must also consider if they also want to implement a procurement factor, as outlined in Table 3 below.

Transaction Types

Transaction types and their durations (contract length) for RECs were discussed extensively with stakeholders. Differing types of electricity procurement provide different perceived values to the users and the County, and were discussed extensively with stakeholders with a strong consensus that certain renewable electricity procurement types with more direct renewable energy contributions be allotted a higher allowance than other procurement types. Specifically, stakeholders supported multiyear power purchase agreements and community solar commitments being allotted a higher allowance than the purchase of unbundled RECs. This concept is mimicked by the 2021 International Energy Conservation Code's Zero Energy Commercial Building Provision Procurement Factors, further described below. These types of renewable electricity procurement include several which are available to building owners in the County including:

- Community Solar
- Offsite Power Purchase Agreements
- Direct Access (Renewable electricity purchased via certain wholesale market contracts)
- Unbundled RECs

In developing choices, ICF considered the use of a "Procurement Factor" (in the form of a fraction) to serve as a discount to the allowance provided to different types of RECs.

Figure 6: Procurement Factor Example

$$\text{Renewable Energy Allowance (REA)} = \text{Qualified RECs x Procurement Factor x conversion to kBTUs}$$

Using Procurement Factor as a tool, ICF narrowed the choices for this option to the following, based on stakeholder feedback and feasibility for implementation:

Category C: Transaction Types for Offsite Projects

- **Choice C-1)** Provide all offsite renewable energy projects with a uniform procurement factor designating their status as an offsite project and thus providing all offsite projects with the same REA potential regardless of procurement type.
- **Choice C-2)** Provide a 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.
- **Choice C-3)** 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. An overview of Procurement Factors from 2021 IECC can be found in Table 3.

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Table 3 Overview of 2021 International Energy Conservation Code's Procurement Factors[10]

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

Through the five components and choices A, B and C outlined above, the County has the flexible concepts with which to shape regulations for a REA. The implementation of these choices could also overlap and with various factors needed and implemented together in one set of regulations. For example, if a location factor and procurement factor were both instituted, an REA could include both, as outlined in Figure 7.

Figure 7: Location and Procurement Factor Example

Renewable Energy Allowance (REA) = Qualified RECs x Location Factor x Procurement Factor x conversion to kBTUs

Policy Objectives and Implementation Considerations for Renewable Energy Allowance

Determining which REA choices may be the best fit for the County is largely an exercise in understanding the policy objectives and benefits of differing approaches and then selecting REA components that align. There are no across-the-board superior or inferior REA components, and there is no national best practice roadmap yet. The key is understanding the County government's policy priorities, as informed by stakeholders, and then selecting the REA components most effectively meet those priorities.

Policy Objectives/Benefits

Building Energy Performance

Building energy performance, as determined by BEPS, can be achieved through retrofit measures (i.e., insulation and building envelope improvements, energy efficient upgrades, electrification, and lighting retrofits, etc.). If an REA were broadly implemented, a wide range of renewable energy types were deemed qualified resources, and a significant number of building owners elected to use the REA for compliance, building energy performance and associated retrofit measures might decrease. If an REA were more restrictive, it could cause additional local investment in energy efficiency retrofit measures to comply with BEPS, and the expansion of qualified renewable resources may be limited.

Reduced Carbon Pollution

Reductions in carbon pollution are expected through energy efficiency improvements, electrification, and use of renewable energy from the REA. If the REA were to take a more restrictive approach to RECs, by only allowing the allowing retired RECs as a qualified renewable energy source, the REA could have a larger impact on reducing local carbon emissions under traditional GHG accounting (since RECs are the primary mechanism for recording renewable electricity impacts on GHGs). Alternatively, if the REA were to recognize a broader approach to RECs, the REA would likely be more cost effective and renewable energy

[10] ICC. 2021. *Appendix CC Zero Energy Commercial Building Provisions*. Available online at: https://codes.iccsafe.org/content/IECC2021P1/appendix-cc-zero-energy-commercial-building-provisions. These are the model code procurement factors, and the County may choose to amend these as the 2021 IECC code is adopted.

could become more widely used for compliance with BEPS. This approach could also reduce grid carbon emissions broadly, depending on the types of projects installed, and the boundaries and geographies set by the REA regulations.

Grid Benefits

The implementation of BEPS along with the REA should have multiple benefits to the electric grid. First, the reduction in energy use (from efficiency measures) will ease the burden on the grid as demand for electricity for some of the major users will decrease. Additionally, with the increase in renewables, especially onsite renewables, there will be some decentralization of generation which can increase resilience to grid outages (by eliminating the need to upgrade overloaded sections of the grid or if paired with battery storage) and reduce or defer the need for construction of more electric distribution infrastructure. To the extent that an REA were implemented with a focus on local renewable energy generation (either onsite or offsite projects), the grid benefits would be stronger in the County than otherwise and less pronounced for other locations in the state or region.

Alignment with Existing Building Codes

When considering actions to meet BEPS, building owners need to be aware of local building codes. The utilization of an REA can keep buildings within the existing codes while still working toward being compliant with BEPS. An REA that allows new buildings that achieve code using renewable energy requirements to also count that renewable energy towards BEPS compliance via an REA would simplify processes for local code officials and the County staff implementing BEPS. This would further ensure that new buildings, built to existing code were on track to meet compliance of BEPS, barring deviations in energy performance from design.

Other Local Benefits

If an REA were implemented with a focus on local renewable energy generation, the distributed generation could also reduce overall demand on the electricity grid and improve local grid resiliency. There is also potential for significant local benefits from BEPS and the REA beyond the electric grid. The reduction of pollution can lead to cleaner air and better health outcomes in the area. The influx of energy efficiency and renewable projects will lead to local job creation and, once the work is finished, property values and tax revenue may increase as well.

Flexibility in BEPS Compliance

The implementation of an REA provides flexibility when it comes to meeting BEPS compliance. Alternate pathways to compliance will be especially useful for those buildings that may not have the capital to perform deep energy efficiency retrofits as well as buildings that have already taken steps toward building energy optimization and/or that are excellent sites for onsite renewables. By allowing offsite renewable energy, an REA also provides an avenue for building owners without suitable space for onsite renewable energy.

Implementation Considerations

REA implementation success will depend on data collection and submission mechanisms that are easy to understand, relay accurate information, build on available data and documentation (i.e., do not require building owners to acquire new documents), and not overly burdensome for either building owners or the County. ICF framed these considerations in stakeholder sessions around the following objectives:

- Level of effort and documentation required from building owners
- Resources and effort by the County to administer an allowance
- The need for accurate, credible information (County and participants)

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Stakeholders generally supported these objectives and were particularly concerned about creating additional burdens for building owners seeking an REA for onsite solar installations. For offsite renewable transactions, stakeholders generally felt that a somewhat larger burden for documentation was appropriate and should fall on the building owner looking use employ the REA.

County Stakeholder Priorities for Allowance Objectives and Components

County stakeholders provided a range of feedback on what the REA objectives should be and on specific REA design options. County stakeholders provided a range of feedback on policy objectives of an REA. Surveys were conducted at the end of each stakeholder session asking the participants to rate six potential benefits of BEPS on a scale of 1-10, with 10 being the maximum score[11]. Reduced carbon pollution was the highest ranked benefit (8.89), followed closely by building energy performance (8.79). These priorities are reflected in the potential approaches to an REA outlined below.

The understand of the priorities of stakeholders, ICF held a series of stakeholder meetings through nine different meetings in early 2022, representing a diverse set of community members. In these meetings, stakeholders shared their preferences with regards to the implementation of the REA for BEPS. In addition to review of stakeholder priorities, several questions were discussed with the groups. From those discussions, ICF distilled preferences related to objectives and outlined areas where there was consensus. A full overview of this discussions can be found in Appendix C: Montgomery County Stakeholder Feedback Process and Outcomes.

1. **For onsite renewable energy installations, do RECs need to be retained to obtain the allowance?**
   Stakeholder Consensus: Allowance should apply even if onsite RECs are sold or transferred.
2. **For onsite renewable energy installations, does the energy need to be used onsite?**
   Stakeholder Consensus: All onsite electricity generated will receive allowance, including exported power.
3. **Can offsite renewable energy be used for the allowance?**
   Stakeholder Consensus: Only specific types of offsite RECs are given allowance (e.g., depending on characteristics of the offsite contract) and offsite RECs are given a smaller allowance than onsite RECs.
4. **If offsite renewable energy is allowed, does it matter where the generation is located?**
   Stakeholder Consensus: No consensus was found.
5. **What renewable energy sources can be used for the allowance?**
   Stakeholder Consensus: No consensus was found.

[11] Overall survey response was limited with 10 total responses, survey results may not be as indicative of the preferences of the whole stakeholder group.

Three Potential Approaches

Summary

By consolidating information on stakeholder views from the table above, ICF identified three recommended approaches (which can be viewed as REA principles) and developed a list of the pros and cons of each approach. Approach A, B, and C represent three ways of designing an REA and should serve as a useful frame as the County defines BEPS regulations. These approaches are not mutually exclusive and within each, policymakers may select to make choices as they move toward developing regulations. All recommended approaches provide a full allowance for any new or existing, onsite renewable projects, irrespective of REC retention or net energy metering exports. Additionally, all offsite recommended approaches restrict qualified renewable energy to be purchased on a minimum of five-year increments to cover each interim performance period outlined by BEPS and with the vintage of RECs aligning with Maryland's RPS.

> *All recommended options provide a full allowance for any new or existing onsite renewable energy projects irrespective of REC retention or net energy metering considerations.*

Approach A- Onsite only

This approach allows for only onsite renewable generation to receive an REA:

Onsite Renewables: Qualified renewable energy sources consist of electricity generated from onsite renewable energy installations.

Offsite Renewables: Offsite renewable energy sources would not be included.

Pros:	• Easy to implement for the County since only onsite projects would count toward the REA. • By implementing this option, the County would have all data and information available through ESPM. • Easier submission process for applicants to REA since information would by largely available through billing or onsite metering and provided through ESPM to receive REA. • Prioritizes building performance since organizations would only be able to comply with BEPS through local investments in energy efficiency, electrification, and renewable energy, since options for complying with BEPS would be limited to building improvements (and not offsite renewable energy procurement). • Ensures that any economic activity, job creation, and air quality benefits associated with the REA would remain local.
Cons:	• Goes against the stakeholder recommendation of providing a REA for offsite projects. • Limits building owner's flexibility in meeting BEPS, particularly for high-rise facilities in dense areas where access to onsite solar isn't easily available or covers only a modest amount of the building's electricity consumption. • This option would not align the REA with IECC 2021 building codes, as the code may allow additional options for renewable energy procurement, which would not be provided an REA.

Approach B- Customized

This approach provides the County with a flexible and customized framework for determining the value of an REA. Key components of an REA would include:

Onsite Renewables: Qualified renewable energy source consist of electricity generated from onsite renewable energy installations.

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Offsite Renewables: Offsite renewable energy sources would be defined as Maryland's RPS with the County excluding combustion-based sources. A County-derived set of location and procurement factors would be applied to RECs from offsite renewable projects to provide greater weight to geographically closer renewable projects.

If this option is selected, the following ideas should also be considered:

- Restricting the least favorable location factor to align with PJM, enabling PJM's EIS GATS (see Appendix D: REC Treatment Options) to serve as the system of record for data related to RECs.
- Restricting the most favorable location factor to be Maryland in-state. 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.

Pros:	• Provides many of the benefits of the onsite allowance described in Approach A related to onsite solar. • Enable the County to highly customize what it considers a qualified renewable energy source and weight it based on Location and Procurement Factors, which provides flexibility to the County. • By implementing this option, the County could adjust regulations by simply adjusting Location and Procurement Factors in the future to change the REA if desired. • Provides building owners with significant flexibility in complying with BEPS.
Cons:	• Implementing this option would require more effort for both building owners and the County to report and track qualified purchases than an onsite-only option. • By implementing this option, the County would not have all data and information available through ESPM and would require supplemental REA documentation. • More difficult submission process for building owners that would require a deeper set of documentation and information to receive an REA. • This option could create uncertainty for building owner's looking to understand future compliance pathways, since it could enable easier changes to either the Procurement Factors or Location Factors in the future. • This option may not align the REA with IECC 2021 building codes, as the code may credit renewable energy procurement differently. • Could diminish local energy efficiency, electrification, and renewable energy investments (and associated local economic activity) by allowing building owners options to purchase offsite RECs in place of making property investments.

Approach C- Code Alignment

This approach provides the County with an REA that aligns with existing building codes. Key components would be:

Onsite Renewables: Qualified renewable energy sources consist of electricity generated from onsite renewable energy installations.

Offsite Renewables: Offsite renewable energy sources would be defined as Maryland's RPS. Procurement Factors would align with 2021 International Energy Conservation Code's Procurement Factor and the County would not include a Location Factor, aligning County policy with code.

Pros:	• Provides many of the benefits of the onsite allowance described in Approach A related to onsite solar. • Aligns with existing building codes and while implementing this option, future changes to the REA could be tied to the IECC.

	• Provides building owners with significant flexibility in complying with BEPS.
Cons:	• Implementing this option would require more effort for both building owners and the County to report and track qualified purchases than an onsite-only option. • By implementing this option, the County would not have all data and information available through ESPM and would require supplemental REA documentation. • More difficult submission process for building owners that would require a deeper set of documentation and information to receive an REA. • Could limit future flexibility for the County with respect to how to consider renewable energy in BEPS. • Could diminish energy efficiency, electrification, and renewable energy investments (and associated local economic activity) by allowing building owners options to purchase offsite RECs in place of making investments.

Process for Creating and Tracking Allowance

When considering implementation and tracking allowances for the REA, the County will need strong systems to ensure that REAs are being tracked. Depending on the options and choices selected, data on the amount of renewable energy can be provided through ESPM; however, that tool lacks fields to provide data related to vintage and transaction types of renewable energy. If necessary, pending the final policy recommendation, the County could develop a straightforward process adjacent to the submission of ESPM performance data. This could be completed through an online form and include a section for uploading backup documentation for offsite projects. A set of potential, minimum data requirements is outlined below:

Onsite Renewables

- Building identification information
- Data on the annual onsite energy generation
- System capacity and technology type
- Calculation showing the REA based on the data above (for review by the County)
- Signature from a representative of the building owner certifying the accuracy of the information on the form

Offsite Renewables

- Building identification information
- Data on the annual RECs purchased from offsite projects over the performance period.
- Transaction type (e.g., offsite PPA, community solar, unbundled RECs)
- Renewable technology type
- REC location information
- REC vintage information
- Calculation showing the REA based on the data above (for review by the County)
- Signature from a representative of the building owner certifying the accuracy of the information on the form

In addition to development of an REA entry form, the County will need to develop educational materials and provide outreach to sites with existing or planned renewable transactions to help them understand the REA and how to apply it to their facility(ies).

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Next Steps

This report provides a set of options for consideration and implementation and complements material that ICF helped develop and MCDEP published in association with stakeholder sessions on December 16, 2021, and March 30, 2022. Following review of this report and discussions by policymakers related to the REA, the County will issue draft regulations defining the REA with a public comment period. After formal review and adoption progress, regulations related to BEPS and an REA will be considered final. MCDEP will develop outreach and education materials to assist building owners and other stakeholders in understanding the REA and how it will be incorporated into BEPS compliance.

In addition to drafting regulations, as part of next steps for this report, MCDEP should consider how the national and local energy landscape is changing, and how those changes might impact BEPS. Two specific issues were discussed with stakeholders and the County in reviewing information for this report that will need to be tracked by County officials:

- Since this scope of work was initiated, the State of Maryland passed the Climate Solutions Now Act, which implements a statewide BEPS-type program. Alignment and collaboration on BEPS programs between the State and County could simplify compliance pathways for building owners and help ensure a successful program for the County and State.
- Renewable Natural Gas (RNG) and Thermal Renewable Energy Certificates were presented as a possible solution by a few stakeholders. The markets and technologies for these products is growing, and they could present a pathway for compliance with BEPS in the future if the County determined it to be appropriate.

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Appendix A: Summaries of BEPS Policies in Other Jurisdictions

Review of Relevant BEPS Programs

ICF researched established and developing BEPS and similar programs to understand if and how local governments and states elsewhere in the United States account for onsite and offsite renewable energy. An overview of the results for eight jurisdictions is in the table below, with information as of early 2022. Brief descriptions of the eight BEPS or BEPS-like programs follow the table.

BEPS programs are relatively new, and many jurisdictions are still determining how to handle renewable energy generation as it relates to program compliance. The existing programs typically take a phased approach for reporting, with mandatory city properties as the highest priority followed by agency and private sector properties in order of square footage (largest properties prioritized first). There are no BEPS programs that reached a compliance point for their buildings as of the date this summary was prepared, so many of the details around achieving targets and receiving credit for purchased or generated renewable energy are still in development. Standards based on GHG emissions (as opposed to site EUI) are generally likely to provide an REA, since they focus on a goal of emissions reduction (to which renewable energy accounting is easily applicable), rather than calculating a metric of building performance.

Table A-1: Overview of BEPS Programs

Jurisdiction	Metric	Buildings in Program	Credit or Allowance for Renewable Energy
State of Colorado	In development, recommends Site EUI	BEPS for most buildings over 50,000 square feet ("sf")	In development, recommends credit for renewable energy generation as long as RECs are retained.
City and County of Denver, Colorado	Weather-normalized site EUI	BEPS for most buildings over 25,000 sf (LED lighting requirements for buildings from 5,000-24,999 sf)	Onsite solar be fully credited toward energy use savings, by directly lowering the net EUI of the building. Offsite solar will be credited towards EUI reduction in the same manner, and building owners must self-certify the offsite solar contract.
City of New York City	Greenhouse gas emissions	BEPS for most buildings over 25,000 sf	Unclear- Clean distributed energy resources can include hydropower, solar photovoltaics, geothermal wells, tidal action, and wind, and "the department shall

Jurisdiction	Metric	Buildings in Program	Credit or Allowance for Renewable Energy
			establish separate calculations for each type of commercially available clean distributed energy resource" Onsite and offsite renewable energy likely reflected in GHG metric.
New York Power Authority	Energy use (Target is 11 trillion British thermal units ["TBtu"] of energy savings)	BEPS for state agency or authority owned or leased buildings with floor area greater than 5,000 sf	All energy produced by eligible renewable projects during a reporting period count as site EUI savings; however, purchases of RECs and/or physical energy from offsite renewables projects do not count as savings nor is REC ownership relevant to BEPS calculations.
City of Reno, Nevada	Energy and water use intensity (based on ENERGY STAR® score)	BEPS for most municipal buildings over 10,000 sf and most private buildings over 30,000 sf	Onsite energy generation are allowed to contribute to a building's "GHG emission reductions and energy efficiency requirements." Onsite and offsite renewable energy likely reflected in GHG metric.
City of St. Louis, Missouri	Weather-normalized site EUI	BEPS for most buildings 50,000 sf and larger	No current mention of how renewable energy will impact BEPS policy, if at all.
State of Washington	Weather-normalized site EUI	BEPS for most buildings over 50,000 sf	Renewable energy produced and consumed onsite is not included in the total for net energy use, essentially providing a credit in for non-exported onsite

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Jurisdiction	Metric	Buildings in Program	Credit or Allowance for Renewable Energy
			renewables in the net energy use calculation.
Washington D.C.	ENERGY STAR® Score or Source EUI (Weather-normalized)	BEPS for most buildings over 10,000 sf	Onsite solar helps reduce source EUI and can moderately improve ENERGY STAR score, but no additional credit is given[12].

State of Colorado[13]

House Bill 21-1286 ("Energy Performance for Buildings"), signed into law in 2021, establishes a building energy performance standard for the state. The bill requires owners of commercial, multifamily, and public buildings 50,000 square feet or more in Colorado to report their annual energy use using ESPM. Additionally, building owners will be required to comply with energy performance standards starting with the first reporting deadline on December 1, 2022. The Energy Performance for Buildings law also establishes a task force which will develop recommendations for the standards and submit them for review to the Colorado Energy Office ("CEO").

As the benchmarking program is still in its beginning phases, the CEO and program task force have not made final decisions about onsite renewables and how they affect program compliance. In order to help the State, develop their building performance standards, the authorizing legislation directed the CEO to convene a BPS Task Force to make program recommendations to the Colorado Air Quality Control Commission. The BPS taskforce has recommended adopting a site EUI metric. Additionally, In their Task Force Recommendations presentation[14], the Task Force made several recommendations to the Air Quality Control Commission related to renewable energy:

- A credit for renewable energy generation be provided based on avoided utility grid emissions, as long as the building owners retain the renewable energy credits (RECs), or if the REC is retired on behalf of the building owner.
    - This recommendation allows building owners to receive fractional credit towards BPS compliance while using renewable energy generation, as long as the renewable energy is located within Colorado, and the RECs are retired in the year generated.
    - Renewable energy may be obtained from either onsite (e.g., solar panels installed on a building's roof) or off-site sources (e.g., solar array owned on off-site land).
    - Building owners can only count GHG reductions from actions they take for their building, and cannot count GHG reductions from statewide decarbonization of electricity or natural gas utility grids.

[12] ENERGY STAR® Portfolio Manager FAQs. Available at: https://energystar-mesa.force.com/PortfolioManager/s/article/How-does-my-onsite-green-power-solar-or-wind-affect-my-metrics-score-Source-EUI-1600088546929

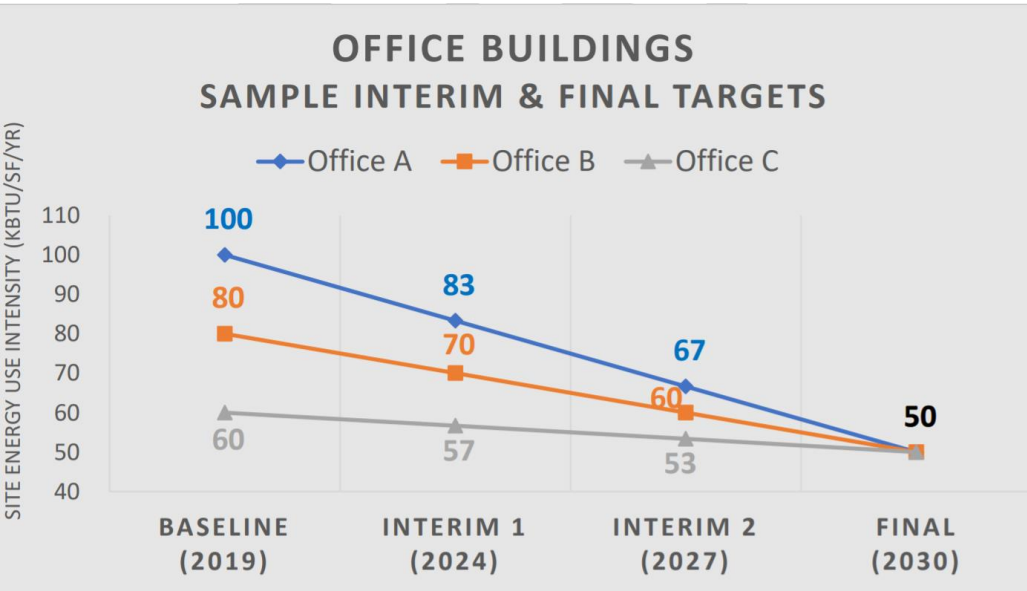
[13] Colorado Energy Office. (n.d.). *Building Benchmarking.* Available at: https://energyoffice.colorado.gov/climate-energy/energy-policy/building-benchmarking.

[14] Colorado BPS Recommendations Presentation Overview (2022) Available at: https://energyoffice.colorado.gov/climate-energy/energy-policy/building-performance-standards

Denver, CO

The City and County of Denver passed a building energy performance policy in November 2021 that will improve energy efficiency for commercial and multifamily buildings and support the Net Zero Energy building goal through efficiency improvements, electrification, renewable energy, and flexible grid capabilities.[15] According to the Energize Denver Task Force, commercial and multifamily buildings account for 49% of Denver's GHG emissions. The Task Force recommended a 30% improvement in energy performance by 2030 for all buildings over 25,000 square feet, which was accepted into the final bill. The performance targets for each building will be based on EUI, and interim targets will be required for 2024 and 2027. Figure A-1 below provides example interim and final targets for buildings with varying EUIs.[16]

Figure A-1: City of Denver Energy Use Intensity Targets for Sample Buildings



According to the bill, onsite solar will be fully credited toward energy use savings, directly lowering the net EUI of the building. Offsite solar will also be credited towards energy use and building owners must self-certify the offsite solar contract. The Technical Advisory Committee will revisit the offsite solar guidelines every three years as utility-scale solar continues to increase.[17]

New York, NY[18]

As part of its Climate Mobilization Act, New York City ("NYC") passed Local Law 97 in April 2019, which requires buildings 25,000 square feet or larger to reduce their GHG emissions by 40% by 2030 and 80% by 2050. GHG emission limits are established on a square foot basis for each of the occupancy groups identified in NYC's building code. By May 1, 2025 (and every subsequent May 1st), applicable building owners must file a GHG emissions report showing that their building complies with the applicable building emissions limit (or by how much the building exceeds the limit).

[15] Denver City Council. (2021). *Bill 21-1310*. Available at: https://denver.legistar.com/LegislationDetail.aspx?ID=5196421&GUID=641EBED8-31C9-4CA0-A8F9-946569B7C293&Options=&Search=&mc_cid=1ed62ba202&mc_eid=1069281477.
[16] Energize Denver Task Force. (2021). *Community Briefing Presentation.* Available at: https://www.denvergov.org/files/assets/public/climate-action/documents/hpbh/energize-denver/energize-denver-case-studies/edtf-community-briefing-9-29-2021.pdf.
[17] Energize Denver Task Force Recommendations. (2021). Available at: https://www.denvergov.org/files/assets/public/climate-action/documents/hpbh/energize-denver/task-force/energize-denver-task-force-draft-recommendations-7-19-2021.pdf.
[18] Sustainable Buildings NYC. (n.d.). *Local Law 97.* Available at: https://www1.nyc.gov/site/sustainablebuildings/ll97/local-law-97.page.

According to Local Law 97,[19] building owners may be eligible for deductions from reported annual building emissions "where the owner demonstrates the purchase of greenhouse gas offsets or RECs, or the use of clean distributed energy resources." Clean distributed energy resources can include hydropower, solar photovoltaics, geothermal wells, tidal action, and wind. For a clean distributed energy resource that generates electricity (e.g., onsite solar), "the department shall establish separate calculations for each type of commercially available clean distributed energy resource, which shall not be revised more frequently than once every three years.[20]"

New York Power Authority[21]

New York State's BuildSmart 2025 program is pursuing aggressive energy efficiency improvements in state-owned and -occupied buildings while also advancing economic growth, environmental protection, and energy security. BuildSmart 2025, which is a continuation of the original BuildSmart NY Program, has set a target of 11 TBtu of building site energy savings by December 31, 2025, with a base year of 2014-2015. BuildSmart 2025 was established in part to assist with GHG emissions reduction requirements set forth by the New York State's Climate Leadership and Community Protection Act. BuildSmart 2025 applies to any state agency or authority that owns or leases a covered building (i.e., any building with a floor area greater than 5,000 square feet).

In addition to demand-side energy savings, BuildSmart 2025 recognizes supply-side investments in renewable energy as long as certain criteria are met. Covered buildings can count supply-side energy generation towards energy savings if all cost-effective and practical demand-side investments are already being pursued at the facility, or the renewables project is at least as cost-effective as existing demand-side projects. Additional criteria can apply depending on whether the renewable energy project is part of a facility's net zero energy plan or green building certification. According to the BuildSmart 2025 guidelines, all energy produced by eligible onsite renewables projects during a reporting period count as savings against the site energy requirements. However, purchases of RECs and/or physical energy from offsite renewables projects do not count towards BuildSmart 2025 savings. The BuildSmart 2025 credit for onsite renewables is irrespective of the ownership of RECs associated with the onsite project.

Reno, NV[22]

In 2019, Reno established the Energy and Water Efficiency Program, which enacted a benchmarking and transparency requirement for city-, state-agency, and privately-owned non-residential and multifamily buildings. The reporting requirement applies to city-owned buildings larger than 10,000 square feet and local agency (i.e., local agencies of the state or political subdivisions of the state) or privately-owned properties larger than 30,000 square feet. Once building owners begin reporting their benchmarking data (depending on the size and ownership of the property), they must submit performance goal verification documentation every seven years to demonstrate achievement of their targets.

According to the program's compliance guide, onsite energy generation (e.g., solar photovoltaics) is allowed to contribute to a building's GHG emission reductions and energy efficiency requirements by improving the buildings' ENERGY STAR® score. Building owners are encouraged to use ENERGY STAR® Portfolio Manager® to enter onsite electricity generation data for the most accurate estimates. The guide

[19] *Local Law 97.* Available at: https://www1.nyc.gov/assets/buildings/local_laws/ll97of2019.pdf.
[20] The City of New York (2019). Local Law 97. Available at: https://www1.nyc.gov/assets/buildings/local_laws/ll97of2019.pdf
[21] New York Power Authority. (2020). *BuildSmart 2025.* Available at: https://www.suny.edu/media/suny/content-assets/documents/capital-facilities/sustainability/BuildSmart-2025-Guidelines.pdf.
[22] City of Reno. (n.d.). *Energy and Water Efficiency.* Available at: https://www.reno.gov/community/sustainability/energy-and-water-efficiency.

states that "if you report your renewable energy generation and use accurately, it will be reflected in your building's greenhouse gas emissions."[23]

St. Louis, MO[24]

St. Louis became the fourth jurisdiction in the country and first in the Midwest to mandate reductions in building energy use with the passage of its BEPS in May 2020. The ordinance covers municipal, commercial, institutional, and multifamily residential buildings 50,000 square feet and larger. In May 2021, St. Louis set an energy performance standard for each building type based on local benchmarking data. Most buildings have four years to meet the standard (until May 4, 2025), while qualified affordable housing buildings and houses of worship have six years to meet the standard (until May 4, 2027).

St. Louis set standards using weather-normalized EUIs such that 65% of buildings from each property type will need to improve their energy performance to comply. The Building Energy Improvement Board, which oversees the BEPS, has not released any statements about whether onsite solar can be used to comply with the standards.

State of Washington[25]

Washington adopted a Commercial Clean Buildings Performance Standard in 2019. The law requires the Department of Commerce to develop and implement an energy performance standard for buildings larger than 50,000 square feet (industrial and agricultural buildings are exempt from the standard). The legislature adopted the American Society of Heating, Refrigeration, and Air-Conditioning ("ASHRAE") Standard 100-2018 as the baseline for future targets.

According to the standard's guidelines,[26] energy exported from a building for beneficial use (e.g., excess solar, recovered thermal energy, or excess electricity/thermal energy from co-generation) can be subtracted from a buildings overall energy use to calculate net energy use. Renewable energy produced and consumed onsite will result in a lower net energy use by reducing the amount of electricity required from the grid. The guidelines state that onsite renewable energy "does not need to be metered if used withing the building."

Washington, D.C.[27]

Washington, D.C. established a BEPS program in Title III of the Clean Energy DC Omnibus Act of 2018. The BEPS was created by the Department of Energy & Environment ("DOEE") to improve energy performance in existing buildings and help meet the GHG reduction goals set forth in the Sustainable DC plan. This plan set a target to reduce GHG emissions and energy consumption by 50% by 2032. DOEE established the first set of standards of January 1, 2021, using the local median ENERGY STAR® score as a baseline (or source EUI for buildings that cannot receive an ENERGY STAR® score).

Buildings will be subject to the benchmarking requirements established by BEPS in three distinct periods (based on square footage) until all private and DC-owned buildings over 10,000 square feet are in compliance with the standards. Beyond the principal compliance pathways based on performance and

[23] City of Reno. (n.d.). *City of Reno Commercial Buildings Energy Efficiency How-To Guide*. Available at: https://www.reno.gov/home/showpublisheddocument/85865/637504548945270000.
[24] St. Louis Government, Building Division. (n.d.). *Building Energy Performance Standard Targets*. Available at: https://www.stlouis-mo.gov/government/departments/public-safety/building/building-energy-improvement-board/beps-targets.cfm.
[25] Washington State Department of Commerce. (n.d.). *Clean Buildings Standards*. Available at: https://www.commerce.wa.gov/growing-the-economy/energy/buildings/clean-buildings-standards/.
[26] Washington State Clean Buildings Performance Standard. (2021). Available at: https://www.commerce.wa.gov/wp-content/uploads/2021/07/WSCBPS_20210701.pdf.
[27] District of Columbia Department of Energy and Environment. (n.d.). *Building Energy Performance Standards (BEPS)*. Available at: https://doee.dc.gov/service/building-energy-performance-standards-beps.

target-setting, the BEPS allows for "alternative compliance pathways". According to the BEPS Compliance and Enforcement Guidebook, "DOEE will not consider any "supply-side" methods (e.g., installation of solar photovoltaic systems or power purchase agreements) as a Custom (alternative compliance pathway) option."[28] Onsite solar helps reduce source EUI and can moderately improve ENERGY STAR score, but no additional credit is given. The Guidebook references the District's Renewable Portfolio Standard as a separate policy that is focused on reducing GHG emissions from the electrical grid supply.

[28] District of Columbia Department of Energy and Environment. (2021). *Building Energy Performance Standards Compliance and Enforcement Guidebook*. Available at: https://doee.dc.gov/node/1537071.

Appendix B: Review of Montgomery County Energy Data

ICF reviewed a set of utility and PPA billing, solar generation, and energy benchmarking data provided by Montgomery County and MWCOG as well as ESPM data requirements to help understand how the development of an REA in the County might be impacted by available data.

Information Provided by the County and MWCOG

Utility Bills

PEPCO

Montgomery County provided electric utility bill examples from the local electric utility PEPCO for County sites with and without onsite solar generation. This information showed key data points which could be used as inputs for an onsite REA. Data from PEPCO utility bills are reviewed below:

- **Energy used from the grid** - Accounts for the amount of electricity delivered to the service address, differentiated by time-of-use ("TOU") period as applicable.
- **Excess energy provided to the grid** - Accounts for the cumulative, prior amount of excess electricity received by the grid from the onsite generation project at the service address, differentiated by TOU period as applicable.

This data does not include the total, gross (before netting onsite generation during the month) electricity used onsite, or the total electricity generated by onsite generation. The latter value can come from a separate meter specific to the onsite generation, or possibly inverter data.

Solar PPA Invoice

The County also provided an invoice for one of its sites that has a signed PPA and is invoiced on all solar electricity produced onsite. These invoices (typically provided monthly) could be used to populate the total solar electricity generated onsite and potentially also used to help calculate the total onsite consumption (along with data from the utility bills). However, unlike utility bills, there is no standard to PPA invoicing, as each solar PPA provider could invoice differently.

Previous Benchmarking Data (Sites with Solar)

Lastly, the County provided a set of benchmarking data from existing projects with solar, showing four data points from ESPM:

- Electricity Use - Grid Purchase (kilowatt-hours ["kWh"])
- Electricity Use - Grid Purchase (kBtu)
- Electricity Use - Grid Purchase and Generated from Onsite Renewable Systems (kWh)
- Electricity Use – Generated from Onsite Renewable Systems and Used Onsite (kWh)

Data showed 19 commercial properties reporting onsite generation resources and indicated that these existing commercial solar projects were reporting data correctly in ESPM based on their onsite generation. Most properties were generating 10-30% of their electricity through onsite renewable electricity generation sources (mainly solar), with a few showing larger percentages of onsite renewable electricity (up to 82% in one case).

MCDEP instructs benchmarkers to report onsite renewable energy use per EPA guidance to enter two meters: one onsite renewable electric meter to track how much onsite renewable electricity is used and exported, and a second grid electric meter to track the electricity that is purchased from the grid. However, it is difficult to determine if other sites are only reporting grid-delivered electricity use and omitting onsite renewable consumption, as the renewable-energy-related fields in ESPM are optional and as utility bills do not always clearly provide renewable energy sold back to the grid.

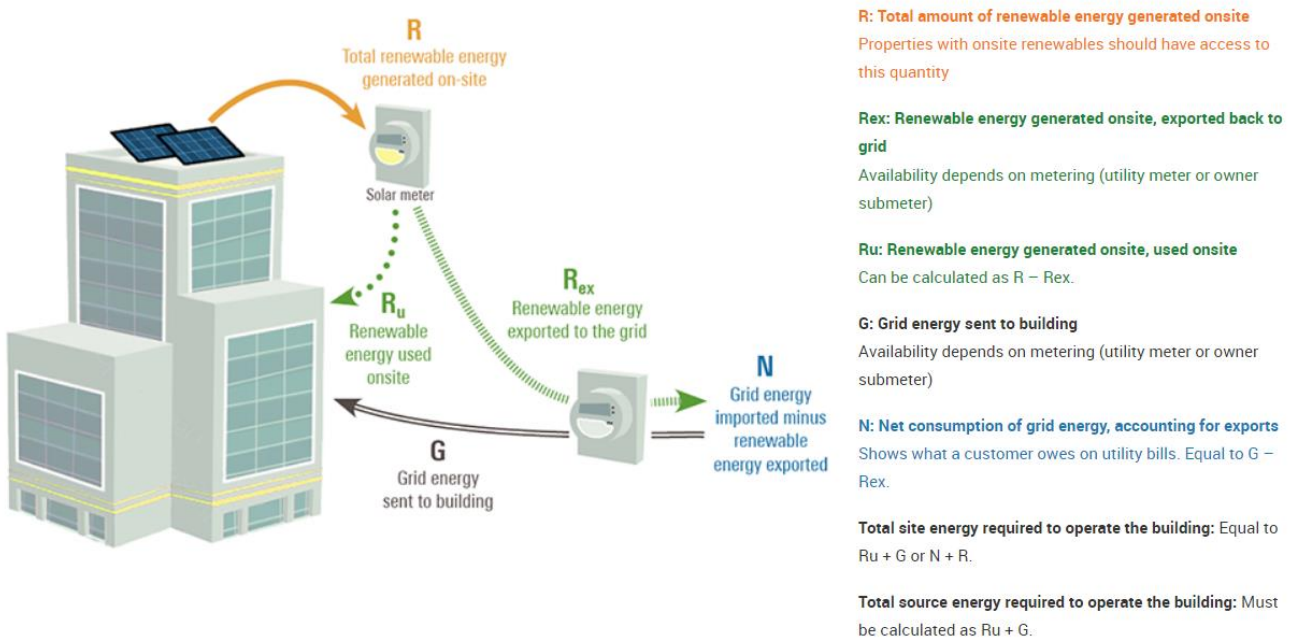
ENERGY STAR® Portfolio Manager® Data

EPA's ESPM tool is currently used for benchmarking in the County and will be the system of record for data collection, analysis, and reporting for BEPS implementation. Therefore, understanding how ESPM interacts with renewable energy systems is a key to considering the options for the REA as well as the County's regulations implementing BEPS.

The ENERGY STAR Technical Reference on Green Power provides information on benchmarking properties in Portfolio Manager that have either onsite or offsite renewable energy. It provides guidance on how to enter data from utility invoices and onsite metering in order to properly account for onsite and grid imported usage. It also shares details on how this information influences energy and greenhouse gas metrics generated in ESPM. With Montgomery County using ESPM as the system of record, any of the metrics generated through Portfolio Manager can easily be employed for an REA.

For onsite renewable energy, Figure B-18 (from the ENERGY STAR Technical Reference document) provides a visual representation of a typical system. The electricity flows in this diagram will all be captured when a building owner enters data for an onsite renewable energy system.

Figure B-18: ENERGY STAR® Portfolio Manager® Configuration of an Onsite Renewable System



Depending on the final approach for the REA pursued, these flows can be utilized to calculate the allowance. For example, the total site energy used by a building with an onsite renewable energy system is Ru + G in the diagram above. If the decision is made to base an allowance on renewable energy generated and used on site, the REA would be Ru. If the decision is made to base an allowance on all renewable energy generated on site, regardless of whether it is used onsite or exported, the REA would be Ru + Rex. If the policy considers whether the building owner retains the RECs, ESPM also captures this information, and it can be taken into account.

Similarly, ESPM captures data about offsite green power purchases, as shown for a typical monthly entry in Figure 9 below. The amount of offsite green power is tracked as an ESPM metric and easily exported. The

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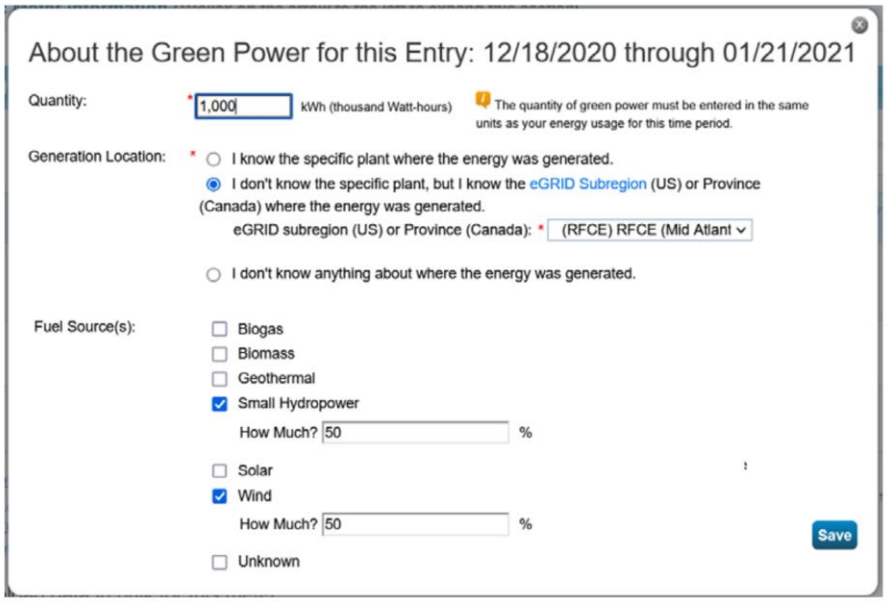
details about the location and type of offsite green power are available on a monthly basis and could be extracted with additional effort if they were utilized in the final approach selected by the County.

Figure 9: Example Dialogue Box for Offsite Green Power Information



The metrics related to onsite and offsite renewable energy systems that can be easily exported from ESPM for any reporting year are included in Table B-2. For simpler solutions, a metric or combination of metrics below may be used to determine the REA. For more complex solutions, it may be necessary to capture data from monthly ESPM entries (e.g., location of renewable generation), or parallel reporting systems to be developed by the County in order to determine the REA.

Table B-2: Metrics in Portfolio Manager Reporting and Labels in Figure B-18.

Metric Name in Portfolio Manager Reporting	As Labeled in Figure 10
Electricity Use - Grid Purchase and Generated from Onsite Renewable Systems (kWh)	Ru + G
Electricity Use - Grid Purchase (kWh)	G
Electricity Use – Generated from Onsite Renewable Systems and Used Onsite (kWh)	Ru
Electricity Use – Generated from Onsite Renewable Systems (kWh)	R
Electricity Use – Generated from Onsite Renewable Systems and Exported (kWh)	Rex
Percent of Total Electricity Generated from Onsite Renewable Systems	n/a
Percent of RECs Retained	n/a
Green Power - Onsite (kWh)	n/a
Green Power - Offsite (kWh)	n/a
Green Power - Onsite and Offsite (kWh)	n/a
Percent of Electricity that is Green Power	n/a

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Appendix C: Montgomery County Stakeholder Feedback Process and Outcomes

To come to a better understanding of the priorities, points of consensus, and points of divergence of the County community with regards to the implementation of the REA for BEPS, nine stakeholder sessions were held with groups in early 2022 representing a diverse set of community members including building owners, contractors that provide building support, advocates, policy experts and local utilities. These sessions were intended to determine what priorities a diverse set of stakeholders is seeking in the REA and to find agreement on the following questions as seen in Table C-1.

Table C-1: Key Questions for Stakeholders

Stakeholder Questions
What energy sources should qualify as renewable for the REA?
Should the REA be given to existing solar projects?
How should RECs factor into the REA?
What REA should offsite renewable energy projects be given?
Should the REA be given to power exported to the grid?
What timescale should net energy metering account for?

From these stakeholder discussions, several themes became clear as points of consensus. They are discussed in turn below.

Improved Building Performance and Reduced Carbon Pollution are the Highest Priority Benefits Across All Stakeholders

Across the small-group discussions, stakeholders made it clear their preference that the design of the REA should promote energy efficiency in building upgrades first and use renewable energy generation to ease short to medium-term compliance requirements.

> *"First and foremost, the priority is energy efficiency, we are just seeking to fill in gaps with renewable energy."*

Notable Exceptions to Survey Trends

- Advocates and policy stakeholder groups placed more importance on grid benefits than other groups
- Building owners ranked additional options for compliance (i.e., more ways to obtain the REA) higher than other groups

Surveys were conducted at the end of each stakeholder session asking the participants to rate six potential benefits of BEPS on a scale of 1-10, with 10 being the maximum score. Of the seven stakeholder groups, five of the groups provided responses to the surveys[29]. Reduced carbon pollution was the highest ranked benefit (8.89), followed closely by building energy performance (8.79). Local benefits (7.39) and additional options for compliance (7.09) were also ranked highly. Grid benefits (6.59) and alignment with existing building codes (5.50) were ranked the lowest of the potential benefits.

[29] Overall survey response was limited with 10 total responses, survey results may not be as indicative of the preferences of the whole stakeholder group.

BEPS is an Energy Efficiency and Building Performance Standard, and the REA Should Supplement, Not Replace Building Energy Reduction Projects

Numerous stakeholders discussed the limits of the REA for BEPS, reiterating the focus of the standard to reduce building energy use. Stakeholders were concerned that the REA, especially a version that allows for full BEPS credit for RECs could allow buildings to forego energy efficiency projects through the purchase of RECs.

> *"Cleaning the grid is important, but BEPS is more on the building footprint"*

> *"The County should stay in the lane with what is happening with buildings and let the State focus on the utility side."*

A few stakeholders shared their belief that the cleanliness of the grid is out of the jurisdiction of the County; the State regulates the grid, while the County regulates buildings. Relatedly, a few advocates and policy experts noted that the Maryland RPS will decrease the environmental benefit of offsetting grid power with PPAs and RECs in the long-term.

Stakeholders were generally receptive to the idea of a sliding scale cap on the use of offsite electricity generation to meet BEPS. This seemed to strike a balance between the prioritization of energy efficiency projects over RECs and of onsite renewables over offsite renewables while also allowing some credit to be given for the environmental benefits of RECs. This idea was expanded by some stakeholders to consider a capped allowance for renewable energy so that building performance improvements must be pursued. This cap could be adjusted by the County over time.

> *"What if the legislation only allowed a capped percentage of RECs to count toward the credit, which would encourage building efficiency projects in line with the goal of the BEPS program. That cap could be reduced or faded out over time."*

Onsite Renewable Generation is the Gold Standard, the Further Away from the Site, or the County, the Less REA the Renewable Energy Deserves

There was unanimity that renewable energy generated onsite should be given credit regardless of REC treatment and that renewable energy produced onsite should be prioritized over offsite renewable sources. This would help to promote renewable generation within the County and support additional local benefits such as improved air quality and job creation.

> *"The closer to home is better. We don't want to give building owners a way to simply buy their way out of compliance– offsite solar credits should probably have less weight if they are generated farther away."*

Due to these local benefits, stakeholders mostly felt onsite solar generation should give the most benefit, followed in descending order by local offsite generation (within the County), PPAs or RECs for generation within the State, PPAs or RECs for generation within PJM, and then PPAs further afield. Many felt out-of-state RECs provide little to no benefit.

"No one is going to fight hard for unbundled RECS that are far away to get credit."

Many, but not all, stakeholders are in favor of giving some REA to offsite renewable generation through PPAs, and some through unbundled REC purchases, as well, but they do not agree on the level of benefit each REC source deserves. Stakeholders who prioritized GHG emissions often advocated for giving an equal REA to all methods of reducing GHG emissions, whether from building energy efficiency, unbundled RECs from across the country, or a mix; i.e., as far as existing versus new onsite renewable energy projects, stakeholders believed that the REA should treat them equally. To do otherwise would be seen as disadvantaging building owners for prior renewable investments.

"If the goal is a reduction in carbon pollution, what difference does it make that the renewable is onsite, within the service area, etc.? Why would a carbon offset be more valuable if it is on property or somewhere else if the reduction of carbon would be the same?"

The REA Should Be Flexible and Have Mechanisms in Place to Adapt to Future Changes

Many stakeholders discussed the need for the BEPS program to have mechanisms in place to adapt to future changes, including new technologies, regulatory changes, and the environmental characteristics of the grid, especially with regards to the Maryland RPS. Multiple stakeholders asked about some sort of body to oversee and act on making changes to the program.

"It important to allow the document to be able to adapt to future changes"

"Is there any other governing body or agency that could be written into the legislation to keep the document living and act on making changes to the program?"

One stakeholder group discussed the idea of flexibility from the point of view of building owners with multiple buildings in their portfolios and how an REA could be distributed across a portfolio of buildings.

"If the goal is reduction in carbon, and [building owners] can reduce carbon across their portfolios, there may be creative solutions and flexible pathways (or) options for these portfolios to comply with the BEPS regulation."

The REA Needs to Strike a Balance Between Being Comprehensive and Easy to Use

Stakeholders were aware of the balance that needs to be achieved between having a program that can consider factors that will accurately give weight and incentivize different types of renewable energy generation while being simple enough to minimize the administrative burden on property owners and County staff. Either way, stakeholders stated a clear preference towards relying on existing documentation sources to verify compliance to the extent possible.

"Streamlining the documentation is going to be very important so as not to dissuade people from pursuing renewable projects."

A high administrative burden may serve as a disincentive for renewable energy projects; some feel that is a good thing as it would encourage more investment in energy efficiency and onsite generation, which are easier to document. Others are concerned that onerous paperwork will disproportionately make compliance more challenging for under-resourced buildings and for owners of smaller buildings that may fall under BEPS in the future.

There was consensus around the treatment of net energy metering: all stakeholders felt property owners should receive the REA for the renewable electricity they generated on an annual basis. While some stakeholders discussed the importance of considering time of use data when weighing the benefit of renewable generation, it was clear to these same stakeholders that the burden required for that level of analysis was too high.

> *"By making [verification] more intensive it may discourage some from going the route of RECs and going toward investing in building efficiency."*

Under-Resourced Buildings Will Need Additional Assistance and Additional Pathways to Compliance

Across a few different group discussions, stakeholders highlighted that there is a wide range in the building staff capacity and resources available to support BEPS compliance, even with—or especially with—the REA. For example, some larger corporations and building portfolio owners have dedicated staff to support their corporate sustainability goals and regulatory compliance. In contrast, owners, and operators of under-resourced buildings (e.g., affordable housing, non-profit organizations) shared their challenges accessing the capital necessary for extensive building retrofits. They emphasized their preference for the REA to be as broad and simple as possible to be able to help them meet BEPS. Yet, given the lack of dedicated staff, both the complexity of the renewable energy space and the likely administrative burden involved with receiving an REA may be too high for these building owners and operators to pursue. Therefore, stakeholders suggested the allocation of additional resources for under resourced buildings, such as technical assistance, and options for additional pathways to support their BEPS compliance.

> *"Affordable housing organizations typically have limited staff capacity, so any guidance is appreciated, such as technical assistance on the various pathways to compliance."*

It is Unclear Whether or How the REA Factors in Renewable Thermal Energy Sources, such as Renewable Natural Gas

Promoting renewable sources for electricity both accelerates the greening of the grid and addresses the growing demand for electricity from the electrification of thermal uses. Yet, what about the replacement of direct fossil fuel use in buildings with decarbonized gases, such as renewable natural gas ("RNG")? This question arose as one stakeholder discussed his building's use of renewable natural gas as a step-down approach to decarbonization. Decarbonized gas could be used either directly as a replacement for a building's natural gas or oil use or as part of a co-generation system.

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A few stakeholders felt it makes sense to include RNG in the REA. This may be a useful compliance pathway for certain large buildings as electrification may not be possible without grid upgrades, and the timing of these upgrades are out of the hands of the building owners. However, there were no stakeholder suggestions for how to calculate the REA for RNG.[30]

However, other stakeholders expressed concerns about bioenergy in the REA due to the combustion of organic materials that is involved.

> *"There are existing definitions in county codes that link expressly to (RPS) Tier 1 renewable energy in Maryland. Since a slew of sources in Tier 1 are not renewable, we urge the County to be careful and use this opportunity to clear up the definition of renewable."*

Summary Matrix of Stakeholder Views

Table C-2 provides a crosswalk of stakeholder views –– how strongly or weakly they felt each REA design option matched their policy objectives (i.e., priorities). Numerical values (and colors) in the chart indicate how positively a given REA component meets a policy objective, in the general view of stakeholders. A very positive result receives a "5" and a dark green square, while a negative result receives a "1" and a red square. Opinions between those extremes are reflected in scores of "2" through "4" and orange to light green colors. When stakeholder consensus was identified, that is noted in the right-most column.

Table C-2 Stakeholder Views on REA Components and Objectives

		Objectives							
Components for an REA	**Position/Way of Defining a Component**	**Ease of Implementation (County)**	**Ease of REA Submission Process (Building Owner)**	**Encourages Energy Efficiency**	**Accelerates Local RE Economic Development**	**Aligns with Building Codes**	**Maximizes Carbon Reduction**	**Aligns with ENERGY STAR® Portfolio Manager®**	**Stakeholder Consensus**
1. For onsite renewable energy installations, do RECs need to be retained to obtain the allowance?	A. Allowance applies even if onsite RECs are sold or transferred	4	4	3	5	4	2	5	**Yes**
	B. Onsite RECs must be retained to receive full allowance	2	2	3	4	4	5	3	
	C. Onsite RECs must be swapped (with equivalent number of offsite RECs) to receive allowance	1	1	3	4	4	4	2	
2. For onsite renewable energy	A. Only onsite electricity generation consumed onsite will receive allowance	2	2	4	5	2	3	5	

[30] For more information on RNG and other renewable thermal technologies, see

Appendix D: REC Treatment Options.

installations, does the energy need to be used onsite?	B. All onsite electricity generated will receive allowance, including exported power	4	4	4	4	4	3	3	**Yes**
	C. Onsite electricity generated will receive an allowance, including exported power, with a cap based on the amount of electricity used onsite	4	2	4	4	2	3	3	
3. Can offsite renewable energy be used for the allowance?	A. Offsite RECs are given the same allowance as onsite	4	4	1	3	2	3	4	
	B. Only specific types of offsite RECs are given allowance (e.g., depending on characteristics of the offsite contract)	2	2	2	3	4	3	3	**Yes**
	C. Offsite RECs are given a smaller allowance than onsite RECs	2	2	2	3	4	2	2	**Yes**
	D. Offsite RECs are not given any allowance	4	4	3	3	2	1	5	
4. If offsite renewable energy is allowed, does it matter where the generation is located?	A. It does not matter where generation is located	4	4	3	3	4	3	5	
	B. PJM region RECs only allowed (i.e., located in or delivered to PJM)	2	2	3	3	2	3	2	
	C. Maryland RECs only allowed	2	2	3	4	2	3	2	
	D. In-County RECs only allowed	1	1	3	5	2	3	2	
5. What renewable energy sources can be used for the allowance?	A. Alignment with Maryland RPS Tier 1 sources (includes solar, wind, qualifying biomass, methane from a landfill or wastewater treatment plant as well as other sources)	4	4	3	4	4	2	3	
	B. Alignment with Maryland's RPS Tier 1 sources, with exclusions (e.g., for combustion technologies)	4	4	3	4	2	4	3	
	C. County-developed list of qualified renewable energy sources	4	4	3	4	2	3	3	

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Appendix D: REC Treatment Options

Introduction

BEPS will include an REA for solar and other forms of renewable energy. Central to defining an REA is determining how RECs will be treated. This appendix was spurred by clarifying questions on RECs and related matters from stakeholders at the BEPS renewable energy sessions held between December 2021 and February 2022. The appendix provides an overview of six categories, and 18 sub-categories, of REC considerations as seen in Table D-1.

Table D-1: Considerations included in REC treatment options

Category	Sub-Category
Maryland Renewable Energy Portfolio Standard	Overview of Maryland RPS
Characteristics of RECs	Resources and Technologies
	Locations
	Vintages and Eligibility Periods
Onsite Renewable Electricity Projects	Ownership of Onsite RECs
	REC Swapping/Arbitrage
	Net Energy Metering
Offsite Renewable Electricity Projects	Aggregate Net Energy Metering
	Unit-Specific PPAs
	Community Solar Subscriptions
	Bundled Renewable Supply Agreements from Electric Suppliers
	Community Choice Energy
	Unbundled RECs
Non-Electricity Combustion	Renewable Natural Gas
	Thermal Biomass
Accounting and Reporting Methods	Maximum Annual Credit
	Weather Normalization
	Systems of Record and Preventing Double Counting

This appendix does not offer analysis or views on a seventh, cross-cutting category: whether some types of RECs should receive partial credit versus full credit based on their contributions to the County's climate goals or other factors.

Maryland's Renewable Energy Portfolio Standard

Maryland's RPS requires that electricity generation suppliers include specified percentages of renewable electricity (accounted for with RECs) in their supply to end-use customers in the State. If a supplier does not obtain sufficient quantities of RECs to meet its annual RPS requirements, the supplier must make

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alternative compliance payments (ACPs) for the shortfall. The shortfall payments go to Maryland's Strategic Energy Investment Fund, which is overseen by the Maryland Energy Administration.[31]

The RPS must be met from qualifying Tier 1 and Tier 2 sources (described below) located in, or delivered to, the PJM footprint. There is a further in-state (delivered to the Maryland distribution grid) requirement for solar, geothermal power, geothermal heating and cooling, poultry litter–to–energy, waste–to–energy, and refuse–derived fuel, and an in-state use requirement for thermal biomass.[32] Qualifying offshore wind projects must be located within a certain number of miles of Maryland's coast. The 2022 RPS percentage is 32.6% in total (compromised of 23.24% Tier 1 beyond the solar carve-out, 5.5% solar carve-out, 1.36% for the offshore wind carve-out, and 2.5% for Tier 2).[33] The total RPS percentage rises to 52.5% by 2030, including 2.5% from Tier 2 sources.[34] RECs produced in a given year are eligible to count towards the RPS in any of the following three years.[35]

Though all end-users essentially have RPS percentages of RECs (minus minor, possible ACP-related shortfalls) embedded in their traditional generation supply transactions, the County does not expect that these RPS-related RECs will count towards the REA. That is because the purpose of the REA is to encourage renewable energy actions beyond those occurring under existing State policies like RPS.

Characteristics of RECs

RECs, whether obtained for projects onsite at a building or acquired from an offsite source, have three important categories of characteristics described below in this section. The County may consider restricting the REA to only RECs with certain characteristics to enhance the local, in-state, or regional environmental, economic development, and/or renewable market impacts of the REA.

Resources/Technologies

Depending on the jurisdiction, 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[36], 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.[37] ICF recommends that a list of eligible renewable energy resources or technologies be identified for the REA. That could simply be an explicit linkage to the

[31] Maryland Department of Natural Resources, *Final Report Concerning the Maryland Renewable Portfolio Standard as Required by Chapter 393 of the Acts of the Maryland General Assembly of 2017*, December 2019, p. 4-24, https://dnr.maryland.gov/pprp/Pages/RPS-WorkGroup.aspx.

[32] Renewable energy projects must be registered with the Public Service Commission of Maryland ("PSC") to be eligible to create RECs meeting the State's RPS requirements. See PSC, *Renewable Energy Portfolio Standard Report with Data for Calendar Year 2020*, November 2021, pp. 2-3, https://www.psc.state.md.us/wp-content/uploads/CY20-RPS-Annual-Report_Final.pdf.

[33] PSC, *Renewable Energy Portfolio Standard Report with Data for Calendar Year 2020*, November 2021, p. 5.

[34] Ibid.

[35] See PJM EIS, *Program Information: Maryland*, https://www.pjm-eis.com/program-information/maryland.

[36] Black liquor (an industrial byproduct of pulp and paper mills) is no longer a qualifying form of biomass as of October 1, 2021. See PJM EIS, *Program Information: Maryland*. See also Maryland Senate Bill 65, 2021 Session, *An Act Concerning Electricity – Renewable Energy Portfolio Standard – Tier 2 Renewable Sources, Qualifying Biomass, and Compliance Fees*, May 2021, https://legiscan.com/MD/text/SB65/2021.

[37] PSC, *Renewable Energy Portfolio Standard Report with Data for Calendar Year 2020*, November 2021, p. 4. There is also a Tier 2 category of the RPS comprised of hydroelectric power other than pump storage generation.

Maryland Tier 1 RPS list, or it could be a subset of Tier 1 resources, or an independent list deemed more appropriate by the County and its stakeholders.

It's important to note that geothermal heating and cooling ("GHC") is a part of the Maryland RPS beginning in 2023.[38] If a building installs a qualifying GHC system, that technology is likely to reduce the building's EUI for BEPS purposes due to the energy efficiency characteristics of GHCs. The County must decide if and how such a GHC system's RECs may or may not receive an additional allowance towards BEPS compliance.

Locations

Any certified REC obtained from a U.S. market may be valid for a building's GHG accounting, depending on the GHG accounting methods used for the building. However, many policies (e.g., RPS) and individual entities place narrower geographic boundaries (e.g., in the same electricity market or state) on what RECs will count towards policy achievement or GHG emissions reductions.

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. That was a topic of particular interest to stakeholders and the decision may also affect what REC systems of record will be relevant, since different parts of the country rely on different REC recordation and reporting systems (see the end of this appendix for more discussion of REC reporting). The decision also may affect certain REC buyers who are unsure of the exact location of their REC purchases (e.g., if their supplier of bundled or unbundled RECs commingled RECs from multiple locations).

Vintages and Eligibility Periods

Because RECs are an accounting instrument, not a physical unit of energy, they can be stored indefinitely in principle. Certain policies (e.g., RPS) and GHG accounting standards place time limitations on what RECs count towards attainment in a given year. There are two dimensions to this question – when the renewable energy project was commissioned and when the individual RECs under consideration were created.

REC eligibility cut-offs are made for multiple reasons, including to create more stable growth of in-state renewable energy markets than would be achieved with longer REC "banking" or eligibility periods. However, RECs often retain eligibility for more than one year to allow flexibility in meeting goals given the inherent, weather-driven uncertainty in renewable energy production and electricity consumption from year-to-year. As noted above, RECs qualifying for the Maryland RPS have a 3-year eligibility period. Policies also can limit how long a given project is eligible to create policy-compliant RECs.

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. The County's choices should be made in recognition of what data elements are readily available on the years that projects were originally commissioned and individual RECs were created.

Onsite Renewable Electricity Projects

This section describes three key considerations with renewable energy projects physically located onsite at a building in the County subject to BEPS.

[38] See Maryland House Bill 1007, 2021 Session, *An Act Concerning Renewable Energy Portfolio Standard and Geothermal Heating and Cooling Systems*, May 2021, https://legiscan.com/MD/bill/HB1007/2021.

Ownership of Onsite RECs

In this instance, the owner of the renewable energy project controls disposition of the project's RECs.

If the RECs for any period are (i) retained by an outside party (other than the building owner) that owns the renewable project[39], (ii) sold to an entity other than the host building owner, or (iii) sold by the building owner who owns the renewable project itself, then the RECs for that period are not the property of the building owner and cannot be credited to that building owner for GHG accounting purposes. Whether the REA in BEPS follows the same principle is a decision for the County.

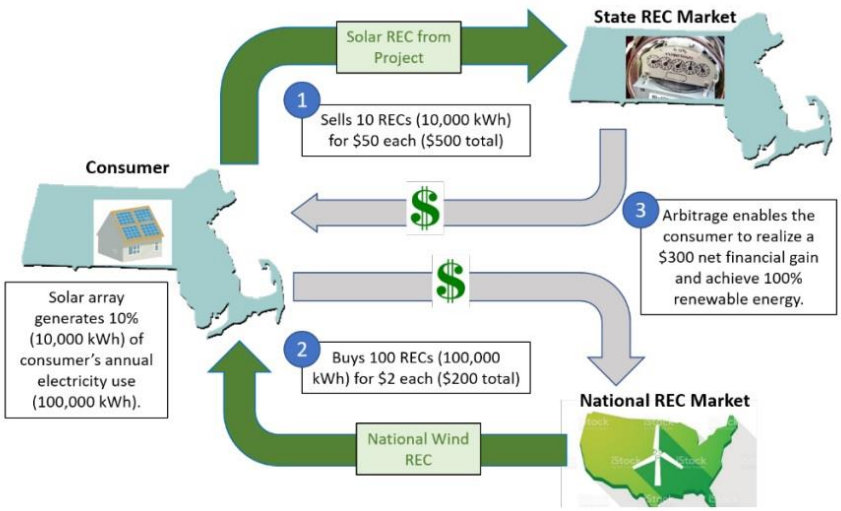
The onsite project's RECs, if sold, are likely to be purchased by an electricity supplier in Maryland to meet its RPS commitments. Alternatively, the project's RECs could be purchased by a supplier to be bundled in customer-specific physical supply transactions that exceed RPS requirements or could be purchased as unbundled RECs by a broker or a separate building owner. Depending on the nature of the onsite project's REC sales transaction, the offsite purchaser of those RECs may be eligible to apply them to its BEPS requirement.

REC Swapping/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.[40] Such transactions are often called REC swaps, REC substitution, or REC arbitrage.

The "arbitrage" label is used because such transactions typically involve purchasing offsite RECs with lower costs than the onsite RECs, so the host saves money through the pair of transactions (sales of more expensive RECs and purchase of less expensive RECs). A depiction of REC arbitrage is in Figure 10 below.

Figure 10 REC Arbitrage[41]



In Maryland, in-state solar renewable energy credits ("SRECs") are usually several times more expensive than Maryland Tier 1 or other non-solar PJM RECs, so REC arbitrage is a common strategy for buildings

[39] That outside party (e.g., solar firm) would typically have a PPA or lease, through which the host building owner would make payments to that party for the physical energy (and, potentially, RECs) produced by the project.
[40] See EPA, Green Power Partnership, *Renewable Energy Certificate (REC) Arbitrage*, September 2017, https://www.epa.gov/sites/default/files/2017-09/documents/gpp-rec-arbitrage.pdf.
[41] Ibid.

wishing to host solar in the most cost-effective manner while being able to claim they are purchasing green energy (albeit not from the project located on their premises).[42]

It's important to note that the purchase side of a REC arbitrage transaction, in isolation, is typically no different than any other unbundled REC transaction.[43]

Net Energy Metering

Net energy metering is the electric utility's mechanism for compensating onsite renewable energy project hosts for physical electricity that they produce, but do not consume, onsite. It establishes compensation for power exported to the utility. Payments for such exported power ("excess generation") can be lower than for power consumed onsite by the building.

The creation and sale of RECs is independent of how much or how little of an onsite project's physical electricity is used onsite and the compensation rates for physical electricity used onsite versus exported to the utility.

If the County distinguishes the REA based on how much of an onsite project's power is exported, it will, among other issues, need to (i) distinguish the time intervals for the calculations of exported power (sub-hourly, hourly, daily, monthly, or annually) and whether those intervals will differ based on a building's existing metering and future changes in utility net energy metering rules, and (ii) recognize that no comparable concept of power consumed onsite vs. exported applies to offsite renewable energy transactions. Therefore, injecting net energy metering concepts in REA calculations is likely to cause considerable complexity, and for that and other reasons is not favored by stakeholders.

Offsite Renewable Electricity Projects

This section describes how RECs may be handled in six types of offsite renewable energy transactions. The County will need to determine if and how these transaction types affect the REA that buildings are eligible to receive.

Aggregate Net Energy Metering

Maryland utilities allow certain non-residential customers to apply onsite physical electricity from projects produced in excess of onsite requirements to consumption at other, offsite meter(s) owned by the same customer.[44] Doing so is advantageous to customers, for example, that have large, solar-suitable sites but low electricity consumption at one location and large electricity consumption loads with little to no solar-suitable space at another location in the same utility territory.

Just as with traditional net energy metering (see the section above), the creation and sale of RECs is independent of how the utility compensates physical electricity production for aggregate net energy metering ("ANEM") customers.

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[42] For example, Maryland SRECs had an average price of $66.10/MWh in 2020, while non-solar Maryland Tier 1 RECs averaged $8.24/MWh and Tier 2 RECs averaged $1.06/MWh. See PSC, *Renewable Energy Portfolio Standard Report with Data for Calendar Year 2020*, November 2021, p. 7.

[43] "Unbundled" REC transactions are those made outside of a physical supply transaction. In contrast, "bundled" REC transactions convey RECs and delivery of physical electricity (typically in the same quantities and over the same duration) in a single transaction to one of more building owners.

[44] For more information on Aggregate Net Energy Metering, see PEPCO, *Rate Schedules for Electric Service in Maryland: Effective Date December 1, 2021, Aggregate Net Energy Metering Rider "ANEM"*, Fifth Revised Page No. 52, https://www.pepco.com/SiteCollectionDocuments/MD%20PEPCO%20Current%20Rate%20Schedule%20SOS%20Type%20II,%20I%20and%20Residential%20effective%20120121.pdf. Eligible customers are agricultural firms, non-profits, and municipal or county government agencies, and individual projects may not exceed 2 MW_{AC} in capacity.

However, the ANEM structure highlights a broader decision for BEPS – if and how will a building owner be allowed to allocate RECs it retains from an offsite project to other building(s) it owns in the County? For example, if the building owner, irrespective of its qualification for ANEM, owns RECs, does it have full freedom to apply those RECs across its portfolio of buildings for BEPS? If not, how do transaction types, project locations, etc. affect the REA? The sub-sections below explore several permutations.

Unit-Specific PPAs

Some building owners, especially in large organizations, sign long-term (up to 30-year) PPAs with specific solar or wind projects located offsite from the building owner's properties. Often, to achieve lowest possible physical electricity costs, these transactions are with utility-scale renewable electricity projects.[45] When there is no physical delivery of electricity from the renewable project to the building owner, these transactions are often structured as virtual PPAs ("VPPAs"), whereby the building owner pays or receives money each month depending on the difference the fixed price in the VPPA and the spot market proceeds that the renewable project owner receives for the project's outputs.

The PPAs may be for all or a portion of the output from the offsite projects; they typically convey RECs to the building owner (PPA buyer), but that is not required. If RECs are not conveyed at all to the buyer in the PPA, then the transaction should not be relevant for BEPS. If RECs are only conveyed to the buyer for part of the PPA term (e.g., after year 5 of the transaction), then only that portion of the term may be relevant for BEPS.

Large organizations may use long-term PPAs to cover a portfolio of buildings in multiple states, making proper accounting challenging to incorporate into a REA.

Community Solar Subscriptions

Community solar subscriptions are a type of unit-specific, offsite renewable energy transaction. The community solar generator or subscriber organization determines if and how the SRECs associated with the solar project are conveyed to individual residential and non-residential subscribers.

Apart from their subscription and billing rules, Maryland community solar subscriptions only differ from other offsite transactions in that their individual project capacity is limited (to 2 MW), they may not require any long-term (multi-year) commitment from the buyer, and the projects must be located in the utility's service territory.[46] Those differences may or may not be pertinent to the County as it establishes REA rules.

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[45] Though ICF is not aware if Verizon allocates a portion of its virtual PPA with a specific solar project to its facilities in Montgomery County, this summarized transaction is a good example of the type: Lightsource BP, *Power Contract Signed with Verizon for 152.5 MW Solar Farm in Indiana*, January 2021, https://www.lightsourcebp.com/us/2021/01/power-contract-signed-with-verizon-for-152-5mw-solar-farm-in-indiana/. Verizon's January 2021 press release seems to indicate that the Indiana solar project is in the PJM market; the company also lists other PJM virtual PPAs: Verizon, *Verizon Becomes a Leading Corporate Buyer of U.S. Renewable Energy*, January 2021, https://www.verizon.com/about/news/verizon-becomes-leading-corporate-buyer-us-renewable-energy.

[46] For more information on the community solar pilot program, see PEPCO, *Rate Schedules for Electric Service in Maryland: Effective Date December 1, 2021, Community Solar Pilot Program Schedule "CS", Second Revised Page No. 23, and Community Net Energy Metering Pilot Program Rider "CNM"*, Original Page No. 57, https://www.pepco.com/SiteCollectionDocuments/MD%20PEPCO%20Current%20Rate%20Schedule%20SOS%20Type%20II,%20I%20and%20Residential%20effective%20120121.pdf.

Bundled Renewable Supply Agreements from Electric Suppliers

Because Maryland has a deregulated (competitive) electric generation market, customers of investor-owned utilities can (i) choose to obtain their supply from any licensed electric supplier in the State, or (ii) if they do not choose a supplier, will receive default "standard offer service" sourced from the utility through a series of competitive auctions. RPS-mandated levels of RECs are included in the bundled supply in either case.

However, if a customer chooses a competitive electric supplier[47] (i.e., does not receive standard offer service), the customer can contract for electricity with renewable energy content (as represented by RECs) in excess of RPS requirements. The customer can sign bundled electricity contracts with any level of RECs between the RPS minimum for a given year and 100% renewables. Such contracts can be for any duration, but 1- to 5-year contracts are most common. These are not typically unit-specific contracts; instead, the generation supplier will allocate physical electricity and RECs from among its wider portfolio of numerous sources to the customer. The supplier, however, can make the REC component as specific (renewable technology, location, vintage) as the customer desires.

The County will need to consider the percentage renewable energy, the location of renewable energy generation, the technology and the duration of supply agreements should it and REA with offsite renewable energy. For bundled agreements, these types of transactions could be challenging since the location of REC generation, generation technology, and REC vintage of bundled RECs are sometimes unknown to the customer. Clear regulations and language related to bundled supply agreements will be needed to ensure that building owners understand how their purchases might receive an REA.

Community Choice Energy

Montgomery County, pursuant to Maryland House Bill 768 passed in April 2021, will have an opportunity to establish a Community Choice Energy (CCE) pilot program to take effect no earlier than April 2023.[48] Relevant to BEPS, small C&I customers (along with residential customers) on standard offer service will be served by the CCE program unless they opt out of CCE.[49]

The nature of CCE program offerings will affect whether CCE renewable energy transactions will differ from those already available from competitive electric suppliers. For example, the CCE program could mandate minimum levels of renewable energy that exceed the State RPS. It could also define the renewable resource types, locations, and/or vintages available to its customers to further County environmental and economic goals. How the CCE program will account for RECs bought above RPS requirements is also unclear. Because the CCE program will be defined by upcoming PSC regulatory and County policymaking actions, as informed by stakeholders, it is too early to determine if and how CCE will affect the REA. However, as a principle, CCE transactions should probably be treated no differently than comparable competitive electric supplier transactions.

[47] For example, in November 2021 the percentages of PEPCO's small commercial and industrial ("C&I"), mid-sized C&I, and large C&I customers served by competitive suppliers were 30%, 52%, and 81%, respectively. See PSC, *Electric Choice Enrollment Monthly Report, All Investor Owned Utilities in Maryland: Month Ending November 30, 2021*, https://www.psc.state.md.us/electricity/electric-choice-monthly-enrollment-reports/.

[48] See Montgomery County, Maryland, *Maryland General Assembly Passes Community Choice Energy Pilot Program Enabling Montgomery County Residents More Affordable and Equitable Access to Renewable Energy*, April 2021, https://www2.montgomerycountymd.gov/mcgportalapps/Press_Detail.aspx?Item_ID=34083.

[49] Ibid.

Unbundled RECs

Unbundled REC transactions are conveyed in contracts without associated physical electricity supply. A wide variety of organizations can sell unbundled RECs – they do not need to be licensed physical electricity suppliers or Maryland community solar subscriber organizations. The minimum duration for any REC contract is typically one year, with no maximum duration. Unbundled REC transactions do not generally need to be tied to any individual premise; the buyer can buy whatever quantity of RECs it desires and later decide outside of the REC transaction how to allocate the RECs among its building portfolio. While unbundled RECs aren't associated with physical energy supply, there are several systems in place for tracking them. There are regional generation attribute tracking systems ("GATS") for RECs that require renewable energy generators to register their projects and that create a unique serial number for each REC produced by each registered generator.[50] The tracking system in the Mid-Atlantic and Ohio Valley region is called PJM EIS GATS, and it is managed by an independently-capitalized subsidiary of the regional transmission grid operator called PJM Environmental Information Services (PJM EIS).[51]

Beyond registration in a GATS, there are additional REC standards that can be applied. For example, the Center for Resource Solutions ("CRS") requires completion and approval of a GATS tracking attestation form and an additional layer of review before it deems a REC green-e® certified.[52] Green-e® certification includes tracking the chain of REC custody and confirming REC retirement.[53] These systems, standards and tools helping to ensure that RECs are not double counted, however since there tools were primarily focused on renewable energy market participation, the potential for double counting could still exist when applying the RECs to a specific buildings, which needs to be considered by the County.

Potential Role of Renewable Energy Credits (RECs) in the BEPS Allowance Process

RECs serve as a powerful tool for tracking renewable energy attributes, that are well established and understood by many professionals in the energy industry. They provide clear benefits County as they look to build a REA by allowing the County to build from existing, well understood accounting systems. Should RECs be used as a way of designating a qualified renewable energy source, the County will need to determine the age, location, and which renewable energy resources and technologies can be used in a REA.

Additionally, while RECs are enabled by an accounting system of record for the generation of renewable energy, they do not have uniformity or systems for applying renewable energy to facilities or accounts. This means that there is no system for allocating RECs to specific facilities, which could enable manipulation of REC purchases in applying a REA. Consider the following example:

> *A multistate organization, with a BEPS covered facility in Montgomery County purchases renewable energy for 25% of its national building portfolio. When they seek to comply with the County's BEPS they can apply the RECs from their renewable purchase to create an REA for their facilities in Montgomery County (at 100% of use). Since there is no system in place to ensure that*

[50] See National Renewable Energy Laboratory, *Renewable Electricity: How do you know you are using it?*, August 2015, https://www.epa.gov/greenpower/solar-power-use-claims-guidance.
[51] PJM EIS, *PJM EIS Generation Attribute Tracking System (GATS): Solar Training*, November 2010, p. 3, https://www.pjm-eis.com/events-and-training/~/media/9F8DD1987EEB40118BC84F7140866AC2.ashx.
[52] CRS, Green-e®, *The Tracking Attestation Form: Description and Frequently Asked Questions*, https://www.green-e.org/energy/about-tracking-attestation. Green-e(R) is a leading REC certification standard.
[53] Ibid.

they do not also apply those same RECs to other facilities and other local government REC programs, there's a potential for double allocating the RECs.

This challenge and example are limited in its impact at present, however it does present challenges that the County should consider.

Non-Electricity Combustion of Renewable Natural Gas and Thermal Biomass

Renewable Natural Gas

If a building in the County uses RNG[54] or any other eligible form of bioenergy to produce onsite electricity and RNG is an allowable renewable energy resource type under BEPS, REC issues with that onsite project should be no different than for any other BEPS-eligible onsite generation project.

However, RNG can also be used for onsite thermal purposes that differ from electricity generation. For example, onsite RNG can be combusted to provide air or water heating (in lieu of traditional natural gas or fuel oil), or RNG can be directly used in industrial processes in lieu of fossil fuels. It's also possible (though not cost-effective nor administratively easy at present) for a building to purchase offsite RNG and use it in place of traditional natural gas for part or all of the gas supply delivered to its burner tip by its utility.

Thermal Biomass

In the Maryland RPS, "thermal biomass" is a Tier 1 resource. It is defined as "a system that uses primarily animal manure, including poultry litter and associated bedding to generate thermal energy, and food waste or qualifying biomass for the remainder of the feedstock."[55] Though no thermal biomass facilities are registered in the State at this time,[56] there is a mechanism to convert their output from biomass facilities so that an equivalent volume of RECs can be attributed to them.

For any RNG sources and thermal uses outside of Maryland's definition of thermal biomass, there is no existing pathway to create RECs. Therefore, if BEPS will be providing an REA for such onsite and/or offsite non-electricity RNG use in buildings, the County will need to determine eligibility rules and any environmental attribute accounting necessary to do so.

Accounting and Reporting Methods

Together with decisions on if and how certain types of RECs will provide an REA, the County will establish the BEPS accounting and reporting rules for RECs. Below, three relevant issues are highlighted.

Maximum Annual Credit

While it is possible that a building would obtain more RECs (qualifying for REA in a given year) than its electricity consumption in a given year, ICF presumes that the maximum REA for renewable electricity would be no more than the building's total electricity consumption in a year. That implies that, in the

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[54] Per the EPA, RNG "describe(s) anaerobically-generated biogas that has been upgraded (or refined) for use in place of fossil natural gas." "Currently, there are four main sources of biogas used to produce RNG in the United States: municipal solid waste (MSW) landfills, anaerobic digestion (AD) at municipal water resource recovery facilities (WRRFs), AD at livestock farms and AD at stand-alone organic waste management operations." See EPA, *An Overview of Renewable Natural Gas from Biogas*, July 2020, p. 1, https://www.epa.gov/sites/default/files/2020-07/documents/lmop_rng_document.pdf.

[55] Maryland (Proposed) House Bill 682, 2021 Session, *Fiscal and Policy Note*, February 2021, p. 1, https://trackbill.com/bill/maryland-house-bill-682-renewable-energy-portfolio-standard-thermal-biomass-systems/2000003/.

[56] PSC, *Renewable Energy Portfolio Standard Report with Data for Calendar Year 2020*, November 2021, p. 3.

absence of onsite RNG used for direct combustion, the minimum site EUI would be the non-electricity portion of site EUI for the building. And, even with onsite RNG use meeting all non-electricity loads and being provided a REA, the absolute minimum net-normalized site EUI for a year would be zero.

Weather Normalization

Presumably, the County will not be weather-normalizing REC volumes (e.g., based on solar or wind conditions in the locality where the project is located compared to average resource conditions). RECs in their traditional policy and GHG accounting uses are not typically weather-normalized.

This point is included in the memo, though, because building energy consumption may be weather-normalized in the final BEPS law. As long as building owners have some year-to-year flexibility in applying RECs to their BEPS requirements, the lack of weather normalization of RECs would not seem to be a material issue.

Systems of Record and Preventing Double Counting

A core principle of REC markets is that no REC should be double-counted. Only one party can claim a given REC, and it is the party that currently owns the REC. PJM EIS GATS provides this service for Maryland's RPS and Public Service Commission notes that "a GATS certificate from a Commission-certified renewable energy facility will be considered a Maryland-eligible Renewable Energy Credit."[57] There were more than 78,000 Maryland solar generators (i.e., projects) registered in PJM EIS GATS as of December 2021, with an additional 355 Tier 1 generators and 30 Tier 2 generators registered as Maryland-eligible resources.[58,59] Most of the Maryland Tier 1 and Tier 2 generators are registered in multiple states and are physically located outside of Maryland.[60]

If a renewable project owner in PJM EIS GATS sells its RECs, it must either (i) transfer the RECs to the buyer within the tracking system (if that person or entity has a PJM EIS GATS account), or (ii) retire the RECs on behalf of the buyer.[61] Because EPA's ENERGY STAR® Portfolio Manager® will be the system of record for BEPS data collection and reporting, it's likely that a parallel data collection process will be needed to supplement REC data that can be provided in Portfolio Manager®.

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[57] PSC, *Maryland Renewable Energy Portfolio Standard Program – Frequently Asked Questions*, https://www.psc.state.md.us/electricity/maryland-renewable-energy-portfolio-standard-program-frequently-asked-questions/.

[58] See PJM EIS, *Reports & Events: Public Reports: Market Reports: GATS Generators*, https://www.pjm-eis.com/reports-and-events/public-reports.

[59] As of August 1, 2021, there were a total of 77,199 solar energy facilities in Maryland registered in PJM EIS GATS, 12,405 of which were in Montgomery County. There are 13 additional Tier 1 renewable energy facilities in Montgomery County. See PSC, *Renewable Energy Portfolio Standard Report with Data for Calendar Year 2020*, November 2021, p. 25.

[60] Maryland solar generators are often also registered as renewable energy facilities for the Virginia RPS, which allows import of RECs from within PJM to meet its RPS through 2024. See PJM EIS, *Program Information: Virginia*, https://www.pjm-eis.com/program-information/virginia. The great majority of non-solar Tier 1 RECs and Tier 2 RECs retired in 2020 for Maryland RPS compliance were from facilities located outside of Maryland, while all SRECs retired in Maryland in 2020 were from solar facilities within the State. See PSC, *Renewable Energy Portfolio Standard Report with Data for Calendar Year 2020*, November 2021, p. 13.

[61] See EPA, *Guide to Making Claims About Your Solar Power Use*, August 2017, p. 4, https://www.epa.gov/greenpower/solar-power-use-claims-guidance.