Maryland Smart Energy Communities: Guidelines and Resources for Renewable Energy Policy

Maryland Energy
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Renewable Energy Policy:
Reduce conventional centralized electricity generation serving a local government's buildings by meeting 20% of those buildings' electricity (or electricity equivalent) demand with distributed, renewable energy generation by 2022.

Purpose
The purpose of this document is to help Maryland Smart Energy Communities (MSEC) better understand the program and ultimately meet the three program deliverables required to receive MSEC funding. This document is an excellent starting place for completing the deliverables, but should be supplemented by asking MEA staff and/or resources on the MSEC website at:
http://energy.maryland.gov/Govt/smartenergycommunities/.

Contents

Reduce conventional centralized electricity generation serving a local government's buildings by meeting 20% of those buildings' electricity (or electricity equivalent) demand with distributed, renewable energy generation by 2022.

INTRODUCTION

Maryland's Renewable Portfolio Standard (RPS) requires that 20 percent of Maryland's electricity sales come from renewable energy sources by 2022, including 2 percent from solar energy by 2020. The eligible technologies include, but are not limited to solar photovoltaics (PV), solar thermal water heating, wind, geothermal heating & cooling, waste-to-energy, poultry litter-to-energy, ocean energy, and qualifying biomass.

GOAL

Becoming a Maryland Smart Energy Community requires that a local government (city, town or county) adopt a policy to utilize distributed, renewable sources to generate or displace at least 20 percent of its electricity (or electricity equivalent) by 2022. This goal applies to the set of buildings owned by the county/local government and specified as being part of the Smart Energy Community program.

DELIVERABLES

By applying to become a Maryland Smart Energy Community, the local government agrees to the following three deliverables, to be completed by October 31, 2014:

(1) Develop an initial estimate of total local government building electricity consumption for a baseline year. This baseline electricity consumption must include all divisions and departments of the local government including all municipal buildings, drinking water and wastewater treatment plants, and pumping stations owned by the local government. If you are also pursuing the energy efficiency policy, please use the same electricity consumption baseline.

- The baseline year should consist of the most recent year of complete data. For applications due in December 2013, this should be Calendar Year 2013. However, if you are using an earlier year for the baseline pursuant to the energy efficiency policy, please use that same year for the renewable energy policy.

- The electricity use baseline should be provided on an annual kWh (kilowatt-hour) basis. Please be sure to specify your units. 1000 kWh = 1 kWh. Gross floor area should also be provided to determine an electricity use per square foot (SF) calculation. Measuring electricity use per square foot allows for new buildings to come online that will contribute positively to the per square foot reduction goal.

Although the renewable energy policy will not be assessed against kWh/SF, communities are encouraged to collect this data. The renewable energy goal will be measured as kWh of renewable generated electricity divided by total consumed electricity (kWh).

- MEA recommends entering building data into ENERGY STAR Portfolio Manager to establish the electricity baseline inventory. A variety of tools and methods are acceptable, but must be approved by MEA. If a local government owns a very large number of buildings, they may work directly with MEA to define an appropriate way to benchmark and plan for electricity reductions on the most relevant subset of their buildings.

- If you choose to use Portfolio Manager, completing the baseline inventory requires the following information about each building:
  -Building street address
  -Year built
  -Gross floor area
  -Key operating characteristics for each major space type (details found on the Portfolio Manager website)
  -12 consecutive months of electricity bills. If you don't have this information readily available, contact your electric utility provider, as most will be able to easily supply this historical information.

For all buildings:

- Using the separately-provided Excel spreadsheet called "Energy Use Baseline," provide the annual kWh consumption. Include building size (gross square feet) and a calculation of electricity consumption intensity (kWh/SF). The Excel spreadsheet can be found at http://energy.maryland.gov/Govt/SmartEnergyCommunities

or

- Use ENERGY STAR Portfolio Manager to provide a summary of baseline energy consumption, in kWh. Include building size (gross square feet) and a calculation of electricity consumption intensity (kWh/SF).

(2) Pass a policy committing the local government to utilize distributed, renewable sources to generate or displace at least 20 percent of its electric energy by 2022. MEA provides sample policy language below, which local governments can modify to suit their specific needs. MEA will provide local governments with technical support as they work through the policy development process.

(3) Develop and initiate a *Renewable Energy Action Plan* (REAP) to map out how the community will reach its Renewable Energy Goal. A local government will need to assess its existing renewable energy generation percentage to estimate the additional renewable energy needed to meet a 20 percent goal. To do so, the community should determine the amount of renewable energy generation installed at their county or local government buildings at a specific, recent point in time. This will be converted to an equivalent annual renewable energy generation in kWh, which can then be divided by the annual energy consumption to calculate its existing renewable energy generation percentage.[1]

A community's net renewable energy goal can be calculated by subtracting its current renewable energy generation percentage from the 20 percent Maryland Smart Energy Community goal. For example, if a community is meeting 3 percent of its energy consumption needs with renewable energy prior to joining the MSEC program, it would subtract 3 percent from 20 percent for a remaining 17 percent.

To develop and initiate a comprehensive REAP, local governments will need to assess its available renewable energy resources, identify the resource conversion technologies that it wants to deploy, the building sites where it would site the technologies, and the amount of energy that would be generated from those technologies to meet its renewable energy goal. For detailed instructions, please see the section at the end of this document.

Even if a Smart Energy Community has met its 20 percent renewable energy goal, it still must develop a REAP. This plan should then address strategies which would help the community to achieve more than the 20 percent renewable energy goal for its Smart Energy Community buildings.

Enabling strategies could include:

- Adopting expedited permitting and inspections best practices for renewable energy systems that would drive down the soft costs of installation and potentially create new revenue streams for local governments.
- Encouraging responsible solar siting that gives preference to ground-mount solar PV projects sited on less productive land (e.g. on brownfields, parking lots, waste water treatment plants, abandoned mine land, and marginal agricultural land) rather than on higher-value land (e.g., greenfields and productive agricultural land).

[1] Ideally, the local government can leverage existing funding to implement this baseline study of installed renewable energy generation; if the local government does not have funding available for this purpose, it can use a portion of the Smart Energy Communities grant administration allocation to do so, as approved by MEA.

- Learning more about Power Purchase Agreements (PPAs) or other third-party leasing programs that allow local governments to finance solar energy systems at no cost and very little risk.
- Evaluating what buildings might be good sites for geothermal heating & cooling; heating & cooling typically accounts for 50-67% of a building's energy end-use.
- Evaluating the feasibility of solar water heating (SWH) for any hot water loads in the community's buildings; third-party leasing is available for SWH from a handful of vendors that claim to guarantee 20-30% energy savings.
- Sharing procurement templates or models, e.g. for RFPs and PPA's with peer local governments and/or the private sector.
- Holding targeted press events and outreach to celebrate and inform others about the community's renewable energy successes.

Contact MEA for more information on any of these renewable energy-enabling strategies.

ANNUAL REPORTING

The local government will submit annual reports to MEA documenting the progress made during that year. Participants must show that they are making a good-faith effort to achieve the renewable energy resource goal. Local governments who earn the Smart Energy Community designation and are up-to-date on their annual reporting may be eligible for grant funding in future years.

PROGRAM SUPPORT

The Maryland Energy Administration will provide technical assistance to all participating local governments to help with (1) developing an initial estimate of total local government building electricity consumption for a baseline year, (2) developing and passing the proper policies/ordinances to utilize distributed, renewable sources to generate 20 percent of its electric energy by 2022, and (3) developing a Renewable Energy Action Plan. Participants may use 30% of their grant award to pay for the administrative costs, indirect costs, and pre-project activities including, but not limited to, staff time, project design, feasibility studies, and energy audits.

Electricity Consumption Baseline Template

(Ask contacts at Environmental Finance Center to provide .xls version of the Baseline Template)

The electricity baseline for both the energy efficiency and renewable energy policies may be calculated using the table below. The renewable energy goal is assessed against total baseline electricity consumption (kWh). See the language in the guidelines above about what facilities and buildings should be included. An Excel version of the baseline template is available at the Maryland Smart Energy Communities website. Please visit the MSEC website for sample baselines or contact an MEA staff person for help.

Building Type and Address	Building Age	Building Size		Electricity Purchased	Electricity On-Site Generation	Electricity Total	Electricity Consumption Intensity
	Year Built	Square Feet		kWh	kWh	kWh	Total kWh/SF
Example: Town Hall							
Example: Police Station							
Subtotal for Buildings							
Example: Waste Water Treatment Plant							
Example: Streetlights							
Total							

Rules of Thumb:

- If the town/county pays for electricity on a particular meter, then it should be included in the inventory.
- Electricity consumed at community owned buildings and sewer and water related electricity end-uses should be included in the inventory unless removed under the 75 percent rule (see below).
- Schools may be excluded from the baseline electricity consumption inventory.
- Streetlights do not need to be included in the inventory, but if your community pays the electricity bills on streetlights, they could be a prime candidate for efficiency savings and should be considered.
- Not all buildings need to be included in the baseline inventory, but at least 75 percent of the town's/county's overall electricity consumption should be captured.
- Local governments should track any renewable energy credits (RECs) generated as a result of their renewable energy projects and be able to include information about RECs in their annual reports to MEA.

Renewable Energy Model Policy

(Ask contacts at Environmental Finance Center to provide .doc version of the model policies)

POLICY NAME _____

Disclaimer – This model policy was prepared to assist Maryland Smart Energy Communities adopt a policy related to renewable energy. The policy is for illustrative purposes and may be modified.

A POLICY DECLARING THE CITY OF (COMMUNITY NAME)'S INTENT TO TAKE A LEADERSHIP ROLE IN RENEWABLE ENERGY GENERATION WITHIN (COMMUNITY NAME), PARTNERING WITH THE MARYLAND ENERGY ADMINISTRATION, AND ENROLLING AS A MARYLAND SMART ENERGY COMMUNITY.

WHEREAS, by adhering to the Maryland Energy Administration's Smart Energy Communities Program the town/city/county of (COMMUNITY NAME) has committed to being a socially responsible leader by increasing control of its own renewable energy production; and

WHEREAS, the town/city/county of (COMMUNITY'S NAME) recognizes that by smartly investing in renewable energy, it can have significant monetary savings in the long term;

NOW, THEREFORE, THE (COMMUNITY NAME) TOWN/CITYCOUNTY COUNCIL RESOLVES TO ADOPT THE FOLLOWING GOALS AND COMPLETE THE FOLLOWING INITIATIVES LISTED BELOW:

Section 1: PURPOSE. The purpose of this policy is:

- To become a Maryland Smart Energy Community by enrolling within the program and following the instructions provided by the State of Maryland.
- To reduce conventional centralized electricity generation serving local government buildings by meeting 20 percent of those buildings' electricity demand with distributed, renewable energy generation by 2022.
- To develop and initiate a Renewable Energy Action Plan to map out how the community will reach its Renewable Energy Goal.
- To report electricity consumption and renewable generation capacity annually to the Maryland Energy Administration in order to assure that the town/city/county of (COMMUNITY NAME) accomplishes said goals in a timely fashion.

Section 2: DEFINITION. For the purpose of this policy, the following terms shall have the meaning given:

a) *Renewable Energy* – Energy generated from anyone of the following sources: solar, wind, biomass (excluding saw dust), methane from anaerobic digestion of organic materials, geothermal, ocean, fuel cells powered by methane or biomass, poultry litter, and waste-to-energy facilities.
b) *Electricity Consumption* – The amount of kilowatt-hours (kWhs) consumed by (COMMUNITY NAME) on an annual basis including electricity generated and used on-site and electricity purchased from a utility.
c) *Renewable Energy Action Plan* – Provides details on current and future electricity consumption, estimates required renewable energy production to meet 20 percent of said energy consumption, and designs plans with detailed installation measures and time tables that enable the town/city/county to reach its 2022 goal.
d) *Baseline* – Total electricity consumption (kWhs) in a pre-determined baseline year. May include streetlights, but is not mandatory. Must include all buildings as well as sewer and water facilities.

Section 3: BASELINE DOCUMENTATION

The baseline including data related to the specific time period, electricity consumption, building size, and results will be completed by October 31, 2014 and can be found as an appendix to later be attached to this document titled, "MSEC_Baseline_(COMMUNITY NAME)"

Section 4: GUIDELINES.

The town/city/county of (COMMUNITY NAME) will maintain an annual electricity consumption inventory for all (COMMUNITY NAME) owned buildings and energy consuming entities. This annual inventory will be conducted using Energy Star Portfolio Manager (or equivalent energy management program previously approved by the Maryland Energy Administration), the results of which will be presented to the Maryland Energy Administration by no later than April 1st of each year until the completion of said goals are accomplished.

Plans and Implementation

The (COMMUNITY NAME) will additionally conduct a Renewable Energy Action Plan to assess the amount of renewable energy that currently exists within (COMMUNITY NAME). Any currently existing renewable energy will be included within the 20 percent reduction goal. For example, if the city determines from the Renewable Energy Action Plan that it already meets 3 percent of its energy consumption needs with renewable energy, only an additional 17 percent of renewable energy production would be required in order to meet the city's final goal.

Finally, the city will implement the necessary projects in order to ensure that a minimum of 20 percent of local government building's energy consumption is supplemented by locally generated renewable energy sources by the year 2022.

Questions/Enforcement

All inquiries should be directed to the person responsible for implementing this policy. The Community Energy Manager and/or their designee will implement this policy.

Applicability

This policy applies to all departments of the (Town/County/City) with the exception of the exclusions outlined in the definitions above.

Section 5: EFFECTIVE DATE

This policy shall be effective immediately.

_____ _____

Date (Mayor's/County Executive Name)

Town/City/County Energy Efficiency Policy	
Original Proposal Date	
Revision Date	
Adoption Date	
Effective Date	

REAP Instructions and Outline

Disclaimer – This outline was prepared to assist Maryland Smart Energy Communities as they assemble a renewable energy assessment plan (REAP). The outline is for illustrative purposes and may be modified to suit the community. Contact MEA for completed samples from previous Maryland Smart Energy Communities.

A comprehensive REAP consists of a number of key components that enable a local government to establish energy reduction goals and develop a structure to realistically meet those goals over a specific period of time. The outline below presents the format for the REAP and addresses its key components. *The information contained in the outline below is the **recommended** information that a local government is expected to provide in its REAP.* Please use the sample tables/spreadsheets provided. Note that it is important to also provide a brief supporting narrative.

Resource permitting, MEA will provide support for participants as they develop the REAP, including webinars, in-person trainings, and on-site technical assistance.

Why Does MEA Want This Level of Detail?
This information will be used by MEA to:

- Confirm that a local government has a well thought-out and documented pathway to fulfill their commitment to generating 20% of their electricity needs from distributed, renewable resources.
- Ensure that all Smart Energy Communities have met similar criteria in order to be designated.
- Measure progress toward the Renewable Portfolio Standard including energy generation.

RENEWABLE ENERGY ASSESSMENT PLAN OUTLINE

I. LETTERS FROM THE LOCAL GOVERNMENT VERIFYING ADOPTION OF THE REAP

- The local government should provide a letter from the Chief Executive Officer of the city or town stating that it has adopted the Renewable Energy Assessment Plan. The Chief Executive Officer is defined as the city/town manager, the Mayor, the County Executive, the County Commissioners, or equivalent.
- Include a copy of the enabling legislation or policy.

II. EXECUTIVE SUMMARY

A.*Narrative Summary of the Town* - including population, relevant history, Energy Star© ratings (from Portfolio Manager, if applicable), EPA Community Energy Challenge participant, DHCD Sustainable Communities participant, Sustainable Maryland Certified participant, etc.

- *Summary of Municipal Energy Uses* – Describe the total amount of electricity consumed (kWh), the amount of building space (square footage), and any relevant context related to recent or forecasted physical changes.
- *Total Number of Local Government Buildings* – Break down buildings by type of heating fuel (e.g. electric, oil, propane, natural gas, etc.). This program focuses on reducing electricity consumption, but there may be opportunities in the future to reduce other fuel types as well.
- *Water and Sewer* – note the number of drinking and wastewater treatment plants and pumping stations owned by the local government.

B.*Summary of Energy Use Baseline and Plans for Reductions* – use sample Table 1 provided below. This should be a summary, consistent with the data in the "Energy Use Baseline" and "Planned Energy Conservation Projects" Excel spreadsheets (download at http://energy.maryland.gov/Govt/smartenergycommunities)

Table 1: Summary of Municipal Energy Use Baseline

BASELINE YEAR ____	kWh Used in Baseline Year	% of Total kWh Baseline Electricity Consumption	Gross Square Footage (Baseline)	Projected Planned kWh Savings	Savings as % of Total kWh Baseline Electricity Consumption	Gross Square Footage (Projected for Year 5)
Buildings						
Water/Sewer /Pumping						
Total		**100%**			**15%**	

C.*Identification of Renewable Energy-Enabling Strategies* – Identify strategies which would help the community achieve at least the 20 percent renewable energy goal for its Smart Energy Community buildings. Strategies could include:

- Adopting expedited permitting and inspections best practices.
- Encouraging responsible solar siting.
- Learning more about Power Purchase Agreements (PPAs) or other third-party leasing programs.
- Evaluating what buildings might be good sites for geothermal heating & cooling.
- Evaluating the feasibility of solar water heating (SWH) for any hot water loads in the community's buildings.
- Sharing procurement templates or models, e.g. for RFPs and PPA's with the local public and private sector.
- Holding targeted press events and outreach to celebrate and inform others about the community's successes.

III. ENERGY USE BASELINE INVENTORY

A.*Local Government Energy Consumption for the Baseline Year*

How much electricity did your local government buildings use in the baseline year? MEA recommends using ENERGY STAR Portfolio Manager to create a baseline inventory and track the ongoing energy consumption. If you choose not to use Portfolio Manager, provide a description of how you determined the baseline, as well as all relevant data and calculations.

B.*Local Government Energy Generation*

How much electricity from eligible resources does your local government generate? Contact MEA or take advantage of available technical resources to calculate how much of the renewable energy goal your community is already meeting.

C.*Estimation of Net Renewable Energy Goal*

Working off the baseline electricity consumption (total kWhs) and the known generation of electricity from renewable resources (kWhs from renewable sources), the community can calculate how close it is to achieving the 20 percent goal. For example a community consuming 100,000 kWhs per year and generating 18,000 kWhs from a solar PV system would have 18/20 percent covered and would need to identify and plan for an additional 2,000 kWhs as part of their renewable energy action plan.

IV. RENEWABLE ENERGY ACTION PLAN

A.*Narrative Summary –*

1. *Identify Areas of Greatest Renewable Energy Generation Potential.* This can be determined by assessing renewable energy resource availability, sites, area, technologies that can convert renewable resources to electricity or thermal energy, actual projects, and potential generation outputs of those projects.

B.*Getting to a 20% Renewable Electricity Generation by 2022 -* The local government will need to develop a Renewable Energy Action Plan, showing how the local government plans to utilize distributed, renewable sources to generate or displace at least 20% of its electric energy by 2022. This section should include electricity generation anticipated from all divisions and departments including: all local government buildings, drinking water and wastewater treatment plants, and pumping stations owned by the local government.

1. *Program Management Plan for Implementation, Monitoring and Oversight* – Identify the personnel responsible both for oversight of the REAP implementation and for implementation of renewable energy generation projects in specific departments or buildings, if applicable. Also identify personnel responsible for the Annual Reporting requirements.

2. *Renewable Energy Resource Assessment.* The cost effectiveness of renewable energy options depend primarily on 1) the cost of the conventional energy solution, 2) the cost of the renewable energy conversion technology itself, and 3) the quality of the renewable energy resource. Assessing the quality of energy resources is termed "resource assessment." As a first step, the local government will need to assess the amount of renewable energy resources available to be used in its buildings, sites where the renewable energy conversion technologies would be sited, and the amount of area available for the technologies. The government can use the table below as a guide:

Renewable Energy Resource	**Resource Availability**	**Sites (Building rooftops, open space, etc.)**	**Area (Sq. Ft.) Available for Renewable Energy Conversion Technologies**
Solar	*E.g., average of 5.3 kW hours/day/square meter*	*E.g., 6 county buildings with flat roofs, 1 open recreation area*	*E.g., 600,000 sq. ft. of flat roof space that could support ballasted roof-mount PV arrays, 2 acres of open recreation area that could host a ground-mount PV array*
Wind	*Can be determined with anemometer*	*E.g., community-owned land next to landfill*	*E.g., 4 acres that could host wind turbines and meet local ordinance restriction*
Geothermal heating & cooling	*Nearly inexhaustible supply of stored thermal energy*	*Can drill wells next to 6 county buildings*	*Sufficient space for large drill rigs to drill multiple deep wells*
Poultry litter waste to energy	*May need engineering study*	*TBD*	*TBD*
Ocean energy	*May need engineering study*	*TBD*	*TBD*
Qualifying biomass	*May need engineering study*	*TBD*	*TBD*

MEA will assist local governments in assessing their renewable energy resource availability, as needed, by sharing a variety of Maryland-specific studies and data. Some renewable energy resource availabilities may need to be determined by professional engineering studies.

3. *Renewable Energy Resource Conversion Technologies*. Next, the local government should identify the most appropriate renewable energy resource conversion technologies to meet the Renewable Energy Goal. Some basic information on some of Maryland's more commonly used technologies follows:

a. *Solar photovoltaics (PV)* use sunlight to generate electricity. A PV panel is made up of many individual solar cells, all of which are covered with a protective sheet of glass in a PV module or panel. The cells are made from silicon, a very common chemical element found in sand. PV is a popular solar energy resource conversion technology that can take advantage of Maryland's plentiful solar resources.
b. *Solar water heating (SWH)* systems use flat plate, evacuated tube of glazed polymeric collectors that collect and concentrate the sun's heat and transfer the heat to homes and businesses using a heat transfer fluid. Large-scale SWH systems are best suited for use in buildings that have a high demand for hot water, such as multi-family housing development and detention centers.
c. *Geothermal Heating & Cooling (GHC)* systems heat pump systems use the constant temperature of the earth to heat and cool homes and buildings by exchanging heat with the earth:
    i. In the winter, they move the heat from the earth into the house or building.
    ii. In the summer, they pull the heat from the house or building and "dump" it into the ground.
    iii. Provide hot water, year-round, with a "desuperheater."
d. *Wind power* is one of the most efficient, deployable, scalable and affordable renewable energy technologies. Under Maryland's net metering statute, customers can receive credit for generated energy from utilities even when it exceeds their demand.

4. Renewable Energy Generation Projects and Output Potential -- List planned renewable energy generation projects, including the annual renewable energy generation potential (kWh/yr) for each project, as illustrated in the table below for a hypothetical Project #1:

Project #1

Renewable Energy Resource	**Conversion Technology**	**Capacity** (amount of generation potential, in units of output)	**Capacity Factor** (annual actual output/annual theoretical output, measured in hrs/yr)	**Projected Annual Renewable Energy Output Potential** (a product of capacity x capacity factor, in kWh/yr)
E.g, Solar	*E.g., PV*	*E.g., 120 kW*	*E.g., 14% or 1,227 hrs/yr*	*E.g., 147,240 kWh/yr*

5. Renewable Energy Project Financing -- The local government should specify the means by which it is going to finance renewable energy projects, including direct purchase using existing funds, loans from financial institutions, or one of several no- or low-cost financing options.

An example may illustrate the how solar PV, using a no-upfront-cost Power Purchase Agreement (PPA)--a contract by which a third-party developer which owns, operates, and maintains the PV system, and a host customer which agrees to site the system on its roof or elsewhere on its property and buys the PV system's electricity (rather than the PV system itself) from the developer for an agreed-upon period of time--could be implemented to meet a community's full 20% Renewable Energy Goal. In this scenario, let's presume a Maryland Suburban County had an estimated annual energy consumption of 37,200,000 kWh, as calculated in the table below.

Annual community energy consumption

Community scenario	**Monthly community energy consumption (kWh)**	**Annual community energy consumption (kWh)**	**20% of annual energy consumption to be met with renewable energy (kWh/year)**
Suburban county	*3,100,000*	*37,200,000*	***7,440,000***

The Suburban County could then work with solar PV developers to contract for electricity from PV systems through a PPA, with no upfront capital expenditures. This financial arrangement allows the host customer to receive stable electricity, and ideally at a lower-cost than conventional electricity, while the developer can benefit from valuable financial benefits such as the Federal Investment Tax Credit, advanced depreciation of the PV system, income generated from the sale of electricity to the host customer, and the Solar Renewable Energy Certificates (SRECs) associated with the amount of electricity generated. Ideally, the building owner or operator can buy PV-generated electricity through the PPA at rates lower than those from conventional electricity providers, creating immediate positive cash flows from energy savings.

In this scenario, the Suburban County would need a 6,060 kW solar PV system that generates **7,435,620** kWh/year. Let's assume the County negotiated with the PV developer to buy solar electricity at $0.10/kWh, at a total annual cost of $743,560, as illustrated in the table below. This is not an additional expense – instead, it replaces what the County is currently paying for electricity. If this price for electricity is below what the County would otherwise be paying for conventional electricity, it could create **immediate positive cash flow from energy savings.**

Community scenario	**Solar PV capacity (kW)**	**14% capacity factor (hrs/year)**	**Annual output (kWh)**	**PPA rate**	**Annual electricity cost**
Suburban County	*6,060*	*1,227*	*7,435,620*	*$0.10/kWh*	*$743,560*

The example above is one option for meeting the policy. There are a variety of other zero-to-low upfront capital outlay options available to communities, such as:

- Leasing geothermal heating & cooling systems from companies which finance, install, operate, and maintain these clean HVAC systems and sell the heating, cooling, and hot water services over an agreed-upon period of time.
- Contracting with solar water heating developers to buy hot water at a rate 30 percent lower than it could get the hot water from conventional means, a service currently being offered by at least one provider.
- Contracting with an Energy Services Company (ESCO), which could finance, install, and maintain a renewable energy system and share the energy and cost savings with the building owner.
- Issuing low-interest bonds to finance large-scale renewable energy systems, e.g. community-scale wind systems on public lands.
- Facilitating "shared solar" installations will allow consumers without direct access to renewable energy resources (e.g. without enough sunshine to power a PV system) to buy a percentage of a local solar PV system.

For each project, also provide:

- the projected total cost
- any Federal, State, local, and utility incentives received
- any planned use of Maryland Smart Energy Communities grant funds, if designated

C. *Questions about Institutionalizing Renewable Energy Generation Goals – Beyond 2022*

1. Has the local government considered a renewable energy generation revolving loan fund (in which some of the energy savings are reinvested into a revolving fund to finance future renewable energy projects)?
2. Would the local government be interested in incorporating renewable energy generation into its Emergency Preparedness and Recovery plans?
3. Would the local government be interested in streamlining procurement and permitting processes necessary for renewable energy?
4. Would the local government be interested in learning more about "net zero energy building" codes and standards?
5. What enabling strategies would help the local government and the entire community meet and exceed its renewable energy goals?

V. LIST OF RESOURCES

Identify resources that the local government used to create its REAP (websites, documents, tools).