Proposed Solar Farm Site Selection Initiative

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Montgomery County Planning Board
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Agenda

Introduction
- Why Solar?
- What are solar panel and solar arrays?
- Why is this a good idea?

Research
- Site Selection Process
- What is best for Parks and the public?

Site Selection Analysis and Process
- Site Selection Criteria
- Proposed Sites
- Proposed Project Schedule

Conclusion
Background

Culmination of a 10 month study involving
- Park Planning and Stewardship
- Horticulture Forestry and Environmental Education
- Park Development
- Northern and Southern Region
- Facilities Management
- Department of Planning (Area 3)

Staff contacted current solar users from public and private sectors, conducted site visits and worked closely with energy consultant CQI.

The Goal is to effectively utilize solar technology to
- reduce the Commission’s energy cost
- reduce carbon footprint and associated environment impacts
- aid in the development of local emerging solar industry

Why Solar?

- Free and limitless energy source (In 14 seconds the Sun provides enough energy to meet a day’s worth of world wide energy demand)
- Offset M-NCPPC energy consumption costs
- Reduce M-NCPPC’s carbon footprint and reliance on environmentally damaging extraction, transport, and burning of fossil fuels
- Consistent with Parks Stewardship mission
- Consistent with Montgomery County’s Energy initiatives and carbon reduction goals
- Create new jobs/support emerging markets
- Proven return on investment

Germany employs more people in the solar industry than its car industry, using technology created in the U.S.
Why Solar

The use of solar energy has seen exponential increases in use in recent years due to 3 primary reasons

1. Improved technology and cost reductions = economic viability
2. Unstable costs and speculative nature of fossil fuels
3. Focus on clean, carbon neutral and environmental friendly energy sources.

Environmental Benefits

- Solar energy production doesn’t involve the extraction, transport, facility construction and fuel combustion of fossil fuels. All of these stages have health and safety impact to the public.
- Expanded use of solar energy can greatly reduce water pollution, deforestation, greenhouse gas emissions, airborne particulates and other pollution.
- 2,890,000 kWh produced by solar per year equates to 1,500 metric tons of carbon reduction-equivalent to the annual greenhouse gas emissions from 300 cars.
Economic Benefits

Baseline Data: MC Department of Parks- 2014
- Annual electricity consumption: 13,457,340 kWh
- Annual electricity cost: $1,958,580

Solar Data – 2 megawatt system
- Annual electricity consumption reduction estimate: 2,890,000 kWh – 21% of annual consumption
- Potential annual electricity cost savings: $72,000 to $110,000 – 3.7% to 5.6% of annual cost

U.S. Solar Energy Market largely private investment driven with proven return on investments

Solar Panels (PV Cells)

Photovoltaic (PV) Solar Panels
- Convert sunlight directly into electricity
- Have been in use for decades
- Quiet
- No harmful emissions

A PV cell is a wafer of silicon sandwiched between two thin contact plates. The top contact is positively charged and the back contact plate is negatively charged.

When sunlight strikes the solar panel, its energy knocks electrons loose creating energy.
Solar Panels (PV Cells)

Photovoltaic (PV) Solar Panels
- PV modules power things as small as calculators and bird baths to providing energy for cities

Right: 100 acre, 18 megawatt solar array- Mount Saint Mary’s College, Emmitsburg MD

What is a solar array (Farm)?

Ground Mounted Solar Arrays
- Similar size and look of proposed Parks solar farms

Top right: Town of Poolesville
Bottom left: Collection terminal
Bottom right: Dover, Delaware
Solar Arrays

Innovative Solar Arrays

Top left: Concentrated Solar Tower
Top Right: Parking Shelters
Middle right: Road/Trail Beds
Bottom left: Sculptures
Bottom right: Floating

Research Determination

Internal analysis and energy consultant specialists indicated significant benefits of a Power Purchase Agreement:

- Most viable option at this time is a 15-20 year Power Purchase Agreement with a ground mounted system capable of producing 2 megawatts of electricity per year in the PEPCO and Potomac Edison Utility Service Areas.

A lease or contract where a third party finances, builds and maintains the solar array for a specified time period and provides a negotiated rate on the energy produced and transmitted to a power utility as part of a net metering arrangement.
Site Selection Analysis and Process

How did we determine which park sites would be best?

Analysis of Park sites for solar farm suitability

- 135 initial candidate Park Sites
- Geographic Information Systems Analysis using site selection criteria
- Short List of sites (35)

Field Review by Park Planners, Park Managers and subject matter experts

Site Selection Matrix Scoring Elements

- Impacts to environmental buffer, high quality forest, steep slopes or erodible soils.
- Degree of forest clearing or tree removal
- Historic and/or cultural elements
- Special Protection or Primary Management Areas
- Minimum area and adequate buffer to adjacent uses
- Master Plan and adjacent area compatible
- Elimination of needed or planned park amenities
- Resource, aesthetic or recreation value
- Proximity to electric meter
- Solar aspect, shading, and other site conditions
- Ease of Implementation
Site Selection Analysis and Process

Proposed Sites

- Rock Creek Regional Park
  - Dredge Spoils Site
- South Germantown Recreational Park
  - Maintenance Yard Area

Proposed Site

- South Germantown Recreational Park
  - Maintenance Yard Area
Site Selection Analysis and Process

South Germantown Recreational Park
- Maintenance Yard Area
  - Proposed Solar Farm

South Germantown Recreational Park
- Maintenance Yard Site
  - Scored High on Site Selection Matrix
  - Compatible with maintenance yard and adjacent to high voltage power lines
  - Extension of existing developed area of South Germantown Recreation Park
  - No immediately adjacent residents
  - Visually isolated from view
  - Educational opportunities for the public on alternative energy
Site Selection Analysis and Process

Proposed Site
- Rock Creek Regional Park
  - Dredge Spoils Site
Site Selection Analysis and Process

Rock Creek Regional Park
- Dredge Spoils Site

- Proposed Solar Farm Area

- Highest score in Site Selection Matrix of all undeveloped sites considered
- No environmental constraints
- Adjacent to the ICC
- No adjacent residents
- Essentially a brownfield site where an interim use will synchronize well with future needs of the site in 20+ years for stockpiling future dredge spoils
- Synergy with adjacent Natural Gas Pumping Station and Rock Creek Maintenance Yard from a similar use standpoint
Public Outreach

- Organizations
- Adjacent property owners mailing
- Web page, Online Comment Tool, Media Releases, Direct Emails, Enewsletter, Social Media
- Public Meeting February 9, 2015 - UpCounty Regional Services Center

Media and Press

- February 4, 2015 - Gazette.net online article
  Parks Department proposes solar arrays for sites in Germantown and Derwood
- February 11, 2015 - Gazette.net online article
  Solar arrays in Germantown, Derwood parks would be built and operated by third party

Public Outreach

What we have heard so far ...

- “Just wanted to share that I support this initiative and believe it moves Montgomery County in the right direction.”
- “On the face of it, these solar arrays sounds like an excellent idea.”
- “The county government has dozens of acres of rooftops and parking lots. Rather than dedicate land to solar farms, break them up into smaller pieces and put them on government building rooftops and as carport shelters over parking lots. Only after you have covered every rooftop and parking lot should you consider setting aside land just for solar panels.”
- “I agree with (see above comment) but I also feel that this is a good project because we need as many solar panels as possible to generate enough energy to get off fossil fuels.”
- “Decades overdue, but better late than never.”
- “Very good use of land”
- “I just wanted to state for the record my strong approval of the two solar farm proposals currently being reviewed and discussed. Bravo for MNCCPC Montgomery Parks' foresight!”
### Proposed Project Schedule

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<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>2014</td>
<td><strong>Fall/Winter</strong> Staff research, evaluation and Draft RFP Development, Public Outreach</td>
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<tr>
<td>2015</td>
<td><strong>February</strong> Public Meeting (UpCounty Regional Service Center)</td>
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<td>Ongoing Outreach (website, media releases, mailings)</td>
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<td><strong>March</strong> Planning Board Review</td>
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<td></td>
<td><strong>May</strong> Contractor Awarded / Agreement Period</td>
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<td></td>
<td><strong>June</strong> Notification to Proceed</td>
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<td></td>
<td><strong>December</strong> Completion Date</td>
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<td></td>
<td><strong>Ongoing</strong> Continued pursuit of alternative energy uses in Parks</td>
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<td>Parks Department envisions future emphasis on systems such as</td>
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<td>photovoltaics embedded in parking, roads and trails surfaces;</td>
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<td>structured systems over existing Commission parking lots and</td>
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<td>structures, and stand-alone systems.</td>
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### Conclusion

The Department of Parks seeks approval from the Planning Board for the placement of the Commission’s first solar arrays in Montgomery County at the following sites:

- South Germantown Recreation Park in a field west of the maintenance facility

- Rock Creek Regional Park east of Needwood Road in an area used to stockpile dredging spoils.
Thank you

“We are like tenant farmers chopping down the fence around our house for fuel when we should be using Nature’s inexhaustible sources of energy—sun, wind and tide. I’d put my money on the Sun and solar energy. What a source of power.”

- Thomas Alva Edison (inventor of the incandescent lightbulb) to Henry Ford and Harvey Firestone shortly before his death in 1931

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Energy 101

- **Watts** are a measurement of power, describing the rate at which electricity is being used at a specific moment. A 15-watt light bulb draws 15 watts of electricity at any moment when turned on.

- **Watt-hours** are a measurement of energy used over time. A 15-watt light bulb draws 15 watts at any one moment, uses 15 watt-hours of electricity in the course of one hour.

- **Kilowatts and kilowatt-hours** are useful for measuring amounts of electricity used by large appliances and by households. Kilowatt-hours are what show up on your electricity bill, describing how much electricity you have used. One kilowatt (kW) equals 1,000 watts, and one kilowatt-hour (kWh) is one hour of using electricity at a rate of 1,000 watts. New, energy-efficient refrigerators use about 300-400 kilowatt-hours per year. The typical American home uses about 7,200 kilowatt-hours of electricity each year.

- **Megawatts** are used to measure the output of a power plant or the amount of electricity required by an entire city. One megawatt (MW) = 1,000 kilowatts = 1,000,000 watts. A typical coal power plant is about 600 MW in size.

- **Gigawatts** measure the capacity of large power plants or of many plants. One gigawatt (GW) = 1,000 megawatts = 1 billion watts. In 2012, the total capacity of U.S. electricity generating plants was approximately 1,100 GW.

- **Terawatts** useful when going astronomical in scale – 173,000 terawatts of solar energy strikes the Earth continuously.
PROPOSED SOLAR FARM SITE SELECTION INITIATIVE

Electric Utility Service Areas

South Germantown Recreational Park

Maintenance Yard Area

- Resource Atlas
Dredge Spoils Site

- Resource Atlas Map

The site selection study, made it clear that besides the 2 proposed sites, there are few undeveloped sites in Commission ownership that Parks would consider for future ground arrays.

Staff will be returning to the MCPB with more Renewable Energy Recommendations.