





Going Green with Energy: Solar Panels and Battery Storage

BERKLEY GROUP


Mid-Atlantic Chapter
APWA
AMERICAN PUBLIC WORKS ASSOCIATION

Virtual Training
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The Berkley Group 



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The Fastest Growing Energy Source

Solar photovoltaics (PV)

Benefits

- Pollution reduction
- Climate change mitigation
- Job creation
- Decentralization /
redundancy / resilience

Scalable!



Utility-Scale Solar



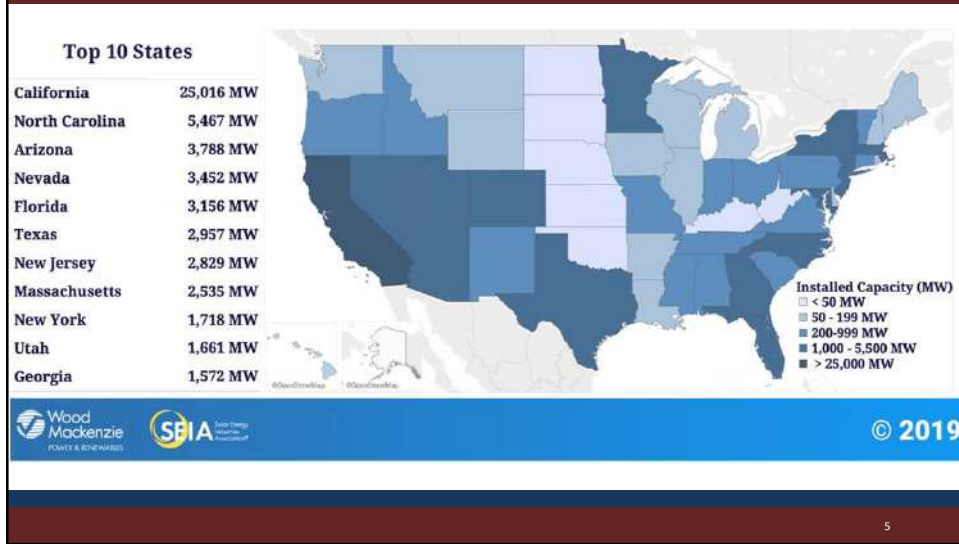
Public or private
energy generating
facility

Connected to grid

~ >2 acres

~ >1 MW

Solar Nation-Wide

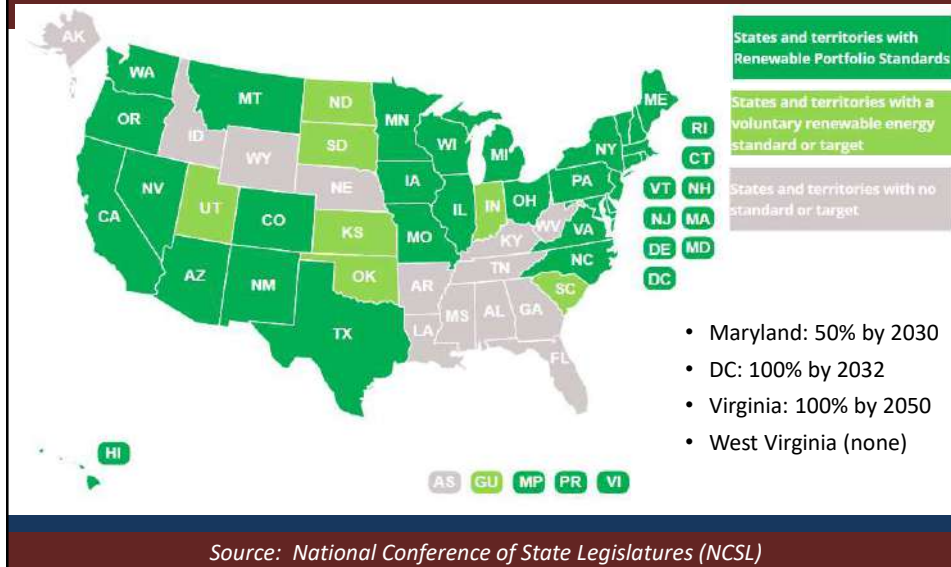


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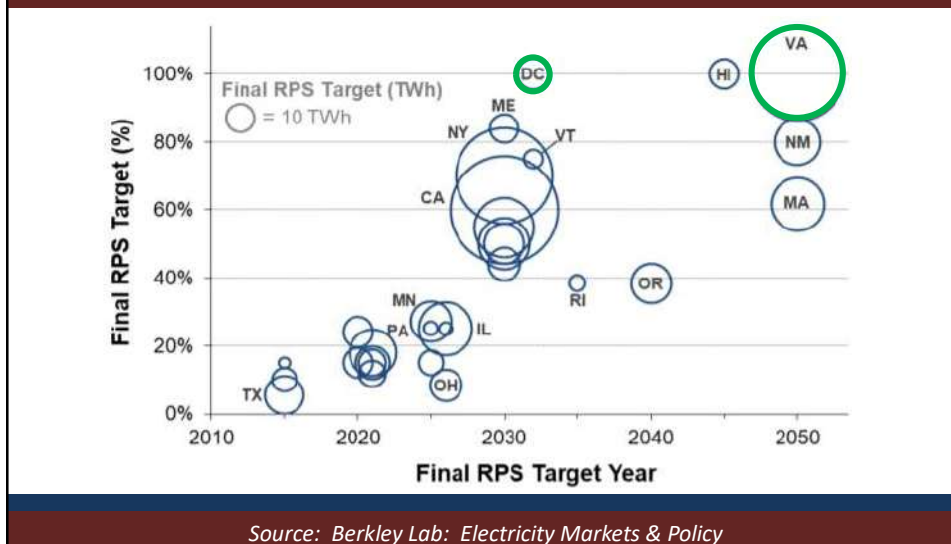
Private Demand for Clean Energy



Public Demand for Clean Energy



Public Demand for Clean Energy



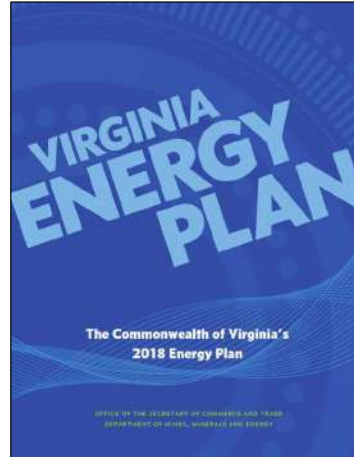
Clean Energy Demand in Virginia

Solar and on-shore wind targets

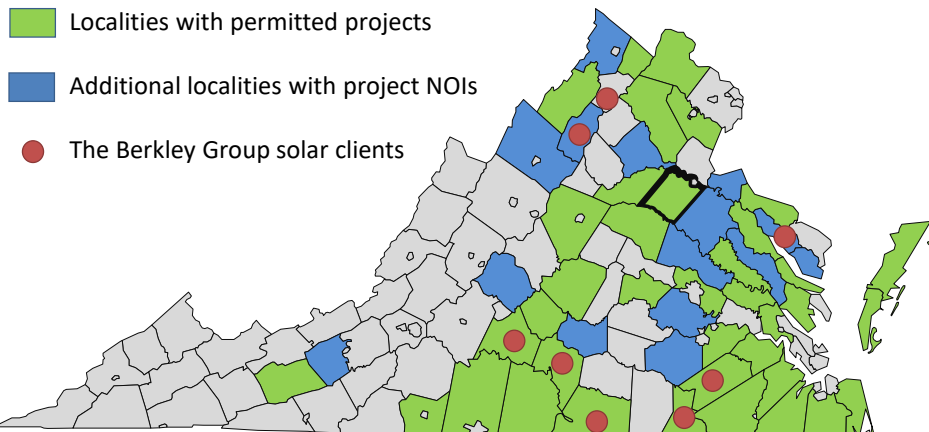
- 3,000 MW by 2022
- 5,500 MW by 2028

Source targets

- 100% carbon-free by 2040
- 100% renewable by 2050



Virginia's Growing Solar Industry



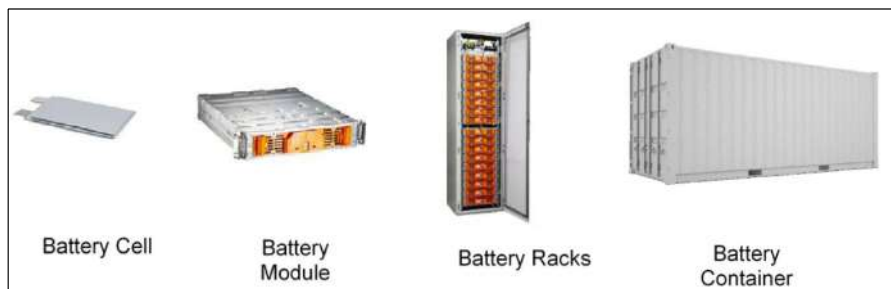
Utility-Scale Solar Facility Components

- Ancillary structures: inverters, substation, switchyard, generator lead lines (gen-tie lines)



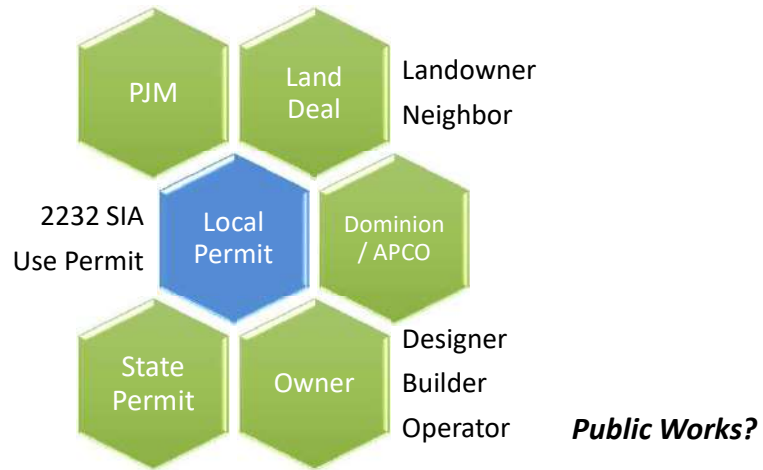
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Battery Energy Storage Systems (BESS)



12

Solar Development Web

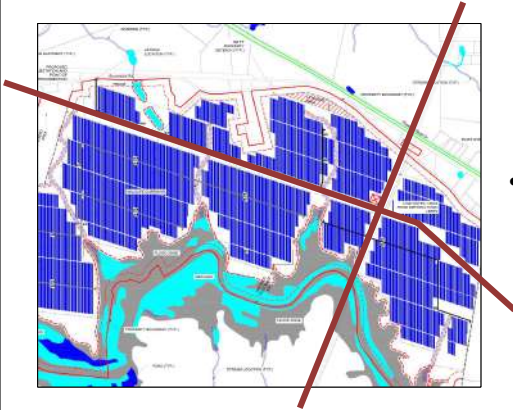


Changes in Land Use

- Agricultural or forested
- Industrial
- Residential



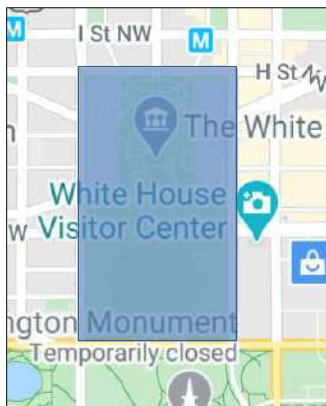
Appropriate Locations



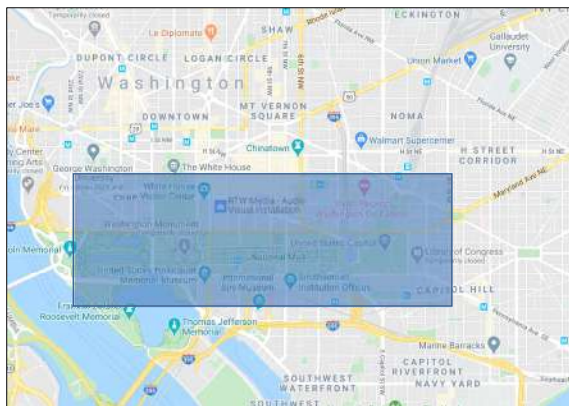
- Avoid
 - Near cities or towns
 - Growth areas
 - Adjacent to residences or businesses
- Consider
 - “Invisible” or undesignated areas
 - Brownfields or capped landfills
 - Near transmission lines

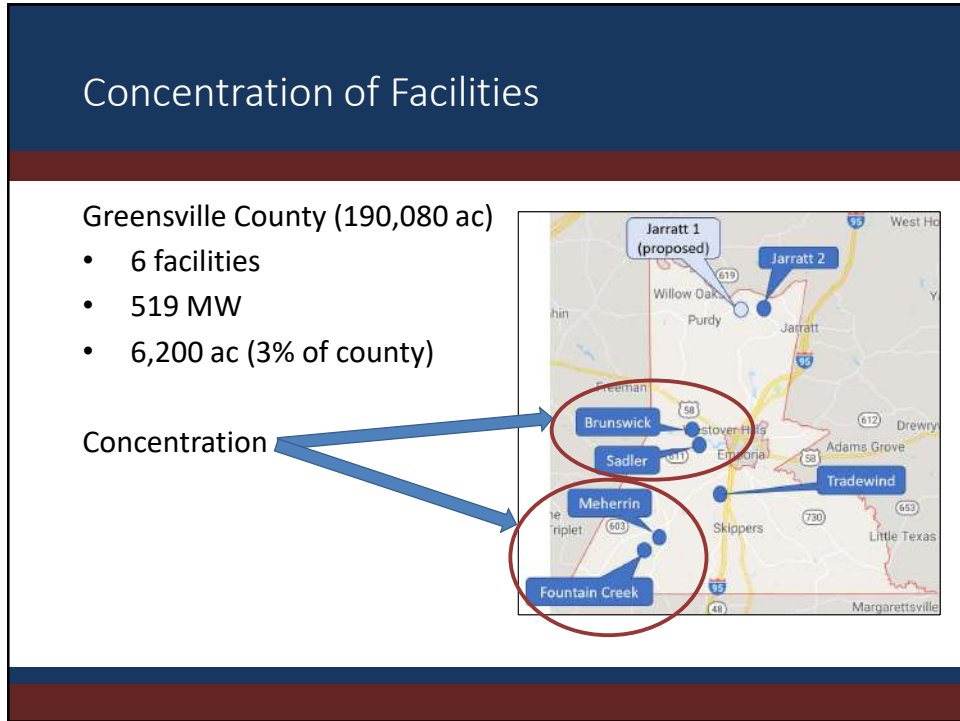
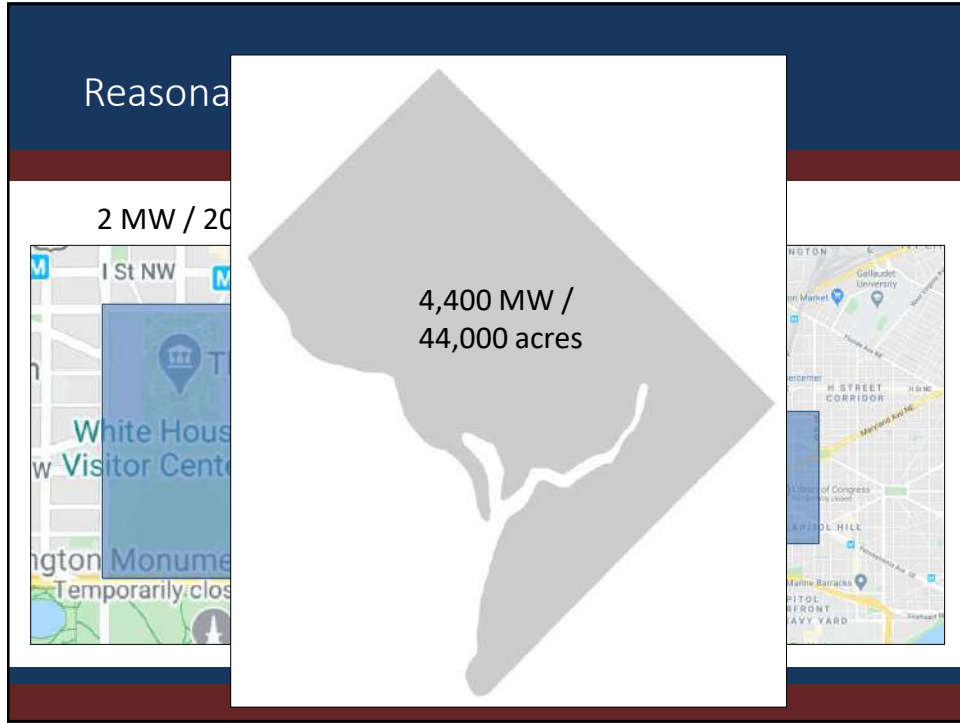
Reasonable Sizes

2 MW / 20 ac



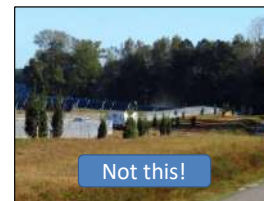
500 MW / 5,000 ac



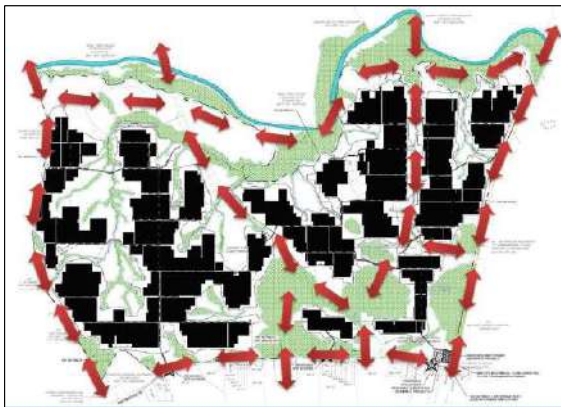


Community Impacts

- Avoid historical or cultural sites
- Setbacks
 - >150 ft from property lines
 - >250 ft from a dwelling
- Buffer/screen >100 ft vegetated
- Fence >7 ft and on interior of buffer
- Limit height <15 ft (10' max drip line)
- Minimize lighting nuisance



Environmental Impacts



- Avoid ecologically-sensitive sites
- Preserve topsoil
- Use native vegetation and pollinators
- Minimize lighting nuisance
- Provide wildlife corridors

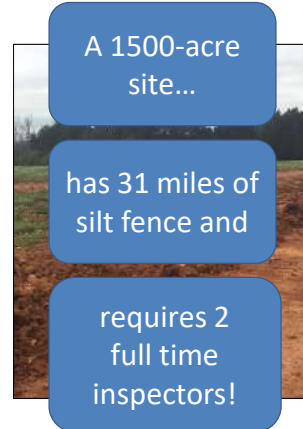
Construction Impacts

Consider capacity and fees for

- Environmental site plan reviews (one or multiple)
- Land disturbance (ESC) inspections (on-going during construction)

Consider limiting clearing and grading limits. Permit additional clearing and grading when the area is stabilized.

Construction entrances and traffic



Concerns During Operations

- Stormwater runoff
- Landscape maintenance
- Damaged equipment
- Equipment upgrades
- Changes in ownership



Otherwise, solar is a passive land use

Decommissioning Concerns



- Plan for removal and restoration after 35 to 45-year useful life
- Recognize removal can be more disruptive than construction
- Require an adequate security

Fiscal Impact

- Locality Revenue
 - Increased real estate tax
 - Machinery and tools tax or, in Virginia, revenue share
 - Siting agreement
 - Reasonable payment
- Landowner sale or lease
- Employment



Local Tools

- Comprehensive Plan
- Zoning Ordinance
- Use Permit conditions (CUP, SUP, SEP)



Zoning Ordinance – Solar

Applications and procedures

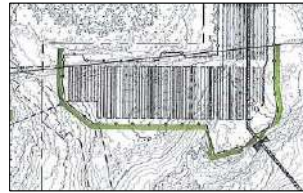
- Pre-application meeting
- Comprehensive Plan review
- Permit application
- Concept plan and concept plan compliance
- Traffic study
- Construction schedule
- Surface water and floodplain inventory
- Environmental inventory
- Visual impact analysis

A Regulation



Solar Use Permit Requirements

- Application form
- Tax map
- Adjacent owners list
- Statement of intent
- Draft conditions
- Conceptual site plan
- Project screening and buffers
- Economic impact analysis
- Decommissioning plan



Solar Use Permit Conditions

- Plan submittal
- Operations
- Buffers
- Traffic
- Decommissioning Plan
- Securities
- Training
- Violation of conditions



Community Concerns

- Visual impacts
- Toxins and radiation
- Taxes and electric bill increasing
- Property value decreasing
- Water pressure decreasing
- Wells going dry
- Construction traffic
- Tree removal and burning stumps



Health and Safety Impacts of Solar
Photovoltaics
MAY 2017

Resources



VIRGINIA SOLAR INITIATIVE

solar.coopercenter.org



www.energy.gov



www.eia.gov



www.seia.org



<https://energystorage.org/>



<https://nccleantech.ncsu.edu/>



A photograph of a solar farm with rows of blue solar panels under a cloudy sky. A semi-transparent white box with the text "Q&A" is overlaid in the center. At the bottom of the image, there is contact information for Denise Nelson and Aaron Berryhill, along with the Berkley Group logo.

Q&A

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 **BERKLEY**
GROUP

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