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Agenda

• Introduction to the solar industry
• Land use impacts and recommendations
• Policy issues and recommendations
• Q&A
Learning Objectives

• See how local and state governments are classifying utility-scale solar generation and storage facilities.

• Identify key parameters to analyze for land-use impacts and develop conditions to mitigate impacts.

• Identify language to incorporate in comprehensive (general) plans and ordinances to guide evaluation of proposed projects.
Introduction to the Solar Industry
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
Utility-Scale Solar Facilities

Solar PVs
Inverters
Substation
Switchyard
Generator lead lines (gen-tie lines)
Battery storage
Resources

- www.energy.gov
- www.seia.org
- https://energystorage.org/
- www.eia.gov
- https://nccleantech.ncsu.edu/
Utility-Scale Solar Nation-Wide

Top 10 States

<table>
<thead>
<tr>
<th>State</th>
<th>Installed Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>25,016 MW</td>
</tr>
<tr>
<td>North Carolina</td>
<td>5,467 MW</td>
</tr>
<tr>
<td>Arizona</td>
<td>3,788 MW</td>
</tr>
<tr>
<td>Nevada</td>
<td>3,452 MW</td>
</tr>
<tr>
<td>Florida</td>
<td>3,156 MW</td>
</tr>
<tr>
<td>Texas</td>
<td>2,957 MW</td>
</tr>
<tr>
<td>New Jersey</td>
<td>2,829 MW</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>2,535 MW</td>
</tr>
<tr>
<td>New York</td>
<td>1,718 MW</td>
</tr>
<tr>
<td>Utah</td>
<td>1,661 MW</td>
</tr>
<tr>
<td>Georgia</td>
<td>1,572 MW</td>
</tr>
</tbody>
</table>

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Private Demand for Clean Energy

These 100 companies have agreed to go to 100% green energy.
These states have agreed to go to 100% green energy.
Clean Energy Demand in Virginia

Installed solar capacity
• 17 MW by 2014
• 470 MW by 2020

Solar and on-shore wind targets
• 3,000 MW by 2022
• 5,500 MW by 2028

Storage target
• 3,100 MW by 2035
Planning for Utility-Scale Solar
Land Use Impacts and Recommendations
Local Development

Solar developers work at the local level
• Identify potential sites
• Contact landowners
• Prepare development application
Land Use Impacts

- Changes in land use
- Location
- Size
- Concentration of uses
- Visual impacts
- Decommissioning
- Environmental impacts
- Economic impacts
Changes in Land Use

- Agricultural and forested
- Residential
- Industrial
Locations to Avoid

• Growth areas
• Prime farmland
• Ecologically-sensitive sites
• Historical sites
• Adjacent residences or businesses
Locations to Consider

- “Invisible” areas
- Undesignated areas
- Brownfields
- Capped landfills
- Near transmission
Size

2 MW / 20 ac

500 MW / 5,000 ac
Size

2 MW / 20 acres

4,400 MW / 44,000 acres
Concentration of Facilities

Greensville County (190,080 ac)
- 6 facilities
- 519 MW
- 6,200 ac (3% of county)
Concentration of Facilities

Brunswick Solar
• 150 MW on 1460 ac

Meherrin River

Sadler Solar
• 100 MW on 1490 ac
Concentration of Facilities

Fountain Creek Solar
• 80 MW on 800 ac

Meherrin Solar
• 60 MW on 900 ac

Rectangle is 5200 ac
• 60 MW on 900 ac

This area will have 30% of the land converted from agricultural use to solar.

The projects are 600 feet apart at one point.
Visual Impacts

Post-construction

6 years later
Environmental Impacts
Decommissioning
Fiscal Impact

• Revenues
  o Real estate tax
  o Machinery and tools tax
  o Sales tax
  o Proffers
  ❖ Financial incentives
• Employment
Southern VA - Economic Impact

Solar Facility

- 75 MW on 1500 ac
- Investment of $150 M

Economic impact during construction

- 150-200 jobs for 12-18 months

Economic impact during operations (first year)

- Real estate tax = $36,000
- Machinery and tools tax = $140,000
- Voluntary payments = $50,000

$6.5 M over 35 years
Public Concerns

Property owner
- Supporting clean energy goals
- Selling or leasing land ($)
- Individual property rights

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

- Residents and absentee landowners
- Farmers working the land
- Development, plan review, stormwater, and ESC staff
- Planning Commission
- Governing Body
- Developers
- Regional power provider

Start education and outreach now!
Greensville County - Stakeholder Engagement

Discussed

• Top opportunities/benefits
• Top challenges

To propose

• County’s vision for utility scale solar
• County’s goals for implementing vision
Policies

• State requirements
• Comprehensive (General) Plan
• Zoning Ordinance
• Conditional or Special Use Permit / Special Exception Permit
• Construction agreements
State Requirements
Local Requirements

Localities process the application

• Planning department review
• Public hearing and Planning Commission approval
• Public hearing and Governing Body approval
Comprehensive (General) Plan

Review

• Does it address solar?
• Does it address solar adequately?
• Vision, goals, objectives
• Current and future land uses
• Decision guidance
**Amend** to describe preferred solar project features

Utility-scale Solar Facilities (>1MW)

- Agriculture, brownfields, landfills
- Avoid prime farmland, forests, development areas
- Consider proximity to residences; historic, cultural, recreational, or environmentally-sensitive areas; and scenic viewsheds
Comprehensive (General) Plan

Amend to include relevant maps

Existing Land Use Map
- Prime Farmland
- Brownfields
- Capped landfills

Major Electrical Facilities
- Transmission lines
- Transfer stations
- Generation facilities (including solar)
Zoning Ordinance

Review

• Does it address solar?
• Does it address solar adequately?
• Definitions
• Zoning districts and permitted uses
• Conditional use permit requirements
Amend to include definitions

Solar facility, small-scale
• <15 kW and <1 ac or on existing structure

Solar facility, medium-scale
• <999 kW to reduce onsite consumption

Solar facility, utility-scale
• >1 MW electricity to provide electricity to a utility provider
Zoning Ordinance

**Amend** to include a solar article

- **Intent**
- **Applicability**
- **Zoning districts**
  - Small-scale solar facilities: by-right in all districts
  - Medium-scale solar facilities: by-right in commercial and industrial districts
  - Utility-scale solar facilities: CUP in A-1, brownfields, or landfills
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
Applications and procedures

- Neighborhood meeting
- Decommissioning plan
  - Procedures
  - Cost estimate
  - Schedule for updating plan
Zoning Ordinance – Solar Article

Applications and procedures

- **Security - Escrow, Surety, Letter Of Credit**
  - Decommissioning salvage value
  - E&S
  - Maintenance

- **Application fee**
  - Time
  - Third-party expenses
Minimum development standards
• Area <1,500 ac
• Distance to other solar facilities
• Setbacks
  o >200 ft from residential property lines
  o >150 ft otherwise
Zoning Ordinance – Solar Article

Minimum development standards

- Height <15 ft (10’ max drip line)
- Buffer/screen >100 ft vegetated
- Fence >7 ft and on interior of buffer
- Wildlife corridors
- Native vegetation
- Minimize lighting nuisance
Other conditions

- Battery storage
- Acquire building permit within 24 months
- Change of owner notification (30 days)
- Offset burdens
Use Permit
Use Permit (CUP, SUP, SEP) Application

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

• Plan submittal
• Operations
• Buffers
• Traffic
• Decommissioning
• Security
• Training
• Violation of conditions
Agreements

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.

A 1500-acre site...

has 31 miles of silt fence and

requires 2 full time inspectors!
Comprehensive Plan
- Silent on solar

Zoning
- Solar article

Update
- Solar parameters in the Comprehensive Plan
- Solar article in Zoning Ordinance defines 3 facility sizes and allows use in 4 districts
Sussex County

Comprehensive Plan
- Silent on solar

Zoning
- Silent on solar
- Identifies 5 districts for power generation

Update
- Solar parameters in the Comprehensive Plan
- Solar article in Zoning Ordinance defines 3 facility sizes and allows use in 3 districts
Recommendations

• Review state requirements

• Review and amend the Comprehensive (General) Plan

• Review and amend the Zoning Ordinance

• Evaluate each application based on its own merits

• Consider local government capacity and fees for planning and construction activities

• Learn from others
Conclusion