The Virginia Renewables Siting Scoring System

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In 2006, Virginia passed Senate Bill 262 which established new energy policy and directed the Division of Energy of the Department of Mines, Minerals and Energy, in consultation with the appropriate state agencies, to prepare a ten-year comprehensive State Energy Plan to implement the Commonwealth's energy policy. As part of the Energy Plan, the Division of Energy and other agencies were tasked to develop a system for measuring the extent to which parcels are suitable for the siting of wind (and solar) energy facilities and, upon receipt of a recommendation from the Department of General Services, a local governing body, or a parcel's owner that a parcel is a potentially suitable location for such an energy facility, the Division would analyze the parcel's suitability.
James Madison University was contracted to develop the **Virginia Renewables Siting Scoring System** (VRS³) which took the form of a numerical scoring system used to evaluate the suitability of sites within the state for wind (and solar) energy systems. The legislation stated that “…the scoring system shall address the wind velocity, sustained velocity, turbulence, proximity to electric power transmission systems, potential impacts to natural and historic resources and to economically disadvantaged or minority communities, and compatibility with the local land use plan. The system …[shall] compare parcels under examination with other parcels, and shall establish a scale that evaluates the score of any parcel to be measured against the hypothetical score of an ideal location for such a wind (or solar) facility.
WHAT IS THE VRS$^3$ ?
What is the VRS³?

- A proactive wind resource evaluation and siting analysis tool
- “suitability model,” “screening tool,” “preliminary siting tool”
- Integrates criteria used by land use planners, developers, and communities
- It is *NOT*
  - a micro-siting process
  - an environmental impact assessment
  - a project assessment or project impact tool
What is the VRS$^3$?

- It answers the basic question—
  
  "Which places are more (or less) suitable than others for siting wind energy systems, and why?"

- It is designed primarily for land use planners

- Others can use it, but not quite as easily

- Requires GIS, local maps, and local knowledge

- Works best at the county scale
What is the VRS³?

- A numerical scoring system mandated by the state legislature
- Real parcels of land
- Must account for:
  - wind characteristics
  - proximity to power lines
  - potential impacts on natural & historic resources
  - compatibility with local land use plan
  - potential impacts on minority and disadvantaged communities
- Must allow standardized comparisons between scores
- Must have a benchmark “ideal” score
What is the VRS³?

It scores 15 individual criteria in 3 categories

**Land Use Planning**
1. Compatibility w/ Comp Plan*
2. Consistency w/ Zoning *
3. Parcel fragmentation
4. Degree of multiparty consultation

**Community Development**
11. Presence of economically disadvantaged communities*
12. Environmental justice issues*
13. Preferential land uses
14. Cultural assets*
15. Recreational value

**Natural Resources**
5. Fish & wildlife implications*
6. Cold water streams*
7. Plant, insect, & natural heritage resources implications*
8. Forest implications*
9. Watershed implications*
10. Special scenic vistas

- Each item scored 0-2
- Total score = 30
- * = Criteria required by legislation
Why Use the VRS³?

- Social, economic, political pressures for wind energy are increasing
- Breadth of criteria

1. Land Use Planners…
   - Incorporate in comprehensive planning process
   - Evaluate potential for community wind energy
   - Empower discussions with developers
   - Identify possibility of utility scale wind

2. Developers…
   - More holistic, addresses many community concerns up front

3. Citizens…
   - Understand wind issues in your community, suitability of own property

4. Non-Profit Groups
Here, for example, are five tracts that Bath County might like to evaluate and compare.
Limitations of the VRS³

- Someone will always be (very) unhappy
- It is for guidance, not actual siting
- There are other major considerations not currently accounted for in the scoring system (e.g., FAA regulations)
- It can be used “reactively,” but it means the process will be rushed
- The viewshed issue
- But…
  - It is very transparent, with explicit criteria
APPLICATION OF THE VRS$^3$ INVOLVES FOUR STEPS
Step 1: What’s Your Wind?

Step 1 is a brief tutorial that introduces the fundamental concepts about wind energy and the size of wind energy systems. This is where it is determined whether or not a community has sufficient wind resources to power more than small, onsite systems.
A 1-kW onsite system in Floyd, VA

A 660-kW community system in Hull, MA, less than 10 miles from Boston.

Four (of 44) 1.5 MW turbines at Mountaineer in West Virginia.
Wind Classes

- Basic prerequisites for community and commercial wind energy development in the mid-Atlantic: (see handout for more detail)
  - Availability of a wind resource, and its class
  - Topography
  - Accessibility of, distance to, electric power lines
  - Price/cost of electricity

<table>
<thead>
<tr>
<th>Wind Class</th>
<th>Potential for Wind Development</th>
</tr>
</thead>
</table>
| Class 1 or 2 | • Marginal for onsite  
                 • Unsuitable to marginal for community-scale  
                 • Unsuitable for utility-scale |
| Class 3    | • Appropriate for onsite  
                 • Marginal to appropriate for community-scale  
                 • Unsuitable for utility-scale |
| Class 4    | • Appropriate for onsite or community-scale  
                 • Marginal for utility-scale |
| Class 5+   | • Appropriate for all scales |
Turbines Sizes

Community Scale

Offshore in Europe

Onsite
Legend

Counties Land Boundary
Acreage of Wind Class 4 or Greater
- 0 - 99
- 100 - 519
- 520 - 1499
- 1500 - 3499
- 3500 - 6499
- 6500 - 9999
- 10000 - 20000
What’s Your Wind?

- VRS\(^3\) only scores wind Class 3 and higher.
- Class 1 and 2 only suitable for small, on-site systems (see VA small wind guide).
- These are readily handled by existing land use planning procedures.
- For Class 1 and 2 wind, the VRS\(^3\) is not applicable.
Step 2: Pre-Screening

- In Step 2, it is determined if and where wind power in a community is technically feasible.
- Are there (a) sufficient wind resources in areas that (b) can be connected to the appropriately-sized electric power lines, and are (c) not notably environmentally sensitive?
Basics of Step 2

A. Identify tracts of land appropriate for scoring
   - GIS layer of wind resources
   - GIS layers of environmentally sensitive areas and public lands
   - Filter out sensitive areas and public lands

B. Consult with local utility
   - Provide consolidated GIS to review layer for power line access and distances
   - Utility will indicate availability of appropriate lines
   - Will only be done for local governments/land use planners
VRS$^3$ Filters Sensitive Areas and Public Lands

- Federal lands
- Shenandoah National Park and other national parks
- Appalachian National Scenic Trail and 5-mile buffer zone (the AT and 5-mile buffer includes some private land)
- Blue Ridge Parkway
- U.S. Fish and Wildlife Service National Wildlife Refuges
- Virginia Dept. of Conservation and Recreation, Division of Natural Heritage, state parks and natural area preserves
- Virginia Department of Forestry, Virginia state forests
- Virginia Department of Game and Inland Fisheries, Wildlife Management Areas
- Virginia Outdoor Foundation easements
- regions identified as hosting submerged aquatic vegetation
Identify Tracts for Scoring
Identify Tracts for Scoring

- Remember, Class 3+ only is scored in VRS³
- Gray in image is sensitive area or public lands
- Each pixel represents 10 acres
- Generate a “tract map” for scoring in next step

- Utility will determine proximity to appropriately sized power lines
Step 3: Scoring

- In Step 3, the tracts are scored with electric power line access that are identified in Step 2. Community-scale wind is scored separately from utility-scale wind because of the differences in purpose and size of these systems.
The VRS\(^3\) Scores 15 Criteria

**Land Use Planning**
1. Compatibility w/ Comp Plan*
2. Consistency w/ Zoning *
3. Parcel fragmentation
4. Degree of multiparty consultation

**Natural Resources**
5. Fish & wildlife implications*
6. Cold water streams*
7. Plant, insect, & natural heritage resources implications*
8. Forest implications*
9. Watershed implications*
10. Special scenic vistas

**Community Development**
11. Presence of economically disadvantaged communities*
12. Environmental justice issues*
13. Preferential land uses
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15. Recreational value

- Each item scored 0-2
- Total score = 30
- * = Criteria required by legislation
A. Scoring Land Use Planning

1. Compatibility w/ Comp Plan*
2. Consistency w/ Zoning
3. Parcel fragmentation
4. Degree of multiparty consultation

• Scoring requires…
  - tract map from Step 3
  - GIS or paper maps of comp plan
  - GIS or paper maps of zoning designations
  - GIS or paper maps of parcels
  - GIS layers for AT buffer zone, national scenic byways, federal lands, Commonwealth lands, VOF easements
1. Compatibility with the Comp Plan Plan

Augusta County Comp Plan relative to a tract...
## I. Compatibility with the Comp Plan

| A. Is the entire tract located on land that is designated as either agriculture or rural conservation (or a combination of both)? | If yes, score = 2  
If no, leave blank |
|---|---|
| B. Are there any proposed or designated land uses that would prevent development of this entire tract for a community scale wind power system? | If yes, score = 1/2  
If no, leave blank |
| C. Consider the level and type of existing development in this tract (residential, commercial, industrial, recreational, urban growth boundary, etc.). Could at least 10 acres of land in this tract be developed for community scale wind power systems without changing the comprehensive plan? (Note: in the base map, 1 pixel is equal to 10 acres) | If yes, score = 1  
If no, score = 1/2 |

**Total Score, consistency with comprehensive plan:**

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**Enter the lowest of the scores from lines A, B, and C here**

The score should be ½, 1, or 2. A score of 1 or 2 means there is no fundamental conflict with the comprehensive plan for this tract to be developed for community scale wind power, and that the minimum acreage needed for such a system is available. A score of ½ means that there is a conflict with existing land use or that the comprehensive plan would need to be changed to accommodate a community wind power system.
B. Scoring Potential Natural Resource Impacts

5. Fish & wildlife implications* [DGIF]
6. Cold water streams* [DGIF]
7. Plant, insect, & natural heritage resources implications* [DCR-DNH]
8. Forest implications* [pre-evaluated by DCR]
9. Watershed implications* [pre-evaluated by DCR]
10. Special scenic vistas [local knowledge]

• Legislation requires “natural resources” but does not specify which

• Scoring requires...
  • Tract map
  • DCR VCLNA GIS resources for forest economics, watershed integrity
  • Reports from VA DGIF and VA DCR-DNH

• Must submit request for formal review of tracts to DGIF and DCR-DNH
5, 6, 7. Wildlife, cold water streams, natural heritage resources, plants, insects, T&E species

These 3 criteria all depend on Commonwealth reports. They are scored very similarly to #5 (fish and wildlife impacts), presented below.

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Recommendation</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Did DGIF recommend that this tract, in its entirety, should not be developed for a wind power system?</td>
<td>If yes, score = 0&lt;br&gt;If no, leave blank</td>
</tr>
<tr>
<td>B.</td>
<td>Did DGIF recommend that this tract, in its entirety, could be developed for wind energy without any mitigatory measures for wildlife impacts?</td>
<td>If yes, score = 2&lt;br&gt;If no, leave blank</td>
</tr>
<tr>
<td>C.</td>
<td>Did DGIF recommend that at least part of this tract could be developed for wind energy with some mitigatory measures for wildlife impacts?</td>
<td>If yes, score = 1&lt;br&gt;If no, leave blank</td>
</tr>
<tr>
<td>D.</td>
<td>Did DGIF recommend that at least part of this tract could be developed for wind energy with substantial mitigatory measures for wildlife impacts?</td>
<td>If yes, score = ½&lt;br&gt;If no, leave blank</td>
</tr>
</tbody>
</table>

**Total Score:**

-- If A is scored 0, then enter 0 on this line and go on to #7.

-- If B is scored 2, then enter 2 on this line and go on to #7.

-- Otherwise, please enter the higher of scores C and D here and go on to #7.
8, 9. Forest Value and Watershed Integrity

- These scores require GIS resources from the VCLNA
- Forest Value: a composite measure of the biological and economic value of forest land
- Watershed Integrity: a composite measure of the contribution of land to water quality, both surface and ground water
A tract with Forest Value layer on
### 9. Special Scenic Vistas

<table>
<thead>
<tr>
<th></th>
<th>Does this tract contain a scenic vista or overlook that is popular with tourists and the local community? (You will need to use personal knowledge of local scenic attractions to score this item.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Note: <em>please do not include overlooks from the national scenic byways or national park vistas in this item. These have been accounted for in criterion #4.</em></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>If no, score = 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>If yes, score = 1</td>
</tr>
</tbody>
</table>

**Total Score:**

-- Please enter the score for line A here
Scoring Wrap Up

- Community Scale (class 3+) is scored separately from Utility Scale (class 4+).
- Both scoring systems are fundamentally the same. They differ only where size matters (acreage, potential # of turbines, etc.). In these situations, the scoring is tweaked to reflect the differences (eg, parcel fragmentation, available acreage).
- What about public lands???
How to Use the Scores

- Scores can be measured against the “ideal” maximum of 30, which reflects a tract with no preliminary limitations for wind power.
- Scores can be used to evaluate one tract against another.
- Scores will highlight the strengths and weaknesses of different tracts for wind power development.
- Allows communities to highlight their most sensitive places and concerns.
- Allows jurisdictions to incorporate wind power into the comprehensive plan or zoning.
A Hypothetical Case

- We started w/ 6 tracts
- No power lines for tracts 3 and 4
- We score tracts 1, 2, 5, 6 for Community Scale Wind