Scales of Wind Energy
Wind Turbine Size and Terminology

- **The Industry**: defines a wind turbine by its generating capacity
  - Small wind < 100 kW, Large wind > 100 kW
- **The Public**: defines a wind turbine by its physical size
  - How big/tall is it? How many turbines?
- **Net-metered**
- **Grid-connected, grid-tied**
- **Nameplate capacity**: rated maximum output
- **Capacity factor**: estimates energy output
## Wind Turbine Size and Terminology

<table>
<thead>
<tr>
<th>Category</th>
<th>Nameplate Capacity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onsite</td>
<td>≤ 10 kW (residential) ≤ 500 kW (commercial)</td>
<td>These systems are small, either stand-alone or net metered, and would probably involve only 1 turbine.</td>
</tr>
<tr>
<td>Community</td>
<td>≤ 10 MW</td>
<td>Community-scale projects are typically either net metered or connected to the local distribution network, but could be connected to transmission. These projects are typically owned by and serve the community, and operate less than 5 turbines. In the Midwest, there are community wind systems that are also “utility scale” using our definition.</td>
</tr>
<tr>
<td>Utility</td>
<td>&lt; 50 MW</td>
<td>Industrial-scale wind power projects are most often developed by a company that either will own or sell the project for the purpose of realizing a return on their investment.</td>
</tr>
<tr>
<td></td>
<td>≥ 50 MW</td>
<td>An industrial-scale wind power project equal to or greater than 50 MW nameplate capacity is subject to the full approval process by the Commonwealth’s State Corporation Commission.</td>
</tr>
</tbody>
</table>
Onsite Systems

A 1-kW Bergey in Floyd, VA
Height: ~ 45 ft

A 20-kW Westwind in Ireland
Height: ~ 60 ft
Community Wind Power

A 100-kW Northwind in MA
Height: ~ 120 ft

A 50-kW Atlantic Orient in VT
Height: ~ 80-90 ft
Community Wind Power

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

Bear Creek Wind Power Project near Wilkes-Barre, PA, as seen from the PA Turnpike. These are 2.0 MW Gamesa Turbines.
Vertical Axis Wind Power
Flow over hills and obstacles

Good Sites

Speed up effect over smooth hills

Turulence

Bad Sites

Turbulence at top and bottom of cliffs or sharp ridges

Obstacles

Site clear of obstacles by at least 10 x the height of the obstruction or use a very tall tower
Questions?

Jonathan J. Miles, Ph.D.
Director

Remy Pangle
Associate Director,
Curriculum Coordinator

Blaine Loos
Project Facilitator,
Education Coordinator

Cindi Smead
Administrative Assistant

Dane Zammit
Data Manager

Deanna Zimmerman
Outreach Coordinator

1401 Technology Drive, Suite 120
MSC 4905
Harrisonburg, VA 22807
540-568-8770
vacenter4windenergy@jmu.edu

www.windpowerVA.org
www.offshorewindVA.org

Visit our Facebook Page to ask questions, give feedback, see current events and project photos, and stay up-to-date on what’s happening at the Center and with wind energy throughout Virginia!

Join our LinkedIn Group to engage in discussions, participate in polls, read current articles, and ask questions!

Skype us via VACenterforWindEnergy to ask questions or just chat with us!