WIND ENERGY EDUCATION IN VIRGINIA
CURRICULA: PRESENT AND FUTURE

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Virginia Wind Energy Symposium, June 2012
OUTLINE

• Importance of Wind Energy Education
• Current Wind Energy Resources
• DOE Energy Literacy Principles
• Current Activity Development
• Future Needs
IMPORTANCE

• Need for informed citizens
• Future of the wind industry workforce
• Addresses STEM concepts using real world issues
• Concepts for all grades
• Multi-disciplinary nature of the industry is good for integrating subjects
AVAILABLE RESOURCES
AVAILABLE RESOURCES

Virginia Center for Wind Energy

- Classroom visits
- Campus tours
- Teacher training
- Online repository of online resources
- WebQuests
- Lending library of kits
- Museum events

http://wind.jmu.edu/education/
**Virginia Wind for Schools**

- Host a wind turbine at your school
  - School will have to raise about $1,000-4,000 for the installation and write grants for remaining $10-15,000

- Borrow a meteorological tower to measure the wind

- Use data in the classroom

- Teachers trained on wind energy curricula
Virginia KidWind Challenge

- Saturday, March 17th and June 16th, 2012
- Teams of 2-4 students compete to build their own wind turbine that can generate them most electricity
- 13 teams competed
- $6,500 in prizes from sponsors
PAST STUDENT BLADE DESIGNS
Energy Literacy: Essential Principles and Fundamental Concepts for Energy Education

• Sponsored by the Department of Energy (DOE) and the American Association for the Advancement of Science (AAAS) in the fall of 2010

• Presents energy concepts to help individuals and communities make informed energy decisions

• Focus on areas of energy understanding that are essential for all citizens

• Offers a framework upon which curricula can be based without prescribing when, where, or how content is to be delivered
# Energy Literacy: Essential Principles and Fundamental Concepts for Energy Education

<table>
<thead>
<tr>
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<th>Principle</th>
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<tbody>
<tr>
<td>1</td>
<td>Energy is a physical quantity that follows precise natural laws.</td>
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<td>2</td>
<td>Physical processes on Earth are the result of energy flow through the Earth system.</td>
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<td>3</td>
<td>Biological processes depend on energy flow through the Earth system.</td>
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<td>4</td>
<td>Various sources of energy can be used to power human activities, and often this energy must be transferred from source to destination.</td>
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<td>5</td>
<td>Energy decisions are influenced by economic, political, environmental, and social factors.</td>
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<td>6</td>
<td>The amount of energy used by human society depends on many factors.</td>
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<td>7</td>
<td>The quality of life of individuals and societies is affected by energy choices.</td>
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Guiding Principle for Teaching and Learning

1. People are born investigators and learners
2. Effective learning focuses on a core set of ideas and practices
3. Understanding develops over time
4. Literacy requires both knowledge and practice
5. Connection to interests and experiences enhances learning
6. Educational opportunities must be equitable and accessible
**Wind Energy Activity Development**

- JMU Course “Wind in K12” for pre-service teachers
  - ID gaps in the currently available curricula
  - Content lectures
  - Develop lesson plans on topics not covered or not covered as well as would like
  - Many activities created on lift principle/aerodynamics, gears, site and resource assessment
- Activities about transmission and grid operation
- Activities using industry standard software (Windographer, GIS, etc.)
- Board games
- Museum exhibits
**Next Steps**

- Continue to create curricula to meet the needs of the Energy Literacy principles
- Continue to fill gaps in curricula pertaining to key wind energy topics
- Create teacher focus group to help evaluate new activities
- Train more teachers as facilitators in VA – diversify training locations
- Research on what the students are learning. How is it helping learn concepts?
- Need to promote engineering in lower grade levels – i.e. Children’s Engineering
THANK YOU!

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