Three Goals of Regional Energy Policy

1. High Energy Surety
2. Low Energy Costs
3. Increasing Energy Jobs

- Energy Security is also a priority in Hampton Roads
Electricity Prices by State, July 2012

Virginia

11.52

Source: Energy Information Administration
Electricity Use vs Generation in H.R.

<table>
<thead>
<tr>
<th></th>
<th>Virginia</th>
<th>Hampton Roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produce</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consume</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Import</td>
<td>40M MWh</td>
<td>4.3M MWh</td>
</tr>
<tr>
<td></td>
<td>(35.9%)</td>
<td>(18.2%)</td>
</tr>
</tbody>
</table>

Source: Energy Information Administration, eGrid 2012, HRPDC
Current Capacity and Outlook in H.R.
Net Generation in Hampton Roads, 2009

- Nuclear: 67%
- Coal: 28%
- Oil: 2%
- Gas: 1%
- Biomass: 2%

Source: Energy Information Administration eGrid 2012, HRPDC
Potential Energy Technologies in Hampton Roads

- Biomass and Biofuels (x)
- Coal (✓)
- Offshore Wind (x)
- Offshore Oil & Gas (✓)
- Natural Gas (x)
- Nuclear (✓)
- Solar (x)
Levelized Cost of New Electricity Generation Capacity Installed in Virginia and Carolina’s in 2017

2010 $'s Per Megawatt-Hour of Electricity

- Advanced Combined Cycle Natural Gas
- Wind
- Advance Nuclear
- Advanced Coal
- Biomass
- Solar PV
- Offshore Wind

Source: Energy Information Administration
Coal

Source: The Virginian-Pilot
Coal Reserves

- US: 28%
- Russia: 18%
- China: 13%
- Australia: 9%
- India: 7%
- Rest of World: 25%

Years of Reserves at Current Rate Production

<table>
<thead>
<tr>
<th>Country</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>239</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>471</td>
</tr>
<tr>
<td>China</td>
<td>33</td>
</tr>
<tr>
<td>Australia</td>
<td>184</td>
</tr>
<tr>
<td>India</td>
<td>103</td>
</tr>
</tbody>
</table>

Source: BP Statistical Review of World Energy 2012
Offshore Natural Gas and Oil

- BOEM Lease Sale 220
- Estimated
  - 130 barrels of oil
  - 1.14 trillion cubic feet of gas
- Citi estimates mid-Atlantic offshore development could not be online until 2022
- Many unknowns

Source: Bureau of Ocean Energy Management
Offshore Wind - Manufacturing Potential

- No first mover advantage
- Cape Wind
- Deepwater (Rhode Island)
- All mid-Atlantic sites proceeding at the same pace

Source: Bureau of Ocean Energy Management
Offshore Wind

- Atlantic Wind Connection 2021
- Dominion would not use Atlantic Wind Connection
- Probably no turbine construction prior to 2018 at the earliest.
- Turbines are still very expensive - levelized cost of $340/MWh

Source: Bureau of Ocean Energy Management
## Offshore Wind

### Potential Virginia Employment Impact from a 2000 Megawatt Offshore Wind Farm

<table>
<thead>
<tr>
<th>Phase</th>
<th>Per MW</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turbine Components</td>
<td>1</td>
<td>2,000</td>
</tr>
<tr>
<td>Wind Farm Installation</td>
<td>11</td>
<td>22,000</td>
</tr>
<tr>
<td>Total from Construction</td>
<td></td>
<td>24,000</td>
</tr>
<tr>
<td>Yearly Operation and Maintenance</td>
<td>0.7</td>
<td>1,400</td>
</tr>
</tbody>
</table>

Source: South Carolina Wind Energy Supply Chain Survey and Offshore Wind Economic Impact Study, HRPDC
Nuclear

Nuclear Generation, 2011

Top 10 Countries

United States
France
Russia
Japan
South Korea
Germany
Canada
Ukraine
China
United Kingdom

Note: The remaining twenty-one other countries account for 417 billion KWh (17% of the total world nuclear generation).


Surry Power Station
Source: Dominion Resources
Policy Recommendations

- Avoid the temptation to pick winners
- *Energy efficiency is the most cost effective way to meet energy needs*
- *Maintain simple permitting processes for distributed energy technologies*
- Recognize that some questions are policy questions and not economic or energy questions
- Support the Hampton Roads Energy Corridor
  - *Multi-tiered rate structure*
Energy Options

- Approval of “Hampton Roads Energy Options” is Consent Agenda Item 9F

Comments