Mid-Columbia Region
Clean Energy Opportunities
Clean Energy in the Mid-Columbia Region

- The Mid-Columbia region of southeast Washington offers outstanding opportunities for creation of an industrial base for clean energy and other developments.
The Mid-Columbia Region of Southeast Washington

- Plateau terrain
  - Steppe
- Rich in agriculture
  - Wheat, corn, grapes, alfalfa
- Rivers run through it
  - Columbia, Snake, Yakima
- Rich heritage
  - Cultural
  - Historic
  - Geologic
Clean Energy: Scoping some potential markets

- National needs – fuel consumption
  - Forecast fuel use increased 3.1 million barrels per day by 2035

- Pacific Northwest region - electricity use
  - Forecast 7,000 MW increase in electricity use through 2030

- U.S. Department of Defense regional consumers
  - 3 Air Force Bases, 2 major Army facilities, and 1 Naval shipyard in the Pacific Northwest Region
  - Columbia River provides access from inland areas to West Coast and Pacific commands

- U.S. Department of Energy – Hanford Site
  - Forecast 60 MW increase in consumption by 2020
  - Required reductions in petroleum use and greenhouse gas production
Regional Attributes

- Low cost of doing business
- Roads, Rails & Rivers
  - Diverse transportation infrastructure built up around DOE/DOD and agricultural needs
- Capable & highly educated workforce
- Available reserved water rights and clean, low cost electricity
- Robust community support
Mid-Columbia Region rich in agricultural waste resources

- Region within 150 road miles of Richland, Washington on the Columbia River grew 7.5 million tons of wheat straw in 2007
  - Enough to manufacture >300 million gallons of liquid fuel annually, or ~1,000 megawatts of electricity continuously

- Other crops produce usable smaller amounts
  - Alfalfa, grapes, corn

- Pacific Northwest economics conversion to liquid fuels and chemicals over electricity
  - Varies with market conditions, time of year, etc.
Biomass Availability and Cost Delivery by truck

Cost of Straw Delivered to Port of Benton by Truck, $/ton

Straw by County, tons/yr

Washington
Oregon
Idaho

Whitman
Umatilla
Lincoln
Walla Walla
Adams
Grant
75 MW Boiler or Peaker or
22 million gallons/year Refinery
Benton
Columbia
Franklin
Morrow
Douglas
Nez Perce
Latah
Spokane
Garfield
Yakima

Environmental Management

safety • performance • cleanup • closure
Feedstock Logistics

- Transportation of large amounts (>1M tons/yr) of biomass) to processing points will provide economic advantage for large developments through economies of scale
  - Feedstock logistics costs can represent up to one-third of the final end product cost, so minimizing cost throughout the supply chain is crucial.
- The DOE Biomass Program has invested $21.3M in feedstock logistics demonstration projects to focus on commercial equipment availability
- Commercial development of lightweight, multi-modal rail cars enables reduced cost for movement of large amounts of biomass
- The end result will be reduced delivered feedstock costs to bring the biomass industry into cost-competitiveness with conventional fuel production
Resource and Infrastructure Map
Solar Findings

- Large-scale concentrating solar generation in this region is a difficult commercial proposition
  - Concentrated Solar power not expected to be economically viable
    - Low Solar Factor
    - High costs vs. photovoltaic technology
- Photovoltaic solar deployment mature, modular and potentially cost effective
  - Costs have fallen sharply in past 2-3 years
  - Sites and interconnections to support photovoltaic deployment readily available
    - Commercial and government
Wind Findings

- Wind energy generation already widely deployed in the region
  - Most commercially developed renewable resource in the region
  - Springtime production was recently curtailed due to restrictions on grid integration with hydro
  - Wind resources in the immediate Tri-Cities area are limited

- Ancillary Services required to integrate existing and planned wind power to the grid may provide an opportunity to deploy energy storage and clean generation technologies
Conclusion: The Promise of the Mid-Columbia Region

• The Mid-Columbia region has a combination of attributes needed to become a leader in clean energy technology and industry
  – Resources
  – Infrastructure
  – Supportive Community

• A positive and supportive community environment exists in the region to help create new clean industries in the Mid-Columbia region
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