



Energy Assurance Update

Presented to:

Wyoming Infrastructure Authority

Board Meeting – April 27, 2010

Laramie, Wyoming

Background

- Wyoming has abundant **supply** of wind, natural gas, coal
- Other State's RPS **demand** renewable energy
- Wyoming's load is low but transmission system is **limited**
- Multiple transmission export lines are **proposed** in Wyoming
- Consider **line spacing, collector system, and wind variability**

August 2009 study: Address transmission line **spacing/reliability**

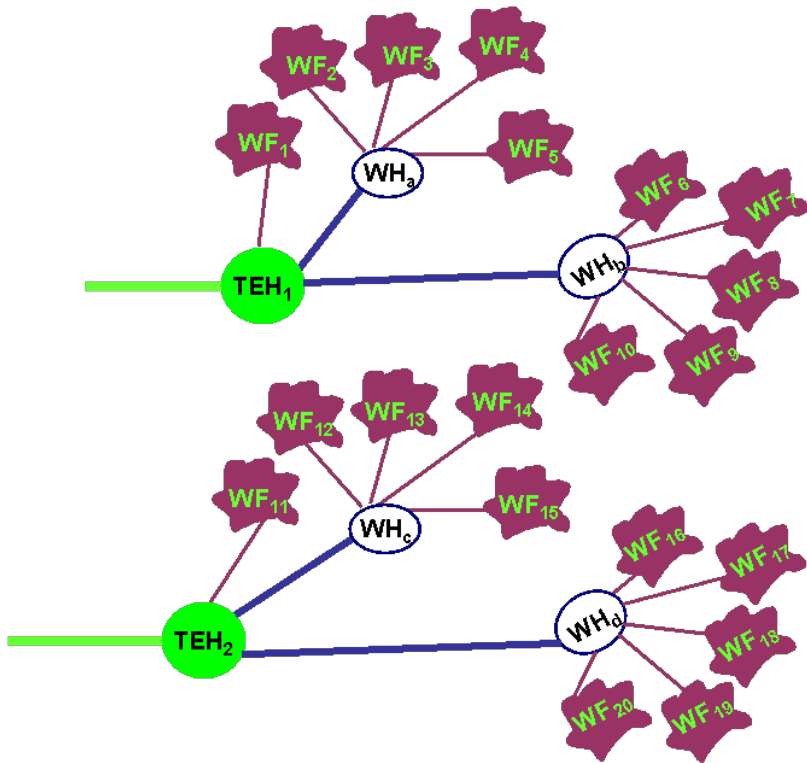
February 2010 study: **Connect** wind farms to transmission export lines

Separation Distance – How Much is Enough?

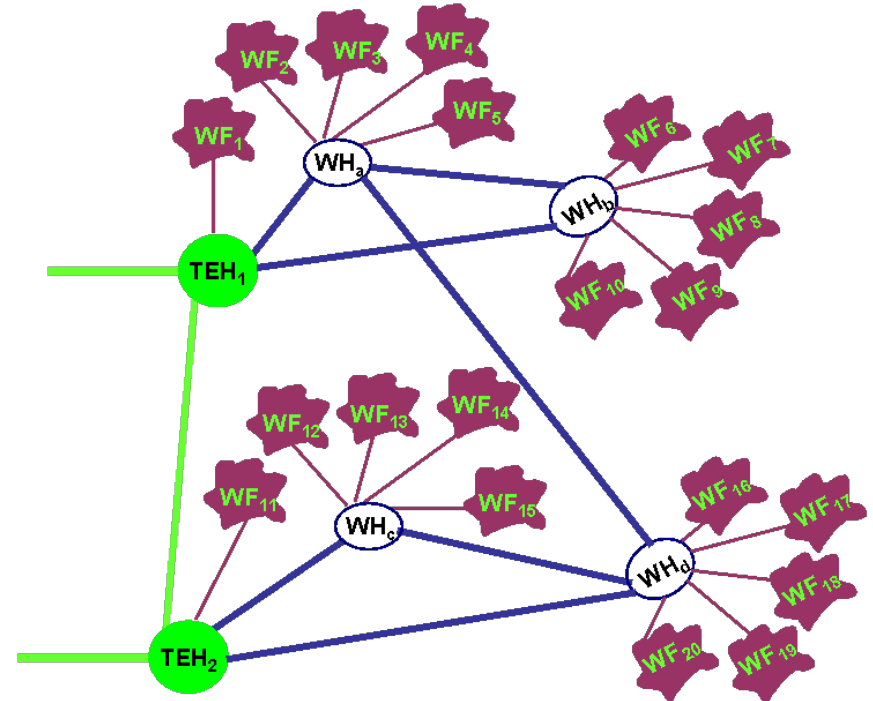


Two Primary Collector System Designs

Radial



Networked

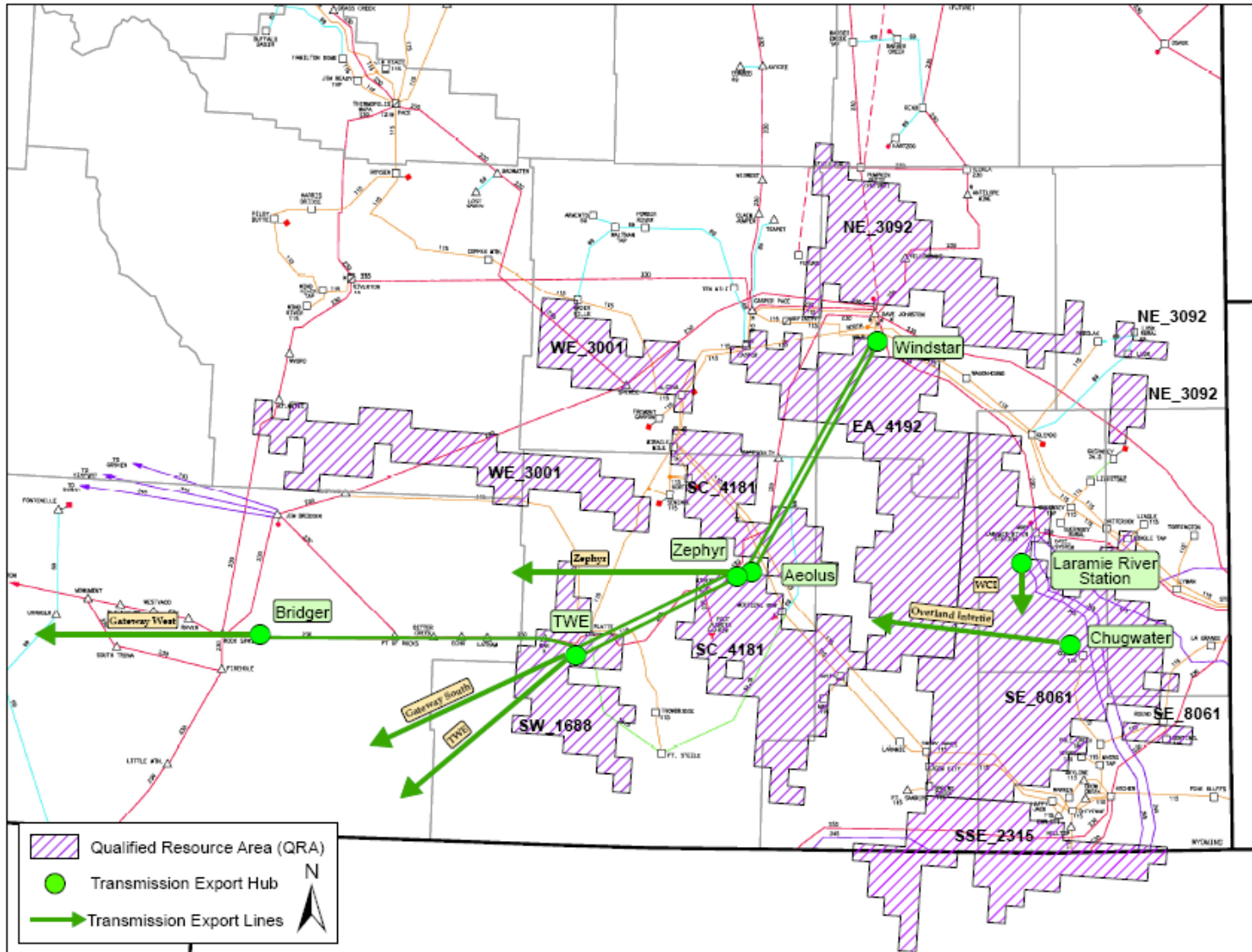


Current Energy Assurance Tasks¹

1. Develop criteria for identifying constraints and opportunities
2. Determine commercial business model for collector system
3. Analyze fossil/renewable energy integration issues

¹ — Contract with Wyoming State Energy Office in partnership with Wyoming Infrastructure Authority.

Task 1: Constraints and Opportunities



Task 3: Background

- Renewable energy can exhibit intermittency that must be managed by the entire infrastructure network.
- Natural gas generation can provide “complimentary” generation to supplement wind generation intermittency.
- Only recently have studies addressed interactions and interdependencies of the electricity and gas networks.

Task 3: Objective

- Scoping and preliminary analysis of issues as they affect the development of wind energy in Wyoming.
- Estimate the total system cost for 5 scenarios to gain insight into which offers the best opportunity for the competitiveness of wind generation in Wyoming.
- Five scenarios “bracket” system costs of alternative configurations.

Task 3 is Not...

- A detailed engineering study of total requirements.
- A system optimization.

Task 3: The Scenarios Include

Building renewable generation in WY with:

1. Gas power plants in WY and gas storage in WY
2. Gas power plants in WY and gas storage in CA
3. Gas power plants in CA and gas storage in CA
4. Electricity storage in WY
5. Electricity storage in CA

Next Steps

- Ongoing work through 2010
- Final Report due December 31, 2010