The Wind Coalition

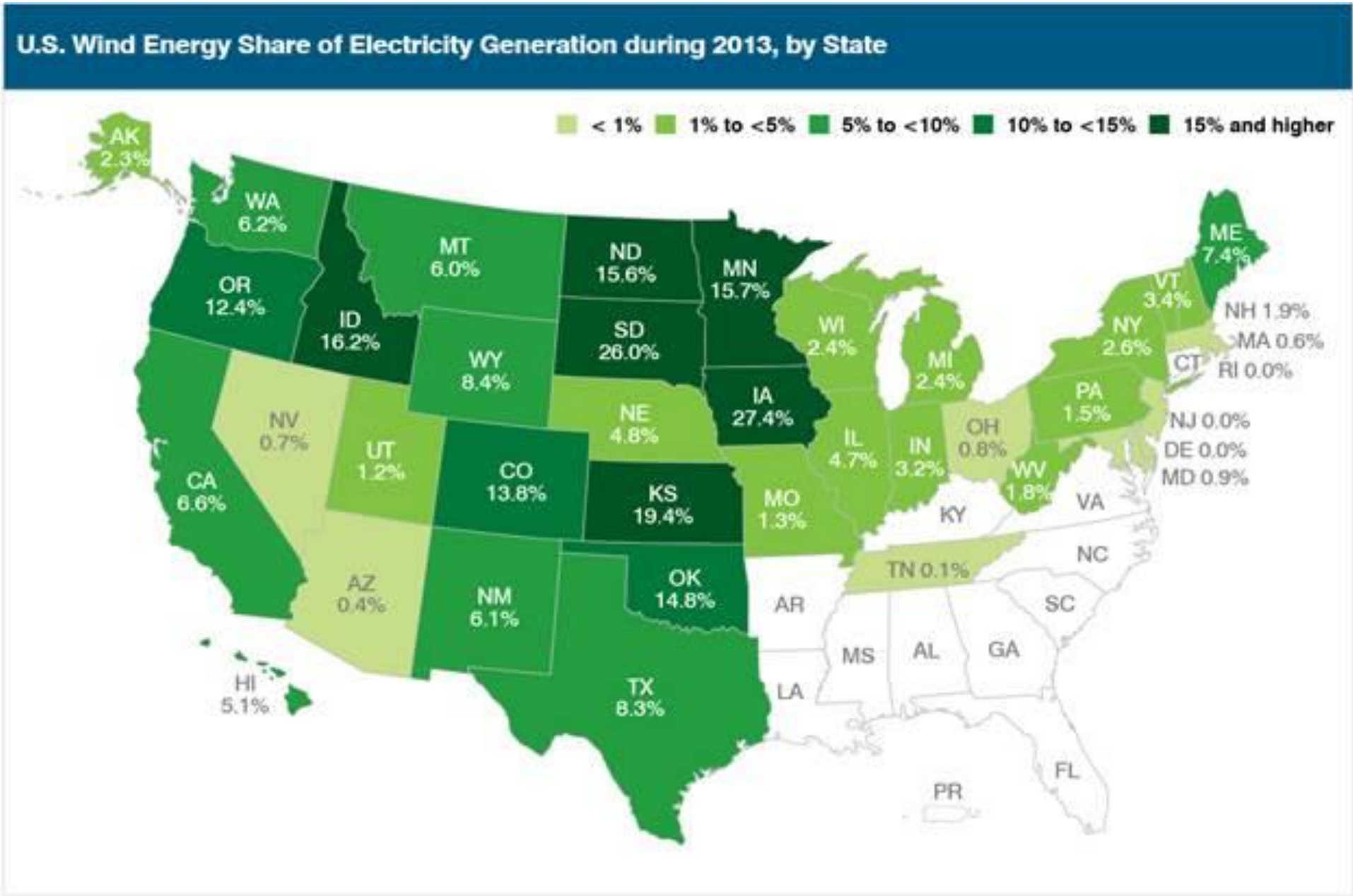
WIND ENERGY IN KANSAS

SENATE UTILITIES COMMITTEE

KIMBERLY SVATY, THE WIND COALITION

21 JANUARY 2015

U.S. is reliably integrating large amounts of wind



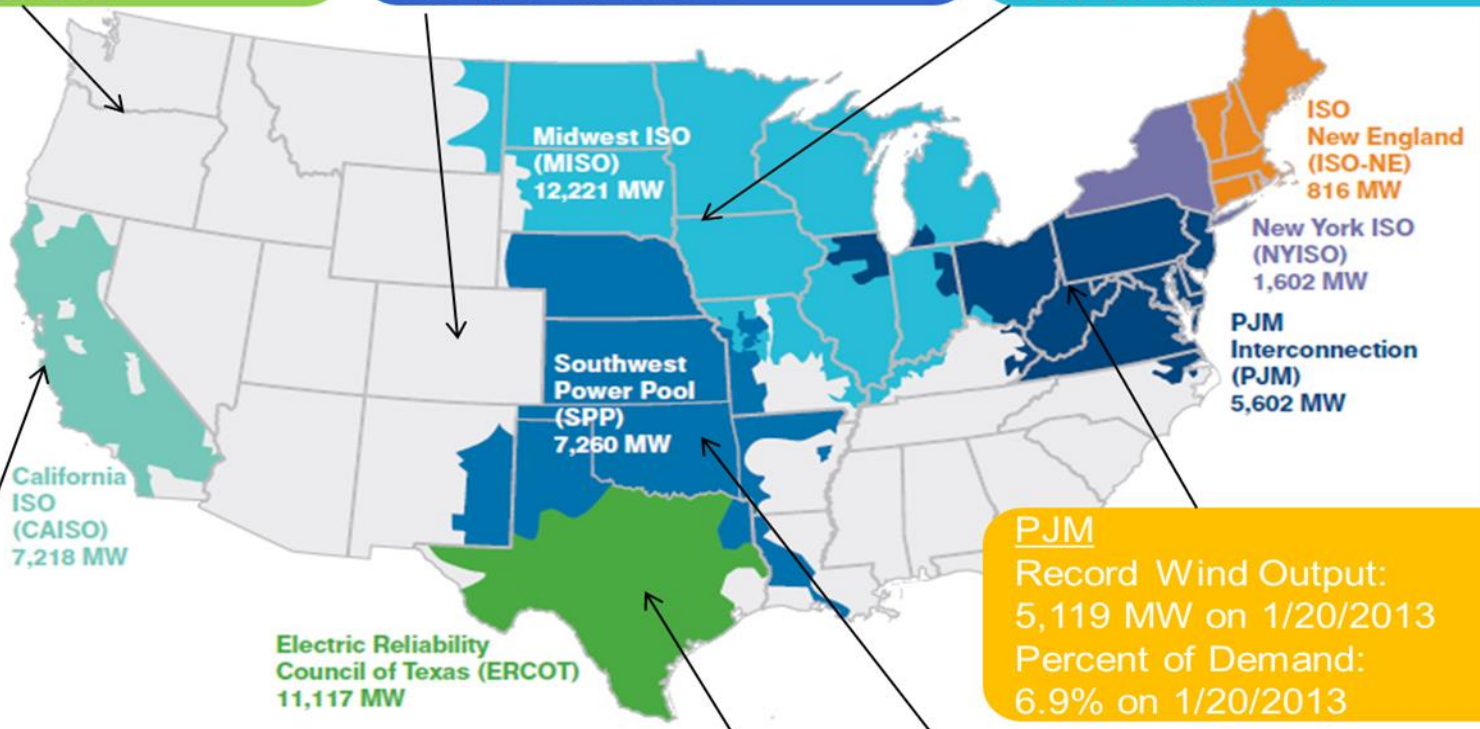
U.S. wind generation records

Wind saved SPP ratepayers $1.2B in 2013

Bonneville Power Administration
Record Wind Output:
4,512 MW on 2/22/2013
Percent of Generation:
39.9% on 10/20/2012

Xcel Energy Colorado
Record Wind Output:
1,874 MW on 5/24/2013
Percent of Demand:
60.5% on 5/24/2013

MISO
Record Wind Output:
10,012 MW on 11/23/2012
Percent of Demand:
25% on 11/23/2012



PJM
Record Wind Output:
5,119 MW on 1/20/2013
Percent of Demand:
6.9% on 1/20/2013

CAISO
Record Wind Output:
4,768 MW on 4/12/2014
Percent of Generation:
17.5% on 4/7/2013

ERCOT
Record Wind Output:
10,296 MW on 3/26/2014
Percent of Demand:
39.7% on 3/31/2014

SPP
Record Wind Output:
7,202 MW on 3/18/2014
Percent of Demand:
33.4% on 4/6/2013

What Does Wind Energy Look Like in Kansas?

Overview of Wind Energy In Kansas

Kansas has the second best wind resource in the nation

6 Kansas wind projects signed PPAs & 1 announced construction since late 2013

873.5 MWs contracted for and 400 MW announced for construction

21 operating commercial wind projects in Kansas generating 2,967.50 MWs

Equates to more than $8 billion in capital investment, 13,000 new Kansas jobs manufacturing, construction, O&M, forecasting, engineering, development, etc

Key statistics:

- Percent of in-state production from wind energy in 2013 – 19.4%
- Kansas ranked 8th in the US in 2013 for percentage of electricity delivered from wind
- End of 2013, Kansas wind projects powered more than 870,000 average American homes
- Offset equivalent of 2,053,000,000 gallons of water

Wind Energy in Kansas

Development

Wind Projects in Kansas

State & Federal Policy

Role of Wind Energy

Jobs & Investment

Development

Critical Components

Construction

Siting

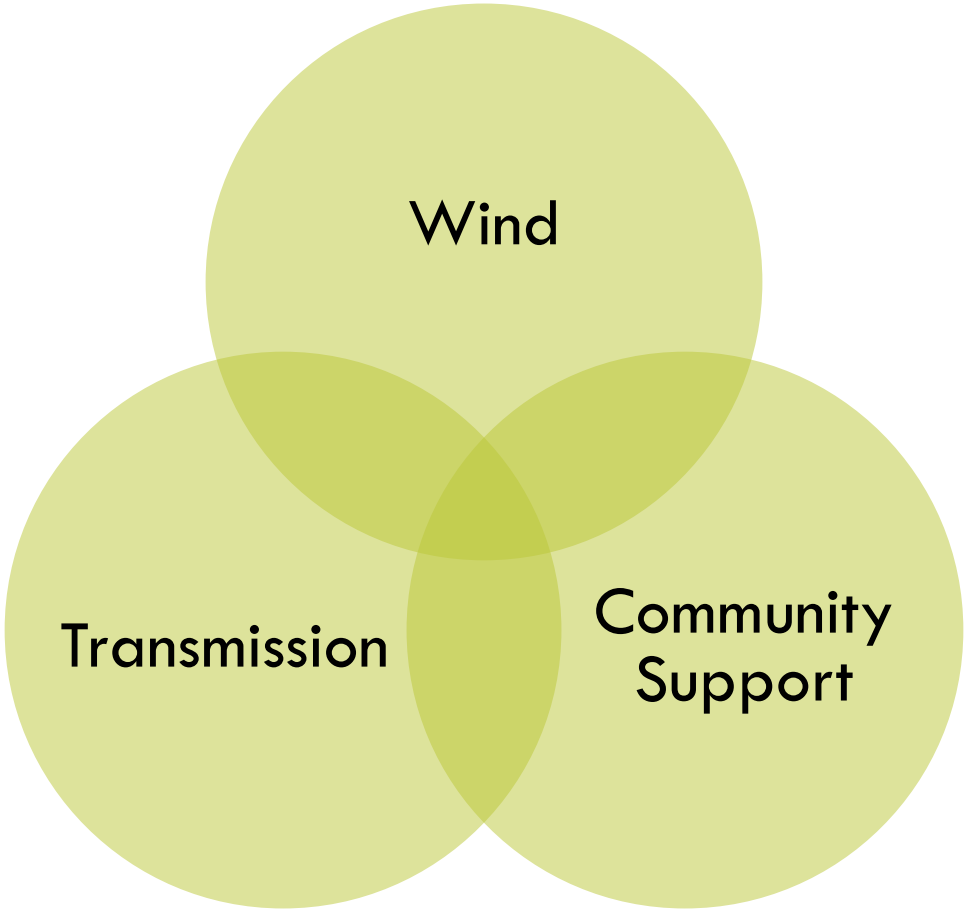
- Land use
- County jurisdiction & permitting, DOD, FAA
- Guidelines
- Tallgrass Heartland & Supreme Court case
- Decommissioning & Road Agreements
- Environmental Considerations

Transmission

- Generator Interconnect Agreements, Firm Path, Planning studies

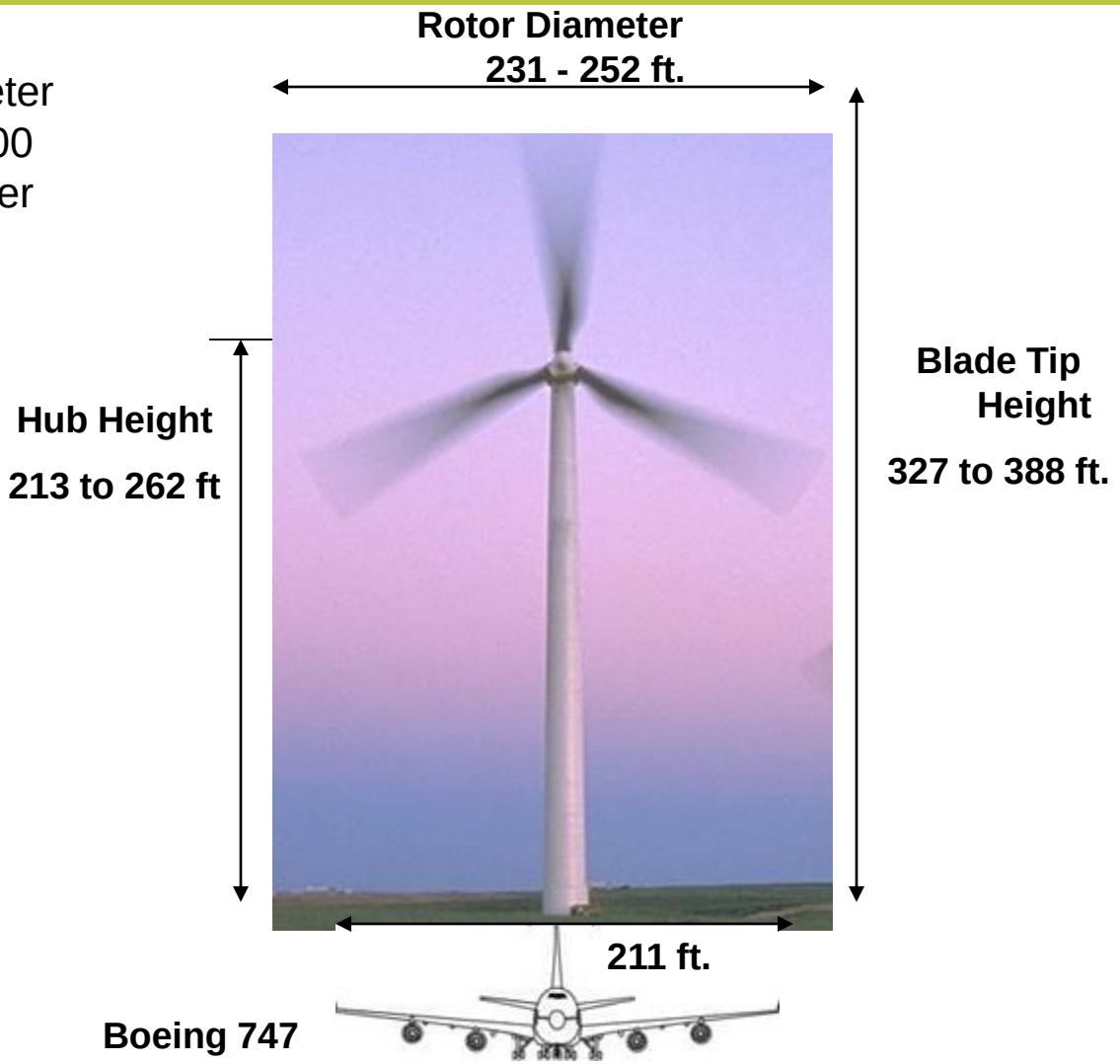
Critical Project Components

- Qualify wind resource
  - Multiple MET Towers 2+ years
- Community Support
- Minimal environmental issues
  - Avoid sensitive areas
  - Conduct rigorous avian/wildlife studies
  - Minimize disturbance to land
- Market evaluation
- Transmission access/capacity
  - ATC Studies
  - SPP Interconnection Filings



1.5 MW Wind Turbine Scale

Using 80 – 100 meter towers and 77 – 100 meter rotor diameter blades



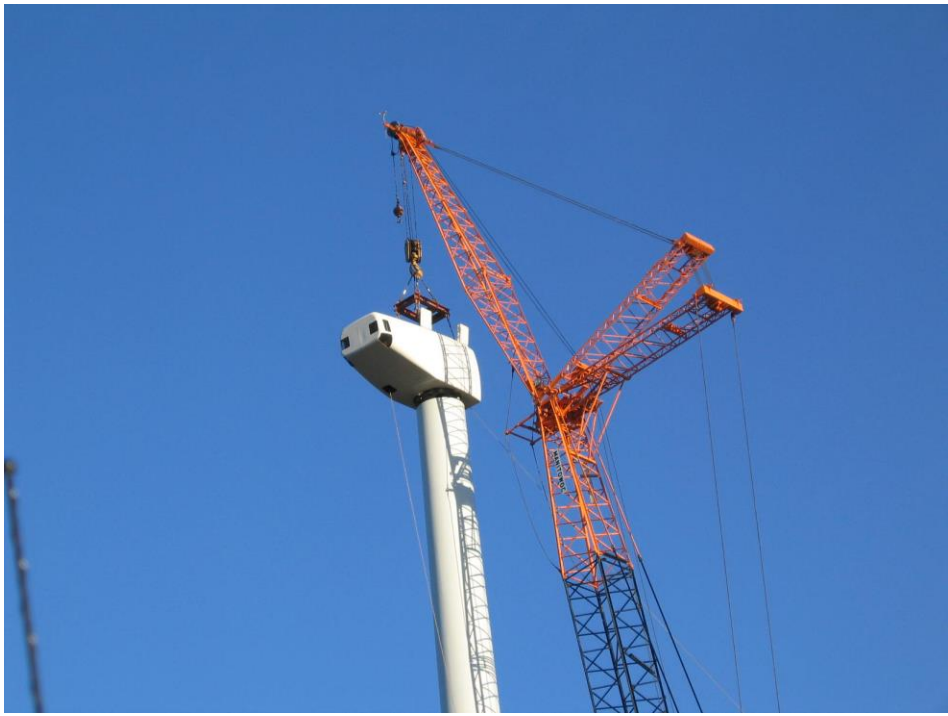
Excavated Foundation With Spread Footings

Tower Section

Base section = 16’ in diameter

Tower Sections

Tower Installation



Blade

Tower/Nacelle/Rotor

Operation & Maintenance

Completed Arrays

Siting Guidelines

State

- Wind Energy Siting Handbook: Guideline Options for Kansas Cities and Counties – April 2005
- The Kansas Renewable Energy Working Group has developed guidelines.
- KDWP&T has a position statement on wind projects.
- KDWP&T developed an online tool to help guide landscape scale development, such as wind energy facilities. The Kansas Natural Resource Planner is a dynamic, interactive mapping system that includes various GIS layers. Additions and upgrades to the NRP are ongoing.
- **http://www.kars.ku.edu/maps/naturalresourceplanner/**
- Nature Conservancy & other stakeholder groups

Federal

- Wind Power Siting, Incentives and Wildlife Guidelines in the United States
  - US Fish & Wildlife Service along with Association of Fish and Wildlife Agencies
  - October 2007
  - Various updates
- Lesser Prairie Chicken, Native Habitat Conservation Plans, Indiana Bat, Whopping Cranes
- FAA
- DOD
- NEPA

State Level Siting Guidelines

- 2003, the KREWG Environmental and Siting Committee drafted voluntary guidelines for stakeholders considering potential project sites in Kansas.
- Guidelines are meant to minimize various impacts that wind development may have, and focus on the following areas:
  - Land use;
  - noise management,
  - natural & biological resources;
  - visual impact;
  - soil erosion and water quality;
  - safety;
  - cultural, archaeological, paleontological, socioeconomic;
  - public service and infrastructure;
  - public interaction.

State & Regional Filings

- Kansas Corporation Commission
- Kansas Department of Health and Environment
- Kansas Dept. of Wildlife, Parks, and Tourism
- Kansas Department of Transportation
- Kansas State Historical Society
- Kansas Department of Agriculture
- Kansas Siting Guidelines

Wind Projects in Kansas

Operating Kansas Wind Projects – End 2014

Project Name	County	Developer	Size (MW)	Power Offtaker	Turbine Type (MW)	Installed Turbines	In-Service Year
Gray County	Gray	NextEra	112	MKEC KCP&L	Vestas 660kW	170	2001
Elk River	Butler	Iberdola	150	Empire	GE 1.5	100	2005
Spearville Spearville II	Ford	enXco	100.4 48	KCP&L	GE 1.5	67 48	2006 2010
Smoky Hills Phase I	Lincoln/ Ellsworth	TradeWind Energy	100.8	Sunflower – 50 KCBPU- 25 Midwest Energy – 24	Vestas 1.8	56	2008
Smoky Hills Phase II	Lincoln/ Ellsworth	TradeWind Energy	150	Sunflower – 24 Midwest – 24 IP&L – 15 Springfield -50	GE 1.5	99	2008
Meridian Way	Cloud	Horizon EDP	201	Empire – 105 Westar - 96	Vestas 3.0	67	2008
Flat Ridge	Barber	BP Wind Energy	100	Westar	Clipper 2.5	40	2009
Central Plains	Wichita	RES Americas	99	Westar	Vestas 3.0	33	2009
Greensburg	Kiowa	John Deere/ Exelon	12.5	Kansas Power Pool	Suzlon 1.2	10	2010
Caney River	Elk	TradeWind Energy	200	Tennessee Valley Authority (TVA)	Vestas 1.8	111	2011

Operating Kansas Wind Projects – End 2014

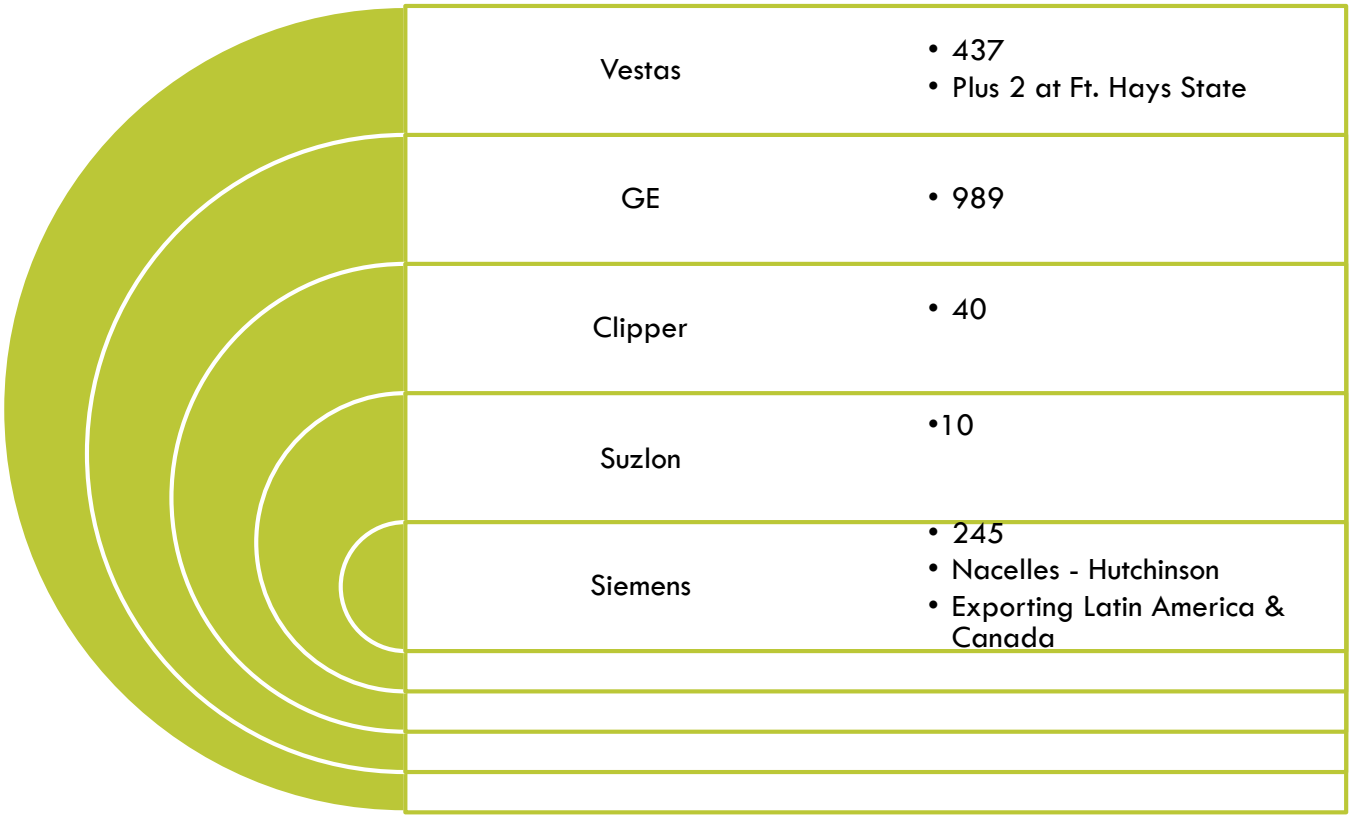
Project Name	County	Developer	Size (MWs)	Power Offtaker	Turbine Type (MW)	Installed Turbines	In-Service
Post Rock	Ellsworth Lincoln	Wind Capital Group	201	Westar	GE 1.5MW	134	2012
Ironwood	Ford Hodgeman	Infinity Duke Energy/ Sumitomo Corp. of America	168	Westar	Siemens 2.3MW	73	2012
Cimarron I	Gray	Competitive Power Venture (CPV) NextEra	165	Tennessee Valley Authority (TVA)	Siemens 2.3MW	72	2012
Cimarron II	Gray	CPV Duke Energy/ Sumitomo	131	KCP&L	Siemens 2.3MW	57	2012
Shooting Star	Kiowa	Clipper Infinity	105	Mid-Kansas Electric	GE 1.6MW	65	2012
Flat Ridge 2	Barber, Kingman, Harper & Sumner (gen tie line)	BP Wind Energy	470.4	AECI – 310.4 Arkansas Electric -51.2 SWEPCO - 108.8	GE 1.6MW	294	2012
Spearville 3	Ford	enXco (EDF Renewable Energy	100.8	KCP&L	GE 1.6MW	63	2012
Ensign	Gray	NextEra	99	KCP&L	Siemens 2.3M	43	2012
Buffalo Dunes	Finney, Grant, Haskell	TradeWind Energy	202	Alabama Power	TBD	TBD	2013

Announced Wind Projects

Project Name	County	Developer	Size (MWs)	Power Offtaker	Turbine Type (MW)	Installed Turbines	In-Service
Marshall Wind	Rush	RPM Access Wind Development	74	Missouri Joint Municipal Electric Utility Commission			2015
Buckeye Wind	Ellis	Invenergy	200	Lincoln Electric System			2015
Western Plains	Ellis	Infinity	400	To Be Announced			2015
Alexander Wind	Rush	NJR Clean Energy Ventures	49.5	KCBPU & Yahoo	Siemens 2.3 MW		2015
Waverly Wind	Coffey	EDP Renewables	200	KCP&L	Gamesa 2.0 MW		2016
Slate Creek Wind	Sumner	EDF Renewable Energy	150	Great Plains Energy	Vestas 2.0 MW		2015
Cedar Bluffs Wind	Ness Trego	NextEra Energy Resources LLC	200	Westar			2015

Turbine Types in Use in Kansas

1721 Installed Turbines in Kansas end of 2013



Why Kansas Leads the Nation

Kansas wind projects produce power on average more than 90% of the time.

The energy that wind projects produce is, on average, close to or above 50% of their nameplate, or maximum, capacity each year, a high utilization rate by industry standards.

Because of this performance, wind developers with projects in Kansas are signing power purchase agreements with in-state and out-of-state utilities with guaranteed pricing for twenty years in the $0.029 to $0.033 per kilowatt hour range (with the $0.02 PTC).

New turbine technologies have deployed in the last two years with taller hub heights further enhancing efficiency and driving down cost. There are now 500 component part facilities in 43 states including Kansas. At least 78% of the value of a wind turbine produced domestically compared to 25% in 2005.

Kansas has a stable and attractive policy environment.

State & Federal Policy

- Definition of Renewable Energy
- RPS Statute
- Retail Rate Docket
- Property Tax
- Federal Production Tax Credit

Definition of Renewable Energy

K.S.A 17-4652

"Renewable" energy as wind, solar, photovoltaic, biomass, hydropower, geothermal, waste incineration, landfill gas resources or technologies

Renewable Portfolio Standard

Senate Substitute for HB 2369 enacted in 2009:

- 10% by 2011, 15% by 2016 and 20% by 2020
- All electric utilities must file an annual report which includes: "the calculated percentage increase in the utility's revenue requirement and retail utility rates that would be caused by compliance with the act's portfolio requirement for the year." Filing by August 1 annually
- Nameplate based – not energy sales
- Allows for owned or purchased generation, some RECs and net metering capacity
- 1% price cap & KCC exemption
- 10% in-state "sweetener" *1MW counts for 1.10MW*
- Allows some RECs purchase for compliance – 2 year use window

RPS Compliance

All utilities have met the 10% by 2011and 15% by2016 benchmark

Signed PPAs for projects currently under construction will bring all impacted into compliance several years before the final 20% by 2020 benchmark

Retail Rate Docket

- HB 2526 passed by Legislature in 2012
- "The commission shall annually determine the annual statewide retail rate impact resulting from affected utilities meeting the renewable energy requirement."
- Report annually issued on March 1 – Governor, House & Senate Utilities
- 2013 report
  - Average retail rate for Kansas electric customer is $0.09/kwh
  - RPS compliance impact 1/16 of a cent
- 2014 Report
  - Energy from renewable resources counts for about 0.21 cents of the about 9.55 cents per kWh retail electricity cost in 2013 across the state

Exported Wind Power

Wind generation exported to other states does not count toward RPS compliance.

Questions about how Kansas wind power is treated for Clean Power Plan compliance? For Kansas or purchasing utility in other state?

Export projects do not affect Kansas utility customer rates, but the construction and operation of these wind farms has positive economic effects on the citizens of Kansas.

Testimony provided by Bob Glass, Chief of Economics and Rates at the KCC to the Joint Committee on Energy & Environmental Policy 11.20.12

The Production Tax Credit

$0.022 per kilowatt hour for ten years

Extended in fiscal cliff negotiations, renewed end of 2014

- Granted approximately 2 additional weeks
- 1-Year extension – commence construction 1.01.15 from 1.01.14
- IRS ruling defining construction 5% of plant and additional project completion benchmarks

Once the market knows the path forward, the Kansas market will grow

- Project economics remain compelling due to excellent wind resource

Our product is top-shelf

- Strong capacity factors, attractive and stable policy environment, improving transmission grid, access to component parts, transportation system, qualified work force

Role of Wind Energy

- Generation comparisons
- Hedge
- Predictability
- Reserve Margin

Generation Comparisons

Comparisons of new wind generation vs. existing fossil fuel assets can be deceptive

New wind generation compares favorably with new fossil fuel and nuclear generation

- Lazard's Levelized Cost of Energy Generation 2014 study
- "Comparisons of the LCOE indicate that the cost of wind is less than new coal, new natural gas and new nuclear generation."

Existing fossil fuel generation is experiencing increasing cost pressures from environmental regulations

- KCC estimates cost of environmental upgrades at $3B for various EPA mandates

Wind As a Hedge

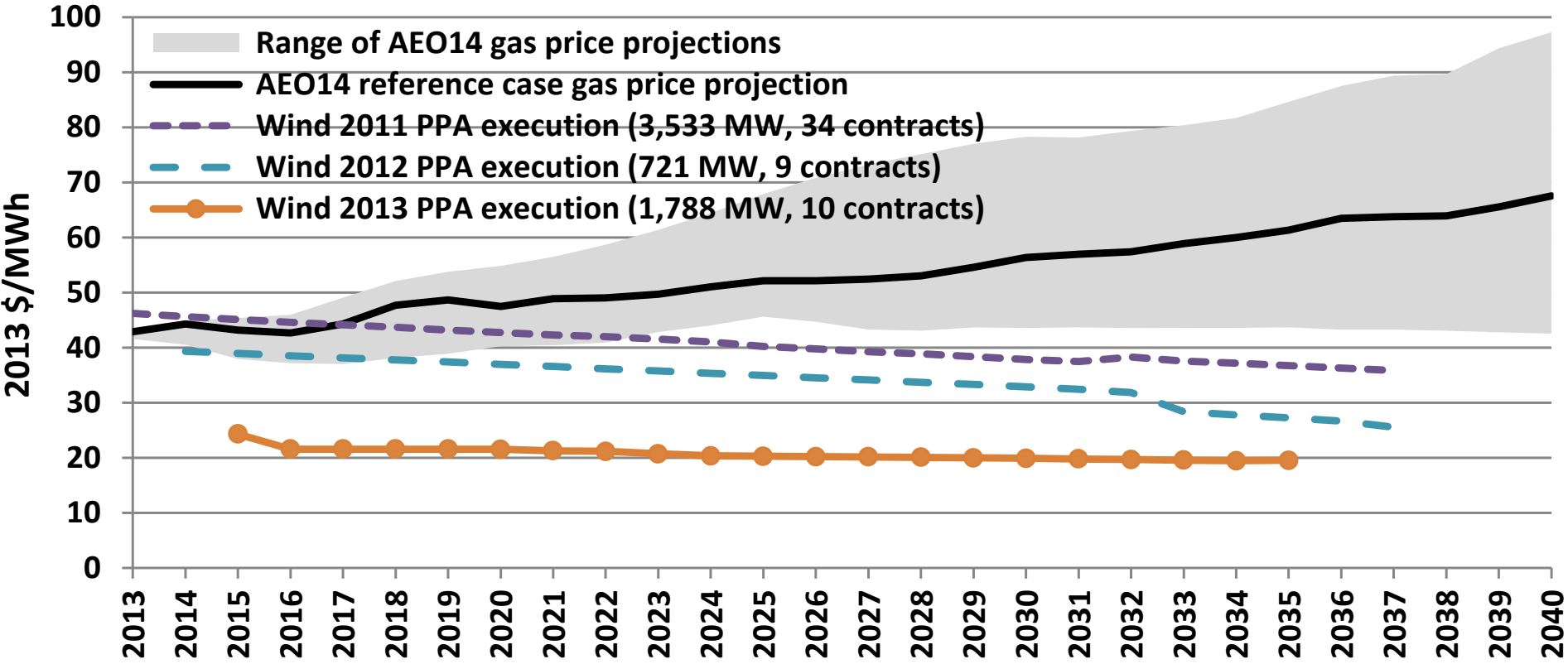
Wind is a part of a utility's balanced and diverse power portfolio.

- Helps offset volatile fuel costs
- Generation with a 20-year fixed price

Diversity in fuel location and fuel type

Purchase Power Agreement (PPA) vs. Ownership

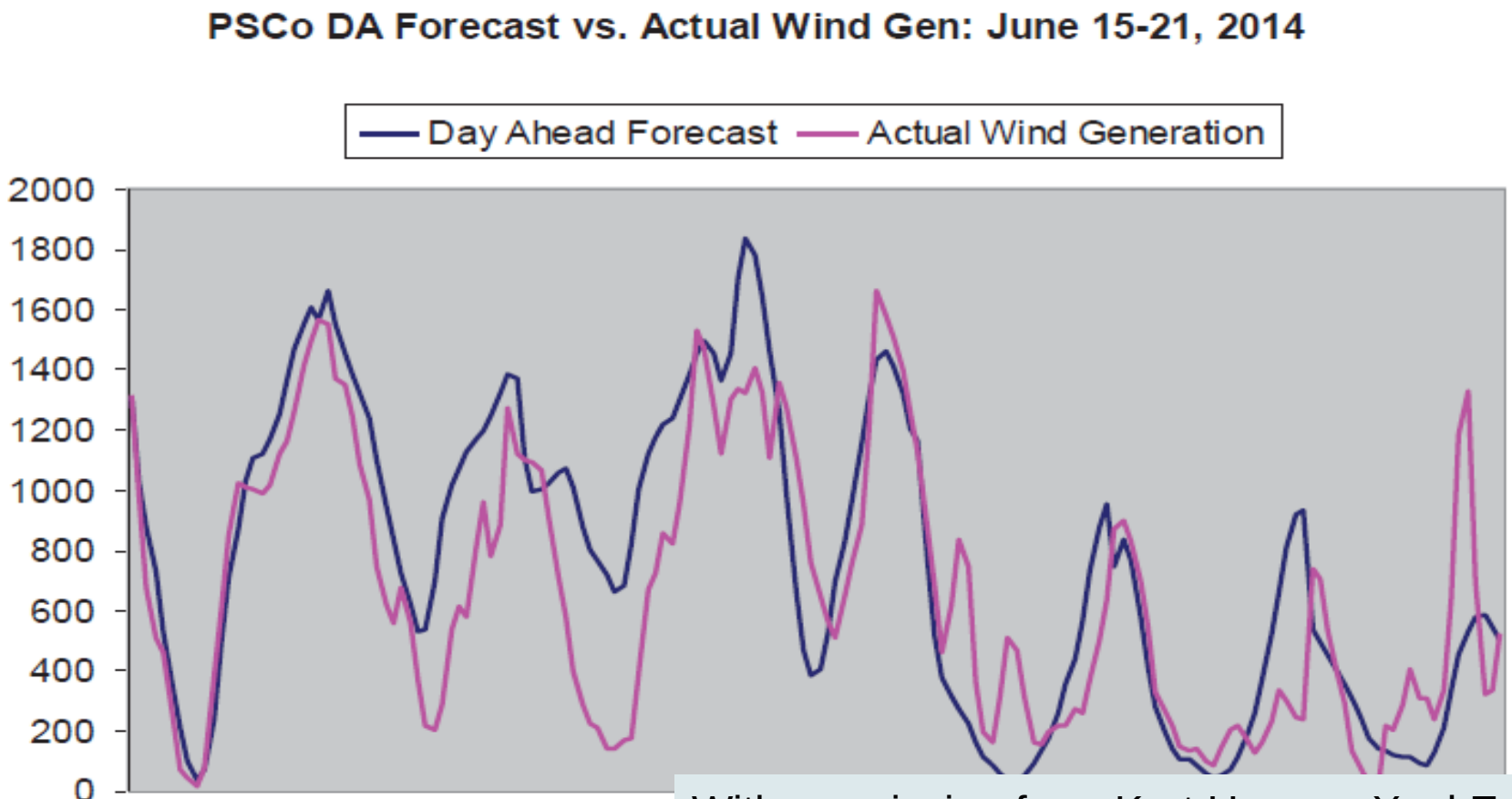
Wind Energy and Risk Management



Source: A Preview of the 2013 Wind Technologies Market Report, US DOE

Wind is Predictable

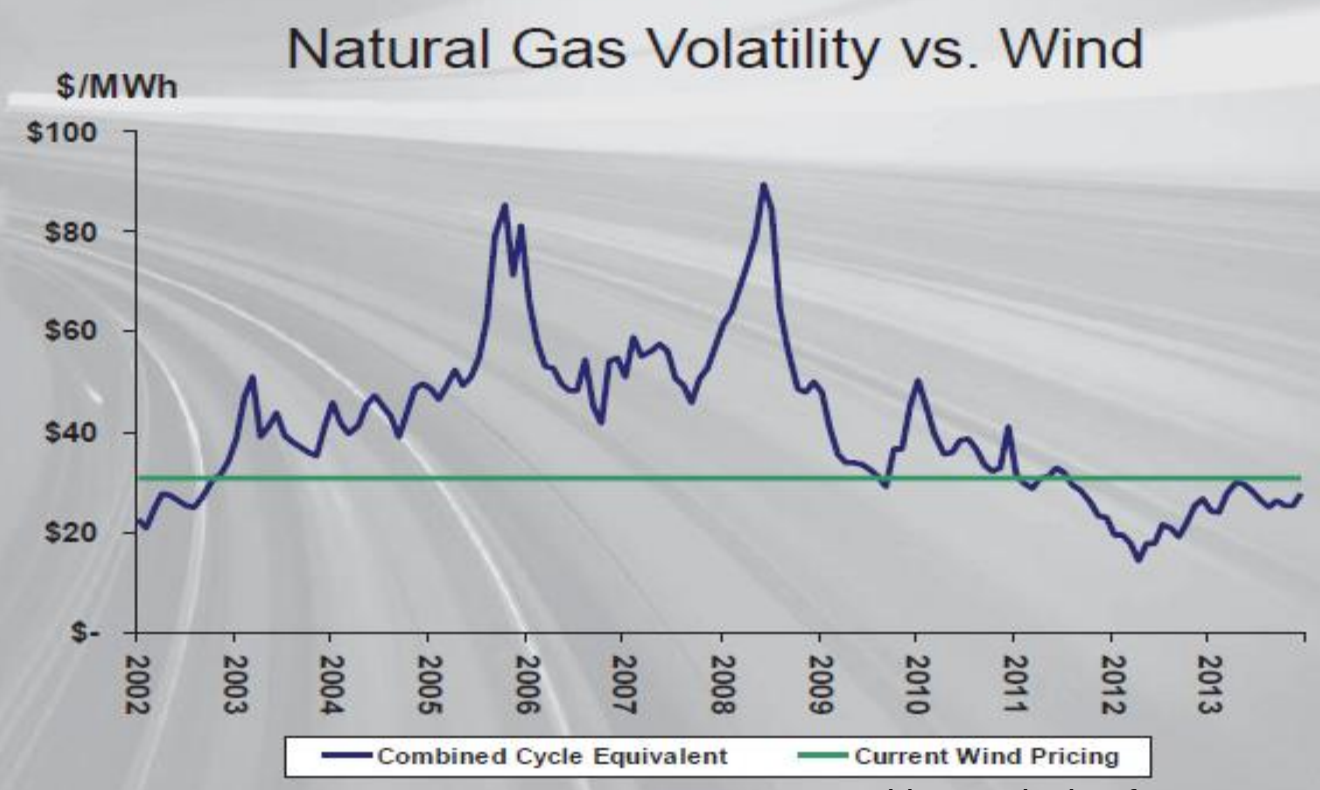
Ability to Forecast Wind



With permission from Kurt Haeger, Xcel Energy
Presentation to NARUC Gas Committee, July 15,

Wind is Predictable

Wind as a Hedge Against Price Volatility



With permission from Kurt Haeger, Xcel Energy
Presentation to NARUC Gas Committee, July 15,

Wind minimally increases reserve need

For the ~5,400 MW Westar power system:

Regulation reserve need without wind	**120.2 MW**
Regulation need with 400 MW of wind	**123.0 MW**

Source: Data submitted to Federal Energy Regulatory Commission by Kansas's Westar Energy on February 29, 2012.

Jobs & Investment

- Project Jobs
- Project Investment
- Donation Agreements
- Manufacturing
- Ripple Effect

Economic Impacts

- Capital investment in an average 200MW facility $400M
- Donation Agreements vary across project size
  - Smaller projects $300,000 annually ($5.6M for 20 years)
  - Larger projects between $750,000 and $1,000,000 over life of project with an escalator
  - Counties determine how gifts or donation agreement monies are spent
- Road Agreements
  - Restoration to pre-construction conditions
  - Escrow accounts
  - Generally several million dollars in improvements
- Construction Jobs
  - Peak 250 construction jobs for the average 200MW project
- Operation & Maintenance Jobs
  - 10-12 highly-skilled FTEs for every 100MW

Economic Impacts Examples

- Flat Ridge
  - Donation Agreement for Phase 1 & 2 - $1.6M
  - Landowner payments for Phase 1 & 2 - $2.4M
  - Operation & Maintenance Jobs for Phase 1 & 2 – 50
  - Construction Jobs for Phase 1 & 2 – 750
  - Payroll and Economic Boost
    - Flat Ridge 1 - $15M in payroll taxes and $5M to local contractors and suppliers
    - Flat Ridge 2 - $40M in payroll taxes and $23M to local contractors and suppliers
- Caney River
  - The project provides $ 3M annually in lease rent payment to participating landowners and payments in lieu of taxes to Elk County. These payments represent a 50% increase in annual county revenues.

Questions?