

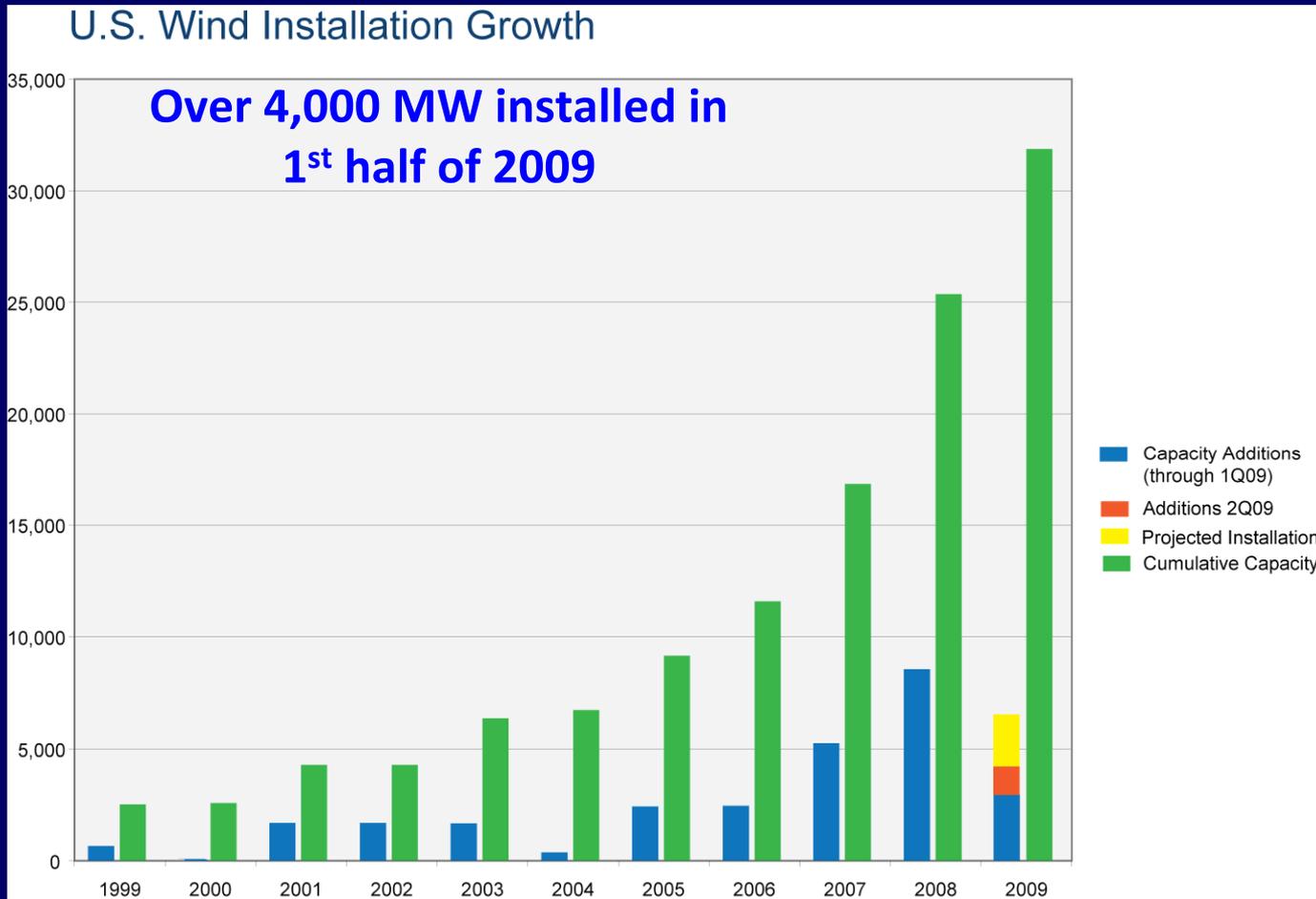
# The U.S. Wind Energy Industry Today

Craig Cox  
Interwest Energy Alliance

*to Wyoming Legislature's  
Task Force on Wind Energy*

*Casper, Wyoming  
27 August 2009*

# U.S. wind industry today

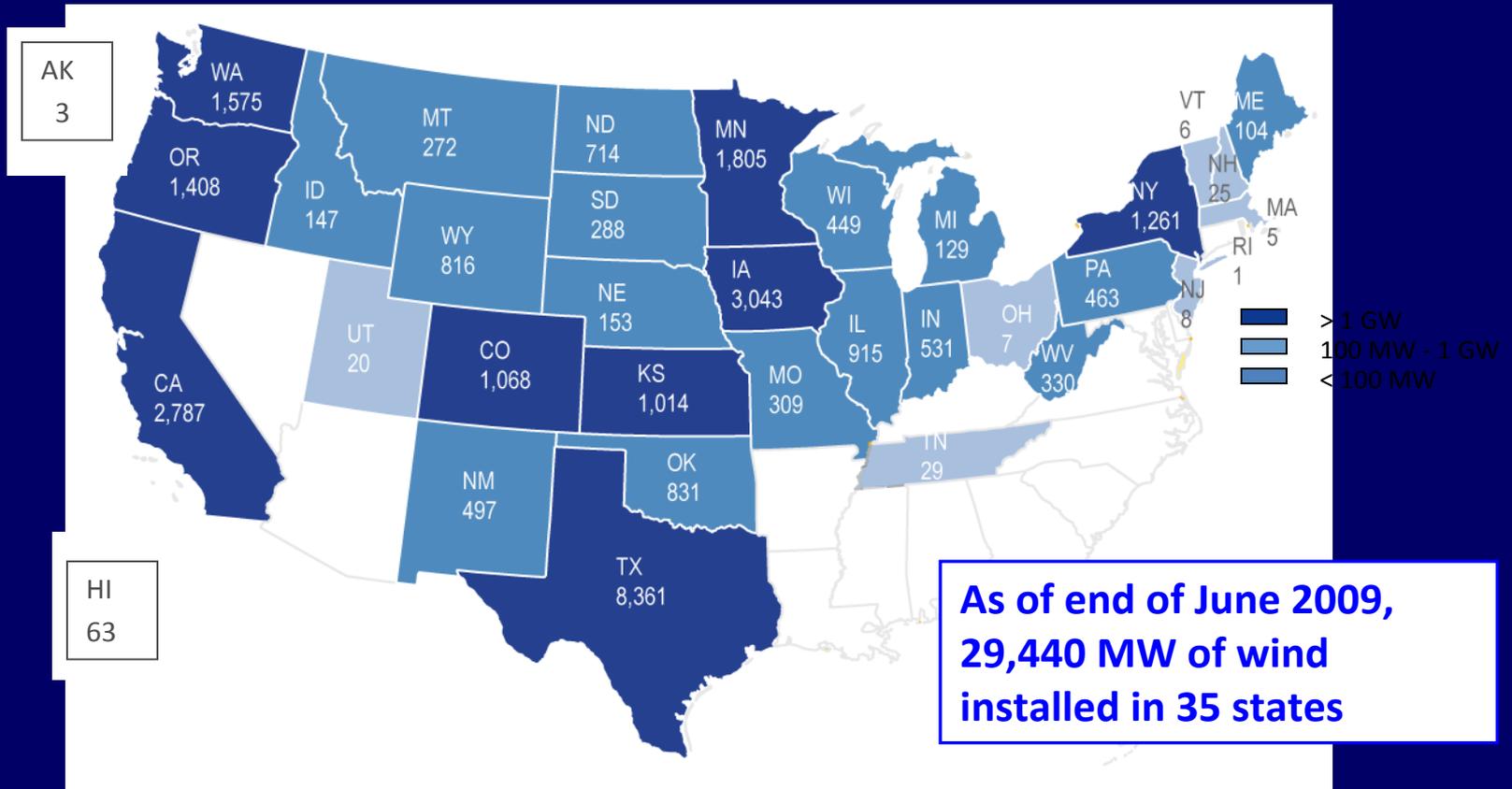


2,860 MW  
commissioned in  
Q1 2009

1,210 MW  
commissioned in  
Q2 2009

>5,500 MW under  
construction (for  
completion in second  
half of 2009 and/or  
first half of 2010)

# Installations Growing Throughout U.S.

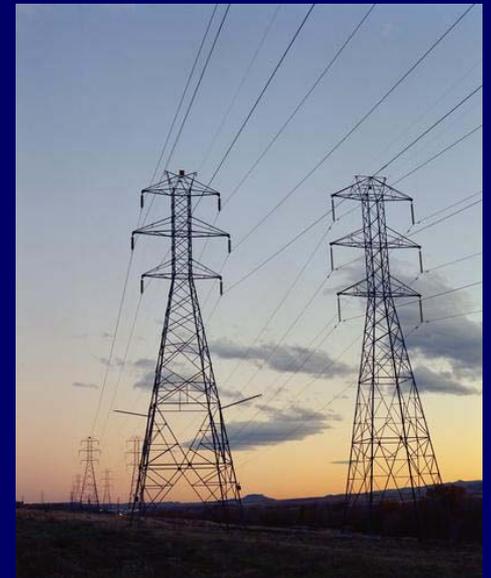


# Four Trends in the market

- Market Scaling Up
  - Sustained Growth
- Strong Investment, Larger Players
- Global Market/Supply Chain Growth
  - Less Eurocentric
- More Robust Long-term Vision

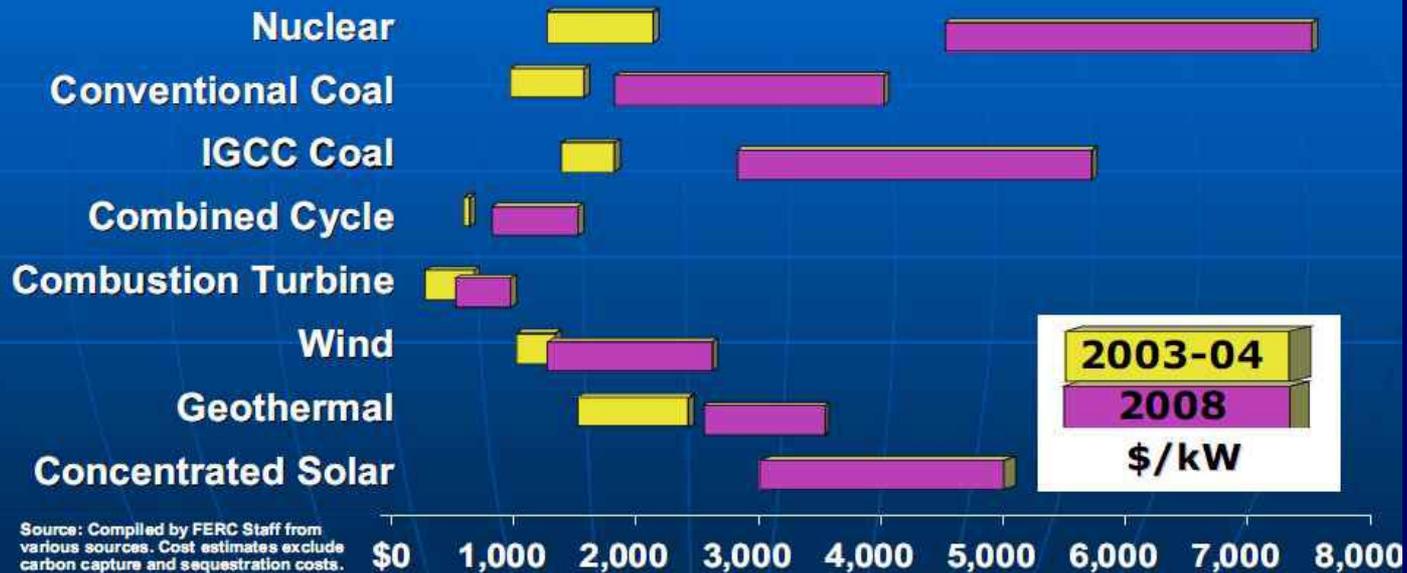
# Hindrances to wind energy growth

- Inconsistent federal and state policies
- Duplicative/overlapping layers of permitting (e.g., county and state)
- Transmission constraints



# Wind is cost-effective

## Estimated Cost of New Generation



# Wind energy saves water



Nearly 50% of all the water the U.S. withdraws from streams, rivers and aquifers is for electricity consumption

# Wind energy creates jobs

- 20% Wind Scenario stimulates significant domestic job creation
- Wind turbine manufacturing, installation and operations
- Over 500,000 jobs would be supported between 2007 and 2030
- 150,000 directly employed by wind industry
- 100,000 jobs supporting the wind industry
- 200,000 jobs indirectly

# Wind energy is wildlife-friendly

Table ES-2: Highest Levels of Relative Wildlife Risks for each Life Cycle Stage of Each Electricity Generation Source

Source	Relative Wildlife Risk Level for Potential Harm					
	Resource Extraction	Fuel Transportation	Construction of Facility	Power Generation	Transmission and Delivery	Decommissioning of Facility
Coal	Highest Potential	Lower Potential	Lower Potential	Highest Potential	Moderate Potential	Lower Potential
Oil	Higher Potential	Highest Potential	Lower Potential	Higher Potential	Moderate Potential	Lower Potential
Natural Gas	Higher Potential	Moderate Potential	Lowest Potential	Moderate Potential	Moderate Potential	Lowest Potential
Nuclear	Highest Potential	Lowest Potential	Lowest Potential	Moderate Potential	Moderate Potential	Lowest Potential
Hydro	None	None	Highest Potential	Moderate Potential	Moderate Potential	Higher Potential
Wind	None	None	Lowest Potential	Moderate Potential	Moderate Potential	Lowest Potential

From "Comparison of Reported Effects and Risks to Vertebrate Wildlife from Six Electricity Generation Types in the New York/New England Region," NYSERDA Report 09-02 [http://www.nysERDA.org/publications/Executive\\_Summary\\_Report.pdf](http://www.nysERDA.org/publications/Executive_Summary_Report.pdf)

# The wind industry addresses wildlife issues pro-actively and collaboratively



*Colorado  
Renewables  
Conservation  
Collaborative*

“The Mission of AWWI is to facilitate timely and responsible development of wind energy while protecting wildlife and wildlife habitat. We do this through research, mapping, mitigation, and public education on best practices in wind farm siting and habitat protection.”

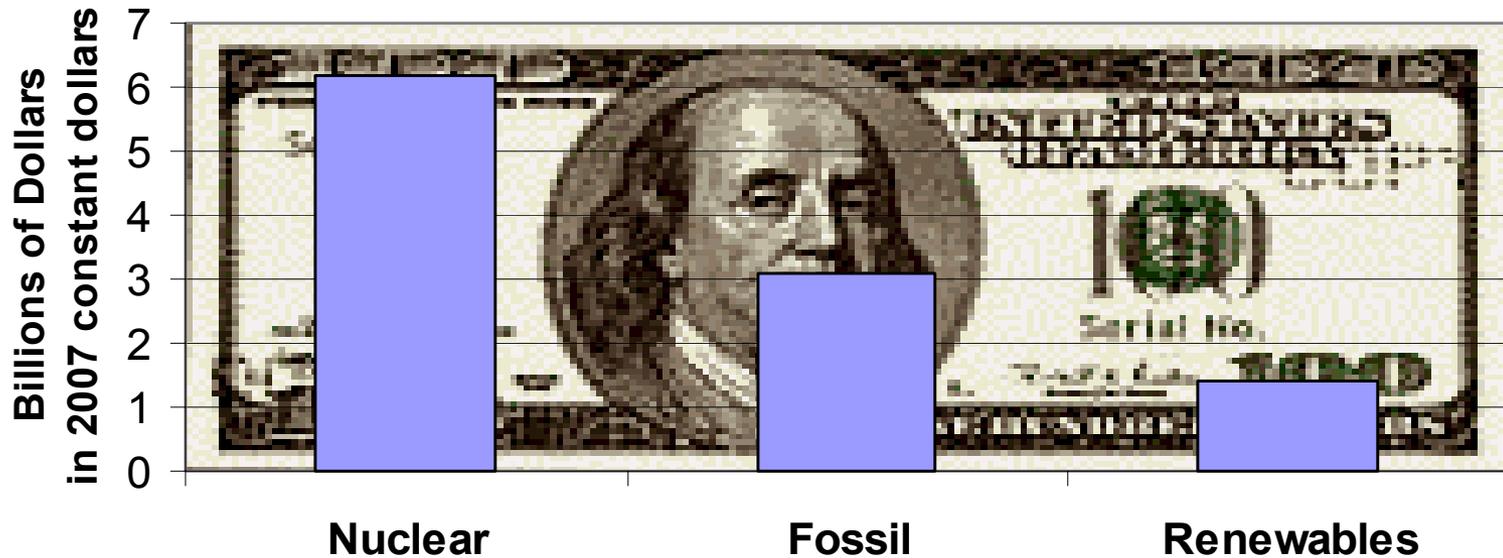
–From <http://www.awwi.org/home.php>

“The Colorado Renewables and Conservation Collaborative (CRCC) is an informal collaborative effort between the renewable energy industry and the conservation community to constructively address conservation concerns related to renewable energy development in Colorado. Specifically, the group wishes to develop tools to assist the renewable energy industry to reach its project development and transmission goals while simultaneously enabling the conservation community to meet its goals. Ultimately, the participants in the CRCC hope the collaboration will result in a high-performing renewable energy industry and the preservation of the opportunity to conserve vibrant prairie and mountain ecosystems in Colorado.”

–From [http://www.interwest.org/crcc\\_overview.htm](http://www.interwest.org/crcc_overview.htm)

# Federal energy subsidies: R&D

Federal Funding for Energy Research and Development  
Fiscal Years 2002 through 2007



# Federal tax subsidies

Total Federal Tax Expenditures for Energy Sector  
Fiscal Years 2002 through 2007



# Federal energy subsidization in 2006

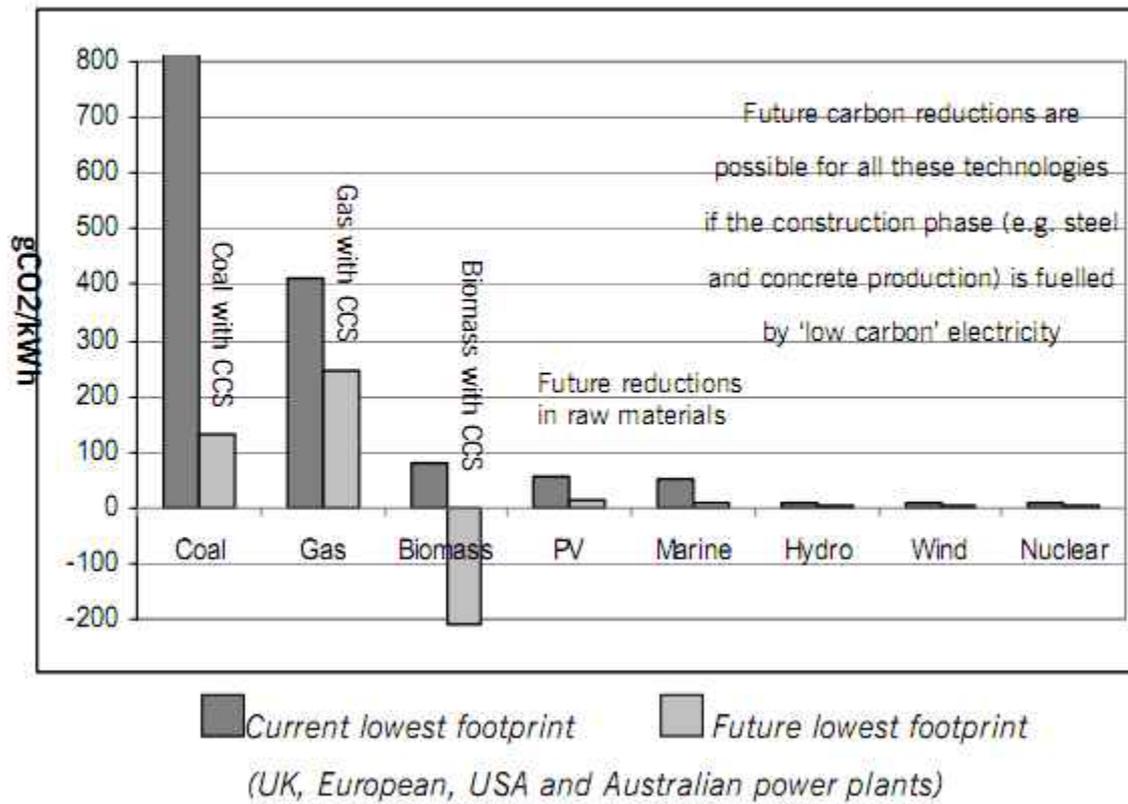
**Exhibit 2: Distribution of Federal Fiscal Subsidies to Energy, 2006**  
*Preliminary Estimates*

	<b>\$Billions Per Year</b> (Avg. of High/Low Ests)	<b>% Share</b>
Oil and Gas	39	52.4%
Coal	8	10.5%
Fossil, mixed	<u>2</u>	<u>3.3%</u>
<i>Total Fossil</i>	49	66.2%
Nuclear	9	12.4%
Ethanol	6	7.6%
Other Renewables	6	7.5%
Conservation	2	2.1%
Mixed Resources/Other	<u>3</u>	<u>4.2%</u>
<b>Total, all resources</b>	<b>74</b>	<b>100.0%</b>

Source: [www.earthtrack.net](http://www.earthtrack.net)

# Life-cycle carbon footprints of eight energy technologies

Figure 3. Current and future carbon footprints



From "Carbon Footprint of Electricity Generation," issued by UK Parliamentary Office of Science and Technology, October 2006, Number 268, [www.parliament.uk/documents/upload/postpn268.pdf](http://www.parliament.uk/documents/upload/postpn268.pdf)

# Repowering/ Decommissioning

- As new turbine models are introduced, older projects can be repowered, providing indefinite project lifespans and continued economic benefits.
- Decommissioned components are handled in environmentally sensitive manner.



# Wyoming attitudes toward wind

## Building the Wyoming We Want

Priorities and Values

### **Preliminary Report**

June 1, 2009

Presented By:  
Dee Allsop, Ph.D., President

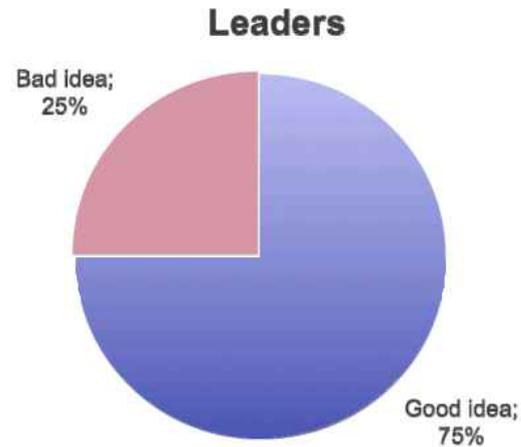
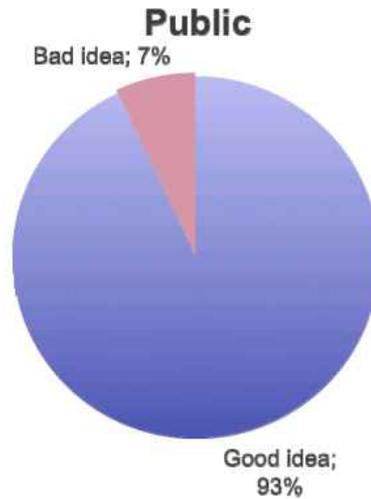
Heart + Mind  
STRATEGIES



# Wyomingites support wind

## Strong Support for Wind Energy

Heart + Mind STRATEGIES



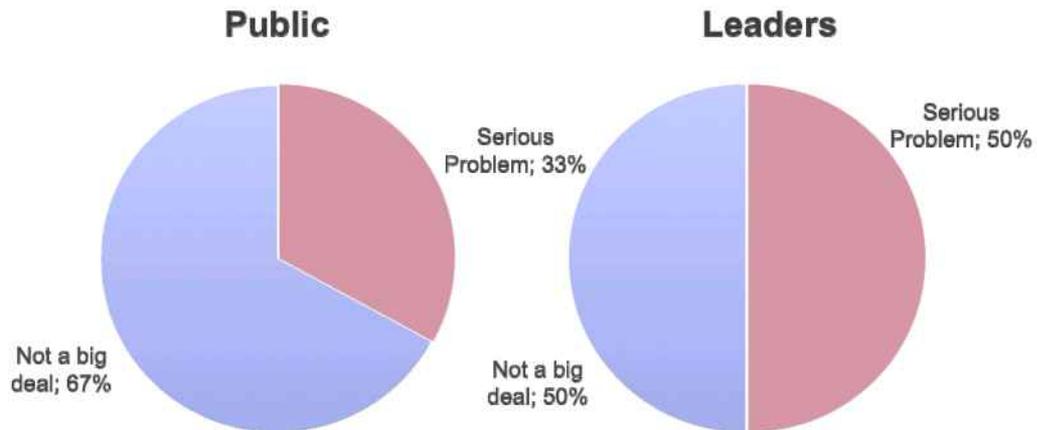
Environmental concerns  
and aesthetics

Q1150. There has been lots of discussion recently about renewable energy and in particular wind energy. Overall, do you think the growth and development of wind energy in the state is a good idea or a bad idea?

# Wyomingites understand and support transmission

## Transmission Corridors

Heart + Mind STRATEGIES



Q1155. Moving energy that is produced in Wyoming to the places where it is needed will require the creation of "transmission corridors". In the big scheme of things here in Wyoming, do you believe "transmission corridors" are serious problem or not that big of a deal?

# Wyoming business and community leaders pursuing wind

ImagesWyoming.com

## WYOMING

### BUSINESS IMAGES

**Winds of Change**  
Clean fuels spark business opportunity

**Feeling Right At Home**  
Entrepreneurs like the laid-back lifestyle



**Innovation Lives Here**  
State attracts knowledge-based enterprises

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## Winds of Change

■ energy

### Hub of Activity

Roads, rail and air make Wyoming a distribution natural

■ transportation



**"We are not moving out of here. This is home."**

For a distribution operation, Servo Trading Post, a large catalog and online clothing retailer, has called Wyoming home since 1982, when it moved from Deer and Boise, Idaho, to a new location in Cheyenne. The cost of doing business in Nevada "was really going up," says Robert Ishak, the company's chief of fulfillment and corporate services.

Indeed, Servo Trading Post ships more than 2 million orders annually — 8 million pieces of merchandise, from outdoor sporting gear to clothing and shoes and, its latest line, accessories and gift items.

In many instances new shipping and retail their merchandise yesterday that Servo Trading Post has moved its delivery methods and now just orders instead on the East Coast on trucks by UPS delivery out of Chicago.

The company looked at the feasibility of an eastern distribution center near those markets, but another factor and other complications scuttled the idea, Ishak says.

"We are not moving out of here," Ishak says. "This is home."

— Pamela Goye

Wyoming's integrated system of interstates and major highways allows for efficient distribution for trucking.



ing is at the forefront of energy technology, serving abundant as to provide power at a city, single stream, use energy efficiency says," says Tom Fuller, energy programs for area control. In its rich oil and coal fields well-endowed to generate low- or 35 in areas what do in the marketplace for an area. And it's highly risky," Fuller says. "Who's to wind power is rapidly expanding, and farms spread up

ness, with a parcel of 400,000 acres to build life-long high-voltage low 3,000 megawatts needed in Wyoming up the southwest into all state. Power rising, gas a wind

# Supply-chain opportunities: Turbine components

*There are over 8000 components in a turbine, including:*

## Towers:

Towers  
Ladders  
Lifts

## Rotor:

Hub  
Nose Cone  
Blades  
- Composites  
- Blade Core  
Pitch Mechanisms  
Drives  
Brakes  
Rotary Union

## Nacelle:

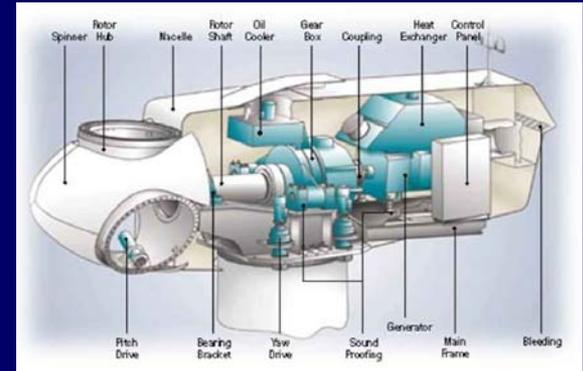
Nacelle Cover  
Nacelle Base  
Heat exchanger  
Controllers  
Generator  
Power Electronics  
Lubricants  
Filtration  
Insulation  
Gearbox  
Pump  
Drivetrain  
Ceramics  
Shaft

## Foundation:

Rebar  
Concrete  
Casings

## Other:

Transformers  
Bolts/Fasteners  
Wire  
Paints and Coatings  
Lighting  
Lightning Protection  
Steel Working/Machining  
Communication Devices  
Control and Condition Monitoring Equipment  
Electrical Interface and Electrical Connection  
Batteries  
Bearings  
Brakes



# Communities embrace wind: Lamar, Colorado

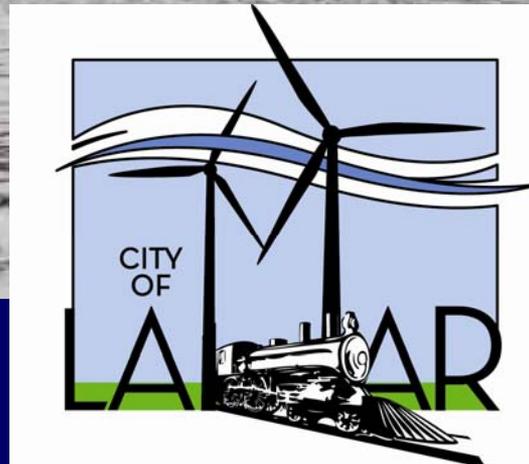


WELCOME  
TO  
LAMAR



WINDS OF PROGRESS  
POWERING OUR FUTURE

# Lamar's community-owned wind project

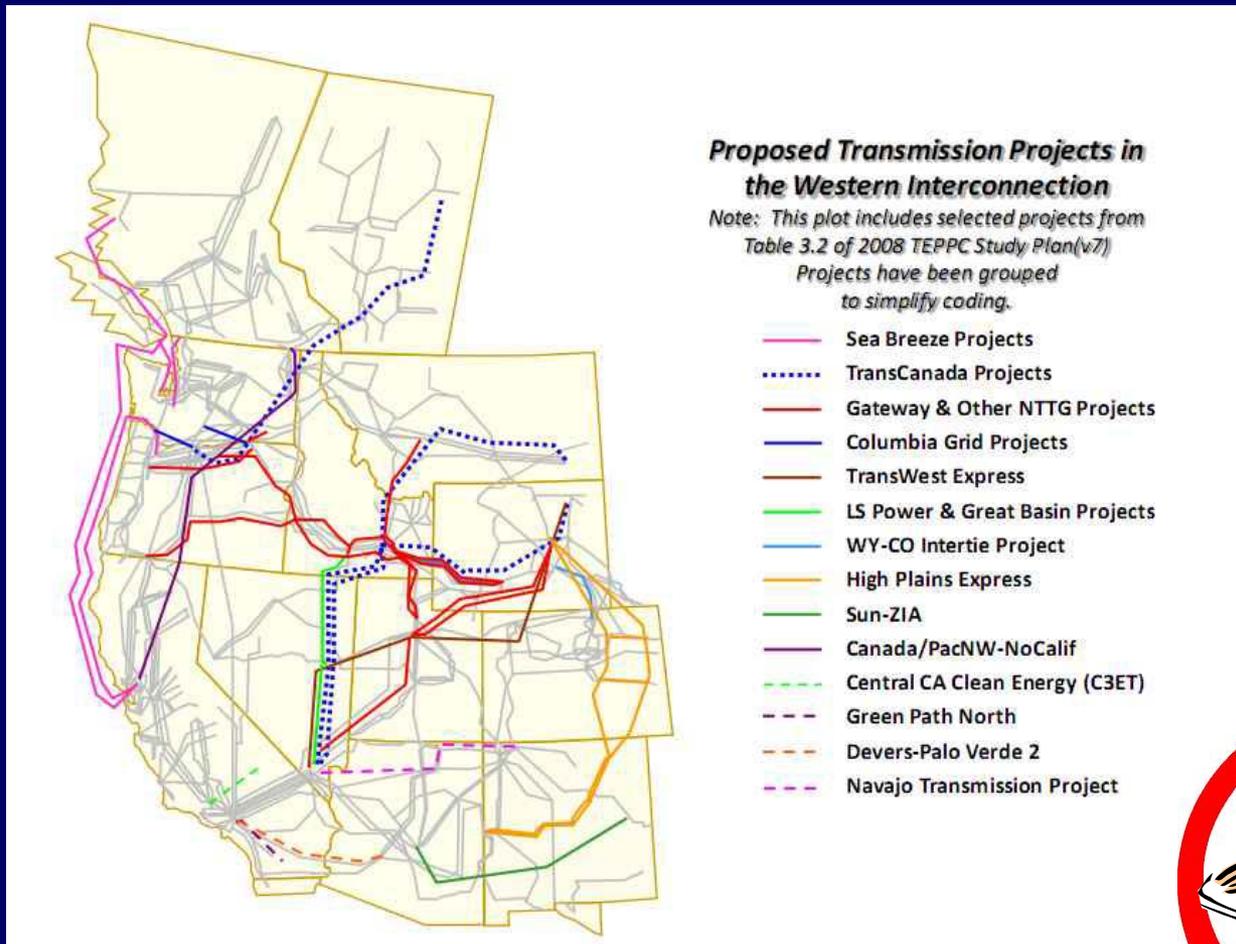


# Local economic benefits: Lamar, Colorado





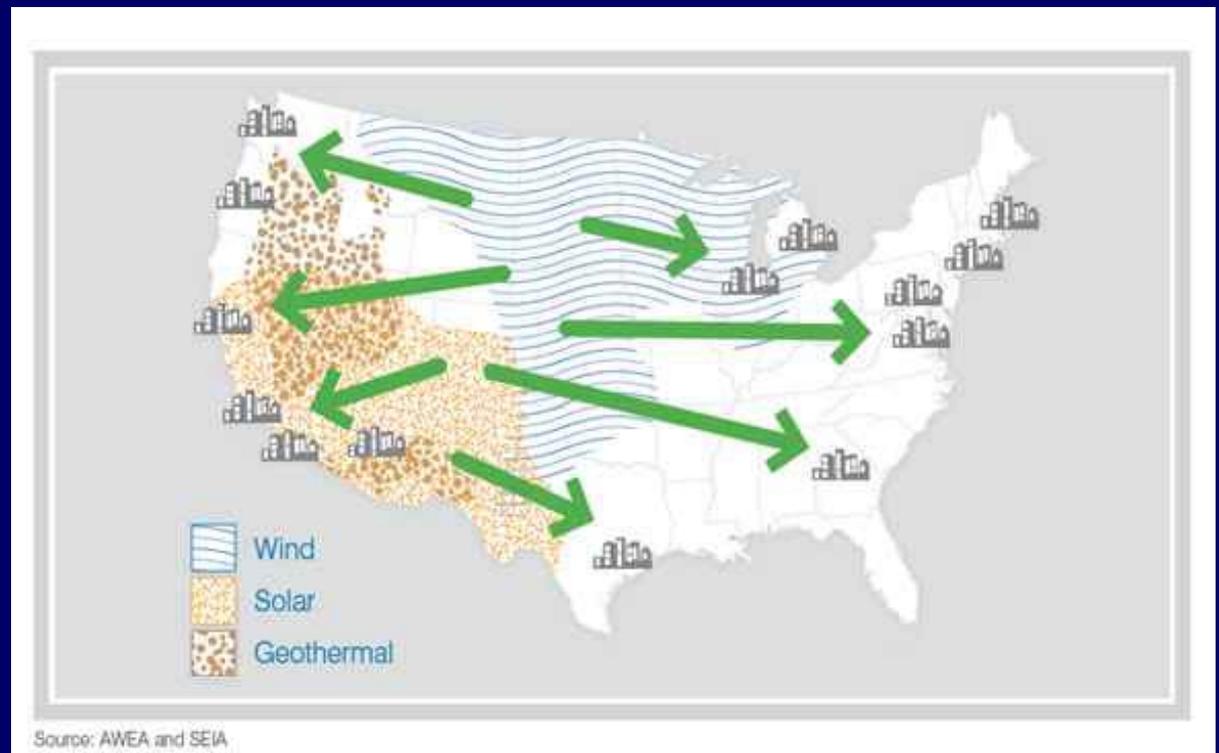
# Transmission



# Green power superhighways

- Link areas with vast supplies of renewables to areas of high electricity demand green power superhighways
- Improve grid operations

## Critical to Development Renewable Potential



# Federal legislative priorities

## Near-term action – Recovery Act

- 3-year PTC extension
- Option to choose grant in lieu of PTC

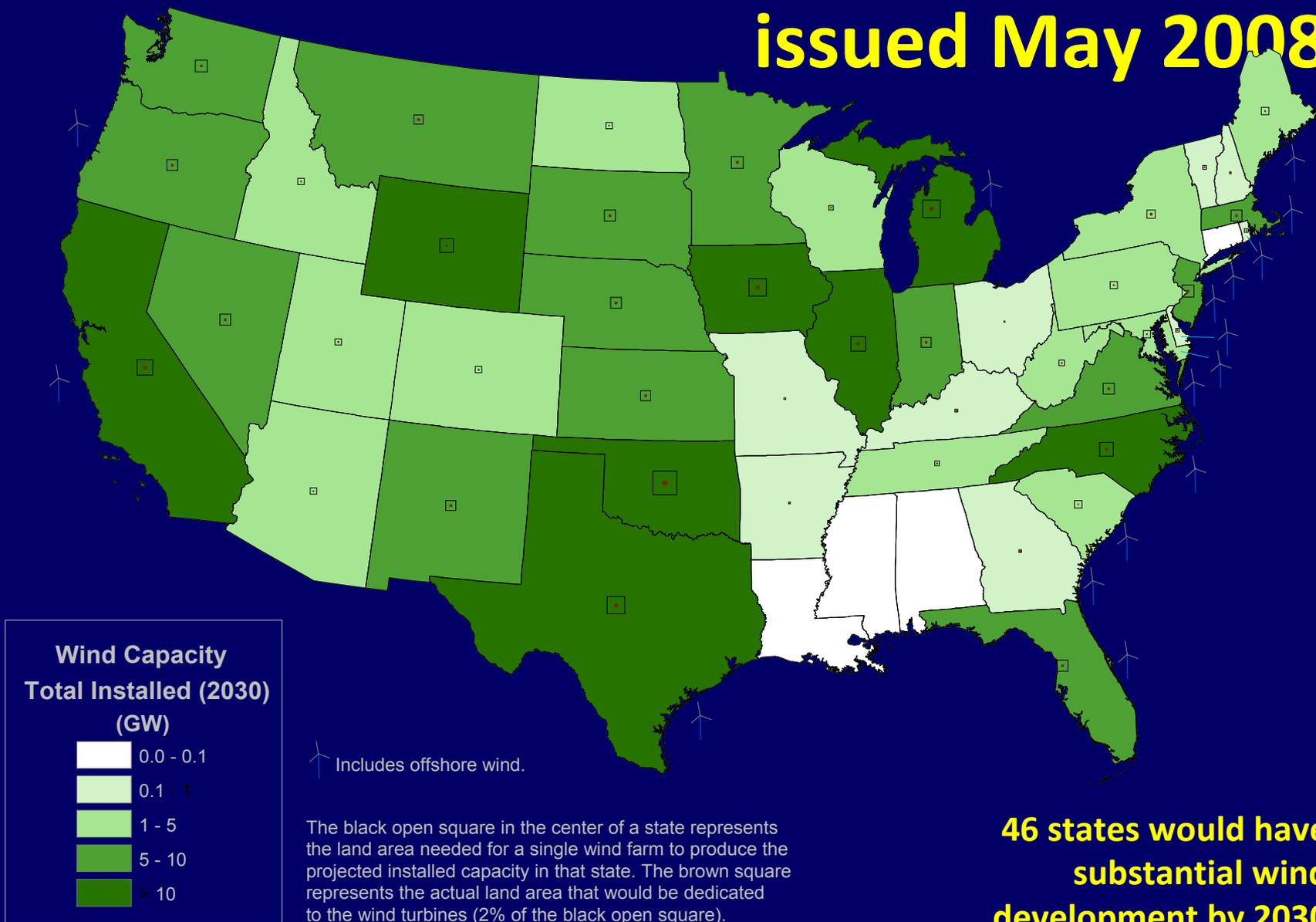
## Mid-Term Action

- National Renewable Electricity Standard
- National Transmission Legislation

## Long-Term Action:

- Effective Carbon Regulation

# DOE "20% Wind Scenario," issued May 2008



**46 states would have  
substantial wind  
development by 2030**

# So, What's in it for Wyoming?

## Hundreds of new permanent jobs

Average of one job per installed 10 MW, plus significant potential number of supply-chain jobs

## Thousands of construction jobs

Number varies depending on project and location

## Millions of dollars in local economic benefits

Increased local tax base, new infrastructure, landowner payments, economic multipliers

## End of boom-bust cycle

Wind is inexhaustible and less vulnerable to booms and bust

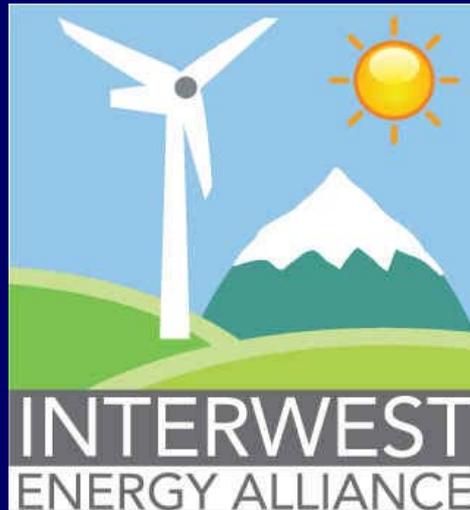
## Opportunity to lead in a 21st-century energy industry

Worldwide demand is booming for clean energy technologies

## Strengthening U.S. energy security – and national security

Clean energy will be a cornerstone of America's national security in the 21st century

# Thank you



Craig Cox  
Interwest Energy Alliance  
[cox@interwest.org](mailto:cox@interwest.org)  
[www.interwest.org](http://www.interwest.org)  
303-679-9331