Presentation to House Appropriations Subcommittee Committee on Budget Transparency and Reform

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Oil and Gas Development

- Texas recently had 839 drilling rigs operating — nearly half of all rigs in the U.S. and 22.7 percent of rigs worldwide.

- Early estimates for the Cline put the estimated recoverable reserves at 30 billion barrels of oil.

- By comparison, the U.S. Geological Survey estimates the Eagle Ford holds up to 7 billion to 10 billion in recoverable reserves, while the Bakken Shale (North Dakota) could hold as much as 4.3 billion barrels of recoverable oil.

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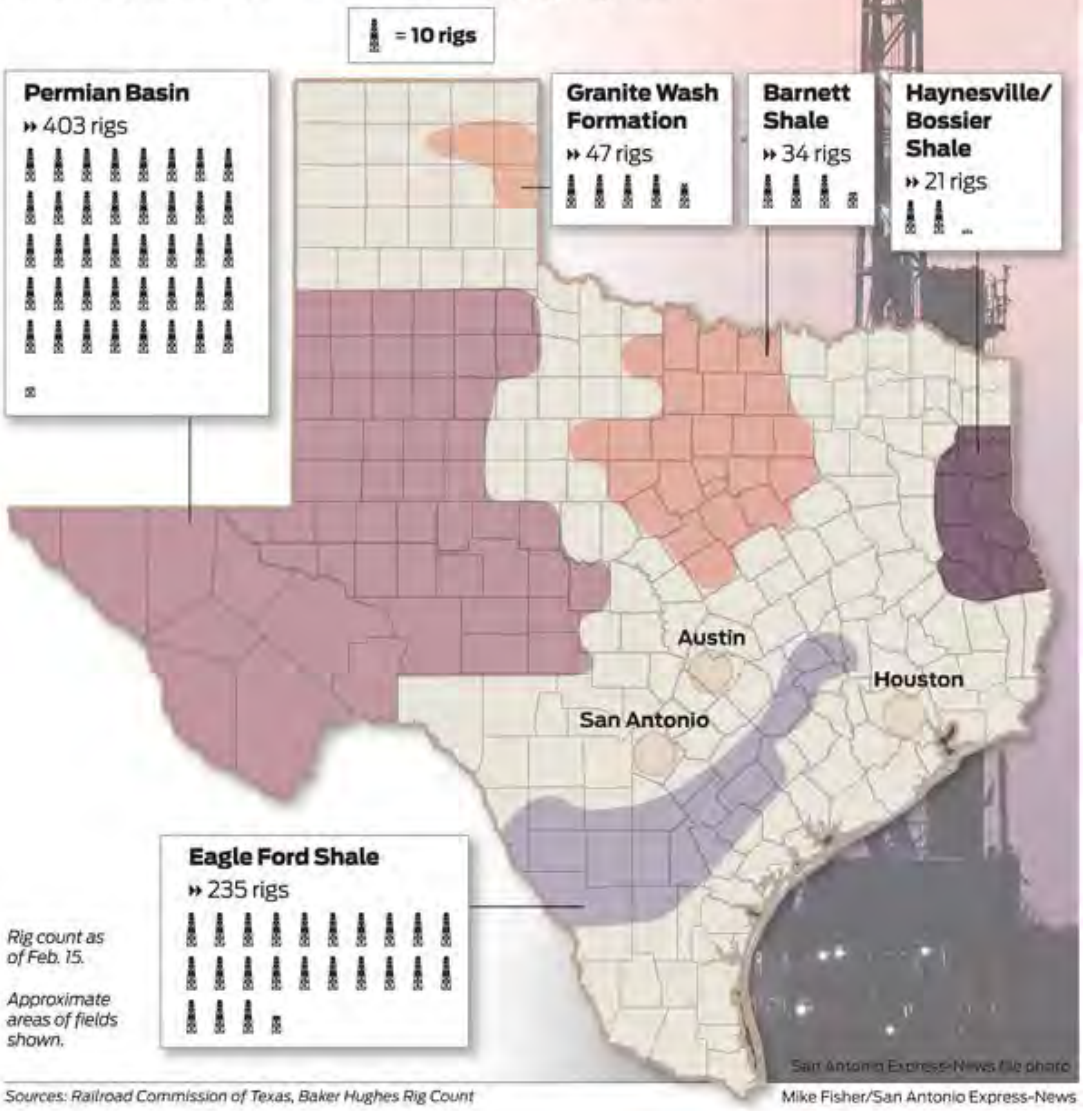
Texas oil and gas fields

Texas has more than one-fifth of the world's drilling rigs operating and five major areas of oil and gas production. The Barnett Shale in North Texas was the first field where horizontal drilling and hydraulic fracturing were used to produce oil and gas from dense shale rock. Since then, drilling and production has ramped up in the Eagle Ford in South Texas, the Haynesville/Bossier Shale in East Texas and the Panhandle's Granite Wash, a tight sandstone. The Permian Basin, a historically prolific area for oil and gas production, has re-emerged as a complex field with drilling in multiple geologic horizons.



Sources: Railroad Commission of Texas, Baker Hughes Rig Count

Mike Fisher/San Antonio Express-News

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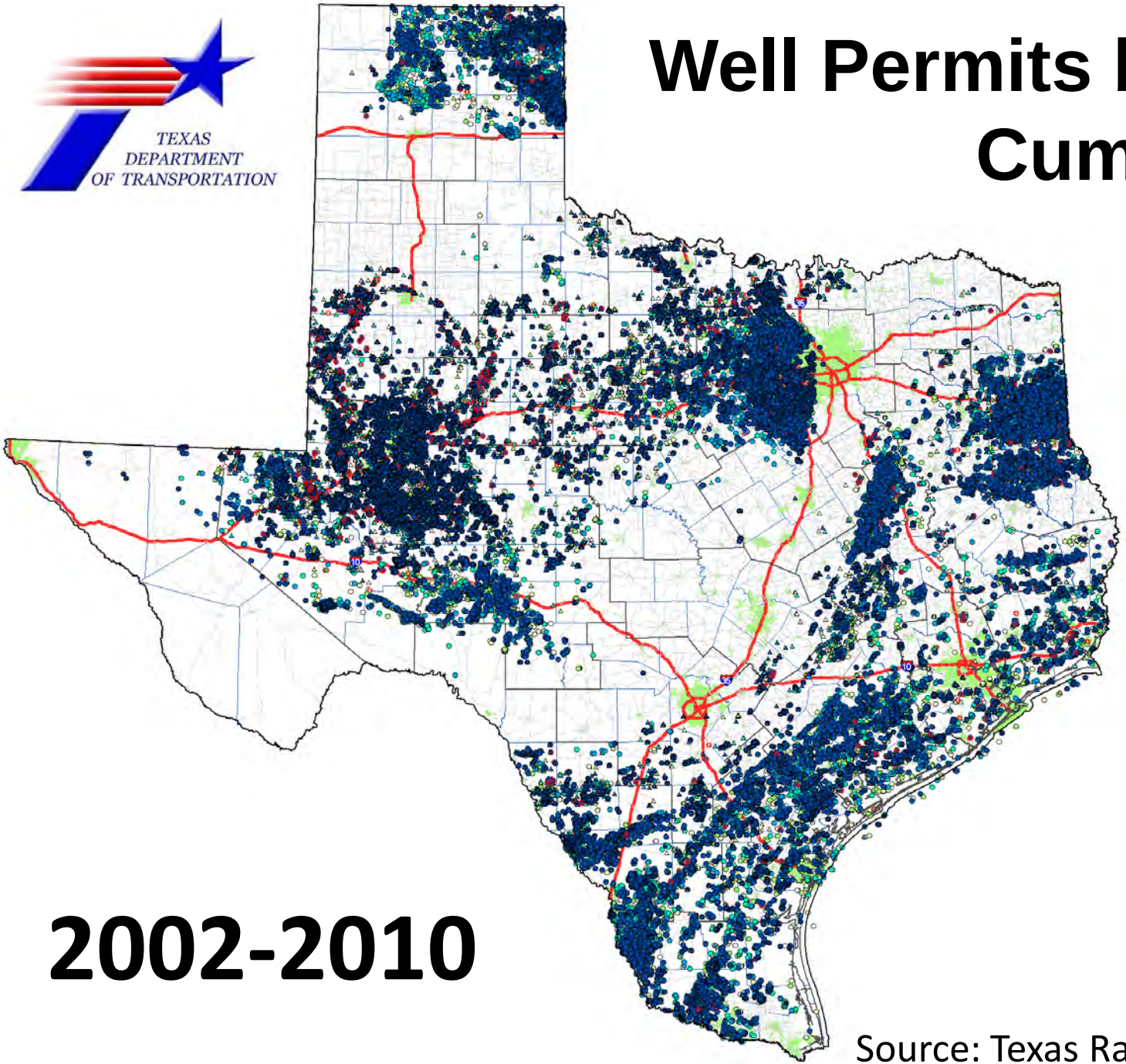
Well Permits by Year Cumulative



2002-2010

Source: Texas Railroad Commission

Wind Development

- Texas has 12,000 MW of wind generation, more than double any other state.
- More than +1,500 MW of capacity in wind installations just in 2012.
- Most wind farms are located in areas overlapping oil and gas development.

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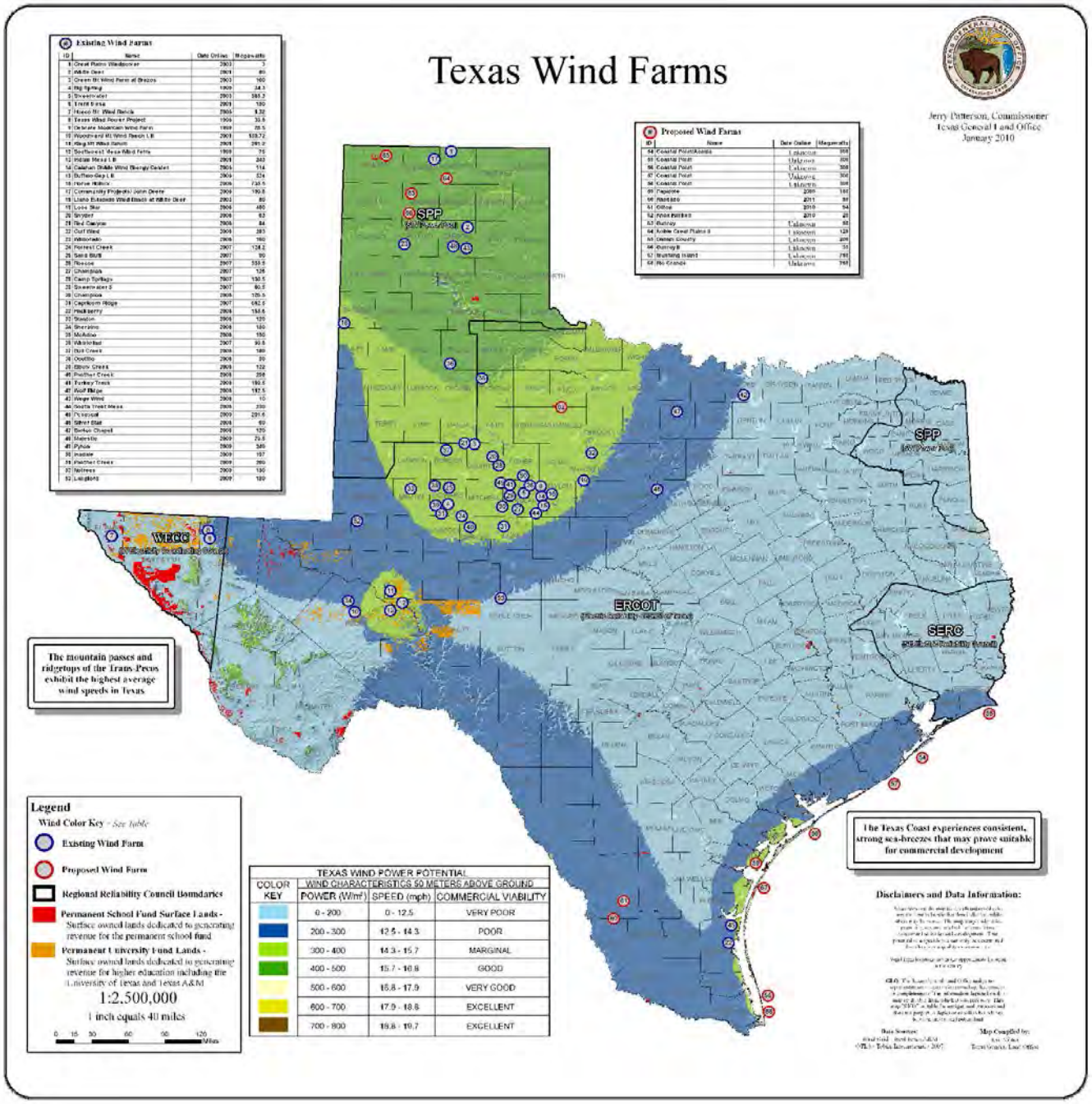
Texas Wind Farms

Jerry Patterson, Commissioner
Texas General Land Office
January 2010



TEXAS WIND POWER POTENTIAL

COLOR KEY	WIND CHARACTERISTICS 50 METERS ABOVE GROUND		
	POWER (W/m²)	SPEED (mph)	COMMERCIAL VIABILITY
	0 - 200	0 - 12.5	VERY POOR
	200 - 300	12.5 - 14.3	POOR
	300 - 400	14.3 - 15.7	MARGINAL
	400 - 500	15.7 - 16.8	GOOD
	500 - 600	16.8 - 17.9	VERY GOOD
	600 - 700	17.9 - 18.8	EXCELLENT
	700 - 800	18.8 - 19.7	EXCELLENT

1940 – 1950 era tractor trailer……

FM roads were designed for this vehicle……

2010 era tractor trailer……

FM roads now must carry these vehicles….

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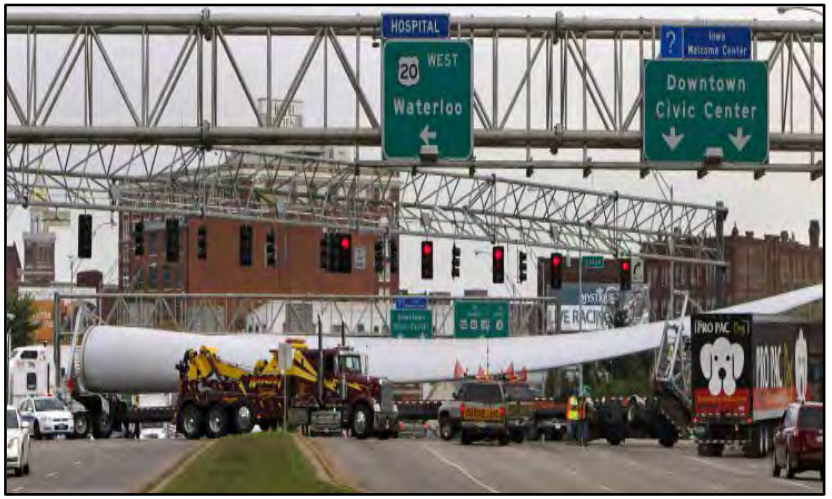
Increased Traffic - Safety Concerns



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Traffic Impacts

Loaded Trucks Per Gas Well

- 1,184 loaded trucks to bring one gas well into Production, plus
- 353 loaded trucks per year to maintain, plus
- 997 loaded trucks every 5 Years to re-frac the well

This is equivalent to roughly 8 Million cars plus an additional 2 Million cars per year to maintain

Pavement Consumption Analysis

- The empirical Load Equivalency Factor (LEF)
- LEF$= \left(\frac{Axle\ Load}{18{,}000}\right)^{4.2}$

- A 90,000 lbs. truck (12.5% increase in weight) equates to a minimum of 156% in pavement loading

Impacts to the System

Research has determined that the service life on IH, US, SH, and FM highways is reduced:

- Due to truck traffic associated with natural gas well operations alone between:
  - 1% and 16% for rig movements
  - 1% and 34% for the saltwater disposal traffic
  - 4% and 53% for construction traffic
  - Overall Impact (Average) 30%

Impacts to the System (Continued...)

- Due to truck traffic associated with crude oil well operations alone between:
  - 1% and 3% for construction traffic
  - 2% and 16% for the production traffic
  - Overall impact (Average) 16%

Estimated Annual Impacts

- Original Estimate for FM System: $890 million
  - Additional 20% for heavier trucks
  - Additional 15% for higher road material prices
  - Very conservative: well over $1 billion annually
- Extrapolating to local roads
  - Similar number of lane miles
  - Lower original design requirements
  - Estimated impacts well over $1 billion annually

Case Study

- Dimmit County
  - FM 2688 (12.61 Miles)
  - FM 1916 (3.01 Miles)
- Reactive vs. Proactive
  - Reactive: roads are fixed or maintained after damage has occurred.
  - Proactive: maintains roads before damage is done to preserve the quality of the road.

FM 2688 : Reactive vs. Proactive in 20 Years

Scenarios	Reactive Cost	Proactive Cost
0 more	**$13,756,000**	**$2,004,536**
1 more	**$19,271,448**	**$2,004,536**
5 more	**$23,303,952**	**$4,654,149**
10 more	**$27,452,880**	**$5,723,553**

Note: Scenarios refer to the additional numbers of well permits assumed

FM 1916 : Reactive vs. Proactive in 20 Years

Scenarios	Reactive Cost	Proactive Cost
0 more	$1,750,545	$492,778
1 more	$1,750,545	$492,778
5 more	$1,750,545	$1,110,943
10 more	$1,750,545	$1,366,209

Note: Scenarios refer to the additional numbers of well permits assumed

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Impact on Infrastructure

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Roadway Damage

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Roadway Damage

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Roadway Damage

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Bridge Impacts/Restrictions

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ROW Issues

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Safety/Environmental Concerns

2012 Crash Data

Barnett Shale (25 Counties):
On-System Fatal Crashes = 15%
On-System Total Crashes = 19%

Eagle Ford Shale (23 Counties):
On-System Fatal Crashes = 8%
On-System Total Crashes = 5%

Granite Wash (6 Counties):
On-System Fatal Crashes = 1%
On-System Total Crashes = .3%

Haynesville/Bossier Shale (10 Counties):
On-System Fatal Crashes = 4%
On-System Total Crashes = 3%

Permian Basin (58 Counties):
On-System Fatal Crashes = 10%
On-System Total Crashes = 6%

Leading causes of crashes according to law enforcement were failure to control speed and driver inattention.

BE SAFE. DRIVE SMART

- TxDOT is partnering with oil and gas companies, the Texas Department of Public Safety and communities across in the energy sectors to promote roadway safety.

- The campaign will include safety messages on TV, radio, billboards and gas pumps in the area.

- The new *Be Safe. Drive Smart*. campaign urges all drivers to take the following basic safety precautions: buckle up; drive a safe speed; pass carefully; always stop at red lights and stop signs; and avoid using cell phones while driving.