



## Shale Development and FERC's Environmental Review Process



2011 Woodford Shale Summit  
March 29, 2011

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Office of Energy Projects*

# Why Shale Gas? Why Now?



## ⇒ Project drivers

- ❖ Market

- ❖ Supply

## ⇒ Projects in Oklahoma

...and why is FERC involved???

# Woodford Shale in South-Central Oklahoma

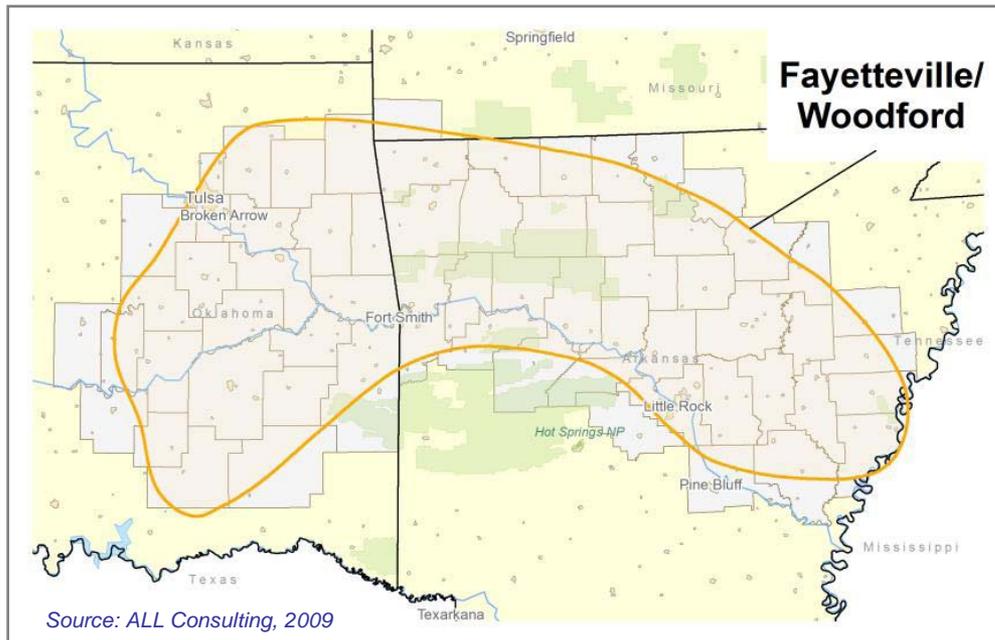


- The Woodford Shale is located in south-central Oklahoma.
- This formation is a Devonian-age shale
- Covers an area of 11,000 square miles at an average thickness of 120 ft to 220 ft
- Estimated depth of production is between 6,000 ft and 11,000 ft
- The Woodford shale is in the early stages of development with recent production beginning in 2003 and 2004 with vertical well completions only.
- Due to the success in the Barnett Shale, horizontal drilling has been adopted.
- The average well spacing is 640 acres per well
- The technically recoverable resources is estimated to be 11.4 Tcf
- The amount of gas in place is estimated to be up to 101 Tcf \*

\* Navigant Consulting's North American Natural Gas Supply Assessment – July 4, 2008

Source: Exhibit 21 and text - Woodford Shale in the Anadarko Basin, DOE's Modern Shale Gas Development in the United States; A Primer, dated April 2009

# Fayetteville Shale in Northern Arkansas and Eastern Oklahoma

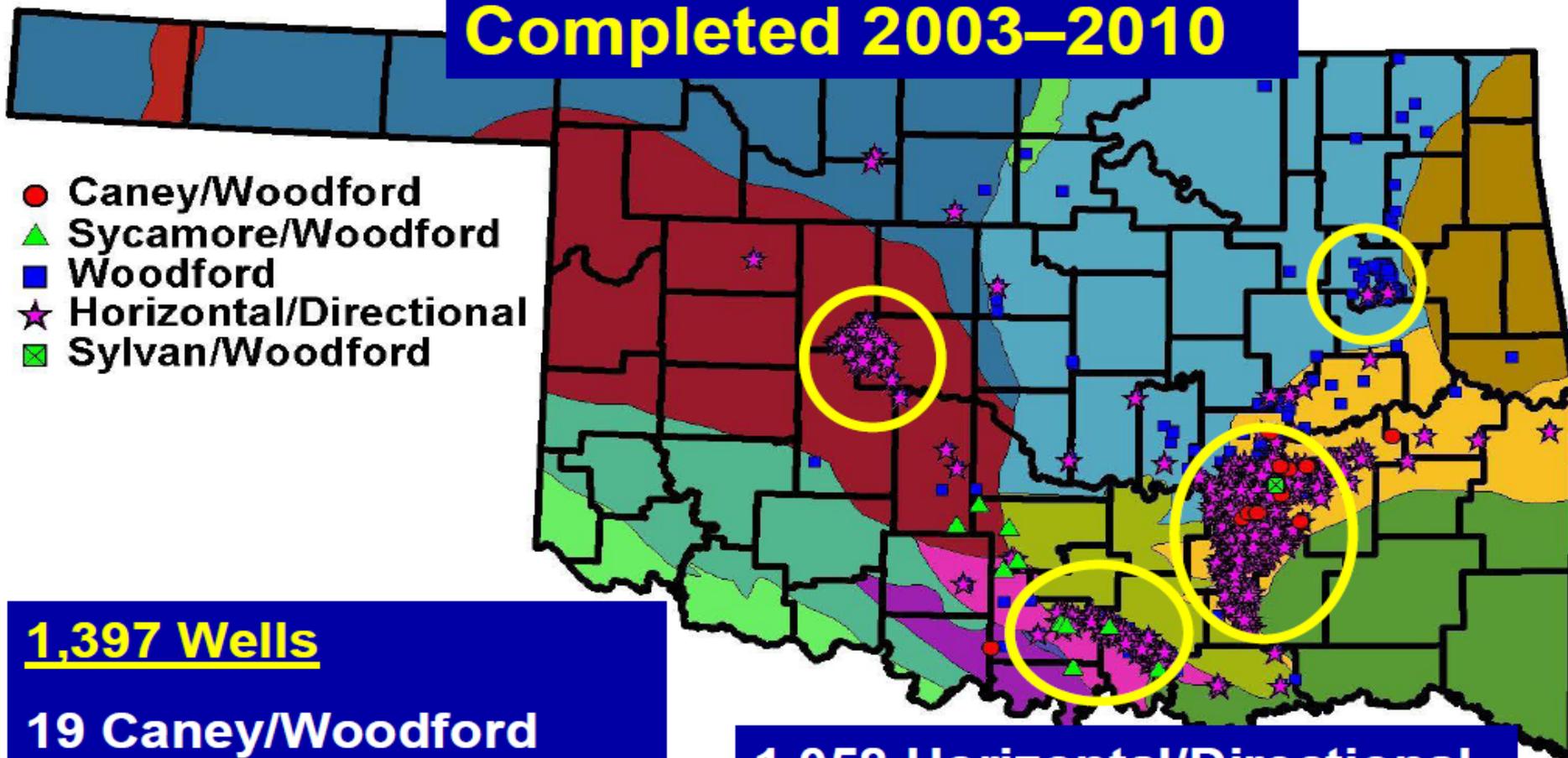


- The Fayetteville Shale is located in the Arkoma Basin of northern Arkansas and eastern Oklahoma.
- This formation is a Mississippian-age shale
- Covers an area of 9,000 square miles at an average thickness of 20 ft to 200 ft
- Estimated depth of production is between 1,000 ft and 7,000 ft
- Lessons learned from horizontal drilling and hydraulic fracturing in the Barnett when adopted to the Fayetteville Shale, made this play economical.
- Average well spacing range from 80 to 160 acres per well.
- The technically recoverable resources is estimated to be 41.6 Tcf
- The amount of gas in place is estimated to be up to 52 Tcf

# Woodford Gas-Shale Wells

## Completed 2003–2010

- Caney/Woodford
- ▲ Sycamore/Woodford
- Woodford
- ★ Horizontal/Directional
- ▣ Sylvan/Woodford



**1,397 Wells**

**19 Caney/Woodford**

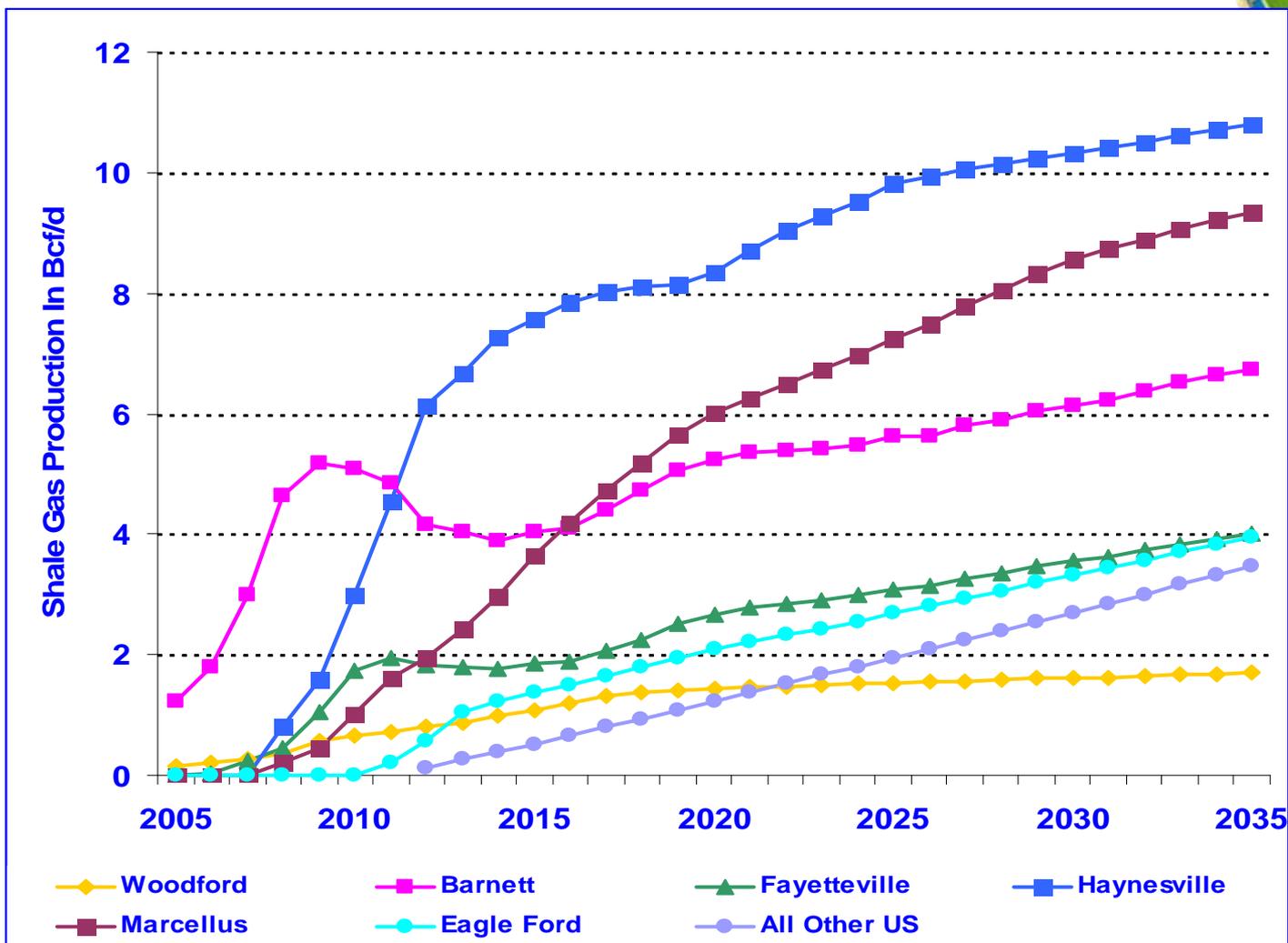
**11 Sycamore/Woodford**

**308 Vertical Woodford**

**1,058 Horizontal/Directional  
Woodford (76%)**

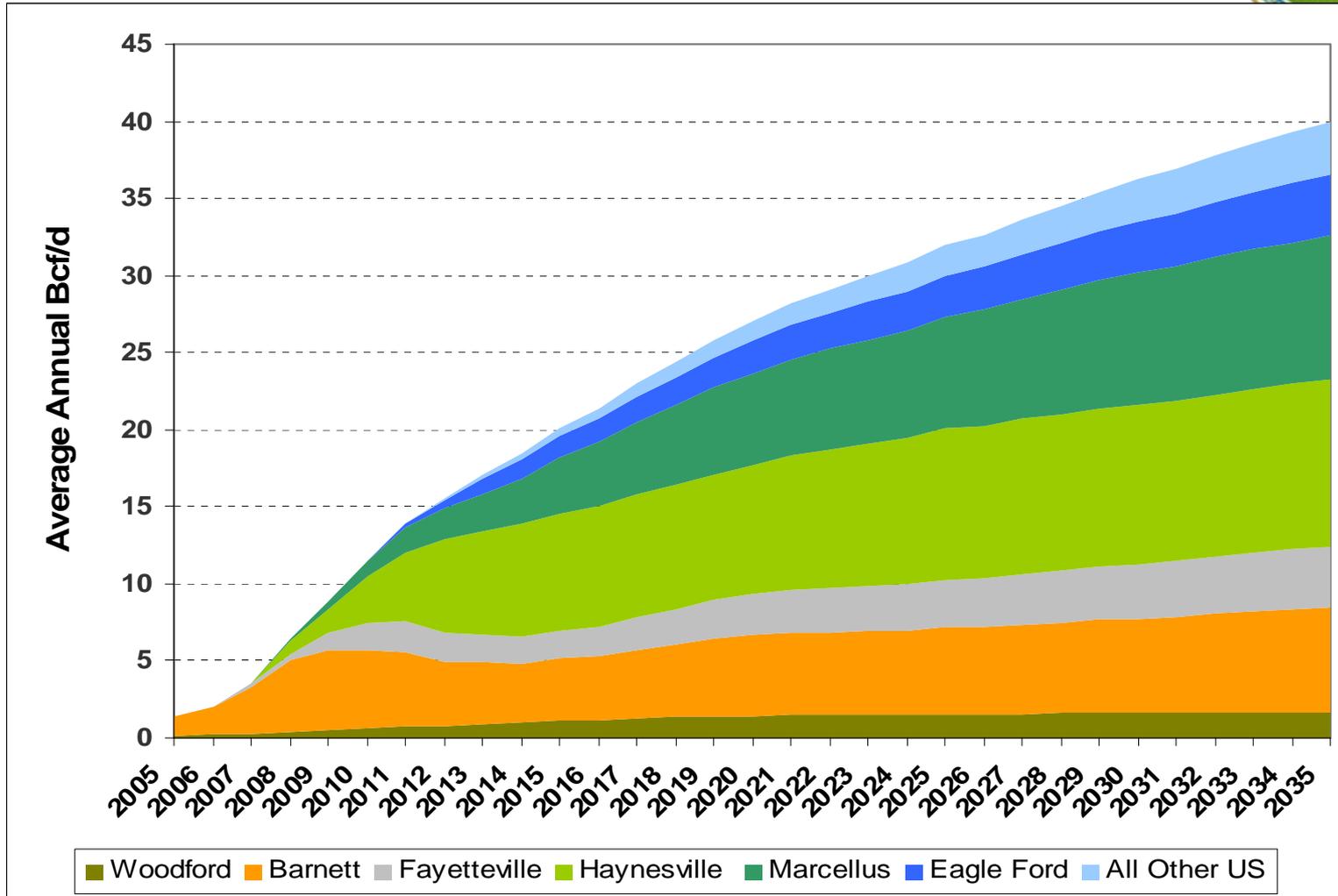
**1 Sylvan/Woodford**

# Shale Gas Estimates



Source: Based on data from ICF International and Compass Report January 2011

# Shale Gas Estimates



Source: Based on data from ICF International and Compass Report January 2011

# Summary of FERC Related Projects and Potential Projects Impacting the Shale Basins



## FERC

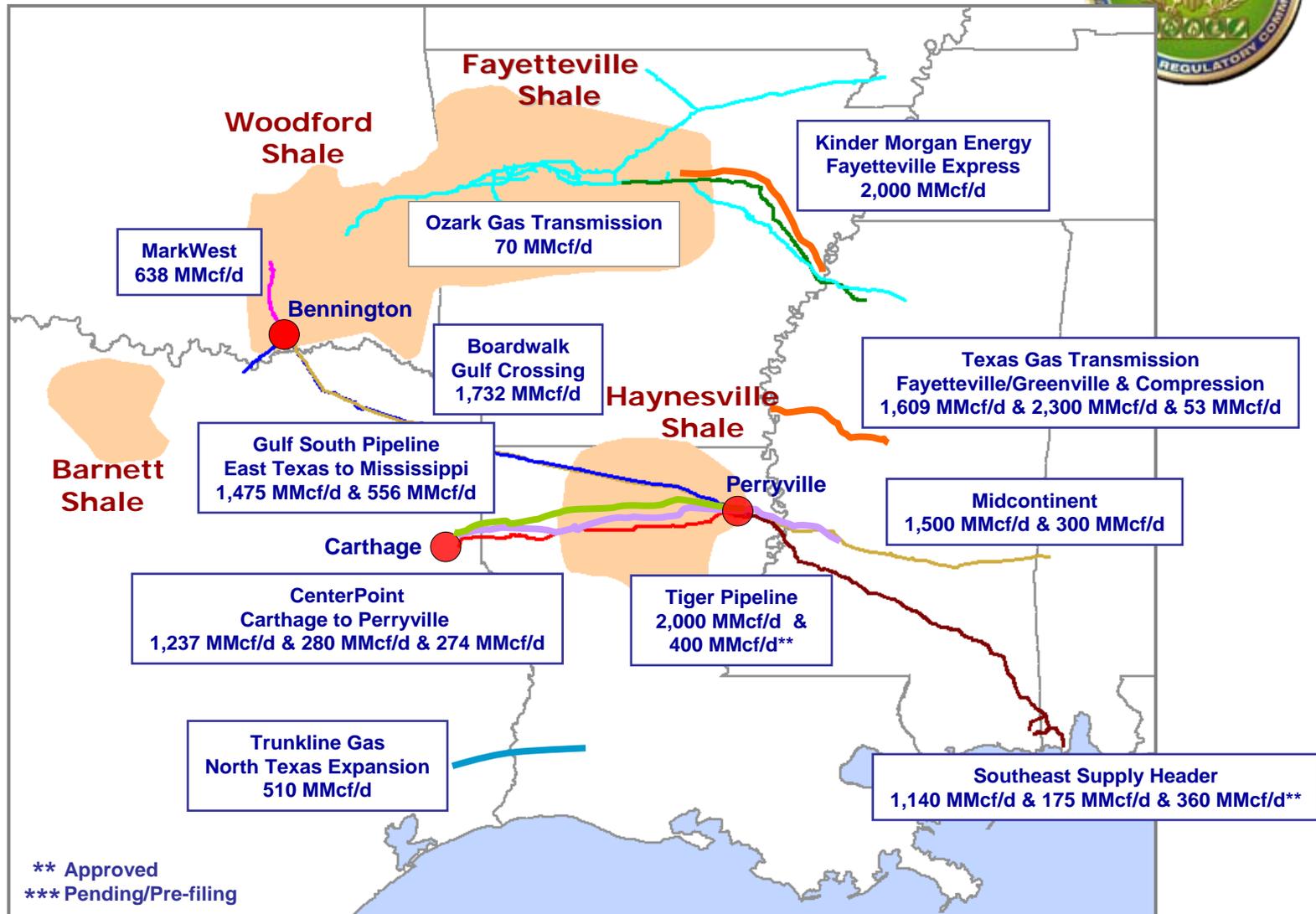
Natural Gas Basin	Capacity (MMcf/d)	Miles of Pipe	Compression (HP)	Cost (Millions)
Total Barnett	2,027	230	91,940	\$602
Total Barnett, Woodford & Fayetteville	3,532	877	290,070	\$3,517
Total Fayetteville	6,032	448	122,107	\$2,240
Total Woodford	638	50	19,500	\$134
Total Haynesville	3,230	196	229,716	\$1,618
Total Marcellus	6,616	634	404,347	\$3,130
Total Various Supplies	3,910	638	283,334	\$2,168
<b>Grand Total</b>	<b>26,164</b>	<b>3,073</b>	<b>1,441,014</b>	<b>\$13,409</b>

## Potential

Natural Gas Basin	Capacity (MMcf/d)	Miles of Pipe	Compression (HP)
Total Barnett	2,139	40	9,500
Total Barnett & Woodford	1,800	175	70,000
Total Fayetteville	1,100	346	100,000
Total Bakken	130	100	0
Total Haynesville	1,100	0	20,260
Total Marcellus	4,988	962	0
<b>Grand Total</b>	<b>11,257</b>	<b>1,623</b>	<b>199,760</b>

Source: FERC

# Major Projects to move shale gas out of East Texas and Arkansas.



Source: Based on data from Ventyx Velocity Suite, October 2010 & FERC applications

# Summary of Natural Gas Facilities Impacting the Barnett, Woodford, Fayetteville, and Haynesville Shale Basins



Natural Gas Basin	Year Certificated	Company/Project	Docket No.	Capacity (MMcf/d)	Miles of Pipe	Compression (HP)
Barnett	2006 In-Service	CenterPoint Energy Gas Trans. Co. (Carthage to Perryville Project)	CP06-85	1,237	172	41,240
Barnett	2007 In-Service	CenterPoint Energy Gas Trans. Co. (Carthage to Perryville Phase III)	CP07-41	280	0	30,000
Barnett	2007 In-Service	Trunkline Gas Co., LLC (N. TX Expansion/Field Zone)	CP06-452	510	59	20,700
<b>Total Barnett</b>				<b>2,027</b>	<b>230</b>	<b>91,940</b>
Barnett & Woodford	2008 In-Service	Boardwalk Pipeline Partners (Gulf Crossing PL Proj. & Gulf S. PL)	CP07-398 & 401	1,732	371	130,734
Barnett & Woodford	2009 In-Service	Boardwalk Pipeline Partners (Gulf Crossing PL Proj. & Gulf S. PL)	CP07-398-002	0	0	14,896
Barnett, Woodford & Fayetteville	2008 In-Service	Midcontinent Express PL LLC	CP08-6-000 & 003	1,500	506	111,720
Barnett, Woodford & Fayetteville	2009 In-Service	Midcontinent Express PL LLC (Midcontinent Express Exp.)	CP09-56	300	0	32,720
<b>Barnett, Woodford &amp;</b>				<b>3,532</b>	<b>877</b>	<b>290,070</b>
Fayetteville	2008 In-Service	TX Gas Trans., LLC (Fayetteville/Greenville Exp.)	CP07-417	1,609	263	10,650
Fayetteville	2007 In-Service	Ozark Gas Transmission, LLC	CP07-381-000 & 001	70	0	0
Fayetteville	2009 In-Service	TX Gas Trans., LLC (Fayetteville Shale Compression)	CP08-467	2,300	0	39,990
Fayetteville	2009 In-Service	Fayetteville Express PL, LLC (Fayetteville Express)	CP09-433	2,000	185	71,467
Fayetteville	2010 In-Service	TX Gas Trans., LLC (Fayetteville/Greenville Exp.)	CP07-417-006	53	0	0
<b>Total Fayetteville</b>				<b>6,032</b>	<b>448</b>	<b>122,107</b>

Natural Gas Basin	Year Certificated	Company/Project	Docket No.	Capacity (MMcf/d)	Miles of Pipe	Compression (HP)
Woodford	2008 In-Service	MarkWest Pioneer, LLC (Arkoma Connector Pipeline Project)	CP08-404	638	50	19,500
<b>Total Woodford</b>				<b>638</b>	<b>50</b>	<b>19,500</b>
Haynesville	2009 In-Service	CenterPoint Energy Gas Trans. Co. (Phase IV Exp.)	CP09-29	274	0	30,000
Haynesville	2010 & 2011 In-Service	ETC Tiger PL, LLC (Tiger Pipeline)	CP09-460	2,000	175	119,680
Haynesville	2011 Approved	ETC Tiger PL, LLC (Tiger PL Exp.)	CP10-459	400	21	30,565
Haynesville	2010 In-Service	Gulf South PL Co. (Haynesville/Perryville Exp. Proj.)	CP09-420	556	0	49,471
<b>Total Haynesville</b>				<b>3,230</b>	<b>196</b>	<b>229,716</b>
Various Supplies	2007 In-Service	NGPL Co. of Am. (Louisiana Line Expansion Project)	CP07-3	200	4	35,000
Various Supplies	2007 In-Service	Gulf S. PL Co., LP (E. TX - MI Exp.)	CP06-446	1,706	242	110,604
Various Supplies	2009 Approved	Gulf S. PL Co., LP (E. TX - MI Exp.)	446 & 003	-231	0	0
Various Supplies	2007 In-Service	SE Supply Header (Southeast Supply Header Project)	CP07-44 & 45	1,140	269	62,650
Various Supplies	2007 In-Service	Gulf S. PL Co., LP (SE Exp. Proj.)	CP07-32	560	111	45,080
Various Supplies	2008 In-Service	SE Supply Header	CP07-44-002	175	11	0
Various Supplies	2009 Under Construction	SE Supply Header & Southern NG (Joint Pipeline Exp. Phase II)	CP09-40	360	0	30,000
<b>Total Various</b>				<b>3,910</b>	<b>638</b>	<b>283,334</b>

Source: FERC

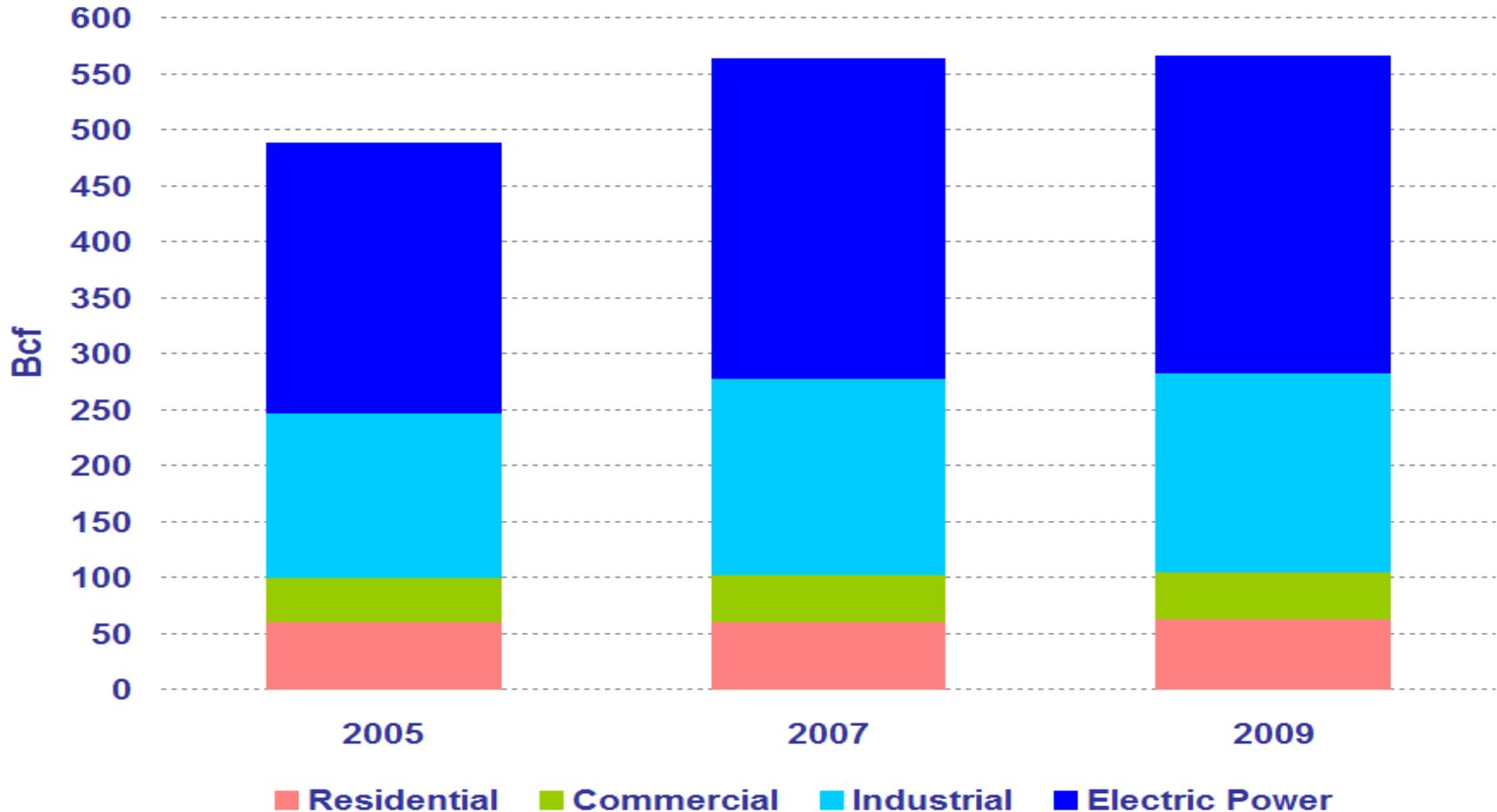
**Oklahoma is a natural gas producing state. With a low natural gas consumption, Oklahoma produces natural gas for its own consumption and for deliveries outside the state.**



<b>Oklahoma Gas Facts - 2009</b>	<b>United States</b>	<b>Oklahoma</b>	<b>% of United States</b>
<b>Total Gas Consumption</b>	<b>22,839 Bcf</b>	<b>657 Bcf</b>	<b>3%</b>
<b>Total Dry Gas Production</b>	<b>21,594 Bcf</b>	<b>1,790 Bcf</b>	<b>8%</b>
<b>Total Proved Gas Reserves</b>	<b>272,609 Bcf</b>	<b>22,769 Bcf</b>	<b>8%</b>
<b>Total Shale Production</b>	<b>3,110 Bcf</b>	<b>249 Bcf</b>	<b>8%</b>
<b>Total Shale Reserves</b>	<b>60,644 Bcf</b>	<b>6,389 Bcf</b>	<b>11%</b>
<b>Total Storage Capacity (2010)</b>	<b>8,710 Bcf</b>	<b>371 Bcf</b>	<b>4%</b>

Source: Data from EIA's Natural Gas Monthly February 2011, Table 11; US Crude Oil, Natural Gas, and Natural Gas Liquid Reserves 2009 Report, Tables 5, 9, and 13; and EIA's Natural Gas Annual 2009, Tables 2, 15, 16, and 63.

Between 2005 and 2009, Oklahoma's largest growth in natural gas usage was in electric power. For this period, natural gas usage for electric generation increased by 18 percent.



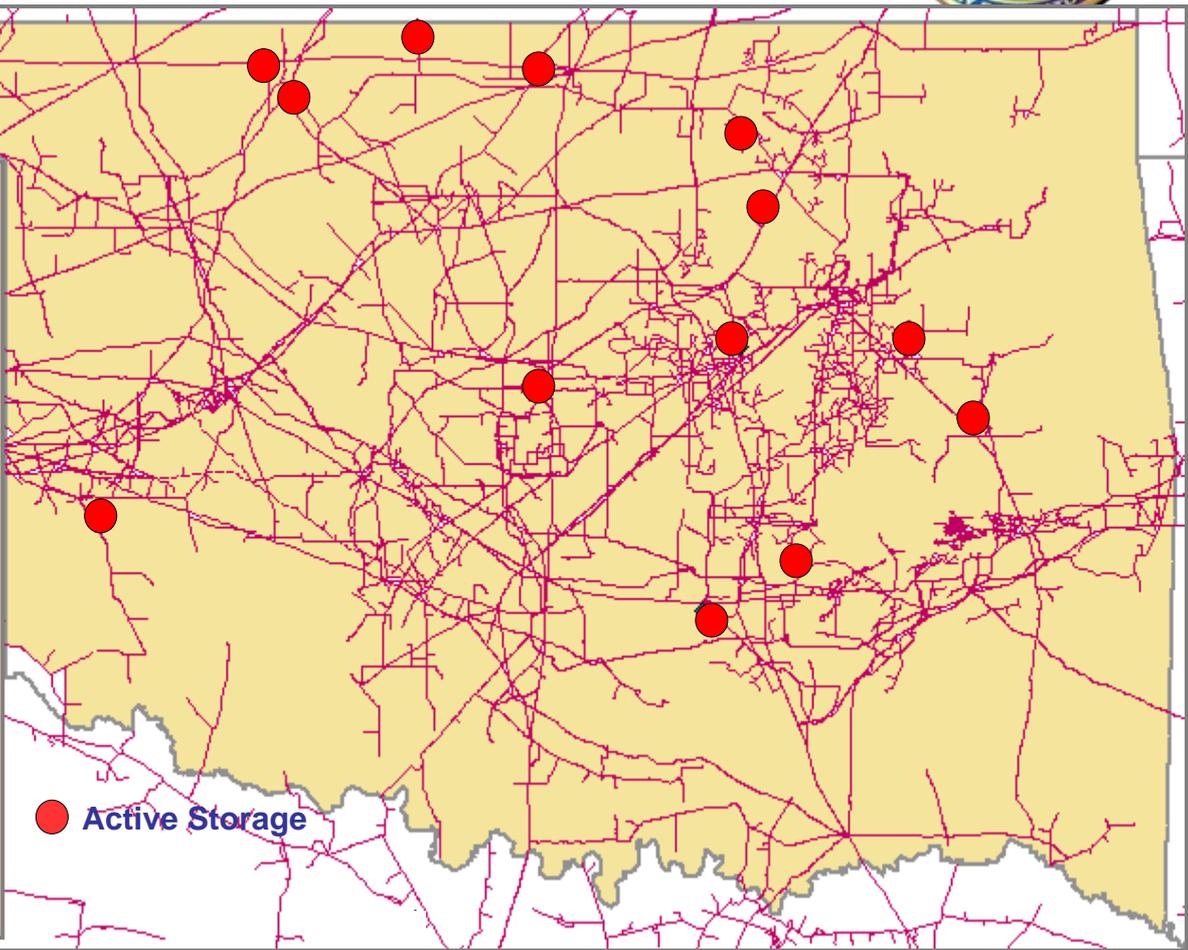
Source: EIA's Natural Gas Annual 2009, Table 63 for Oklahoma

# Natural Gas Pipeline and Storage Facilities in Oklahoma



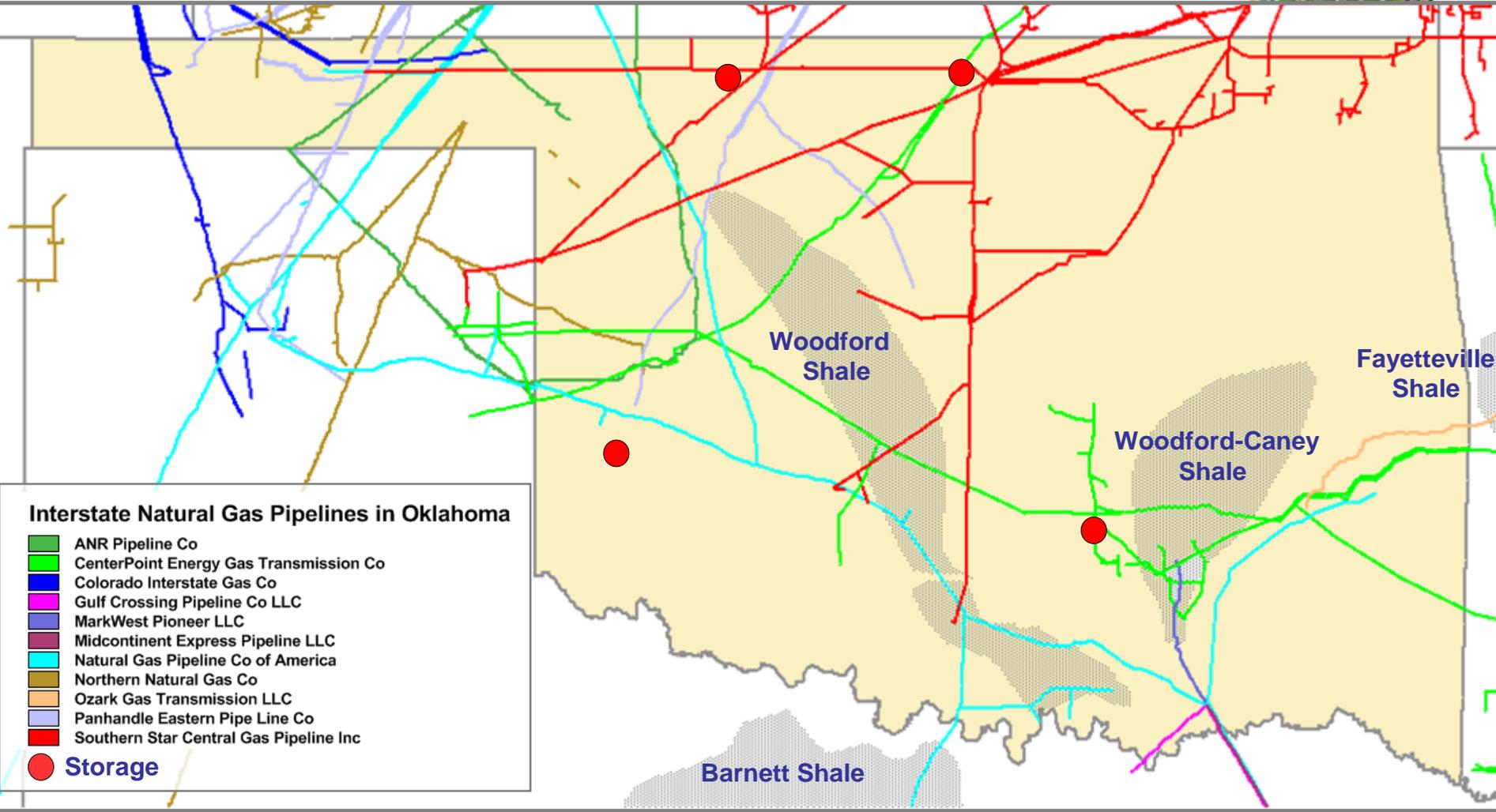
At the close of 2008, it is estimated that 18,539 miles of interstate and intrastate pipelines are located in Oklahoma. The total U.S. pipeline mileage is 305,954. Of this amount, 217,306 miles is interstate pipelines.

At the close of 2009, 13 active storage facilities are located in Oklahoma with a total working gas capacity of 177 Bcf. As of December 2010, Oklahoma has 371 Bcf of storage capacity. The total U.S. storage capacity is 8,709 Bcf.



Source: Based on data from Ventyx Global Energy Decisions, Inc., Velocity Suite, March 2011; EIA's Underground Gas Storage for Oklahoma for 2009; EIA's Estimated Natural Gas Pipeline Mileage in the Lower 48 States, Close of 2008; and EIA's Natural Gas Monthly February 2011, Table 11 – Actives of Underground Natural Gas Storage Operators, by State, December 2010

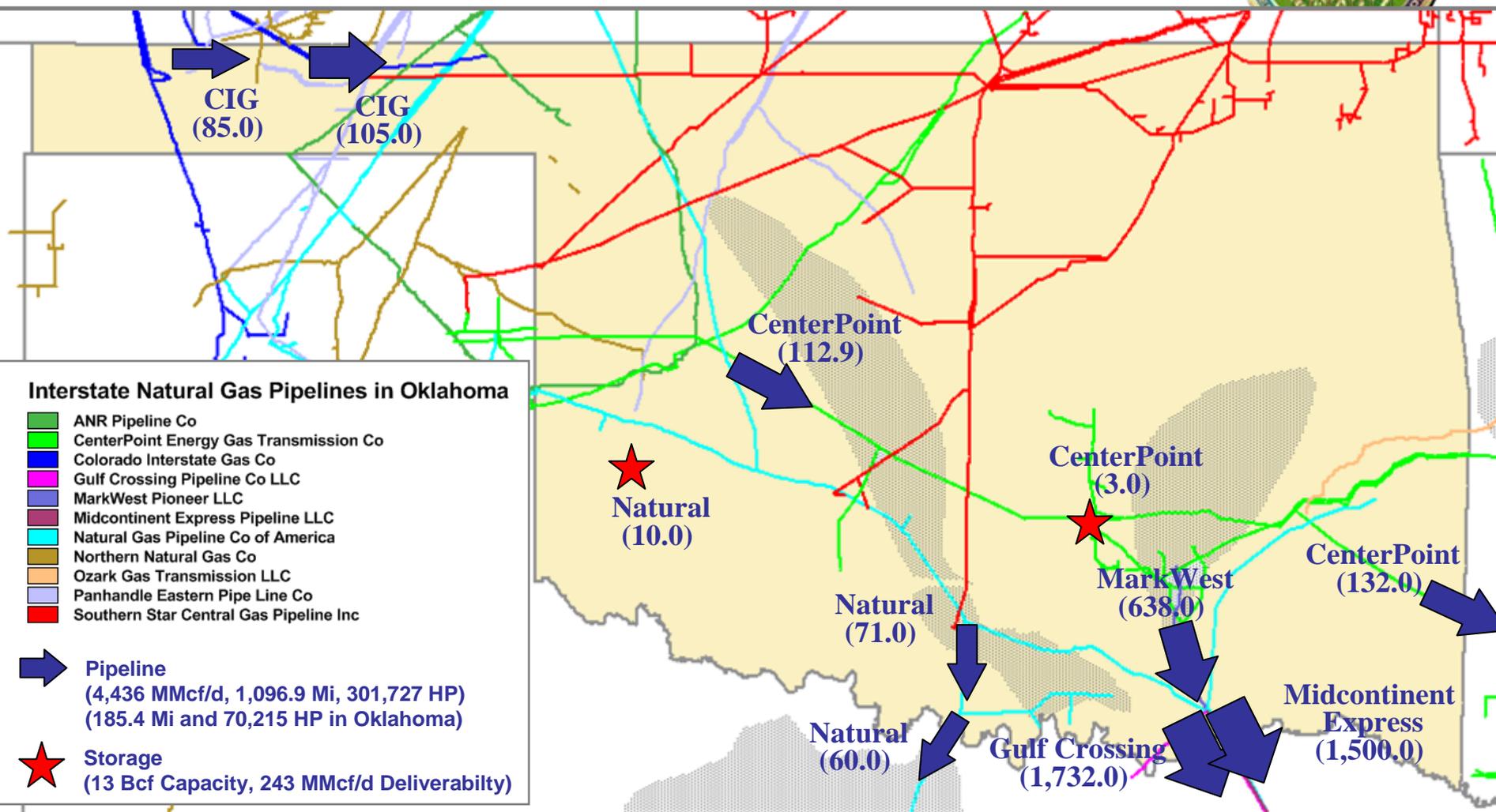
# Interstate Natural Gas Facilities and Shale Basins Impacting Oklahoma



Source: Based on data from Ventyx Global Energy Decisions, Inc., Velocity Suite, April 2010

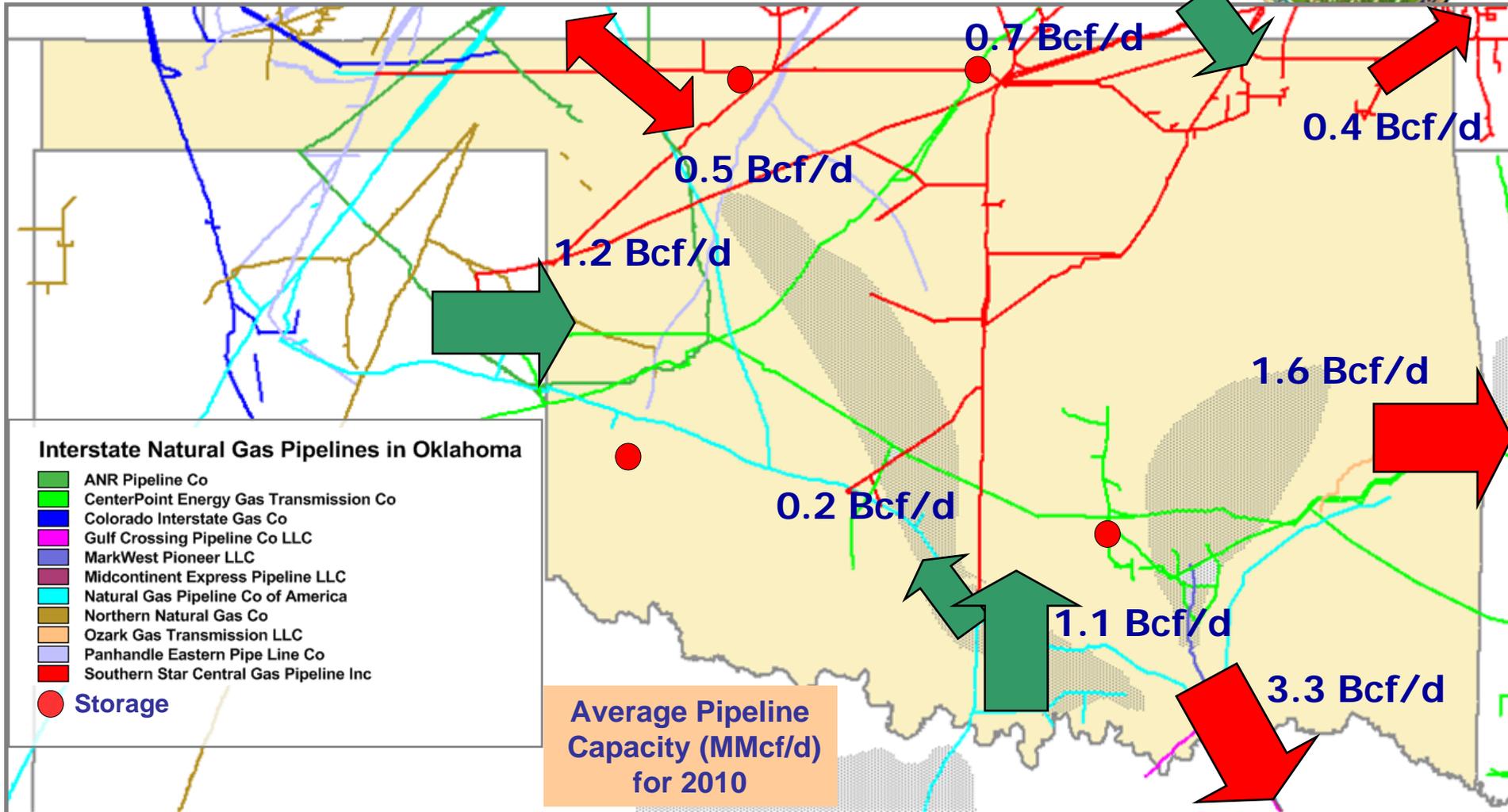
# Natural Gas Pipeline and Storage Project Certificated Since 2000

(Pipeline in MMcf/d, Storage in Bcf)



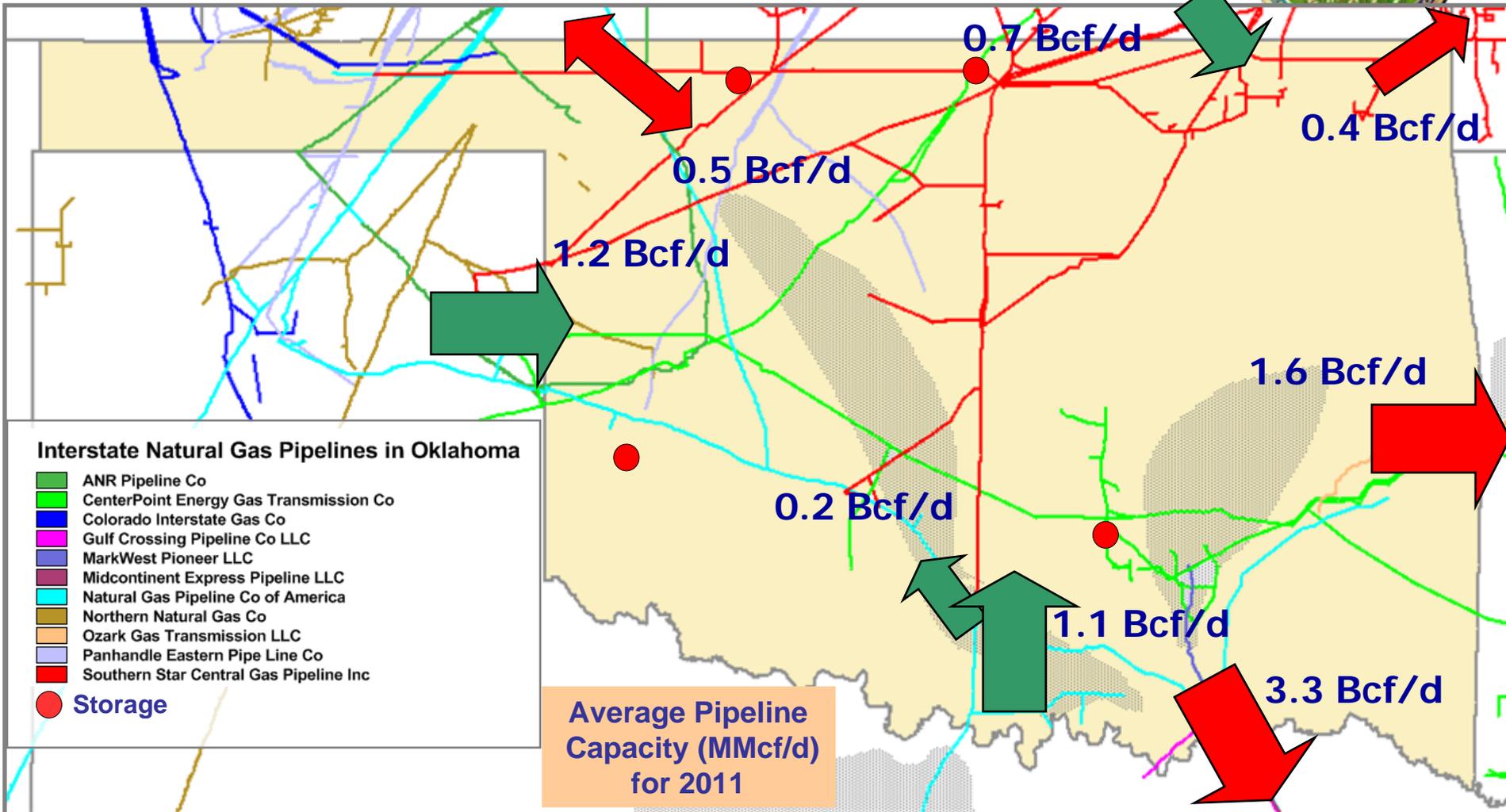
Source: Based on data from Ventyx Global Energy Decisions, Inc., Velocity Suite, April 2010

# Pipeline Capacity Into and Out of Oklahoma for 2010



Source: Based on data from Ventyx Global Energy Decisions, Inc., Velocity Suite, April 2010; and ICF International Data Base January 2011

# Pipeline Capacity Into and Out of Oklahoma for 2011



Source: Based on data from Ventyx Global Energy Decisions, Inc., Velocity Suite, April 2010; and ICF International Data Base January 2011

# Natural Gas Act



- ➔ The Natural Gas Act sets out FERC's areas of responsibility:
  - ❖ Section 1 – Identifies projects exempt from FERC jurisdiction
  - ❖ Section 3 – Allows FERC to authorize import / export projects
  - ❖ Section 7 – Allows FERC to authorize interstate pipeline projects (including storage)

# *Projects Exempt From FERC Jurisdiction*



- ➔ Local Distribution Company facilities
- ➔ Intrastate pipelines (where gas is produced, transported and consumed within a single state)
- ➔ Hinshaw pipelines (gas is produced in one state, but is received at the state border of another and transported and consumed within that state)
- ➔ Production and gathering facilities

# *Project Evaluation*



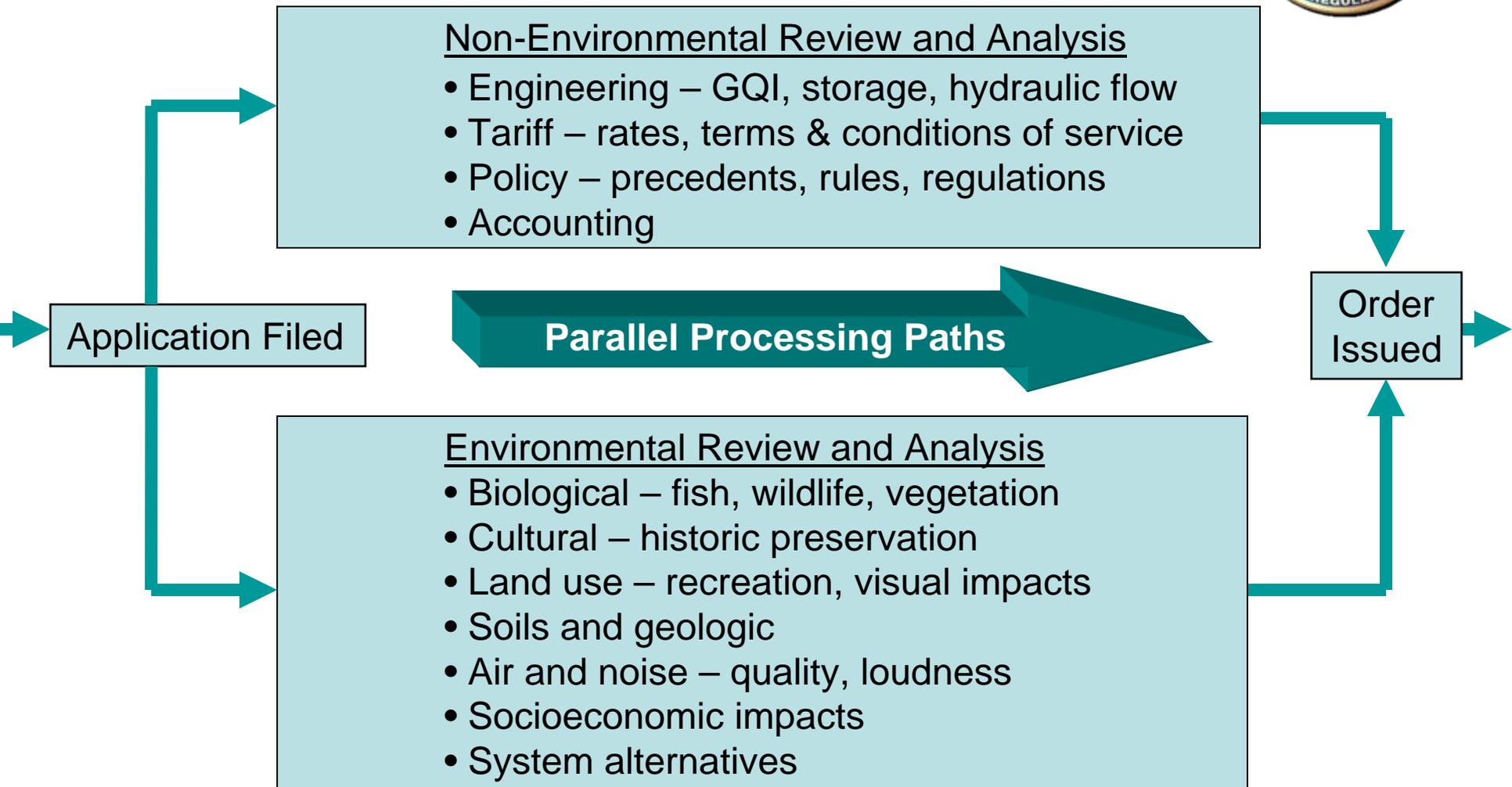
- ➔ How Does FERC Evaluate Major Projects?
- ➔ What Are The Criteria Used in This Evaluation?

# Balancing Interests



<b>People Like...</b>		<b>But They Also Want...</b>
Due Process		Expedited Process
Smaller Government		Effective Government
Less Regulation		Assurance of Fair Markets
Market-dictated Outcomes		Protection from Market Dysfunctions, Unexpected Risk, and Unjust Rates
Protection for the Environment and Property Interests		Ample Supplies of Low-cost Energy

# Certificate Process Overview



# *Final Steps of the FERC Process*



- ➔ Environmental and non-environmental aspects are brought together into a draft Commission Order
- ➔ The draft Order contains analysis and staff-recommended, project-specific requirements, for consideration by the Commission
- ➔ The Commission can reject, accept, and/or modify staff's recommendation
- ➔ If a project is approved, the project proponent is issued a certificate of public convenience and necessity

# Final Steps of the FERC Process



- ➔ For approved pipeline and storage projects, the right of eminent domain is automatically conferred by section 7(h) of the NGA
- ➔ Authority issued to import / export projects (including LNG terminals) under Section 3 of the NGA does NOT include eminent domain
- ➔ The certificate is valid for the life of the project (i.e., the certificate never expires)
- ➔ Abandonment of facilities must be approved by the Commission under section 7(b) of the NGA

# Is the FERC Final Decision Really Final?



- ➔ Intervenors (i.e., those who have filed a formal motion to intervene) may seek rehearing of the FERC decision
- ➔ The Commission may grant in full, grant in part, deny in part or deny in full any rehearing requests
- ➔ If Intervenors are not satisfied the result of FERC's Order on Rehearing, they may seek judicial review at the Court of Appeals.
- ➔ If not satisfied with the Appellate Decision, parties may seek judicial review at the Supreme Court – this is a very rare occurrence

# State and Local Permits



- ➔ FERC encourages cooperation between interstate pipelines and local authorities.
- ➔ During the environmental review, staff works with state and local permitting agencies to identify and minimize conflicting requirements
- ➔ If the Commission approves a project, state or local permits must be consistent with the conditions of any FERC certificate
- ➔ State and local agencies may not prohibit or unreasonably delay the construction or operation of facilities approved by the Commission

# The Environmental Review Process



# *National Environmental Policy Act*



➔ Is the project categorically excluded?

- ❖ Projects with little or no impact (e.g., sale of pipe or abandonment in place)

➔ Environmental Assessment or Environmental Impact Statement

- ❖ Level of environmental impacts: significant (EIS) or less than significant (EA)
- ❖ Applicant-proposed mitigation
- ❖ Anticipated public controversy

# *FERC as the Lead Agency*



- ➔ FERC is the lead agency for NEPA review and coordinator of all federal authorizations
  - ❖ Agencies urged to participate in process
- ➔ FERC establishes the schedule for all Federal authorizations
  - ❖ Ensures expeditious processing of all natural gas project permits and authorizations
  - ❖ Congress saw need for expediting the federal review of new infrastructure
- ➔ FERC maintains a complete consolidated record
  - ❖ Provides for swift judicial review

# Phases of Project Review



## ➔ Project Preparation

- ❖ The applicant working on its own

## ➔ Pre-Filing

- ❖ FERC staff working with the applicant and stakeholders before the filing of an application

## ➔ Application Review

- ❖ FERC staff working with the applicant and stakeholders after the filing of an application

## ➔ Post-Authorization

- ❖ FERC staff working with the applicant and stakeholders to ensure compliance with conditions to the FERC approval

# The Pre-Filing Process



- ➔ Voluntary for pipelines, required for LNG facilities
- ➔ Used for projects requiring an EIS, or an EA where controversy is likely
- ➔ Normally requires the applicant to hire and fund a contractor to prepare EA/EIS
  - ❖ Staff selects contractor from list of three provided by the applicant
  - ❖ Contractor works solely under Staff's direction

# Goals of the Pre-Filing Process



- ➔ Early identification and resolution of environmental issues
- ➔ Direct interaction between FERC staff, agencies, landowners, and the applicant
- ➔ Concurrent NEPA/permitting process, no shortcuts
- ➔ Transparency
- ➔ Goal of “no surprises” when application is filed

*FERC staff are advocates for the process, not the project*

# Initial Pre-filing Requirements for Applicants



- ➔ Select preliminary pipeline routes and begin surveys and studies
- ➔ Contact landowners (hold open houses)
- ➔ Verify that other key agencies are aware of the project and will participate in PF
- ➔ Meet with staff regarding proposed project
- ➔ Submit draft RFP for 3rd-party contract and draft PF request for staff review
- ➔ Agree to complete at least 6 months of PF review
- ➔ File PF request

# *Applicant's Responsibilities*



- ➔ Identify and address stakeholder and agency concerns
- ➔ Provide consistent information to agencies and stakeholders
- ➔ Submit complete application packages and correct deficiencies
- ➔ Provide FERC with proposed schedule of Federal applications
- ➔ File requests for all Federal authorizations before or concurrent with FERC application filing

# *The Environmental Report (13 Resource Reports)*



1. General Project Description
2. Water Use & Quality
3. Fish, Wildlife & Vegetation
4. Cultural Resources
5. Socioeconomics
6. Geological Resources
7. Soils
8. Land Use, Recreation & Visual Impacts
9. Air Quality & Noise
10. Alternatives
11. Reliability & Safety
12. PCB Contamination (for pipelines only)
13. LNG Engineering & Design Details

# FERC Staff Pre-Filing Activities



- ➔ Identify affected parties:
  - ❖ landowners
  - ❖ agencies
  - ❖ other stakeholders
- ➔ Facilitate identification of issues
- ➔ Identify study needs
- ➔ Facilitate resolution of issues
- ➔ Issue scoping notice
- ➔ Examine alternatives
- ➔ Arrange and attend site visits and meetings
- ➔ Initiate preparation of preliminary NEPA document
- ➔ Review draft resource reports

# Federal Permitting Agencies' Responsibilities



- ➔ Identify concerns during pre-filing process
  - ❖ Focus on details early
- ➔ Within 30 days of receiving a request for authorization from the applicant
  - ❖ Notify FERC if application is complete
    - ⇒ Specify additional info needed and time allotted
  - ❖ Identify any required studies
  - ❖ Clarify ability to meet the applicant's proposed schedule
  - ❖ Identify relevant statutory timeframes

# Public Involvement During Pre-Filing Review



## The FERC Process

- ➔ Project sponsor holds Open Houses; FERC staff participates
- ➔ Issue Notice of Intent to Prepare the NEPA Document (i.e., scoping)
- ➔ Hold scoping meetings

## Public Input

- ➔ Contact the project sponsor w/questions, concerns; contact FERC
- ➔ Send letters expressing concerns about environmental impact
- ➔ Attend scoping meetings

# *FERC Activities During Application Review*



- ➔ Develop and issue data requests, if needed
- ➔ Establish the schedule for the environmental review and issuance of federal authorizations
- ➔ Prepare and issue environmental document (EA or EIS)
- ➔ Engage with the public and encourage their participation
- ➔ Address comments, revise document, as needed

# Federal Permitting Agencies' Responsibilities



- ➔ File any data requests with FERC within 10 business days
- ➔ Contribute to FERC's consolidated record
- ➔ Comply with the schedule established
- ➔ Provide a final decision within 90 days of issuance of FERC's final environmental document
  - ❖ Unless other statutory timeframes exist

# Public Involvement During Application Review



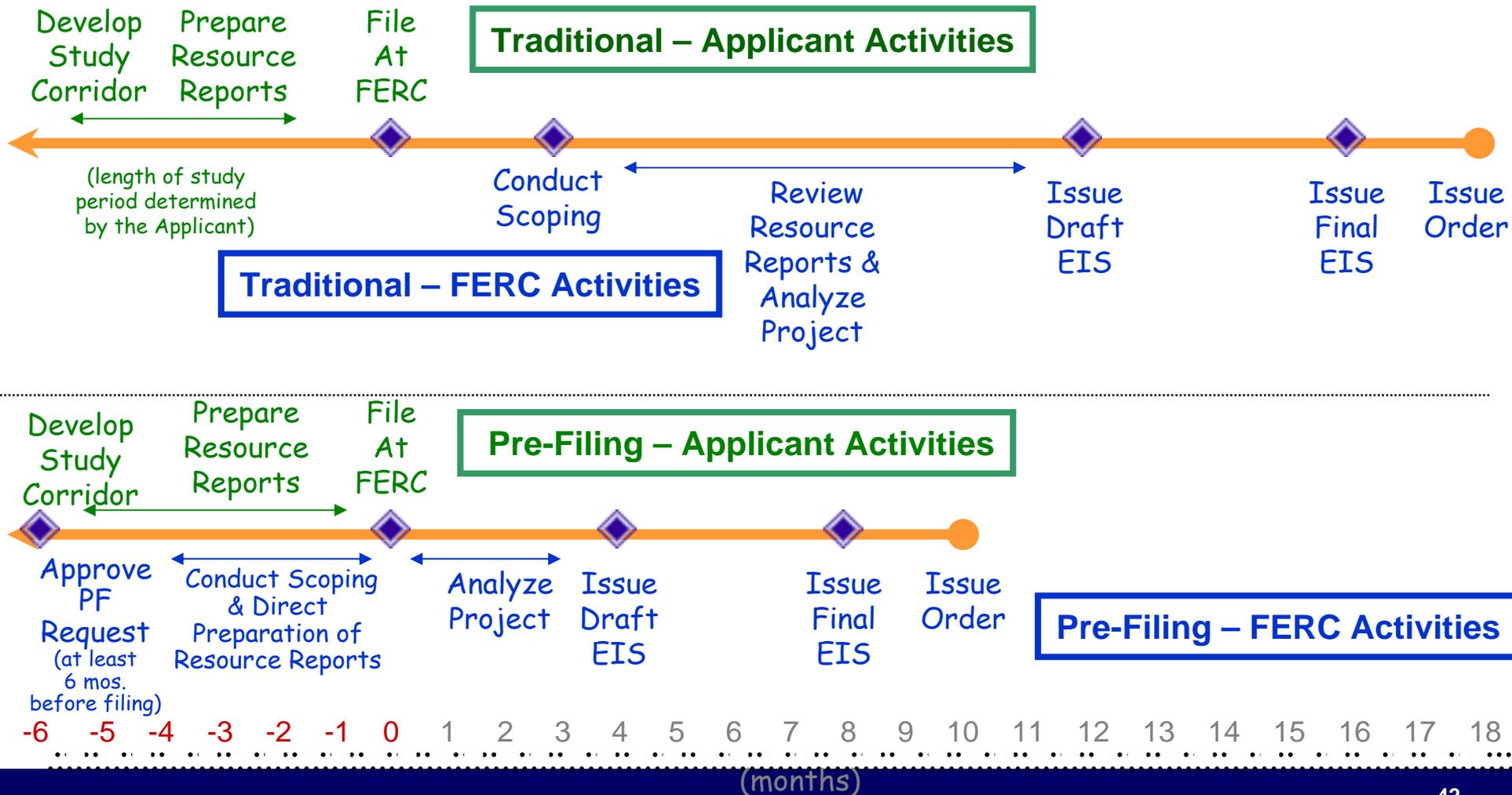
## The FERC Process

- ➔ Issue Notice of the Application
- ➔ Issue Notice of Availability of the DEIS
- ➔ Hold Public Meetings on DEIS
- ➔ Issue a Commission Order

## Public Input

- ➔ File an Intervention; register for e-subscription
- ➔ File comments on the adequacy of DEIS
- ➔ Attend public meetings to give comments on DEIS
- ➔ Interveners can file a request for rehearing of the Commission Order

# Timelines: Traditional vs. Pre-Filing Process



# Working Together



- ➔ The pre-filing process works when all stakeholders participate
- ➔ Benefits to the stakeholders
- ➔ Benefits to Applicants
- ➔ Benefits to FERC
- ➔ Benefits to other permitting agencies
  - ❖ Federal agencies
  - ❖ State agencies
  - ❖ Local agencies

# After FERC Approval...



- ⇒ Staff ensures compliance with any conditions to the approval
- ⇒ Staff conducts regular inspections during and construction and restoration
- ⇒ Opportunities still exist for minor route adjustments per landowner needs
  - ❖ Cannot affect other landowners
  - ❖ Cannot impact sensitive environmental resources

# Issuance of Federal Authorizations



- ➔ Agencies must issue a final decision within 90 days of issuance of FERC's final environmental document
  - ❖ If schedule deadline is met...
    - ❖ Within 30 days after the deadline, file a copy of any decision
    - ❖ File an index of all documents relied upon
  - ❖ If schedule or statutory deadline is not met...
    - ❖ Within 30 days after the deadline, file an index of all documents being reviewed

# *The Final Remedy*



- ➔ Applicant can file in District Court for review
  - ❖ If applicant disagrees with a decision
  - ❖ If agencies fail to meet schedule or statutory deadline
- ➔ FERC's consolidated record must be used for appeals
- ➔ The FERC will certify consolidated Federal record to the Court

# *Appendix*



# FERC Activity Since 2000



## ⇒ Pipeline

- ⇒ 16,000+ miles
- 5 million +HP
- 114 Bcf/d of capacity

## ⇒ Storage

- ⇒ 980 Bcf of storage capacity

## ⇒ LNG

- ⇒ 18 new terminal sites  
– 29.2 Bcf/d of sendout capacity; 7 expansions – 7.8 Bcf/d of sendout capacity