

# Washington Report on Shale Related Infrastructure

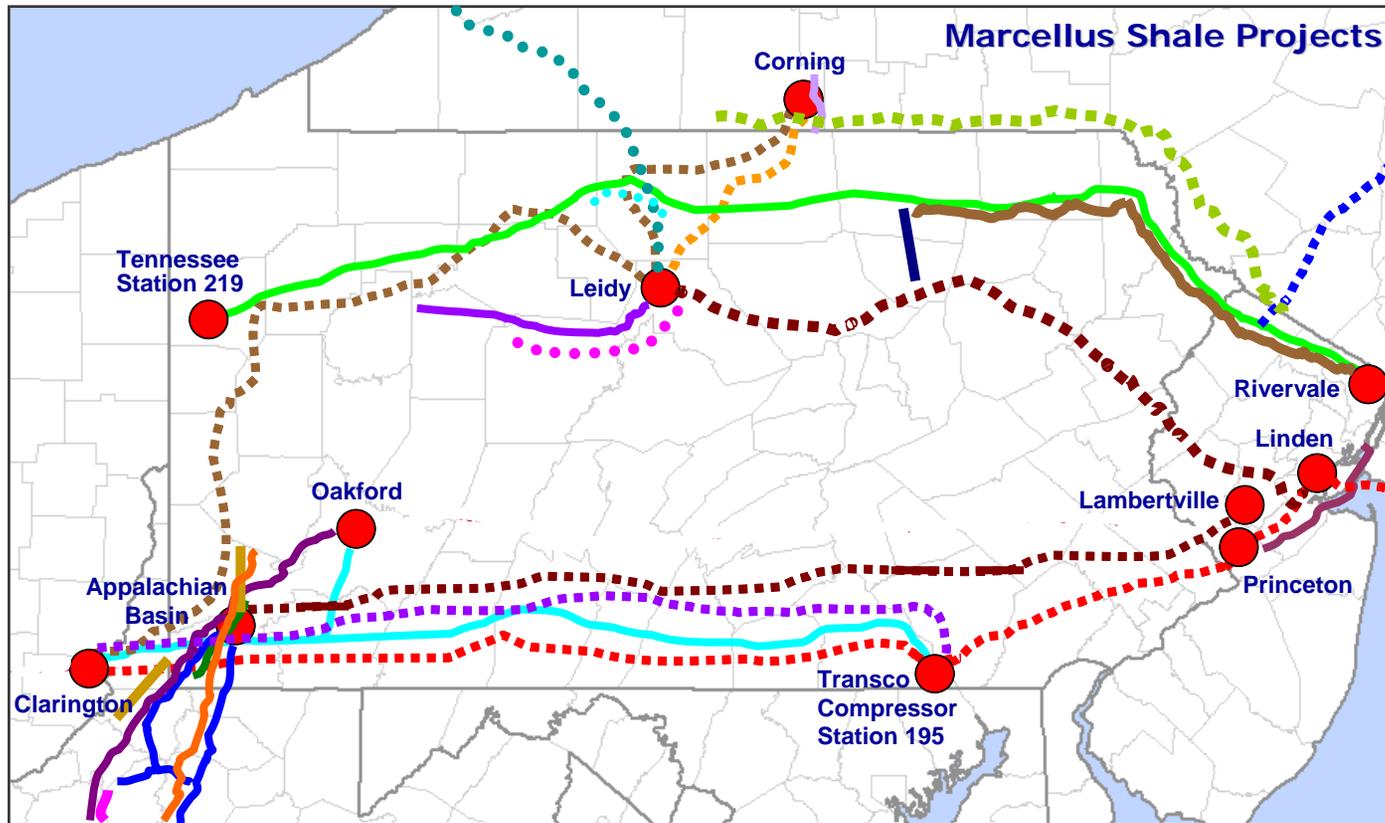


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Office of Energy Projects  
Federal Energy Regulatory Commission**

**Tucson, AZ**

**November 17, 2010**

# Marcellus Shale Projects



Approved or Pending Projects

Potential Projects

<ul style="list-style-type: none"> <li>Appalachian Expansion (NiSource)</li> <li>Line 300 Exp (Tennessee)</li> <li>NiSource/MarkWest &amp; NiSource</li> <li>N Bridge, TIME 3, TEMAX (TETCO)</li> <li>Appalachian Gateway (Dominion)</li> <li>Line N, R &amp; I Project (NFG)</li> <li>Tioga County Extension (Empire)</li> </ul>	<ul style="list-style-type: none"> <li>Sunrise Project (Equitrans)</li> <li>TEAM 2012 Project (TETCO)</li> <li>Northeast Upgrade (Tennessee)</li> <li>Marc I (Central NY)</li> <li>Low Pressure East-West (Equitrans)</li> <li>East-West - Overbeck to Leidy (NFG)</li> <li>NJ-NY Project (TETCO &amp; Algonquin)</li> </ul>	<ul style="list-style-type: none"> <li>NYMarc (Iroquois)</li> <li>New Penn (NiSource)</li> <li>Marcellus to Manhattan (Millennium)</li> <li>Northern Access (NFG)</li> <li>NSD Project (Tennessee)</li> <li>Appalachia to Market Expansion &amp; TEAM 2013 (TETCO)</li> </ul>	<ul style="list-style-type: none"> <li>Keystone (Dominion/Williams)</li> <li>West to East Connector (NFG)</li> <li>Northeast Supply Link (Transco)</li> <li>NiSource &amp; UGI</li> <li>Northeast Supply (Williams)*</li> </ul> <p>* Combined Transco's Rockaway Lateral and Northeast Connector Projects</p>
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Source: FERC

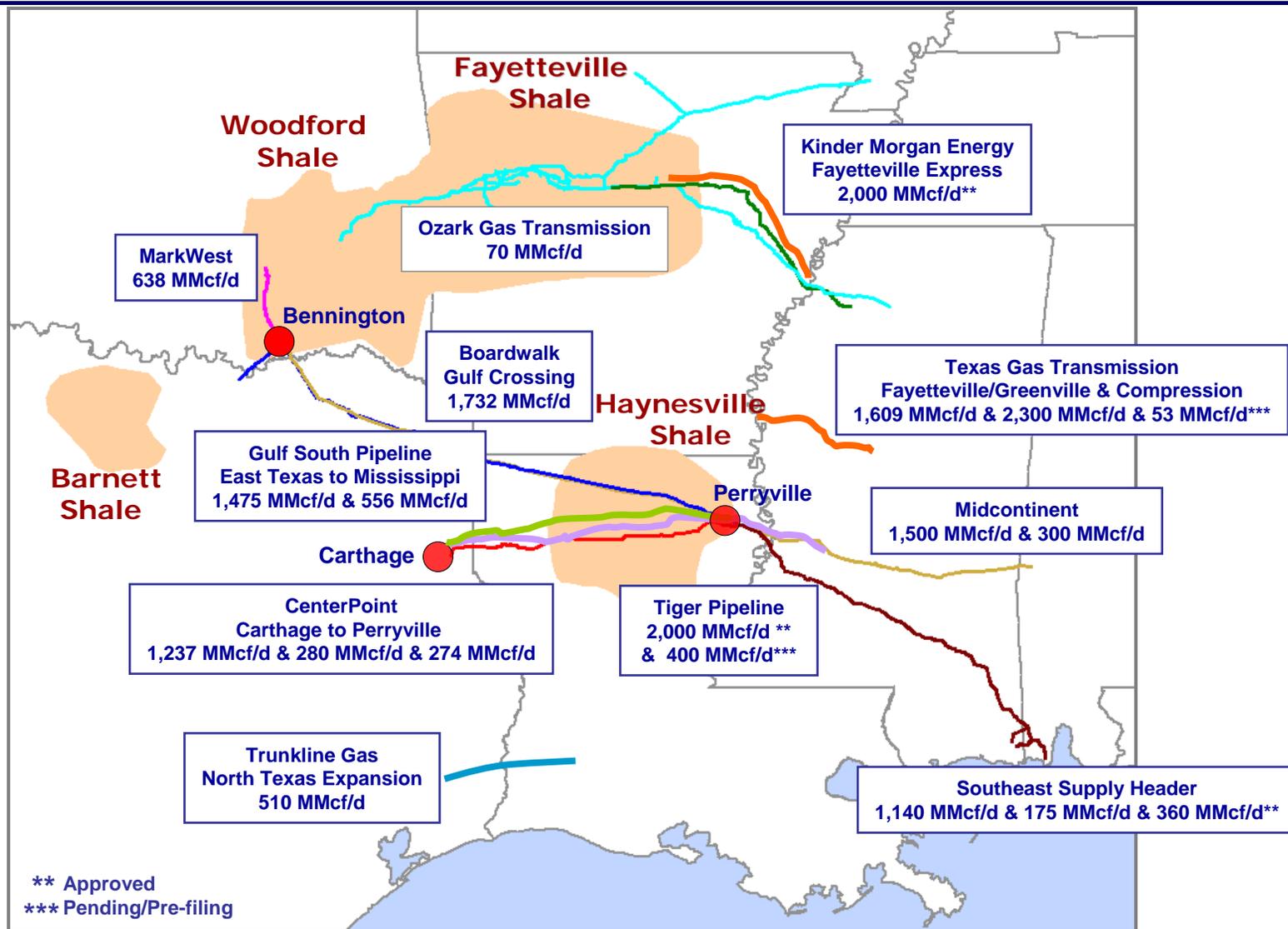
# Summary of natural gas facilities impacting the Marcellus Shale Basin

Natural Gas Basin	Status	Company/ Project	Capacity (MMcf/d)	Miles of Pipe	Compression (HP)
Marcellus	Approved	Texas Eastern Trans., LP (TEMAX & TIME III projects)	455	62	84,433
Marcellus	Approved	Texas Eastern Trans., LP (Northern Bridge Project)	150	0	10,666
Marcellus	Approved	Columbia Gas Trans., LLC (Appalachian Exp. Proj.)	100	0	9,470
Marcellus	Approved	Tenn. Gas Pipeline Co. (Line 300 Expansion)	350	129	59,158
Marcellus	Prior-Notice	Columbia Gas Trans., LLC (Majorsville Compressor/ MarkWest Upgrade)	250	4	0
Marcellus	Prior-Notice	Columbia Gas Trans., LLC	150	6	0
Marcellus	Prior-Notice	Equitrans, LP (Low Pressure East and West Upgrade Project)	92	0	0
Marcellus	Pending	Dominion Trans., Inc. (Appalachian Gateway Project)	484	107	17,965
Marcellus	Pending	Central NY Oil and Gas Co. (MARC I Project)	550	39	31,660
Marcellus	Pre-Filing	National Fuel Gas Supply Corporation (Line N R & I Project)	150	18	5,000
Marcellus	Pre-Filing	National Fuel Gas Supply Corporation (E-W / Overbeck to Leidy)	425	82	25,000
Marcellus	Pre-Filing	Texas Eastern Trans. & Algonquin Gas Trans. (NJ-NY Project)	800	16	0
Marcellus	Pre-Filing	Equitrans, LP (Sunrise Project)	1,000	112	85,000
Marcellus	Pre-Filing	Texas Eastern Trans., LLC (TEAM 2012 Project)	190	22	20,720
Marcellus	Pre-Filing	Tenn. Gas Pipeline Co. (Northeast Upgrade Proj.)	636	37	20,620
Marcellus	Pending	Empire Pipeline, Inc (Tioga County Extension)	350	16	0
<b>Total</b>			<b>6,132</b>	<b>650</b>	<b>369,692</b>

Natural Gas Basin	Status	Company/ Project	Capacity (MMcf/d)	Miles of Pipe	Compression (HP)
Marcellus	Potential	Nisource (New Penn)	500	82	
Marcellus	Potential	TETCO (Appalachia to Market Expansion- TEAM)	500		
Marcellus	Potential	Dominion/Williams (Keystone Connector)	1,000	240	
Marcellus	Potential	Williams (Northeast Supply)	688	250	
Marcellus	Potential	NFG (West to East Connector)	625	324	
Marcellus	Potential	Iroquois Gas Transmission System LP (NYMarc System Project)	500	66	0
Marcellus	Potential	Millennium Pipeline (Marcellus to Manhattan)	675	0	0
Marcellus	Potential	Nat. Fuel Gas Supply Co. (Northern Access Expansion)	450	0	0
Marcellus	Potential	Tenn. Gas Pipeline Co. (Northeast Supply Diversification Project)	250	7	0
Marcellus	Potential	NiSource Gas Transmission and Storage & UGI Corporation	500	0	0
Marcellus	Potential	Transco GPL Corp. (Northeast Supply Link)	420	24	0
<b>Total</b>			<b>6,108</b>	<b>993</b>	<b>0</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; Fayetteville</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 Under Construction	Fayetteville Express PL, LLC (Fayetteville Express)	CP09-433	2,000	185	71,467
Fayetteville	Pending	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 Under Construction	ETC Tiger PL, LLC (Tiger Pipeline)	CP09-460	2,000	175	119,680
Haynesville	Pending	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.)	CP06-446 & 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>Various Supplies</b>				<b>3,910</b>	<b>638</b>	<b>283,334</b>

Source: FERC

# 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	\$1,425
Total Marcellus	6,132	650	369,692	\$2,319
Total Various Supplies	3,910	638	283,334	\$2,168
<b>Grand Total</b>	<b>25,501</b>	<b>3,089</b>	<b>1,406,359</b>	<b>\$12,405</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	6,108	993	0
<b>Grand Total</b>	<b>12,377</b>	<b>1,654</b>	<b>199,760</b>

Source: FERC

# Market Knows Best

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- **FERC is not the market**
- **FERC will present a “menu” of infrastructure solutions that are:**
  - ⇒ **In the public interest**
  - ⇒ **Will cause the least environmental impact**
  - ⇒ **Will be safe**
- **The market is in the best position to select the infrastructure projects that get built**

# Challenges to Shale Development

## ⇒ Challenges in Pennsylvania

- ⇒ Suspension of leasing of state forest land for oil and gas drilling
- ⇒ Proposed severance tax on gas production
- ⇒ Local ordinances prohibiting drilling within city limits
- ⇒ Treatment of waste water from gas drilling
- ⇒ Issue of “forced pooling”
- ⇒ State policy regarding air-quality permitting
- ⇒ Potential contamination of drinking water due to methane migration and/or hydraulic fracturing fluids

## ⇒ Challenges in Texas

- ⇒ Air-quality issues relating to gas production in the Barnett Shale and Eagle Ford Shale
- ⇒ Lack of liquid transportation and processing capacity for liquids production in Eagle Ford Shale
- ⇒ Fracking crew shortages in the Eagle Ford Shale area
- ⇒ Disclosure of chemical contents in hydraulic fracturing fluids
- ⇒ City moratoriums on gas drilling permitting and related operations

# Conclusions

- **The Commission process has benefited all stakeholders in natural gas projects**
- **More needs to be done**
  - ⇒ **Turn opposition into understanding**
  - ⇒ **Continue to refine the siting process**
- **More infrastructure is coming**
  - ⇒ **Alaska**
  - ⇒ **Pipes from non-traditional sources**
  - ⇒ **Hydrokinetics**
  - ⇒ **Electric transmission**