

# European Unconventional Gas Development: Impacts on Communities

Jim Ladlee, Penn State Marcellus Center (MCOR) & Shale Training and Education Center (ShaleTEC)



Photo Courtesy Penn State Marcellus Center

Penn State **Extension**

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MARCELLUS CENTER

**MCOR**

FOR OUTREACH AND RESEARCH



# Opportunity & Perspective



Photo Courtesy Penn State Marcellus Center

# The Timeline

## Extraction Timeline

Lifespan totaling approximately 30-50 years

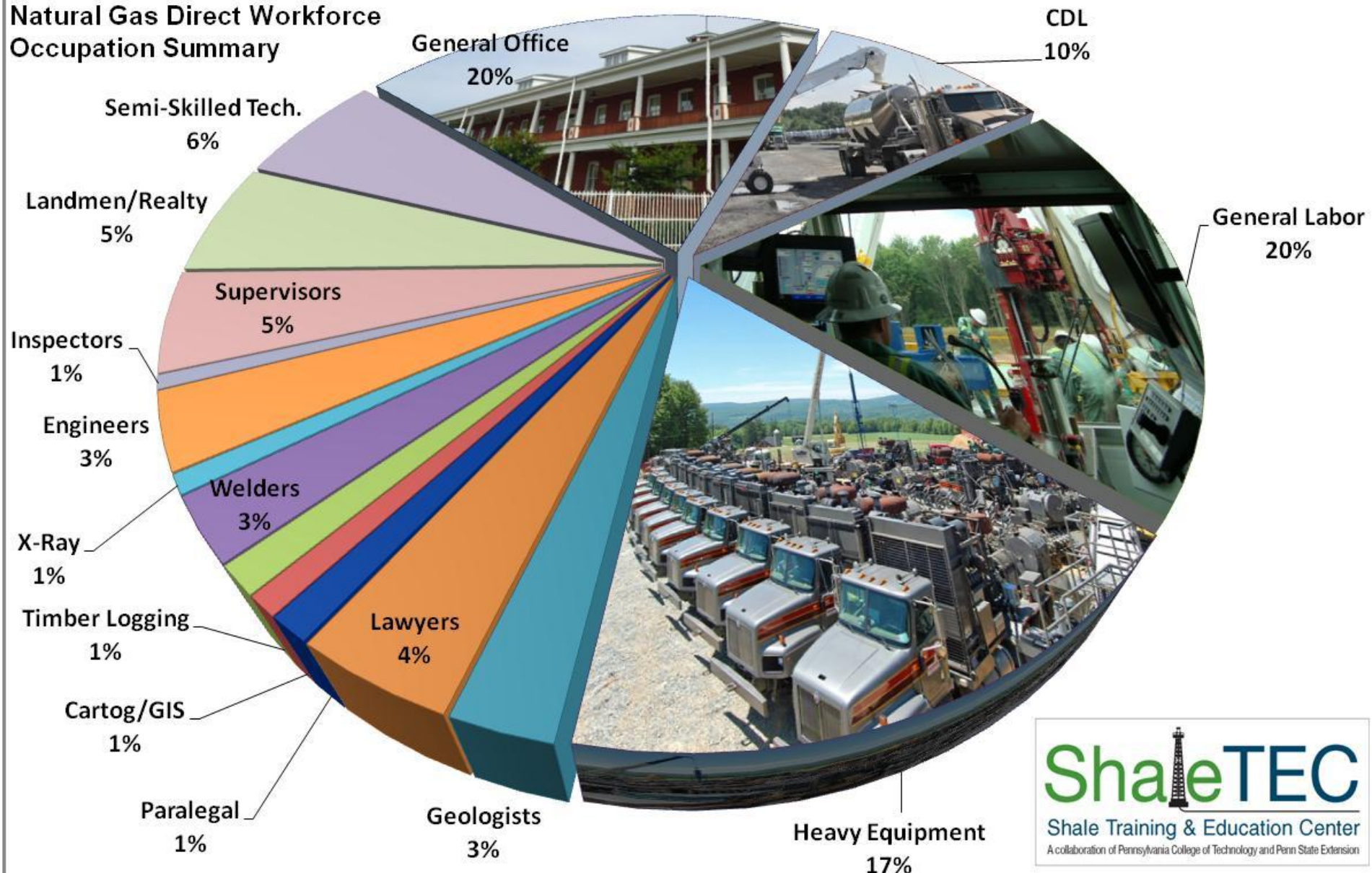
		Pipeline Construction			
		Construction time depends on length and materials			
Permitting		Drilling			
30-90 days		30-45 days			
Pre-Drilling		Drilling & Completion		Production	
Geologic Studies		Staking Well		Completion	Reclamation
6 months - 1 year		30-60 days		1-2 Weeks	1-3 months
Mineral Rights					

© Marcellus Shale Education and Training Center, 2011

Source: Pennsylvania Marcellus Shale Workforce Needs Assessment <http://www.msetc.org/>



# Natural Gas Direct Workforce Occupation Summary



# Direct Workforce Projection Summary...

- 420 individuals across 150 different occupations
  - **13.1** full time equivalent workers/well
  - **Roughly 24,891 Direct jobs** just in 2011
    - 4,585 Predrilling
    - 19,947 Drilling & Completion
    - 358 Production & Reclamation
    - High BTU/Wet gas processing adds .2 fte/well
- } 13.3 FTE/well
- Generally accepted multipliers for indirect and induced oilfield workforce usual fall between 1.5 and 2
  - Total jobs estimate for Pennsylvania = 74,673

# Employment (2009Q1 to 2012Q1)

- Core industries up 19,100 (+177.5%)
  - 29,065 Total Core Jobs
- Ancillary industries up 13,700 (+7.2%)
- All industries up 43,300 (+0.8%)
  - 75% of all jobs created statewide were related to natural gas
- 2012 Shale related industries employment 234,000

Marcellus Shale Fast Facts, October, 2012 edition\*  
Center for Workforce Information & Analysis (CWIA)

# Ancillary Industries

	2009Q1		2012Q11		Actual Change		% Change	
	Est.	Emp.	Est.	Emp.	Est.	Emp.	Est.	Emp.
<b>Specialized Freight Trucking</b>	1,042	9,336	1,286	12,983	244	3,648	23%	39%
<b>General Freight Trucking</b>	1,206	8,085	1,409	10,513	203	2,428	17%	30%
<b>Testing Laboratories</b>	394	7,224	403	8,774	9	1,550	2%	21%
<b>Highway, Street, &amp; Bridge Const.</b>	532	17,591	535	19,090	3	1,499	1%	9%
<b>Engineering Services</b>	2,462	41,691	2,588	42,999	126	1,308	5%	3%
<b>Const., Mine, &amp; Forest Equip Rent</b>	115	2,202	164	3,382	49	1,180	43%	54%
<b>Geophysical Survey &amp; Map Srvs</b>	55	237	59	344	4	106	7%	45%
<b>Oil &amp; Gas Machine &amp; Equip Mfg</b>	8	338	10	427	2	89	25%	26%

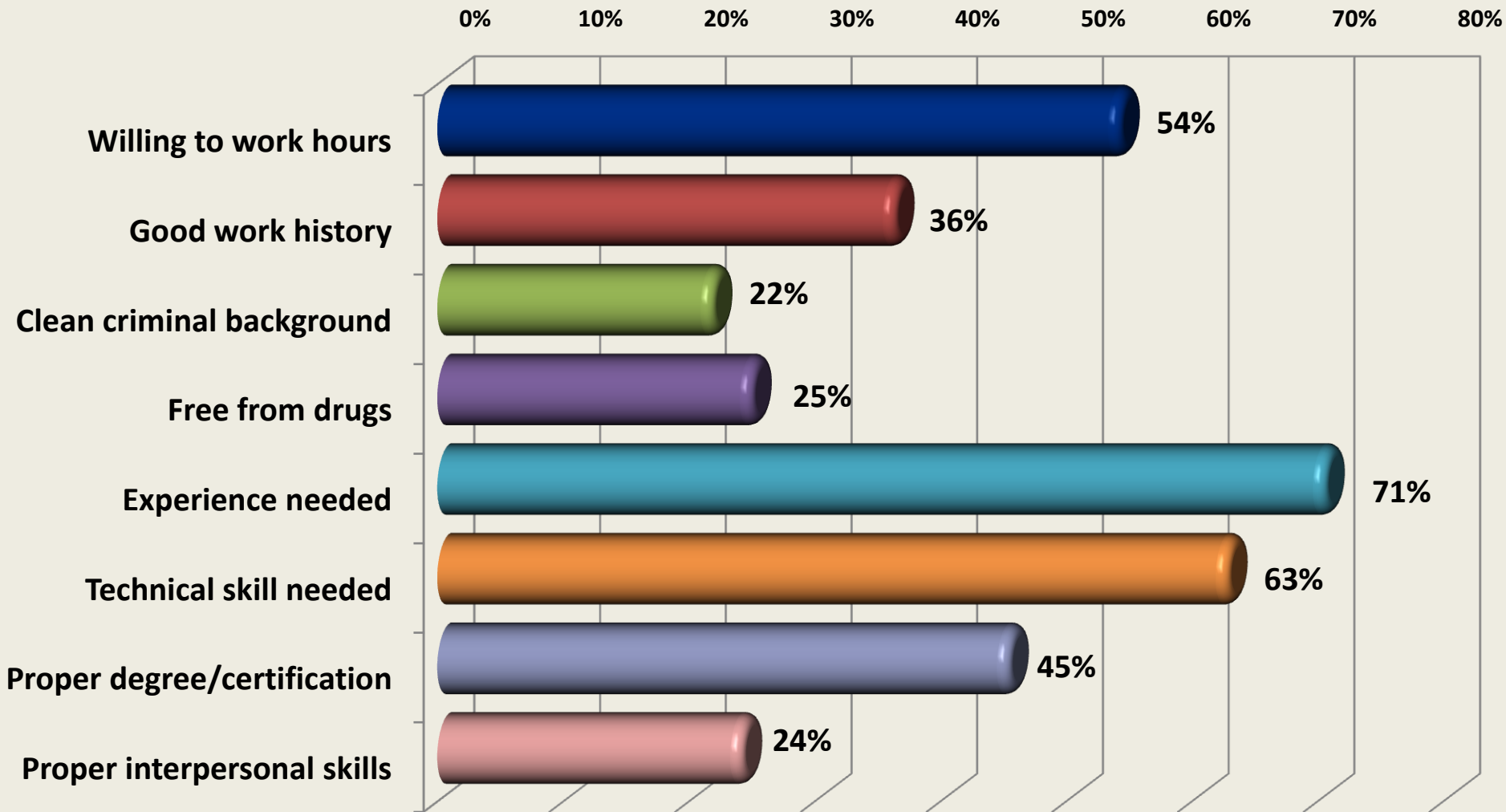
Marcellus Shale Fast Facts, October, 2012 edition\*  
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# Workforce/Business

- Williamsport, PA Example
  - 7<sup>th</sup> fastest growing metro economy in the US
  - 6<sup>th</sup> fastest growing wages in the US
  - 200-300 new businesses



# Biggest Challenge Finding Workers



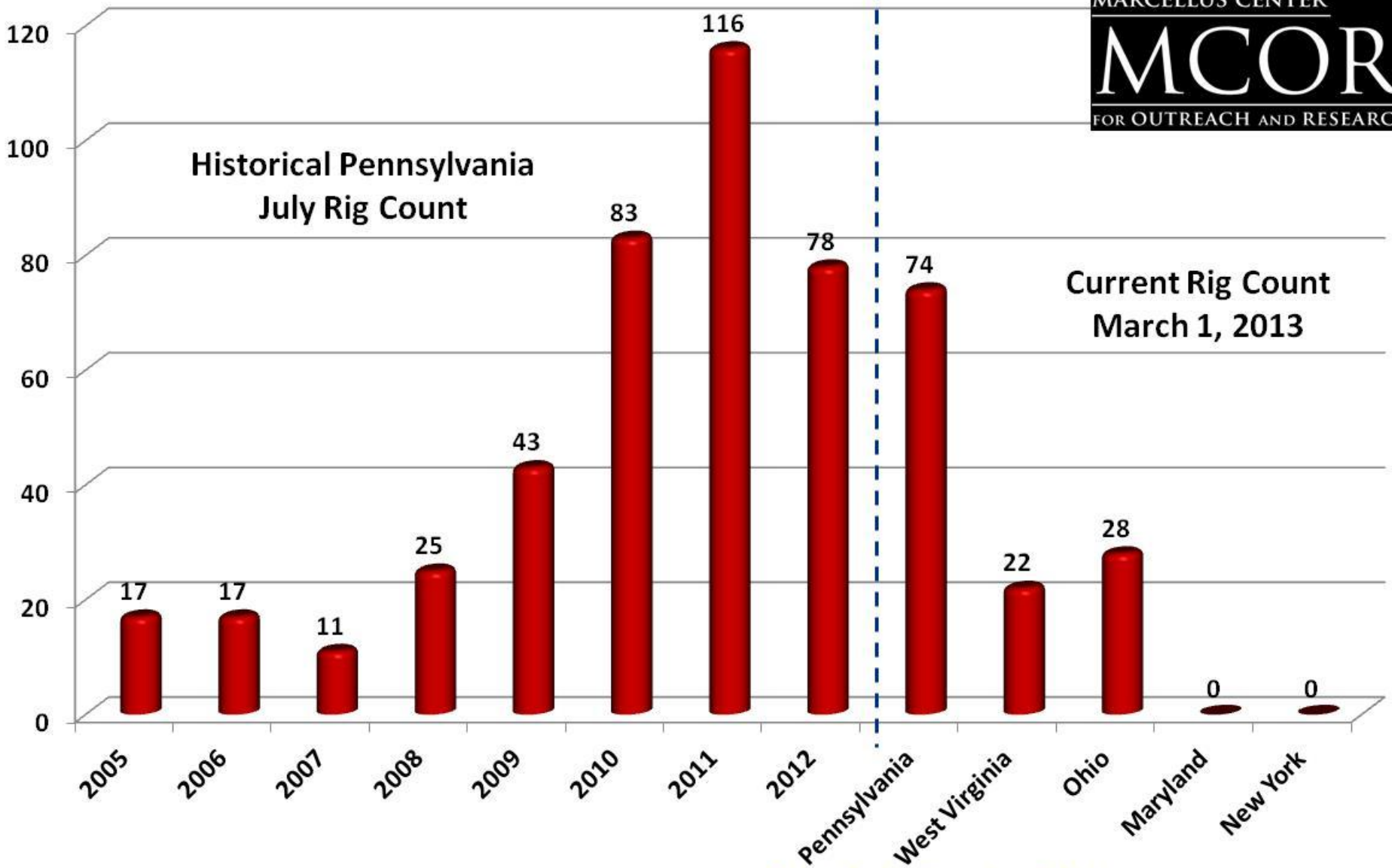
Source: Pennsylvania Marcellus Shale Workforce Needs Assessment <http://www.msetc.org/>

# Development Patterns

- E&P vs. subcontractor
- Hot spot vs. overall
- Pace
  - Price
  - Inventory
  - Production
  - Utilization
- Federal, State, or Provincial Policy



Photo Courtesy Penn State Marcellus Center



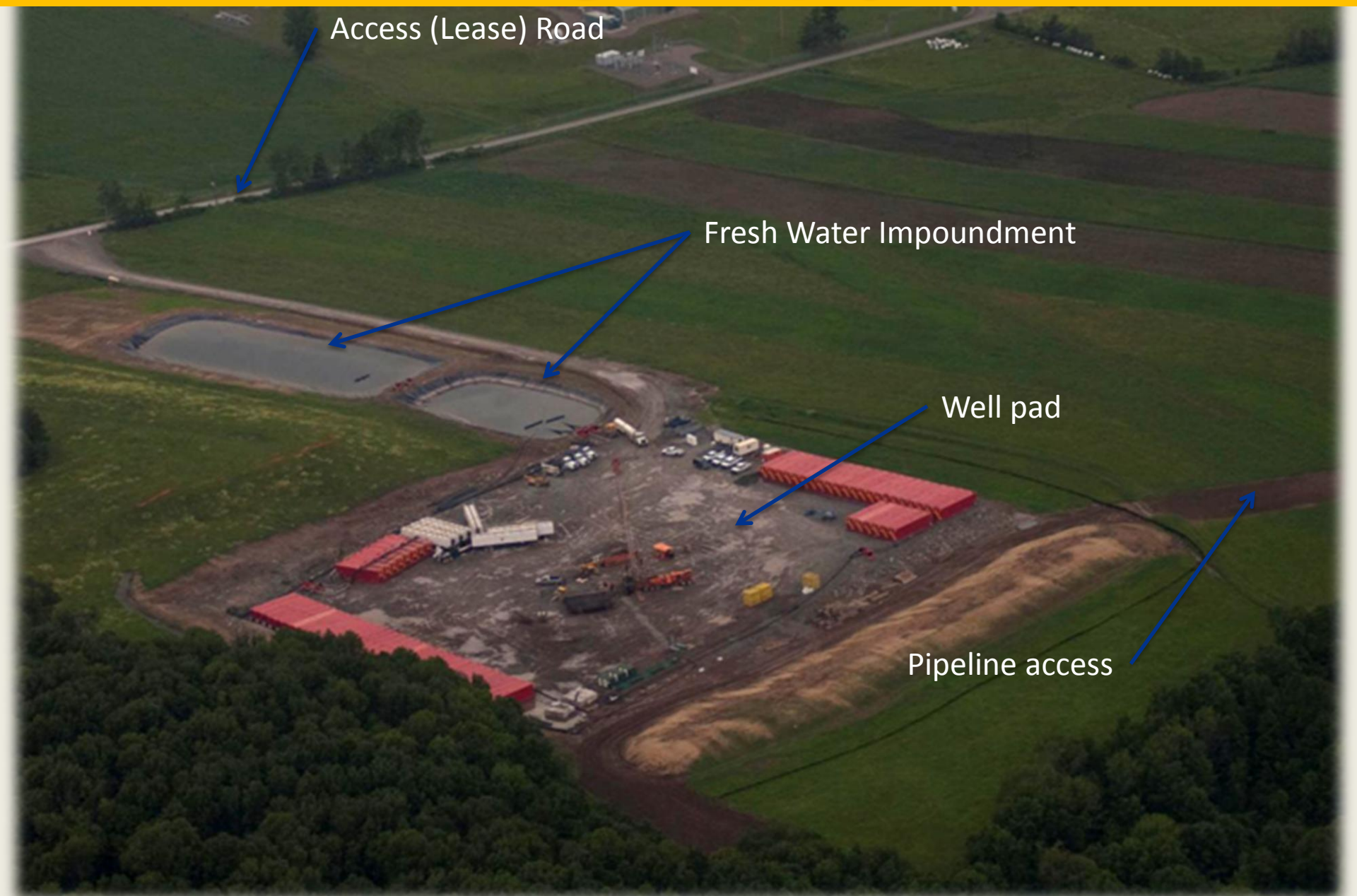
Sources: [Baker-Hughes Investor Relations](#) (March 1, 2013)



# Local Business Opportunities

- Engineering and geological services
- Site construction
- Fuel, stone, and site prep materials
- Equipment rental
- Technical services (electronics, welding, etc...)
- Professional services (surveyors, water testing, environmental services, etc...)
- Office and warehouse space
- Meals, hospitality services, and other retail
- And much more...

# Predrilling Supply Chain



Access (Lease) Road

Fresh Water Impoundment

Well pad

Pipeline access



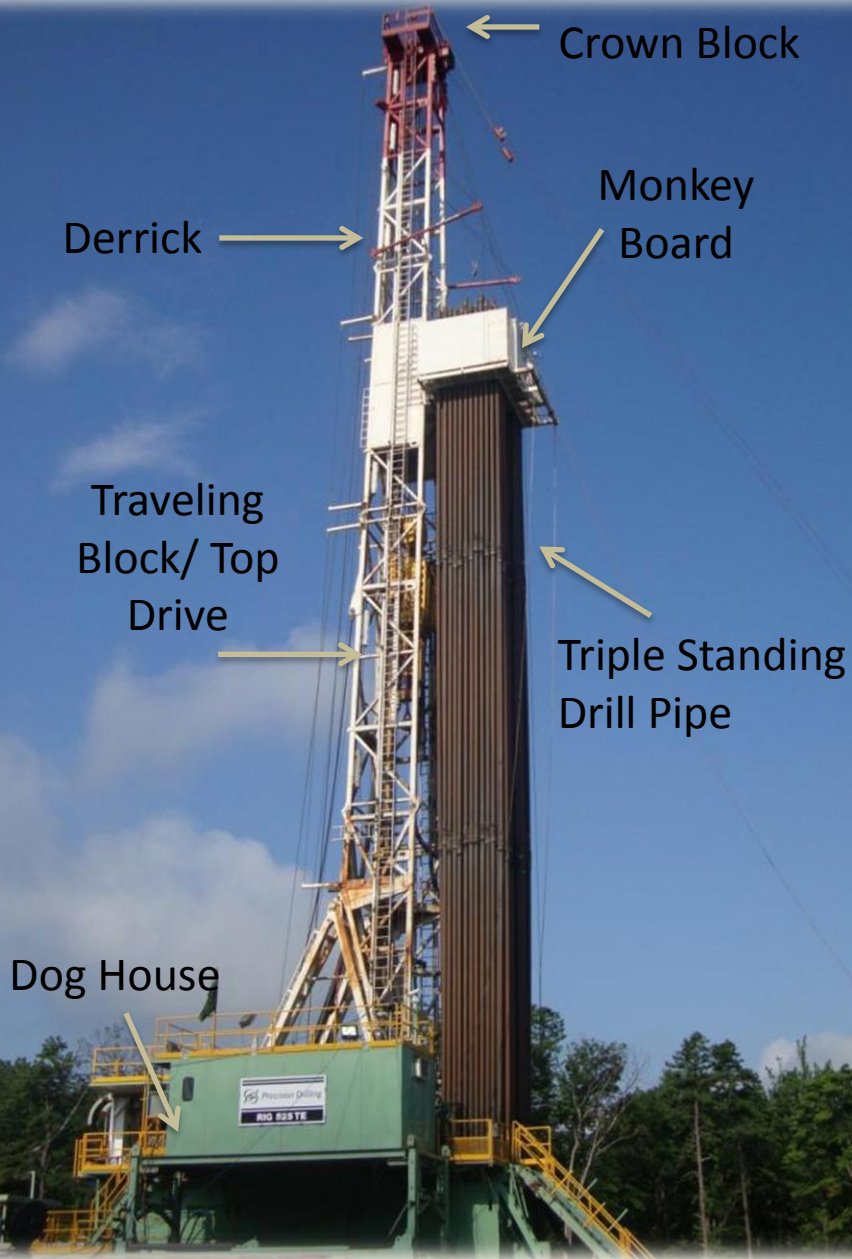
# Drilling & Well Construction



Photo courtesy of Rich Wykoff



# Drilling & Well Construction





# Completion Supply Chain



*Photo courtesy Penn State Marcellus Center*



# Production Supply Chain





# Downstream Supply Chain

## Transportation

- Compressed Natural Gas (CNG)
- Liquefied Natural Gas (LNG)
- Gas to Liquids (GTL)
- Co-fueling
  - Diesel/Natural Gas
  - Electric/Natural Gas

## Ethane Cracker

## Manufacturing

- Strong energy users
  - Paper
  - Steel
  - Plastics
  - Glass
  - Agriculture

## Power Generation

- Combined Heat and Power
- Coal Conversion
- Peaking Power

# ShaleNET Background

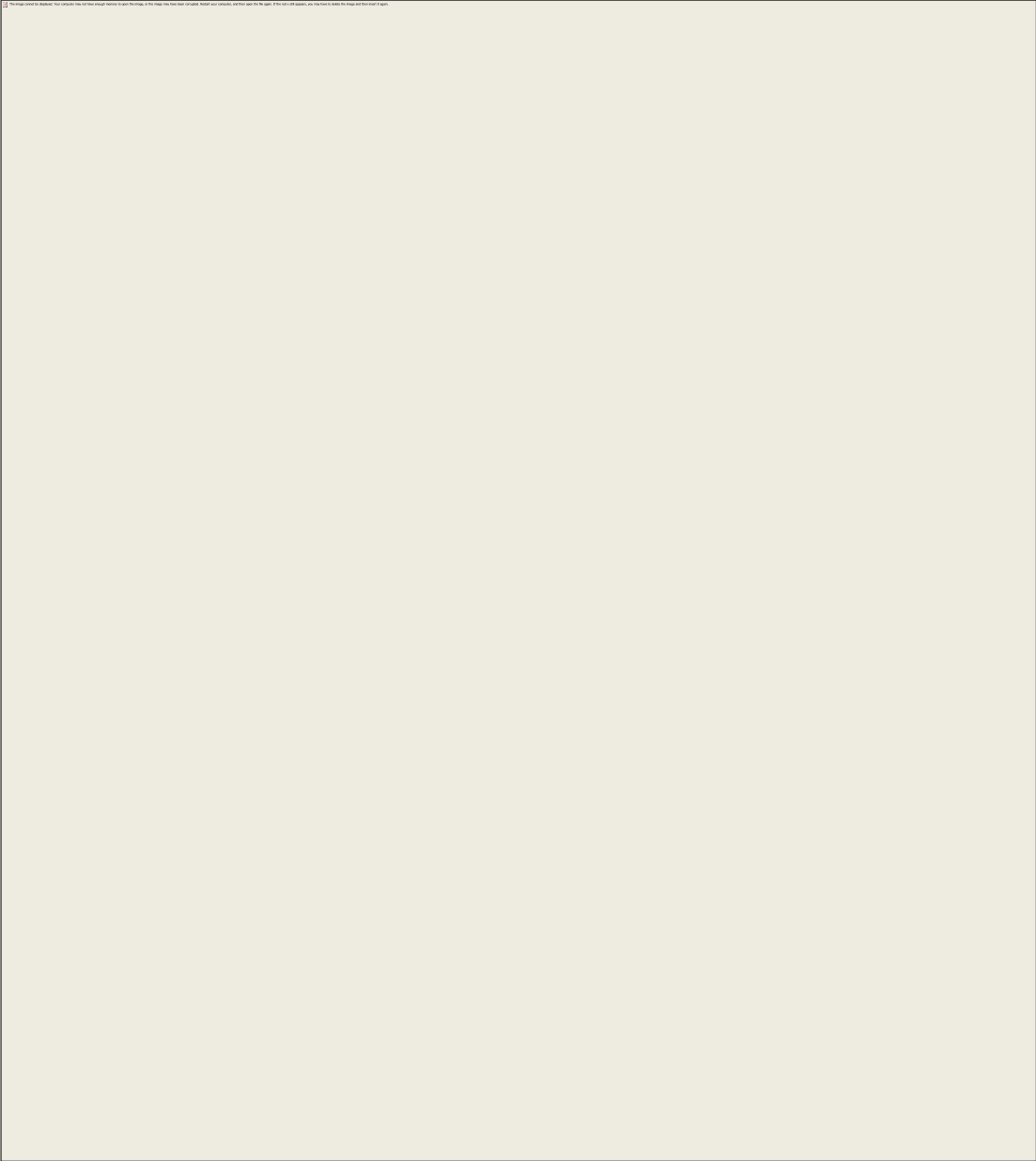
- Formed in July 2010
- Partnership between:
  - *Westmoreland County Community College*
  - *Pennsylvania College of Technology*
  - *Allegheny Conference*
  - *PA Independent Oil & Gas Assoc. (PIOGA)*
- First major initiative – U.S. DOL ShaleNET grant for \$4.9 million



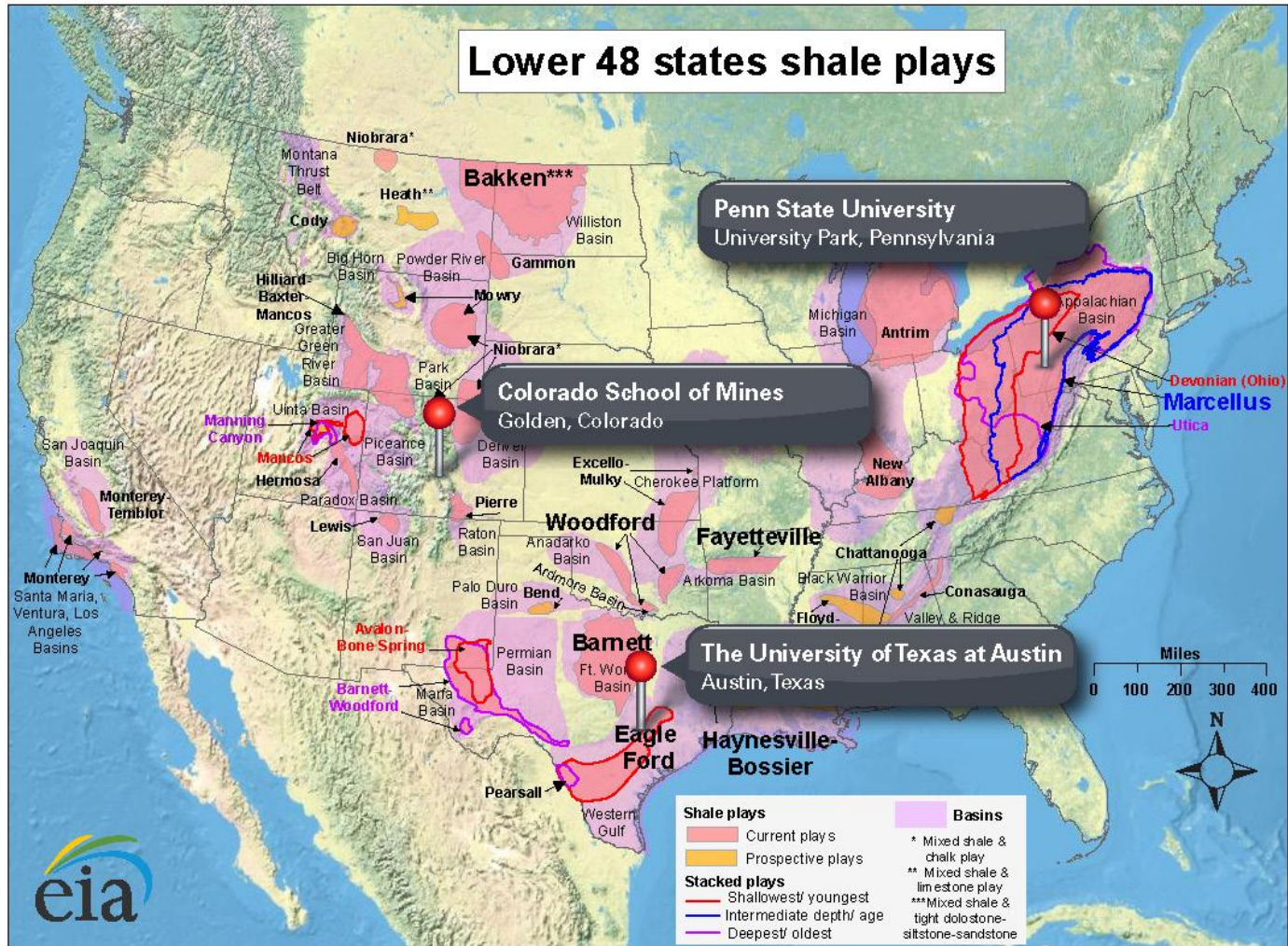
# About ShaleNET...

- ShaleNET now consists of over 20 authorized training partners in PA, OH, WV, and NY
- Standardized curriculum for Roustabouts, Floorhands, Production Technicians, CDL, and Welder Helper
- Talent Match System integration
- “Snapshots” (through August 2012):
  - Participants served: 8,998
  - Completing training activities and education: 2,367
  - Employed: 1,134





# Regulator Training & Certification



Source: Energy Information Administration based on data from various published studies.  
Updated: May 9, 2011

# ShaleTEC Timeline

December, 2012

**Trained 8,500 individuals for Natural Gas Workforce**

October, 2011

**Pennsylvania Statewide Economic Analysis**

July, 2011

**West Virginia Statewide Workforce Needs Assessment**

November, 2010

**Pennsylvania Statewide Workforce Needs Assessment**

September, 2010

**2<sup>nd</sup> Marcellus Workforce Needs Assessment (5-county study)**

June, 2009

**1<sup>st</sup> Marcellus Workforce Needs Assessment (14-county study)**

October, 2008

**ShaleTEC Formed – Partnership between Penn State Extension and the Pennsylvania College of Technology  
Workforce Training Begins**



# Thank You

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- [www.marcellus.psu.edu](http://www.marcellus.psu.edu)
- [www.msetc.org](http://www.msetc.org)
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