

# *Marcellus Shale Workforce*

**ECONOMIC & WORKFORCE DEVELOPMENT  
WORK GROUP**

**GOVERNOR'S MARCELLUS SHALE  
ADVISORY COMMISSION**

*April 14, 2011*

***Marcellus Shale Education  
and Training Center***

***Larry L. Michael***

***(570) 327-4775***



**Marcellus Shale  
Education &  
Training Center**

**Workforce Development  
& Continuing Education**

**Pennsylvania College  
of Technology**  
PENNSTATE

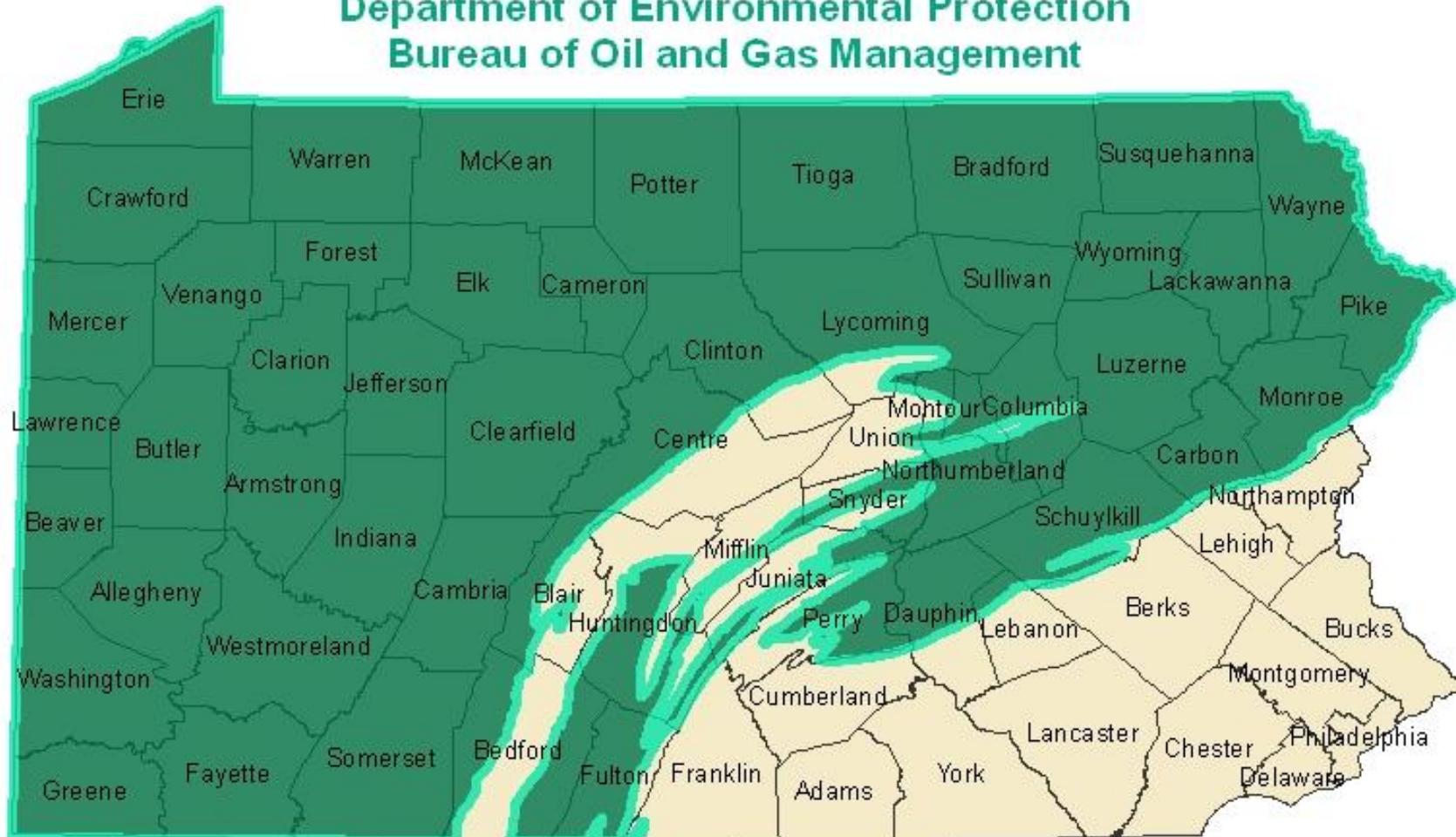
**PENNSTATE**  
College of  
Agricultural  
Sciences

**natural gas**  
exploration & drilling  
<http://naturalgas.psu.edu>

# Workforce Development



Commonwealth of Pennsylvania  
Department of Environmental Protection  
Bureau of Oil and Gas Management



Marcellus Shale Formation

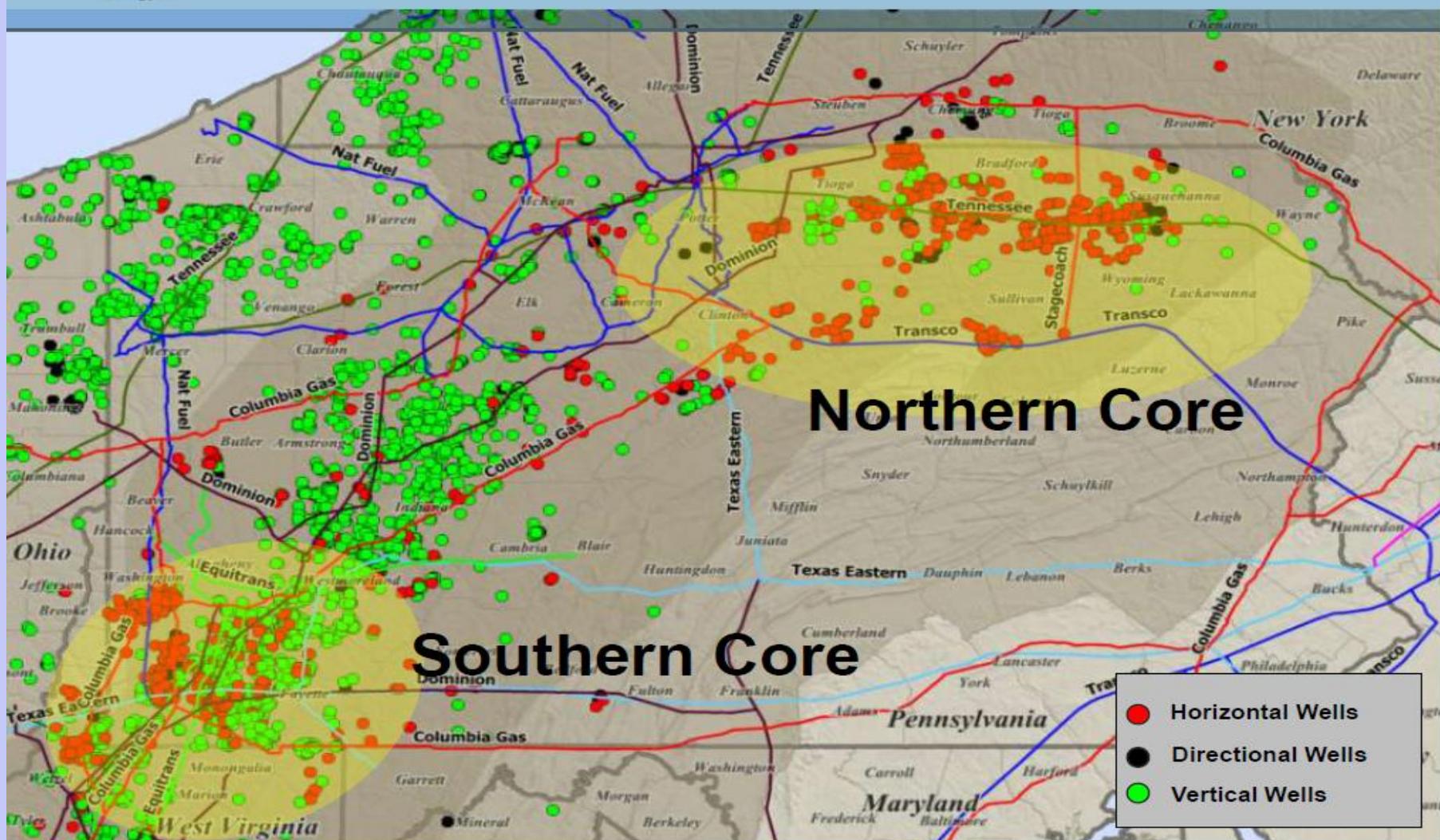
# World's 10 Largest Natural Gas Fields <sup>(1)</sup>

	Field Name	Country	Recoverable Reserves, Tcf
1	South Pars/North Dome	Iran and Qatar	1,235
	<b>MARCELLUS</b>	<b>UNITED STATES OF AMERICA</b>	<b>489 <sup>(2)</sup></b>
2	Urengoy	Russia	222
3	Yamburg	Russia	138
4	Hassi R'Mel	Algeria	123
5	Shtokman	Russia	110
6	South Iolotan-Osman	Turkmenistan	98
7	Zapolyarnoye	Russia	95
8	Hugoton	United States of America	81
9	Groningen	Netherlands	73
10	Bovanenko	Russia	70

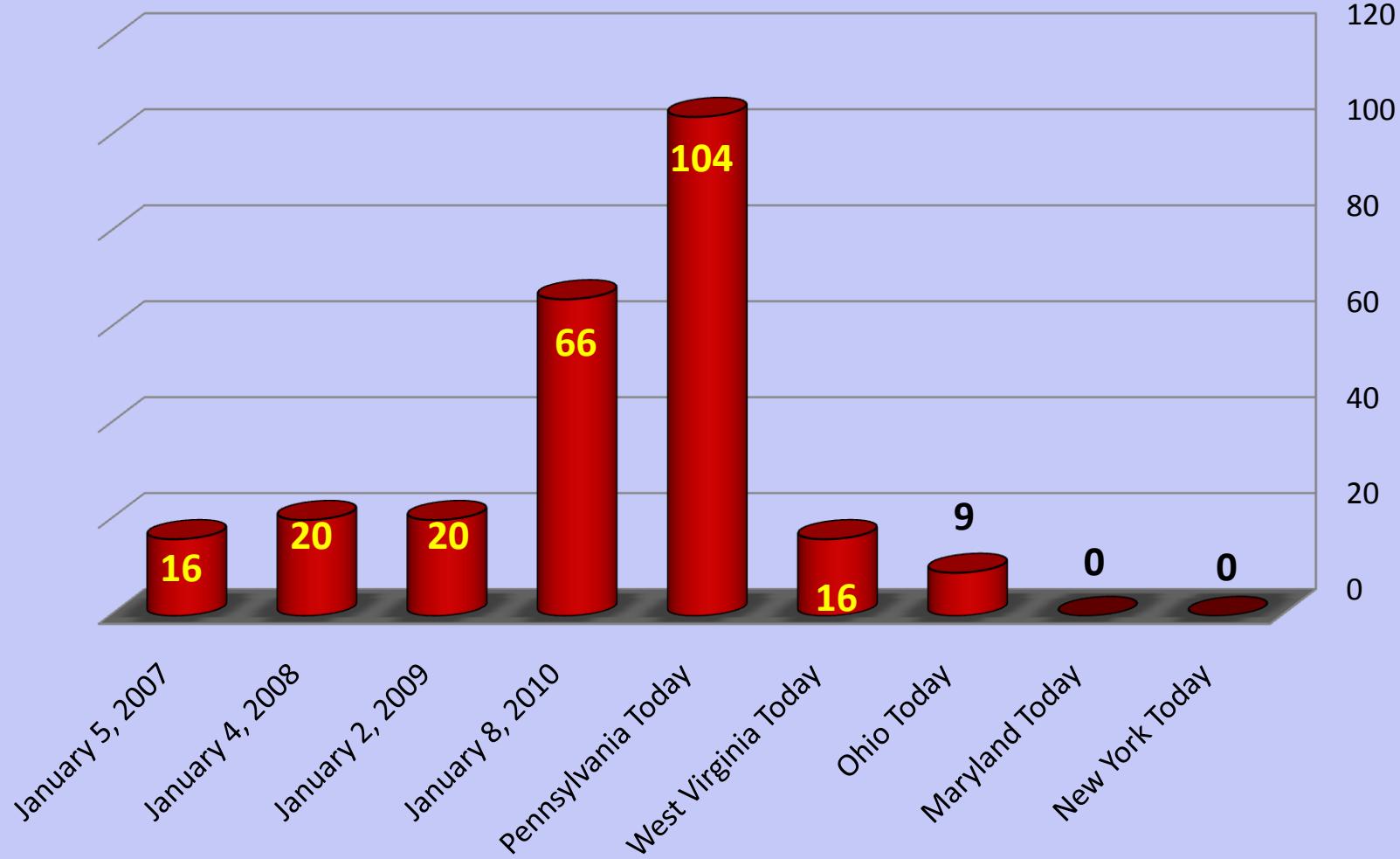
(1) Rafael Sandres, Global Natural Gas Reserves – A Heuristic Viewpoint, March 2006

(2) Dr. Terry Engelder, Penn State University – from August 2009 issue of Fort Worth Basin Oil & Gas Magazine

# Marcellus Shale Region Wells Drilled 2008 – 2010YTD



## Rig Count



- Texas – 335 Land-based Natural Gas Rigs
- United States – 870 Land-based Natural Gas Rigs

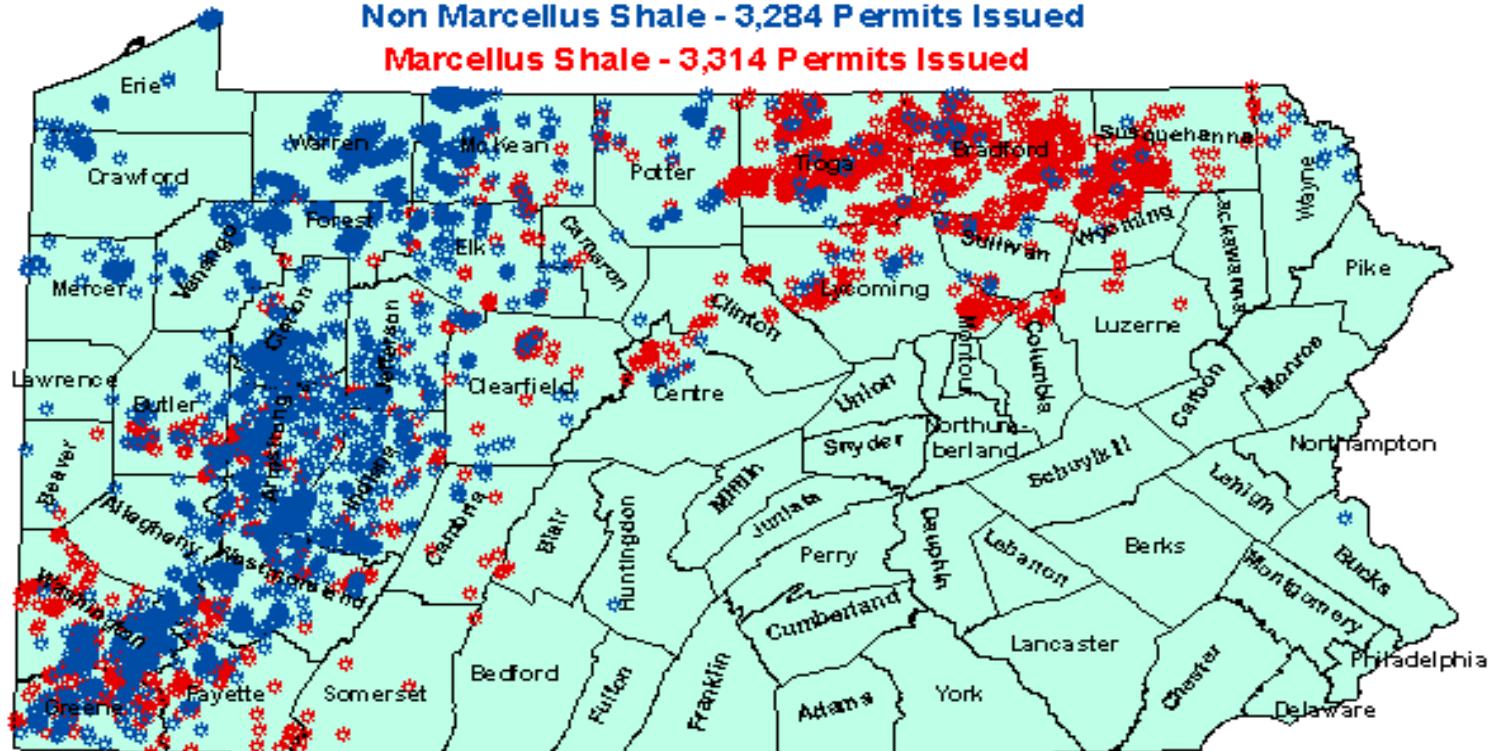
Sources: [Baker-Hughes Investor Relations](#) (April 1, 2011)

# Department of Environmental Protection Bureau of Oil and Gas Management Well Permits Issued

Total Permits Issued January thru December 2010 - 6,598

Non Marcellus Shale - 3,284 Permits Issued

Marcellus Shale - 3,314 Permits Issued



Updated 1/05/2011

# Department of Environmental Protection

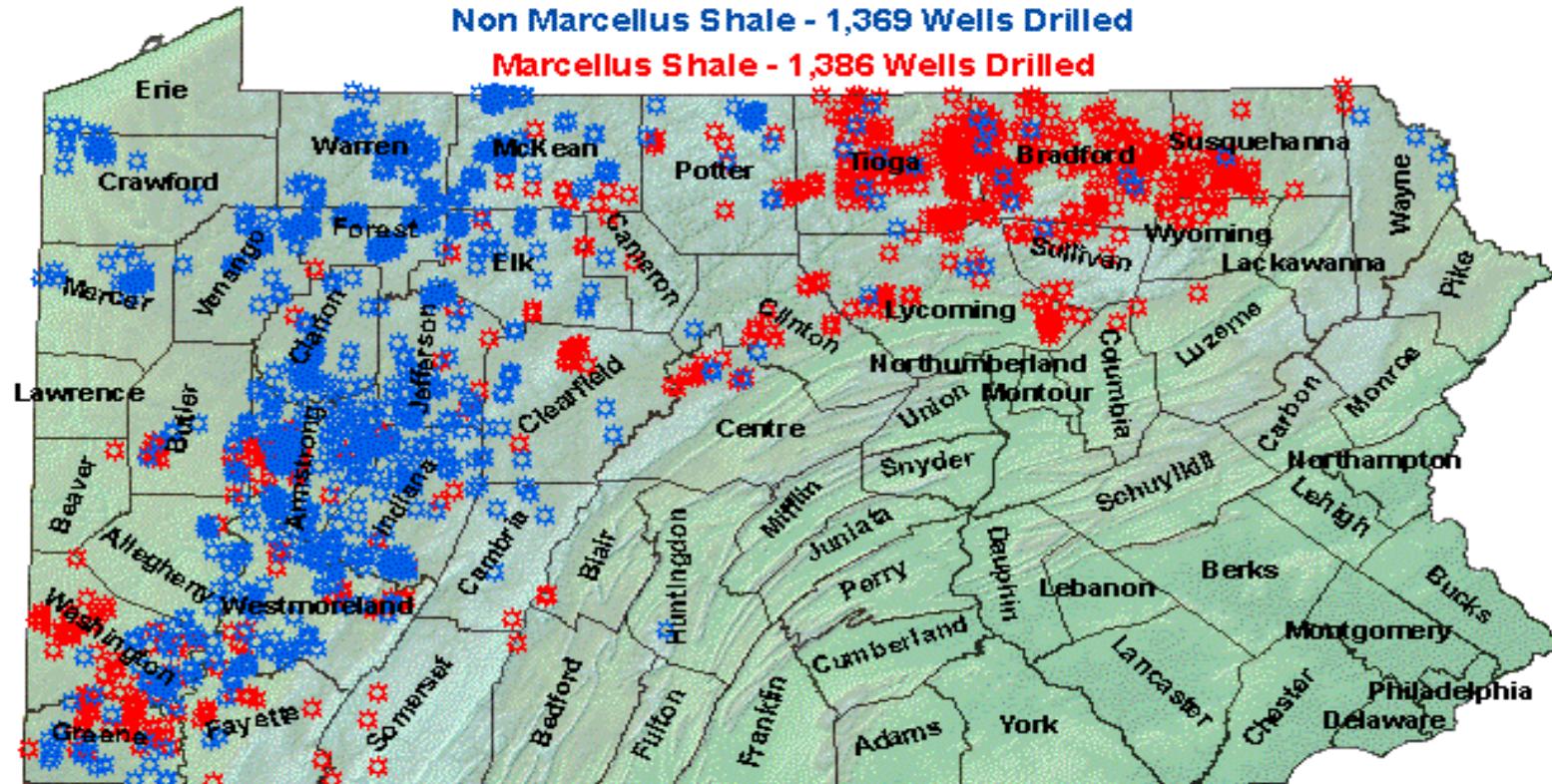
## Bureau of Oil and Gas Management

### Wells Drilled

2010 January-December Wells Drilled - 2,755

Non Marcellus Shale - 1,369 Wells Drilled

Marcellus Shale - 1,386 Wells Drilled

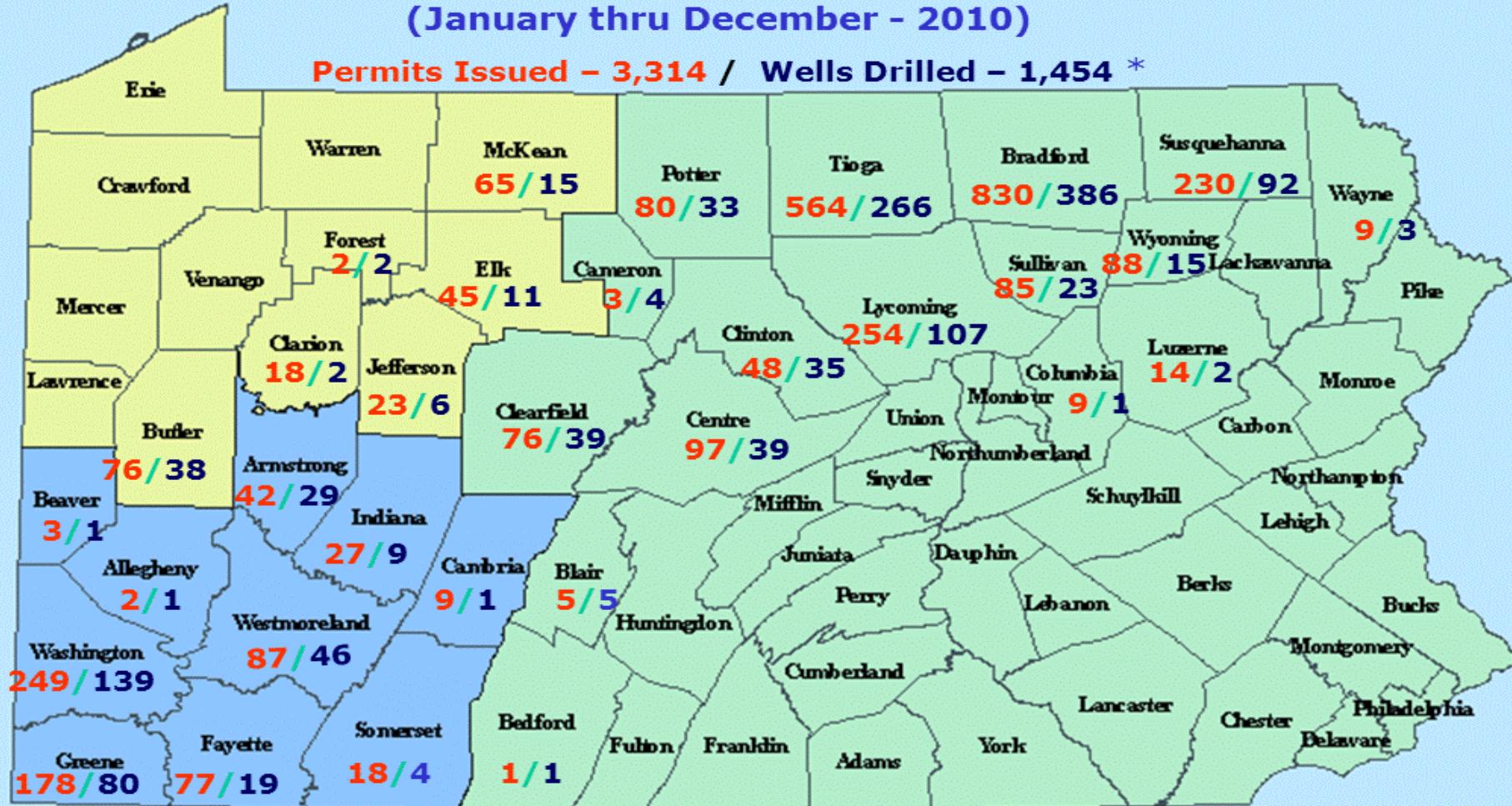


As Reported by Operators

Updated 01/05/2011

**Department of Environmental Protection  
Bureau of Oil and Gas Management  
Marcellus Shale Permits Issued & Wells Drilled  
(January thru December - 2010)**

**Permits Issued – 3,314 / Wells Drilled – 1,454 \***



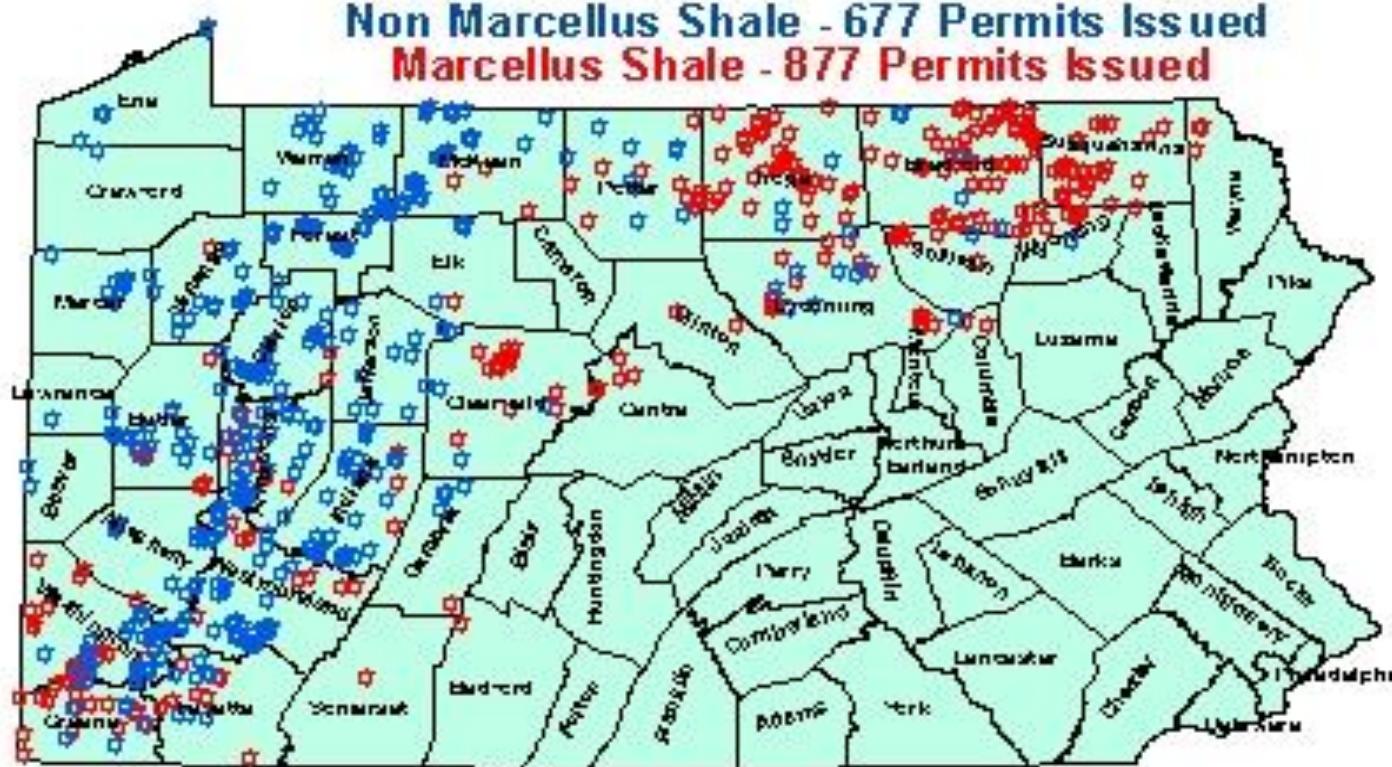
Updated 01/25/2011

**\* As reported by Operators**

# Bureau of Oil and Gas Management Well Permits Issued

Total Permits Issued January-March - 2011 - 1,554

Non Marcellus Shale - 677 Permits Issued  
Marcellus Shale - 877 Permits Issued



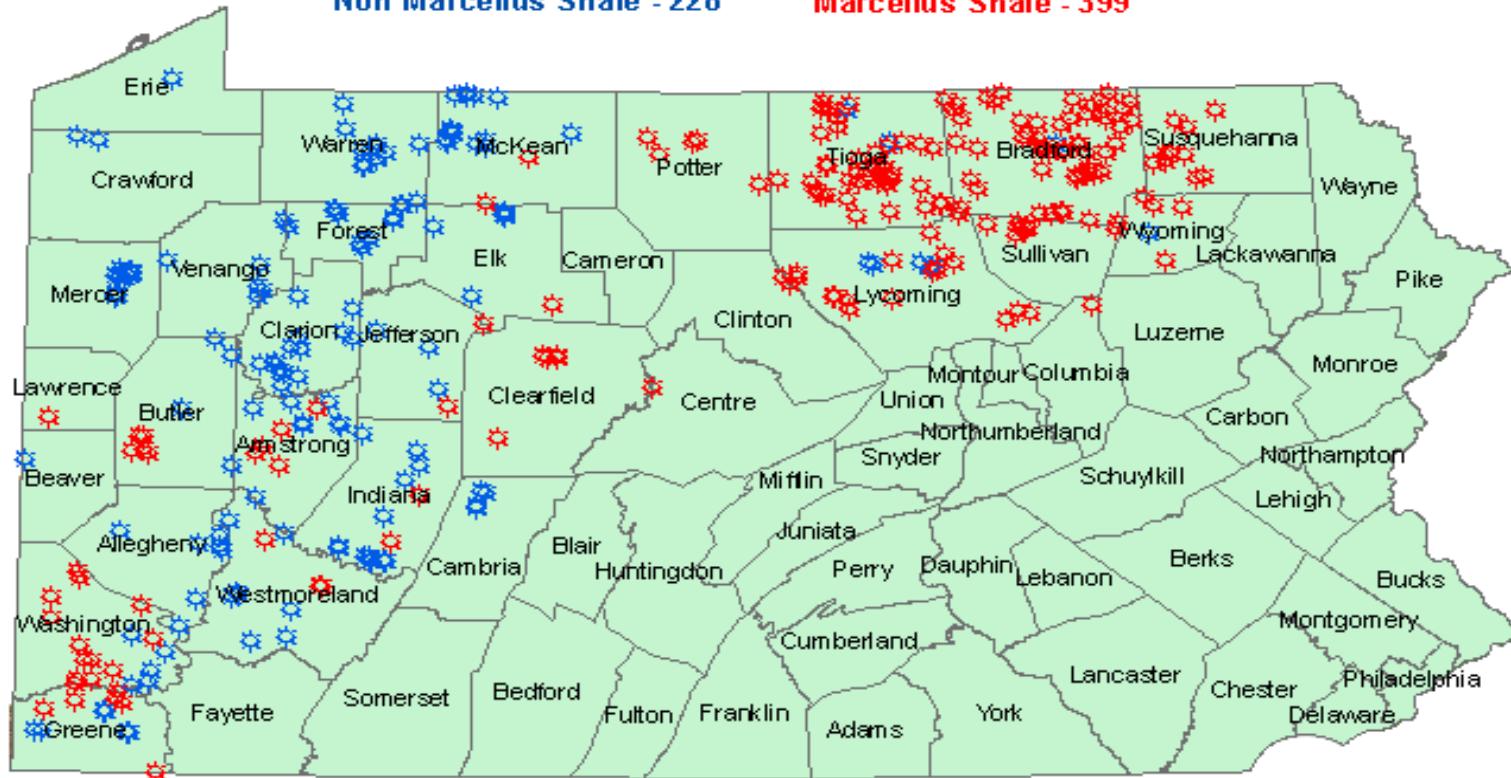
Updated 04/07/2011

Department of Environmental Protection  
Bureau of Oil and Gas Management  
Wells Drilled

2011 January-March Wells Drilled - 627

Non Marcellus Shale - 228

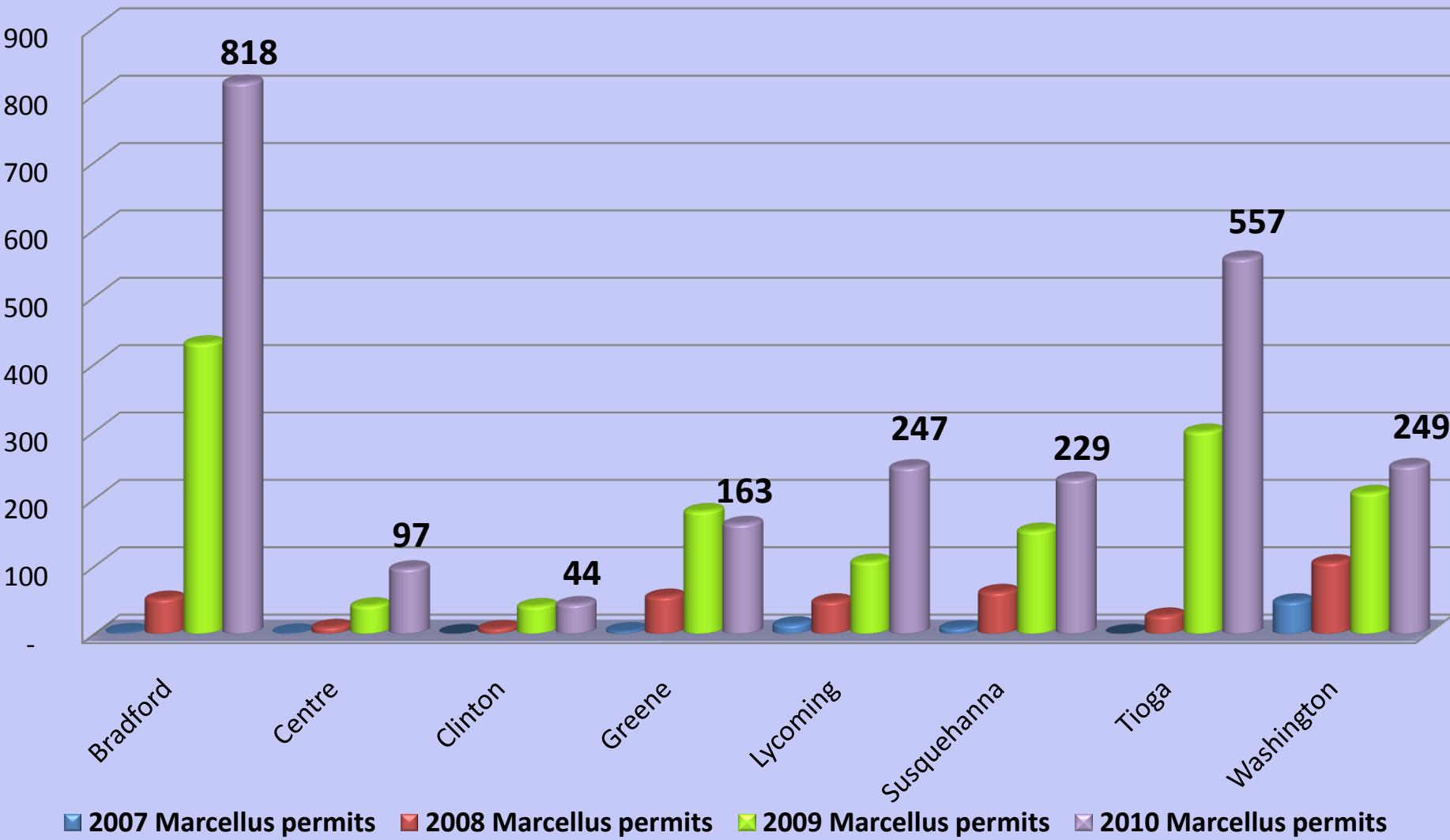
Marcellus Shale - 399



As Reported by Operators

Updated 04/06/2011

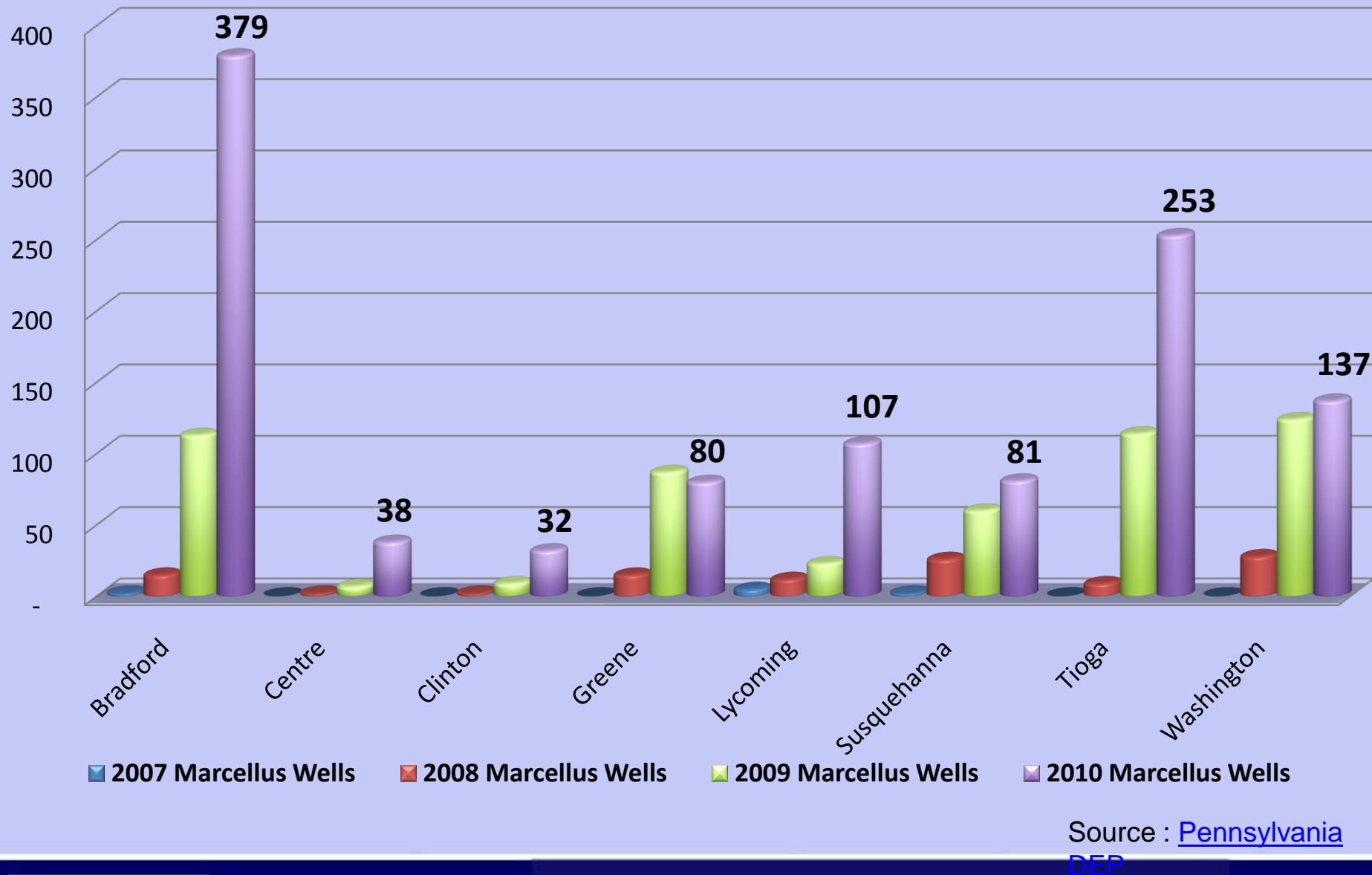
## Marcellus Permits 2007-2010



■ 2007 Marcellus permits ■ 2008 Marcellus permits ■ 2009 Marcellus permits ■ 2010 Marcellus permits

Source : [Pennsylvania  
DEP](http://www.pennsdep.state.pa.us)

## Marcellus Wells 2007-2010



Source : [Pennsylvania DEP](http://PennsylvaniaDEP)

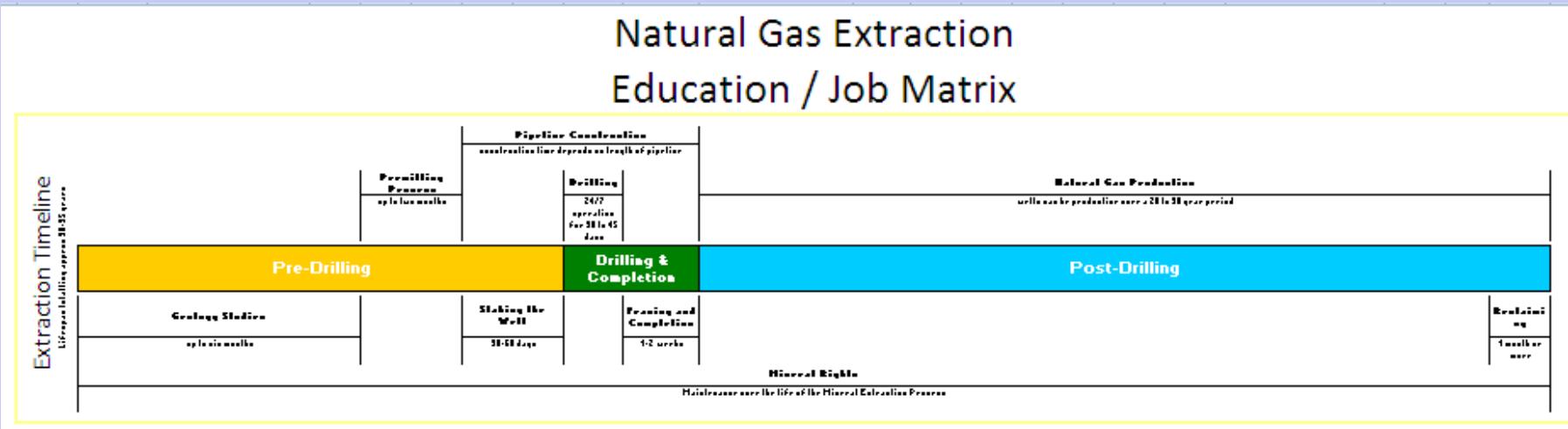
[www.msetc.org](http://www.msetc.org)

# Where is all started for PCT

- Marcellus Shale Education and Training Center (MSETC) formed in November 2008
- Collaboration between:
  - Pennsylvania College of Technology - WDCE
  - Penn State Cooperative Extension

# Education/Job Matrix

## Natural Gas Extraction Education / Job Matrix



# Drilling Down (The Matrix)

Pre-Drilling	Associated Jobs		Secondary/ Career and Technical Centers	Work Experience/ Certification	Post Secondary/ Higher Education
	Geological Studies	Mineral Rights			
	Geologists				x
	Petroleum Engineers				x
	Computer tech				x
	Project Management			x	x
	CDL Drivers			x	
	Seismic			x	x
	Hydro Geologist				x
	Helicopter Pilot/Crew	x	x		
	Cartographer				x
	GIS Technicians		x	x	
	Archeology				x
	Petroleum Chemists				x
	Water Management				x
	Biologist				x
	Geophysicists				x
	Landmen-for drilling/leasing			x	
	Lawyers				x
	Legal Professionals				x
	Para-legal	x	x	x	x
	Title-Abstract	x	x	x	x
	Operational Landmen for pipelines		x		
	Title Attorney				x
	Environmental Engineers				x
	Environmental Technicians		x	x	
	Office operation	x			x
	Water Sampling	x			x
	Civil Engineers				x
	Local Government		x		
	Instrument Chief				x
	Roadman		x		
	Customer		x	x	

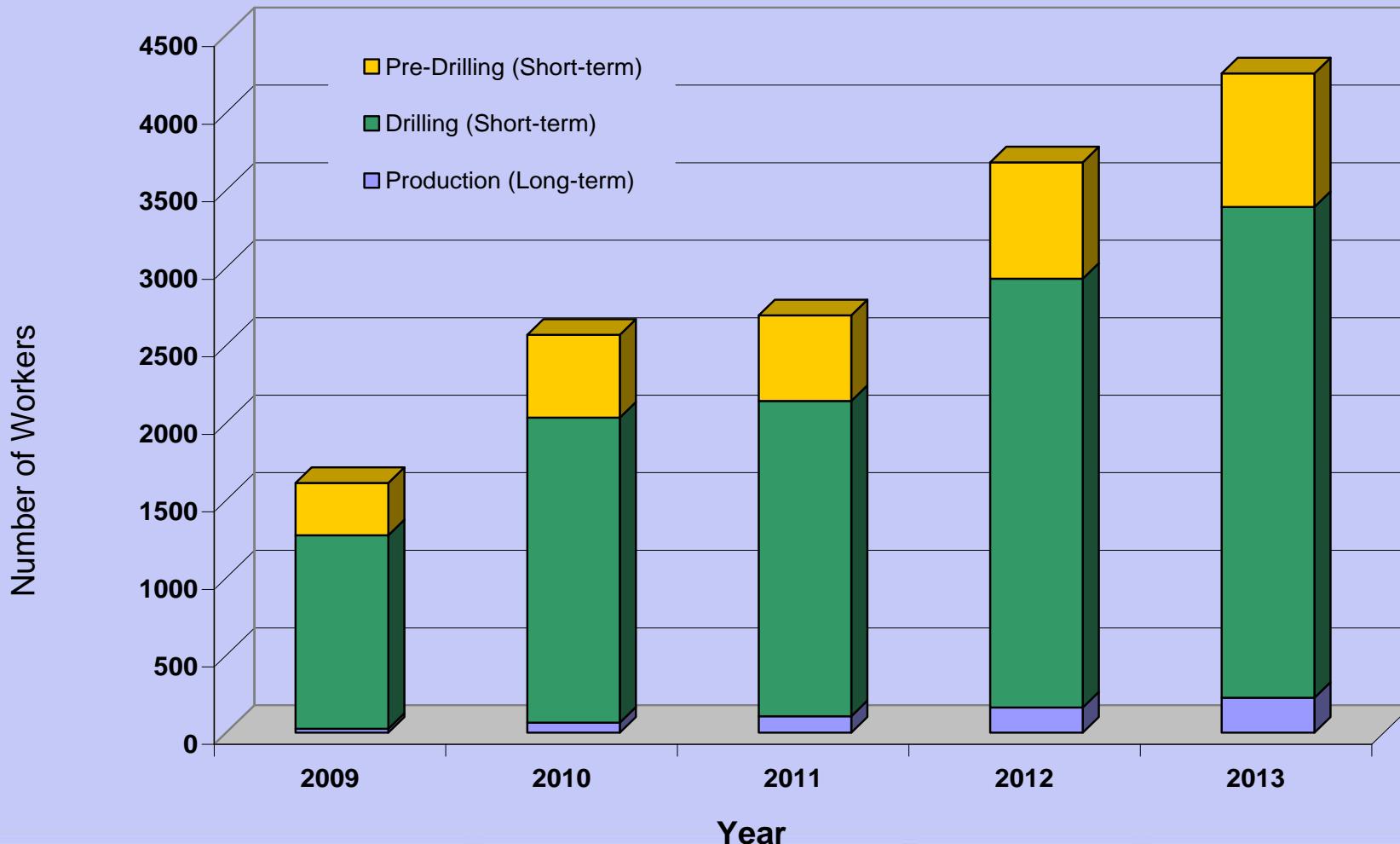
# What Does This Mean in Terms of Wells?

Projected Northern Tier WIB Scenarios - Wells Drilled Per Year

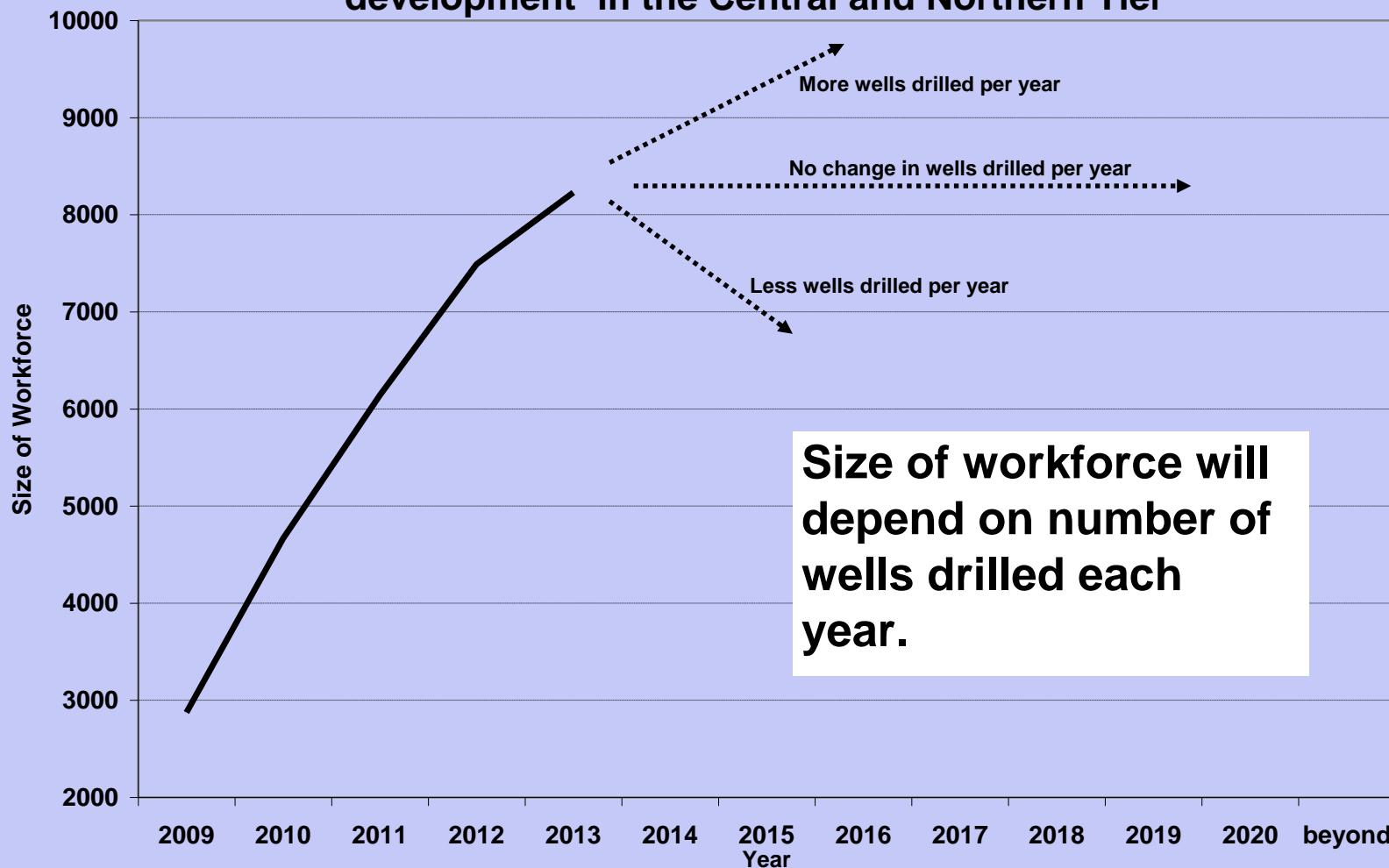


# What Does This Mean in Terms of Jobs?

## "Likely" Scenario Northern Tier WIB Region Marcellus Shale Workforce Requirements By Phase



## Direct Workforce Requirements of Marcellus Shale development in the Central and Northern Tier

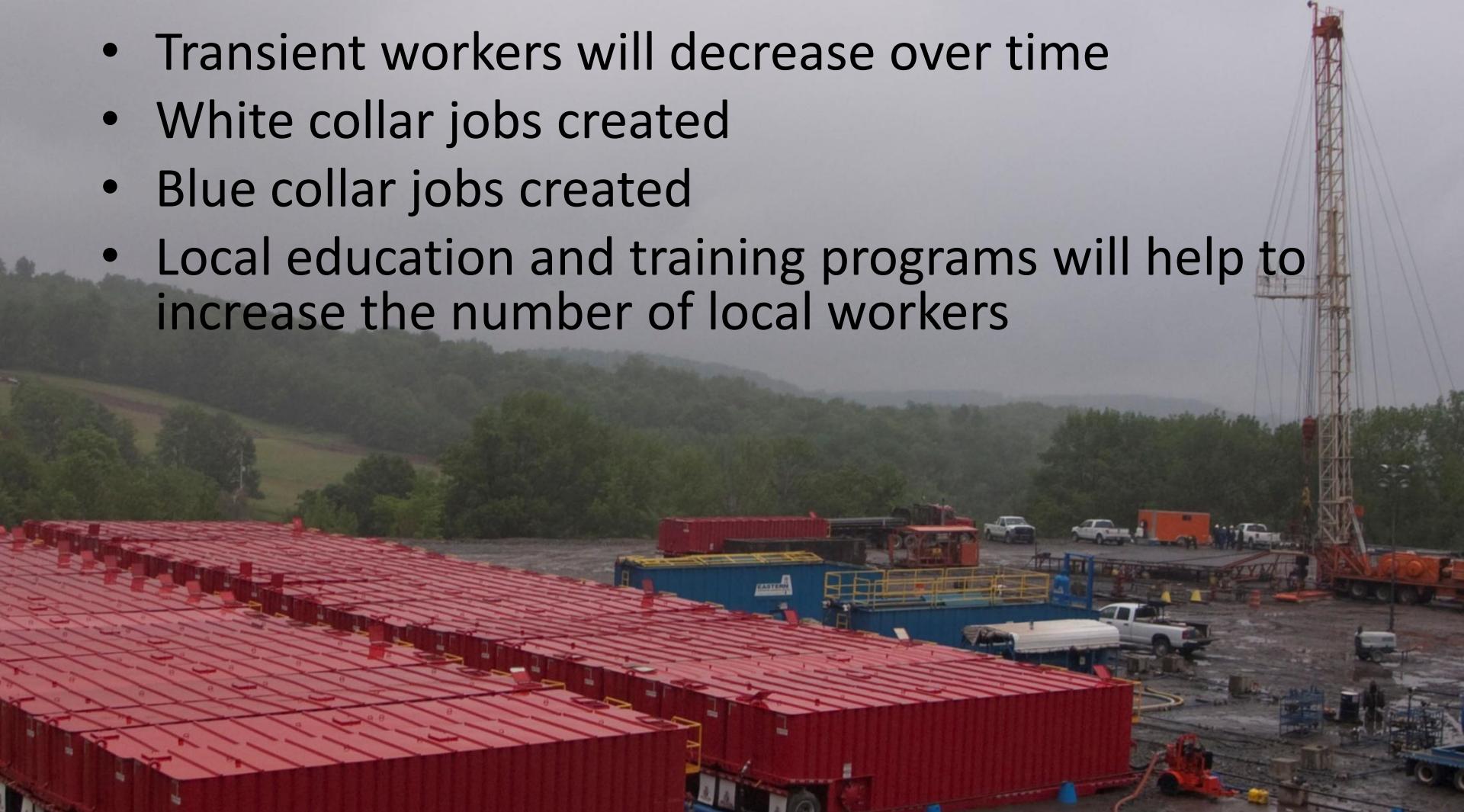


# What We Discovered

- The direct job opportunities in northcentral Pennsylvania will likely increase dramatically
- Most job opportunities will be “blue collar”
- The direct workforce to drill a single well requires approximately 410 individuals working in 150 different occupations
- An average of 20-30 contract companies are utilized to drill a single well
- Each well requires 11.53 full-time equivalent workers and .17 full-time production jobs

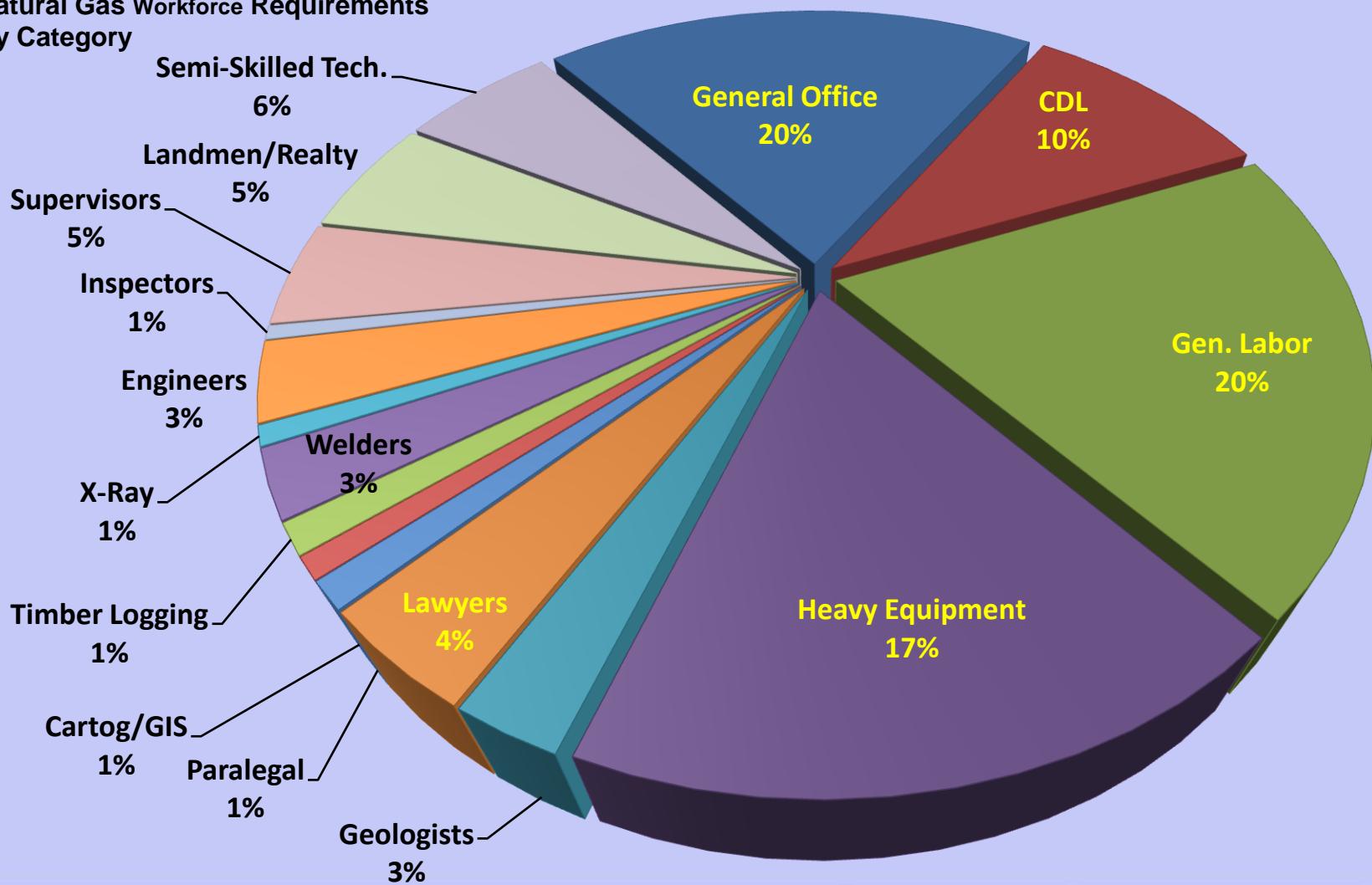
# Jobs

- Transient workers will decrease over time
- White collar jobs created
- Blue collar jobs created
- Local education and training programs will help to increase the number of local workers

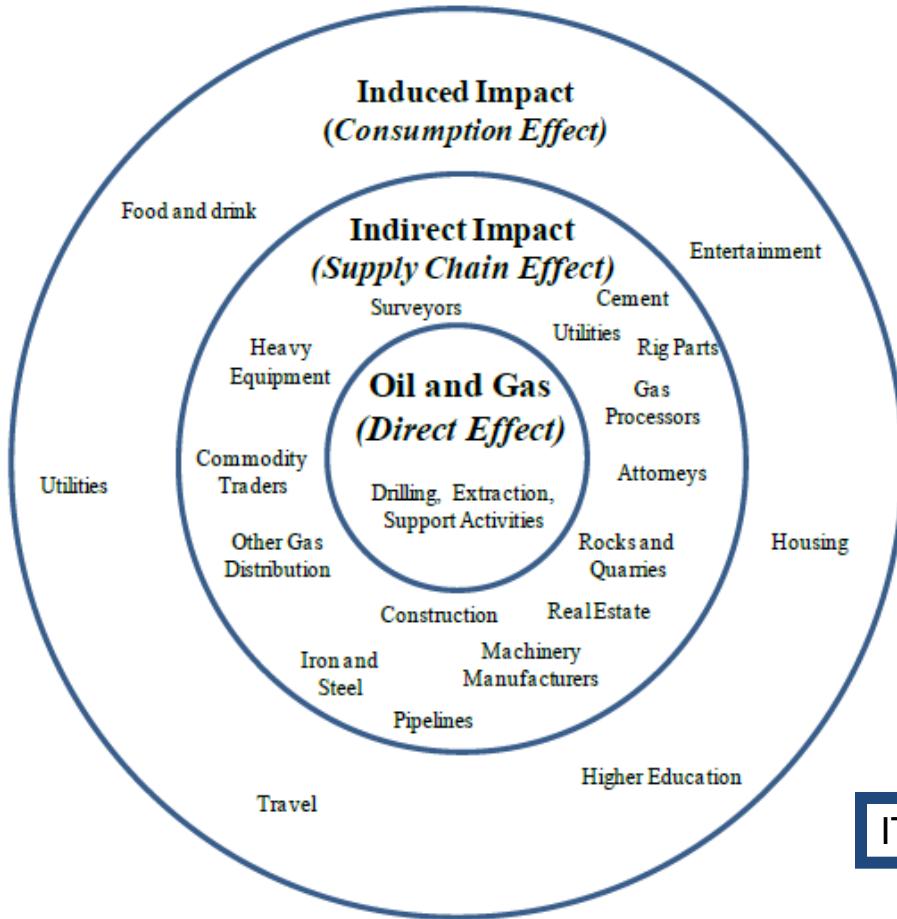


# What specific jobs are required?

Natural Gas Workforce Requirements  
By Category



# Each Direct Job Is Estimated to Create 1.53 Indirect And Induced Jobs



Heavy Equipment



Construction



IT support



Pipe Inspection

Source: *The Economic Impact of the Oil and Gas Industry in Pennsylvania, November 2008*, PA Economy League of SW PA

# INDIRECT JOBS

## Related to the Natural Gas Industry

- Surveyors
- Business Managers
- Retail Sales
- Bankers/Accountants
- Hotel Management
- Realtors
- Restaurant Owners
- Chefs & Food Service Workers
- Forestry
- Mechanics
- Many more.....

# How Long will Unconventional Shale Last?

## “Potential” Marcellus Shale County-based Timeline Example

70% Drillable	6-Well	10-wells
Square Miles	700	700
Drillable Area/Well Pads	490	490
Total Wells	2,940	4,900
Years @ 15 Rig Average	16.3	27.2

Provided as an illustration for discussion, not a forecast of future activity

Don't forget Utica, Huron, Upper Devonian, others?

# Academic Programs

- Degree Programs & Certifications



# PCT Degrees - Directly Related

Automated Manufacturing Technology - A.A.S.

Civil Engineering Technology – A.A.S. and B.S.

Computer Aided Drafting Technology – A.A.S.

Computer Aided Product Design – B.S.

Construction Management – B.S.

Diesel Technology- A.A.S.

Electric Power Generation – A.A.S.

Electrical Technology – A.A.S.

Electronics & Computer Engineering Technology – A.A.S.

Heavy Construction Equipment Technology – A.A.S.

Machine Tool Technology - A.A.S.

Welding - A.A.S.   Welding & Fabrication Engineering Technology – B.S.

# PCT Degrees – Indirectly Related

Accounting – A.A.S. and B.S.

Business Administration – B.S.

Business Management – A.A.S.

Information Technology – A.A.S. and B.S.

Legal Assistant – Paralegal – A.A.S.

Culinary Arts – A.A.S. and B.S.

Hospitality Management – A.A.S.

Health Sciences, esp. Radiography – A.A.S.

# MSETC Noncredit Training



# MSETC Noncredit Programs

- “Fit 4 Natural Gas”
  - Roustabout Pre-emp. Training
- API 1104 welding training
  - Level 1
  - Level 2
- API 1104 certification and testing
- OSHA Rough Terrain Forklift Certification
- Commercial Driver Training (CDL Class A)
- PEC/ Premier SafeLand USA
- Certified Operations Technician
- OSHA 30 hour certifications (Online)
- OSHA 10 Hour Construction
- First Aid/ CPR

# MSETC Offerings – Future

- Emergency Responders
- Roughneck Training (Hands-on)
- OSHA Regulatory Training
- Well operator / tender
- Oilfield Heavy Equipment Safety
- Well Control
- Trenching/ Soils
- Instrumentation and Calibration
- DOT compliance training
- SCADA/ HMI
- Title Abstracting / Landman
- Welder's Helper/ Pipe fitting
- Fall Protection
- Erosion and Sediment Control

# Natural Gas Training Site



**First class  
October 2011**

# High School Preparation

- Math is important!
- Low absenteeism
- On time
- Physically fit
- Able to work as a team
- Safety first
- No DUI
- No criminal offenses
- No drugs
- Clean driving record

# Current MSETC Workforce Assessment Projects

- PA Statewide Workforce Assessment
- West Virginia Statewide Workforce Assessment

# Current MSETC Economic Impact Analysis Projects

- Five-county Northern Tier PA
- Statewide Economic Impact Analysis

# Grants

- National Science Foundation
  - \$900,000, 3-year, 20-county project with approx. 20 school districts
- PA Dept. of Labor & Industry
  - \$250,000 training grant (pre-employment and incumbent)
  - Industry Partnership grants for two regions in PA (SW & NC)
- U.S. Dept. of Labor
  - \$4.9 million for Marcellus wide pre-employment training



- What is ShaleNET?
  - Collaboration among key stakeholders to address Workforce issues related to Oil and Gas
    - Industry
    - Education
    - Public Workforce System



- What is ShaleNET?
  - Standardizes curriculum for six natural gas industry high priority occupations in five programs:
    - Roustabouts
    - Floorhands
    - Production Technician
    - CDL
    - Welder Helpers



- Provides:
  - Central communication structure for all workforce development initiatives:
    - Quarterly regional hub meetings at:
      - Pennsylvania College of Technology
      - Westmoreland Co. Community College
    - Annual Workforce Forum
      - 2011 Conference – Altoona, Sept. 20-21



- What's Next for ShaleNET?
  - Application for ShaleNET US
  - US DOL grant application for approx. \$13 million
  - Adds credit certificates and two-year AAS degree
  - Expands training network across U. S. shale areas

# Where can the Commonwealth help?

- Workforce training funding assistance:
  1. Low-skilled/unskilled workforce to reduce unemployment
    - Roustabouts
    - Floorhands
    - Production Technicians (Hydraulic Fracturing)
  2. First responder/Emergency responder training
  3. Community awareness programming

# Questions???

Larry Michael

Pennsylvania College of Technology

(570) 327-4775

l michael@pct.edu