



Marcellus Shale: Economic Development Implications

Timothy W. Kelsey, Ph.D
tkelsey@psu.edu

A Few Background Concepts

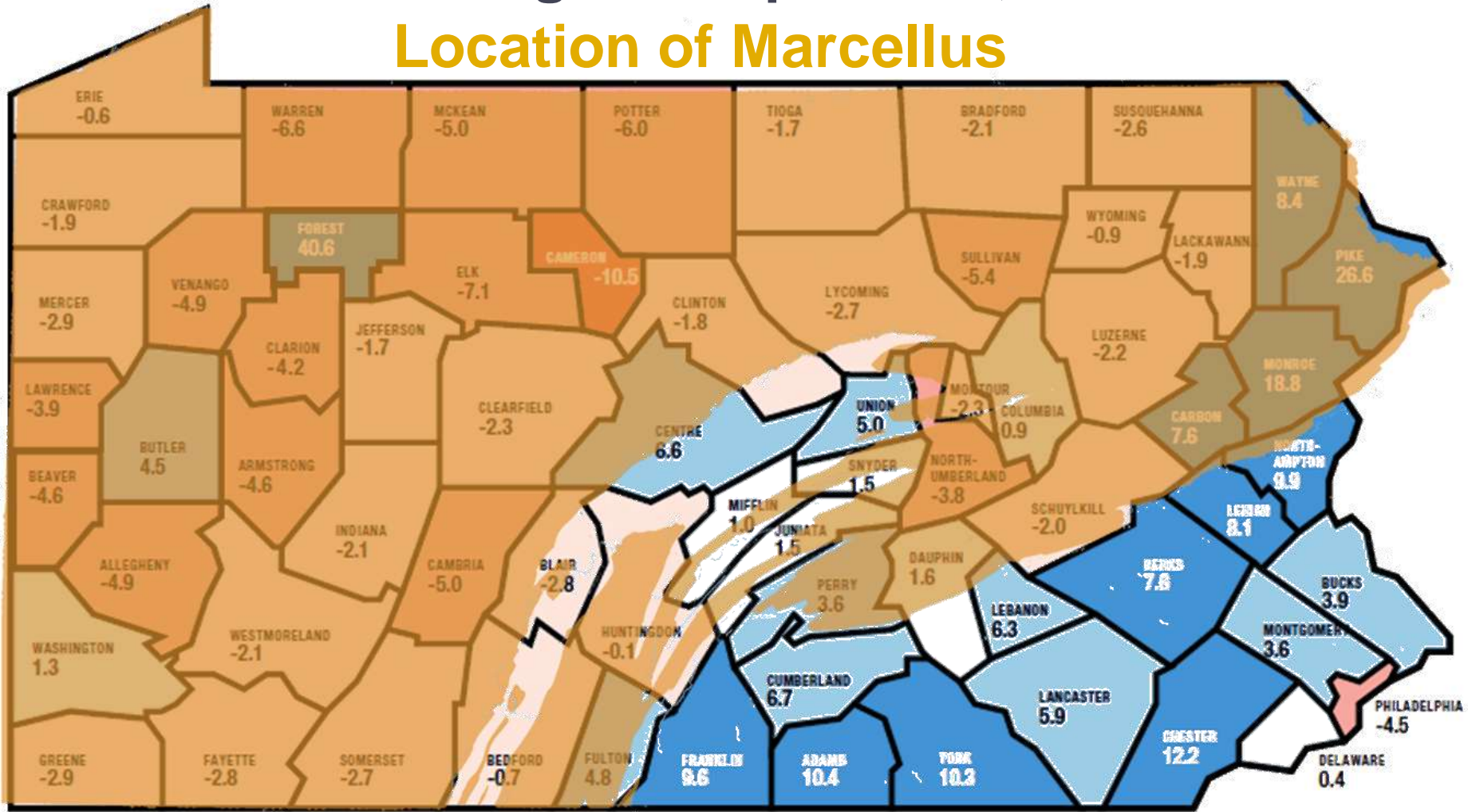
- Scale of this may be **BIG**
 - \$1.46 trillion recoverable gas in PA
(PA economy is \$499 billion as measured by personal income)
 - ~\$2 million 'landowner' share per well
(80 acre spacing)
- Nonrenewable resource-based economic development; when it's gone, it's gone
- Local impact- multiplier effects if keep dollars local
- New 'haves' and 'have nots'

Nature of the Marcellus Discussion

- Large uncertainty
 - What is occurring? *Mostly anecdotes so far*
 - What are the risks?
- Risk
 - Who decides what level of risk is appropriate?
 - Who benefits from the decisions? Who bears the risk/costs?
- Impacts can be extremely close to home (personal)
- Extremely fast pace of activities
- Public discussion increasingly divided and antagonistic

Percent Change in Population, 2000-2007

Location of Marcellus



FAST GROWTH
7.2% and over

VERY SLOW DECLINE
-0.1 to -3.5%

SLOW GROWTH
3.6 to 7.1%

SLOW DECLINE
-3.6 to -7.1%

VERY SLOW GROWTH
0.0 to 3.5%

FAST DECLINE
-7.2% and over

PA: 1.2 %
U.S.: 7.2%

Source: Alter et al., "Pennsylvania Road to Growth," Penn State 2009

Time Elements of Natural Gas Development

Opportunities and Challenges

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Three Phases of Natural Gas Development

Development Phase (Short Lived/Labor Intensive)

- Well-pad and Access Road Construction
- Local collection pipeline Construction
- Drilling of the Well
- Fracturing of the Well
- Reclaiming some Disturbance

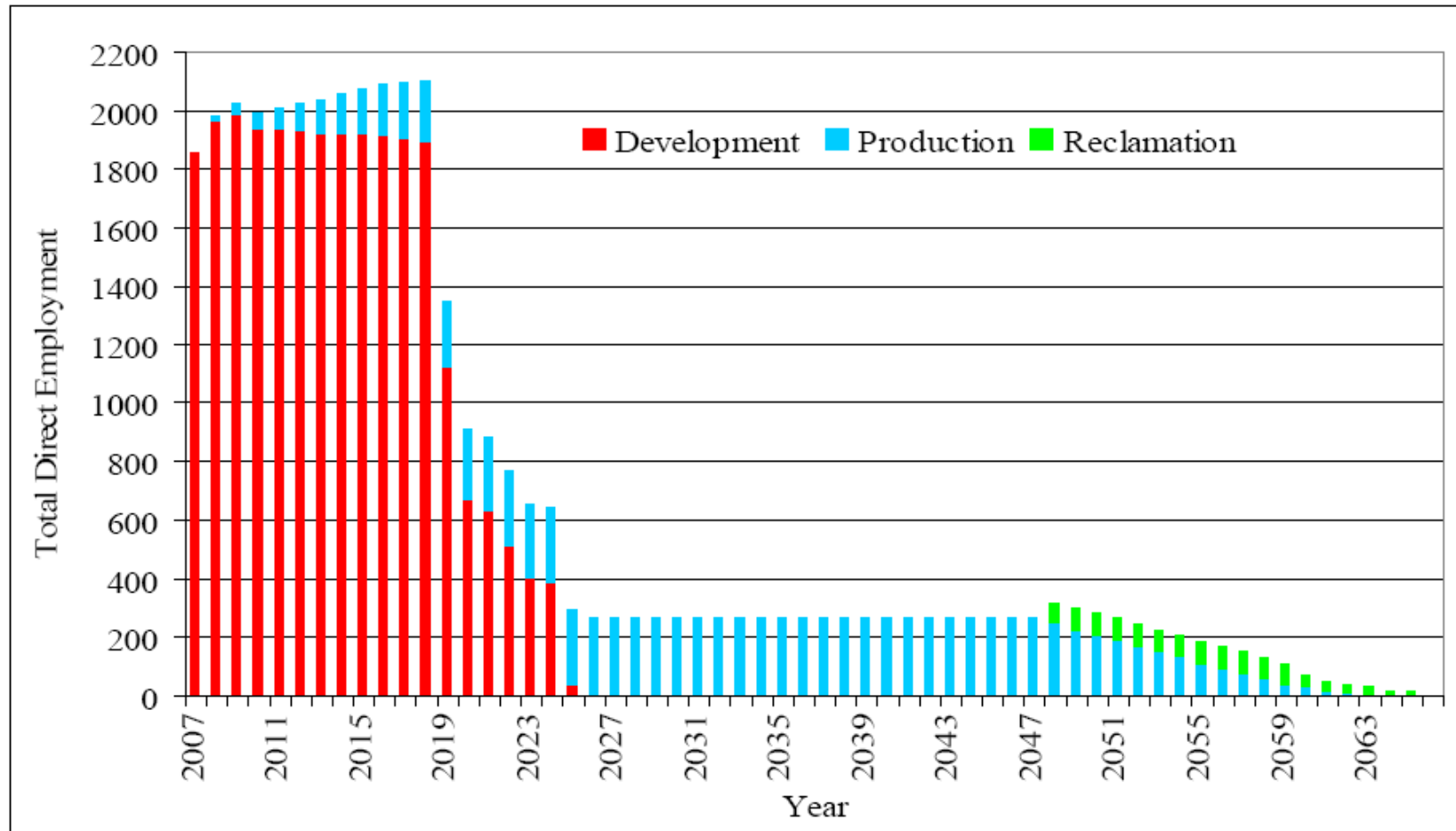
Production Phase (Long lived/Small & Steady Labor Force)

- Trucking Water and condensate from Well Site
- Monitoring Production
- Occasional Well Work-Overs (partially re-drill/re-frac)

Reclamation Phase

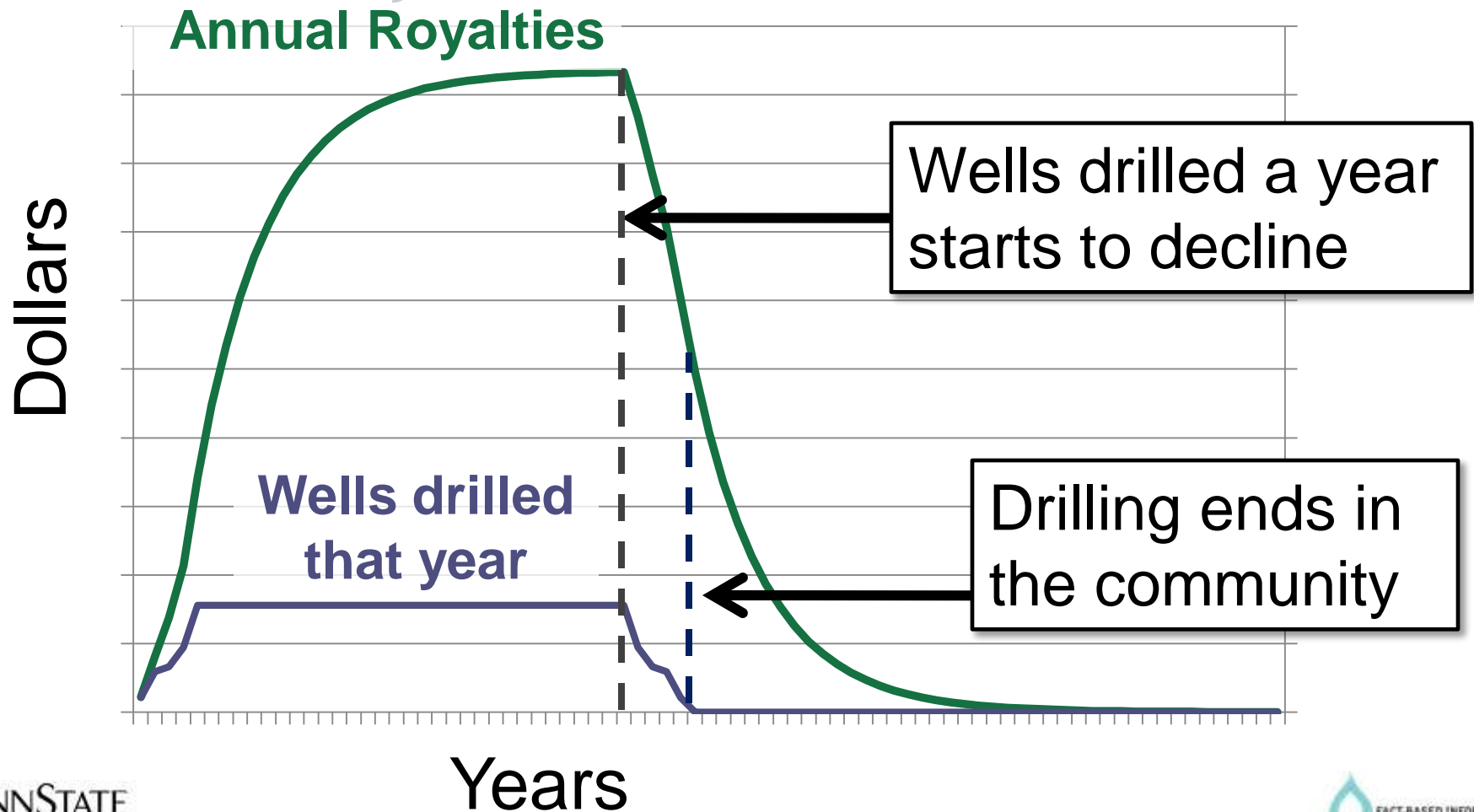
- Dismantle and Reclaim well-sites

Jonah/Anticline Fields Direct Workforce Through The Three Phases:



Graph: Ecosystem Research Group/Jacquet

Example: Annual Total Royalties in a Community



Experiences in Other States

Economic & Community Impacts

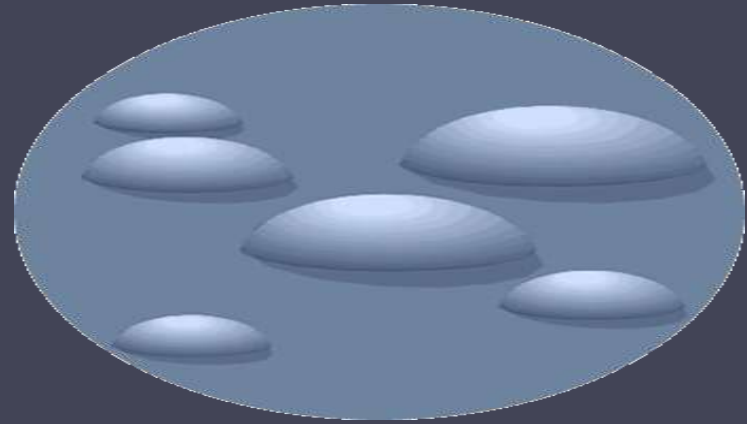
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Past Experience during Energy Booms

- An extensive research literature on energy boomtowns exists
- Direct & significant influence on population, affecting nearly all sectors of the community – Housing, Culture, Public Services
- Local governments are often unprepared by waves of growth
- Increases in social problems such as crime, mental health problems, community dissatisfaction, conflict

Experience *After* Energy Booms

- Many post-energy boom communities are no better off as a result of the experience
 - Poorer economic and social well-being (poverty, unemployment, etc.) than other communities
 - Lack of trust, leadership and human capital to find a way out
- Those which are better off after a boom tend to:
 - Have strong local leadership & community involvement
 - Entrepreneurial support systems to allow adaptation
 - Actively monitor and respond to issues



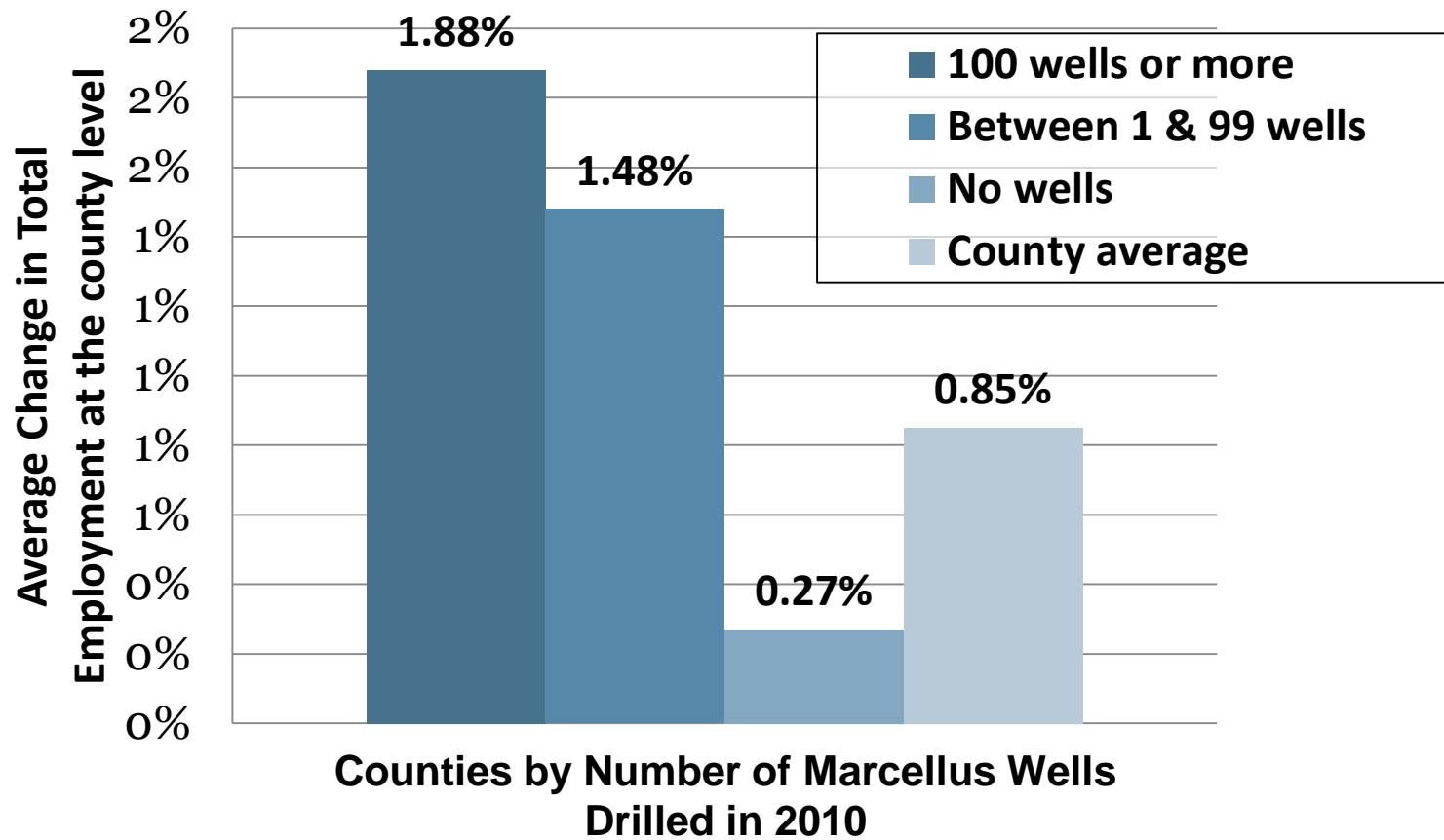
Pennsylvania's Experience

What we're seeing in Pennsylvania



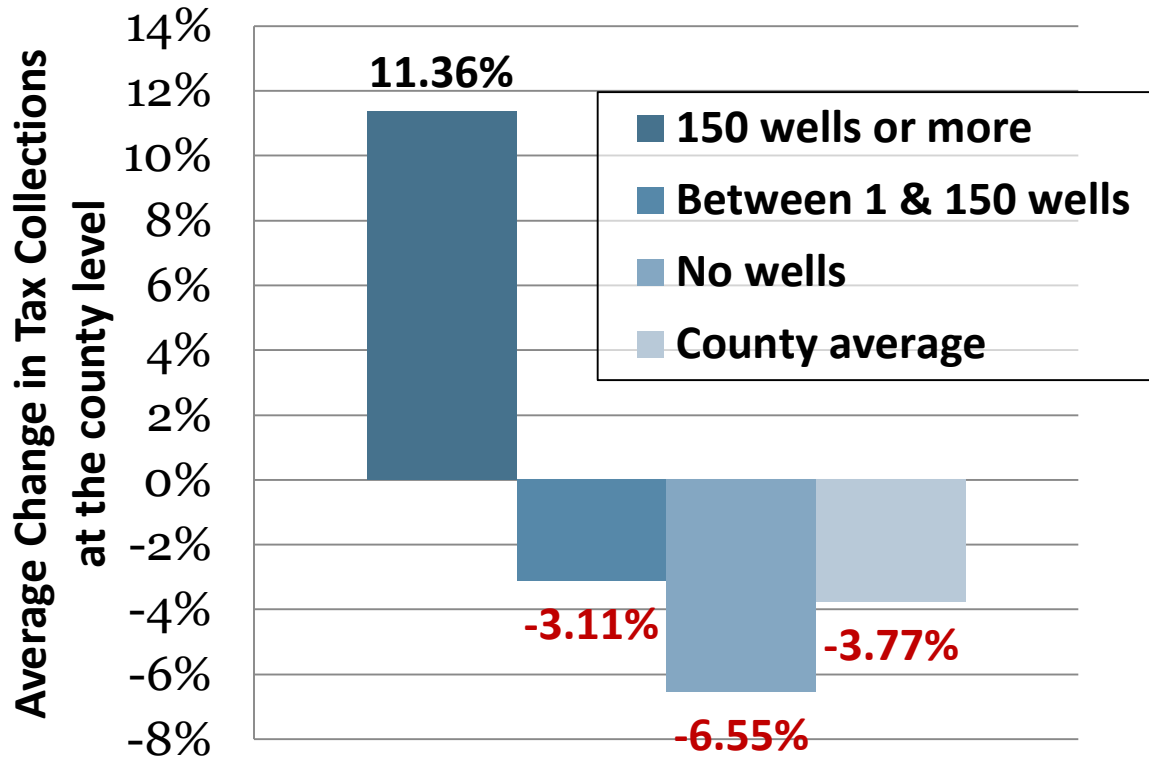
Change in Total Employment, by County Level Marcellus Drilling Activity

September, 2009- September, 2010



Change in State Sales Tax Collections, by County Level Marcellus Drilling Activity

July, 2007- June, 2010



Sales tax dollars go to the state - none remains at the local level (except in a few urban counties)

Counties with more than 150 wells since 2007 include:

- Bradford (482 wells)
- Tioga (387 wells)
- Washington (305 wells)
- Greene (179 wells)
- Susquehanna (174 wells)

Counties by Number of Marcellus Wells Between 2007 and December, 2010

PENNSSTATE



Cooperative Extension
College of Agricultural Sciences

Source: Costanzo and Kelsey, 2011, using PA Department of Revenue 'Statistical Supplements for the Tax Compendium

Impact on Local Government & School Taxes?

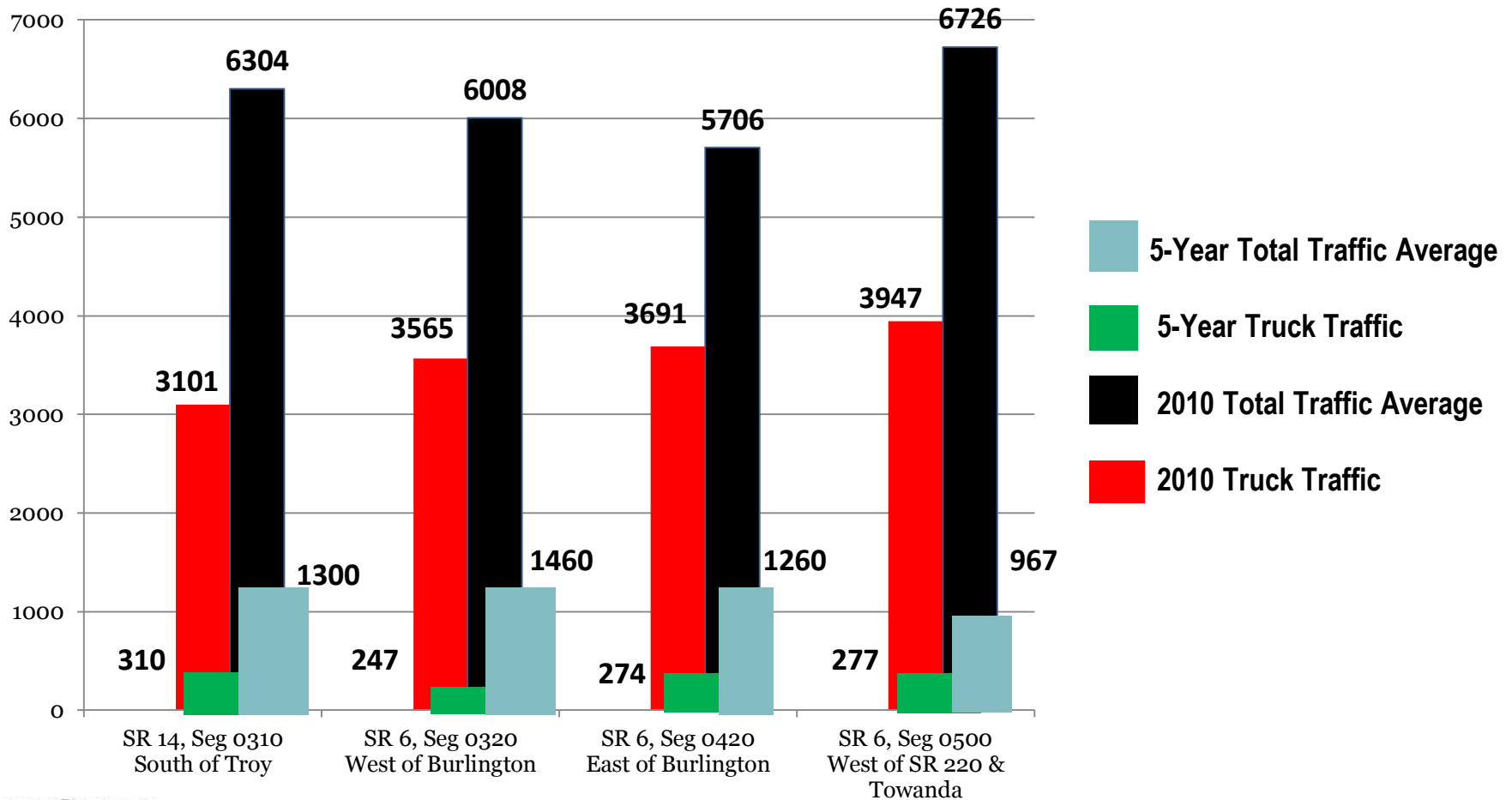
Anecdotes, but not clear yet

Impact on Local & State Public Costs?

Anecdotes, but not clear yet

Traffic Changes - *Bradford County*

Traffic 5-Year Average vs. 2010 Counts



Economic & Workforce Issues

Opportunities and Challenges

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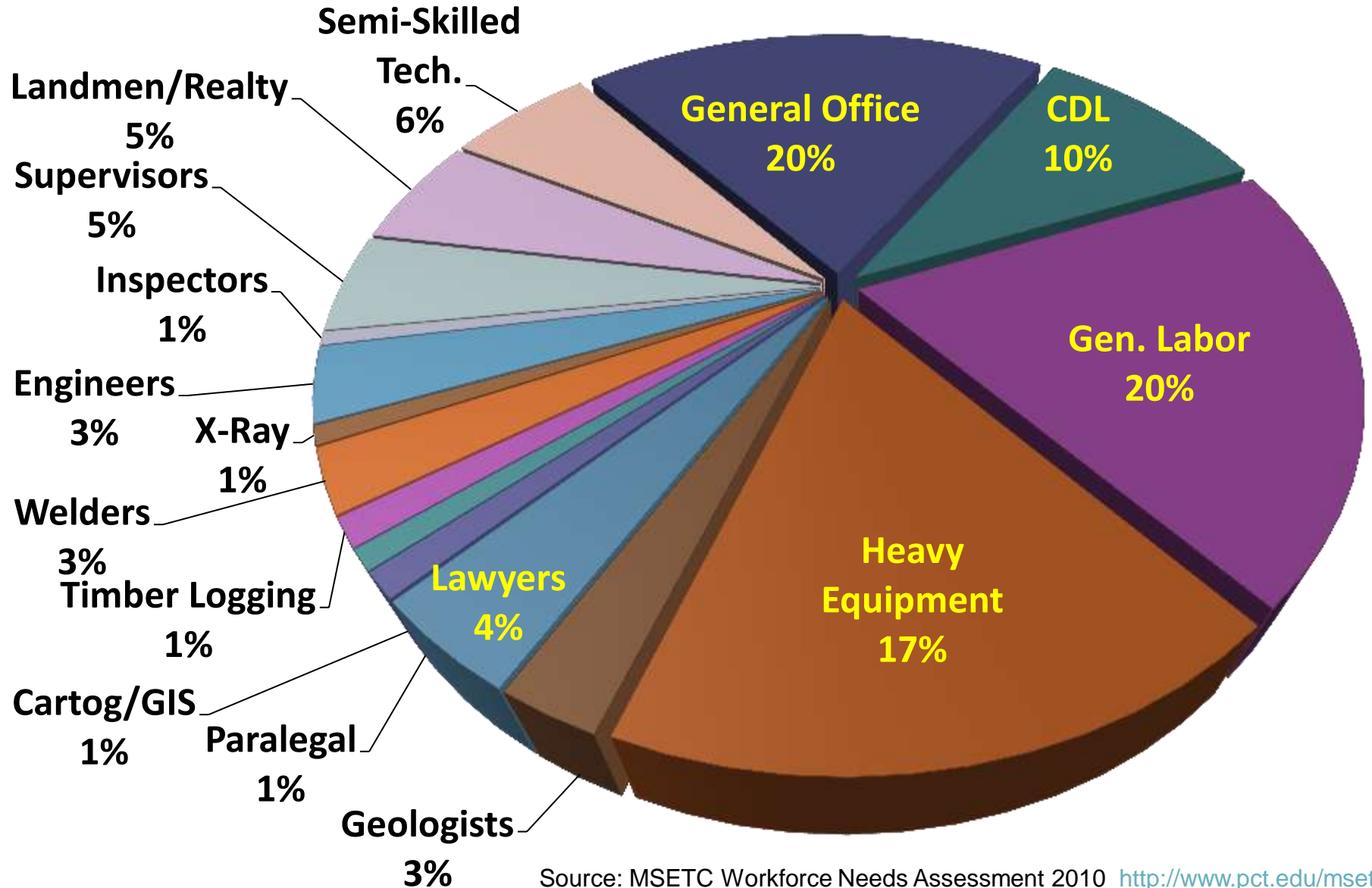
Major Economic Impacts from...

1. Business activity related to Development/Production
 - Gas industry
 - Supporting businesses
 - Other local spending by employees & companies
2. Royalty income to landowners
3. Other industries depending upon natural gas?

Labor Requirements

- Drilling each Marcellus well requires:
 - More than 420 individuals
 - Across 150 different occupations
 - 12.91 full time direct jobs
- Once drilled, every 100 wells generate 18 long-term full-time jobs
- + Indirect employment impacts

Natural Gas Workforce Requirements By Category



Economic & Workforce Questions

Businesses

- Existing local businesses benefit?
- 'New' local businesses?
- Attract outside businesses?



Workers & Residents

- Local residents HAVE the skills?
- Locals LEARN the skills?
- Youth LEARN the skills & stay?
- Newcomers to move into county?

Can be a Two-Edged Sword

Experience in other states suggests major impacts on existing businesses & employees

- Very high wages in the industry
- Raises wages in other sectors

Can be very high cost of living:

- Inflation rates higher than the national average
- Average rentals increase due to housing demand

Non-Gas field businesses and residents can struggle:

- Lose employees to the gas industry?
- Commercial space can become very expensive



Business Impacts

Opportunities and Challenges

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2010 Survey of Businesses

Bradford and Washington Counties



- **Bradford County**
 - Most active Marcellus drilling county
 - 60,384 residents in 2009, 1,345 businesses
- **Washington County**
 - Third most active Marcellus drilling county
 - 200,505 residents in 2009, 5,082 businesses
- Surveyed 1,000 businesses in each county
- Responses from 619 (31%)
- Funding from PA Dept of Community & Econ Development

Impacts on Businesses, 2010

Bradford & Washington Counties

	Percent responding 'Yes'		
	All Responses	Bradford County	Washington County
Because of natural gas drilling...			
Have your business activities changed?	17%	22%	9%
Have your annual sales <u>increased</u> ?	28%	32%	23%
Have your annual sales <u>decreased</u> ?	3%	3%	2%
Has the number of regular non-gas customers <u>increased</u> ?	7%	10%	3%
Has the number of regular non-gas customers <u>decreased</u> ?	3%	3%	2%

Impacts by Type of Businesses, 2010

Bradford & Washington Counties

	Percent responding 'Yes'			
	Business Activities Changed?		Annual Sales Increased?	
	Bradford	Wash.	Bradford	Wash.
Construction	35%	16%	27%	15%
Wholesale Trade	28%	20%	33%	50%
Retail Trade	25%	8%	44%	28%
Financial, Insurance, Real Estate	28%	10%	50%	40%
Business Services	20%	6%	33%	16%
Eating & Drinking Places	29%	0%	38%	33%
Hotels & Campgrounds	80%	50%	100%	50%

Effects on Worker Retention & Hiring

Bradford & Washington Counties

Has Natural Gas Drilling...	Percent responding 'Yes'		
	All Responses	Bradford County	Washington County
Affected the ability of your business to find and hire qualified employees?			
Somewhat easier to find	0.4%	1%	-
Somewhat more difficult to find	5%	7%	1%
Much more difficult to find	4%	6%	1%
Affected your ability to retain your workforce?			
Turnover has increased	5%	9%	1%
Turnover has decreased	0.4%	0.3%	0.5%

Other Impacts

Opportunities and Challenges

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Significant Community and Local Government Issues

- Local Infrastructure
 - Roads
 - Highway safety
 - Sewerage & water
 - Housing
- Demographic – population change
- Family
 - Childcare implications
 - Intergenerational relationships
 - Family well-being
- Community & Social
 - Social equity
 - Newcomers/old timers
 - Local power structure
 - Social problems
- Local Government
 - Impact on services & revenues
 - Local control (tools? Ability to use?)
 - Local capacity for being proactive
 - Coordination between governments

Water & Natural Resource Issues

- Water use
- Protection of private wells & springs
- Wastewater treatment & disposal
- Habitat fragmentation and disturbance
- Spread of invasive species
- Air quality
- Negative effects on recreation
and aesthetics



Taking Action Locally to Shape Impacts

Opportunities and Challenges

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What Does This Potentially Mean?

- Focus needs to be on future AFTER the boom, *not just the present*
- View Marcellus as a potential means to improve economy, social organization, human capital, physical infrastructure – *it is not an end in itself*
- Need public engagement, social networks, collaboration, and communication to address the Long Run, and how Marcellus fits



Penn State Cooperative Extension Resources

• Website & e-newsletter
www.naturalgas.psu.edu

- Primers

- Marcellus Shale: What Local Government Officials need to Know
- Natural Gas Exploration: A Landowner's Guide to Leasing Land in Pennsylvania
- Natural Gas Exploration: A Landowners Guide to Financial Management

- Short Fact Sheets

- Webinars (general; business; other)

