Community Impacts from Natural Gas Development

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Potential Natural Gas Development Impacts

- Natural gas development has great potential economic benefits including new business and job opportunities
- As the industry grows it can cause stress on local resources such as government, housing, roads, environment, and emergency services
- Planned development including pre-emptive measures can mitigate possible negative impacts
- Providing non-partisan factual information to the public is a critical component for stakeholder buy-in

Economic Impacts

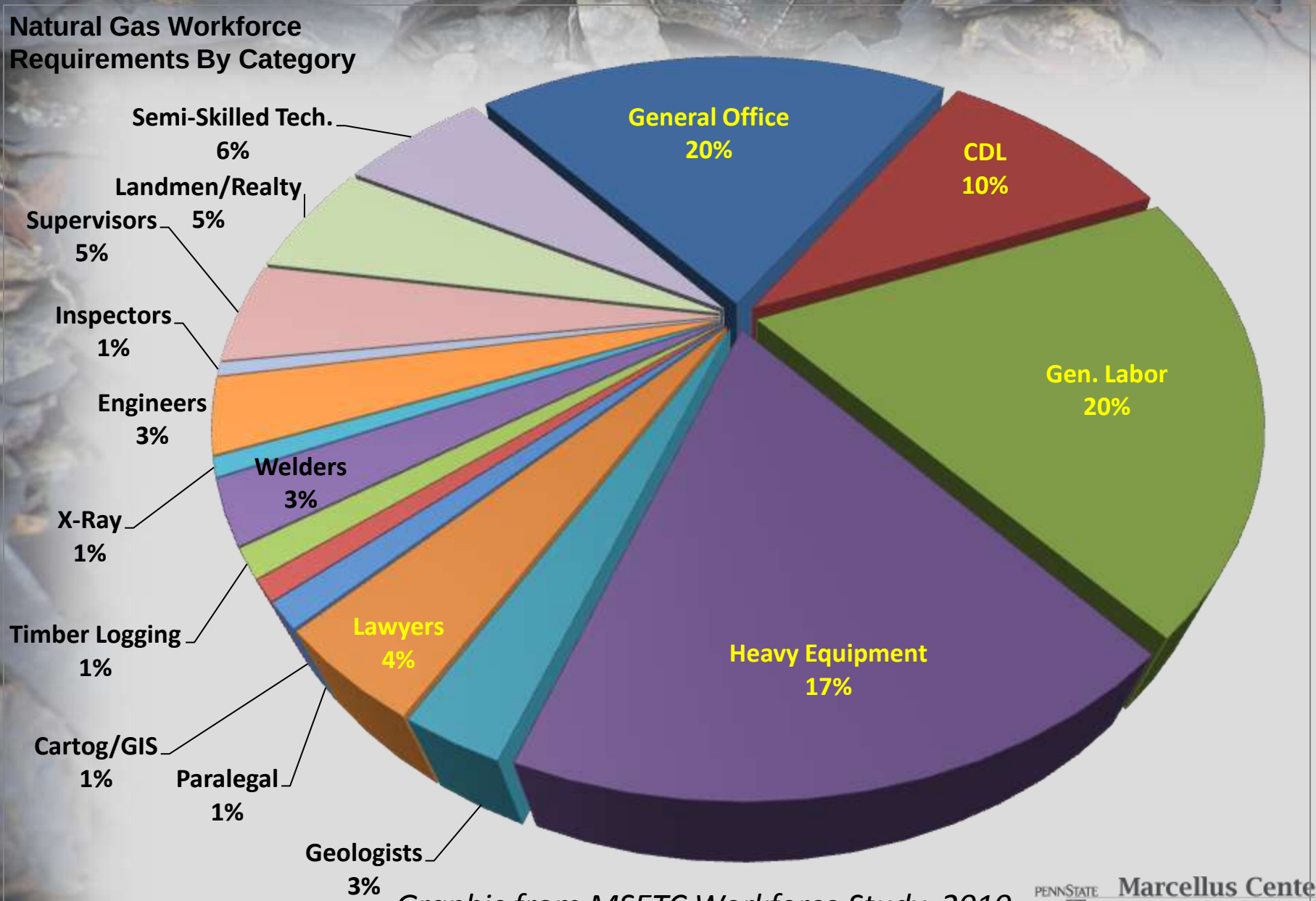
Challenges

- Losing qualified employees to energy industry
- Meeting industry demands/time constraints
- Potential for boom bust cycle

Opportunities

- New jobs opportunities
- Potential for increased salaries
- New business opportunities
    - Service providers, engineering, construction, restaurants, hotels
- Local workforce training initiatives

What specific jobs are required?



Graphic from MSETC Workforce Study, 2010

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Real Estate Impacts

Challenges

- Local businesses many not be able to afford commercial space-displacement
- Hotel availability may be challenging for tourists
- Real estate values go up due to need for additional housing

Opportunities

- Hotel occupancy rates go up
- Housing industry may be stimulated
- Commercial real estate value may rise
- Use of brownfield properties/redevelopment

Transportation Impacts

Challenges

- Increased traffic can create congestion, especially in small towns
- Small rural roads now become busier thoroughfares
- Roads not designed to handle heavy loads become severely degraded

Opportunities

- Industry can invest in roadway improvements
- Stimulates construction industry
- Ultimately have improved roads
- In Pennsylvania ~$400MM invested by industry in road improvements in 2010 alone

Disruptions by Industry

- Challenges
  - Well drilling is a 24/7 industrial activity
  - Noise
  - Light
  - Traffic
- Solutions
  - Pro-active mitigation measures
  - Noise barriers
  - Direct light away from residences
  - Select traffic routes that minimize traffic
  - Conduct work during daylight hours (can be difficult with drilling)
  - Conduct work away from urbanized areas
  - Temporary operations

Landscape Impacts

Challenges

- Clearing land can be significant which may alter ecosystems, wildlife habitats
- Permanent structures such as wellpads, access roads, pipelines, and compressors change landscape amenities

Solutions

- Minimizing surface disturbances through planned development
- Careful well site selection
- Use existing right-of-ways

Environmental Impacts

Challenges

- Water use
- Water quality
- Waste management
- Land surface disturbance
- Air quality

Opportunities

- Water sales/wastewater treatment fees
- Use of revenues for infrastructure improvement
- Enact new more protective regulations
- Monitor environmental quality
- Air quality improvements if displacing coal/oil
- Develop and use best management practices

Best Management Practices

- Wastewater reuse
- Green completions
- Vapor recovery completions
- Closed loop drilling systems
- Lined wells pads
- Secondary containment
- In-field treatment/reuse
- Piping fluids vs. trucking fluids
- Upgrade roads prior to use by industry

Government Impacts

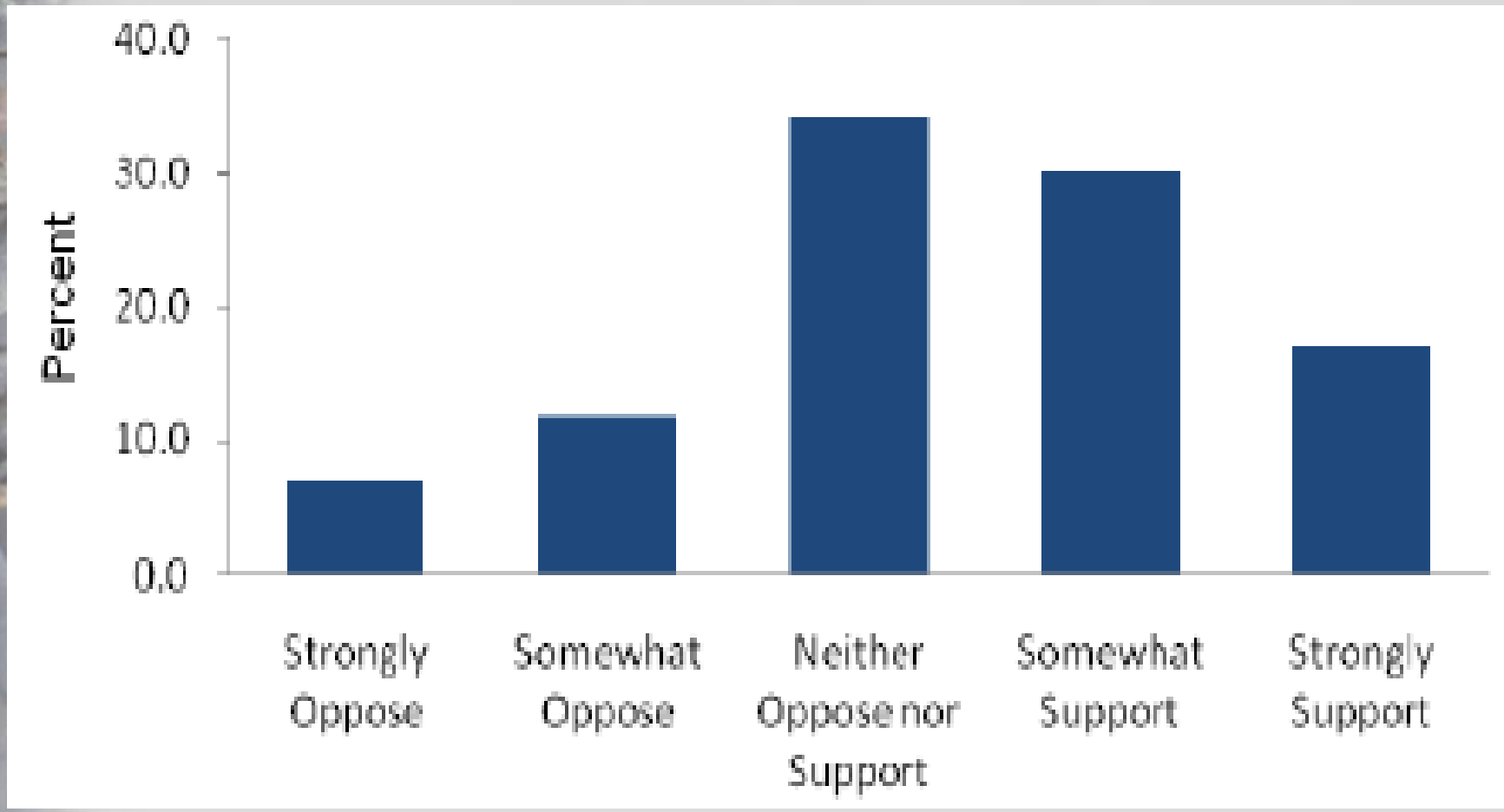
Challenges

- Increase in population
- Increase demand on local government resources
  - Planners
  - Municipal officials
  - Courthouse
- Increase in emergency services
  - Law enforcement-more arrests (young men with extra money)
  - Medical services-Increase in injuries
  - Fire department-increased number of calls, yet may need specific training

Solutions

- Development of ordinances and regulations to protect communities and environment
- Develop specialized training programs w/industry
- Form task forces to deal with unique issues such as
  - Environmental
  - Business
  - Housing
  - Transportation
  - Outreach needs

How Do People Feel About Natural Gas Development-a US example



Results from Appalachian Region Commission, 2010

Who Do You trust?

A recent poll of 1461 respondents in Pennsylvania show that public trust varies depending on the source of information on natural gas issues:

- *71% trust scientists/researchers*
- *62% trust extension educators*
- *56% trust regulators*
- *48% trust industry representatives*

Results from Appalachian Region Commission, 2010

Common Misconceptions

In the US and abroad there are many misconceptions about natural gas development

- Drilling vs. hydraulic fracturing
- Risk of environmental impacts with hydraulic fracturing
- Amount of water use and frequency
- Lack of regulations
- Can drill anywhere

These misconceptions provide a unique opportunity for public education on a topic that includes a large population

Industry Communication

- Proactive industry outreach is important, however public is often skeptical
  - Industry admits that it could improve its public relations skills
- Transparent operation by the industry is crucial for public buy-in
  - Fracfocus.org
- Industry aggressively launching national ad campaigns to discuss the benefits of natural gas development

Scientific Community's Role

- Many universities have formed natural gas centers to promote sound science
- Significant funding opportunities via grants or governmental funding
- Industry funding significant research on improving efficiency to minimize impacts
- Extension education efforts for stakeholders can play a crucial role to provide non-partisan information
- Allowing significant Q&A opportunities for public can dispel many myths

Questions?? Thank You!!

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