



Socio-Economic Considerations in Shale Gas Development

Atlantic Council Meeting



National Benefits of Shale Gas

➤ **ENERGY SECURITY!**

➤ **Geo-political**





National Benefits of Shale Gas

➤ Economic Benefits

- Leasing of Mineral Rights
 - Bonus payments
 - Royalty Payments
 - Taxes (severance & income)
- Jobs
- Balance of Trade

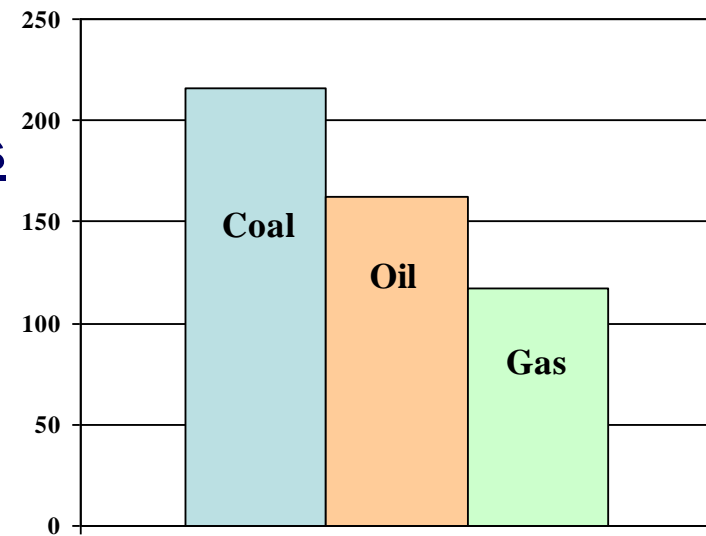


➤ Lower SOx, NOx, and Mercury Emissions

➤ GHG Emission Mitigation

- Lower Carbon fuel
- Allows the Use of Renewable Power

Pounds of CO₂ emissions per
million Btu (averages)





Local Community Benefits of Shale Gas

➤ **Jobs**

➤ **Infrastructure**

➤ **Influx of Highly Paid Workers =>Economic Stimulus:**

- **Housing – rising property values**
- **Demand for Goods and Services.**

➤ **Lease Payments and Taxes (depending on National Government's sharing with local communities)**



Boom/Bust Cycle



BOOM TIMES:

Intense activity during exploration and early development

BUST TIMES:

Jobs and people move on to next

'hot spot'





Drilling and Fracing

- **1000s of Wells will be Drilled!**
- **Sort Term, but Significant Land Disturbance**
- **Footprint Minimized by Drilling from Pads**
- **Each Well may be Completed in 3 Weeks**
- **Production is Expected to Last Decades!**





Possible Adverse Community Impacts

- Traffic

- Accidents
- Congestion
- New Roads

- Road Damage from Heavy Equipment



Water tanker truck rollover in PA



Big truck, little road.



More Possible Adverse Community Impacts

- Influx of “Strangers”
- Changing Way of Life
- Visual (reduced through drilling from pads)
- Noise
- Emissions
- Smog



Many of these impacts are temporary during drilling ...



Community Reaction & Involvement

- In the U.S., Land Owners with Mineral Rights are less likely to object to development...
- Land Owners and Neighbors will be inconvenienced by development.
- Land Owners will be compensated for damages, i.e. “Made Whole”, not a ‘Get Rich Quick’ scenario.
- It is Imperative for Developers to have a ‘Meeting of Minds’ with the Community to agree on the best approach.
 - Timing & Pace, NOT if there should be development!



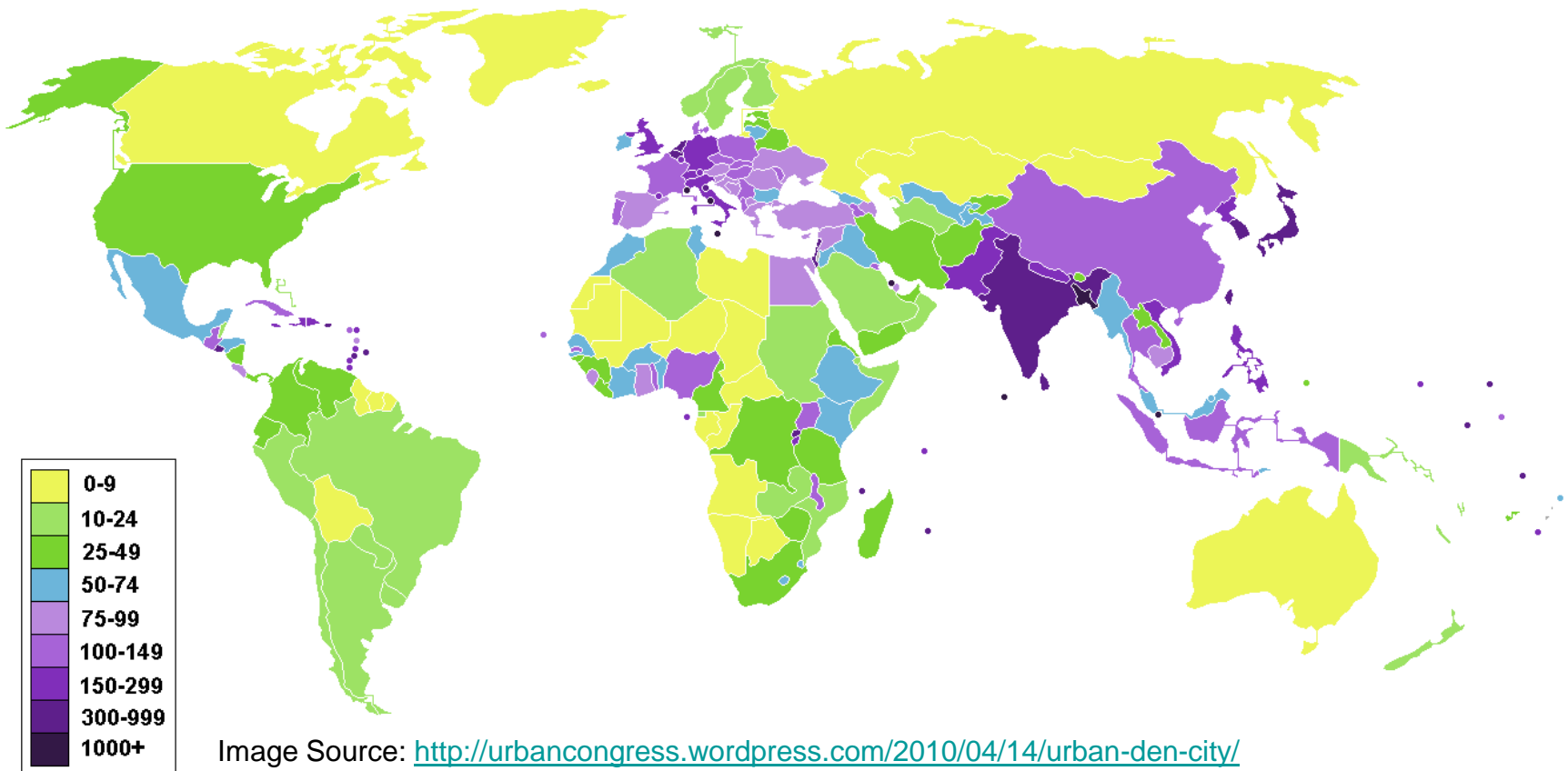
Mineral Rights: U.S. vs. Europe

- In the United States, many land owners also own the mineral rights for the sub-surface.
- When oil and gas is developed, the Company leases the mineral rights directly from the landowner. That landowner will gain from both an initial signing bonus, but also from royalty payments, if production is established.
- In Europe, as in most of the world, the mineral rights remain the National Government's.
- In the U.S., the States have legal primacy on much of oil and gas operations.
 - Environmental regulations
 - Compensation to land owners for damages due to operations.
- *When land owners are compensated for mineral rights, there is less community opposition to development.*



Population Density

- **Lower U.S. Population Density vs. Europe Indicates Different Challenges for European Shale Gas Development .**
- **Significant U.S. Development in Urban and Suburban Areas (ex. Ft. Worth) May Serve as Analogy.**





Responsible Rural Development



**New Access Roads
and Visual
Disturbances Can Be
Minimized through
Planning**





Suburban Drilling and Production



Wells co-exist with:

- Housing,
- Golf Courses,
- Schools,
- Churches,
- Shopping
- Recreation



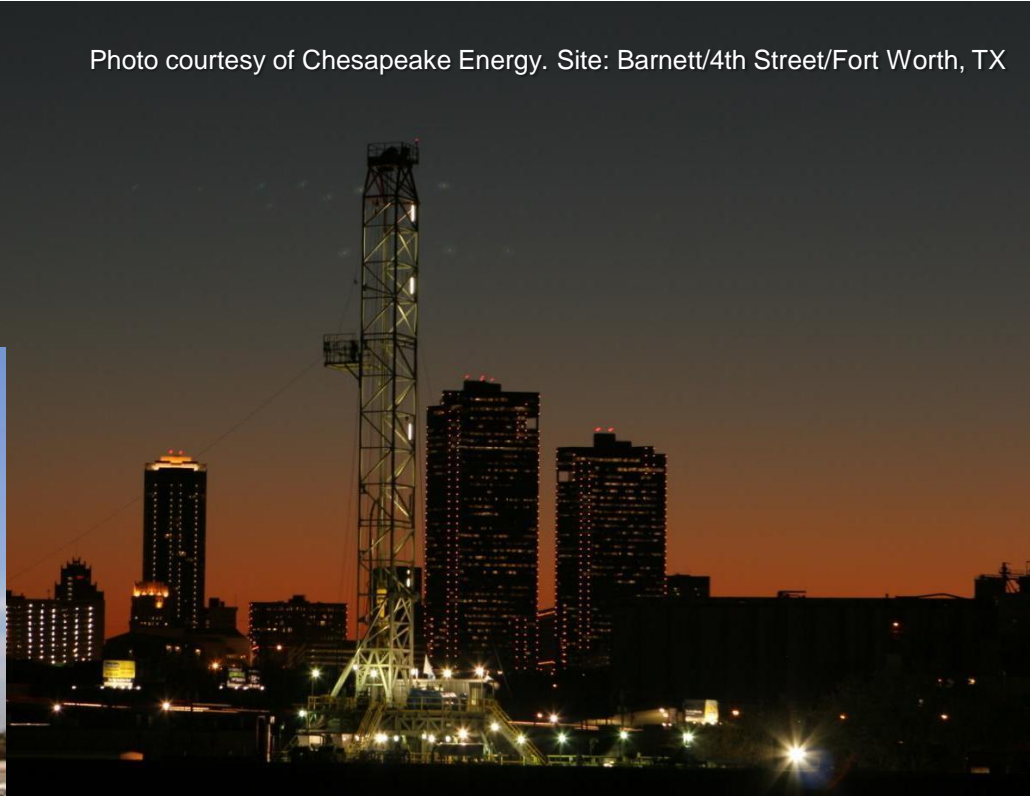
to courtesy of Chesapeake Energy. Site: Barnett/Hidden Creek/Burleson, TX



Responsible Urban Development

- Emissions Mitigation
- Regulations Can Mitigate Noise through Abatement Measures.

Photo courtesy of Chesapeake Energy. Site: Barnett/4th Street/Fort Worth, TX





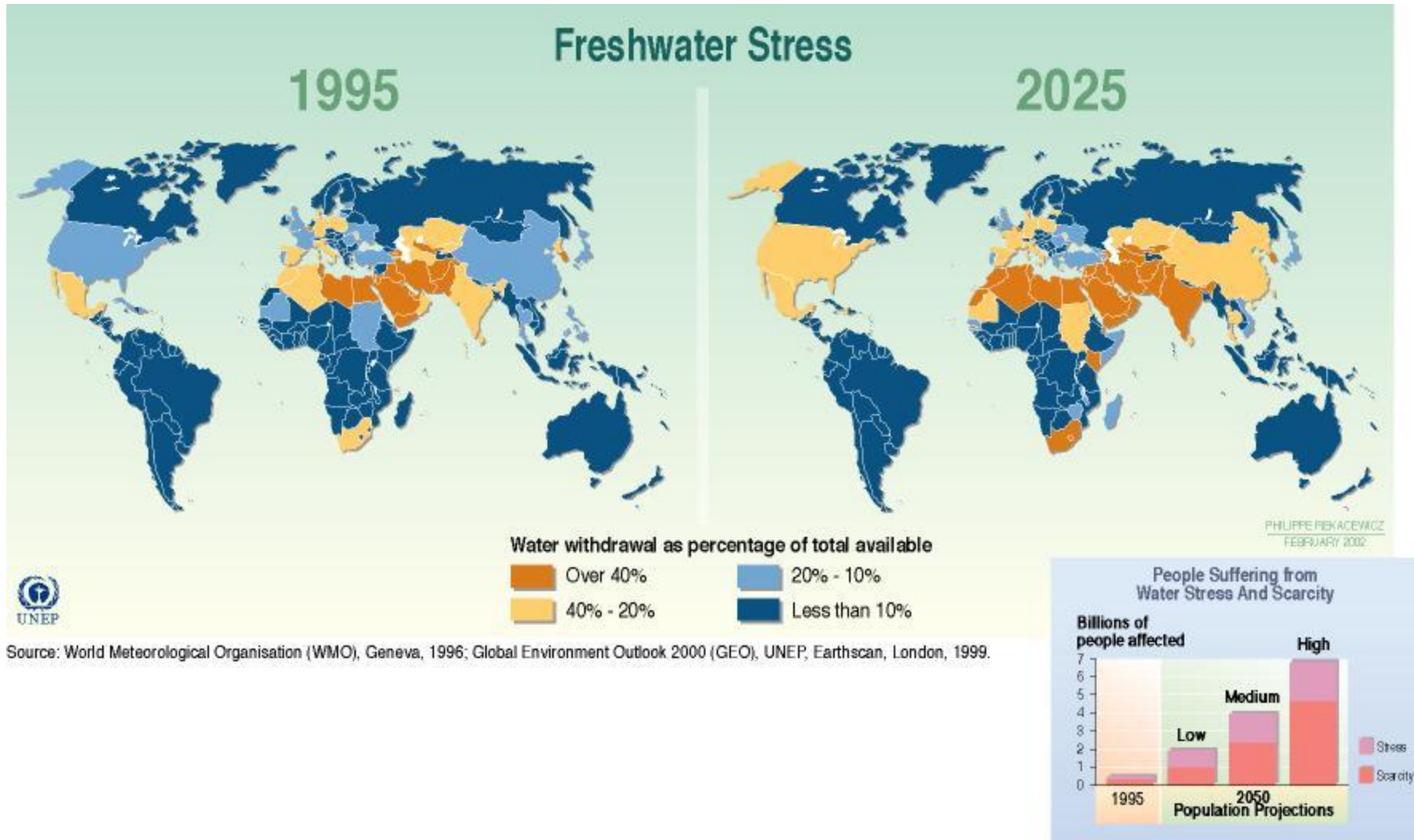
Production Footprint at DFW Airport



Photo courtesy of Chesapeake Energy. Site: Barnett/DFW International Airport/Fort Worth, TX

Water Resources

- **Water Sourcing, Treatment, Re-use, and Disposal are Key Considerations in Shale Gas Development Regulation.**





Water Regulatory Issues Include:

1. Access to water for fracturing

Water is an increasingly scarce commodity. Regulations for managing the use of water often undervalue the resource.

2. Ecologically sound completion of wells through groundwater zones

Multiple layers of steel and concrete protect fresh water formations as wells pass through groundwater zones. Clear regulations must be developed to ensure consistent standards.

3. Conduct of hydraulic fracturing operations in pay zone

Water, a proppant (usually sand) and chemicals are used to fracture the rock which facilitates the flow of natural gas. This occurs thousands of feet below the surface, far beneath aquifers which supply drinking water.

4. Handling, treatment, and re-use of water from operations

Sustainable disposal and/or reuse of produced water – consisting of formation water and flowback from fracturing operations (including sand and chemicals)



Available Resources:

- In 2009, DOE and the Ground Water Protection Council (GWPC) published “Modern Shale Gas Development in the United States: A Primer,” an in-depth analysis of Shale Gas development , including water management and disposal issues related to shale gas stimulation and production.
- In 2009, DOE helped fund GWPC publishing a comprehensive review of regulations designed to protect water resources nationwide. This report, “State Oil and Natural Gas Regulations Designed to Protect Water Resources,” includes a detailed look at current state oil and gas regulations intended to protect water resources, including regulations related to hydraulic fracturing and waste handling.



Available at www.fossil.energy.gov/programs/oilgas/index.html,
www.netl.doe.gov/technologies/oil-gas, and www.gwpc.org.

Establish Regulatory Environment to:

- **Mitigate Adverse Impacts**
- **Not Discourage Investment!**



Factors in U.S. Shale Gas Success

Below Ground:

- **Favorable Geology**
- **Technology – Including U.S. Government R&D**
- **Infrastructure – pipelines and domestic industry**

Above Ground:

- **Stable & Transparent Regulatory/Taxes/Fiscal Terms**
- **Developed Gas Markets**
- **Ease in Leasing**

NOT: Continued Government Financial Subsidies!



Factors in Global Shale Gas Development

Additional Factors to those in U.S.:

- **Access to:**

- **Resources,**
- **Gas Treatment,**
- **Pipelines, and**
- **Markets**

- **Ability/Willingness to Import Expertise:**

- **Investment Climate: Huge Capital Required**
- **Equipment**
- **People (Visa support)**

- **Great Potential, BUT:**

- **In infancy – shale geology not yet proven**
- ***You never know if it is economic until drilled!!***

Questions?



U.S. DEPARTMENT OF
ENERGY

Oil and
Natural Gas