

26th World Gas Conference

1 – 5 June 2015, Paris, France



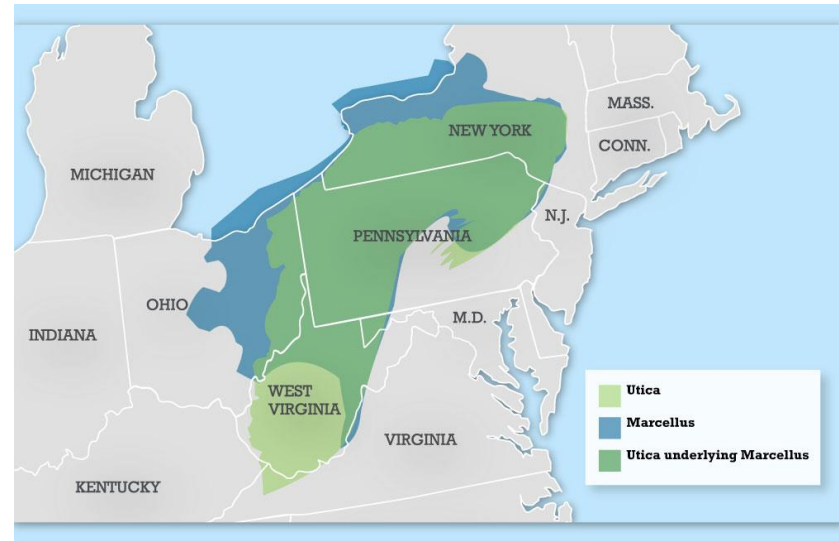
STAKEHOLDERS COLLABORATE FOR
ENVIRONMENTALLY RESPONSIBLE SHALE GAS
RESOURCE DEVELOPMENT

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The Shale Gas Revolution

- Marcellus Shale region production growth from ~1 Bcf/d in 2007 to over 16 Bcf/d as of March 2015.
- Technological improvements increasing drilling and production efficiencies.
- Dry and wet gas production.



Shale Gas - Community Benefits

- Employment – Pennsylvania oil & gas employment grew by almost 260% 2007-2012 to over 15,000 workers.
- Community investments – healthcare, recreational facilities, charities.
- Infrastructure improvements – roadway and bridge improvements and maintenance
- Taxes and fees



Shale Gas – Community Challenges

- Environmental concerns
 - Air
 - Water
 - Noise
- Human services and infrastructure stresses
 - Housing
 - Roadways
- Political
 - Taxation
 - Stakeholder pressures



Center for Sustainable Shale Development

- Conceived by John Hanger, former Secretary of the Pennsylvania Department of Environmental Protection
- Formed to encourage, document and recognize best practices and to “Pull” the industry’s environmental performance up.
- Organized to bring various stakeholders to a common

table: Benedum Foundation

Chevron

Clean Air Task Force

CONSOL Energy

Environmental Defense Fund

EQT Corporation

Group Against Smog and
Pollution (GASP)

Pennsylvania Environmental
Council

Shell



CSSD Board

- **Paul O'Neill**, 72nd Secretary of the U.S. Treasury and retired Chairman and CEO, Alcoa
- **Armond Cohen**, Executive Director, Clean Air Task Force
- **Christine Todd Whitman**, President, The Whitman Strategy Group; former Governor of New Jersey and Administrator of the EPA
- **Jared Cohon**, President Emeritus of Carnegie Mellon University (Chair)
- **Nicholas J. Deluliis**, President, CONSOL Energy
- **Michael De Witt**, General Manager, Appalachia, Shell
- **Nigel Hearne**, President, Chevron Appalachia
- **Fred Krupp**, President, Environmental Defense Fund
- **Jane C.S. Long**, formerly with Lawrence Livermore National Laboratory
- **David Porges**, CEO, EQT Corporation
- **Davitt Woodwell**, President, Pennsylvania Environmental Council



CSSD Aims and Goals

- Continuous improvement of operating practices
- Protection of water and air resources through attainment of its 15 performance standards (e.g. >90% water recycling).
- Continuous development of standards which exceed regulatory requirements to maintain relevancy.
- Building public awareness on excellence in industry performance.

Potential Water-Resource Issues

Sources of water impacts during exploration and production:

- Impact to surface-water and groundwater levels
- Disposal of drill cutting wastes
- Treatment of flowback and produced water
- Surface spills of hydraulic-fracturing fluids, flowback and produced water.
- Well integrity failure of casing and grout seals.

Environmental Performance Standards - Water

Eight Standards:

1. Wastewater management
2. Flowback and produced water recycling
3. Drilling fluid management
4. Centralized water impoundments
5. Geological risk assessment
6. Groundwater monitoring
7. Well integrity and drilling fluid design/disclosure
8. Spill containment and emergency response



Potential Air-Resource Issues

Sources of air impacts during exploration and production:

- Production system leaks
- Exploration and production equipment venting
 - Pneumatic valves
 - Storage tanks
 - Compressor re-starting
- Engines and combustion sources



Environmental Performance Standards - Air

Seven Standards

1. Flaring Limitations
2. Flaring Conditions
3. Drill rig and frac pump engine emissions
4. Compressor engine emissions
5. Storage tank emissions
6. Fugitive emissions
7. Vehicle emissions



CSSD Certification

Steps to Certification

- Operator Application
- Pre-audit
- Audit
- Certification committee
- Annual Assurance



Value Proposition

Benefits to Participation

- Reputational: Improved *Social License* for participating organization and the industry through collaborative efforts to develop solutions rather than “shame and blame”
- Environmental: reductions in impacts and emissions
- Economic: return on investments

Challenges

- Assembling the “right” partners: Industry, NGOs, academia and others.
- Fighting the perception of industry “greenwashing”
- Working between the extremism in public discourse
- Industry investment
 - Financial – capitol, personnel and certification investments
 - Executive and Management Commitment

Future Direction of the CSSD

- Evergreen standards and certification structure to maintain relevancy
- Considering new standards
- Regional adaptability
- Expanding participation

CSSD Contact Information

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Questions

