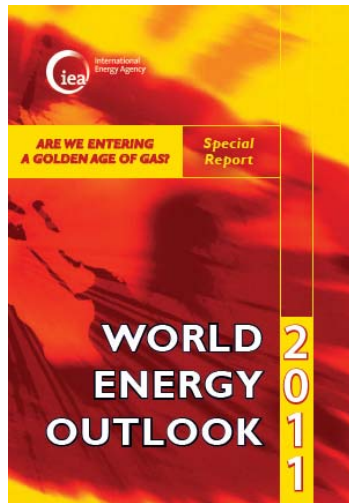


PGCA Study Group 4



Environmental Aspects of Unconventional Gas

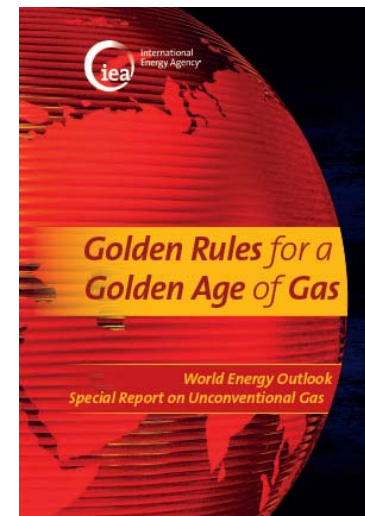
Golden Age of Gas, Golden Rules for that



Departing from the base case of the WEO2010 New Policies Scenario, “The Golden Age of Gas Scenario” assumes that China ramps up gas use, nuclear power growth slows, the use of gas in the transportation sector increases, and prices are \$3 to \$7 per mcf due to ample supply, primarily from unconventional production in many areas of the world.

...bright future for unconventional gas is far from assured: numerous hurdles need to be overcome, not least the social and environmental concerns associated with its extraction.

...The Golden Rules underline that full transparency, measuring and monitoring of environmental impacts and engagement with local communities are critical to addressing public concerns.



Many Aspects, Many Arguments

Methane

Flaring,
Exhaust

Industrial
Waste

VOCs

Water
Contamination

Waste
Water
Treatment

Water
management

Stress to
community
people

Accidents

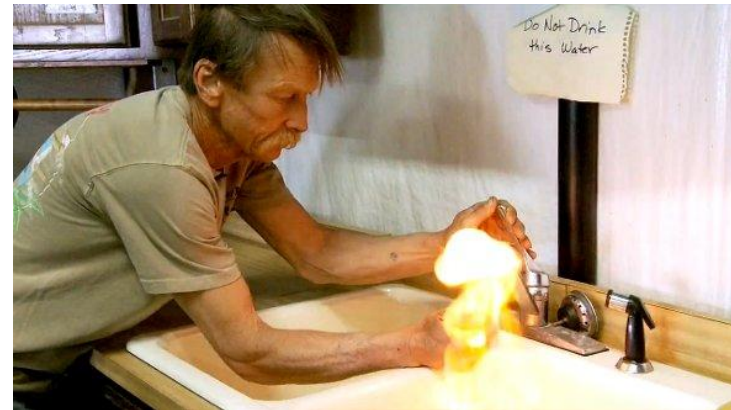
Land Use

Earthquakes

Stress to
farm or wild
animal



Shale Gas Isn't Cleaner Than Coal, Cornell Researchers Say (NY Times, 11 Apr 2011)



The New York Times

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Shale Gas Isn't Cleaner Than Coal, Cornell Researchers Say

By MIKE SORAGHAN of **Greenwire**

Published: April 11, 2011

Cornell University researchers say that natural gas pried from shale formations is dirtier than coal in the short term, rather than cleaner, and "comparable" in the long term.

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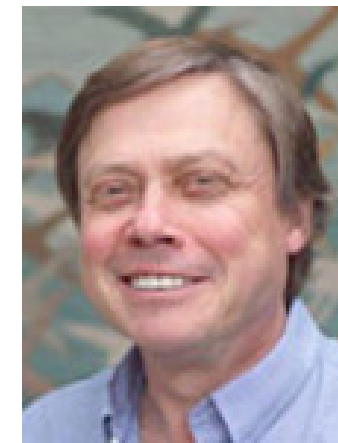
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Two Held on Terrorism Charges at NATO Meeting



The Campaign Against Women



Cornell Professor Robert Howarth
Ecology & Environmental Biology

Manufactured fear?



Howarth's study received an avalanche of coverage, including articles in the New York Times, Washington Post and Wall Street Journal. Their stories fueled critics of hydraulic fracturing throughout the summer.

Meanwhile, the major news outlets that covered the Howarth study largely ignored Carnegie Mellon's, which only garnered the attention of local outlets like the Pittsburgh Post-Gazette and West Virginia Gazette.

We weren't the only ones who noticed this glaring disparity in how the media covered the two studies. Surveying U.S. media coverage on hydraulic fracturing, George Mason University professor Robert Lichter found that, by a ratio of 12 to 1, major media outlets reported on the negative Cornell study while ignoring Carnegie Mellon's.

Cornell vs. Cornell: Turns out shale gas emissions really are lower than coal – Ken Cohen, Exxon Mobil

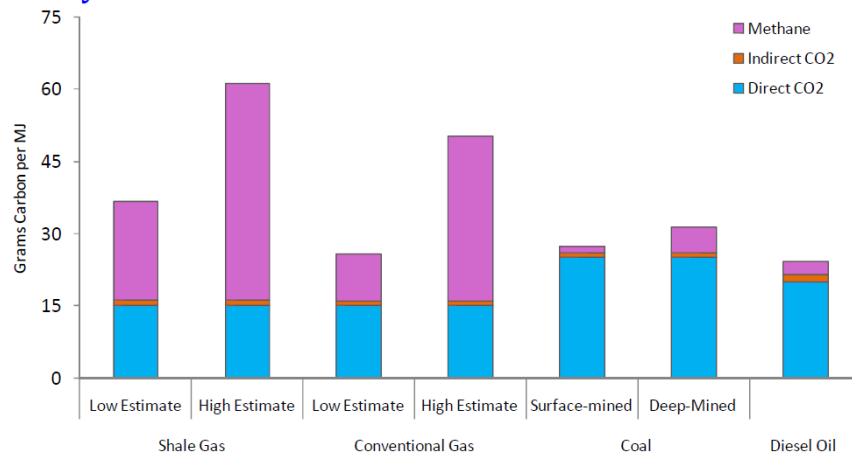
Looking into the paper carefully...

Shale Gas Isn't Cleaner Than Coal, ...

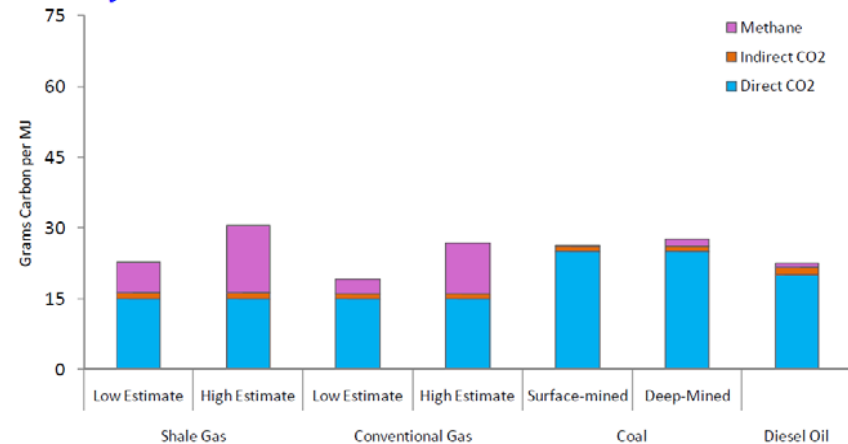
20-year horizon, High-Estimate

On what kind of data or methodologies?

A. 20-year time horizon



B. 100-year time horizon

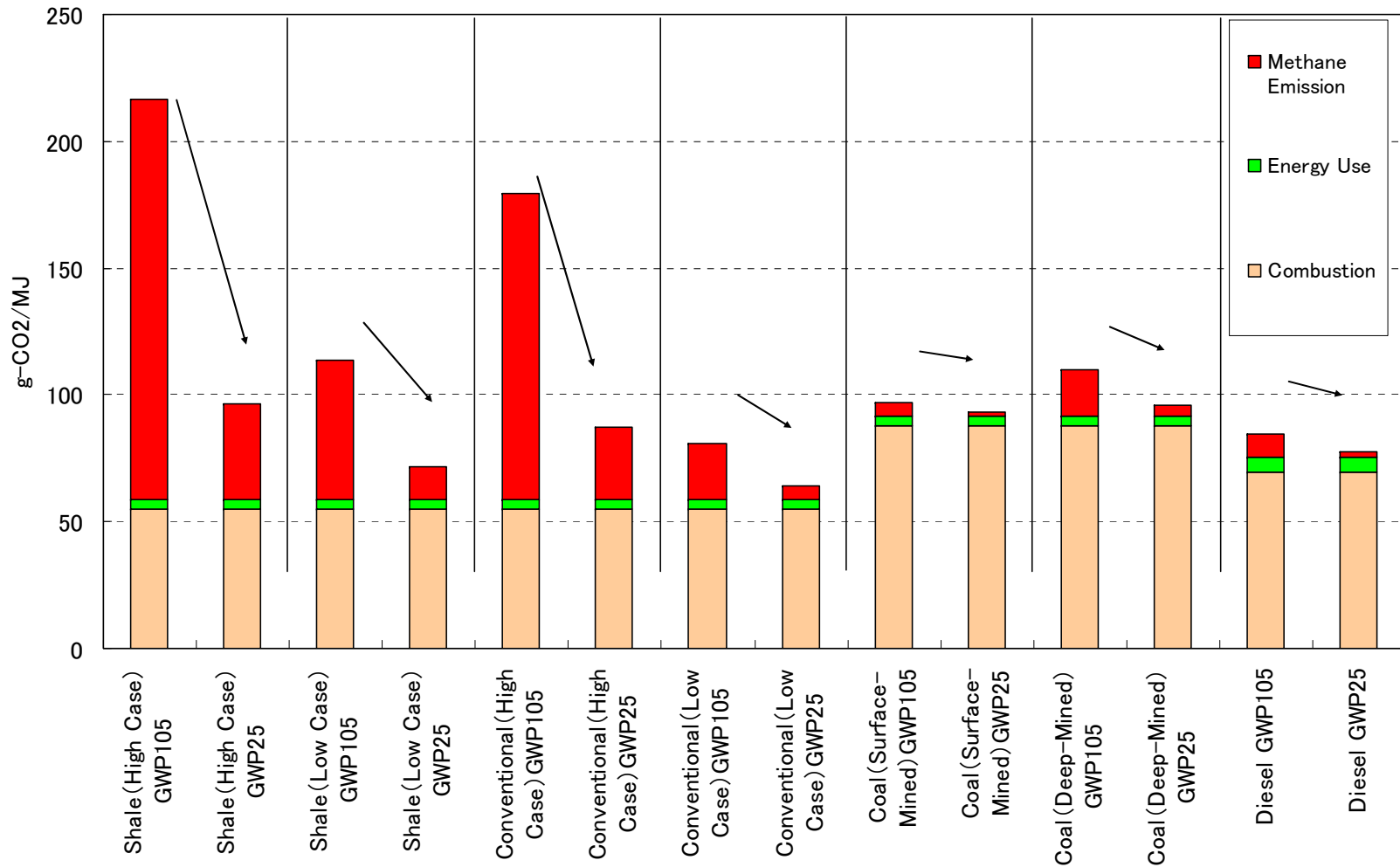




Biased Points in Howarth Paper

- + Using GWP 105 (20-year), 33 (100-year) (IPCC: 72, 25)
- + Lack of credible data
- + Assuming 100% vent (not reflecting actual business practices)
- + Using “Lost and Unaccounted Gas” numbers for methane leakage amount
- + Using higher methane leakage rate in transmission
- + Overestimating the amount of flow back water
- + Underestimating life time production amount as 1.24bcf (instead of 3bcf per well, which can be increased to 3.5bcf :EIA)
- + Comparing calorific values (GJ) of produced Natural Gas with Coal. (not by kWh basis)

Only using IPCC GWP numbers...

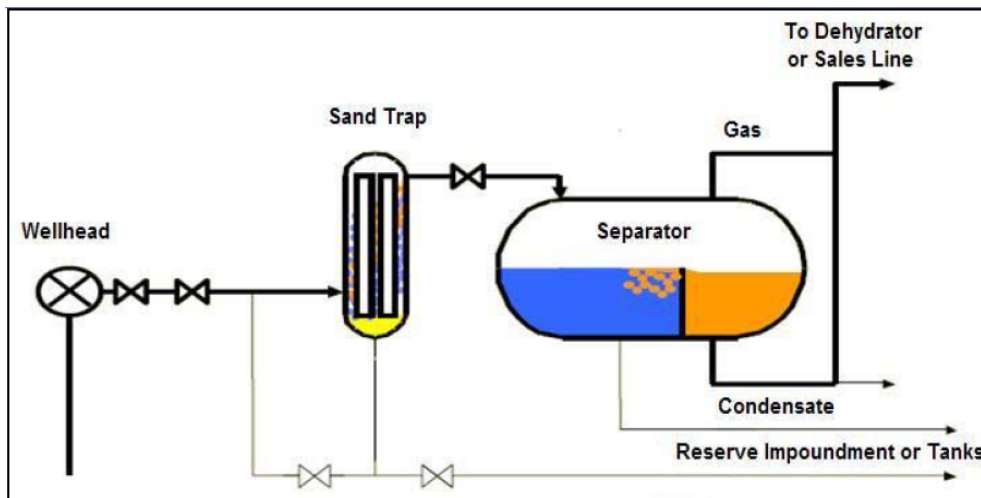


Reduced Emissions Completions (RECs)

“...and what the environmentalists and what the air people wanted was a 95 percent reduction in the emissions of methane and VOCs. And that's what the EPA has done. They've given them that. What they did for industry, industry needed a bit more time to put in place the equipment that the EPA wants industry to use to achieve that 95 percent reduction.”

E&E TV: “McDermott Will & Emery's Pardo discusses impacts of EPA's fracking rule”

(Source) EPA



Based on IGU Report on Shale Gas

Latest Technological Developments (WOC1)

Regulations

Regional Developments

Best Practices

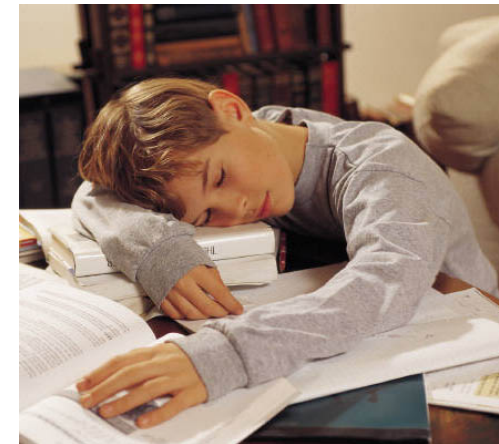
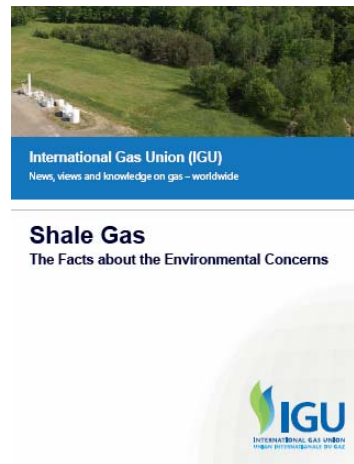
Other Arguments

Work Shops

Case Studies

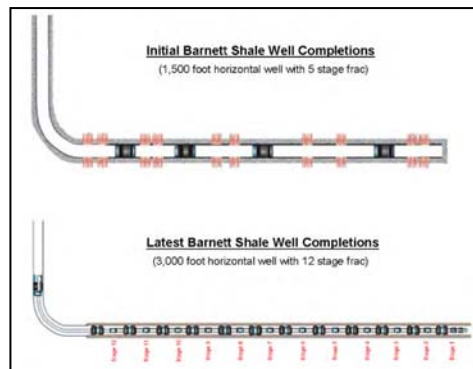
Discussions in the US

Public acceptance and new technologies (WOC3:SG3.3)



Work Plan Proposal

2012 Autumn	Sharing basic informations (IGU Report, IEA Reports, etc) Listing up argument and discussion points
2013 Spring	Analyze background of these arguments (How and Why these happened) Find solved cases (Management Practices, Technologies, Policy Support, etc)
2013 Autumn	Work Hard
2014 Spring	Work Harder
2014 Autumn	Draft Report Prepare WGC Session
2015 Spring	Final Report



GUIDING PRINCIPLES
Our Commitment to the Community

We, the members of the Marcellus Shale Coalition, embrace and operate by the following guiding principles:

- We provide the safest possible workplaces for our employees, with our contractors, and in the communities in which we operate.
- We implement state-of-the-art environmental protection across our operations.
- We continuously improve our practices and seek transparency in our operations.
- We strive to attract and retain a talented and engaged local workforce.
- We are committed to being responsible members of the communities in which we work.
- We encourage open and public dialogue and fact-based education about responsible shale gas development, and
- We support our business in a manner that will provide sustainable and broad-based economic and energy security benefits for all.

We recognize that to succeed in business, we not only embrace these principles, we live by them each and every day. This will be our legacy.

MARCELLUS SHALE COALITION
www.MarcellusCoalition.org