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| **There’s no such thing as a free megawatt: hydrofracking as a gateway drug to energy literacy – Discussion Guide**  Don A. Duggan-Haas, & Robert M. Ross  The Paleontological Research Institution: Ithaca, NY  [dad55@cornell.edu](mailto:dugganhaas@museumoftheearth.org) |  |

***What is the Marcellus Shale?***

*The Marcellus Shale is a black shale formation extending deep underground from Ohio and West Virginia northeast into Pennsylvania and southern New York. It has long been known that the Marcellus Shale holds natural gas deposits; however recent technological advances and commodity price increases have made recovering these deposits very attractive to natural gas companies.*

## Two overarching questions:

In *Risk: A Practical Guide for Deciding What’s Really Safe and What’s Really Dangerous in the World Around You,* Ropeik and Gray (2002) describe four issues to consider in the evaluation of risk:

1. *Probability:* “What are the chances of…”
2. *Consequences:* “What is the severity of the possible outcome?”
3. *Hazard: “*If something we’re exposed to isn’t hazardous, so what?”
4. *Exposure:* “A hazard can’t do you any harm if you’re out of harm’s way.”

In evaluating any energy source, consider the above issues.

* Should we use this kind of energy?
* Should we use this much energy?

The first question drives much of the public conversation about energy, but the second question is, we think, at least as important. If the amount of energy we use is small, its environmental and economic and costs will be small as well. *Why is so much more attention given to the first question than to the second?*

## Questions to consider for any energy source:

* What are the environmental costs and benefits of current energy practices?
* What happens to the environment at the point of extraction?
* What wastes are generated and disposed of away from the point of extraction?
* What happens to the environment as a result of use?
* Per unit of energy generated, how do these impacts compare for the different energy sources being considered? (This may be a comparison of a proposed or new source to the current practice.)
* Which is greater, the cost of development or the cost of efficiency measures? Stated another way, in the consideration of developing a source that provides 45MW hours/year, would it be more beneficial (or more costly) to reduce consumption by 45 MW hours/year instead?

These questions generally frame the issue as a choice between developing a new energy source and maintaining current energy practice. *There are more than two choices*.

* What other options exist?
* Are they being seriously considered?
* Are they practical? Why or why not?

## More pointed questions to consider for any energy source:

* Are accidents known to kill or injure people? Consider extraction, transit, and use. How does the death and injury rate compare to other sources/unit of energy.
* Does standard use alter the environment in ways known to kill or injure people? How does the death and injury rate compare to other sources/unit of energy?
* Are there political costs or benefits associated with this energy source?

MORE CREDIBLE

Statements from organizations that contradict their normal bias.

Statements from professional societies

Government reports

**BIG FUZZY MIDDLE**

University research programs

Petitions

Think tanks and advocacy organizations

Some guy trying to make a buck writing a book

Individual professionals

Individual lay people

LESS CREDIBLE

*A naked credibility spectrum for the global warming debate. Or other stuff.*

Craven, G. (2009). *What's the worst that could happen? : a rational response to the climate change debate* (1st ed.). New York: Perigee.

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| MORE CREDIBLE  LESS CREDIBLE | ***TYPE OF SOURCE*** | ***REASONS FOR PLACING IT AT THIS LEVEL*** |
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| Favor/Accept/Pro |  | Skeptic/Reject/Con |
|  | MORE CREDIBLE  **Big Fuzzy Middle**  LESS CREDIBLE |  |

*Craven’s Credibility Spectrum with adaptations by Eric Pyle.*