Fracking Past, Present, and Future: Costs and Benefits for Community and Landscape

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What is “fracking?”

- **Hydraulic fracturing**—breaking rock with high pressure liquids to allow oil and gas to escape.
- When combined with directional drilling in the mid-2000s, vast reserves of natural gas in shale deposits became economic to develop.
Timber, oil, coal...
Why did shale gas take off in the US?

• Shale is in private ownership, although surface and sub-surface owners may be different.
• There is a lot of money to be made, even though oil and gas markets are volatile.

• Industry was exempted from key national environmental laws—e.g. Clean Water Act, Clean Air Act, National Environmental Policy Act etc...
• Communities are rarely protected by planning codes.
• Sub-surface rights supersede surface rights.
• Landowners are unaware of the consequences of shale gas development.
Gas money: e.g., Sullivan County, PA

- 6,428 people, 15/square mile
- Projected gas wells in Sullivan County—6,000
- Lifetime royalty per well (>12.5%)—$1.6m
- $1.6m x 6,000/6428 = $1.5m/person

Pennsylvania population density
Gas activity and income projections: marcellusgas.org, 10/23/14
Putting it in perspective: UK

- 67,000,000 people, 690/square mile
- Recoverable reserves – 130 Trillion Cubic Feet
- Wellhead value at current price – £975 Billion
- 1% to communities = £9.75bn = £145/person
UK energy use and gas availability

• UK was self-sufficient in fossil fuels 1970-2004
• Currently imports: 47% of gas; 87% coal; 37% oil
• Proven reserves 8.6 Tcf UKCS vs. 130 Tcf shale
• Gas accounts for >33% of UK energy use

Growing UK energy demand
UK Office for National Statistics, 2014

UK Gas imports % 2001-2012
US Energy Information Administration
UK fossil fuel and renewables

- Natural gas is better than coal, but renewable energy is the only low-carbon alternative.
- Development of renewable energy has slowed as access to cheap natural gas has grown.

UK National Average Fuel Mix 2012-13

Projected renewable capacity 2005-30

www.gov.uk

Bloomberg New Energy Finance
What people face...

• Change over which they have little control
• Too much new and unfamiliar information
• Too much hidden and inaccurate information

...and what they are asked to do

• People without technical backgrounds...
  – Are forced to make or accept irrevocable choices about the future in the face of impatient big industry
  – Don’t know what to expect
  – Need to be informed and empowered to minimize the risks they face
The help people need...

- **Know** how to repair what already happened
- **Understand** how current conditions will develop
- **Shape** what has yet to happen
- **Prepare** landscapes to adapt to the unexpected
- **Plan far ahead** to ensure long-lasting benefits
Dispel myths and untruths...

- Tell the whole story
- Explore what we know
- Provide many examples
- Show alternatives
Take pipelines and water, for example...
Projecting the impacts of wells+pipelines

- Existing vs. future well locations projected based on characteristics of current wells

8,077 Acres
Connect existing wells

26,470 Acres

26,959 Acres
Connect future wells
On-line map of threats to water

Analysis and images: Jessica Fegley, Tara Mazurczyk
Loss of forest cover due to pipelines

- Loss of forest reduces water storage, increases downstream flood impacts
Pipeline routing strategies

- Alternate location choices and their impacts
  - Shortest-distance, Fewest leases, Conservation

158 Stream crossings
18 Homes impacted
84 Wetlands impacted
0.56 Miles per well

148 Stream crossings
3 Homes impacted
49 Wetlands impacted
0.63 Miles per well

124 Stream crossings
10 Homes impacted
19 Wetlands impacted
0.66 Miles per well

Geodesign analysis and images: Megan Prikockis, Danielle Sette
Forest fragmentation...

-Interrupts core habitat, creates pathway for invasive species
-Diminishes core habitat and reduces scenic amenity
-Interrupts water access and shade, threatens water quality
...and design responses

Minimizes access road, avoids bisecting core habitat

Consolidates with other disturbances

Maintains core and shaded silt-free streamside habitat.

Images: Nick Monroe
What should we do?

• Families deserve job opportunities, income for education and health care
• They deserve an environment free from water and air pollution, flooding, excess traffic and habitat fragmentation

• Help people understand the changes coming
• Help them understand what they can demand
• Help them make informed choices
• Help them influence their own future
Acknowledgements
NSF Award: DRL-1114670. Marcellus Matters: Educating Adults in Science and Engineering
Professor Timothy Murtha, Penn State Landscape Architecture students

Graphic: Dengke Chen