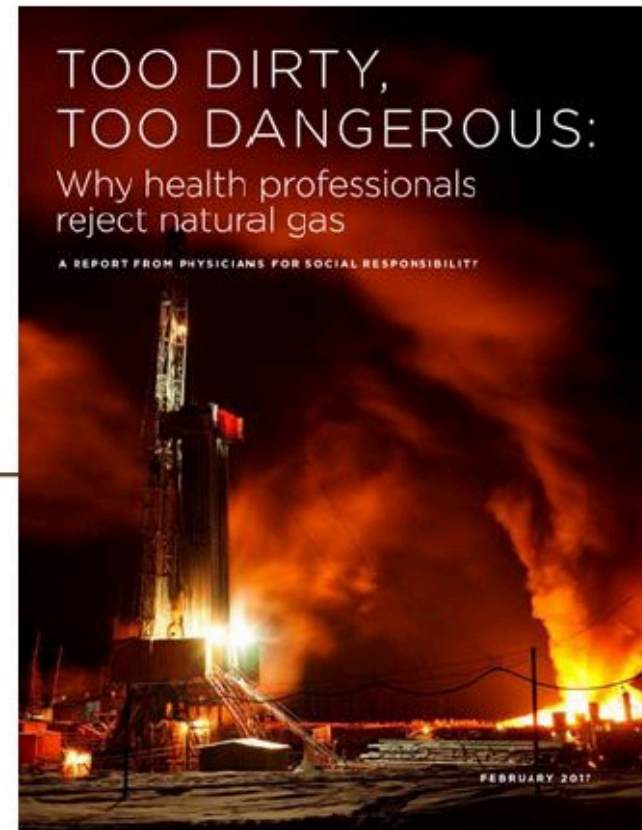


# “TOO DIRTY, TOO DANGEROUS”

---

*Why Health Professionals  
Reject Natural Gas*

Based on a report by Physicians for Social Responsibility  
March 2017



# **This is what the energy future can look like**

Clean, renewable sources and energy efficiency:

- Zero emission of climate pollutants
- Zero fuel combustion => Health threats dramatically reduced
- Vulnerable populations protected
- Jobs created



## Using fossil fuels, we won't get there.

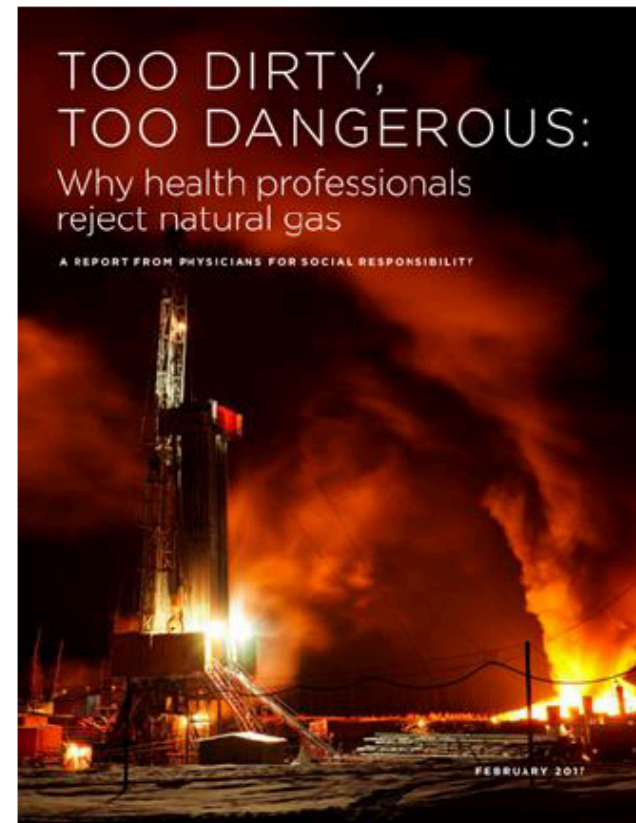
- Fossil fuels emit deadly pollutants, heat-trapping gases
  - Coal and natural gas
- Utilities moving to replace coal-fired power plants with natural gas (methane)
- ***But...***





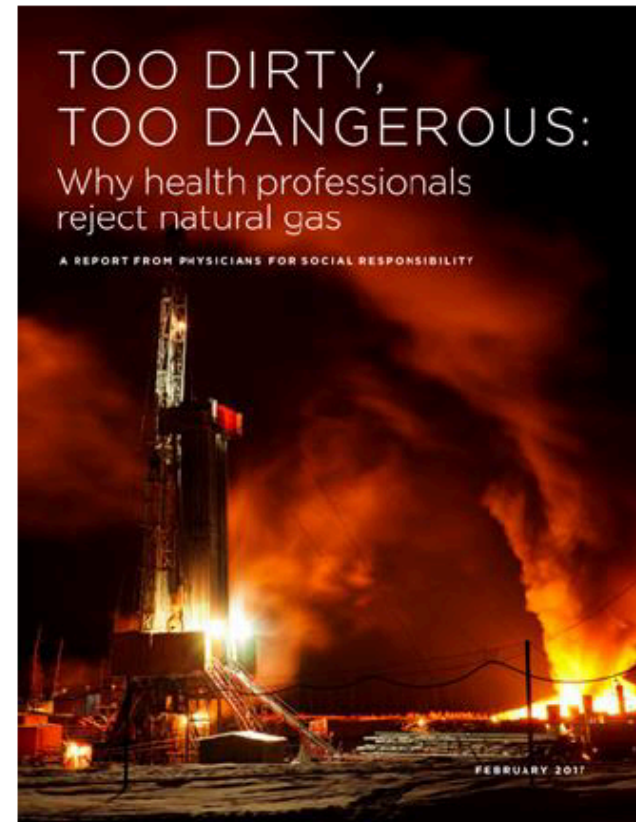
# What's the problem with natural gas?

- Too Dirty
  - Toxic air, water, land contamination, especially from fracking
- Too Dangerous
  - Potent climate change driver -- worse than coal?
  - Climate change endangers health and survival



# What's the problem with natural gas?

- Too Dirty
  - Toxic air, water, land contamination, especially from fracking
- Too Dangerous
  - Potent climate change driver -- worse than coal?
  - Climate change endangers health and survival



# Too Dirty: Toxics We Put into the Earth

- What's in fracking fluid:
  - known human carcinogens (benzene, toluene, arsenic)
  - neurotoxics (ethylene glycol, lead)
  - endocrine-disrupting chemicals
  - ...and more
- What we don't know: “proprietary business information”
- Contaminates huge volumes of water



# Too Dirty: Contaminants We Pull out of the Earth

Wastewater can contain naturally occurring contaminants:

- salts
- radioactive materials
- heavy metals
- PAH's
- volatile organic compounds



(Drilling fluid splashing past the liner, Dimock, PA, Spring 2009)

# Too Dirty: Fracking-Related Air Pollutants

## Volatile organic compounds

- Emitted across the natural gas supply chain
  - can cause cancer, affect the nervous system, cause birth defects
- Contribute to formation of ground-level ozone (smog)
  - can cause irreversible lung damage, significantly increase risk of premature death

## Particulate matter

- Emitted by trucks, diesel motors
- Causes decreased lung function, aggravated asthma symptoms, nonfatal heart attacks, high blood pressure
- Children particularly vulnerable to lung effects: decreased lung function, worsening asthma symptoms, chronic bronchitis
- Long-term repeated exposure associated with cardiovascular disease, death



# What the science shows: dangerous exposures

- Uintah County, UT, one of highest-producing oil and gas fields in US: **dangerously high levels of VOCs and ozone.**
  - Helmig, D., (2014). "Highly Elevated Atmospheric Levels of Volatile Organic Compounds in the Uintah Basin, Utah," Environ. Sci. Technol.
- Colorado, **dangerous airborne levels of benzene**
  - McKenzie L.M., et al., (2012). "Human health risk assessment of air emissions from development of unconventional natural gas resources," Sci Total Environ.
- **Excessive amounts of ambient benzene, carbon disulfide** near gas drilling operations in northern Texas.
  - Wolf Eagle Environmental, "Town of DISH, Texas, Ambient Air Monitoring Analysis." (2009).



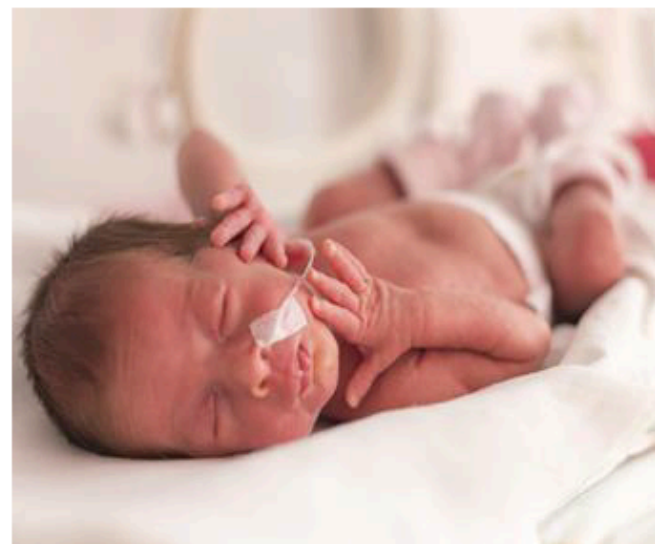
## What the science shows: Health outcomes

- 2015: Statistical association between well density and **increased rates of hospitalization** for cardiac, neurological, urological, cancer-related and skin-related problems.
  - Jemielita T. et al, 2015. Unconventional gas and oil drilling is associated with increased hospital utilization rates. PLoS ONE.
- 2016: Statistical association between the patient's proximity to natural gas fracking operations and progressively **worsening asthma symptoms**.
  - Rasmussen, SG, et al (September 2016). Association Between Unconventional Natural Gas Development in the Marcellus Shale and Asthma Exacerbations. Journal of the American Medical Association.



## What the science shows: Health outcomes, cont.

- 2014: Statistical association between density and proximity of natural gas wells within a 10-mile radius of mothers' residence, and the prevalence of **congenital heart defects**.
  - McKenzie, L. M., et al. (2014). Birth outcomes and maternal residential proximity to natural gas development in rural Colorado. *Environmental Health Perspectives*.
- 2016: Statistical association between expectant mothers living in most active fracking areas, and **increased risk of premature birth**.
  - Casey J.A. et al. "Unconventional Natural Gas Development and Birth Outcomes in Pennsylvania, USA." *Epidemiology*.



## More science: Are EPA air standards strict enough?

Air standards don't account for:

- **long-term health effects** of chemicals
  - Vandenberg, L.N., et al., "Hormones and Endocrine-Disrupting Chemicals: LowDose Effects and Nonmonotonic Dose Responses," Endocrine Reviews. (2012). 33(3):0000 – 0000.
- **risks of episodic spikes** in contaminant levels
  - Weinberger, B. et al. (April 23, 2016) ATSDR Releases Investigation of Pennsylvania Compressor Station. Southwest Pennsylvania Environmental Health Project.
- enhanced **risks to especially sensitive populations**, such as pregnant women, young children and the elderly.
  - Brown, D., et al., "Understanding exposure from natural gas drilling puts current air standards to the test," Rev Environ Health. (2014).