

Regulating Fracking's Risks: Are Environmental Impact Assessments Enough?

2018 NCR WATER RESOURCES SYMPOSIUM

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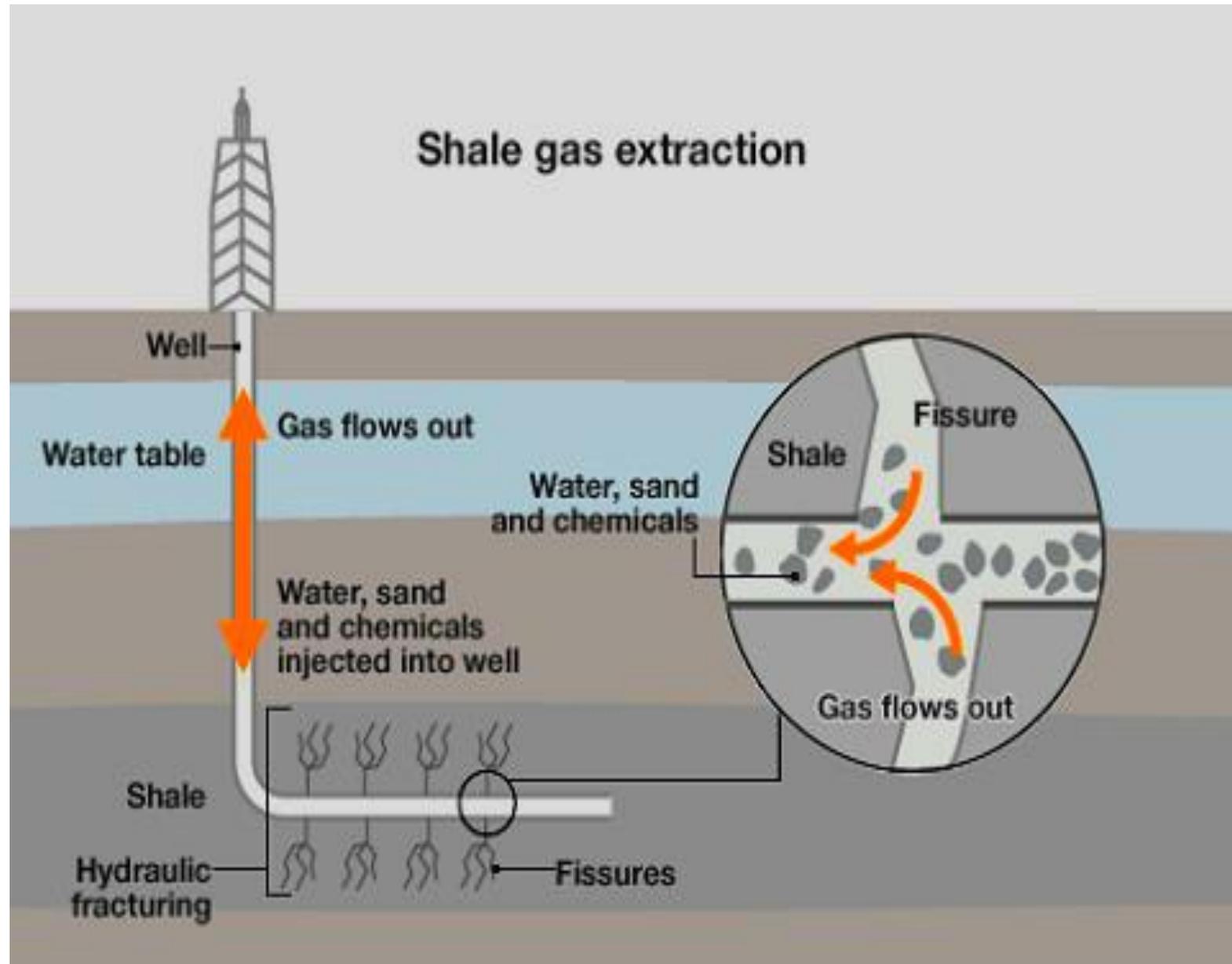
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What is 'fracking'?

- Hydraulic fracturing breaks rock at high pressures to release gas trapped in shale rock
- Fracking technically refers to rock-breaking, but used to mean entire unconventional gas extraction process
- Shale gas and shale oil are 'unconventional' hydrocarbons, trapped in shale rock pores 1-3+ km below surface
- First used in US 1949; combined with horizontal drilling since 1980's
- Currently in initial stages in UK
- Banned in several US states, and in France

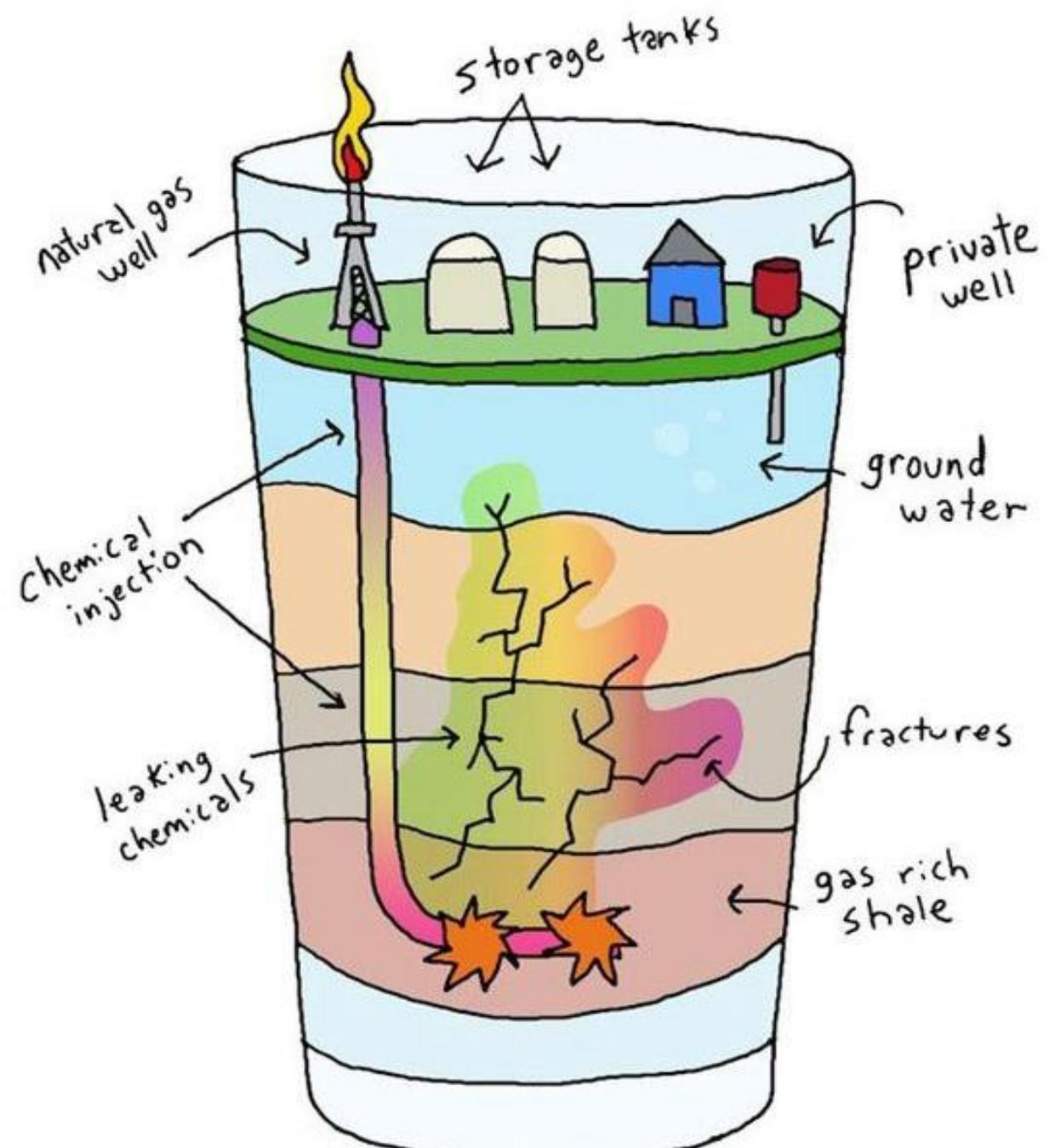


Argued benefits:

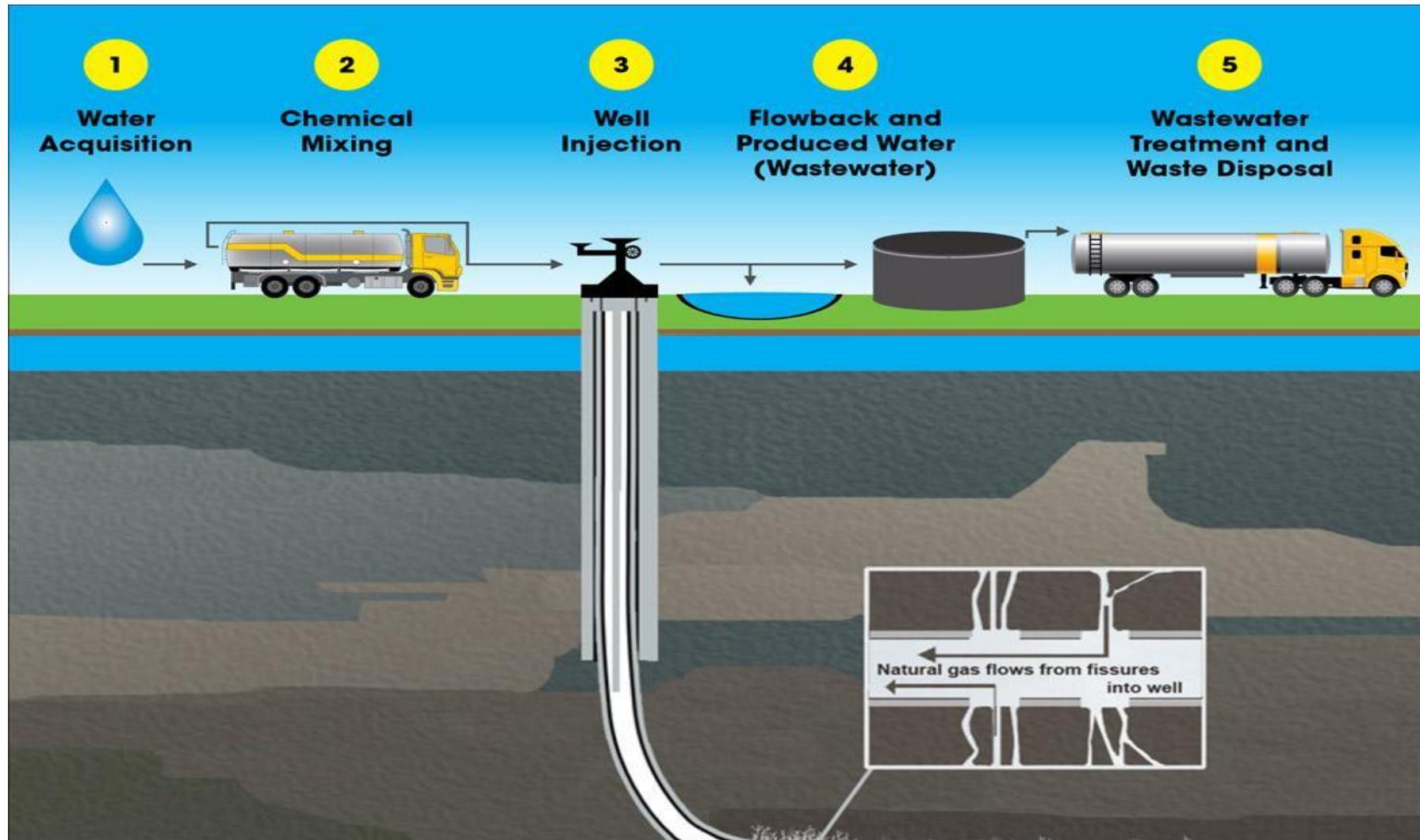
- US EIA projections – world energy consumption will grow by 56% between 2010 and 2040
- Energy use correlated to GDP; colder countries have higher energy use
- The average UK home uses gas for central heating and spends about £550 each year on space heating alone! ([DECC](#)) --Cheapest way to heat a home is with gas
- Energy security and affordability – fuel poverty and **heating**?
- Natural gas is relatively cheap and ‘cleaner-burning’ alternative to oil and coal
- sometimes considered a good ‘**bridge**’ from fossil fuels to renewable energy sources such as wind and solar power
- When burned, releases only CO₂ and water vapour, making it potentially ‘*cleaner*’ than coal
- Job creation
- Large, untapped potential energy source
- ‘safety’ of technology – over 60 years experience in the US
- Fracking can be used to stimulate new production from older wells
(see www.energyfromshale.org)

Potential Impacts:

- Groundwater and surface water
- Biodiversity – plants and animals
- Land use change – scarring, habitats
- Seismicity - earth tremors and quakes
- Air quality – pollution, PM2.5
- Methane emissions – impacts on climate change
- Human health – particularly children, EDC's, carcinogens
- Animal health – livestock
- Quality of life – industrialization, property values, boom-towns
- Noise and traffic pollution
- Access to water – huge water use



Fracking Water Cycle : Potential for Impacts at Every Stage



New York Department of Health. *A Public Health Review of High Volume Hydraulic Fracturing for Shale Gas Development* (New York: DOH, December 17, 2014), pp. 2-5

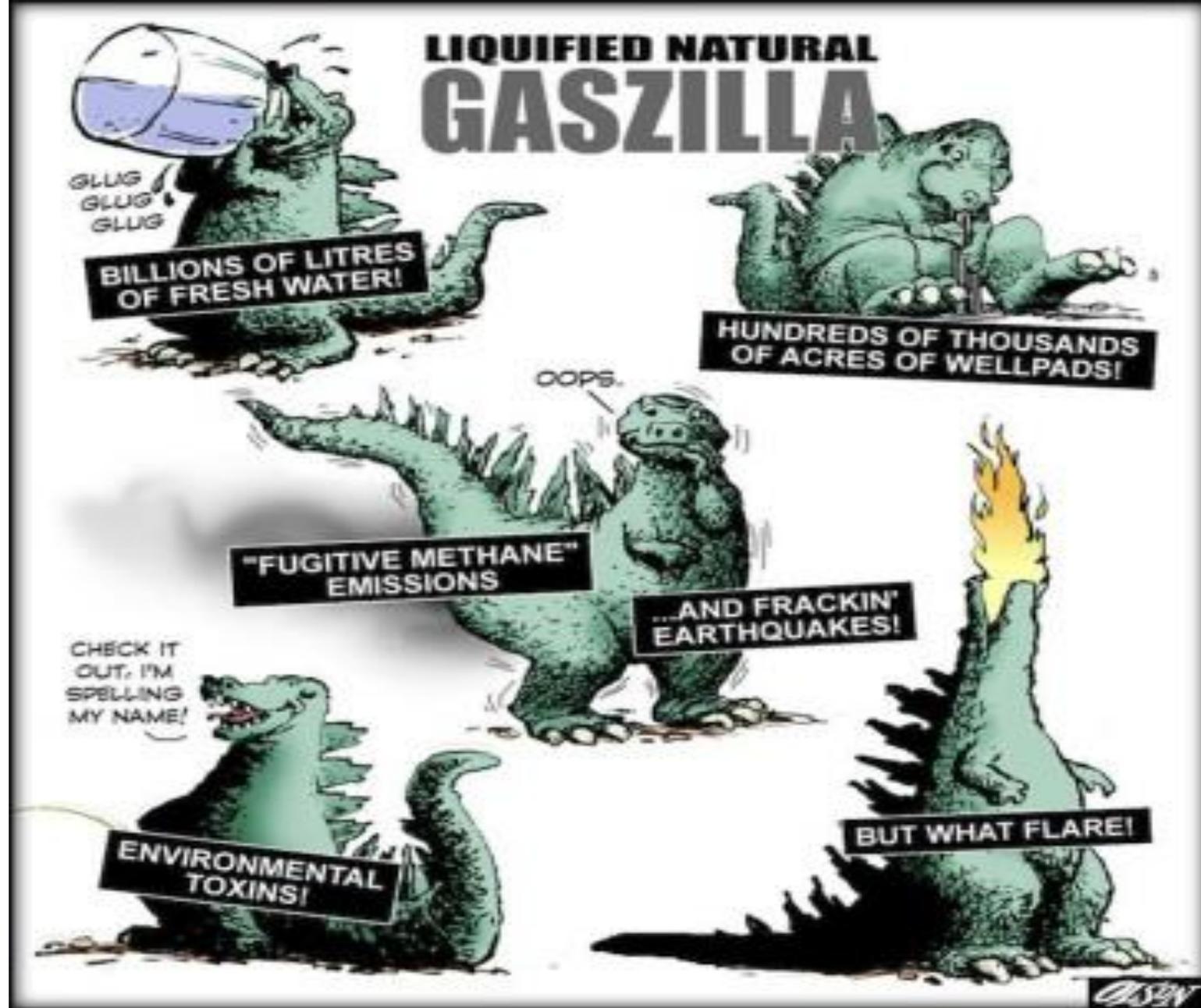
http://www.health.ny.gov/press/reports/docs/high_volume_hydraulic_fracturing.pdf

Shale Gas: A Bridge Fuel?

The natural gas lifecycle is the 'swiss cheese' of leaks:

- 5% of oil and gas wells leak **immediately**
- 50% leak after **15 years**
- 60% leak after **30 years**

(Reports, Physicians for Social Responsibility, 2016)



<https://olscribbler.wordpress.com/2014/06/02/lng-bonanza-hopes-fractured-by-reality/>

Lifecycle : Emissions risk associated with each stage of the fracking process

PRE-PRODUCTION	PRODUCTION	TRANSMISSION STORAGE DISTRIBUTION	USE	WELL PRODUCTION END-OF-LIFE
METHANE	METHANE	METHANE	METHANE	METHANE
BTEX	BTEX		CO ₂	
NON-METHANE VOLATILE ORGANIC COMPOUNDS	NON-METHANE VOLATILE ORGANIC COMPOUNDS		NO _x	
NO _x				
PM _{2.5}				
HYDROGEN SULFIDE				

Adapted from Christopher W. Moore et al., 'Air Impacts of Increased Natural Gas Acquisition, Processing, and Use: A Critical Review,' *Environmental Science & Technology*, (2014).

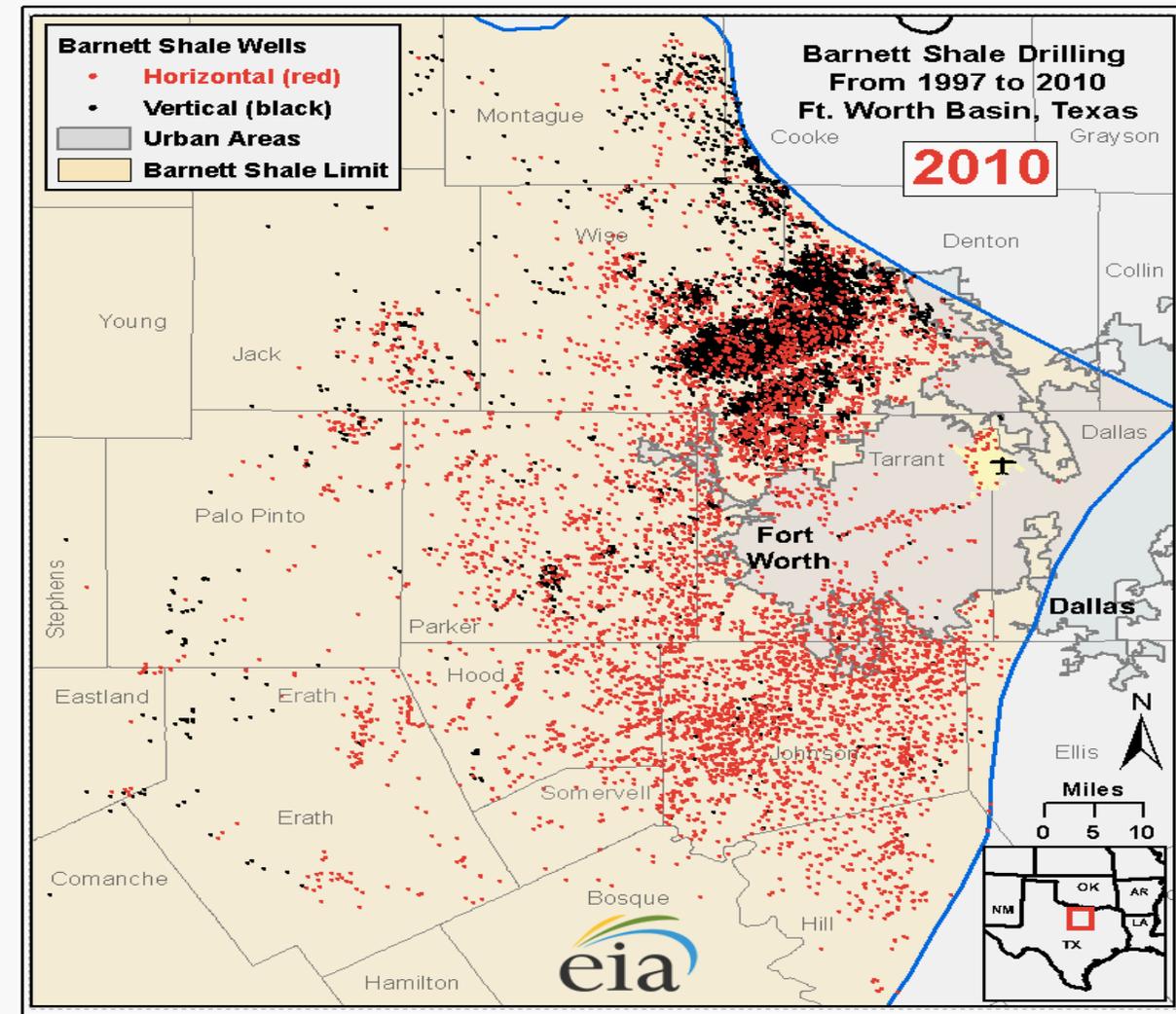
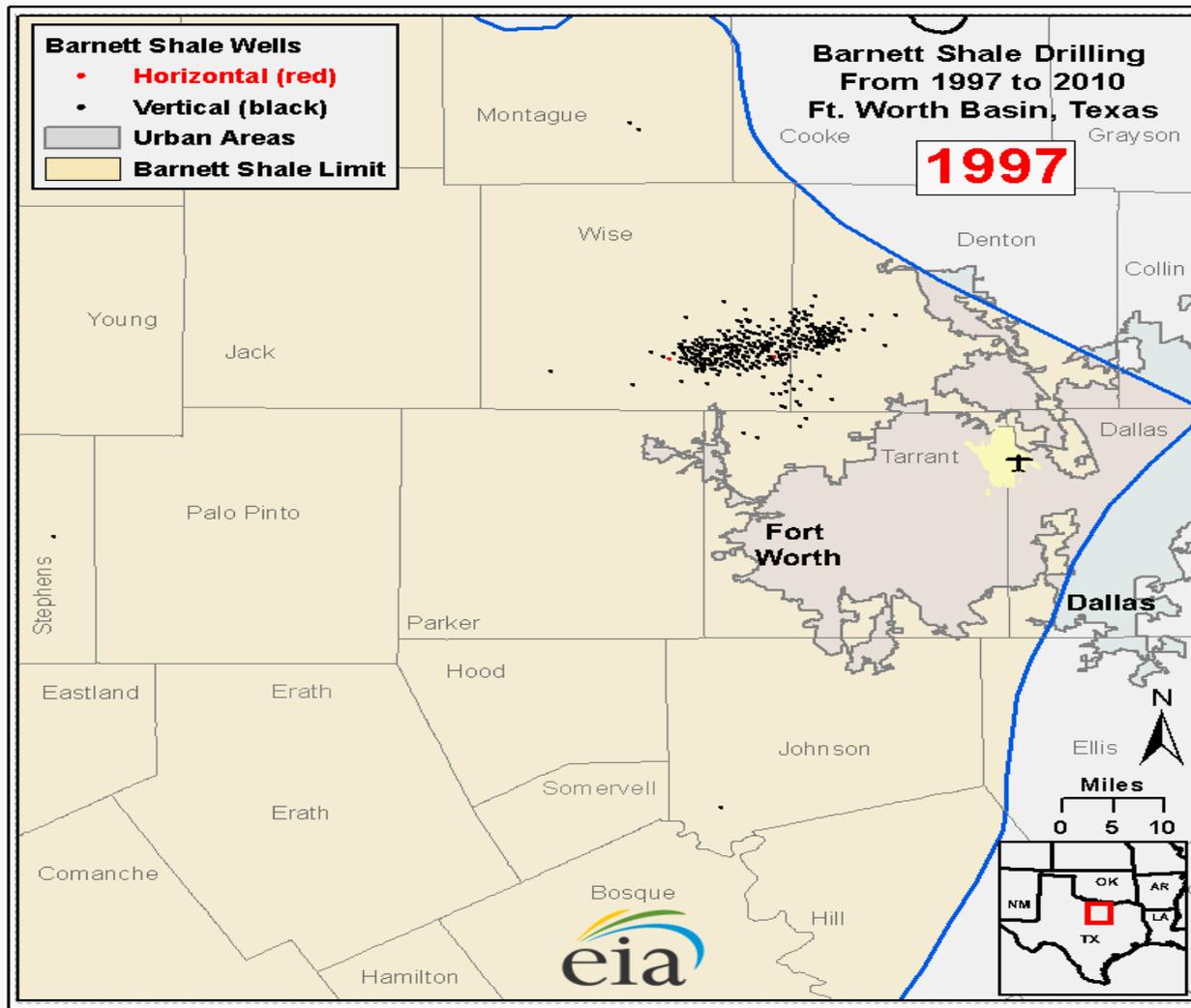
USA: Fracking's Rapid Development

- 2000 there were **26,000** fracked wells, **7%** of the U.S. total gas production (US EIA)
- 2015 there were **300,000** fracked wells, **67%** of gas output. (US EIA)
- Increased potential for impacts
- Massive water use: each well frack uses roughly **2-8 million gallons**
- 10's or 100's of wells in each shale play
- **Lag in data** collection
- Delay in evidence of health impacts
- No long studies on public health, environmental quality, biodiversity, and ecosystem health



<http://www.edlc.org/cases/tackling-new-threats/frackings-risks-to-health-and-the-environment/>

Barnett Shale (Texas) drilling growth 1997-2010



Source: U.S. EIA, 'Technology Drives Natural Gas Production Growth from Shale Gas Formations,' *Today in Energy* (July 12, 2011). <http://www.eia.gov/todayinenergy/detail.php?id=2170>

Access to Information: Lack of Transparency

- Halliburton Loophole
- Chemical disclosure – potential mystery ‘cocktail’ effects
- Non-Disclosure Agreements
- Voluntary disclosure: <https://fracfocus.org>



<http://www.frackcheckwv.net/2014/07/02/letter-of-dr-paulson-to-pa-dep-on-fracking-impacts-on-children/>

Environmental Impact Assessment/Study

- Assess potential environmental consequences of project or plan **before** deciding to proceed
- To ensure that all potential impacts are identified and **environmental damage is prevented or mitigated**
- Iterative: process involves **scoping**; **baseline study**; **impact prediction**; **impact assessment and analysis of impact significance**; **mitigation if necessary** → **EIS and nontechnical summary**

Environmental Impact Assessment



Two case studies: California and New York



Source: Bay Nature Magazine/Emily Underwood

GAS DRILLING IN THE MARCELLUS SHALE IN NEW YORK STATE



Source: <https://kms01.wordpress.com/maps/>

New York Case Study

- EIA mandated by NY State Environmental Protection Act
- Did **seven** year Environmental Impact Assessment (following State Environmental Quality Review)
 - **Had moratorium in place throughout the review**
- Did Public Health Impact assessment: Health Commissioner found 'significant uncertainties'
- Delaware River supplies water for **15.6 million** people (DRBC)
- One of the key differences was the amount of **feedback**— over **260,000 public comments** received, which took a long time to respond to and incorporate
- Concluded review on June 29th, 2015 → **BAN on HVHF**

California Case Study

- EIA mandated by state's Senate Bill No. 4
- California conducted **one** year EIA
- No **Health Impact Assessment** conducted
- Environmental groups criticized **EIA report**: lack of critical information on the **lifecycle effects** and overly narrow objectives
- Natural Resource's Agency commissioned independent review by state's Council on Science and Technology (CCST) but released after final **Environmental Impact Statement**
- EIA concluded and certified on July 15, 2015 → **Fracking can proceed relatively unabated**

Case study findings:

- In both USA and UK, fracking is regulated within an **existing framework** that was not developed **specifically** for this technology and its potential impacts, so **EIA's** are an important step in identification and regulation of impacts.
- **New York's** thorough, **seven-year review** concluded that due to **gaps in available data**, potential impacts from fracking cannot be avoided or mitigated with current knowledge and technology, and led to a **statewide ban**.
www.health.ny.gov/press/reports/docs/high_volume_hydraulic_fracturing.pdf
- **California's study took only one year**, and concluded that a majority of the environmental and health impacts could be “**reduced to a level of less than significant.**” However, considering the **knowledge gaps** identified by the CCST report (not included in the final EIS) and in other studies, California's Department of Conservation cannot **definitively** conclude that negative impacts of fracking can be minimized or prevented
switchboard.nrdc.org/blogs/ggoodstefani/californias_final_fracking_eir.html
- The fact that these states followed different procedures for evaluating environmental risk, shows the result of a **lack of federal regulation governing risk and impact management**. These two cases demonstrate the difficulty in regulating hydraulic fracturing due to the **patchwork of federal, state, and local regulations** in the USA.

Case Study Questions

- Why do you think the two states varied so differently in their decision-making?
- To what extent do you think states should be left to regulate fracking and related processes, individually?
- How can we account for “subjectivity” and politics in the EIA process?
- Compare the two case studies—how important do you consider the role of public participation to be?
- How can we (and should we?) detach emotion and politics from reasoned policy- and science-based decision-making ?
- What might be the pros and cons of a distinct federal regime for the regulation of fracking?
- In the above cases, EIA is regulated under *environmental* law (NEPA 1969, and state implementing legislation) and fracking is regulated under *energy* law (Energy Policy Act 2005). To what extent do you think this might create conflict for decision-makers?
- Under NEPA, federal agencies have to create an EIS, to scope, and evaluate all potential environmental impacts and alternatives for projects that could “significantly affect the quality of the human environment.” Referring to the latter part of this sentence, to what extent does the word *human* affect the level of scrutiny that we ought to apply to the regulation of fracking?
- If we do not have all available and conclusive evidence as to risks to health and environment associated with fracking, should we approve or ban the processes? Discuss.

See Aczel, M.A., Makuch, K.E. (2018) **Environmental Impact Assessments and Hydraulic Fracturing: Lessons from Two U.S. States**, Case Studies in the Environment

<http://cse.ucpress.edu/content/early/2017/12/17/cse.2017.000638>

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- <https://vimeo.com/44367635>
- <http://www.merchantsofdoubt.org>

Thank you!

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