

The climate change researcher Jesse Ausubel says "If we want to minimise the rape of nature, the best energy solution is [increased efficiency, natural gas with carbon capture, and nuclear power](#)".

But if you listen to the talk about fracking, you get the impression that everyone who cares about the environment must be against fracking. Actually hydrofracking is a GOOD thing for the environment, relative to the alternatives. Here's why.

First, there's a great deal of misinformation in the anti-fracking stuff. When I hear some dramatic accusation against fracking, I check it by finding out how the other side defends themselves. Over and over, I've found anti-fracking claims to involve exaggeration, twisting of the facts, or outright lies.

The July 2011 preliminary [environmental impact statement](#) by the New York Department of Environmental Conservation (DEC) is online. DEC thought fracking should be allowed in New York state, since adverse impacts can be prevented or adequately corrected. DEC proposes to prohibit fracking in some sensitive areas, such as the NYC and Syracuse watersheds, and to allow it within 500 feet of a private water well, only with the landowner's permission.

The Gasland movie generated a lot of anti-fracking sentiment. But Don Siegel, a geologist at Syracuse University who specializes in contaminant transport in groundwater systems, says about Gasland: "Every major point that was presented in that movie, from the burning water, to the town that was contaminated by benzene ... has been shown by the science to be categorically wrong". He thinks the anti-fracking claims are way overblown. John Hanger, the head of the Pennsylvania Department of Environmental Protection, called the Gasland movie "fundamentally dishonest".

Somebody's water lighting on fire looks very impressive in the Gasland movie. But methane in well water happens naturally. According to Colorado regulators, out of 28 complaints of methane in well water, [only one had methane from fracking](#). Of the three wells mentioned in Gasland, only in the Ellsworth well was the methane partly a result of gas drilling.

Methane in the water has to be prevented by proper casing of the wells. If somebody's water lights on fire, their well is probably not properly cased and needs to be redone. Methane in the water is harmless anyway, unless there's really a huge amount of it, then it could be a fire hazard. Also, if somebody gets methane in their water, and there's no fracking going on, you aren't going to hear about it. If it happens after fracking, the anti-frackers may make a movie of it and promote it widely. So there's an obvious bias in what you hear about. There are probably many people with bad, outdated wells, who would like to get somebody else to fix them, like the company that's doing the fracking. Some other anti-fracking claims:

"Fracking causes earthquakes."

Fracking does cause microseismic events, i.e. very small earthquakes. However, DEC's environmental impact statement says that they won't be strong enough for anybody to feel them, or to damage infrastructure.

A woman in a video I saw blamed her father's cancer on fracking! And the interviewer didn't even question this! Never mind that cancer is the second most common cause of death. People do get cancer, fracking or no. But they want a convenient scapegoat, and fracking serves well.

"The drilling companies keep the ingredients of their fracking fluid secret. It contains carcinogens like benzene etc."

Actually, fracking is regulated by the state. Whether the drilling companies have to publicize the ingredients of the fracking fluid depends on the state. In NY State, DEC is planning to post fracking fluid ingredients for each well on a website, as explained in the draft [EIS](#). Drilling companies have sometimes in the past used nasty chemicals like benzene, but they are avoiding that now, because of intense public scrutiny.

"Used fracking fluid is going to be used to salt the roads in winter".

The only reference I found to doing that was in West Virginia. Their defense was that the fracking fluid was no worse than what it replaced, they had checked it for various chemicals and the levels were below allowable limits, and they were limiting the amount to be used on the road. It doesn't sound so outrageous once you learn the details, does it? There *are* environmental regulations about what can be put on the roads, although maybe the regulations aren't strict enough.

"Fracking is going to turn our beautiful natural areas into a industrial wasteland".

New York State is about 47,000 square miles in area. DEC estimates about 1,600 new fracking applications/year. That's one fracking site (if approved) for every 30 square miles per year. Most people would probably not notice that the fracking was happening.

"Fracking causes global warming because of methane leaks. Methane is a powerful greenhouse gas, causing > 20 times more global warming than CO2."

This could be a serious issue. It's hard to know how much methane is released to the atmosphere during fracking. Howarth [claims](#) that shale gas could actually be worse for global warming than coal. However, there are many [problems](#) with his paper, and a study by the National Energy Technology Lab estimates the global warming potential of natural gas to be about [50% that of coal](#).

Howarth mentions many ways to prevent methane leaks, and it looks like EPA will be requiring some of those methods. On July 28, 2011 they proposed [requiring drillers to capture VOC's and methane](#) that would otherwise leak from fracking wells. EPA is currently reviewing the environmental impact of fracking.

So far, gas seems much cleaner than coal, in many different ways.

"The gas drillers have dollar signs in their eyes"

Of course they do ... Fracking would bring a lot of money into New York State, and this is not something to lightly dismiss. Money gives people the privilege to make choices. Getting sustainable would mean revolutionizing our economy, and it's going to cost a LOT of money.

Now for the larger context of fracking:

People in the United States use an average of 250 kWh/day of energy. That includes government and industrial use, as well as personal use, and it will probably go up in the future. Where is this energy going to come from?

Even if you aren't personally using natural gas, you're using it indirectly. The main source for NYSEG electric power is natural gas, see <http://www.nyseg.com/GivingBack/intheenvironment/envdisclosure.html>. Natural gas is also used to make fertilizer for agriculture to grow food.

Natural gas is likely to become much more important for electricity generation in the future, since it produces only 58% as much CO2 as coal does, to make the same amount of electricity. See <http://www.scientificamerican.com/article.cfm?id=where-will-the-us->

[get-its-electricity-in-future](#). Unless someone comes up with a new technology to scrub the CO2 out of the emissions from coal plants, natural gas is going to be important in cutting down on our CO2 emissions. Global warming is an environmental disaster in the making, and it's completely crucial to prevent it.

When you ask people who are against fracking, where they expect to get the energy from that they use so abundantly, they usually will say blithely, "We should develop renewable energy". However, we are very unlikely to get much of our energy from renewable sources in the next 25 years or so. See the online book [Sustainable Energy without the Hot Air](#) for a fact-based dream of our sustainable energy future. It's by David Mackay, a physics professor at Cambridge. It's very quantitative; he gives references for everything he says, often online, and he explains his calculations. He's not pushing a particular point of view, but his results are cold water splashed on dreams of converting to renewable energy. The actuality will probably look more

http://www.eia.gov/pressroom/presentations/newell_04272011.pdf, which has a chart of USA projected energy consumption out to 2035, that shows our consumption of natural gas, oil, and coal going UP, not down.

David Mackay shows that if we're to quit fossil fuels, most of our energy would have to come from solar or nuclear power; other sustainable energy sources just can't produce that much.

Solar power right now has the disadvantage that it's very expensive, see <http://www.solarbuzz.com/solarindices.htm>. Right now it would cost about 86 trillion dollars to supply the United States' energy need with solar panels: we use 250 kWh/day/person, there are 310 million people in the US; large scale solar power costs about \$5/peak watt; solar illumination is equivalent to about 4.5 hours peak sunlight per day. That doesn't include money to maintain it all, or financing, or building the infrastructure to distribute the power. The United States national debt is about 14 trillion dollars.

Technological advances may make solar energy much less expensive in the next few decades - but that isn't something you can bet on!

Even if solar power becomes much cheaper, it would still have a huge disadvantage: a huge area would have to be covered with solar cells. David MacKay calculates that to generate the 250 kWh/day that people in the USA use, for 500 million people, would require a solar farm the size of Arizona! Solar panels on the roofs won't do it, because there isn't enough roof area. If you had 450 sq ft of solar panels on your roof, you'd be generating about 15 kWh/day. The environmental impact from generating our energy from solar power would dwarf the environmental impact from fracking. Environmental groups have sued to stop solar farms, because they take up land that's needed by endangered species. See

<http://morgansolar.wordpress.com/2011/01/10/environmentalists-a-new-challenge-to-utility-scale-solar/>

It would also be a GIANT construction project to generate solar power or wind power on a scale to replace our fossil fuel use. It would use HUGE amounts of raw materials; far more than to generate the same energy with nuclear reactors. Renewable energy is diffuse. Nuclear reactors or fracking wells generate a lot of energy without taking up much space, so as large-scale energy sources, they are green.

Another big disadvantage of many renewable energy sources is that they're intermittent.

Without an efficient way to store large amounts of energy, solar power has to be supplemented by fossil fuels at night.

Barry Brook, an Australian ecology professor, started out believing that renewable energy was the answer to global warming, but became pro-nuclear when he thought more about it. His series "Thinking Critically about Sustainable Energy" is available at <http://bravenewclimate.com/category/tcase/>. The site <http://bravenewclimate.com> has a lot of useful info about nuclear power.

The worries about nuclear power are: nuclear waste, enabling proliferation of nuclear weapons, and nuclear accidents. There's a new nuclear reactor design, the [integral fast reactor](#), that would generate waste that would only be radioactive for a few centuries, not tens of thousands of years. It uses 99.5% of the uranium in the fuel, as opposed to <1% in current nuclear reactors, so there's less than 1/200 the amount of nuclear waste. The fuel is reprocessed on-site, which reduces the risk that terrorists might get hold of it. This design isn't yet ready for commercial use; that might take a decade or two.

The risks from nuclear power have been very much overestimated. Coal ash is radioactive, and people near coal-fired power plants are exposed to more radiation than people who live near nuclear reactors. People think that nuclear power is horribly dangerous, and coal is dirty but safe. But so far, coal has killed 4000 times as many people as nuclear power! See <http://ecopolproject.blogspot.com/2011/05/coal-related-deaths-are-higher-than.html>

Nuclear power has the opposite problem from solar or wind power: it's hard to turn a nuclear reactor down, so you have to do something with the extra energy at night! But as Jesse Ausubel [points out](#), the nuclear reactors could be decarbonizing methane at night. If we manage to avoid disaster from global warming, nuclear power will probably be how we do it. France gets most of its electricity from nuclear power. They don't have the negative attitude about it that we do. They make money by exporting cheap electricity to the rest of Europe. They started building nuclear reactors after the 70's oil shocks. They didn't want to be vulnerable to the Middle East and other unstable countries. Which is crucial for us too. See http://en.wikipedia.org/wiki/Nuclear_power_in_France.

I've shuddered at pictures of nuclear power plants: those giant squat sinister stacks, where ugly toxic things happen. Yet I wonder: is this a trained reaction from growing up in America and listening to the propaganda of the left? Nuclear power was pretty much killed in America because of public attitudes. If it hadn't been, we'd be in a much better energy situation now, and in a less dangerous situation with global warming. Maybe we wouldn't have any need to do fracking now.

What happened with nuclear power is a warning for anti-frackers: Be careful what you ask for, you might get it! And cause all sorts of negative effects. In the United States people don't trust the government or the experts; they don't trust DEC and EPA to regulate fracking well. This much mistrust is harming us.

Natural gas can be a bridge to a sustainable energy future, since it's a relatively clean fossil fuel. It takes about ten years to build a nuclear reactor, and it would probably take decades to build enough of them to provide most of our energy. So natural gas is important for energy independence and to mitigate global warming.

As David Mackay [points out](#), electricity is very important for sustainable energy in the future. Converting fuel energy to electricity and then using the electricity to provide heating with a heat pump, is a much more efficient use of fossil fuels than is burning

them directly for heat. Electric cars are more energy-efficient than gas-powered cars, because electric motors are more energy efficient. Electric cars are getting closer to being practical, with recent advances in battery technology. And the electricity could come from a cleaner source, like natural gas, solar power or nuclear power. From a global warming point of view, the electric car is better even if the electricity is generated by fossil fuels.

We are running up against hard limits in this century. The oil reserves are running out, the price of oil is going to be going up, and we're very dependent on oil, not having developed nuclear power. The world population is going WAY up; the people in it are wanting more energy, and more and more countries are getting nuclear bombs. I've read that this century will be a time of increasingly fierce competition for resources. And that most of the wars in this century will be resource wars. So, energy independence is absolutely crucial for the United States. We do not want to get into resource wars, especially since they could become nuclear resource wars! And natural gas is very important for our energy independence. As one politician said, the anti-frackers apparently prefer that we send young people away to die for foreign oil, rather than having gas drilling nearby.

How likely is it that we'll get through the 21st century without a nuclear bombing? We need to do everything we can to promote peace!

Energy conservation is not a way out of this dilemma. Even if we managed to cut our energy use in half - which would mean a lot of sacrifices that people won't want to make - we still couldn't get by purely on renewable energy. If we used 1/10 the energy we do and had a Third World standard of living, perhaps we could.

Fracking is finally bringing some of our energy production back to our backyards. And people really, really hate that. It's as if there were open-air slaughterhouses by the side of the freeway, on the way to work, and it would ruin the pleasure of steak for dinner. They would rather get their energy from offshore drilling, where truly catastrophic accidents can occur a mile under water, or in some faraway land populated by dispensable dark-skinned people. They hide this reality from themselves with dreams of renewable energy. Maybe if people saw the consequences of their energy use right around them, in the industrial activity of fracking, they'd be less wasteful.

If we import energy from some other less wealthy country, maybe the energy company will destroy the environment there; they'll surely try to save money by not being very scrupulous, and if the locals need that money they'll have to accept it. Better to get our energy here, with good environmental regulations.

The positive side of anti-fracking is that if it partially succeeds, it will help ensure that fracking is done safely and considerately. But NIMBYism succeeds more often when privileged people do it. And in this case, it could do serious harm to the United States if it succeeds in banning fracking.

Why have people focused on the possible environmental dangers of fracking, when there are so many far more significant dangers? The possibility of water pollution from fracking fluids does not compare to the danger of nuclear holocaust that may result if we remain reliant on foreign oil. It doesn't compare to heart attacks, which are the leading cause of death in the United States and highly preventable. It doesn't even compare to the environmental devastation and the 50,000 deaths per year from cars. So why are so many lawns festooned with red and black satanic anti-fracking signs, literally demonizing

fracking? Cui bono?

People prefer to protest things that don't involve personal sacrifice. Fracking makes a good demon, because people don't see that banning it has a downside, unless they directly work in the industry or lease their land for drilling. Meat, cars, salt, cholesterol and saturated fat don't make good demons, because people enjoy them and can make a personal choice not to use them. Big companies make good demons, because you can vilify them even while you support them by buying their products (like gasoline or electricity). People resent having money sucked out of them at the gas pump, without direct pleasure in return.

The media LOVES a good scare! Fracking is a lovely scare, because it's going to happen right in our area, and big demonic companies do it. The media has to constantly come up with novel, startling news to grab people's attention, so they are willing to make alarming allegations, even if supported by flimsy evidence. Actually fracking seems to be a reasonably safe industrial process. It can cause environmental damage if done badly and it needs oversight from regulators; but if done well it would have environmental advantages. But the media loves to paint a very dark and scary picture.

When I see something demonized, I look for a truth that is being suppressed. I think it's important to do fracking, and to develop nuclear power in a big way.