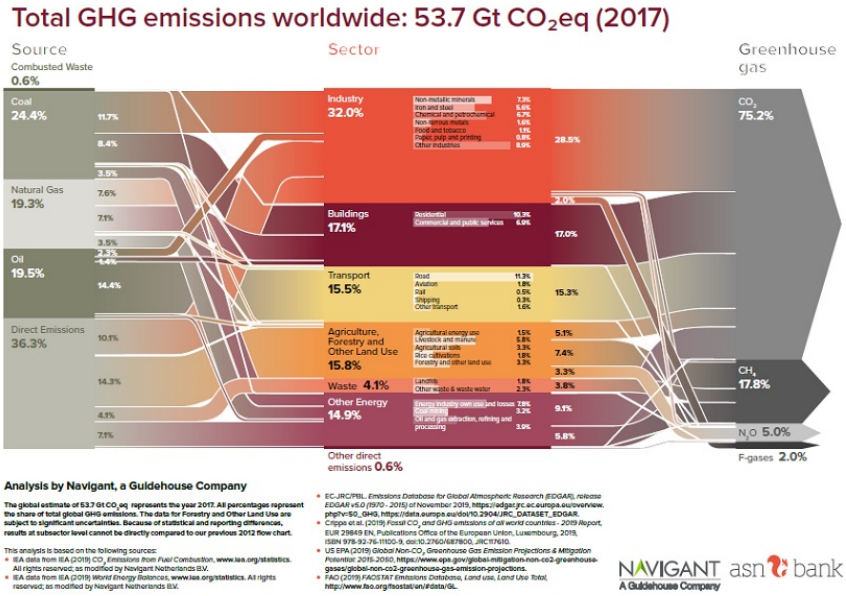
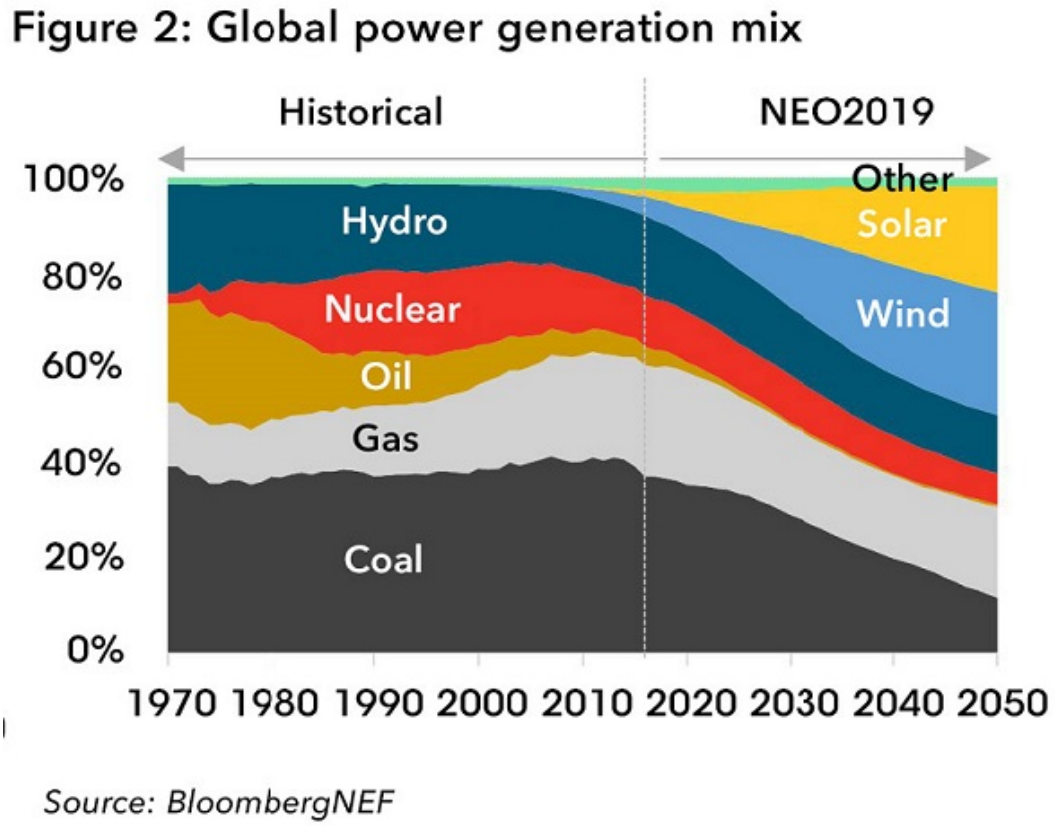
Natural Gas Revisited (Again) - Part Two



I wrote the other day about some of the manifest benefits of natural gas in our economies. There are also, without question, many negatives. Let me count the ways here. I also, however, want to note that there are ways to capitalize on gas in our transition to fully decarbonized energy economies. I'll do that in a third post.

The graphic here shows pretty unequivocally that the presence of gas – the principal component of which is methane (CH_4) – is a **big** contributor to the annual greenhouse gas loading that has been pushing our climate system to the brink. That's a consequence of the combustion of gas in our electrical and industrial power plants; the burning of gas for heating our living and working spaces as well as our water; and for cooking; in transportation to a certain degree; but also from "fugitive methane" along the path from mining to processing and transportation. (Methane is also released from landfills, rice paddies, and livestock production – this being the single-biggest source overall.) We are in a climate crisis and we need to understand the role that every one of the "well-mixed greenhouse gases" depicted above, as well as other climate pollutants like black carbon and ground-level ozone all play. (See this to understand how much each of these has driven radiative forcing over time.) Knowing what we know at this late date, there is no question whatsoever that it is critical to reduce climate pollution.

As I noted in the previous post, we are coming into the full bloom of a transition to renewables and other clean tech that the great Hermann Scheer called "a transition from a fuels-based economy to a technology-based economy." We can't build that out fast and far enough. But we are nevertheless still reliant on fossil fuels. As noted in the previous post, natural gas has been a key contributor to the reduction of the carbon footprint from power in the US because it has been displacing coal. That trend appears to have plateaued for the moment but, as also noted, renewables are hard charging and will eventually, even by the conservative estimates of the US DOE and the IEA, eclipse gas in power. Globally, BNEF, for one, predicts an even quicker pace.



This **is** happening. It's not a mirage. *Reinventing Fire*, which I use as a textbook for my Clean Tech class, has six main criteria to gauge the success of energy systems:

- affordability,
- technical feasibility,
- security,
- reliability,
- environmental responsibility and public health,
- public acceptability

Renewables, and particularly distributed renewable energy resources, hit on all cylinders.

Okay, but we're still talking about natural gas. Let's stipulate, based on what has just been said, that natural gas, along with coal, oil, and nuclear, are going to be largely supplanted by renewables across all energy systems: power, industry, buildings, and transportation. The problem now is how do we handle the gas we're still using?

Beyond the burning of it for productive purposes, but also flaring because of safety concerns at oil rigs, fugitive methane emissions are the hardest nut to crack. This has been recognized as a real problem for decades but it has only come into full view as so significant a concern in recent years. The excellent Inside Climate News wrote recently about the extent of the problem of fugitive methane. The problem exists all along the supply chain and even though the Obama

Administration put forth a comprehensive strategy to cut methane, we know how the present cabal of fossil fuel industry lackeys in the executive branch for the past three years have been working relentlessly to reduce if not actually eliminate regulation. And the problems associated with fugitive methane from oil and gas production may be even worse than we have been calculating, according to some new research just published in Nature.

Can we solve this problem or, at the very least, significantly ameliorate it? Absolutely. It will take, however, a serious commitment on the part of industry and strengthened regulatory regimes, if not from the federal government in the near term, certainly from the states and in other countries across the world. The International Energy Agency, for example, promulgated its "Golden Rules" for gas production several years back.

As a former public servant working in an environmental agency, and as a student of the environmental movement for a very long time, I know that regulation **works**. Since the advent of the Clean Air Act in the US in 1970, we have reduced the six criteria air pollutants by 74% while GDP has expanded by 275%. Many of my sisters and brothers in the environmental movement may not believe that government has the lead role in driving progress on environmental conservation but it's just a fact. Government, to be sure, is subject to pressure, as it should be, from the public and from the many superb environmental organizations that have spearheaded innovations in policy since the coming of the modern environmental era, but it's the agencies that do the heavy lifting.

Industry, too, feels the pressure. "Climate change fears put US gas utilities on defensive" is a recent headline from the FT. Some communities, Berkeley for instance, have banned gas hookups in new construction. As we saw, though, in the previous post, gas is still very much a source of power and heat in the US. Better to use solar hot water for example? Or ground source heat pumps for heating and cooling? To be sure. But how is the penetration so far of these? Globally, not so much as of now. Modern renewables are supplying about 10% of global heating and cooling demand. We've got a way to go yet – and, again – and it can't be emphasized enough: Policy needs to radically improved.

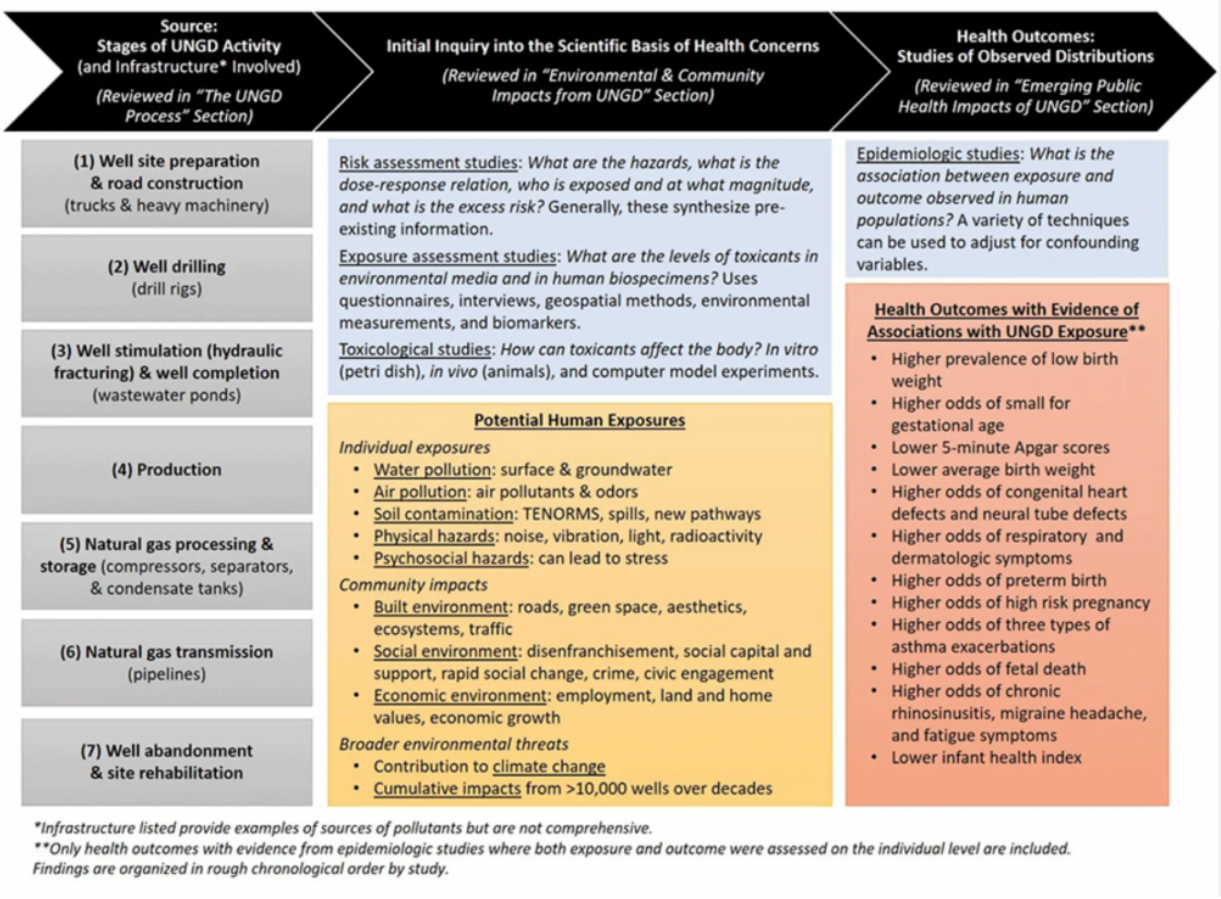
So industry is right to point out, as the spokesperson for the American Gas Association (AGA) does at the FT article, that we should be wary "of efforts to remove natural gas from the system with very little regard to cost, scale, options and the current environmental contributions that natural gas is making today and will continue to make in the future." The AGA has a new "Climate Change Position Statement" in which they make a number of "commitments" that should go a long way to reducing the problems of fugitive emissions. It is certainly in the best interests of industry to not only capture the gas in order to sell it – that's their business model after all – but also to mitigate the growing discontent of environmentalists and others around gas production and use.

Much of the fear and loathing of the gas industry is centered around the highly controversial practice of using fracking and horizontal drilling technologies to extract previously very difficult-to-access gas deposits trapped in shale rock deep underground. It was simply not technically feasible nor cost-effective in most cases to get at these rich sources of gas with conventional technology. (See the previous post to see how this is done now.) Much of the concern around

getting at shale gas in this manner was catalyzed by the 2010 documentary "GasLand." I might get into trouble if I said that the filmmaker, Josh Fox, had credibility issues, but I wouldn't be wholly out on a limb. Greenwire, one of several excellent news wires from E&E News, did an extensive analysis of what the film asserts back in 2011. There are a fair number of flaws in the film. Josh Fox himself has recently been the subject of controversy because The Public Theater cut his one-man show short because of violations of the theater's code of conduct.

In any event, however you view that particular movie, there are indeed problems with fracking. Drinking water would be and certainly is a principal concern. EPA conducted an extensive study over several years during the Obama Administration. Many people were frustrated in the extreme that it was inconclusive on the extent of how drinking water had been impacted. The study identified a number of potential pathways for contamination such as spills, improper disposal, and injection of waste fluids into groundwater, among others. But, "It was not possible to calculate or estimate the national frequency of impacts on drinking water resources from activities in the hydraulic fracturing water cycle or fully characterize the severity of impacts. Our inability to quantitatively determine a national impact frequency, or to characterize the severity of impacts, however, did not prevent us from qualitatively describing factors that affect the frequency or severity of impacts at the local level." (See the summary fact sheet.)

However, independent researchers have been gathering data all along. Environmental Health News reported on this last year. One of the lead authors said "What we found pushes back against the narratives we often hear that say we don't know enough about the health impacts yet. We have enough evidence at this point that these health impacts should be of serious concern to policymakers interested in protecting public health." The study itself, Environmental Health Concerns From Unconventional Natural Gas Development, was broad and deep, the authors examining hundreds of studies, none of which "have been solicited and paid for by the natural gas industry." The study looked at not only water quality concerns, but also those relative to air pollution, physical hazards, climate change, and toxic chemicals. This graphic is an excellent depiction of the findings on both potential and identified outcomes.



It's not a pretty picture. But, as I said at the outset, I would like to get at some of the ways that we can both minimize these dire public health impacts – like focused, adequately funded regulatory oversight – and also put natural gas in the medium term to better use – some ways, like cogeneration, pointed out in the first post – all while **phasing out gas** over the long term. I'll try doing that in the next and last post in this series.