To: The members of the Committee on Energy and Technology
From: Stuart Blood, Thetford Center
Date: 23 April 2019
Subject: Testimony on H.51, H.175, H.214

Overview

I am making these comments in support of bills H.51, H.175, and H.214. I have read the documents provided by Tom Evslin of NG Advantage and Tom Murray of Vermont Gas Systems in advance of their April 11 testimony. I am providing my testimony to correct misinformation that they presented to the Committee. I will start with a summary of some the inaccuracies and follow that with a more detailed rebuttal including citations to scholarly and government publications.

A summary of the inaccuracies in testimony by Mr. Evslin and Mr. Murray

- Mr. Evslin's claim that natural gas results in a "net GHG reduction of 25%" for customers is ***not true***. While CO2 emissions were reduced for customers switching from oil, total greenhouse gas emissions (GHG) actually increased.
- Mr. Murray's selective inclusion of a single graphic from the "2014 EDF Methane Study", suggesting that VGS's system does not contribute to climate change, is a deceptive ***mischaracterization*** of the study.
- Mr. Evslin's assertion that the EPA and the UN have concluded that fugitive emissions of methane do not cause global warming is ***false***.
- Mr. Evslin's claim that fracking is safe is ***false,*** as has been demonstrated by hundreds of scholarly articles in peer-reviewed journals, as well as by the EPA.

Comparing greenhouse gas emissions from natural gas to those of other fuels

Mr. Evslin's claim of a "net GHG reduction of 25%" for customers who switch to natural gas erroneously conflates CO2 emissions with total greenhouse gas (GHG) emissions. A large and growing body of research indicates that the global warming effects of natural gas over the entire life cycle from extraction, transportation and burning is, in fact, ***larger than for either heating oil or propane***. That is because unburned methane, the primary component of natural gas, has a global warming effect 86 times greater than CO2 over the 20-year timeframe after it leaks into the atmosphere[1]. "Fugitive emissions" of methane result from leaks and routine venting during extraction and transportation. The extraction method known as "fracking" causes higher emissions than "conventional" extraction.

Mr. Murray's a slide titled "2014 EDF Methane Study: VGS Has Efficient System" is irrelevant and deceptive. I encourage the committee to look at EDF's own description of the study's results[2]. In an article titled "Major studies reveal 60 percent more methane emissions", the opening sentence reads:

> "Extensive research led by EDF shows methane leaks in the U.S. are **a far greater threat** than the government's estimate suggests." [Emphasis in the original.]

Natural gas as a climate change driver

Mr. Evslin says this about the claim that fugitive emissions cause global warming: "Not happening according to EPA and UN Climate Commission". That statement is false. There is no such organization

[1] IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Chapter 8 "Anthropogenic and Natural Radiative Forcing" table 8.7 page 714 (published in 2014), https://www.ipcc.ch/report/ar5/wg1/

[2] Environmental Defense Fund, "Major studies reveal 60 percent more methane emissions", https://www.edf.org/climate/methane-studies

as the "UN Climate Commission". However, the UN's Intergovernmental Panel on Climate Change (IPCC) has published the values of the global warming potential (GWP) for various GHGs, including methane, which I cited in the section above. The EPA accepts the IPCC's results as fact:

> "The EPA considers the GWP estimates presented in the most recent IPCC scientific assessment to reflect the state of the science. In science communications, the EPA will refer to the most recent GWPs. The GWPs listed above are from the IPCC's Fifth Assessment Report, published in 2014."[3]

In 2011, Cornell Professor Robert Howarth and colleagues published the first peer-reviewed analysis of the GHG footprint of "shale gas", i.e. gas extracted by fracking. In a follow-up paper in 2014[4], Howarth reported that the earlier paper "spurred a large increase in research and analysis, including several new studies that have better measured methane emissions from natural gas systems." He concluded:

> "Using these new, best available data and a 20-year time period for comparing the warming potential of methane to carbon dioxide, the conclusion stands that both shale gas and conventional natural gas have a larger GHG than do coal or oil, for any possible use of natural gas and particularly for the primary uses of residential and commercial heating. The 20-year time period is appropriate because of the urgent need to reduce methane emissions over the coming 15–35 years."

Note that in October, 2018 the IPCC released a report[5] that reframed the urgency assumed by Howarth, four years earlier. The report "confirms that climate change is running faster than we are – and we are running out of time." The report calls for "far more ambitious action to cut emissions by half by 2030 and reach net zero emissions by 2050."

A paper published in *Geophysical Research Letters* in December, 2016 reported an updated methodology for computing "radiative forcing" and concluded that the climate warming effects of methane are 20-25% higher than those previously published by the IPCC.[6]

The take-away for the committee needs to be that the climate emergency is far more urgent than we had understood just a few years ago and that natural gas, especially fracked gas, is a greater contributor to the emergency than we had previously understood. We're out of time.

Other environmental hazards and public health risks due to fracking

Mr. Evslin disputes the well-established fact that fracking is unsafe with this extraordinary claim: "Drilling for natural gas is safer than it's ever been". The committee should treat this statement the way it would if a representative of the tobacco industry were to say, "Smoking is safer than it's ever been."

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[3] U.S. Environmental Protection Agency, "Understanding Global Warming Potentials" https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#Learn%20why

[4] Energy & Science Engineering, Howarth, "A bridge to nowhere: methane emissions and the greenhouse gas footprint of natural gas", http://www.eeb.cornell.edu/howarth/publications/Howarth_2014_ESE_methane_emissions.pdf

[5] "Statement by the Secretary-General on the IPCC Special Report Global Warming of 1.5 ºC", https://www.un.org/sg/en/content/sg/statement/2018-10-08/statement-secretary-general-ipcc-special-report-global-warming-15-%C2%BAc

[6] Geophysical Research Letters, "Radiative forcing of carbon dioxide, methane, and nitrous oxide: A significant revision of the methane radiative forcing", https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2016GL071930

Between 2009 and 2015 at least 685 papers were published in peer-reviewed scientific journals relating to the potential impacts of fracking on water quality, air quality and public health. A 2016 paper published in the journal *PLOS One* categorized all the available data during that period[7]. The abstract says, "This paper demonstrates that the weight of the findings in the scientific literature indicates hazards and elevated risks to human health as well as possible adverse health outcomes associated" with fracking.

Fracking pollutes drinking water.

The EPA concluded in a report released in December 2016[8] that fracking has contaminated groundwater and surface water, including "contamination that made private drinking water wells unusable". The hydraulic fluid that is forced into boreholes at high pressure is a mixture of water and chemicals, some very toxic or carcinogenic. When that fluid makes its way into an aquifer through fractures in the bedrock, water wells that use that aquifer become polluted. In many cases the homeowner has no way to know what is contaminating the well. Even the EPA doesn't know all of the chemicals pumped into fracking wells because their information comes mostly from the gas and oil industry, which has no interest in full disclosure. The toxicity of the fluid is likewise not fully understood. The EPA reported that it was only able to find toxicity data "for 98 of the 1,084 chemicals that were reported to have been used" in fracking

People living near fracking are more likely to get sick

According to peer-reviewed research from the University of Pennsylvania and Columbia University, "Hospitalizations for heart conditions, neurological illness, and other conditions were higher among people who live near" fracking wells[9] The study found that people with zip codes near fracking sites "were predicted to have a 27 percent increase in cardiology inpatient prevalence rates for each year this specific active well density existed compared to Wayne County residents where there is no drilling." The study also found a higher rate of "hospitalizations for skin conditions, cancer, and urologic problems" for people living near active wells.

Fracking has been correlated with low birth weights and long-term health problems

Surface water contamination and air pollution can occur when the fracking fluid, mixed with naturally occurring material, is forced back up the borehole. That fluid, which is stored in ponds, contains benzene and material from the shale bed, including radionuclides and toxic metals like arsenic, barium, and strontium. Research from the University of Pittsburgh[10] concludes that mothers living near fracking wells in Pennsylvania are 34 percent more likely to have babies with low birth weight. As the paper points out, "benzene in air has been associated with adverse birth outcomes." Low birth weight predisposes babies for health problems immediately and later in life.

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[7] Hays, J., Shonkoff, S., "Toward an Understanding of the Environmental and Public Health Impacts of Unconventional Natural Gas Development: A Categorical Assessment of the Peer-Reviewed Scientific Literature, 2009-2015", http://dx.doi.org/10.1371/journal.pone.0154164

[8] U.S. EPA. "Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States (Executive Summary)", https://www.epa.gov/hfstudy

[9] News release: "Hydraulic Fracturing Linked to Increases in Hospitalization Rates in the Marcellus Shale Region, According to Penn Study", Penn Medicine, https://www.pennmedicine.org/news/news-releases/2015/july/hydraulic-fracturing-linked-to

[10] News release: "Lower Birth Weight Associated with Proximity of Mother's Home to Gas Wells", University of Pittsburgh Schools of the Health Sciences, https://www.upmc.com/media/news/plos-one

Recommended additional sources of information

- **Doctors call for state ban on drilling and fracking** (*Pittsburg Post-Gazette*) http://www.post-gazette.com/local/region/2016/10/27/Doctors-group-calls-for-moratorium-on-fracking-in-Pennsylvania/stories/201610270226

- **Too Dirty, Too Dangerous: Why health professionals reject natural gas** *(Physicians for Social Responsibility)* Feb 2017 https://www.psr.org/blog/resource/too-dirty-too-dangerous/