These Papers Give the

Reasons

Use of Natural Gas Must be Reduced

1. **Lost but not forgotten: The hidden environmental costs of compensating pipelines for natural gas losses.** Research Paper No. 2015-01, April 2015, by Romany Webb, Kay Bailey Hutchinson Center for Energy, Law, and Business, University of Texas at Austin School of Law and McCombs School of Business, Austin, TX 78705. https://www.naesb.org/pdf4/r16009_attachment3.pdf

   Major Points:
   Methane has a much higher global warming impact during its lifetime in the atmosphere than does carbon dioxide. After 12 to 20 years after release into the atmosphere, most (99%) of the methane molecules have reacted with oxygen and UV light in the atmosphere to form carbon dioxide and water vapor. Each molecule of CH_4 oxidizes to form one CO_2 and two H_2O molecules. The practice of averaging effects of methane released into the atmosphere over 100 years produces deliberately misleading results by masking the enormous global warming impact during the first 20 years after release it takes for 99% of the methane to be converted to carbon dioxide and water vapor. The carbon dioxide remains in the atmosphere for centuries.

   The existing natural gas system leaks methane from the well head, from the processing plant, and from all the pipelines used to transport the methane from the well head to the customer.

   Federal policy classifies leaks not by size but by proximity to people. Large leaks in remote regions have low priority and are not repaired.

   Since the Supreme court case, West Ohio Gas Company v. Public Utilities Commission. 249 U. S. 63 (1935), pipeline companies are not penalized for delivering less gas than they receive. Leak loss is **mis-identified as** legitimate changes in volume due to pressure and temperature variances.

   Recommendations:
   A. Lost and unaccounted-for gas should be reported based on a standard definition and calculated using a constant methodology.
   B. The cost recovery framework should be reformed to incentivize **reduction** of lost and unaccounted-for gas.
   C. Pipeline operators' claimed gas loses should be carefully scrutinized.
   D. The federal and state regulations should be establish a minimum allowed leak rate that is decreased on a published time schedule.

2. **Methane Emissions from the Natural Gas Industry, Volume 9: Underground Pipelines**. GRI-94/0257 26, EPA – 600/R-96-080i, June 1996. Prepared for Energy Information Administration (U. S. DOE). Prepared by National Risk Management Research Laboratory, Environmental Protection Agency. https://www.epa.gov/sites/production/files/2016-08/documents/9_underground.pdf

This paper describes the tests performed in 1992 that established the national natural gas system leak loss rate at 1.4% +/- 0.5% of gross natural gas production. That inaccurate number is still in use today.

3. **Methane Math: How Cities Can Rethink Emissions from Natural Gas**. Prepared by San Francisco Department of the Environment, November 2017.
   https://sfenvironment.org/download/methane-math-how-cities-can-rethink-emissions-from-natural-gas

   Major points:

   - The accounting practice of a 100-year lifetime of methane in the atmosphere reduces by 67% the actual impact of methane (80 times as powerful a GHG as carbon dioxide). That inaccuracy distorts the short-term impact of methane leak reduction and the effectiveness of cap and trade. We should use a 20-year lifetime for methane in the atmosphere, which is more representative of its actual lifetime in the atmosphere.
   - Methane loss to leaks exceeds the traditionally used 1.4% of total gas extracted. Independent studies conclude the national average is 4.52% with some instances as high as 12%. These higher leak rates give natural gas a higher warming effect in the short-run (20 years) than burning coal.

   A 10-point plan called for:

   1. Changing accounting practices.
   2. Communicate the importance of leaks.
   3. Disclose leaks.
   4. Collect more local data on natural gas leak rates.
   5. Reduce leaks in local distribution.
   6. Incentivize leak repair. (Remove pipeline company compensation for gas lost in transmission).
   7. Prioritize decarbonization.
   8. Support fuel switching.
   9. Switch to renewable natural gas if fuel switching cannot be done.
   10. Create and investment plan for balancing gas infrastructure replacement costs, emission reduction goals, and climate change adaption.

4. **Oil and Natural Gas Sector Leaks**; Report for Oil and Natural Gas Sector Leaks Review Panel, April 2014, Prepared by U.S. EPA Office of Air Quality Planning and Standards (OAQPS)
   https://www.ourenergypolicy.org/wp-content/uploads/2014/04/epa-leaks.pdf

   This paper reviews the sources of natural gas leaks in the US and estimates the total gas lost to leaks. It reviews methods for detecting leaks. The cost and pay-back analysis of repairing leaks is estimated.

5. **Improving Methane Emissions from Natural Gas Transmission and Storage; August 2018**
   https://www.ingaa.org/File.aspx?id=34990&v=56603504
   This white paper supplements those commitments by explaining the sources of methane emissions for the interstate natural gas transmission and storage sector, which is comprised of a network of

high-pressure pipelines, compressor stations, and storage assets (salt caverns and reservoirs), as well as the basis for the methane emissions commitments that INGAA members voluntarily adopted.

6. **Air Pollution Associated with Natural Gas and Oil Operations**, by Ramon A. Alvarez and Elizabeth Paranchos, June 2012;
   https://www.edf.org/sites/default/files/AWMA-EM-airPollutionFromOilAndGas.pdf
   This paper describes the averaging of methane warming effects over 100 years and the air pollution resulting from natural gas released in the atmosphere. It recommends EPA regulation to decrease the adverse effects.

7. **Methane Leaks from Oil & Gas Exploration: A Health Nightmare**, by Vijay Limaye, December 2018;
   https://www.nrdc.org/experts/vijay-limaye/methane-leaks-oil-gas-exploration-health-nightmare

   This blog describes the health risks of continued leaking natural gas into the atmosphere in the regions of highest gas well drilling. It suggests EPA regulations can economically reduce the health hazards while also reducing global warming.