Executive Summary

The greenhouse gas impacts of proposed natural gas pipeline buildout in New York

Prepared for Earthworks by PSE Healthy Energy
February 2018

New York has set a target to reduce greenhouse gas emissions by 40% from 1990 levels by 2030 [1], yet there are numerous proposals to expand fossil fuel infrastructure across the state. In this analysis, we estimate the potential increase in greenhouse gas emissions from the buildout of ten proposed natural gas pipelines and associated compressor stations in New York State. Our estimates include both fugitive methane emissions from the proposed natural gas infrastructure itself as well as the carbon dioxide (CO_2) and lifecycle methane emissions associated with the increase in natural gas consumption implied by this pipeline buildout. While we do not analyze whether sufficient demand actually exists to justify the addition of these new pipelines, our results indicate that construction of the proposed pipelines and utilization at average rates would undermine the state's greenhouse gas emission reduction efforts.

Proposed natural gas infrastructure in New York State as of late 2017 includes ten pipelines, five compressor stations, five meter and regulator stations, and four compressor station upgrades. These projects currently range in status from proposed to under construction to on hold due to permit denial by the New York Department of Environmental Conservation. Six of the pipelines are meant to deliver natural gas to New York, two to New England or Canada, and two to both New York and out-of-state locations. Our analysis indicates that if these pipelines and compressors are built, in-state fugitive methane emissions from natural gas transmission infrastructure would increase by 8%. If we assume the pipelines meant to deliver natural gas to New York are utilized at the same average rate as existing pipelines—and existing pipelines maintain their current flow rates—the natural gas supplied to New York would increase by 23%. The annual greenhouse gas footprint of this natural gas, inclusive of combustion and lifecycle methane emissions (assuming a methane loss rate of 2.5% of dry gas production[1]), would be 31 million metric tons CO_2-equivalent (CO_2e) on a 20-year timescale and 24 million metric tons on a 100-year timescale—an increase in New York's energy-related greenhouse gas emissions of 12% and 11% respectively, all other sources being held constant.

New York could achieve its 40% greenhouse gas reduction target—the equivalent of reducing 2015 emissions by roughly 26-30%—along numerous pathways, although all feasible approaches require reductions in both petroleum and natural gas use. In **Figure E1**, we show the state's energy-related greenhouse gas emissions in 1990, 2015, and in various 2030 scenarios, inclusive of methane leakage at three different rates: a low estimate based on the U.S. Environmental Protection Agency's 2017 Greenhouse Gas Inventory (1.4% of dry production in 2015); a medium estimate of 2.5% reflecting summary estimates from the scientific literature [2, 3]; and a high estimate of 4.0%, in line with the upper range reported elsewhere [3, 4], all using a 20-year global warming potential for methane of 87 [5]. In all 2030 scenarios we assumed that coal use, which has declined rapidly in recent years, falls to zero. These 2030 scenarios include a) proportional emission reductions from petroleum and natural gas to achieve the 40% target; b) proportional emission reductions in each sector (e.g. residential, transportation) prioritizing cuts to oil use before natural gas within each sector; c) petroleum reduction that would be required if proposed pipelines are built and used; and d) flat oil consumption with emissions increasing in accordance with pipeline buildout. Scenarios **a** and **b** present reasonable pathways to achieve 2030 targets. Scenario **c** shows that in order to reduce direct carbon dioxide emissions to 60% of 1990 levels, New York would have

[1] See full report for a discussion of methane leakage rates.

to reduce petroleum use by 67% from 2015 levels by 2030 if the proposed pipelines are built and natural gas use increases accordingly, effectively eliminating oil from residential, commercial, and industrial sectors and reducing oil use in transportation by 57%; if a 2.5% methane leakage rate is included in greenhouse gas targets, petroleum use would have to be cut by 83%. If petroleum consumption stays flat as in scenario **d**, New York State's energy-related greenhouse gas emissions would increase by 12% from 2015 levels under pipeline buildout and utilization.

These greenhouse gas emission estimates change based on various assumptions. If the pipelines currently on hold due to permit denial are not built, the implied increase in emissions would fall by over 40%. If we calculate targets using the 100-year global warming potential for methane rather than the 20-year global warming potential, it is only slightly easier to achieve the 2030 target in the case of pipeline buildout—requiring 77% petroleum reductions rather than 83%. However, methane leakage rates across the natural gas lifecycle are highly uncertain. If methane leakage is at the high end of the range examined here—4%—then petroleum use would have to be nearly eliminated by 2030 in order to achieve emission reduction targets if the pipelines are built and used. Assigning responsibility for methane leakage also requires some jurisdictional questions for greenhouse gas inventories. For example, for natural gas transported through New York, should the fugitive methane emissions from that infrastructure be included in New York's greenhouse gas accounting or in the state or country that actually uses the natural gas? And finally, we did not calculate potential demand for the gas to be delivered by these pipelines. If this demand does not exist, then pipelines may be underutilized, resulting in lower overall emissions than estimated here but also potentially inefficient investments.

Under all reasonable assumptions, however, New York needs to reduce its natural gas consumption in order to achieve its 2030 greenhouse gas targets—meaning that building out new pipelines and increasing the natural gas supply to the state would either greatly undermine these emission reduction efforts, or result in inefficient investments in infrastructure that will be greatly underutilized by 2030 if the state succeeds in achieving its climate goals.

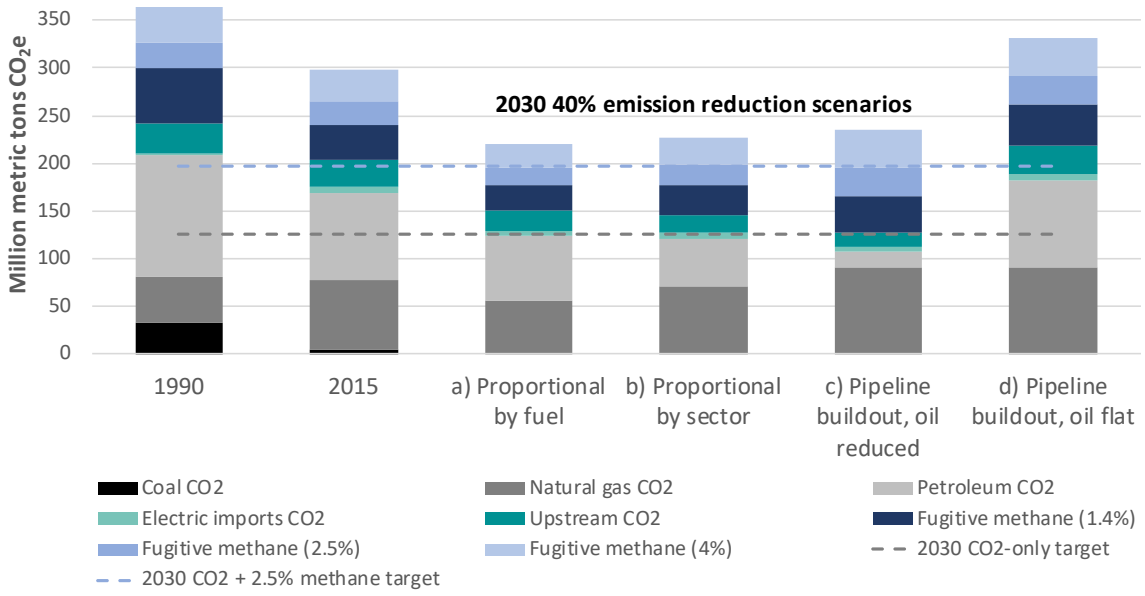

Figure E1: New York's energy-related greenhouse gas emissions in 1990, 2015, and 2030 scenarios. Scenarios include a) proportional emission reductions from oil and gas, b) proportional emission reductions by sector, favoring oil reductions before gas, c) oil cuts required in case of pipeline buildout, and d) oil use flat and pipeline buildout. The 2030 target lines reflect 40% emission reductions from 1990 levels based on CO_2 emissions alone (gray) and inclusive of 2.5% lifecycle methane leakage, using a global warming potential of 87 (blue).

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