

9/5/2019

Comments on the Draft Energy Master Plan  
Issued by the New Jersey Board of Public Utilities on June 10, 2019

I am providing these comments on behalf of the Sierra Club. I also volunteer as a Toxicology Advisor for the New Jersey Chapter of the Sierra Club. Although I am not a climate scientist, I am very concerned with the threatening impact of climate change on our state's invaluable resources, as well as on public health and safety. I applaud the Board of Public Utilities (BPU) in recognizing the adverse impact from climate change, the need to reduce greenhouse gas emissions and focusing the EMP on transitioning to clean energy sources.

However, recent peer-reviewed studies about methane emissions raises the following concerns:

1. Rising global atmospheric levels of methane
2. Determination of emission inventory levels
3. Stakeholders commitment to reducing emissions

Because of these concerns, the BPU should adopt a moratorium on the fossil fuel infrastructure projects that are in progress or planned in New Jersey, as well as other actions as described below.

### **Rising Global Atmospheric Levels of Methane**

The global atmospheric level of methane, the second most important greenhouse gas,<sup>1</sup> has unexpectedly been rising over the past decade.<sup>2,3,4</sup> According to scientists, if this is allowed to increase, the 2015 Paris Agreement target of less than a 2°C change will be nearly impossible to achieve.<sup>5</sup>

The production and use of shale gas may be a significant contributor to the increasing atmospheric levels of methane, according to a recently published study.<sup>6</sup> This study points to the commercialization of shale gas production, especially in North America, being a bigger

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<sup>1</sup> Etmnan, M., Myhre, G., Highwood, E. J., & Shine, K. P. (2016). Radiative forcing of carbon dioxide, methane and nitrous oxide: A significant revision of the methane radiative forcing. *Geophysical Research Letters*, **43**, 12,614–12,623. <https://doi.org/10.1002/2016GL071930>

<sup>2</sup> National Oceanic Atmospheric Administration. Global Monitoring Division. Global CH4 Monthly Means. [https://esrl.noaa.gov/gmd/ccgg/trends\\_ch4/](https://esrl.noaa.gov/gmd/ccgg/trends_ch4/)

<sup>3</sup> S.E. Mikaloff Fletcher, H. Schaefer. Rising methane: A new climate challenge. *Science* 07 Jun 2019: Vol. 364, Issue 6444, pp. 932-933. DOI: 10.1126/science.aax1828

<sup>4</sup> Nisbet, E. G., Manning, M. R., Dlugokencky, E. J., Fisher, R. E., Lowry, D., Michel, S. E., et al. (2019). Very strong atmospheric methane growth in the 4 years 2014–2017: Implications for the Paris Agreement. *Global Biogeochemical Cycles*, **33**, 318–342. <https://doi.org/10.1029/2018GB006009>

<sup>5</sup> Ibid.

<sup>6</sup> Howarth, R. W.: Ideas and perspectives: is shale gas a major driver of recent increase in global atmospheric methane?, *Biogeosciences*, **16**, 3033–3046, <https://doi.org/10.5194/bg-16-3033-2019>, 2019.

factor than biogenic sources such as wetlands or livestock that have previously been reported to be major contributors.<sup>7,8,9</sup>

To assist government leaders to make effective decisions to reduce emissions, the Intergovernmental Panel on Climate Change (IPCC) advised in October 2018 that deep reductions in the emissions of all greenhouse gases are needed, with emission reductions of 35% or more for methane by 2050 relative to 2010 levels, if we are to keep below a 1.5°C change.<sup>10</sup> Achieving this goal will be especially challenging as methane levels are currently rising rather than decreasing.

Although climate scientist may research and debate how much methane escapes from oil and gas enterprises versus biogenic sources, all would agree that the levels of methane must be reduced. Because methane from wetlands and other sources such as forest fires may be extremely difficult to control, the focus should be on minimizing the emissions from sources that can be managed such as the fossil fuel, agriculture and waste industry sectors. All these sectors must make a concerted effort to reduce their methane emissions.

The EMP mentions replacing leaky fossil fuel infrastructure and adopting energy efficiency programs to reduce greenhouse gas emissions. Surprisingly, the EMP does not address the planned or in progress oil and gas projects that will expand the state's fossil fuel infrastructure. The potential for this expansion to exacerbate atmospheric methane levels should be considered and addressed in the EMP.

### **Determination of Inventory Emission Levels**

To determine national inventories of methane emissions, a bottom-up approach is currently used that involves measuring or modeling emissions of individual methane emitters such as petroleum and natural gas wells, landfills, and cattle farms. The values are then extrapolated to regional and national scales. In contrast, a top-down approach uses aircraft or tall towers to measure atmospheric methane concentrations and models to account for atmospheric

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<sup>7</sup> Schwietzke, S., Sherwood, O.A., Bruhwiler, L.M.P., Miller, J.B., Etiope, G., Dlugokencky, E.J., Michel, S.E., Arling, V.A., Vaughn, B.H., J.W.C White, and Tans, P.P., Upward revision of global fossil fuel methane emissions based on isotope database, *Nature*, 538, 88-91, doi:10.1038/nature19797, 2016.

<sup>8</sup> Schaefer, H., Mikaloff-Fletcher, S.E., Veidt, C., Lassey, K.R., Brailsford, G.W., Bromley, T.M., Dlugokencky, E.J., Michel, S.E., Miller, J.B., Levin, I., Lowe, D.C., Martin, R.J., Vagn, B.H., and White, J.W.C., A 21st century shift from fossil-fuel to biogenic methane emissions indicated by 13CH<sub>4</sub>, *Science*, 352, 80-84, doi:10.1126/science.aad2705, 2016.

<sup>9</sup> J. Wolf, G.R. Asrar, T.O. West. Revised methane emissions factors and spatially distributed annual carbon fluxes for global livestock. *Carbon Balance and Management* 12: article 16. 2016. <https://doi.org/10.1186/s13021-017-0084-y>

<sup>10</sup> IPCC, Summary for Policymakers. In: *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*, Intergovernmental Panel on Climate Change, 2018. <https://www.ipcc.ch/sr15/>

transport in estimating regional levels. The IPCC advises that atmospheric analysis be used to verify the bottom-up estimates.<sup>11</sup>

The bottom-up analytical method has consistently underestimated the amount of natural gas emitted,<sup>12,13,14</sup> Bottom-up analysis is often plagued by sparse and unreliable activity data, poorly characterized emission factors with a high degree of uncertainty, time consuming and costly measurement programs, and unaccounted-for emissions.<sup>15,16</sup>

The EMP does mention that the NJDEP is updating its greenhouse gas emissions inventory to account for increasingly sophisticated modeling and measuring techniques. Hopefully, this update will include a top-down analysis of methane emissions. As noted by climate scientists, a top-down approach provides climate relevant data without the problem of limited accuracy in bottom-up estimates and may better integrate national estimates into a global verifiable framework.<sup>17</sup>

The NJDEP and BPU should use a coordinated top-down and bottom-up approach towards setting policy goals and remediation efforts as advised in a recent National Academy of Science report.<sup>18</sup> As suggested by climate scientists, policies may be established based on top-down measurements, with bottom-up measurements used for identifying emission hotspots.<sup>19</sup> This approach should be discussed with other stakeholders such as the fossil fuel industry, federal agencies, and mid-Atlantic state leaders.

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<sup>11</sup> IPCC, Task Force on National Greenhouse Gas Inventories, 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 2, Energy  
<https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html>

<sup>12</sup> E.A. Brubert-Adam, R. Brandt. Three considerations for modeling natural gas system methane emissions in life cycle assessment. *J. Cleaner Production* 222, 760-767, 2019. <https://doi.org/10.1016/j.jclepro.2019.03.096>

<sup>13</sup> Alvarez, R. A.; Zavala-Araiza, D.; Lyon, D. R.; Allen, D. T.; Barkley, Z. R.; Brandt, A. R.; Davis, K. J.; Herndon, S. C.; Jacob, D. J.; Karion, A.; Kort, E. A.; Lamb, B. K.; Lauvaux, T.; Maasakkers, J. D.; Marchese, A. J.; Omara, M.; Pacala, S. W.; Peischl, J.; Robinson, A. L.; Shepson, P. B.; Sweeney, C.; Townsend-Small, A.; Wofsy, S. C.; Hamburg, S. P. Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain. *Science* 2018, 361 (6398), 186–188. doi:10.1126/science.aar7204

<sup>14</sup> T.L. Vaughn, C.S. Bell, C.K. Pickering, S. Schwietzke, G.A. Heath, G. Pétron, D.J. Zimmerle, R.C. Schnell, D. Nummedal. Temporal variability largely explains top-down/bottom up difference in methane emission estimates from a natural gas production region. *PNAS* 115(46); 11712-11717. 2018.  
[www.pnas.org/cgi/doi/10.1073/pnas.1805687115](http://www.pnas.org/cgi/doi/10.1073/pnas.1805687115)

<sup>15</sup> IPCC, Task Force on National Greenhouse Gas Inventories, 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Vol. 2, Energy <https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html>

<sup>16</sup> A. Leip, U. Skiba, A. Vermeulen, R.L. Thompson, Rona L. A complete rethink is needed on how greenhouse gas emissions are quantified for national reporting. *Atmospheric Environment* 174: 237-240, 2018.  
<https://doi.org/10.1016/j.atmosenv.2017.12.006>

<sup>17</sup> A. Leip, N-16

<sup>18</sup> National Academies of Sciences, Engineering, and Medicine 2018. Improving Characterization of Anthropogenic Methane Emissions in the United States. Washington, DC: The National Academies Press.  
<https://doi.org/10.17226/24987>.

<sup>19</sup> A. Leip, N-16

## Stakeholder Involvement

An important stakeholder in the EMP is the Federal government, as federal funding helps to support state transportation projects, programs and strategies. The federal government also regulates the collection and measurement of greenhouse gas emissions for the national inventory for which policy decisions are made.

However, since coming into office, the Trump administration has made sweeping policy changes on a wide range of climate-related programs.<sup>20</sup> For example, this administration has withdrawn from the Paris Agreement, no longer contributes to the Green Climate Fund, replaced the Clean Power Plan with the coal-friendly Affordable Clean Energy rule, and replaced the CAFÉ automobile standards with a much less stringent fuel economy standard.

For methane emissions, this administration has proposed to weaken a requirement that companies monitor and repair methane leaks and to repeal a restriction on the intentional venting and “flaring,” or burning, of methane from drilling operations. Also, methane emissions from animal wastes will no longer have to be reported under the Superfund legislation.<sup>21,22</sup>

The BPU should consider and anticipate these changes in setting policies and expectations. For example, the national greenhouse gas emissions inventory data that is regulated by the EPA may have a much higher degree of uncertainty. Relaxation of greenhouse gas emission standards will make reaching emission reduction goals that much more difficult to achieve. And eliminating regulations that would require oil and gas companies to repair leaks will potentially increase emissions of methane and other greenhouse gases.

Another important stakeholder is the state of Pennsylvania, as most of the natural gas will come from the Marcellus shale deposits in this state. When considering methane emissions from the proposed gas infrastructure projects in New Jersey, a complete impact assessment must include the emissions at the wells, and distribution via the pipelines and compressor stations that feed into the New Jersey system. Although bottom-up analysis will take place, a top-down approach should also be incorporated. For this to occur, cooperation with the Pennsylvania leaders and PA DEP will be required, if not already done.

## Moratorium

Empower NJ, a coalition of over 80 environmental, community and faith organizations, has advocated for Governor Murphy to declare a moratorium on fossil fuel infrastructure projects

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<sup>20</sup> S. N. Seo. Economic questions on global warming during the Trump years. J Public Affairs. 2019;19:e1914. <https://doi.org/10.1002/pa.1914>

<sup>21</sup> *ibid*

<sup>22</sup> L. Friedman, New York Times, August 29, 2019. E.P.A. to Roll Back Regulations on Methane, a Potent Greenhouse Gas.

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in New Jersey, and has provided many scientific and socioeconomic reasons.<sup>23</sup> Given the reasons provided by Empower NJ, the recent IPCC recommendations on reducing methane levels, the current science including the increasing global levels of methane that may be due to commercialization of shale gas, and deregulation of emission controls by the Federal government, a moratorium should indeed be declared until the BPU and DEP fully understand the consequences.

Climate scientists have implored policymakers to allow science to guide in their decisions.<sup>24</sup> Given the current state of the science, the need to reduce greenhouse gas emissions has become especially urgent. As noted by these scientists “There will always be those who hide their heads in the sand and ignore the global risks of climate change. But there are many more of us committed to overcoming this inertia. Let us stay optimistic and act boldly together.” Unfortunately, the Trump administration has ignored the science and has adopted an Orwellian de-regulatory policy for short-term industry gains at the expense of public health and safety now and for future generations. The BPU with Governor Murphy and other state policymakers must act boldly for New Jersey, and together with leaders from other states, for our country.

Respectfully submitted,

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On behalf of the New Jersey Chapter of the Sierra Club

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<sup>23</sup> Empower NJ, 2018. FIGHTING CLIMATE CHANGE IN NJ: The Urgent Case for a Moratorium on all Fossil Fuel Projects. [http://empowernewjersey.com/wp-content/uploads/2019/02/EmpowerNJ\\_Report\\_190211\\_Color.pdf](http://empowernewjersey.com/wp-content/uploads/2019/02/EmpowerNJ_Report_190211_Color.pdf)

<sup>24</sup> Figueres C, et al. (2017) Three years to safeguard our climate. Nature 546:593–595. <https://www.nature.com/news/three-years-to-safeguard-our-climate-1.22201#/b1>