

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities

DG 17-152
Least Cost Integrated Resource Plan

Clark Data Requests - Set 5

Date Request Received: 8/16/19
Request No. Clark 5-17

Date of Response: 8/23/19
Respondent: Paul J. Hibbard

REQUEST:

Please provide, in detail, all of Paul J. Hibbard's research, analyses and assumptions concerning the projected transitioning rate of energy users to green energy sources from now through 2037/2038.

RESPONSE:

Mr. Hibbard's testimony does not include or involve research or analyses concerning the projected transitioning rate of energy users to green energy sources from now through 2037/38.

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Clark Data Requests - Set 5

Date Request Received: 8/16/19
Request No. Clark 5-7

Date of Response: 8/23/19
Respondent: Paul J. Hibbard

REQUEST:

Please state what global warming potential (GWP) that Paul J. Hibbard used for methane in his emissions calculations for determining the emissions impact of the Granite Bridge Project vis-à-vis the status quo or Concord Lateral Extension.

RESPONSE:

Mr. Hibbard used a GWP of 25 for methane in his analysis, see Table 10a of EPA's March 2018 "Emission Factors for Greenhouse Gas Inventories," available here, https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf.

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Clark Data Requests - Set 5

Date Request Received: 8/16/19
Request No. Clark 5-9

Date of Response: 8/23/19
Respondent: Paul J. Hibbard

REQUEST:

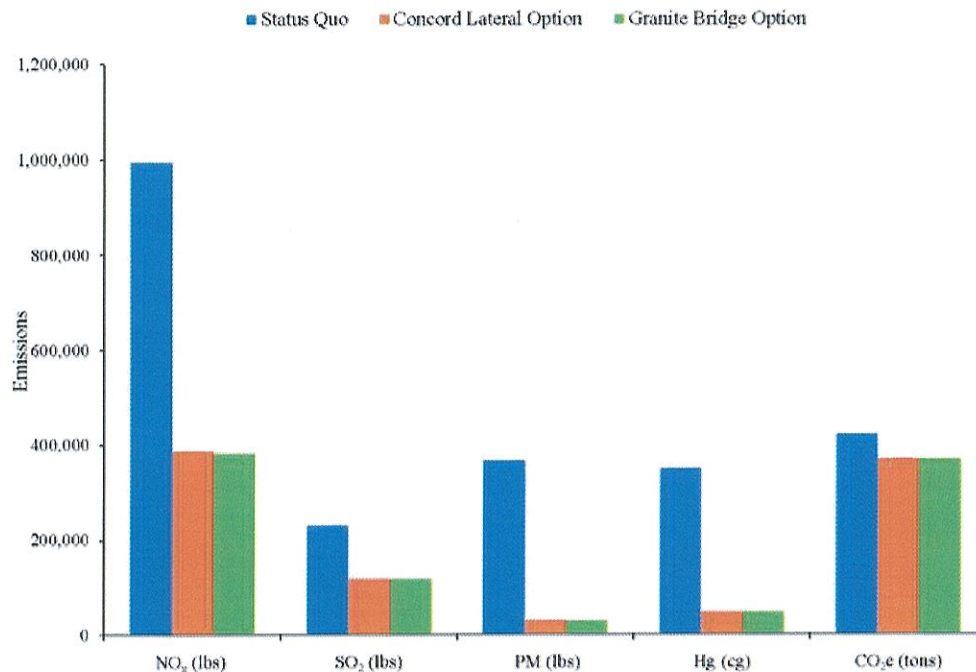
Please state how, if at all, the use of a GWP of 84 for methane for all of Paul J. Hibbard's emissions calculations and assessments would change them (including relevant tables and figures) and Mr. Hibbard's conclusions.

RESPONSE:

Mr. Hibbard recognizes there is some disagreement over GWP factors used in calculations of CO₂ equivalent emissions. However, Mr. Hibbard considers it most relevant and appropriate to apply a GWP of 25 for methane - which is a 100-year GWP - as it is the standard and default for policy and regulatory proceedings to use 100 year GWPs. See the sources under Table 10a of EPA's March 2018 "Emission Factors for Greenhouse Gas Inventories," available here, https://www.epa.gov/sites/production/files/2018-03/documents/emission-factors_mar_2018_0.pdf. Also see the description of the 24.5 GWP of methane on page 70 of the New Hampshire Climate Action Plan, prepared by the New Hampshire Department of Environmental Services, March 2009, available at https://www.des.nh.gov/organization/divisions/air/tsb/tps/climate/action_plan/documents/nhcap_final.pdf.

Nevertheless, a calculation may be performed as a sensitivity using a different GWP for methane. In this case, the use of a 20-year GWP for methane of 84 as a sensitivity changes the magnitude of CO₂ equivalent emissions in Mr. Hibbard's results, but does not qualitatively change the outcome and would not affect the conclusions of Mr. Hibbard's analysis. Even with the use of an 84 GWP potential for methane, the Granite Bridge Option is still advantageous relative to the Concord Lateral and Status Quo options. See the figures and tables reporting CO₂ equivalent emissions in Mr. Hibbard's testimony reproduced using an 84 GWP for methane, below:

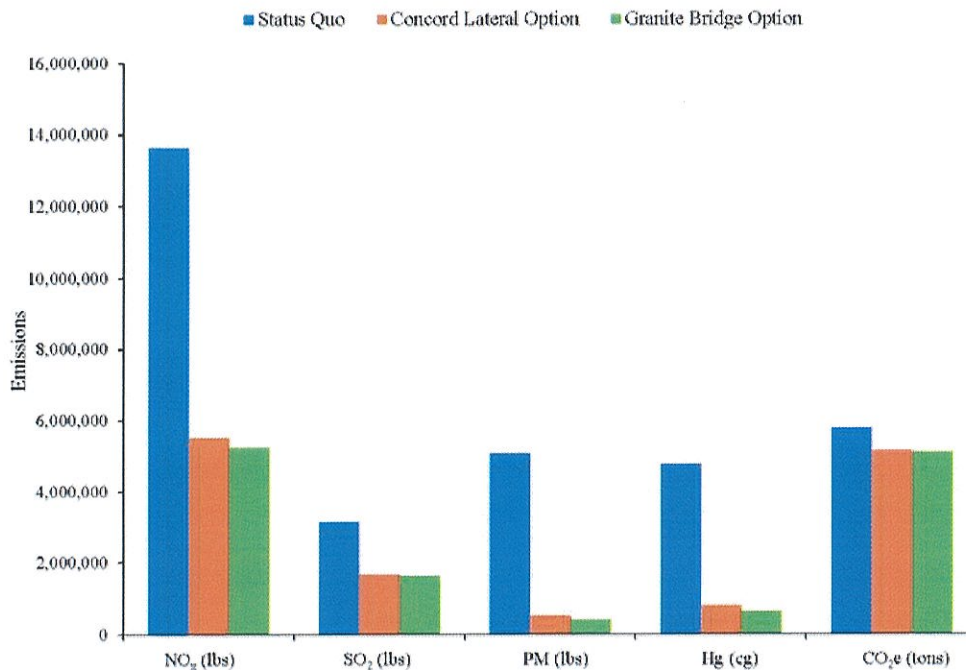
Sensitivity Figure 2: Short-run emissions impacts associated with total additional customers under IRP planning period - GWP of 84 for methane emissions.



Backup Table to Sensitivity Figure 2: Total short-run emissions from customers remaining on existing heating technologies compared to switching to natural gas heating technologies under the IRP planning period - GWP of 84 for methane emissions.

<i>IRP</i>	Status Quo	Granite Bridge Option	Concord Lateral Option
NO _x (lbs)	995,514	383,102	385,690
SO ₂ (lbs)	230,746	118,962	119,453
PM (lbs)	367,469	30,779	31,795
Hg (cg)	351,316	47,762	49,140
CO ₂ e (tons)	421,976	371,199	371,417

Sensitivity Figure 3: Long-run emissions impacts associated with total additional customers under long-term Granite Bridge Pipeline planning period - GWP of 84 for methane emissions.



Sensitivity Table 2: Total long-run emissions from customers remaining on existing heating technologies compared to switching to natural gas heating technologies under the Granite Bridge or Concord Lateral Expansion options - GWP of 84 for methane emissions.

GB-LR	Status Quo	Granite Bridge Option	Concord Lateral Option
NO _x (lbs)	13,629,053	5,250,732	5,521,009
SO ₂ (lbs)	3,157,123	1,630,470	1,681,805
PM (lbs)	5,062,057	421,858	527,957
Hg (cg)	4,768,887	654,623	798,470
CO ₂ e (tons)	5,771,166	5,087,590	5,110,354

Sensitivity Table 4: Annual reductions in emissions associated with reduced delivery truck traffic - GWP of 84 for methane emissions (estimates in pounds).

	235 trucks	300 trucks
CO ₂ e (CO ₂ + CH ₄)	49,603.8	63,324.0
NO _x	285.7	364.7
PM _{2.5}	6.7	8.5

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DG 17-152

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Clark Data Requests - Set 3

Date Request Received: 6/20/18
Request No. Clark 3-5

Date of Response: 7/2/18
Respondent: William R. Killeen

REQUEST:

Please see Liberty's responses to Request No. Clark 1-6, Request No. Clark 1-10, Request No. Clark 1-11 and Request No. Clark 1-12, and Attachment Clark 1-6. Should Liberty choose to inject the following natural gas supplies with sulfur, please identify the approximate amount of pounds that would be used for:

- A. The 100,000 gallons of LNG that may be stored at the Keene facilities.
- B. The 240,000 gallons of LNG that may be stored at the Lebanon facilities.
- C. The approximately 25 million gallons of LNG that may be stored at the Epping facilities.

RESPONSE:

- A. A typical level of odorant in a natural gas distribution system in the U.S. is 0.75 pounds per MMcf. Natural gas delivered via upstream transmission pipelines will typically have some level of odorant in it. In the event that it is not at the level required by the New Hampshire PUC, the Company will inject odorant to ensure these standards are met to ensure the safety of its customers. Assuming LNG were to have no odorant in it already, approximately 6 pounds of odorant would be used when vaporizing 100,000 gallons of LNG. (Please note that Scentinel® E, the odorant used by the Company, based on the manufacture specifications, contains 37% sulfur by weight. Thus, approximately 2.2 pounds of sulfur would be injected into 100,000 gallons of LNG as it is vaporized).
- B. Using the same assumptions in the response to subpart A., approximately 14.4 pounds of odorant would be used when vaporizing 240,000 gallons of LNG. (Also note, again based on the manufacture specifications, approximately 5.33 pounds of sulfur would be injected into 240,000 gallons of LNG as it is vaporized).
- C. Using the same assumptions in the response to subpart A., approximately 1,500 pounds of odorant would be used when vaporizing 25,000,000 gallons of LNG. (Also note, again based on the manufacture specifications, approximately 555 pounds of sulfur would be injected into 25,000,000 gallons of LNG as it is vaporized).



**STATE OF NEW HAMPSHIRE
OFFICE OF THE GOVERNOR**

CHRISTOPHER T. SUNUNU
Governor



June 27, 2019

Richard Husband
10 Mallard Court
Litchfield, NH 03052

Dear Richard,

Thank you for reaching out to my office regarding offshore wind energy.

My administration has taken the first steps and we are working with the Bureau of Ocean Energy Management (BOEM) to establish a task force that will facilitate the coordination and consultation among federal, state, and local governments on renewable energy options in federal waters in the Gulf of Maine. The task force will undertake a public process over the next 1-2 years, which will include multiple public hearings.

The Gulf of Maine is one of the strongest opportunities for offshore wind production in the world. Offshore turbine energy is extremely efficient and emission free, and nineteen towns in New Hampshire have sent letters of support for the project. There are also numerous potential economic benefits, including establishing supply chain infrastructure in New Hampshire for our state and the entire region. The New Hampshire Department of Business and Economic Affairs is leading the charge to make the seacoast a hub for economic development of offshore wind.

As an environmental engineer, I am dedicated to New Hampshire's long and proud tradition of responsible environmental stewardship. Please know that the wind turbines would all be located in federal waters, at least 3 miles offshore. Throughout this process, New Hampshire will be listening to other states that have moved first on offshore wind energy, and learn from their experiences in balancing clean energy and protecting the ecosystem on New Hampshire's coastline. Every part of this project will go through permitting and BOEM approval for effects on the environment.

I will continue to work towards improving renewable energy options and lowering electric rates for Granite Staters. Again, thank you for contacting my office and please do not hesitate to get in touch with my office about other issues of concern to you.

Sincerely,

Christopher T. Sununu
Governor