



**STATE OF NEW HAMPSHIRE  
BEFORE THE  
PUBLIC UTILITIES COMMISSION**

Docket No. DG 18-XXX

Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities  
Approval of Renewable Natural Gas Supply and Transportation Contract

**TESTIMONY  
OF  
KRISTINE WILEY**

September 6, 2018

THIS PAGE INTENTIONALLY LEFT BLANK

1 **Q. Please state your name, position, and business address.**

2 A. Kristine Wiley, R&D Director, 1700 South Mount Prospect Rd., Des Plaines, IL.

3 **Q. By whom are you employed?**

4 A. I am employed by Gas Technology Institute.

5 **Q. On whose behalf are you testifying today?**

6 A. I am testifying on behalf of Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a  
7 Liberty Utilities (“Liberty”).

8 **Q. Ms. Wiley, please state your educational background and professional experience.**

9 A. I have a BA in Biological Sciences from the University of Chicago. I have an MBA in  
10 Finance, Economics and Entrepreneurship from the University of Chicago Booth School  
11 of Business.

12 **Q. Have you previously testified before the New Hampshire Public Utilities  
13 Commission?**

14 A. No.

15 **Q. What is the purpose of your testimony?**

16 A. My testimony pertains to the introduction of landfill derived Renewable Natural Gas into  
17 natural gas pipelines.

1 **Q. Please state your experience with this topic.**

2 A. I have been involved in research focused on renewable natural gas (RNG) since 2007. I  
3 have managed a continuing portfolio of projects addressing biogas and RNG gas quality  
4 and integration into natural gas pipelines. These projects have focused on several topics  
5 including gas quality, improving methods for chemical analysis and real time monitoring  
6 of RNG, RNG blending into natural gas pipelines, development of company specific  
7 RNG gas quality standards, development of RNG interconnect guidelines and impacts of  
8 RNG to pipeline infrastructure and integrity, as well as end use equipment. I managed  
9 two key projects that produced guidance documents for RNG: [1] Pipeline Quality  
10 Biomethane: North American Guidance Document for Interchangeability of Dairy Waste  
11 Derived Biomethane (2009); and [2] Guidance Document for the Introduction of  
12 Landfill-Derived Renewable Gas into Natural Gas Pipelines (2012). Please see  
13 Attachment KW-1 for the Guidance Document for the Introduction of Landfill-Derived  
14 Renewable Natural Gas into Natural Gas Pipelines. I was directly involved with the  
15 collection of over 60 biogas samples from dairy farms, wastewater treatment plants, and  
16 landfills and the analysis for over 300 chemical constituents used to characterize the gas  
17 quality associated with various sources of RNG. These two projects were funded by a  
18 consortium of natural gas utilities, pipelines, and biogas developers.

19 **Q. Please summarize the conclusions of the Guidance Document.**

20 A. Seven sources of high-BTU landfill-derived renewable gas were collected and analyzed  
21 in the project. The clean-up technologies used at the landfills included: Physical Solvent,  
22 PSA (Pressure Swing Adsorption), and Gas Separation Membrane. The gas was sampled

1 in triplicate, with two sites receiving two separate sampling visits, for a total of 27 high-  
2 BTU landfill-derived renewable gas samples. From the results obtained in the 2012  
3 Landfill Study, it can be concluded that high-BTU landfill-derived renewable gas of high  
4 quality may be produced within agreed-upon tolerance specifications for introduction  
5 with natural gas supplies. These results are specific to the facilities and their gas  
6 treatment trains, which represent state-of-the-art facilities at the time of the project.

7 **Q. Does the Guidance Document evaluate any specific technologies regarding the**  
8 **conversion of landfill gas to RNG?**

9 A. The 2012 Landfill Guidance Document does not comment on or endorse specific  
10 methods or designs of cleanup technology employed to produce high quality landfill-  
11 derived renewable gas. As recommended by project sponsors, three specific cleanup  
12 technologies were investigated: Physical Solvent, PSA (Pressure Swing Adsorption), and  
13 Gas Separation Membrane. The samples collected for this project were processed using  
14 those technologies.

15 **Q. Are you aware of the equipment and technology proposed in the Liberty-**  
16 **RUDARPA, Inc., RNG project?**

17 A. I was provided the Facility Design Specifications of the proposed facility as outlined in  
18 Exhibit D of the Liberty–RUDARPA contract. Please see Attachment WJC/MES-1 for a  
19 copy of the contract and Exhibit D.

1 **Q. Is it your opinion that the technology proposed, or similar, will be capable of**  
2 **producing RNG that will meet the specifications outlined within the Guidance**  
3 **Document?**

4 A. The proposed biogas clean process is a train of technologies designed to remove major  
5 components such as carbon dioxide as well as other trace components that may be present  
6 such as siloxanes. The technologies proposed are gas processing technologies that were  
7 used in some of the RNG facilities where samples were collected for the 2012 Landfill  
8 Study. Six of the seven landfills in the 2012 study were injecting the processed gas into  
9 existing natural gas pipelines. For reference, The Environmental Protection Agency  
10 Landfill Methane Outreach Program reports there are 40 operational landfill projects  
11 producing high-BTU gas.

12 **Q. Does this complete your testimony?**

13 A. Yes, it does.