



November 2, 2019

Ms. Kathleen Theoharides, Chair
Transportation & Climate Initiative of the Northeast and Mid-Atlantic States
Georgetown Climate Center
600 New Jersey Avenue, NW
Washington, DC 20001

Dear Secretary Theoharides:

My name is Rita Hansen and I am the CEO of Onboard Dynamics, Inc., an early phase company and a spinout from Oregon State University that provides novel compression technology to enable the use of natural gas and renewable natural gas as a transportation fuel. I appreciate this opportunity to comment on the Transportation & Climate Initiative (TCI) Framework for a Draft Regional Policy Proposal and I commend TCI's goals of equity, environmental justice, non-discrimination and meaningful public participation as it develops and implements a regional policy for transportation emissions reductions.

Onboard Dynamics endorses strategies that support the transition to low-carbon transportation fuels, including geologic and renewable natural gas. Converting the Northeast and Mid-Atlantic regions' heavy- and medium-duty freight and transit transportation network to natural gas provides a readily available, proven and cost-effective solution to accelerate the transition to a low-carbon transportation future. Further, cap-and-invest program resources invested in natural gas technologies would significantly and immediately benefit all communities by maximizing the displacement of older, higher emitting trucks and buses, including those higher emitting vehicles that operate in communities that are underserved by current transportation options and overburdened by urban pollution.

Cleaner Air Starts with Cleaner Trucks and Buses

Increased use of natural gas as a transportation fuel provides immediate and significant criteria and toxic air pollutant reductions. Fact: the cleanest commercially available heavy-duty engine in the world is powered by natural gas now and for the foreseeable future. Designed, built, and manufactured in America by Cummins Westport, this engine is certified to a 0.02 g/bhp-hr. standard, making it 90 percent cleaner than the EPA's current NOx emissions requirement and 90 percent cleaner than the cleanest diesel engine. And in real-life study, these engines emitted lower NOx emissions than certified.¹

Replacing just one traditional diesel-burning heavy-duty truck with one new Ultra Low-NOx natural gas truck is the emissions equivalent of removing 119 traditional combustion engines cars off our roads. Heavy-duty equals heavy impact.

Carbon-Neutral/Negative Freight with RNG

Natural gas engines offer significant climate change benefits. Compared to diesel, natural gas engines fueled with geologic natural gas reduce CO₂ and greenhouse gas emissions by at least 12 percent. When fueled with

¹ University of California, in-use testing of heavy-duty trucks in port applications, November 2016.

renewable natural gas (RNG or biomethane) captured from agricultural, food, landfill or wastewater, even greater CO₂ and greenhouse gas benefits are achieved, up to 382 percent lower than diesel.²

The Argonne National Labs GREET model indicates that landfill RNG has 1,637 CO₂ equivalent g/GGE and geologic CNG has 8,767 CO₂ equivalent g/GGE, while the U.S. average electricity charging electric vehicles is 16,604 CO₂ equivalent g/GGE. Fueling with RNG is carbon-neutral, even carbon-negative, depending on the feed stock.³ No better commercially available and deployable alternative fuel option currently exists for the heavy-duty sector, as shown in the chart below.

CARBON INTENSITY of TRANSPORTATION FUELS (EER-Adjusted)

Transportation Fuel	Carbon Intensity	Energy Efficiency Ratio (On-road HDVs)	EER-Adjusted CI	CI Value Relative to Baseline Diesel
Baseline: Diesel - Conventional	100.45	1.0	100.45	0%
Natural Gas - Conventional	79.21	0.9	88.01	-12%
Electricity - National-Grid Average (EPA/NGVA)	196.39	5.0	39.28	-61%
Hydrogen - Landfill Biogas	99.48	1.9	52.36	-48%
Hydrogen - Conventional Natural Gas	117.67	1.9	61.93	-38%
RNG - Landfill Biogas	47.28	0.9	52.53	-48%
RNG - Wastewater Biogas	43.02	0.9	47.80	-52%
RNG - Food/Green Waste Biogas	0.34	0.9	0.38	-100%
RNG - Dairy Biogas	-254.94	0.9	-283.27	-382%

Address Noise Pollution

Natural gas vehicle technology affordably addresses noise pollution in urban neighborhoods. A U.S. Department of Energy study identified significant noise reduction benefits as a motivator for many refuse collection truck operators in accepting the technology, citing up to 10 decibels quieter than their diesel counterparts.⁴ A 2016 in-use study of diesel and CNG urban transit buses in Serbia found considerable reductions in noise pollution when powered by CNG.⁵

Invest Impactfully – Emissions Reductions using Cost Effective Solutions

Investments in Ultra Low-NO_x and Near Zero emission natural gas vehicle technologies greatly impact communities, especially the underserved and marginalized communities in metropolitan and industrial areas. With vehicle costs close to that of diesel and fuel price differentials of up to \$1.50 less than diesel

² Dependent upon RNG source. Reductions of 45% up to 382% compared to diesel; values based on CARB LCFS program data under CA-GREET 3.0.

³ California Air Resources Board, February 2017.

⁴ U.S. Department of Energy, *Case Study – Compressed Natural Gas Refuse Fleets*, February 2014.

⁵ Milojevic, Sasa, "CNG propulsion system for reducing noise of existing city buses," *Journal of Applied Engineering Science*, January 2016.

per DGE, natural gas transportation provides the largest and most cost-effective reductions in transportation-related pollutants than any other powertrain option commercially available today or near-term.⁶

UPS, Waste Management, Republic Services, Los Angeles World Airports Buses, City of Los Angeles, City of Fresno Transit, LA Metro Transit, New York's Hunts Point fleet Industries and many other fleets recognize the exponential impact of using RNG for emissions reductions and their improving business' bottom line. In May of 2019 UPS announced that it will purchase 170 million gallon equivalents over 7 years that will reduce GHG emissions by more than 1 million metric tons, and in October UPS announced the order of 6000 heavy duty NGV RNG trucks to double the size of their NGV fleet. RNG already fuels more than 32% of the NGVs in the U.S. today, and a growing number of fleets are taking advantage of vehicles that are available now at comparable life cycle costs to diesel vehicles and that provide transformational GHG and tailpipe emissions reductions.

As such, investments in RNG-fueled trucks and transit buses accessing ports, cities, and densely-populated neighborhoods are the most immediate and fiscally-responsible investment to clean our air and combat climate change. Communities get more clean vehicles having greater clean air and climate impact for the money with natural gas than with any other alternative fuel option, especially electric. No other transportation fuel is as sustainable, adaptive, and competitive across all applications and vehicle classes. And heavy-duty natural gas trucks are not demonstration science projects; they are proven, scalable, and on U.S. roads today. We will not meet emissions reduction goals or time frames without using natural gas.

Natural Gas Pays Its Way and Provides Economic Opportunity

Natural gas fueling pays into the federal highway trust fund and is ready-right-now technology. It is road-tested and backed by a mature network of manufacturers, servicers, and suppliers coast-to-coast. An established refueling infrastructure of 2,000 stations already exists.

It is also important to note that while 34 U.S. states produce geologic natural gas, the potential to produce renewable natural gas exists in every U.S. state and the District of Columbia by taking the problem of fugitive methane gas created from organic waste, capturing it, then using it to fuel traditionally heavy-carbon freight and transit transportation applications. In addition to its clean air and climate benefits, the development of RNG facilities also supports the agriculture industry with new revenue streams, addresses many cities' solid waste issues, and impacts watershed management efforts and nitrogen runoff concerns. With these positives, the demand for RNG production is growing and new RNG facility development projects are increasing rapidly.

100 % Domestic Fuels

Geologic and renewable natural gas are 100 percent domestic fuels, unlike limited electric vehicle battery components that are controlled by foreign interests and mostly sourced from conflict countries like the Democratic Republic of the Congo and China. The U.S. EPA recognizes the value of RNG and includes it in the

⁶ <https://www.ngvamerica.org/environment/>.

EPA Renewable Fuel Standard (RFS) federal incentive. Similarly, several states have implemented low carbon fuel standards (LCFS) that promote the use of RNG and other renewable fuels.

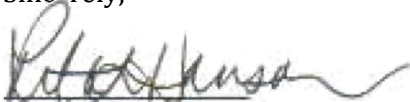
More than four in ten Americans live in communities with dangerously dirty air. According to the American Lung Association, that number continues to rise, from 125 million in 2017 to nearly 141.1 million today.⁷ Cap-and-invest program investments in natural gas vehicle technologies offer the most proven, cost-effective, and immediate way to promote a low carbon transportation future, clean our air, and provide more affordable, accessible, and reliable transportation opportunities for marginalized and underserved communities.

As the TCI states in the Framework, “there is an urgent need to reduce greenhouse gas (GHG) emissions and other harmful pollutants generated by the transportation system” which I fully agree with and offer that natural gas vehicles, especially those using renewable natural gas (RNG) must be a key component to any TCI strategy if these reductions are to occur in any reasonable time frame.

Thank you for your consideration, and please contact me at rita.hansen@onboarddynamics.com or 206.291.3206 with any comments or questions.

Thank you for your consideration.

Sincerely,



Rita Hansen
CEO

⁷ American Lung Association, 2019 *State of the Air Report*, April 2019.