NJ Clean Cities Coalition, A NJ Nonprofit Corporation

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Testimony for the NJ Energy Master Plan
Clean and Reliable Transportation
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As the US Department of Energy's designated Coordinator, and Chair of the Board of Trustees, of the nonprofit NJ Clean Cities Coalition, I appreciate the opportunity to submit the following testimony for the Clean and Reliable Transportation stakeholder committee in an effort to ensure the new Energy Master Plan reflects the following goals for NJ:

1. Putting New Jersey on a path to achieve 100 percent clean energy by 2050
2. Growing New Jersey's clean energy economy
3. Ensuring reliability and affordability for all customers
4. Reducing the state's carbon footprint
5. Advancing new technologies for all New Jersey residents

The NJ Clean Cities Coalition (NJCCC) is a New Jersey registered 501(c)3 Nonprofit dedicated to the creation of public/private partnerships to reduce the use of petroleum in transportation. We do this by advancing alternative transportation fuels and methods, and deployment of advanced vehicle technologies. We are the only state-wide entity that does this on a fuel-neutral basis, supporting a variety of alternative transportation fuels, technologies and methods. Having said that, we recognize that some fuels and advanced technologies are better suited to certain situations than others. In our own state, the NJ Clean Cities Coalition and its public and private stakeholders have long supported the state's initiatives to deploy alternative fuel vehicles. Our efforts have led the way in encouraging the deployment and use of electric vehicles, as well as those powered by compressed natural gas, propane and even hydrogen, along with the associated infrastructure. We have also sponsored numerous education and outreach campaigns and supported efforts to raise awareness of the need for fuel efficiency, idle reduction, driver training, and similar petroleum-reducing techniques. A few highlights of our efforts over the past few years include the following:

- Under contract to NJDEP, NJCCC was among the first speaking of an EV future when we prepared a report of recommendations for "Development of a Comprehensive Plan for An Electric Vehicle Infrastructure" and facilitated a state interagency task force (back in 2012).
- Under contract to the regional Transportation & Climate Initiative (TCI), NJCCC supported the Northeast Electric Vehicle Network, part of a team of 10 states & DC. The project: established stakeholder advisory teams; identified market barriers, grid impacts, economic, health & environmental issues; developed siting & design guidance, model building & electrical codes, permit rules, zoning & parking ordinances; education & outreach.
- Leveraged a $15 million US Dept. of Energy grant to work with 15 public and private entities to execute a more than $50 million program to deploy over 300 CNG heavy-duty trucks and shuttle buses, and the development of six CNG fueling stations across the state.
- Appointed by NJBPU President as Chair, NJ Energy Master Plan AFV advisory work group, 2012

- Gubernatorial Appointee to the NJDCA Propane Safety & Education Commission

With this experience, the NJ Clean Cities Coalition offers to support the NJBPU in its development and administration of the EMP and presents the following recommendations that will help reduce NOx, leverage existing infrastructure and other assets to stretch the state's dollars further, and provide the most immediate and cost-effective public health benefits to at-risk populations.

A well-documented wave of transformation is underway within the transportation sector with more innovation likely in the next decade than in the previous century. Traditional market players and business models are facing increased competition from new entrants seeking to capitalize on advancements in technology and changing consumer preferences. This transition presents a significant opportunity to improve economic productivity and provide unprecedented gains in safety, affordability, environmental performance, and accessibility to all people. The ability to set our state on an energy-efficient trajectory by 2050 will be determined by decisions and investments that must start now. Given current turnover time for vehicle fleets, technologies capable of achieving greater energy-efficiency and greater than 80% reduction in GHG emissions will need to enter the market and be scaled to full deployment in the very near future (2018–2034). The application of these technologies, and the speed and scale at which they are adopted into the market, however, will be affected by many factors, including changes to the mobility system – for both goods movement and people movement. Disruptive technologies such as automated, connected, electric and/or shared (ACES) vehicles will greatly impact energy consumption in transportation in ways that are not yet known. For example, a recent USDOE study showed that the disruption that connectivity and automation will bring to the sector could result in a potential 200% increase in 2050 baseline energy consumption, or a 60% decrease in energy use.[1] Increases could be caused by factors including easier travel and more accessibility, while on the other hand, the availability of connected and automated technologies to enable ride sharing, drive smoothing, and vehicle resizing, could decrease energy consumption.

While the charge of this Committee is extremely broad and complex, it must be recognized that in the short- to medium-term, the opportunity to increase carbon efficiency and emissions reduction through the use of fuel switching could bring about significant benefits. As such, I will focus my comments on transportation fuel switching and will make the distinction between those fuels commercially viable for the light-duty sector, versus those commercially viable for the heavy-duty sector. Within that context, we believe it is critical that the NJ Energy Master Plan:

- **Support Multiple Fuel Alternatives/Technologies**
- **Promote Electric Vehicles for the Light-duty Sector**
- **Promote Currently Available Commercially Proven Cleaner Fuels for the Heavy-duty Sector**
- **Promote Near-zero-emission Carbon-negative Renewable Natural Gas (RNG) Initiatives**

[1] US DOE. EERE. "The Transforming Mobility Ecosystem: Enabling an Energy-Efficient System. January 2017. https://www.energy.gov/sites/prod/files/2017/01/f34/The%20Transforming%20Mobility%20Ecosystem-Enabling%20an%20Energy%20Efficient%20Future_0117_1.pdf

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Support Multiple Fuel Alternatives/Technologies

New Jersey has the opportunity to look beyond conventional petroleum fuels to not only mitigate harmful emissions, but also incentivize the adoption of cutting edge alternative fuel vehicle technologies. There is an array of alternative fuel vehicle incentive projects that can help achieve this – on-road trucks and buses, non-road equipment, marine engines, and locomotives, among others. This extensive menu could potentially create a scenario by which New Jersey manages multiple individual grant programs, leading the state to carrying increased overhead expenses and staffing costs.

We appreciate the significant investments needed for fleets to transition to alternative fuels but note that additional and often more cost-intensive infrastructure investments are also required to provide these fleets with reliable and sufficient fueling capacity.

We recommend that New Jersey recognize the cost-effective benefits for those projects proposing to leverage existing refueling infrastructure. On a whole project basis, funding alternative fuel vehicle projects that propose to use already available commercial fueling stations which have existing capacity can help better utilize prior investments in clean transportation technology.

To advance the goals of the EMP, while reducing the state's administrative burden, we recommend that New Jersey create fuel- and technology-neutral funding programs that prioritize cost-effective NOx reductions. This puts the impetus on the applicants to propose the most cost-effective project while creating a more efficient format by which the state reviews applications.

Promote Electric Vehicles for Light Duty

Globally, light-duty vehicles consume more energy than any other mode of transportation[2] and therefore a transition to electric vehicles in this sector provides a significant opportunity for energy savings as well as the many benefits associated with an increase in the use of electric vehicles such as improved air quality, reduced greenhouse gas emissions, and savings through reduced energy costs for rate payers.[3]

Electric Vehicles are a transformative solution that will reshape not only our transportation markets, but also our energy markets and the way we travel, both here in NJ and across the US. The EV market in New Jersey is starting to grow, based on the recent availability of new vehicles that have greater range and lower costs that make EV ownership feasible for mainstream consumers. Just a few years ago, I personally knew every driver of a plug-in vehicle in NJ, currently there are approximately 15,000 of

[2] US EIA. "Plug-in electric vehicles: future market conditions and adoption rates." October 23, 2017. https://www.eia.gov/outlooks/ieo/pev.php
[3] Charge EVC. "Electric Vehicles in New Jersey Costs and Benefits." January 26, 2018. https://www.nj.gov/dep/cleanair/PPP/2018/ChargEVC%20New%20Jersey%20Study.pdf

them. The nonprofit group ChargEVC, of which the NJ Clean Cities Coalition is a Founding Member and active participant, analyzed the shift from running cars on gasoline to powering them with electricity. The research finds widespread benefits. At the present time, however, that opportunity is almost completely untapped in New Jersey due to the lack of supporting market development policies and programs. New Jersey lags behind other states that have taken more aggressive action to greatly enhance EV adoption rates, especially now that a new generation of affordable long-range EVs are becoming available. To appreciate the scope of potential impact, consider the following:

- Approximately 40% of GHG emissions, and related emissions in New Jersey are from the transportation segment, with about half of that (20%) coming from the use of gasoline in cars. These air quality impacts are particularly acute in the state's urban centers and along dense travel corridors.
- Every electrically fueled mile is at least 70% cleaner than an average gasoline fueled mile, so that widespread EV adoption results in large reductions in GHG emissions and significant improvement in air quality overall.
- Widespread adoption of EVs enables the shift from petroleum to electricity, which will have a large and potentially beneficial impact on electricity infrastructure and markets. Moving to 100% electrification of light-duty vehicles will increase electricity use by about 30%, and if guided through proactive programs and policies, has the potential to reduce electricity costs for all consumers significantly.
- The cost of driving will be reduced significantly, even at today's low retail gasoline prices, and maintenance expenses will also decline.
- Electrically fueled cars result in sustained energy independence for the transportation sector.

Regarding charging infrastructure for light-duty plug-in vehicles, the EMP should call for the establishment of policies and utility ratemaking that ensure that most EV charging happens at times and in ways that maximize public benefit, especially considering optimal loading on the utility grid and as an integral component of microgrids.

The previous discussion primarily concerned light-duty plug-in battery-electric vehicles. It should also be noted that charging technologies for such vehicles continues to rapidly advance and many charging technologies that do not require plugs (i.e. inductive wireless charging) are becoming commercially viable. Furthermore, hydrogen, when used in a fuel cell to provide electricity, is a Zero-Emission alternative fuel produced from diverse energy sources. Automakers and others across the world, including in NJ, are working to deploy networks of fueling stations for drivers of fuel cell electric vehicles (FCEVs). Such stations can fuel a vehicle in less than 5 minutes and obtain a driving range of more than 300 miles. Research and commercial efforts are under way to expand the limited hydrogen-fueling infrastructure and increase the production of FCEVs.

Promote Currently Available Commercially Proven Cleaner Fuels for the Heavy-duty Sector

While there is much excitement about the potential of electric (both plug-in and hydrogen fuel cell) technologies for the heavy-duty truck sector, the fact is that those technologies are many years away from being commercially viable and widely implemented. Few, if any of such vehicles are actually in production or commercial use and it is expected that they will remain a minor market-participant for quite some time. At this time and for the foreseeable future, it is our opinion that for the heavy-duty truck sector, Compressed Natural Gas (CNG) represents the most efficient, cost-effective, and immediate pathway to mitigate public health risks by reducing NOx emissions and providing air quality benefits in areas disproportionately burdened by diesel pollution. The latest iteration of near-zero emission medium- and heavy-duty engines fueled by CNG yield unrivaled NOx reductions. The EPA and the California Air Resources Board (CARB) certify this new technology at 0.02 g/bhp-hr NOx, which is 90% lower than the current emission standard for heavy-duty engines (and similarly lower than the level that the cleanest diesels can achieve).[4] This solution is necessitated by the transportation sector's impact on our air quality – according to NGVAmerica, "while heavy-duty vehicles total 7% of all vehicles on America's roadways, they account for 50% of all smog-precursor emissions and 20% of all transportation-related greenhouse gases."[5] What's more, in New Jersey, on-road heavy-duty diesel vehicles account for 53% of the state's NOx emissions from mobile diesel sources.[6]

While many other advanced vehicle technologies continue their pre-commercial development efforts (and we wholeheartedly support those efforts), CNG near-zero emission engine technology is commercially available today, ready for immediate deployment, and suitable across a wide range of vehicle platforms. CNG vehicle technologies are mature and proven, and they also eliminate the need for DEF and diesel particulate filters which increase the cost of maintaining a fleet. Furthermore, the service network and fueling infrastructure is already largely established in NJ for these technologies.

Beyond the advanced technology aspects of CNG transportation, these vehicles also provide much needed environmental justice benefits. Heavy-duty diesel vehicles emit disproportionately high levels of pollutants that cause millions of New Jersey citizens to regularly breathe unhealthful air. They emit high levels of toxic air contaminants, such as cancer-causing diesel particulate matter, that disproportionately impacts minority populations living in economically disadvantaged communities, which are often located adjacent to highways, ports, distribution centers and other areas of high diesel engine activity. By replacing these vehicles with cleaner burning CNG vehicles, New Jersey can quickly and substantially mitigate these harmful effects.

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[4] "ISL G Near Zero Natural Gas Engine Certified to Near Zero - First Mid-Range engine in North America to reduce NOx emissions by 90% from EPA 2010". Cummins Westport, October 5, 2010. http://www.cumminswestport.com/press-releases/2015/isl-g-near-zero-natural-gas-engine-certified-to-near-zero.

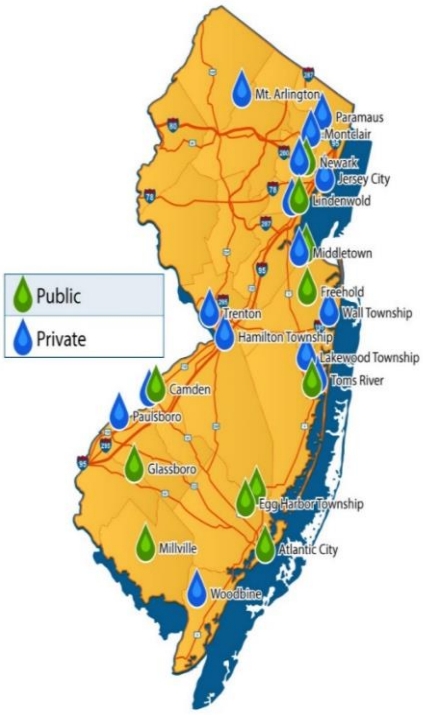
[5] Gage, Daniel J. "Opinion: VW Settlement Offers Funds for Purchase of Natural Gas Trucks". Transport Topics, November 16, 2017. http://www.ttnews.com/articles/opinion-vw-settlement-offers-funds-purchase-natural-gas-trucks.

[6] "2014 National Emissions Inventory (NEI) Data". Environmental Protection Agency, Air Emissions Inventories. https://www.epa.gov/air-emissions-inventories/2014-national-emissions-inventory-nei-data, data accessed on December 4, 2017.

As evidence of similar efforts, California has prioritized near-zero emission CNG vehicles in its recently published Mobile Source Strategy because of this technology's ability to rapidly provide broad health benefits at both the regional and community level. Specifically, CARB notes that the "large-scale deployment over the next 15 years of low-NOx heavy-duty engines for ozone and PM2.5 attainment, combined with particulate filters to reduce direct particle emissions, will provide the largest health benefit of any single new strategy."[7]

The NJ Clean Cities Coalition, together with utility partners South Jersey Gas and NJ Natural Gas, along with private sector participants such as Waste Management and Clean Energy Fuels and others have made substantial investments to create a statewide network of CNG stations, as shown in Figure 1. **CNG is therefore the only alternative fuel that is positioned to initiate new heavy-duty vehicle deployment projects without waiting on new technology development or costly new refueling infrastructure installation.**

Figure 1: New Jersey's Natural Gas Vehicle Refueling Infrastructure



Promote Near-zero-emission Carbon-negative Renewable Natural Gas (RNG) Initiatives

Renewable natural gas (RNG) complements the NOx reductions provided by the near-zero emission engines as it offers a game-changing solution to heavy-duty transportation issues by providing the lowest carbon intensity of any fuel available in the market today.[8] RNG can immediately provide substantial GHG emission reductions. State policies that would support expanded use and production of RNG in New Jersey would offer an array of environmental and economic benefits, including enhanced job creation, improved air quality, and various environmental waste stream management improvements that will accrue at local levels.

RNG, also called biomethane, is a pipeline-quality **non-fossil fuel** gas that is fully interchangeable with conventional natural gas and thus can be used in natural gas vehicles. RNG is essentially biogas (the gaseous product of the decomposition of organic matter) that has been processed to purity standards.

[7] "Mobile Source Strategy". California Air Resources Board, May 2016. https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf, page 79.
[8] "Game Changer Technical White Paper Executive Summary". Gladstein, Neandross & Associates, April 2016. http://www.gladstein.org/gna_whitepapers/game-changer-next-generation-heavy-duty-natural-gas-engines-fueled-by-renewable-natural-gas/, pages 3-4.

Biogas is produced from various biomass sources (such as landfills, food waste, or sewage treatment plants) through a biochemical process, such as anaerobic digestion. With minor cleanup, biogas can be used to generate electricity and heat. To fuel vehicles, biogas must be processed to a higher purity standard. The resulting RNG has a higher content of methane than raw biogas, which makes it comparable to conventional natural gas and thus a suitable energy source in applications that require pipeline-quality gas. RNG qualifies as an advanced biofuel under the Renewable Fuel Standard.

Reducing carbon dioxide and other greenhouse gas levels is important to help reduce global warming. RNG is considered a carbon-neutral fuel because it comes from organic sources that once absorbed carbon dioxide from the atmosphere during photosynthesis. RNG has even greater benefits when it's produced from organic waste that would otherwise decay and create methane emissions. **By capturing more greenhouses gases than it emits, this RNG is actually considered carbon-negative**!

Near-zero-emission natural gas engines using RNG therefore provide a commercially proven, broad-based and affordable strategy to immediately achieve major reductions in emissions of criteria pollutants, air toxins, and GHGs from New Jersey's on-road transportation sector. Encouraging the use of RNG in lieu of diesel is consistent with many other goals, including diversion of food waste from landfills, more efficient capture of methane emissions, and other statewide energy and broader priorities.

We urge the state to recognize that the combination of new near-zero emission natural gas engine technology and RNG provides the single best opportunity for the state to achieve immediate and substantial NOx and GHG emission reductions in the heavy-duty transportation sector. Equally important, major reductions of cancer-causing toxic air contaminants can immediately be realized in disadvantaged communities adjacent to highways and areas of high diesel engine activity, where relief is most urgently needed.

Each of the state's twenty-one counties is designated by the Environmental Protection Agency (EPA) as nonattainment under the ozone standards.[9] This means that the state's 8.8 million citizens are at increased risk for aggravated lung diseases such as asthma, emphysema, and chronic bronchitis. These adverse health impacts, for which children and the elderly are particularly susceptible, may lead to increased school absences, medication use, visits to doctors and emergency rooms, hospital admissions and mortality.[10]

Conclusion

On behalf of NJ Clean Cities, thank you for the opportunity to provide these comments and recommendations.

[9] "Green Book 8-Hour Ozone (2008) Area Information". EPA, 2017. https://www.epa.gov/green-book/green-book-8-hour-ozone-2008-area-information.
[10] "Health Effects of Ozone Pollution". EPA, 2017. https://www.epa.gov/ozone-pollution/health-effects-ozone-pollution.

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NJCCC hopes to continue to engage with the Clean and Reliable Transportation stakeholder group of the 2019 EMP and serve as a trusted and reliable source of data – be it regarding the thoughts in this testimony, or in other areas - as the state's EMP is developed and implemented. To that end, I offer the services of the NJ Clean Cities Coalition to assist in your efforts related to program design, outreach, administration, or in other areas that we can discuss.

SUBMITTED BY:

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