

Federal Advisory Committee Act
Clean Air Act Advisory Committee

Mobile Sources Technical Review Subcommittee

EPA's National Vehicle and Fuel Emissions Laboratory
2000 Traverwood Drive
Ann Arbor, MI 48105
September 17, 2019

Introduction, Opening Remarks

Ms. Courtney McCubbin opened the meeting at 9:00 am on September 17, 2019 and welcomed the Clean Air Act Advisory Committee MSTRS Subcommittee members. Ms. McCubbin noted that the presentations and meeting minutes from the last MSTRS meeting are available online, and the minutes and presentations from this meeting will also be posted online. Ms. McCubbin then reviewed the meeting agenda (see Table 1).

Table 1. MSTRS Meeting Agenda: September 17, 2019

Time	Topic
8:30 – 9:00	Registration
9:00 – 9:15	Opening Remarks
9:15 – 9:45	OTAQ Office Director Remarks
9:45 – 10:00	MOVES Workgroup Update
10:00 – 10:15	Introduction to Workgroup Breakouts
10:15 – 10:45	Discussion Break
10:45 – 12:15	Data and Future Mobility Breakouts
12:15 – 1:15	Lunch
1:15 – 2:45	Data and Future Mobility Breakouts
2:45 – 3:15	Discussion Break
3:15 – 4:15	De-Brief of Breakouts
4:15 – 4:30	Final Remarks & Adjourn

Mr. Rich Kassel, MSTRS co-chair, welcomed everyone to the meeting. He stated that the purpose of this meeting was to discuss the new ideas and information that arose at the previous two meetings from MSTRS members.

Mr. Karl Simon, Director of OTAQ's Transportation and Climate Division, also thanked everyone for coming and stated his excitement for the discussions to follow. Mr. Simon then introduced Ms. Sarah Dunham, Director of the Office of Transportation and Air Quality, for her to give remarks.

A list of meeting attendees is provided in the Appendix. Presentations are posted online at the MSTRS website: <https://www.epa.gov/caaac/mobile-sources-technical-review-subcommittee-mstrs-caaac>.

Office of Transportation and Air Quality (OTAQ) – Office Director Remarks

Ms. Dunham welcomed the Subcommittee. She thanked everyone for getting together to spend time discussing the work they do and emerging issues. Ms. Dunham took a moment to introduce herself, since she is newly back in OTAQ. She started as the Director of the Office of Transportation and Air Quality in August and noted her excitement for working with OTAQ again and taking on this challenging, interesting and important work. She gave an overview of her employment history, including her start at the Illinois Environmental Protection Agency and her work there addressing transported air pollution, which brought her to the U.S. EPA. She also discussed her background in both OTAQ and the Office of Atmospheric Programs, where she served as the Director before transitioning back to OTAQ this year.

Ms. Dunham defined her four key principles for supporting OTAQ's continued commitment to protecting human health and the environment as the following: (1) designing thoughtful and well-supported regulations, (2) building strong partnerships, (3) creating strong compliance programs, and (4) investing in science and technical foundations. She acknowledged MSTRS' key role in developing the best environmental results, due to the guidance it provides the Agency on important and emerging issues, noting that OTAQ has a long history working with diverse stakeholders to achieve emission reductions. Ms. Dunham noted that she intends to continue to foster this interaction.

Ms. Dunham then provided an update on OTAQ's current key areas of work. She defined the first area as fuels and the Renewable Fuel Standards (RFS) program, noting that there are active rulemakings ongoing with the RFS. Since the last meeting, a final rule allowing gasoline with 15 percent ethanol to be available year-round was issued. The 2020 standard rule volumes were also issued. She noted that the EPA is currently working on a rule to reset the volumes that Congress set in the RFS and that the proposal is under review by the Office of Management and Budget (OMB). OTAQ is also working on a major fuel standard streamlining action, and they hope to submit that to OMB later this fall.

The second key area of work that Ms. Dunham discussed was the Clean Trucks Initiative (CTI). She stated that CTI remains a critical priority for OTAQ, and it is also very important to state and local air quality agencies. She elaborated that there is a very talented team working with technical experts and meeting with stakeholders to inform their approach. The CTI is expected to

result in significant NO_x reductions, as well as reductions in ozone and particulate matter (PM). She noted that OTAQ is planning to issue a proposal in 2020 informed by the ongoing stakeholder and technical engagement work they are doing.

Ms. Dunham mentioned that another key area of work includes the Safer Affordable Fuel-Efficient (SAFE) Vehicles rule, which is a jointly proposed rule between the EPA and the Department of Transportation (DOT). Ms. Dunham commented that the final action on this rule is being reviewed by OMB. Circling back to her four key principles, she mentioned that progress has been made on partnership efforts, through working closely with regional colleagues and the Office of Environmental Justice on the partnership agenda. The Ports Initiative, one of OTAQ's partnerships, has been successful in helping ports conduct their own emissions analyses. Ms. Dunham commented that the most recent Diesel Emissions Reduction Act (DERA) report to Congress has been issued and that the SmartWay program is turning 15 years old this year. Ms. Dunham concluded providing her high-level overview of OTAQ's work and once again thanked the MSTRS members for helping to guide OTAQ.

Comments and Discussion

Dr. Matt Miyasoto asked if the EPA could provide insight on how the CTI could be harmonized with the California Air Resources Board (CARB) rules.

Mr. Charmley replied that, in general, the EPA believes the CTI will be helpful for reducing air pollution in California and the U.S., and it will be helpful to industry if the EPA and California could align the highway heavy duty programs. With respect to current programs, he noted that the EPA is in the process of finishing heavy duty phase 2, and logistically, this makes it difficult to catch up to CARB. However, Mr. Charmley noted that the EPA plans to issue a proposal in 2020, and a goal with that action will be to get the programs aligned.

Mr. Robertson added that CARB has been working with the EPA at the staff level to discuss ideas, share data, and conduct technical work. He agreed that a harmonized program has significant benefits for California and everywhere that those trucks travel. California is currently efficiently pushing towards completing their regulation by early 2020 and looking forward to continued interaction with EPA on data- and science-driven decision making.

Dr. Rasto Brezny welcomed Ms. Dunham and then turned towards the SmartWay program, asking if there is a mechanism within that program to incentivize early introduction of ultra clean low NO_x trucks into the fleet like those that will be required by the CTI.

Mr. Simon replied that the EPA is trying to do whatever they can within the SmartWay program to encourage top performers, and he also noted that the DERA program offers another way that the EPA that could potentially incentivize ultra clean trucks.

MOVES Workgroup Update

Ms. Megan Beardsley gave a presentation updating meeting attendees on the activities of the MOVES model review workgroup. She began by recognizing her co-chair of the workgroup, Dr.

Matt Barth. She summarized that the EPA's MOVES model estimates emissions from cars, trucks and nonroad vehicles and equipment, and the current version of MOVES, MOVES2014b, came out in 2018. Ms. Beardsley noted that this version did not change the onroad inventory but did result in significant improvements to the nonroad emissions inventory. She elaborated that the changes to the nonroad portion of MOVES included using updated nonroad engine population growth rates, Tier 4 emission rates, and updated sulfur levels in fuels. She stated that the release date of the next version of MOVES is still to be determined, but it will include new data based on the latest test programs and analyses, the latest vehicle population and activity data, newer rules (e.g. Heavy-Duty Greenhouse Gas Phase 2), and improved functionality and performance.

Ms. Beardsley then gave an overview of the MOVES review work group, explaining that the group is comprised of stakeholder participants that provide review and recommendations for MOVES. The meetings typically include presentations by the EPA regarding planned updates or improvements, as well as presentations from work group members on MOVES issues and potential improvements. In the past year, she noted, the EPA provided updates on revising start/soak relationships for light-duty gaseous emissions, updates to "high-power" emission rates, start deterioration for light-duty vehicles, and modeling of gliders. Highlights from these meetings included Dr. Barth sharing his work on utilizing MOVES for evaluating shared, electric, connected, and automated vehicles, in addition to focusing on technical questions. The October 2019 meeting plans to focus on MOVES improvements, including adapting MOVES to better model autonomous and connected vehicles, using the MOVES-Matrix system for storing MOVES rates, and potential MOVES improvements at the project-level. In the future, Ms. Beardsley commented that the EPA hopes to gain stakeholder ideas on longer-term MOVES design, obtain input on the EPA's proposals for longer-term MOVES design, and present draft results from upcoming MOVES updates.

Ms. Beardsley also provided an update on light-duty NO_x, saying they have examined whether the NO_x emission rates being used in MOVES were too high, and they have concluded that their assumptions were too conservative. She expects light-duty NO_x emissions to decrease significantly in future years. In terms of heavy-duty NO_x running emissions, she said having in-use data, as compared to just certification data, has been extremely helpful. The use of the new emission data in MOVES results in a significant increase in NO_x running emissions in class 8 trucks. In terms of hoteling, Ms. Beardsley highlighted that MOVES estimates used to be based on rules for truck drivers, but they now have telematics data from a fairly reliable sample. This data shows that trucks do not hotel as much as originally assumed, and incorporating this data provides a better estimation of actual emissions rates for extended idling.

Comments and Discussion

Dr. Barth thanked members of the MOVES work group for their participation and suggestions that have helped the EPA in their updates to the MOVES model. He noted that the work group looks at longer-term recommendations in addition to short-term recommendations. He made the

point that the work group should also be looking at the fundamental structure of MOVES, since development on the model first began 19 years ago.

Mr. Michael Replogle commented that in New York City, 10 to 20 percent of trucks are significantly overweight, asking whether this is accounted for in the MOVES model. Ms. Beardsley responded that this is accounted for in the model.

Ms. Coralie Cooper asked whether the sensitivity analysis conducted for light-duty NO_x showed that emission rates should be lower, and, if so, how that would be incorporated into the next model version. Ms. Beardsley responded that updated rates will be incorporated in future versions of MOVES. She noted there are other changes to the model she did not discuss, so emissions in other areas may increase, but net impacts still remain to be seen and will vary depending on location.

Dr. Rachel Nealer asked whether MOVES is being built with the capability to incorporate automated and connected vehicles, and specifically whether MOVES will allow for connected and automated vehicles to be modeled separately. Ms. Beardsley replied that they are still figuring out how to approach this topic. She noted that MOVES will continue to be part of a system with other models, and the EPA would be interested in working further with the Department of Energy (DOE) to address these vehicles.

Ms. Elena Craft asked whether emissions from running engines seem to be about the same as hoteling emissions, and, if so, whether this information is useful in making the case for an electrification strategy in the heavy-duty sector. Ms. Craft stated that future emissions, as shown in many reports on the increase in congestion, are expected to increase over time, and she wonders about how that is being considered in the evolution of MOVES. Ms. Beardsley responded that it is important to note that the results she showed were the national average and that municipal policies add variation by location.

Dr. Brezny asked how MOVES is accounting for tampered heavy-duty trucks. Ms. Beardsley responded that MOVES has tampering built into its emission rates, but those tampering rates are dated, so they are looking forward to hearing more from California on their tampering data collection.

Introduction to Workgroup Breakouts

Mr. Rich Kassel shifted the discussion to MSTRS meeting participants getting into their workgroups for the afternoon sessions. He noted that this format allows groups to dive deep into questions on future mobility and nonroad data topics. He framed each of the topics for the group. For non-road, he stated that the EPA knows there are real data needs and an unbelievably diverse range of engines and uses that are covered under the nonroad sector. He told the group that their conversations should be focused on identifying data gaps in the nonroad sector and ideas for filling these gaps, including considering how data collection can be improved, what types of data

and data sets are needed, and how the needs for data will change in the face of the three revolutions. For the future mobility breakout sessions, Mr. Kassel put a focus on thinking about how MSTRS structures its future work and how OTAQ should consider future needs in the face of the three revolutions changing many of the assumptions transportation regulations are based upon. Specifically, he asked the groups to discuss whether the EPA is considering the correct categories and metrics and how OTAQ can think about autonomous vehicles and shared vehicles moving into the future. He then dismissed everyone to join their working groups.

Group A:

- Mr. Chris Nevers, Alliance of Auto Manufacturers
- Mr. George Lin, Caterpillar, Inc.
- Mr. Bill Roberston, CARB
- Mr. Robert Anderson, Chevron U.S.A. Inc
- Dr. Elena Craft, Environmental Defense Fund
- Dr. Kent Hoekman, Energies
- Mr. Michael E. Iden, Association of American Railroads
- Dr. Tracey Jacksler, AIR LIQUIDE Research & Development

Group B:

- Ms. Barbara Kiss, General Motors Corporation
- Dr. Rasto Brezny, Manufacturers of Emission Controls Association
- Ms. Diep Vu, Marathon Petroleum Company (alternate for Vince Lichtinger)
- Dr. Dave Cooke, Union of Concerned Scientists
- Dr. Matt Miyasato, South Coast Air Quality Management District
- Mr. Adam Cohen, Transportation Sustainability Research Center (alternate for Susan Shaheen)
- Ms. Simone Sagovac, Southwest Detroit Community Benefits Coalition

Group C:

- Mr. Jim Kliesch, American Honda Motor Co., Inc.
- Dr. Rachel Nealer, U.S. Department of Energy
- Mr. Mike Cooper, Cummins, Inc
- Ms. Coralie Cooper, NESCAUM (alternate for Elaine O'Grady)
- Ms. Amanda Appelbaum, Fuels Institute
- Ms. Erica Bowman, Southern California Edison
- Mr. Blair Chikasuye, Hewlett Packard

Group D:

- Mr. Bob Holycross, Ford Motor Company

- Mr. Andrew Cullen, Penske Logistics
- Ms. Kate Blumberg, International Council on Clean Transportation
- Ms. Joanne Rotondi, Hogan Lovells
- Ms. Nancy Kruger, National Association of Clean Air Agencies
- Dr. Mathew Barth, Institute of Electrical and Electronics Engineers
- Mr. Michael Replogle, NYC Department of Transportation

De-Brief of Breakouts

Nonroad Emissions Data Report Out

Mr. Robertson presented the ideas of Group A from their nonroad data discussion. The group discussed how nonroad represents a catchall category for vehicles that are not included elsewhere and wondered how data can best represent this diversity. The group identified several potential new data sources, including the applications for MPOs, DERA, TERP, Green Building, or Carl Moyer programs that likely contain useful information and may also have instrumented pieces of equipment. He also noted that the group agreed information should be shared as group members become aware of it, elaborating that social media could provide a resource for finding nontraditional information about equipment. Mr. Robertson stated that Group A is supportive of the development of a nonroad data clearinghouse, similar to NREL's Fleet DNA clearinghouse for heavy-duty vehicle activity, to share information from a variety of sources, including surveys.

Ms. Simone Sagovac shared Group B's discussion points, agreeing with Group A that nonroad is not a well-characterized sector and understanding the challenges of that is critical. Group B recommended extrapolating from data that already exists or somehow tying incentives, such as grants or federal funding, to data collection. They also discussed approaching data gaps from either the bottom up or top down, depending on the sector (i.e. manufacturers versus end users). They asserted that official data sources that already exist, such as from federal agencies or state and local agencies, should be better utilized. Other examples of existing data that could be leveraged included data from California, data through building partnerships with engine/equipment manufacturers, Department of Homeland Security data, Farm Bureau data, DERA program data, consumer data for the lawn and garden sectors, and data from insurance companies or property tax registries. Lastly, the group discussed that there is currently no SmartWay type of program for nonroad equipment, and they saw this as a potential opportunity for the future.

Ms. Erica Bowman summarized Group C's recommendations. Ms. Bowman said the group discussed looking beyond existing data sets, such as requesting information through a Request for Information (RFI) also identifying people and organizations who may be interested in sharing nonroad data. Group C recommended looking at trade associations and equipment dealers for new sales information and equipment maintenance records. They also discussed the importance of getting data for electric and hydrogen-fueled equipment, because these two populations of equipment are growing.

Ms. Kate Blumberg shared Group D's ideas with the full group of MSTRS meeting attendees. Her group discussed utilizing telematics and data loggers that are currently available in nonroad equipment (as well as mini-PEMS, NOx sensors, and SEMS) to collect more real-world in-use data, noting that some of these devices are available on new equipment, but could also be retrofitted on older equipment. Their other ideas included using grants to universities or other research organizations to get data and avoid the issues the EPA has when requesting data through RFIs. They also discussed utilizing equipment rental companies and stores that sell smaller equipment as potential sources for data. Finally, Group D discussed how collaborating with state and local governments could promote the electrification of nonroad equipment, including whether the EPA could support local and state efforts to switch to electric construction vehicles through incentives and permitting.

Comments and Discussion

Dr. Kent Hoekman commented on the overwhelming complexity of the nonroad sector, stemming from the vast number of different equipment types being used at different places and at different times. He asserted that this complexity makes it necessary for the EPA to establish priorities.

Ms. Barbara Kiss noted that she is unsure whether she has seen requests for information from the EPA before, asking if it is unprecedented to request this data.

Mr. Charmley responded that the EPA does request information through surveys, but the agency must get permission to ask a specific set of questions. Dr. Nealer added that the DOE often uses requests for information and that perhaps the DOE could collaborate with the EPA by collecting existing data sets or information from data sets, since agencies collecting the data themselves is burdensome under the Paperwork Reduction Act (PRA). Mr. Simon elaborated that this request for information could be framed in such a way that it was included in an Advanced Notice of Proposed Rulemaking in the renewable fuels space.

Mr. Charmley asserted that there was not much discussion around policy drivers to decarbonize the existing nonroad engines out there and wanted to shift the conversation from new vehicles and engines to thinking about decarbonizing the existing fleet.

Ms. Blumberg responded that focusing on supporting state and local governments to decarbonize their existing fleets is key, because it is a task they can undertake effectively. She added that due to the focus on data, her group did not discuss this topic as thoroughly during this session. During their future mobility section, she noted that the policy drivers discussed included city regulations that require the use of the best equipment and incentive programs to replace older equipment and to collect data.

Mr. Robertson stated that there was some discussion about trying to make structural changes, but in the nonroad sector, there are some pieces of equipment that are well-suited to being electrified and others that are not, which is something they struggle with at CARB. They also struggle with how to account for zero-emissions equipment in inventories, such as forklifts, and how to give credit for making progress with electrification. He concluded by saying the model for

decarbonization, and the incentives that go along with it, should not be limited to just pieces of equipment with tailpipes.

Mr. Jim Kliesch noted that as this transition to zero-emission takes hold, we should remain cognizant of the uses of zero-emission equipment, noting that electrified equipment is not always suitable and citing the differences between commercial and residential equipment.

Future of Mobility Report Out

Mr. Chris Nevers reported on Group A's discussion of the future of mobility. His group commented on the necessity of looking beyond individual vehicles, taking a holistic view of the environment, and providing incentives for clean electrification. They discussed using a holistic view of lifecycle emissions, considering the whole vehicle, its use, and its expected lifetime, to efficiently reduce aggregate emissions. They also believed that electric vehicle use should be prioritized, as should clean electrification in the nonroad sector and aerodynamics in the rail sector. They grappled with the question of decarbonizing an entire fleet and fleet turnover, considering both carbon and criteria pollutant emissions. The group also noted that incentives conceived to reduce emissions need to be considered carefully, as there could be unintended consequences (e.g., incentivizing shared mobility could disincentivize the use of public transit).

Mr. Dave Cooke summarized Group B's discussion of future mobility. Their top three discussion points included having the EPA create a roadmap for emissions goals, streamlining regulations that are not applicable for the future, and adopting national standards. They commented that the EPA should create a road map or vision for the future that looks at increments of time and has an overarching set of goals that direct and provide information for stakeholders. This road map would provide a framework for the EPA to work backwards from when considering the data and analyses needs and the need for future regulations or other means of achieving objectives. The roadmap would also provide for a concrete and transparent way of weighing objectives. They also discussed the applicability of and the potential need to streamline existing emissions reduction regulations as we move towards electrification. Group B identified the built environment as being important for current and future technologies. They also identified the importance of leveraging multi-agency coordination to aid in the transition to EVs and having national standards to reduce barriers to compliance. The group discussed concerns around affordability and technology adoption, as the most vulnerable communities need the change to EVs to happen the quickest but are likely the last to adopt these technologies. Lastly, Group B noted the importance of including mobility service providers in stakeholder discussions and thinking more about how they are regulated.

Mr. Jim Kliesch shared Group C's ideas. Mr. Kliesch stated that the group believes the EPA should not be overly presumptive about what the future of mobility holds, especially considering how different the future looks today as compared to 10 years ago. Group C cautioned that being overly prescriptive could lead to insufficient regulations to cover societal needs. They noted that regulations move more slowly than technology and trends, and the EPA's efforts to get in front of that can be difficult. Group C's top three priorities were understanding vehicle usage, exploring vehicle metrics, and recognizing the importance of regulatory certainty for regulated

parties. They also discussed zero emission vehicle (ZEV) alternatives, including a national ZEV program, technology mandates, and other ways to reach those goals.

Dr. Barth gave the read out for Group D. They discussed the implications of shared, electric, connected, and automated vehicles on the environment, energy, safety, and mobility. Group D concluded that while there is a leadership opportunity for the EPA on future mobility, the EPA by itself cannot do everything, but there is an opportunity for the EPA to collaborate and work with the National Highway Traffic Safety Administration (NHTSA), DOT, and DOE on new regulations. Along the same lines, they also discussed that the EPA needs to support state and local agencies to embrace the co-benefits of safety, traffic reduction, livability, noise reduction, and quality of life. Group D discussed vehicle connectivity and the possibility that new certification standards, like in-use monitoring, could be developed. They emphasized the importance of using new processes to certify and regulate these vehicles, adopting life-cycle analyses, and that the EPA should gather data on emerging issues. In terms of metrics, Group D noted that the Federal Highway Administration went through an exercise of defining new metrics that could be helpful, and the DOE has a new metric called the Mobility Energy Productivity Metric.

Comments and Discussion

Dr. Nealer addressed Dr. Cooke, asking for clarification on the purpose of an EPA roadmap. Dr. Cooke responded by saying that the roadmap would look at possible future scenarios and think about the overall objectives, providing a framework to reevaluate those objectives over time, but also having it laid out for stakeholders. From there, the EPA and stakeholders could examine a range of futures and objectives and work backwards to collect data from that. This would allow the EPA to support progress, while also closing the loop. He mentioned that his group did discuss concerns around being too prescriptive in the face of an uncertain future and cautioned against the roadmap not allowing room for objectives to change and evolve.

Mr. Adam Cohen added that part of the idea for a roadmap is that the role of regulators is going to change as the transportation ecosystem evolves. He pointed out that it may be helpful for the EPA to map a spectrum of outcomes that could occur so they can consider what some of these changes might mean for EPA's regulatory role from an environmental perspective.

Mr. Robertson added that his group discussed who is being regulated and who should be regulated, including how much an original equipment manufacturer (OEM) can be held accountable. He noted that when the EPA is considering transportation as a service, there may need to be different standards for the highest emitting vehicles and that corporations probably bear some responsibility to operate cleanly. He elaborated by saying that when vehicles move from the personal ownership model to a system-wide service provider model, it becomes a gray zone for the EPA to conduct smog checks, engage in repair assistance programs, and put statutory limitations on smog.

Mr. Kassel asked if any group touched on the issue of equity.

Ms. Sagovac responded that certain areas of the country will benefit more from electrified vehicle introduction than others. She stated that low income areas will not be the first to benefit from this technology, but those areas have infrastructure needs, and infrastructure improvements can be made in communities with old fleets as well. Since truck fleets turn over slowly, fleet electrification will take a long time, and the EPA should consider prioritizing improvements in the existing fleets to improve air quality in low income communities.

Mr. Nevers added that his group also discussed improving the existing fleet and that the smartest strategy may be to use incentives to replace gross polluters with lower polluting vehicles, even if they are not ZEVs.

Mr. Replogle added that the equity issue is very important. He stated that air quality strategies must be examined in a holistic framework that considers safety, equity, mobility, and access if better air quality outcomes are going to be attained. He also discussed that heavier vehicles have made roads less safe and vulnerable road users are disproportionately low-income people who suffer more from road safety issues and air pollution in their communities. Looking beyond electrifying light duty vehicles and buses, Mr. Replogle posed the question of how to expand opportunities for people to utilize small vehicles, such as electric bikes and other modes of transportation. He noted that there are roles for the EPA to play in removing barriers to these lighter vehicles and that the EPA can also work with NHTSA to improve traffic safety and reduce emissions. On the topic of automated vehicles, Mr. Replogle stated that it should be illegal to allow automated vehicles to be programmed in such a way that they do not comply with state and local traffic laws.

Mr. Michael Iden pointed out that, as a society, we are fixated on the future, but the group should also think about what can be done better today. He gave the example of synchronizing existing traffic lights in cities, which improves congestion and requires no new infrastructure.

Mr. Simon responded that the EPA likely does not have the authority to regulate traffic lights, but they can provide information and data to state DOTs. He then posed a question, asking whether meeting participants were pessimistic or optimistic about the future and about how the EPA can be most useful in ensuring an optimistic view of the future.

Ms. Sagovac responded that Detroit had \$13 million invested under DERA and other grants to retrofit approximately 250 different pieces of equipment, including trucks and cranes. She noted, though, that the city has about 10,000 trucks crossing its bridge and numerous other sources of emissions. While she is supportive of investing in future technology and infrastructure to accommodate it, she feels as though there are low hanging investments that could be made to current equipment or infrastructure that would significantly reduce emissions.

Mr. Robertson commented that vehicle-level regulation and system-level regulation are key. He noted that California is currently working on system-level regulations and would welcome similar efforts at the federal level.

Dr. Cooke stated that the idea of mitigating congestion is one to think more about. Since it is system wide, the greenhouse gas implications of congestion go both ways. He added that trying

to incentivize people using alternate modes of transportation to cars, while simultaneously inducing more demand on the streets, does not necessarily create a net positive. He suggested that, as the group considers future mobility options, they must look system-wide to ensure all impacts are being captured.

Final Remarks and Adjourn

In closing, Mr. Kassel thanked everyone for their time. He praised participants for being actively engaged and stated that these conversations will translate into future conversations that continue the work of MSTRS. He noted that the discussion raised some real challenges and questions for the EPA. These questions included: What is the role of the EPA versus other stakeholders? Where does the EPA explicitly have authority to act? Where is there not explicit authority necessarily, but the EPA can still act? He added that there are still many topics where it is unclear whether the EPA can be involved or not, using big data as an example. He did say, however, that there is ample precedent through voluntary programs, state and local governments, and the provision of guidance. He finished by adding that, in order to move forward, the thoughts that were discussed at this meeting and how EPA can meaningfully act on them need to be integrated.

Mr. Simon thanked the participants as well and added that the next MSTRS meeting will most likely occur in March or April of 2020 in Washington D.C.

Mr. Charmley stated that he appreciated the ideas shared and gave special thanks to everyone for their thoughts on nonroad data.

Ms. McCubbin officially adjourned the meeting.

Appendix

MSTRS Meeting Attendance List	
Subcommittee Members and Presenters	
Name	Organization
Robert Anderson	Chevron Global (Chevron)
Amanda Appelbaum	Fuel Institute
Noelle Baker	Hyundai
Dr. Matt Barth	Institute of Electrical and Electronics Engineers (IEEE)
Kate Blumberg	International Council on Clean Transportation
Erica Bowman	U.S. Environmental Protection Agency
Dr. Rasto Brezny	Manufacturers of Emission Controls Association (MECA)
Amy Bunker	U.S. Environmental Protection Agency
Julia Burch	U.S. Environmental Protection Agency
Bill Charmley	U.S. Environmental Protection Agency
Blair Chikasuye	Hewlett Packard (HP Inc.)
David Choi	U.S. Environmental Protection Agency
Adam Cohen	International Journal of Sustainable Transportation (TSRC)
Dr. Dave Cooke	Union of Concerned Scientists (UCS)
Mike Cooper	Cummins, Inc.
Coralie Cooper	Northeast States for Coordinated Air Use Management
Dr. Elena Craft	Environmental Defense Fund
Andrew Cullen	Penske Logistics
Angela Cullen	U.S. Environmental Protection Agency
Sarah Dunham	U.S. Environmental Protection Agency
Dr. Kent Hoekman	Desert Research Institute
Bob Holycross	Ford Motor Co.
Aaron Hula	U.S. Environmental Protection Agency
Michael Iden	Association of American Railroads
Dr. Tracey Jacksier	AIR LIQUIDE Research & Development
Rich Kassel	Tri-State Transportation Campaign
Barbara Kiss	General Motors
Jim Kliesch	American Honda Motor Company
Nancy Kruger	National Association of Clean Air Agencies (NACAA)
George Lin	Caterpillar, Inc. (CAT)
Andrea Maguire	U.S. Environmental Protection Agency
Courtney McCubbin	U.S. Environmental Protection Agency
Dr. Matt Miyasato	South Coast Air Quality Management District
Dr. Rachel Nealer	U.S. Department of Energy
Chris Nevers	Alliance of Automobile Manufacturers
Christy Parsons	U.S. Environmental Protection Agency
Clay Pope	Clay Pope Consulting, Member of CAAAC

Michael Replogle	NYC Department of Transportation (NYC DOT)
Sarah Roberts	U.S. Environmental Protection Agency
Bill Robertson	California Air Resources Board (CARB)
Joanne Rotondi	Hogan Lovells US LLP
Simone Sagovac	Southwest Detroit Community Benefits Coalition
Karl Simon	U.S. Environmental Protection Agency
Diep Vu	Marathon Petroleum Co.
Sara Zaremski	U.S. Environmental Protection Agency
Other Attendees	
Giedrius Ambrozaitis	Alliance of Automobile Manufacturers
Dan Bowerson	Alliance of Automobile Manufacturers
Steve Fine	U.S. Environmental Protection Agency
Chris Miller	AESI
Alexandria Reed	Mercedes Benz
Michael Block	Mitsubishi
Pingan He	Mitsubishi
Contractor Support	
Lesley Stobert	SC&A, Inc.
Allison Owens	SC&A, Inc.