

Federal Advisory Committee Act
Clean Air Act Advisory Committee

**Mobile Sources Technical Review Subcommittee (MSTRS)
Meeting Summary**

May 31, 2017
Washington Marriott at Metro Center
775 12th Street NW
Washington, DC 20005

Introduction, Opening Remarks

Ms. Courtney McCubbin opened the meeting at 9:15 am on May 31, 2017. The meeting was called to order and the meeting minutes from the prior MSTRS meeting held on October 18, were approved. Ms. McCubbin welcomed the Clean Air Act Advisory Committee MSTRS Subcommittee members and had participants introduce themselves. Ms. McCubbin reviewed the meeting agenda (see Table 1) and highlighted that the agenda includes time for participants to provide feedback.

Table 1. MSTRS Meeting Agenda: May 31, 2017

Time	Topic
9:15-9:30	Introduction, Opening Remarks, Approval of 10/18/2017 Meeting Minutes
9:30-10:15	Office of Transportation and Air Quality – Office Director Remarks
10:15-11:00	Work Group Updates <ul style="list-style-type: none">- MOVES Work Group- Ports Follow-Up
11:00-11:30	Discussion Break
11:30-12:00	Air Quality Modeling Research
12:00-1:30	Lunch
1:30 – 2:30	Lubrizol: Higher Performing Lubricants
2:30-3:00	Discussion Break
3:00-3:30	Impacts of Car2Go – An Analysis of Five North American Cities
3:30-4:00	General Discussion – Roundtable Discussion of Areas of Interest to the Subcommittee
4:00-4:15	Final Remarks and Adjourn

Mr. Rich Kassel, MSTRS co-chair, reminded meeting participants of the MSTRS’s role to inform, discuss and advise the Office of Transportation and Air Quality (OTAQ) staff in day-to-day work and emerging issues and thanked the committee for their participation.

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 – Office Director Remarks

Mr. Chris Grundler expressed gratitude to the Committee for their attendance and participation in the MSTRS and informed meeting participants that one MSTRS member, Dr. Alberto Ayala, will be changing from his current position at the California Air Resources Board (CARB) to the Sacramento Air Quality Management District (AQMD) in July. Dr. Ayala noted that he will be the Executive Director of the Sacramento AQMD. He also noted and that CARB has valued the ability to interact with the MSTRS. Mr. Grundler expressed gratitude to Dr. Ayala for his leadership and contributions.

Mr. Grundler presented general remarks on changes and progress made since the last MSTRS meeting in October 2016. He noted that, although there have been election and policy changes, the Environmental Protection Agency's (EPA's) mission to serve the American people has not changed. He stated that there continues to be a focus on implementation and that the EPA is looking forward to sharing their experience and knowledge with the Agency's new leadership.

Mr. Grundler presented the following key metrics:

For vehicles, equipment and engines, there are over 1,000 manufacturers, and the EPA issues over 4,500 certificates of conformity annually, which show that all applicable emission requirements have been met. In addition, there are over 3,000 information technology system checks in place to process the greater than 125,000 submissions of certification and compliance data each year.

For fuels, approximately 8,400 fuel additives and 900 fuels are registered, and each year there are about 50 fuels and 500 fuel additives newly registered in addition to the approximately 400 registrations that are revised. Under the renewable fuel standard (RFS) program, over 200 obligated parties and 800 renewable fuel production facilities are registered and submit over 1,600 compliance reports. The EPA approves over 50 new RFS pathways each year, and there are over 23,000 RFS transactions each day.

The EPA also provides public information and compliance assistance for these programs, which has included nearly 1,000 requests for compliance assistance through email and at least 6,000 unique tickets through the EPA's Fuels Helpline.

Mr. Grundler also discussed the Volkswagen (VW) Clean Air Act (CAA) civil settlements. He reported that VW pled guilty and agreed to pay \$4.3 billion in criminal and civil penalties and that there were seven executive/employee indictments in conspiracy to circumvent U.S. emission tests for certain 2-liter and 3-liter diesel engines. He also noted that a trustee was appointed in March 2017 to handle the \$2.7 billion trust fund that has been established for NOx mitigation projects as part of the settlements.

Mr. Grundler reported that there are international efforts to share emissions testing information. He also noted that the EPA will be less predictable in its emissions testing and will be striving to reflect real world driving operations in its testing programs.

Mr. Grundler also reported that the EPA issued a Notice of Violation to Fiat Chrysler Automobiles N.V. for certain 3-liter vehicles for having undisclosed auxiliary emission control devices (AECDs) that constitute defeat devices.

Mr. Grundler noted that the EPA's top priority is to stay on track for a 2018 proposal for the RFS.

Mr. Grundler acknowledged the Regulatory Reform effort, for which the EPA has conducted several outreach meetings/webinars and solicited comment from the public in a *Federal Register* notice about opportunities to reduce burden associated with EPA programs and standards. He reported that the EPA has received over 200,000 public comments and that the EPA is in the process of evaluating those comments. He noted that the EPA routinely evaluates existing regulations and will use this opportunity to evaluate regulations for technical amendments based on comments received. He noted that the EPA frequently reviews regulations and revises standards through technical amendments to address these types of issues, as well as other technical issues. For example, amendments were made to the Phase 2 Heavy-Duty Vehicles Program standards last year, and a few years ago fuels reforms were proposed for the Tier III standards but were not finalized due to time and funding constraints.

Lastly, Mr. Grundler reported that the EPA and MOVES Work Group continue to make improvements to MOVES, and a new release is anticipated in 2018. Also, the Ports Work Group is continuing to engage with port authorities to address port emissions.

Comments and Discussion

Mr. Matt Solomon stated that several states have joined with California in trying to get new NO_x standards, and he inquired about the status of future NO_x standards. Mr. Grundler responded that they had not yet had the opportunity to discuss this with the new leadership. He reported that the EPA is, however, actively involved with California in a Work Group with engine manufacturers. He noted that there is a big opportunity for emission reductions in ozone/particulate emissions from heavy-duty vehicles, and technical work on this front continues.

Dr. Rasto Brezny inquired about OTAQ's role in the process of regulatory review. Mr. Grundler stated that the EPA is in the process of soliciting ideas, but they are unsure of the process that will be used to address comments and ideas. He reported that there is an EPA Task Force created to address regulatory review and that OTAQ expects to be asked what they would recommend addressing. He further stated that he thought fuels are a candidate for the focus of amendments but that there will be limited resources to address all ideas and to go through the regulatory process. He also stated that the new Administrator's back-to-basics agenda supports moving nonattainment areas back to attainment.

Mr. Jim Kliesch stated that the VW settlement addresses some vehicles, whereas others are not getting as much attention. Mr. Grundler noted that the settlement defines criteria that need to be met but it was not intended for EPA to oversee or make the decisions in how VW's investments related to the settlement are made.

Mr. Chris Nevers inquired whether the EPA has an updated version of key metrics regarding compliance testing and reports and whether there is a role for the MSTRS in regulatory reform suggestions. Mr. Grundler stated that the compliance report key metrics have not been updated yet and that it is too soon to talk about regulatory reform, but that there may be a role for the MSTRS with this in the future.

Mr. Robert Anderson stated that there was fuel reform work initiated several years ago that could be continued under regulatory reform. Mr. Grundler stated that the goal of regulatory reform is not to relax rules but is to relieve burden associated with existing regulations while achieving the same goals.

Mr. Don Anair requested a status update on the Greenhouse Gas (GHG) Standards. Mr. Grundler reported that the 2022-2025 GHG Standards are currently being reconsidered. He noted that the EPA is adding to the record and is having a continuing dialogue with auto firms and other stakeholders, and the next steps have not yet been determined.

Dr. Ayala expressed concerns regarding VW hydrogen infrastructure investments. He also noted that there are California petitions requesting that the EPA act to adopt more stringent emission standards for locomotives. Mr. Grundler acknowledged that there are three petitions from California requesting that the EPA act to adopt more stringent emission standards for locomotives. He stated that they had not yet engaged the new Agency leadership regarding these petitions and that this effort is behind heavy-duty trucks in priority for NO_x emission reductions. Mr. Bill Charmley of EPA stated that the EPA would engage stakeholders prior to responding to petitions, but that process has not yet started.

Work Group Updates

Presentation – MOVES Review Work Group Update

Mr. Kassel introduced Dr. Matthew Barth as the Work Group Co-Chair of the EPA's Motor Vehicle Emission Simulator (MOVES) Review Work Group.

Dr. Barth acknowledged his EPA Co-Chair Ms. Megan Beardsley for her contributions and provided a brief background on himself. Dr. Barth provided an overview of the EPA's MOVES and its use in estimating emission impacts, in the preparation of emission inventories for State Implementation Plans (SIPs) and transportation conformity, and in academic research when analyzing policy impacts.

Dr. Barth stated that the MOVES Work Group consists of experts in modeling emissions from highway and nonroad vehicles and represent a spectrum of stakeholders, including vehicle and engine manufacturers, fuel producers, state and local emission modelers, academic researchers, environmental advocates, and affected federal agencies. He reported that from Fall 2016 to Winter 2018, the EPA has been and will be presenting proposed updates to MOVES, including underlying data and analyses. Work Group members have been coordinating with their organizations to solicit specific comments and recommendations. Dr. Barth outlined historic Work Group discussion topics and future meeting topics. Dr. Barth then provided both short-term and long-term MOVES recommendations received from the MOVES Work Group.

Dr. Barth reported that more information on MOVES is provided on the MOVES web page: <https://www.epa.gov/moves>

Comments and Discussion

Dr. Ayala inquired whether there were plans to incorporate new real-time data into MOVES. Dr. Ayala stated that new requirements will provide a regulatory framework for collecting real-world

carbon dioxide (CO₂) emission data and parameter data. Dr. Barth responded that the Work Group has discussed using real-world data to validate the model.

Mr. Matt Solomon asked if different off-cycle driving/emission factors are being captured. He stated that MOVES could add or modify variable frequency drive (VFD) or on-road performance. Dr. Barth stated that the MOVES Work Group could suggest this.

Mr. Luke Tonachel asked whether there is data validation before it is put into the model. Dr. Barth stated that that the MOVES team does a lot of data validation. Mr. Bill Charmley confirmed Dr. Barth's answer.

Mr. Kassel thanked Dr. Barth for his work and stated he was looking forward to the outcome of future meetings.

Presentation – Update on EPA's Ports Initiative

Mr. Grundler introduced Ms. Sarah Froman of EPA.

Ms. Froman presented background on the Ports Initiative and recent activities. She presented a map of ports in areas designated Nonattainment or Maintenance and noted that roughly 39 million people live in close proximity (5 km) to ports in the U.S. She emphasized that port traffic and emissions are expected to grow, and there are opportunities to protect public health while making needed infrastructure updates that will both improve efficiency and costs for port operators and customers.

Ms. Froman outlined the vision for the Ports Initiative and presented the MSTRS Ports Initiative Work Group's September 2016 recommendations. The overarching recommendation was to provide funding, technical resources and expertise to enable and encourage environmental improvements. In response to recommendations, the EPA held a retreat with the Ports Team in October 2016 to identify near-term actions and potential long-term opportunities related to funding, collaboration, technical tools, coordination and communications. Actions to date include:

Funding. The EPA awarded \$123 million in Diesel Emissions Reductions Act (DERA) grant funds to port projects and another \$55 million multi-sector DERA grant funds that involved ports.

Collaboration. The EPA has developed draft tools and resource material promoting port/community decision-making. The EPA is piloting these tools, delivering technical assistance, and convening dialogues with local partners.

Technical Tools.

- The EPA is working with Port Everglades to develop an activity-based baseline inventory, emission reduction scenarios, inventories for future analysis years, and methods/lessons learned that EPA can share with other ports, related agencies and stakeholders to support and encourage sustainable development. The target date for completion of this work is this summer.

- The EPA released the *National Port Strategy Assessment: Reducing Air Pollution and Greenhouse Gases at U.S. Ports* in September 2016. This report explores scenarios for reducing emissions with effective strategies available today.
- The EPA released the *Shore Power Technology Assessment at U.S. Ports* document on April 4, 2017. This report characterizes shore power systems at U.S. ports and includes a new method for calculating shore power system emission reductions.

Coordination. Twenty-five Federal agencies (including the EPA) coordinate maritime transportation policy. The Committee on the Marine Transportation System (CMTS) was established to assess the U.S. marine transportation system and report its findings to Congress on a regular basis. The EPA believes that the CMTS is the right venue for addressing the Work Group's recommendation to improve Federal coordination.

Communications. The EPA created the EPA's Ports Initiative website, which includes a newsletter sign-up: <https://www.epa.gov/ports-initiative>

Mr. Kassel thanked Ms. Froman for her work and presentation.

Comments and Discussion

Dr. Ayala suggested that the map (on slide 3 of the presentation) be updated to show the 2008 ozone limit. He also asked whether, in addition to the costs, the EPA could also present the health impacts associated with controlling emissions through the use of shore power. Dr. Ayala suggested that the EPA could do a case study. Ms. Froman acknowledged that cost-effectiveness can mean different things to different people and does not necessarily need to be presented only in terms of costs per ton of emission reduction.

Mr. Solomon suggested that the EPA also investigate stack add-on controls for ships and barges.

Mr. Kassel asked whether a long-term goal is to be able to use port emissions information elsewhere and to create a uniform protocol for the creation of port inventories. Ms. Froman stated that building from the Port Everglades work, the hope is to provide guidance so that port inventories are more consistent.

Mr. Anair asked whether the EPA plans to continue to update its ports information to include demonstration projects to address the changing technologies and types of port equipment. Ms. Froman reported that the EPA would like for the Ports Initiative website to be used as a clearinghouse for port emissions-related information.

Presentation - Impact of Mobile Source Emissions on Air Quality

Mr. Rich Kassel introduced Ms. Molly Zawacki.

Ms. Zawacki presented the EPA's assessment of mobile source contributions to ambient concentrations of pollutants. Specifically, the (1) contribution of mobile source fine particulate matter (PM_{2.5}) precursors to ambient PM_{2.5} concentrations; and (2) contribution of mobile source NOx and volatile organic compounds (VOC) to ambient ozone concentrations.

Ms. Zawacki provided an overview of the models and model methodology used and the limitations of the modeling projections. She then described the mobile source inventory inputs used for 11 mobile source categories for VOC, NO_x, and PM_{2.5}.

Ms. Zawacki presented the air quality model outputs. Based on the 48 continental states, mobile sources were projected to contribute 21% of the PM_{2.5} and 24% of the ozone concentration in 2025. On-road light-duty and nonroad diesel sources were the largest contributors to the mobile source PM_{2.5} concentration, with 20% each. On-road light-duty contributed 23% and on-road heavy-duty diesel contributed 22% to the mobile source ozone concentration. Maps illustrating mobile source contributions to ambient PM_{2.5} and ozone in 2025 were also presented. Maps of on-road light-duty and on-road heavy-duty diesel vehicle emission contributions to ambient ozone concentrations from NO_x and VOC were also presented, which showed that more ozone came from NO_x than from VOC. She qualified that this was likely due to the magnitude of NO_x emissions in the modeled area.

Ms. Zawacki expressed that air quality modeling results could be used to make seasonal comparisons and trends over time and provided examples. In closing, she stated that the plan is to submit their results to a peer-reviewed journal this summer.

Mr. Kassel thanked Ms. Zawacki for her work and presentation.

Comments and Discussion

Mr. Solomon inquired whether NO_x emission inputs used were local. Ms. Zawacki responded that the presented NO_x emissions are national emissions but that localized emissions data are available.

Dr. Ayala stated that the work done could lead to a several published papers. He asked whether the EPA had looked into the NO_x reductions that would be needed for attainment to be reached. He noted that the EPA could run an input for NO_x to see the effect of a standard. He reported that California did this with a 90% reduction in NO_x. Ms. Zawacki responded that the EPA could do that.

Mr. John Viera inquired how broad the peer review would be and suggested using a University in Beijing for peer review. He stated that he can provide contacts if this would be helpful. Ms. Zawacki thanked Mr. Viera but informed him that she thinks that the publishing journal will choose the peer reviewers.

Dr. Brezny asked how the inventory translates to ozone and whether it accounts for inspections and maintenance (I/M) programs. Ms. Zawacki responded that the inventory is based on the 2011 National Emissions Inventory (NEI), which includes all the state and national programs in place at that time, and the projections account for programs that will take effect in the future.

Mr. Bill Charmley added that there are a series of inventories, and this work emphasizes the need to look at more than just the inventories as part of a national program for public health.

Mr. Nevers inquired whether the assessment included different scenarios for light-duty and heavy-duty vehicles to reflect age and fleet turnover. Ms. Zawacki responded that they had included only one scenario for fleet turnover but acknowledged that including different scenarios is of interest.

Mr. Tonachel commented that light-duty vehicle emissions still contribute significantly to emissions in 2025 and wondered whether a Tier 4 standard was warranted. Mr. Charmley responded that the last year of phase-in for the Tier 3 standards and their full effect is not shown in the assessment, so the current assessment should not be used to conclude a need for a Tier 4 standard.

Mr. Rashid Shaikh expressed concern about aircraft emissions of PM_{2.5}. Ms. Zawacki clarified that landing and take-off emissions were included in the assessment, as well as ground support equipment. She also stated that a long-term objective is to include emissions from an entire flight.

Dr. Ayala asked whether the EPA has investigated or modeled ultrafine particle pollution contributions. Ms. Zawacki responded that they have not included ultrafine particle pollution contributions and is unsure whether there are plans for this in the near future.

Presentation - The Role of Higher Performing Lubricants in Reducing Emission and Improving Efficiency

Mr. Rich Kassel introduced Mr. Scott Halley.

Mr. Halley presented an overview of Lubrizol, lubricants, the role of higher performing lubricants (HPLs), and how the use of HPLs are facilitated.

Mr. Halley emphasized that lubricants and additives can improve engine performance and that HPLs will be needed more in the future for a variety of reasons (e.g., to meet the demand for increased vehicle efficiency and lower emissions). He stated that creating new lubricants requires extensive testing, resources and years of planning.

Mr. Halley provided case studies demonstrating that HPLs have the potential to reduce vehicle emissions. A heavy-duty diesel engine oil case study showed how HPLs can be used to extend the life of diesel after-treatment devices and increase fuel economy. He stated that newer lubricants improve fuel economy by lowering the High Temperature High Shear (HTHS) viscosity of engine oils. A passenger car motor oil case study showed how HPLs can be used to extend the life of three-way catalysts. A third case study showed how reducing low-speed pre-ignition (LSPI) uncontrolled combustion events in turbocharged, gasoline direct injection engines can reduce CO₂ emissions. Mr. Halley stated that new formulations are being developed to reduce the propensity for LSPI.

Mr. Halley stated that HPLs are a cost-effective way to reduce emissions, increase efficiency, and protect advanced engines and other hardware. He stated that, because lubricants require regular service, strategies to encourage HPLs at every oil change will pay dividends for the life of a vehicle. He reported that the market is not taking full advantage of the emissions reduction potential of available HPLs and that expanding the use of HPLs can make a sizable contribution toward GHG emission reductions. He reports that programs to educate and encourage consumers and fleets to use HPLs will help ensure their use.

Mr. Kassel thanked Mr. Halley for his informative presentation.

Comments and Discussion

Mr. George Lin asked at what point lower viscosity oils impact engine life/durability. Mr. Halley responded that they have not found a definitive point at which engine life is impacted. Low viscosity oils need additives to protect the engine, and the lowest viscosity oils still need testing to prove they do not impair engine durability. He also noted that current testing uses current engines, but it may be possible to match engines with fluids to make a better overall solution.

Dr. Tracey Jacksier asked how the low viscosity oils handle the decrease in temperature tolerance with increased wear (e.g., hot spots in engine due to metal on metal wear). Mr. Halley noted that they have not run into this issue in their testing.

Dr. Jacksier inquired whether they had used their additives in renewable or alternative oils and whether the emissions were similar. Mr. Halley stated that Lubrizol has started preliminary work with alternative oils, but they have not reached the point of doing any emissions testing.

Mr. Nevers asked when they would bifurcate lubricants into different classes for light-duty vehicles like they did for heavy-duty vehicles. Mr. Halley stated that there likely will be a point at which differentiated classes will be needed, which would be based mostly on viscosity.

Dr. Brezny asked whether they see any issues with these new oil and lubricants impacting catalyst life expectancy. Mr. Halley stated that they have gone from high-sulphated ash, phosphorous, sulphur (SAP) to low-SAP and will soon be investigating what would be needed in a no-SAP scenario.

Dr. Ayala stated that the emission reductions reported are not trivial. He asked what the incremental costs are given the fuel savings. Mr. Halley responded that individuals might not see the savings, which could be a 0.5% improvement in fuel economy, but those savings can be seen across a fleet. He further explained that lubricant market pricing can be driven as much by container size as by performance level. Having lubricants available in bulk rather than gallon containers has a big impact on the cost effectiveness of a chosen lubricant.

Mr. John Eichberger asked what the marketing and distribution plans are to ensure these new lubricants are used appropriately. He stated that there may be some back-compatibility issues making these new lubricants appropriate only for specified vehicles. Mr. Halley stated that there would likely be marketing/distribution plans for fleets and that there are interesting possibilities for light-duty vehicles (e.g., change-out of whole container of lubricant).

Mr. Karl Simon (via Mr. Kassel) asked how electric vehicles, alternative fuel vehicles and hydrogen fuel cell vehicles and other newer vehicle types fit in with advanced lubricants. Mr. Halley responded that even a pure electric vehicle needs high performing lubricants for heat transfer, and these lubricants offer opportunities to optimize hybrid and other alternative fuel vehicles.

Presentation - Carsharing Trends and Research Highlights

Mr. Rich Kassel introduced Dr. Susan Shaheen.

Dr. Shaheen presented an overview of carsharing service membership and vehicle growth trends in the Americas, North American one-way and roundtrip impacts, a recent study of Zipcar's

college/university market, and the impact on vehicle miles traveled (VMT) and GHG emissions. She also provided weblinks to recent reports and research resources.

Dr. Shaheen reported that there have been fluctuations in U.S. carsharing service membership growth, but the overall trend in North America is toward greater carsharing with greater membership growth than vehicle growth. Annual roundtrip impacts indicate that one carsharing vehicle replaces an estimated 9 to 13 vehicles, results in an estimated 34% to 41% reduction in GHG emissions per household, decreases household VMT by 27% to 43%, increases monthly household savings, and results in more users using other modes of transportation (e.g., bus, rail, biking, walking). Annual one-way impacts indicate that one carsharing vehicle replaces 7 to 11 vehicles, results in a reduction of 4% to 18% GHG per household, and reduces VMT per household by 6% to 16%. It is important to understand that impacts differ based on land use and the built environment, and average impact estimates may not be applicable to all locations.

Dr. Shaheen stated that a recent study of Zipcar's college/university market indicate that college students that use Zipcar were more likely to not buy a car or were more likely to sell or put off buying a car.

Dr. Shaheen presented the overall impact of carsharing on VMT and GHG emissions. She reported VMT reductions are greatest in urban land-use areas. Dr. Shaheen concluded her presentation by referring participants to recent report websites, a book she co-authored on the subject, and where they can find the latest information.

Mr. Kassel thanked Dr. Shaheen for her informative presentation.

Comments and Discussion

Mr. Viera stated that he would like to see a breakdown of carsharing in urban/rural/suburban areas. Dr. Shaheen responded that access patterns were not included in her recent study of car2go, but generally there are longer trips taken in rural and suburban areas.

Mr. Viera asked whether car ownership patterns affected by carsharing differs depending on the urban/rural/suburban location. Dr. Shaheen stated that there is more car dependency in rural and suburban areas. She stated that she would like to conduct more site-specific analyses, if funding was available. She also noted that Zipcar would like to do longitudinal studies. The Zipcar college/university study did look at differences in impacts based on land use environment in both Canada and the U.S.

Mr. Kliesch inquired about how long the foregone vehicle purchases extend in time. Dr. Shaheen stated this is difficult to know, as the foregone purchase information is based on consumer surveys; however, there is measurable decline in VMT in the carsharing studies, licensing rates (nationally), and car purchases (shared mobility studies, including carsharing).

Mr. Michael Iden asked what the impacts are on public transportation. Dr. Shaheen stated that all other modes of transportation already compete with public transportation options, and shared mobility services could be viewed as a form of public transportation. Research suggests that there is both competition and complementarity among shared modes and public transit. Impacts differ based on land use and the built environment, including availability of public transit. She

stated that there has been an increase in bikesharing and other microtransit options that focus on first- and last-mile connections to public transit.

Mr. Simon inquired whether there are any existing policies that have been successful in promoting carsharing. Dr. Shaheen stated that keeping taxes and insurance costs low and promoting public-private partnerships help.

Ms. Elena Craft asked whether there is a meta-analysis planned to investigate the combined effects of ride providers, such as Uber and Lyft, along with carsharing services like Car2Go. She also noted that there could be an opportunity to develop a set of recommendations for starting a carsharing program or to help one become more established. Dr. Shaheen stated that these suggestions could be pursued, but more resources would be needed to be identified to undertake this type of large study and develop a solid set of recommendations.

Mr. Don Anair inquired about the studies' VMT reduction estimation method. Dr. Shaheen stated that the studies used all carsharing miles and adjusted activity and summary data based on survey-reported VMT previous to carsharing. She stated that details are provided in the report, *An Analysis of Five North American Cities*.

Dr. Anair inquired whether there is an expectation for the carsharing membership trend to continue. Dr. Shaheen stated that there will likely be fluctuations in the market with a relatively steady growth pattern, based on historical data.

Mr. Chris Nevers asked what the general membership usage looks like. Dr. Shaheen stated that members get information from operators on how often they must drive to maintain an active membership, and active members generally use a carsharing vehicle at least once every 4-6 weeks.

General Discussion – Roundtable Discussion of Areas of Interest to the Subcommittee

Mr. Kassel began the roundtable discussion by requesting input from the subcommittee participants regarding both regulatory and nonregulatory ideas/issues that they would like the subcommittee to spend time on. He noted that numerous topics have been discussed by the MSTRS in the past.

Mr. Simon suggested input be provided on things that OTAQ can address in the next 5 to 10 years, including opportunities in other regulatory sectors, voluntary strategies, and what the EPA should be doing both policy- and regulatory-wise.

Ms. Peg Hanna suggested that there be a focus on electric vehicles and fuel cells in the heavy-duty, medium-duty and nonroad world, including gaining an understanding of the state of the technology and how to incentivize it.

Mr. Eichberger suggested that they further explore strategies on how to get higher octane fuels in the market (implementation strategies), realizing that many people involved with fuels have no experience or understanding of the regulatory process. He suggested that insurance companies may have useful information on driving behavior that could be evaluated.

Mr. Nevers agreed that octane and fuels could be investigated as a potentially low-hanging fruit for obtaining vehicle emissions reductions.

Mr. Iden noted that there is a recently-created autonomous vehicle committee at the Department of Transportation (DOT) – the Advisory Committee on Automation in Transportation (ACAT) and that the MSTRS could investigate what this group is doing and how it might interact with the MSTRS work.

Ms. Fanta Kamakate suggested that future discussions of the MSTRS include a public health perspective associated with emissions reductions. She suggested that the nonroad sector would be a good area for discussion, including understanding the possibilities for emission reductions from this very diverse sector. She also noted that advanced technologies may offer emission reduction opportunities. Innovative mobility, including understanding the environmental impacts and how can decisionmakers impact progress, could be another area for future discussion.

Dr. Shaheen suggested that they investigate mobility and alternative vehicles and the impacts of disruptions in goods delivery (such as use of drones, changes to courier network services, consumers reducing trips to retail outlets but using more delivery services). She stated that there should be future discussions with the DOT on overlapping work, and there is a need for better longitudinal tracking of transportation use trends.

Mr. Anair suggested several topics, including the potential of existing or future data to use in model validation; how the real-world data that is being collected can be used; and how vehicle on-board diagnostics (OBD) data can be leveraged to provide consumers information, such as personalized fuel economy information. He also suggested that there could be investigation into whether there are existing tests, test protocols and test data adequate to ensure that autonomous vehicle (AV) programming is most efficient.

Mr. Kassel stated that he would like the subcommittee to look at AV impacts on emissions and mobility and also the impacts of light-duty and heavy-duty AVs used in construction and other nonroad applications.

Mr. Simon suggested that the subcommittee could discuss the EPA/consumer interface and how the EPA collects and shares data. The discussion could provide the Agency with information about and what is effective and ineffective.

Ms. Craft suggested looking at vehicle and equipment life and how the actual used life of equipment and vehicles is often longer than the assumed life used in models and analyses, and how emissions and emission projections are impacted (such as for tug boats and locomotives).

Mr. Blair Chikasuye noted interest in information for differing fuels and other strategies that can reduce CO₂ and GHG emissions in the shipping and transportation sector.

Final Remarks and Adjourn

In closing, Mr. Rich Kassel reviewed the presentation information covered at the meeting and thanked the presenters and meeting participants. Mr. Kassel requested that any additional ideas for topics for future meetings be sent to Ms. Courtney McCubbin.

Ms. McCubbin thanked everyone for their attendance and adjourned the meeting.

Appendix

MSTRS Meeting Attendance List	
Subcommittee Members and Presenters	
Name	Organization
Don Anair	Union of Concerned Scientists
Robert Anderson	Chevron Global
Dr. Alberto Ayala	California Air Resources Board
Deborah Bakker	Hyundai Motor Company
Dr. Mathew Barth	Center for Environmental Research and Technology
Dr. Rasto Brezny	Manufacturers of Emission Controls Association
Blair Chikasuye	Hewlett Packard
Elena Craft	Environmental Defense Fund
John Eichberger	Fuels Institute
Sarah Froman	U.S. Environmental Protection Agency
Chris Grundler	U.S. Environmental Protection Agency
Scott Halley	Lubrizol Corporation
Peg Hanna	New Jersey Department of Environmental Protection
Michael Iden	Association of American Railroads
Dr. Tracey Jacksier	AIR LIQUIDE Research & Development
Fanta Kamakate	International Council on Clean Transportation
Rich Kassel	Tri-State Transportation Campaign
Barbara Kiss	General Motors
Jim Kliesch	American Honda Motor Company
Nancy Kruger	National Association of Clean Air Agencies
George Lin	Caterpillar Incorporated
Steven McConnell	Marathon Petroleum Company
Courtney McCubbin	U.S. Environmental Protection Agency
Dr. Matt Miyasato	South Coast Air Quality Management District
Chris Nevers	Alliance of Automobile Manufacturers
Susan Shaheen	International Journal of Sustainable Transportation
Rashid Shaikh	Health Effects Institute
Karl Simon	U.S. Environmental Protection Agency
Matt Solomon	Northeast States for Coordinated Air Use Management
Luke Tonachel	Natural Resources Defense Council
John Viera	Ford Motor Company
Molly Zawacki	U.S. Environmental Protection Agency
Other Attendees	
Ryan Beene	Bloomberg BNA
Bill Charmley	U.S. Environmental Protection Agency
Pat Childers	U.S. Environmental Protection Agency
Ezra Finkin	Diesel Technology Forum
Paul Fiore	Auto Care Association

MSTRS Meeting Attendance List	
Subcommittee Members and Presenters	
Name	Organization
Marilyn Herman	Herman & Associates
Parissa Joukar	POET
Camille von Kaenel	E&E News
Rob Kaufmann	Koch Companies Public Sector, LLC
Amy Kopin	Mitsubishi Motors
Aaron Landry	Car2Go
Amandine Muskus	Global Automakers
Chris Mylan	U.S. Environmental Protection Agency
Stuart Parker	IWP News
Julia Rege	Global Automakers
Shai Sahay	POET
Allen Schaeffer	Diesel Tech Forum
David Schultz	Bloomberg BNA
Hideharu Takemoto	American Honda Motor Company
Jim Valerio	Opus Inspection
Contractor Support	
Joanne O’Loughlin	SC&A Incorporated
Lesley Stobert	SC&A Incorporated