Federal Advisory Committee Act

Clean Air Act Advisory Committee

Mobile Sources Technical Review Subcommittee

Virtual Meeting
March 31, 2020

Opening Remarks & Introduction to Virtual Meeting

Due to increased concerns regarding the coronavirus, this Mobile Source Technical Review Subcommittee (MSTRS) meeting was held remotely via GoToMeeting™. Ms. Courtney McCubbin opened the meeting at 12:30pm on March 31, 2020, and introduced herself as the Designated Federal Officer (DFO). Ms. McCubbin thanked everyone for their patience with this virtual meeting format and proceeded to announce all meeting attendees. A list of attendees is provided in Attachment 1. Ms. McCubbin summarized the abbreviated meeting agenda provided below, which would start with remarks from Sarah Dunham, the EPA Office of Transportation and Air Quality (OTAQ) Director, followed by Karl Simon, who would provide an introduction to the individual breakout sessions. Ms. McCubbin explained that the breakout group format is designed to be attended by MSTRS members only. Materials associated with this virtual meeting, including a summary of this meeting will be available online on the EPA's MSTRS website (https://www.epa.gov/caaac/mobile-sources-technical-review-subcommittee-mstrs-caaac).

Virtual Meeting Agenda

12:30-12:45pm	**Opening Remarks & Introduction to Virtual Meeting**	Courtney McCubbin, EPA Rich Kassel, Tri-State
12:45-1:15pm	**Office of Transportation and Air Quality**	Sarah Dunham, EPA Office Director, Remarks
1:15-1:30pm	**Introduction to Scenarios**	Karl Simon, EPA
1:30-1:45pm	**Break and connect to Breakout VMRs**	
1:45-3:15pm	**Future Mobility Breakouts**	Members Only • Scenario #1 Room • Scenario #2 Room • Scenario #3 Room • Scenario #4 Room
3:15-3:30pm	**Break and connect to General Session VMRs**	
3:30-3:50pm	**Future Mobility Further Conversation**	Members
3:50-4:00pm	**Preview of September meeting, Final Remarks & Adjourn**	Courtney McCubbin, EPA Rich Kassel, Tri-State

Mr. Rich Kassel, MSTRS co-chair, welcomed everyone to the meeting. Mr. Kassel noted that he recognizes this is a challenging time and appreciated everyone helping the EPA think through important issues as the office contemplates trends in vehicle technology, fuels, personal mobility and goods movement. Mr. Kassel took a moment to thank a number of helpful staff and listed several people who have been part of the process of preparing for this meeting and taking part in the process of sharing this collective wisdom. As we all try to think about the future, Mr. Kassel noted that trends are accelerating, noting that while everyone is sitting at home, no one is traveling, and goods movement is directed to our homes now more than ever. This trend will change, Mr. Kassel noted, and he posed questions to consider including: How do we meet the environmental goals we have set out for ourselves? How do we make sure the EPA has the right tools to succeed? How do we make sure the right stakeholders are involved, *i.e.,* state level, local level, industry, environmental groups, academia, etc. How do we make sure the combination of regulatory, non-regulatory, voluntary actions, public education, and everything else that we do is successful? These are important questions, Mr. Kassel urged. Mr. Kassel stated that each breakout group will have scenarios to work through and to discuss. He thanked everyone again for their participation, including the planners of the virtual meeting, and indicated that he hoped the September meeting would be in person.

Office of Transportation and Air Quality

Ms. Sarah Dunham (EPA, Director of OTAQ) continued the meeting, also thanking the EPA team, members, and everyone else participating. Ms. Dunham expressed that she thought it was important to keep this meeting, even considering the unusual circumstances. In Ms. Dunham's opinion, the MSTRS team is really helpful and, in many ways, provides a foundation for the work done at the EPA and as a guiding post for the EPA's work. Ms. Dunham further mentioned she was glad we could pull this meeting off virtually and thanked everyone for their efforts, including Mr. Kassel for his continued great work. She thanked all EPA staff who are making sure the committee continues to move forward. Ms. Dunham specifically noted appreciation for Ms. McCubbin's efforts to ensure this meeting would take place and wished Ms. McCubbin well in her future endeavors outside the Agency pursing a different career.

Ms. Dunham indicated that the last few weeks have been unprecedented, with having all staff working remotely. She remarked that folks are continuing to do their jobs, the EPA is open, and the Agency continues to make progress and is meeting its milestones and deadlines. Moving forward, Ms. Dunham emphasized that the EPA has a number of priority areas, both related to policies and actions and in the way the Agency does its work. This includes continuing to build on the strong history of producing technically and legally defensible regulatory actions and continuing to focus on ensuring compliance. Ms. Dunham expressed that today's group and agenda can specifically help the EPA. To that end, she emphasized that it is important to maintain a long-term outlook when decisions are being made in the near-and mid-term, and that it is necessary to avoid short-sighted decisions without knowing what the emerging trends are. She remarked that it is helpful as we go forward to recognize how much has changed in the last decades. This is the 50-year anniversary of the EPA and the Clean Air Act, and overall, huge progress has been made in making the air cleaner since the 1970s. We can continue to make

great strides, and Ms. Dunham indicated that there are many emerging technologies and trends that are or will impact the transportation sector, and it is important to ask what this means for the EPA. The four emerging areas that have been identified for the MSTRS team to weigh in on, regarding where the EPA can either improve on or do things differently, include new technology and zero emissions vehicles, personal mobility, future fuels, and goods movement.

Ms. Dunham then continued by indicating that day-to-day work at the EPA is continuing. The COVID-19 crisis has brought up new questions and amid this public health crisis, there are a several things the EPA is responding to and trying to support as much as possible. For instance, several states have temporarily closed their departments of motor vehicles and made adjustments to the implementation of their inspection and maintenance programs. In some cases, inspection stations are being used to conduct health screenings for COVID-19. The EPA is working with states to follow these temporary changes and continue to provide support. In addition, Ms. Dunham noted that because the demands for various fuels is so low, the supply chains and fuel systems are backed up, which could cause further reactions. The EPA has had several requests to waive certain fuel requirements specifically to alleviate these problems. The EPA is engaged and working on responding to these requests, according to Ms. Dunham.

Ms. Dunham provided an update on the Cleaner Trucks Initiative. The Agency is moving forward towards proposing new standards for emissions of nitrogen oxides from heavy duty trucks and engines. The framework and early thinking were laid out in the advanced notice of proposed rulemaking (ANPRM) published on January 6, 2020. Ms. Dunham indicated that many of the MSTRS members provided comments on the ANPRM, and the EPA is assessing those comments and working on the proposed rule that will be issued in late spring to early summer. Ms. Dunham indicated that the EPA is planning to begin implementation requirements starting with model year 2027. This is the current timeframe the EPA is working under, but Ms. Dunham noted that the rule timing may be impacted by COVID-19.

In terms of the Renewable Fuel Standards Program, the EPA has also gotten some waiver requests, and there was a significant court decision recently that raised new questions the EPA needs to sort through, Ms. Dunham explained. The EPA continues to have the annual obligation to issue annual volume standards, and the annual volume standards for 2020 were issued last fall. Ms. Dunham noted that the EPA has already begun working on the annual volume standards for 2021.

Ms. Dunham indicated that the Agency, in coordination with the National Highway Traffic Safety Administration, has finalized a rule that sets the corporate average fuel economy and carbon dioxide emissions standards for model years 2021-2026. Ms. Dunham referred to the website[1] which has been updated with final rule package and supporting material.

Ms. Dunham described that OTAQ is working on a major update to the Motor Vehicle Emission Simulator (MOVES) model, noting that the MSTRS group has been instrumental in providing input to further improve that model, which is the most important tool available for estimating

[1] https://www.nhtsa.gov/laws-regulations/corporate-average-fuel-economy

emissions from mobile sources. The update to the model is intended to be released towards the end of the year. The new version includes substantial updates to emission rates, fuels, and default activity based on new data and analysis. It also incorporates new features including the ability to model additional idle time, according to Ms. Dunham.

With respect to voluntary programs and partnerships, Ms. Dunham emphasized that these are extremely important and compliment the regulatory tools the Agency has. These efforts continue to be valuable.

On the Ports Initiative, Ms. Dunham indicated that last February the EPA published and requested stakeholder comment on an updated draft ports inventory methods document. The EPA hopes this document will assist ports in developing a high-quality emissions inventory. Ms. Dunham urged MSTRS members to review that document, which will be an important technical tool to assist ports and their business partners.

Ms. Dunham thanked all members of MSTRS, the staff at OTAQ, and everyone for their flexibility and dedication, and expressed that she looked forward to the results of the afternoon breakout sessions on the four key topics identified.

Questions and Discussion

Ms. McCubbin asked if any members had questions for Ms. Dunham. Mr. Kassel asked if Ms. Dunham had a sense of how the current COVID-19 situation would impact ongoing efforts in terms of timing. Ms. Dunham recognized that there will likely be impacts on the timing. The situation is affecting staff and their ability to continue to do the amount of work they do. It varies by situation, program and project. So far, people have been able to deliver very good work under tight timelines, but there will be effects, Ms. Dunham expressed. The ongoing testing work at the Ann Arbor lab in Michigan is on hold, and that will have an effect on some areas of work, but Ms. Dunham was unable to speak to the exact impacts at this time.

Ms. Simone Sagovac (Southwest Detroit Community Benefits Coalition) asked if there are any updates on the state-by-state Volkswagen funding effort. Mr. Karl Simon indicated that the EPA is asking similar questions and pulling together information on what the different states are doing. Mr. Simon indicated that he would try to send some information around and possibly do a short presentation at the fall meeting on this topic. Mr. Simon indicated that in general, progress is being made, and some states are further along than others.

Dr. Elena Craft (Environmental Defense Fund) indicated that on the fuels waiver issuance, it was her understanding that it was related to a fuel shortage. Dr. Craft asked if an analysis had been conducted to determine whether there was a real need for the waiver, given that there was no fuel shortage. Ms. Dunham indicated that she would defer to Mr. Byron Bunker (OTAQ, Director of Compliance Division), remarking that historically a shortage has been the reason a fuel waiver would be issued, but it is not the only reason. Mr. Bunker responded to the question further and indicated that the actual language in the Clean Air Act (CAA) is about extreme and unusual

circumstances that prohibit the distribution of adequate supply, and that is almost literally what is happening here as it relates to the COVID-19 pandemic. In this case, the compliant fuels cannot get to the end terminal because the system is blocked by winter fuel already in the system. According to Mr. Bunker, the only way to allow the clean fuel to get to the market is to consume the winter fuel, hence the need for allowing waivers. Mr. Bunker expressed that it matches the intent of the CAA, and it is better to consume the winter fuel so the system can be turned over to lower RVP summer fuel.

Dr. Rasto Brezny (Manufacturers of Emission Controls Association) asked about the timeframe for the Cleaner Trucks Initiative. Ms. Dunham indicated that the current plan is late spring for putting a proposal out, but there are several steps that need to occur before then, and she is uncertain how the current situation will impact the proposal timeline.

Mr. Kassel thanked Ms. Dunham for her work, acknowledging the difficulties of the current situation, and appreciated the work the EPA has done to continue moving forward. Mr. Kassel offered that if any help is needed, to not hesitate to call on him or MSTRS members and to view the group members as a resource. Ms. Dunham appreciated the offer and thanked the MSTRS members for the help provided so far.

Introduction to Scenarios

Mr. Simon shifted the meeting by introducing the effort for the mobility breakout sessions to dig into the questions from the past year or two. Some of the pertinent questions related to mobility are: What are the options and how can MSTRS help the Agency? What megatrends are before us? What is going to happen with technology? How are we going to move goods and people? What fuels will power that transportation? Mr. Simon indicated that he expected to learn a lot from the breakout sessions and laid out in the scenarios document (included as Attachment 2 to this meeting summary) the structure and list of questions that would be interesting to explore. Mr. Simon explained that the individual breakout groups will have an EPA moderator and a scribe to help in discussions. Mr. Simon emphasized that the breakout groups are meant to be broad and creative and to enable a discussion to take place. The EPA has laid out a vision/scenario, but there are many pathways to an outcome, and he urged members to focus in on what the CAA allows the EPA to do or could allow the EPA to do. Mr. Simon indicated he looked forward to the results and expects valuable feedback and insight. Mr. Simon thanked everyone for their participation and keeping things moving forward during this time.

Break and connect to Breakout VMRs

Ms. McCubbin indicated that she would disconnect from the GoToMeeting platform and asked each member to connect to the VMR breakouts and return to this General Session following the breakout group sessions.

Future Mobility Breakouts

A list of the topics and MSTRS Breakout Groups is included as Attachment 3 to this meeting summary.

Break and connect to General Session VMRs

After the end of the individual breakout group sessions, the general meeting was resumed.

Future Mobility Further Conversation

Mr. Kassel opened the general meeting back up and asked if there was any impressions and key takeaways from the individual four scenarios in the subcommittee subgroups.

Scenario #1: Technology

Ms. Christy Parsons (EPA) indicated that her group - Scenario #1: (Technology) "Zero Emissions," had a great conversation related to a future world, where the majority of new vehicles have zero tailpipe emissions technology. The group discussed which analyses would be important, and they agreed that when evaluating emissions reductions, it is critical to view emissions in terms of a lifecycle and with proper consideration of fleet turnover and duty cycle. Other key points included the need to evaluate vehicle performance under differing standards and considering the educational material the EPA distributes in terms of charging infrastructure, emissions impacts related to when charging might occur, and the impacts of different types of chargers. Finally, Ms. Parsons noted that the group also discussed the importance of considering the cost-effectiveness of different approaches.

Draft notes taken by the scribe for the session during the Scenario #1: Technology discussion are provided in Attachment 4 to these meeting minutes.

Scenario #2: Personal Mobility

Ms. Lisa Snapp (EPA) also noted there was great conversation in her group - Scenario #2: Personal Mobility, ranging from legislative authority, data needs, behavior change, range of types of mobility EPA would be covering, the EPA's role regarding VMT and land use, how to work with stakeholders, upstream emissions, charging infrastructure, and what policies are needed. Ms. Snapp noted that the group asked if there should be an effort to integrate with other groups on overlapping topics (*e.g.,* items role of zero-emissions vehicles on personal movement and goods movement).

Mr. Michael Replogle (New York City Department of Transportation) added that the group also discussed the need for the EPA to do more data and information collection to help support electrification and carpooling and also to better understand and help manage and influence VMT, vehicle occupancy, and time and space management of roads in a way that reduces emissions.

Draft notes taken by the scribe for the session from the Scenario #2: Personal Mobility discussion are provided in Attachment 5 to these meeting minutes.

Scenario #3: Fuels

Mr. Michael Shell (EPA) reported a robust conversation in his group - Scenario #3: Fuels. This included discussion about the EPA's role in regulating emissions in the future, where the predominate fuels may be hydrogen and electricity rather than liquid fuels. The group considered that there may be different solutions for different locations and end use. Another theme that emerged from the session was the importance of infrastructure, recognizing that there is a lot of legacy roadway and fueling infrastructure that will need change. In the goods movement arena, the group noted that there is a shift occurring toward more localized and diversified commerce, *e.g.,* straight to home shipping. In this space, the group reflected that there should be consideration of the shift to a less centralized supply chain. The group expects the marine and aviation sector to have the most difficult transition away from liquid fuels.

Draft notes taken by the scribe for the session from the Scenario #3: Fuels discussion are provided in Attachment 6 to these meeting minutes.

Scenario #4: Goods Movement

Dr. Britney McCoy (EPA) summarized her group's conversation on Scenario #4: Goods Movement. The group focused their discussion on a society that used online orders and direct home delivery options and described EPA's role in reducing emissions in this scenario. A key point that came up was the distinction between short-haul and long-haul types of delivery, and where they end up in the supply chain process. Dr. McCoy noted coordination of delivery, coordination of trips, ensuring no empty containers, and coordination amongst federal government such as EPA, DOE, DOT. Also, she noted that some of the members felt similarly to Group 2, in that some coordination between groups may be necessary due to the overlap in topics.

Draft notes taken by the scribe for the session from the Scenario #4: Good Movement discussion are provided in Attachment 7 to these meeting minutes.

Preview of September meeting, Final Remarks & Adjourn

Mr. Kassel noted that his impression is that the groups have had four very rich conversations that have identified some key opportunities and needs regarding vehicle technology, fuels, personal mobility, goods movement, while noting that there is a lot of overlap and commonalities between these topics. Mr. Kassel noted that as we move forward and plan further conversations and white papers, there will be opportunities to coordinate between MSTRS members, not only within the individual breakout topics. Ultimately, Mr. Kassel is hopeful that the result of today's sessions will provide guidance to help the EPA tackle these very important issues. Mr. Simon indicated that he believed Mr. Kassel summarized everything nicely and agreed on his assessment of today's meeting.

Closing Remarks

In closing, Ms. McCubbin thanked everyone for participating in today's meeting and especially thanked the members for being so actively engaged in the breakout session. Ms. McCubbin noted it is her last MSTRS meeting and she has enjoyed working with everyone. Ms. Burch is the current alternate DFO and the EPA is determining how this position will be staffed going forward. The next meeting is scheduled for the fall, around the September time frame. Mr. Kassel thanked the entire EPA team and thanked Ms. McCubbin specifically for all her work and wished her the best for her future.

Attachment 1

MSTRS Virtual Meeting Attendance List[2]	
Subcommittee Members	
Name	**Organization**
Robert Anderson	Chevron Global (Chevron)
Susan Anenberg	GW Public Health
Dr. Matt Barth	CE-CERT
Michael Berube	DOE
Ms. Erica Bowman	Southern California Edison
Dr. Rasto Brezny	Manufacturers of Emission Controls Association (MECA)
Blair Chikasuye	Hewlett Packard (HP Inc.)
Steve Cliff	CARB
Dr. Dave Cooke	Union of Concerned Scientists (UCS)
Mike Cooper	Cummins, Inc.
Dr. Elena Craft	Environmental Defense Fund
Andrew Cullen	Penske Logistics
John Eichberger	Fuels Institute
Margaret (Peg) Hanna	New Jersey DEP
Michael Iden	Association of American Railroads
Dr. Tracey Jacksier	AIR LIQUIDE Research & Development
Rich Kassel	Tri-State Transportation Campaign
Jim Kliesch	American Honda Motor Company
Nancy Kruger	National Association of Clean Air Agencies (NACAA)
George Lin	Caterpillar, Inc. (CAT)
Dr. Matt Miyasato	South Coast Air Quality Management District
Elaine O'Grady	NESCAUM
Michael Replogle	NYC Department of Transportation (NYC DOT)
Joanne Rotondi	Hogan Lovells US LLP
Simone Sagovac	Southwest Detroit Community Benefits Coalition
Rashid Shaikh	HEI
Luke Tonachel	NRDC
Cynthia Williams	Ford
Dr. Kent Hoekman	Energies/Desert Research Institute
Other Attendees	
Julia Burch	U.S. Environmental Protection Agency
Craig Butler	Ohio DEP
Erin Birgfeld	U.S. Environmental Protection Agency
Amy Bunker	U.S. Environmental Protection Agency

[2] This list of meeting attendees is not comprehensive due to a number of unidentified call-in participants.

MSTRS Virtual Meeting Attendance List[2]	
Subcommittee Members	
Name	**Organization**
Byron Bunker	U.S. Environmental Protection Agency
Susan Burke	U.S. Environmental Protection Agency
Dave Cetola	Johnson Matthey
Bill Charmley	U.S. Environmental Protection Agency
Adam Cohen	Transportation Sustainability Research Center (TSRC) at UC Berkeley
Jessica Daniels	U.S. Environmental Protection Agency
Sarah Dunham	U.S. Environmental Protection Agency
Roger Fairchild	
Ezra Finkin	
Paul Fiore	
Robert Froznak	
Diana Galerpin	U.S. Environmental Protection Agency
Michelle Graff	U.S. Environmental Protection Agency
Philip Guillernette	
Tom Van Heeke	GM (alternate on 3/31/20 for Barbara Kiss, GM)
Marilyn Hermon	
Aaron Hula	U.S. Environmental Protection Agency
Tim Hogan	American Petroleum Institute
Eric Junga	
Lee Kindberg	Maersk
Paul LaRock	
Courtney McCubbin	U.S. Environmental Protection Agency
Britney McCoy	U.S. Environmental Protection Agency
Mark Monaghen	
Chris Nevers	Alliance of Automobile Manufacturers
Stuart Parker	
Christy Parsons	U.S. Environmental Protection Agency
Clay Pope	Clay Pope Consulting, Member of CAAAC
Michael Shell	U.S. Environmental Protection Agency
Karl Simon	U.S. Environmental Protection Agency
Lisa Snapp	U.S. Environmental Protection Agency
Diep Vu	Marathon Petroleum Co.
Zifei Yang	ICCT

MSTRS Virtual Meeting Attendance List[2]	
Subcommittee Members	
Name	**Organization**
Contractor Support	
Tanya Parise	SC&A, Inc.
Lesley Stobert	SC&A, Inc.

Attachment 2

MSTRS Future Mobility:
Four Scenarios for Evaluation in Subcommittee Subgroups

Objective: EPA would benefit from additional detailed feedback from the MSTRS subcommittee about EPA's role with respect to future mobility paradigms which have been discussed by this subcommittee since mid-2017.

Structure: Ahead of the March 2020 MSTRS committee meeting, members will self-select into four subgroups; each subgroup will have a specific topic to explore, as described below. It is expected that subgroups will initially meet for two hours during the March meeting, again at the following meeting in September, and on their own outside of the formal meetings, as necessary. During the subcommittee meetings, EPA will provide a moderator and scribe for each subgroup. Below, EPA proposes a scenario for each of the subcommittee subgroups to discuss. Each focuses on an aspect of new mobility in which EPA has a particular interest. The scenarios are intended to provide a foundation for each subgroup's discussion by painting a picture of a possible future for the transportation sector. The subgroup is asked to provide insight on how EPA could best ensure continued reductions in transportation emissions, *given that possible future* (i.e., assuming that this future has occurred).

For each of the scenarios, EPA challenges the MSTRS subgroups with a list of questions to initiate discussion. However, the subgroups should not feel strictly bound by the questions posed below. If there are additional questions that arise out of the subgroup's work and which the subgroup believes will be informative for EPA, they are encouraged to pursue those, as well. In addition to the scenarios and the associated questions, OTAQ will also provide a general primer piece on relevant EPA authorities and past categorial actions to help MSTRS members understand what may or may not be feasible as a potential EPA action.

Goal: By the Spring 2021 meeting, each subgroup is encouraged to produce a 15-20 page report providing feedback and insights on their respective topic. This document should assume that the subgroup's future scenario, as described below, occurs. The group should provide insights into what this would imply for EPA's near, mid, and long-term work. That is, structurally, what would need to change about EPA's work to support our mission of emission reductions while maintaining mobility and accessibility? What new factors and approaches would EPA need to consider?

Scenario #1: (Technology) "Zero Emissions"

In a world where the majority of new light-duty and heavy-duty fleets are zero tailpipe emission technologies (e.g., battery-electric, hydrogen fuel cell), describe EPA's work and role in reducing emissions from transportation while maintaining mobility.

Scenario specific questions:

- *What will be needed to ensure the technology deployment happens in a way that achieves emission reductions most efficiently?*
    - *What analyses would EPA need to conduct to evaluate the potential for emission reductions from different transportation subsectors? (e.g., light-duty, heavy-duty, buses)*
    - *How could EPA help see that emissions reduction technologies be utilized in subsectors with the greatest potential for emission reductions?*
- *What analyses will EPA need to conduct to evaluate emissions and energy efficiency from zero-tailpipe emission technologies?*
    - *What type of models or other analysis tools could EPA consider for evaluating emission impacts from electricity or hydrogen generation?*
- *What is EPA's role related to charging or refueling infrastructure?*
    - *With which stakeholders could EPA engage to better understand potential emission impacts of charging or hydrogen refueling infrastructure?*
    - *Are there criteria other than emissions impacts that EPA should consider related to infrastructure, e.g., for providing technical resources or public education?*

Scenario #2: (Personal Mobility) "Share a Ride"

In a world where the majority of people in the U.S. get from Point A to Point B using a transport mode other than a personally-owned vehicle, describe EPA's work and role in reducing emissions from transportation while maintaining mobility/accessibility.*

**Transport modes may include but are not limited to: taxis, TNCs, fixed and flexible transit, micro-mobility (bikeshare, scooters), and active transport (bike/pedestrian).*

Scenario specific questions:

- *What will be needed to ensure mobility as a service happens in a way that achieves emission reductions most efficiently? Consider both overall transportation emissions reductions and sector specific emissions reductions. Are there differences in technology applications under the different use cases? What could that look like?*
- *What is the infrastructure in place? Does EPA have a role in establishing this infrastructure?*
- *What role should data play in enabling and optimizing shared mobility towards emissions reductions while maintaining mobility/accessibility (e.g., real-time activity info, dynamic on-demand services, occupancy/location data)? What is EPA's role regarding data in this space?*

Scenario #3: (Fuels) "Future Fuels"

In a world where alternative fuels such as electricity and hydrogen are used to meet a significant percentage of the light duty and heavy duty onroad fuel demand, describe EPA's work and role in reducing emissions from the fuel pool.
Scenario specific questions:

- *Are there transportation sub-sectors where liquid fuels will be critical? If so, which ones?*
- *What actions should EPA take to provide that liquid fuels reduce emissions, particularly for fuels such as biofuels where a majority of the emissions could be upstream of the tailpipe?*

Scenario #4: (Goods Movement) "I Want My Stuff!"

In a world where goods delivery primarily happens through on-line orders and by direct-to-household-and-business deliveries, describe EPA's work and role in reducing emissions from transportation options in the supply chain (e.g. between the final distribution site and a household or business).*
**Transportation options may include but are not limited to: drone delivery, wheeled robot delivery, new delivery business models and processes, connectivity and improved intelligent routing software, 3D printing, etc.*
Scenario specific questions:

- *What will be needed to have technology deployment happen in a way that achieves emission reductions most efficiently? Consider both overall transportation emissions reductions and sector specific emissions reductions. Are there differences in technology applications under the different use cases? What could that look like?*
- *What would an efficient low-emissions goods delivery system look like? Who are the major players? What is EPA's role in this space?*
- *How can EPA best utilize, or encourage utilization of, data to enable and optimize low emissions deliveries? (e.g., real-time activity info, intelligent routing software, etc.)*

Questions for all scenarios

OTAQ has historically undertaken an array of approaches to achieve its mission of reducing emissions of air pollutants from transportation. For each scenario, consider the following questions:

- *What are the opportunities and challenges that may arise in each scenario?*
- *What factors are most important for positive environmental outcomes?*
    - *What approaches could EPA consider to address factors that are important for positive environmental outcomes? (e.g., EPA voluntary programs, new regulations, public education)*
    - *What should EPA keep doing? What needs to change moving forward?*
    - *In what timeframes should EPA consider utilizing the above approaches?*
- *What type of information would EPA need?*
    - *What data gaps need to be filled?*
    - *What additional research is needed?*
    - *Which stakeholders would EPA need to engage with?*
    - *Which metrics provide the best measuring stick for assessing emissions, both impacts and reductions?*
    - *Is real-time data needed?*
        - *If so what role would real-time data play in reducing transportation emissions in the given scenario?*
        - *What temporal and spatial aspects of data will be particularly relevant to understand?*
    - What information and tools could EPA develop to help educate the public about new mobility options and reducing emissions from transportation?
- *What tools/skills/authority would EPA need to continue reducing transportation emissions in the given scenario?*
- *What role would other stakeholders (local, state govt, industry, NGO, etc.) play in this evolving landscape?*
    - In addition, how would recommendations change considering the following:
    - *Higher levels of automation*
    - *Varying levels of advanced technology penetration*
    - *Legacy fleets*
    - *Urban and rural travel settings*
    - *Activities to mandate or reduce use of certain technologies in other countries*
- *What other new concepts are emerging that we need to take into account – what is the next disruptor? (e.g., vertical take-off and landing (VTOL) vehicles, drones, robot delivery, micromobility, new forms of transit, combined goods and people movement)*

The table below can be a helpful way to organize ideas.

	Timeframes		
EPA Approaches Table	Near Term 5 years	Medium Term 10 years	Longer Term 30 years
EPA Knowledge Building and Stakeholder Engagement			
Public Education and Tools			
Non-regulatory Approaches			
Regulatory Approaches			

Attachment 3

MSTRS Breakout Groups

Scenario #1: Technology

Moderator: Christy Parsons, EPA
Scribes: Amy Bunker and Susan Burke, EPA
Additional Technical POC: Bill Charmley, EPA

Members:
Zifei Yang, ICCT
Jim Kliesch, Honda
Rasto Brezny, MECA
Steve Cliff, CARB
Susan Anenberg, GW Public Health
Barbara Kiss, GM
Cynthia Williams, Ford
Luke Tonachel, NRDC

Scenario #2: Personal Mobility

Moderator: Lisa Snapp
Scribe: Aaron Hula
Additional Technical POC: Rich Kassel, Tri-State, MSTRS Chair

Members:
Dave Cooke, Union of Concerned Scientists
Elaine O'Grady, NESCAUM
Adam Cohen, UC Berkeley
Erica Bowman, Southern California Edison
Michael Repogle, NYC DOT
Matt Barth, CE-CERT
Simone Sagovac, SW Detroit Community Benefits Coalition
Vince Valdes, US DOT

Scenario #3: Fuels

Moderator: Diana Galperin
Scribe: Michael Shell
Additional Technical POC: Byron Bunker, EPA

Members:
John Eichberger, Fuels Institute
S. Kent Hoekman, Desert Research Institute
Bob Anderson, Chevron
Tracey Jacksier, Air Liquide
Rashid Shaikh, HEI
Michael Berube, DOE
Joanne Rotondi, Hogan Lovells
Diep Vu, Marathon

Scenario #4: Goods Movement

Moderator: Britney McCoy, EPA
Scribe: Jessica Daniels, EPA
Additional Technical POC: Karl Simon, EPA

Members:
Michael Iden, Association of American Railroads
Nancy Kruger, NCAA
George Lin, Caterpillar
Elaina Craft, EDF
Mike Cooper, Cummins
Andrew Cullen, Penske
Matt Miyasato, South Coast
Margaret (Peg) Hanna, NJDEP
Blair Chikasuye, HP

Attachment 4

MSTRS Future Mobility Breakout Session #1: Technology Scenario
Draft Notes Taken by Session Scribe

Members:
✓Zifei Yang, ICCT
✓Jim Kliesch, Honda
✓Rasto Brezny, MECA
Steve Cliff, CARB
Susan Anenberg, GW Public Health
✓Tom VanHeeke, GM (alternate on 3/31/20 for Barbara Kiss, GM)
✓Cynthia Williams, Ford
✓Luke Tonachel, NRDC
✓Clay Pope, CAAAC

✓Designates members in attendance at the 3/31/2020 meeting.

EPA:
Moderator: Christy Parsons; Technical POC: Bill Charmley; Scribes: Amy Bunker and Susan Burke; Julia Burch, EPA

Scenario

In a world where the majority of new light-duty and heavy-duty fleets are zero tailpipe emission technologies (e.g., battery-electric, hydrogen fuel cell), what will EPA's work need to look like to best ensure reduced emissions from transportation while maintaining mobility?

Questions/comments on scenario or goals for the day

Question: Is this about how to get to this scenario? Response: No, please generally assume that the scenario has occurred. Consider that given that the majority of new light-duty and heavy-duty fleets are zero emission vehicles (ZEVs), what EPA's work will need to look like to best ensure reduced emissions from transportation while maintaining mobility. However, some of the scenario-specific questions ask you to consider how EPA could/should prepare for this future, so it would also be helpful to understand how to best ensure continued reductions while the transition to the scenario is occurring.

Question: what does "majority of new light- and heavy- duty fleets" mean? Response: This scenario is not intended to be prescriptive of quantity/share, but it would be helpful to consider that there are still ICEs on the road (not exclusively ZEVs).

Key Questions

Key Q1: What will be needed to ensure the technology deployment happens in a way that achieves emission reductions most efficiently?

Over next 5–10 years - Transition period, EPA should look at policies for consumer acceptance. Examples: fuel costs, international approaches, taxation (note taxation is not currently in the EPA toolbox), engaging state and local policy makers on potential approaches they could consider for incentivizing ZEVs.

Look at low carbon fuels, like E-fuels; incentive mechanisms for some of these fuels so that non-ZEV vehicles are also transitioning to lower carbon operation.

Consider different metrics for fuel economy and GHGs.

What analyses would EPA need to conduct to evaluate the potential for emission reductions from different transportation subsectors? (e.g., light-duty, heavy-duty, buses)

Need to look at life-cycle analyses for both fuel cycle (well to wheel) and the vehicle cycle. GREET is a useful tool. Look at where greatest reductions can come from across different vehicle subsectors. How do we ensure that we are continuing to drive emissions down? Need to understand the effects of the rate of transition to a zero emissions fleet. Modelling the rates of fleet turnover with the transition in each subsector.

Scenario planning and analysis. Take a look at heterogeneity of turnover within subsectors (rate of transition to zero or net zero emissions). Also look at what types of customers are moving early or moving late (both in light- and heavy-duty subsectors). This will help to target incentives to slow moving market areas, e.g., high VMT consumers may have more range anxiety. Should consider duty cycles, rural vs urban drivers, and usage patterns.

How could EPA help see that emissions reduction technologies are utilized in subsectors with the greatest potential for emission reductions?

See recommendations for analyses above.

Key Q2: What analyses will EPA need to conduct to evaluate emissions and energy efficiency from zero-tailpipe emission technologies?

See comments on lifecycle analyses under Q.1.
Need performance metrics and durability standards for electric and fuel cell vehicles to make sure things like batteries, battery components and driving range enable emissions reductions.

Need to monitor real-world, in-use performance to ensure emission reductions. What are the technologies for monitoring performance, and how will we certify those technologies?

Investigate technologies that can help to improve fuel consumption of ICEs.

What type of models or other analysis tools could EPA consider for evaluating emission impacts from electricity or hydrogen generation?

Need bottom-up and top-down analyses to understand market scenarios and potential reductions.

GREET is a tool to consider for upstream/LCA.

Key Q3: What is EPA's role related to charging or refueling infrastructure?

Educational materials about when to charge and the impacts on emissions; and about interoperability and connectivity of charging stations.

Secondary vehicle market and multi-unit dwellings will need infrastructure.

With which stakeholders could EPA engage to better understand potential emission impacts of charging or hydrogen refueling infrastructure?

Are there criteria other than emissions impacts that EPA should consider related to infrastructure, e.g., for providing technical resources or public education?

Analyses to identify the most cost-effective tons to remove.

Other topics

Question: When will EPA be making MOVES model updates to reflect current emissions from the heavy-duty fleet? Response: Goal is to release updated version of MOVES before the end of the year.

Group Synthesis

Emission reductions should be viewed through the lens of a lifecycle analysis with proper consideration of fleet turnover and duty cycle, as well as efficient usage across different sub-sectors.

Fuel standards for low carbon fuels (this topic may be part of the fuels scenario).
Need performance and durability standards for electric vehicles to make sure things like batteries, battery components and driving range enable emissions reductions. Need to monitor real-world, in-use performance to ensure emission reductions.

Consider analyses to identify the most cost-effective tons to remove, including differences in region and time of day.

Need bottom-up and top-down analyses to understand market scenarios and potential reductions.

Educational materials about when to charge and the impacts on emissions; and about interoperability and connectivity of charging stations.

Roles and Responsibilities
Jim Kliesch and Cynthia Williams will co-lead

Check-in Call?
June check in call proposed – to be scheduled

Ideas for a Rough Timeline

- Writing through summer
- September is another working meeting
- Fall and winter – more refinement
- Deliver a report in the Spring

Attachment 5

Scenario #2: (Personal Mobility) "Share a Ride"
Draft Notes Taken by Session Scribe

Scenario #2: (Personal Mobility) "Share a Ride"
In a world where the majority of people in the U.S. get from Point A to Point B using a transport mode other than a personally-owned vehicle, describe EPA's work and role in reducing emissions from transportation while maintaining mobility/accessibility.*

**Transport modes may include but are not limited to: taxis, TNCs, fixed and flexible transit, micro-mobility (bikeshare, scooters), and active transport (bike/pedestrian).*

Moderator: Lisa Snapp
Scribe: Aaron Hula
Additional Technical POC: Rich Kassel, Tri-State, MSTRS Chair

Members in attendance:
Dave Cooke, Union of Concerned Scientists
Elaine O'Grady, NESCAUM
Adam Cohen, UC Berkeley
Michael Repogle, NYC DOT
Matt Barth, CE-CERT
Simone Sagovac, SW Detroit Community Benefits Coalition

Members not in attendance:
Erica Bowman, Southern California Edison
Vince Valdes, US DOT

Introduction by moderator, recapping goals of the group as outlined in the main session. What should EPA be thinking about in the personal mobility space as these trends emerge? Familiarize the team with the scenario and questions, and figure out procedurally how the team wants to operate.

These are the 4 scenarios, we're scenario #2 on shared mobility. Focus on this scenario is a reality, don't worry about how we get there. Our expectation is that our work will have to change, we're looking to you to help us figure that out.

- Should there be some kind of integration towards the end? Mobility vs electrification, etc.

Moderator – Good question, something we might have to talk about, realize that some subgroups will bleed into each other.

- Include topics that reduce mobility needs? Tele-commuting? Can we broaden this to include pooling and non-vehicular modes (active transportation, also synergies with goods movement.

- Doesn't EPA need to start work before scenario happens to achieve a desirable outcome?

Moderator We didn't want to focus on the barriers, but okay for team to discuss near term as well. Introduction to the goals and scenarios slide - Don't want to limit access or mobility.

- Also considering EPA's role in the transition to that future?

Moderator – Primary focus is assuming the scenario becomes real. Don't want to focus on if it can occur, okay to explore, but assume it will occur.

- I think we're well on our way so I think it's a good approach.

Moderator – If we just have a subscription service instead of owning a vehicle, is that better? Research is starting to say maybe not. EPA needs to know what does good look like.

A lot of what we need to do is manage VMT, which EPA doesn't regulate and will be difficult challenge to work with DOT. How do we think about this?

Moderator – Current legislation doesn't require specific metrics, so could think about gram per passenger mile for example. How do we encourage clean mobility? It's possible that that's allowed under the Clean Air Act. Think broadly.

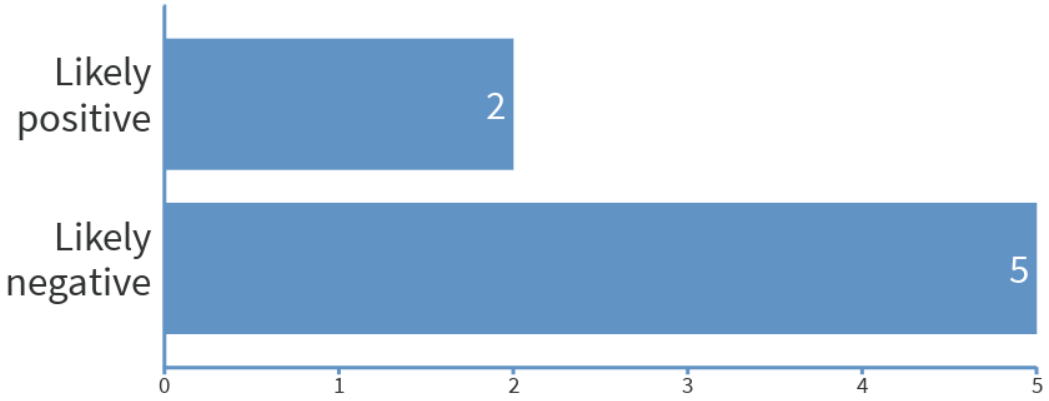
- Transport could become more of a managed utility, where we manage vehicle travel with a system of time/place/emissionbased road charging. EPA, working with states, could become a utility manager, which is a different way to think about this outside the box.

- Incentivizing certain behaviors is an important tool and is similar to a voluntary program.

Moderator – Matrix slide, use as a possible template to organize what a report might look like. Three poll questions:

Poll locked. Responses not accepted.

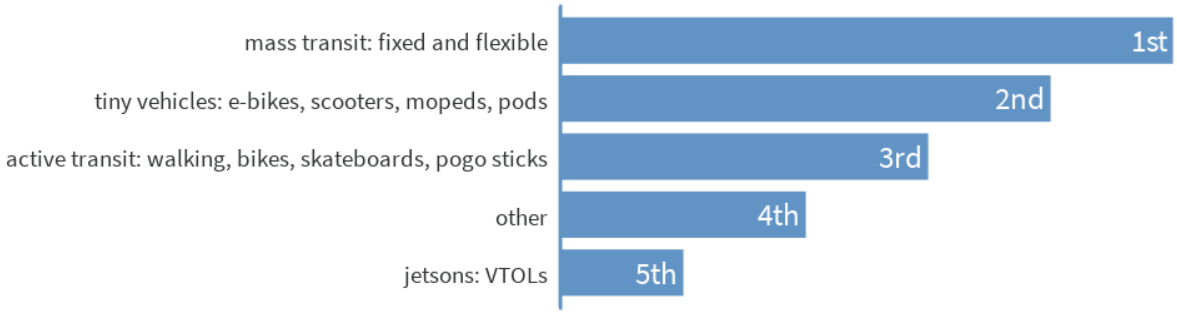
In the absence of policy, are new mobility options likely to positively or negatively impact emissions and the environment?



Poll Everywhere

Poll locked. Responses not accepted.

Rank these options in terms of their potential to contribute towards our long-term emission goals while maintaining mobility/accessibility



Poll Everywhere

Poll locked. Responses not accepted.

Word cloud! What are the most important things for EPA to consider in this changing world of personal mobility? Answer up to 3 times.

Poll Everywhere

Scenario specific questions and discussion:

What will be needed to have deployment of shared mobility happen in a way that achieves emission reductions most efficiently? What is EPA's role here?

- There is a need for EPA to categorize strategies in terms of strategic, tactical, etc. For shared mobility there is a tactical role for waste and life cycle, also important strategic role to partner with other agencies on things like the built environment to reduce emissions.

- For shared mobility to achieve maximum benefits, we need to move surface transportation into more of a managed utility framework which needs to happen in conjunction with time/place/emissionbased road charging. Need market incentives on scarce road and emissions capacity.

- Here's a framework to organize/prioritize my thinking: 1) we need vehicle emission standards, which are designed to electrify as much of the vehicle fleet as possible, and with increasingly renewable power, 2) we need to manage VMT, and 3) we need to implement carbon budgeting to bring both together.

  Two big things, electrification and pooling. EPA's role initially is data collection. Need consistency and national data. Fleet standards and voluntary programs to support standards.

- Coordinate and communicate using data collected at the local level, for example zoning decisions are made at the local level and could eventually impact the built environment.

- Echo points made about TNCs, CA clean miles standard is a good template. Interconnect between that and mode sharing, not sure if EPA can bridge. Data is great, can use a stick to get some data, unclear even if pilot programs, scooter operators, how you encourage that data to also be shared. Challenge = getting some of these companies to share data.

What is the infrastructure in place in this future? Does EPA have a role in establishing this infrastructure?

- Thinking about data portals and some way of sharing information real time on how the modes of transportation are performing.

- Challenging enough doing normal infrastructure like charging stations; in terms of EPA's role, struggling a little bit here. Cities are engaged in the data part, but there is no consistency. Might be an area for DOE/DOT to come up with standard reporting mechanisms, might help move from local data level to broader data sharing.

- Regarding EV charging, EPA could also assess the air impacts of having infrastructure in place -> SIPs and 105 grants for rural or disadvantaged communities. CMAQ funds, settlements, such as the VW settlement.

- When I think about infrastructure, I think of two components: Physical part, and digital part. Agree with data and monitoring data part. Physical infrastructure is outside EPA's traditional role. Need to focus on policy on pooling and pricing, and policies that support active transportation and small motorized devices. Focus should be policy.

- Microeconomic incentive level: first we need private PII-protective framework to monitor and bill transport users for transportation, private sector but with public aggregation. We also need to build off CAA structure, with the intent to make more flexible and integrated, into an emerging smart mobility and travel framework. Under CAA, can we use Reasonable Further Progress part to lead into SIPs, and then tie into mode share goals, tradable credits, zero emission micro-mobility, incentivize zero emission travel, telecommuting, etc.

- Data, EV charging infrastructure, roadway infrastructure (more of a DOT role), connected and automated vehicles – roundabouts versus traffic signals, automated they can support as much flow. How can we change roadway infrastructure to minimize emissions, including CAVs?

- There are crazy things in the federal/state/local interaction right now, for example it is very difficult to use federal funds for bike lanes. Need to change regulatory structures to stop disincentivizing reallocation of road space.

- Need to think about where we locate things that people need to get to. Beyond how roads are designed, but also how we design cities.

What role should data play in enabling and optimizing shared mobility toward emissions reductions while maintaining mobility and accessibility? What is EPA's role here?

- Collecting data from TNCs and micro-mobility companies, are they increasing or decreasing emissions or both? To inform future regulatory work or policies that EPA might put in place.

- EPA needs to play a greater role as a data clearing house about occupancy time of day, mode use, price people pay for travel, and set up (with DOT?) a better mobility observatory nationally. Also ensure that local regulators have better access to data.

- There's a tug and pull with built environment and modes of transit we use; an important way EPA can reduce emissions is partnerships with DOT/HUD to encourage mixed use development and break down barriers. Much of the US built environment is suburbs, lots of cul-de-sacs, how do we develop targeted solutions for challenging land use questions? How do we adapt a rigid built environment that's not conducive to solutions?

- EPA is in charge of reducing emissions, and much of transportation is about getting around, hard to determine what EPA's role should be.

- Will emphasize the importance of time/place issue of data. Particularly important when and where you are emitting, particularly for criteria emissions. Need better data for source of electricity and how that plays into transportation.

- We only look at direct GHG emission in oft-quoted 24% of GHG, closer to 40% with life-cycle. EPA has a role to play in educating the public and how that changes over time.

- Regarding public information and EPA's role, people are understanding more that data can impact the decisions that they make for travel. Consider the privacy of data gathered into the future.

Moderator - Thanks, hopefully this is a start to many great conversations. In addition, the documents laid out some questions for all scenarios, covering the sorts of things that we hope will come out of feedback over the next year. How do we proceed?

- Definitely want to be involved but next 3 months will be full.
- Also interested in being involved but can't take on leadership role.
- Same.
- Same, maybe start with an outline?

- Makes a lot of sense.
- Key resources group might be able to share?
- Minutes could guide an initial outline?
- Mid/near/long term matrix also useful.

Attachment 6

Scenario #3: Fuels
Draft Notes Taken by Session Scribe

Moderator: Diana Galperin, EPA-OTAQ-TCD
Scribe: Michael Shell, EPA-OTAQ-TCD
Additional Technical POC: Byron Bunker, EPA-OTAQ-CD

Members:
John Eichberger, Fuels Institute
S. Kent Hoekman, Desert Research Institute
Bob Anderson, Chevron
Tracey Jacksier, Air Liquide
Rashid Shaikh, HEI
Michael Berube, DOE
Joanne Rotondi, Hogan Lovells
Diep Vu, Marathon

Our Task
In a world where alternative fuels such as electricity and hydrogen are used to meet a significant percentage of the light duty and heavy duty on-road fuel demand, describe EPA's work and role in reducing emissions from the fuel pool.

Are there transportation sub-sectors where liquid fuels will be critical? If so, which ones?

What actions should EPA take to provide that liquid fuels reduce emissions, particularly for fuels such as biofuels where most of the emissions could be upstream of the tailpipe?

What could and should EPA's role be in this new world?

Brainstorming

The group went through a visioning exercise where the questions in italics below were asked of the members.

> Visioning exercise:
> *Imagine it's sometime in the next few decades. And we're in a world where alternative fuels such as electricity and hydrogen are used to meet a significant percentage of the light duty and heavy duty on-road fuel demand.*
>
> - *Think about a typical day- how are you going to work? What's around you? What do the streets and houses look like? How are you getting around to run errands?*
>   - Members described their daily routines and how those may change in the future. Members noted that there are differences between urban and rural environments and how those would change in the future. Several members

noted that POVs will continue to remain primary source of transportation, so day-to-day life will not change due to new modes of charging. They pointed out that there may be other ways our environment differs- such as apartment buildings will need to have distributed charging, we will need new safety precautions for pedestrians, but we may need fewer sound barriers. There may also be more living infrastructure. Another member pointed out the need for better city design to manage traffic flow and new types of chargers. Members agreed that there will be a lot of in-home charging but still pointed to the need for public chargers. Members agreed that the latter charging infrastructure will be critical for longer trips and imagined them being place on highways.

A member also highlighted the importance of freight and commerce and thought that growth of this sector could spill out onto the roadway as we'd see a great mix of commercial vehicles and less light duty vehicles on the road. Another member envisioned that we may also be sharing the road with autonomous vehicles and robots and may have dedicated lanes for this. Other members discussed the increase role of sharing in the future, including the sharing of roads between modes, increased micromobility use, and mobility-as-a-service

- *Now it's the weekend: where are you going? How are you getting there?*
  - One member noted that the use of an autonomous vehicle would be preferred for weekend activities, particularly for an aging population.

- *Now vacations, how are you getting there?*
  - For vacations, members noted a desire to use airplanes and trains to travel further. Most members agreed that electric airplanes will not be options in the next few decades, and instead see as continuing to be liquid fuel based.
- *Now think about goods- How are you getting goods? How are stores getting goods?*
  - Members noted several possibilities for the quickly growing sector of goods delivery. One member saw even further use of localized distribution centers with smaller delivery trucks. The member felt that this trend would result in a greater reliance on a diversity of fuels and particularly natural gas.
  - Members also noted several other technologies that are on the horizon of impacting goods delivery. These included drones and robots to deliver goods, 3D printing of goods, more use of rail for transporting goods, and vehicle platooning for efficiency gains from long-haul delivery.
  -

<u>*Discussion Questions:*</u>

- Members were then asked to discuss the sources of emissions from this future world.
- *In this world, where do people think largest emissions are going to come from?*
  - One member discussed agricultural zones as being large zones of emissions. Another member noted that electricity would have to transition to renewables in

order to decrease emissions stress on the system. Finally, a third member felt that the aviation and maritime sectors would continue to use hydrocarbon fuels and this would be a large source of emissions.

- *How can emissions sources in this world be abated?*
    - One member asked whether this question was addressing GHG or criteria pollutants. The member felt that for criteria pollutants there was enough of a long history of cleaning up the air without structural changes, whereas addressing GHG pollutant require a wholesale change in the economy to transition ot non-fossil fuels.
    - Another member felt that regardless of whether the discussion centers on GHG or criteria pollutants, there will be a greater diversity of where fuels come from in the future. Several members agreed that an LCA approach to policy decisions about which of these fuels are used would be important to harmonize and understand the emissions impact of those fuels. Another member also said that a cost benefit analysis would also be important in the future to assess fuels.
    - Members noted several strategies including a higher dependence on public transport, connected vehicles, and tele-commuting.

Discussion: Ran out of time; saving rest of discussion topics for future conversation

Next Steps:

- For next steps, the members agreed to continue to meet on their own through the summer and several of the members volunteered to play an organizational function.

Summary/Themes

- Different solutions for different uses and locations.
    - Rural vs urban
    - Short- vs long- trip
    - Depending on landscape more could be the same vs different
    - There are instances where EVs could satisfy most mobility demand, but there will be circumstances where it won't
- Infrastructure will be both necessary but also a challenge
    - There will need to be a lot more fueling infrastructure to facility a high alternative vehicle world for passenger mobility. There will be large swaths of the population that won't be able to rely on home charging.
    - Currently a lot of legacy infrastructure between roads, fueling infrastructure, and urban landscapes. This is a barrier to transitions to new technologies and systems.
    - The intersection of pedestrians and vehicles will become more important because of 1) the quiet nature of EVs and 2) the introduction of autonomous vehicles (and robots); infrastructure should be thoughtful of these relationships
- How goods are delivered has been changing and will continue to
    - Commerce is becoming more and more localized, and delivery is becoming more diversified. With this comes an increasing importance on ensuring supply chain resilience.
- Emissions:
    - Marine and Aviation will be hardest sectors to transition away from liquid fuels
    - How we generate electricity will be increasingly important.

- Teleworking and virtual workspaces on a more wide-spread basis are an opportunity for substantial emissions reductions
- In determining which future fuels should be promoted, policymakers should employ LCA and CBA

Attachment 7

Scenario #4: Future Mobility Breakout: Goods Movement Session (I Want My Stuff!)
Draft Notes Taken by Session Scribe

MSTRS Members in Attendance:
Michael Iden, Association of American Railroads
George Lin, Caterpillar
Elena Craft, Environmental Defense Fund
Margaret (Peg) Hanna, New Jersey DEP
Drew Cullen, Penske

Other Members in this Breakout Session:
Nancy Kruger, NACAA
Mike Cooper, Cummins
Matt Miyasato, South Coast AQMD
Blair Chikasuye, HP

EPA Staff:
Britney McCoy, Moderator
Jessica Daniels, Scribe
Karl Simon, Technical Point of Contact

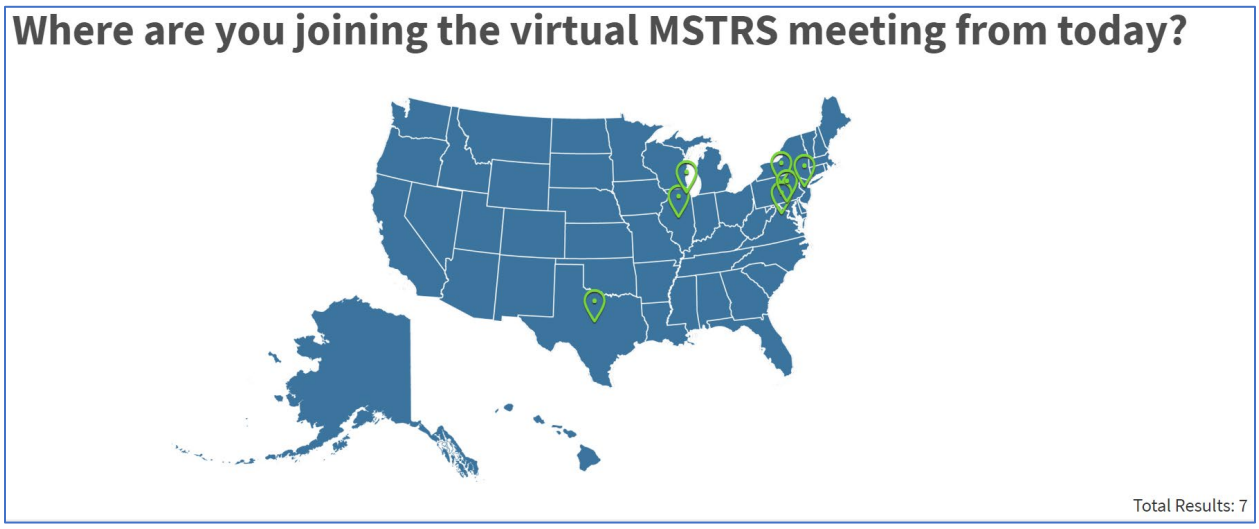
Materials Provided:

- Scenarios Document (see Courtney McCubbin's 3/28/2020 email)
- One-pager document with background information (see Britney McCoy's 3/28/2020 email)
- Slides (see Britney McCoy's 3/28/2020 email)

Breakout Session Notes:

The moderator began the session with a brief group activity to see where everyone was calling from.

Poll 1 results:

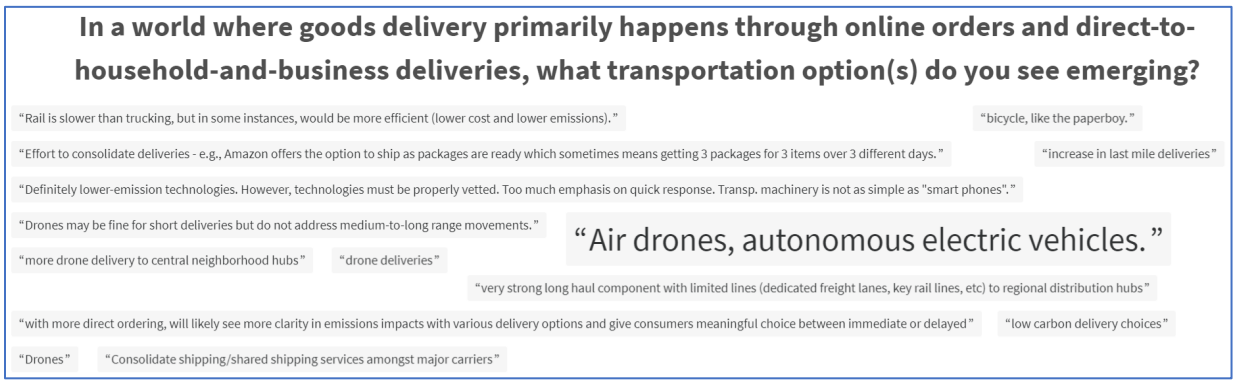


Then, she reviewed the meeting objective, ultimate goal, desired outcomes for the Goods Movement Session, tools for a successful session, key questions to consider, and a brief background on greenhouse gas emissions in the United States and by transportation sector.

The "Goods Movement" definition from the Ports Initiative was introduced. One member helped develop the definition and indicated that, by design, it had to be broad to include all of the various sectors that play a role. Another suggested that differences in mileage hauled should be acknowledged (e.g., around 50% of truck and rail tonnage moves 500-2000 miles).

When reviewing the supply chain process, it was agreed that adding a distinction between short-haul and long-haul trips to the definition would be reasonable. One member noted that consumers are important supply chain stakeholders as well.

Poll 2 results:



One member wanted to expand on the comment about consumers being a stakeholder: several existing methods of transportation are provided to consumers because that's what transportation providers *believe* consumers want. There's a chicken/egg thing happening – do we want to change consumer behaviors or let the transportation community dictate what options are going to be provided?

Another member said we need to keep in mind that four entities are involved in planning: the transportation industry (i.e., ultimate deliverers of gross ton miles), and then within the Federal government there's EPA (i.e., with respect to emission), DOT (i.e., involved in various efforts, such as autonomous vehicles), and DOE (e.g., whose SuperTruck2 program doubled the mileage of Class 8 trucks). This consortium of disparate entities is not necessarily in sync.

A member suggested that additional agencies may play a role in the future of goods movement that have not been involved before, such as the Department of Homeland Security (i.e., whoever regulates drones and the legal implications of full-scale deployment, for example). Maybe EPA could champion or develop a way to integrate more voices and perspectives into one larger conversation.

The moderator moved on to explain the Topic Map and where some technologies fit within the triangle of research coverage, state of development, and degree of variance. This was followed by brainstorming responses to the following question:

> *Based on this [goods movement] scenario, what will be needed to have technology development happen in a way that achieves emissions reductions most efficiently?*

Round-robin responses were offered by group members as follows, with similar responses grouped together:

- Various types of coordination:
    - Consolidation of trips
        - Abilities for crowdsourcing
        - Can delivery companies work together?
        - "Uber for freight" mechanism expanded; bid offer system with individuals too
        - Leaving without a load – address empty miles
    - Systemic coordination
    - Coordination with FAA (drones)
    - Integrating across the nodes more holistically

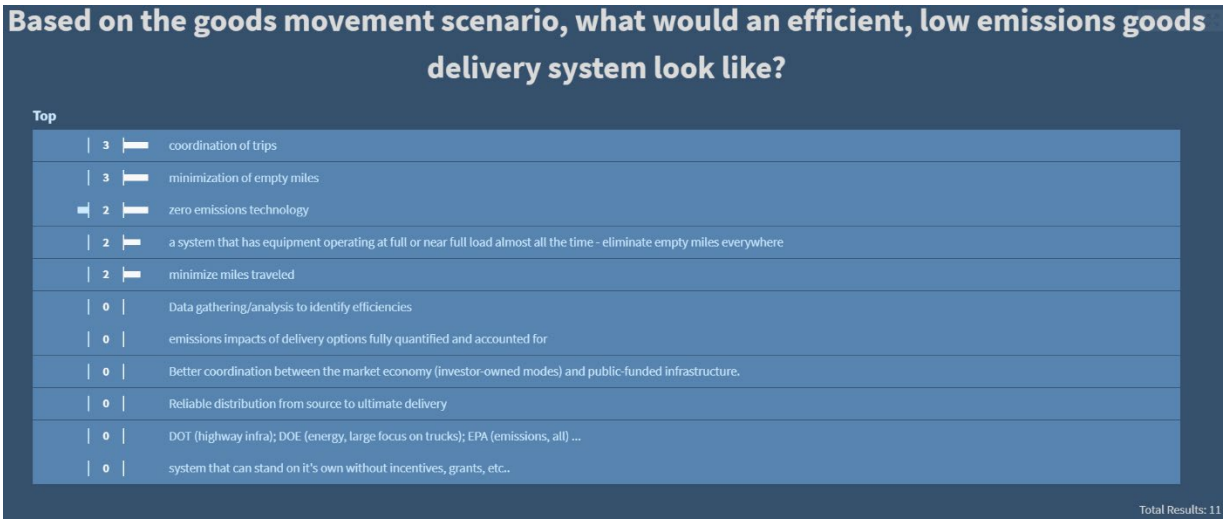
- Clear standards:
    - Zero emission standards on engines
    - Tighter fuel economy standards for medium- and heavy-duty sectors
    - Regulatory, longer-term clarity that supports making large investments and working towards changes (e.g., to develop and acquire machinery and capital)
        - e.g., Tier 5ish?

- Careful consideration of the full range of deployment needs:
    - Consider support infrastructure for tech deployments to mobilize these technologies – maintenance, breakdown services, etc.

- Adequate testing:
    - Testing for EVs to ensure battery mileage claims are valid
    - Time to test, test, and test before implementing new technologies

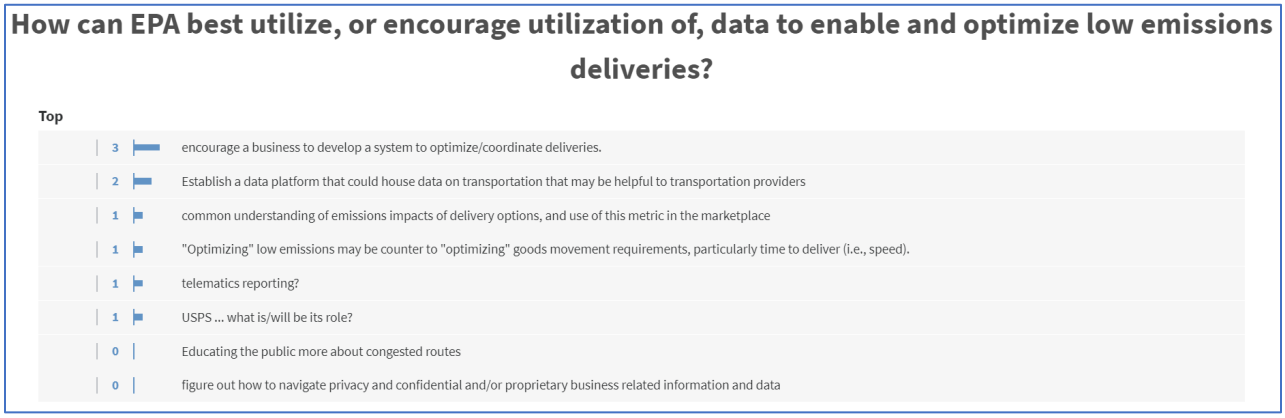
- Other:
    - Role in looking at what happens to used batteries
    - Funding for advancing ZEV technologies

Poll 3 results:



Members suggested that some of these poll responses could be grouped together, such as: minimization of empty miles, minimize miles traveled, coordination of trips – they're all in the same bucket.

Poll 4 results:



To expand on the poll response about USPS, one member proposed that maybe daily mail delivery is becoming less critical. For example, the person does not need to get mail every day, Monday through Saturday; Canada has mail delivery only five days a week. There could be emissions reduction potential there. EPA asked if restructuring deliveries (e.g., so that goods are moved less in the last mile while pushing more on the back end) would help with congestion and

emissions or be counterproductive. The member suggested that optimizing a system for low emissions may be not be the same as optimizing the system for goods movement. Maybe the service of getting mail, scanning mail, and sending an email about mail delivered could be expanded to avoid delivery to every house every day. Of course, in reality, to save a trip this may require lots of people on a given day saying they do not want mail, but in principle it could work.

Another member liked this mail idea. As the world becomes more automated, personal decisions like that could help. Maybe EPA could host a convening with various transportation delivery providers (e.g., Amazon, and maybe others) on technologies that could help support these kinds of initiatives, to get a lay of the land in terms of what is being done. EPA as a convener focused on transportation technologies could be helpful.

> *Later clarification:* EPA could be a convener on technology not for technology's sake, but to reduce emissions. Maybe EPA could publish guidance on low carbon delivery options or engage on last mile door-to-door types of deliveries.

NEXT STEPS:

- Several members expressed interest in a June check-in call
    - See what members are interested in and where, in those particular areas of interest, there is expertise
- There was additional clarification on what a final product could look like:
    - The document may need to include some background information
    - Maybe think through and categorize some of today's ideas
    - Provide any insights that might be useful to EPA's work in the short-, medium-, and long-term
        - e.g., In terms of a collaboration role – this is in EPA's wheelhouse, so consider including a few paragraphs on key stakeholders with bullet points to help flesh out ideas (i.e., like a legal brief; what makes sense in terms of language)
    - Identify and include relevant research questions or data needs
- There may be opportunities to synchronize with other scenario groups, but each group's outline and final product will be different
- EPA is still sorting through interns, but at this time cannot offer potential help with background research
- Note the table provided to help organize ideas, in case it is useful:

	Timeframes		
EPA Approaches Table	Near Term 5 years	Medium Term 10 years	Longer Term 30 years
EPA Knowledge Building and Stakeholder Engagement			
Public Education and Tools			
Non-Regulatory Approaches			
Regulatory Approaches			

EPA raised the point that the coronavirus pandemic is an experience that we are all going through together, in terms of how we are seeing different modes getting goods to people. We do not know the impacts per se. For example, are grocery stores changing their behaviors in ways that are more sustainable? But, it would be beneficial to think about what we are learning during this experience and what could continue moving forward.