Minnesota Pathways to Decarbonizing Transportation

Technical Stakeholder Meeting #2

MnDOT Central Office | TEC Center
395 John Ireland Blvd | Saint Paul, MN 55155
May 16, 2019
2:00 pm to 4:00 pm

Agenda

1:30 pm   Registration and Networking

2:00 pm   Welcome from Tim Sexton

2:05 pm   Introductions and Meeting Overview

2:15 pm   Pathways Modeling, Tory Clark

- Background and objectives
- Feedback received from meeting #1
- Present initial modeling results

3:00 pm   Q & A with E3

- Clarifying questions on results, assumptions, and scenarios

3:15 pm   Small Group Discussions

Groups

- Transit/Electric Transit/Heavy Duty
- Community Design/Planning
- Electric Vehicles
- Biofuels & Other Low Carbon Fuels

Questions

- Are there specific assumptions you would change?
- What seems too aggressive or not aggressive enough?
- What are you most excited about?
- Do the initial results reflect what you envisioned? Why or why not?
- Are the results realistic?
- Do you have any other feedback that hasn't been addressed thus far?

3:55 pm   Closing Thoughts & Next Steps

4:00 pm   Adjourn

Getting there

- Transit: Plan your route using Metro Transit's website
- Parking: Ramp F or street parking available

Additional Logistics: The TEC Center is in the basement and can be accessed via the stairwell. Elevators require a badge for operation, so please let us know beforehand if you need elevator access. Afternoon refreshments will be available.

This meeting is facilitated by the Great Plains Institute, a nonpartisan, national, nonprofit organization transforming the energy system to benefit the economy and environment. Learn more at www.betterenergy.org.

Minnesota Pathways to Decarbonizing Transportation

Technical Stakeholder Meeting #2

May 16, 2019

Contents

Attendees

Name	Organization
Amanda Bilek	Minnesota Corn Growers Association
Amanda Jarrett Smith	Minnesota Pollution Control Agency
Andrew Twite	Fresh Energy
Ben Martin	Minnesota Department of Commerce
Ben Stafford	Clean Energy Economy Minnesota
Bob Patton	Minnesota Department of Agriculture
Brendan Jordon	Great Plains Institute
Carly Gelderman	Great Plains Institute
David Bael	Minnesota Pollution Control Agency
Dorian Grilley	Bicycle Alliance of Minnesota
Ellen Anderson	Energy Transition Lab
Emily Smoak	Minnesota Department of Health
Erika Bigelow	Center for Transportation and the Environment
Frank Douma	Humphrey School of Public Affairs, University of Minnesota
Gabe Mantegna	E3
Jeffrey Meek	Minnesota Department of Transportation
Jeremy Martin	Union of Concerned Scientists
Jessi Wyatt	Great Plains Institute
Jessica Burdette	Minnesota Department of Commerce
Jessica Treat	Move MN
Jon Hunter	American Lung Association
Joshua Houdek	Sierra Club North Star Chapter

Katelyn Bocklund	Great Plains Institute
Kevin Bright	City of Rochester
Lauryn Schothorst	Minnesota Chamber of Commerce
Lola Schoenrich	Great Plains Institute
Marcus Grubbs	Minnesota Department of Administration
Mauricio Leon	Metropolitan Council
Michelle Medina	Minnesota Farmers Union
Nick Mark	CenterPoint Energy
Nick Martin	Xcel Energy
Pat Jones	Metro Transit
Robert Grinstead	Zeus Electric
Sean Gosiewski	Alliance for Sustainability
Siri Simons	Minnesota Department of Transportation
Stacy Miller	City of Minneapolis
Stephanie Pinkalla	The Nature Conservancy
Tim Rudnicki	Minnesota Biofuels Association
Tim Sexton	Minnesota Department of Transportation
Tory Clark	E3
Will Seuffert	Environmental Quality Board

Clarifying Questions

Are things like combined heat and power, cutting reliance on coal, grid, wind, etc. part of the calculations so far?

- o E3 has used assumption that reflects the whole state
- o Data source for the carbon intensity (CI) of corn/ethanol was taken from a USDA report
  - ▪ Report has a low CI compared to California Low Carbon Fuel Standard
  - ▪ *Let GPI know if there is a different data source you want to compare*

How does E3 estimate number of stock vehicles; how are we projecting it forward?

- o E3 has used state data sources from the Minnesota Department of Transportation and Minnesota Pollution Control Agency's fleet information for a starting point
- o Projections used data from the Annual Energy Outlook from the U.S. Energy Information Administration.

How can E3 project electric vehicle data?

- o Modeling makes assumptions about stock rollover and uses current data (from 2015) for a starting point with an estimated 15-year life span
  - ▪ *Assumption of rate of change for sales; do we think these are the right levels? E3 wants feedback*

Can E3 explain stock rollover? What is the main data source used to inform this part of the modeling?

- o Total number of vehicles – state data source
- o Lifetime/retirement of vehicle – distribution
- o Growth rate and total mileage
- o Sales of new vehicles

What is the basis for the VMT reductions (3-5%)? How is this predictable when lifestyles could change drastically?

- o E3 notes this is a hard category to project
- o Modeling currently include things like ride sharing impacts
- o Data source is an academic paper (see appendix in modeling slides) that defines different urban design principals that could increase walkability, public transit, and people moving to urban areas, etc.

Is the biofuel percentage the same for ethanol and biodiesel?

- o Assumption shows they are fairly equal in current modeling

What technology was used to account for the biofuel calculation? (did it recognize the technical range is 80-85%?)

- o E3 used a combination of technology that would lead to varying goals of blend levels

Does the modeling include ethanol use in heavy-duty vehicles?

- o   No, modeling does not reflect the use of ethanol in heavy-duty trucks
- o   *E3 wants feedback on this*

If we didn't reach goals of 70-75% carbon-free electricity by 2025, how would it impact this model? How would modeling compensate with other measures?

- o   E3 is more focused on 2050; near term target is probably too aggressive
- o   The "Emission Reduction by Measure" does not include upstream categories

If the electric vehicle technology is better than expected in 2050, does that change the modeling?

- o   Yes, the amount of biofuel demanded would decrease

Was location included when figuring population projections?

- o   Data source is from Minnesota State Demographic Center
- o   E3 has not considered sub state geographies

Is cost considered anywhere in modeling? Will it be added?

- o   Cost is not included
- o   Out of scope at this point because of accelerated modeling

Small Group Discussions

Are there specific assumptions you would change?

COMMUNITY DESIGN

- •   15-year vehicle fleet turnover is too long based on technology advancements
- •   MN Department of Transportation's future study predicts 100% autonomous EVs by 2040
- •   VMT reductions seem small
    - o   Is this personal-vehicle-use reduction?
    - o   Should we break down VMT projections by Twin Cities Metro vs. Greater Minnesota?
        - ▪   MN Department of Transportation has this data
    - o   How does cost driving effect VMT?

ELECTRIC VEHICLES

- •   Baseline maybe too low, but that's okay
    - o   Tend to lean to more conservative baselines to show what happens without any changes
- •   Are policies reflected in the assumptions?
    - o   What is the policy that leads to the 40% reduction goals?
    - o   Discussion on slide 29: this slide focuses on policy outcomes; not actual policies
- •   Cost and daily impacts need to be addressed in this phase somehow

BIO-FUELS AND OTHER LOW CARBON FUELS

- Is natural gas used as a vehicle fuel?
  - Nick Mark from CenterPoint can provide data
  - Is renewable natural gas a biofuel?
- Breakdown specifics about which biofuel
- Renewable natural gas is ~30% of compressed natural gas nationally – 60 billion cubic feet (BCF) nationally (CenterPoint total throughput is 170 BCF)
- 20-30% of liquid fuels could be ethanol
- Participant can provide input on ethanol CI
- Include generation emissions for electricity

TRANSIT/ELECTRIC TRANSIT/HEAVY DUTY

- Idling time important along with VMT
- Adoption rate of electric transit is not aggressive enough
- What are the assumptions on technology (i.e. batteries)?
- Are Metro Transit's growth goals incorporated?

What seems too aggressive or not aggressive enough?

COMMUNITY DESIGN

- What is being included in the VMT reduction? It seems so small—It's not just the built environment (Price, transit availability, ride share, etc. all affect it)
  - This is where equity fits in
  - Should also look at how this impacts health
  - Should include micro mobility (scooters, bikes, mobility hubs)
    - Scooter data is encouraging
  - It would be helpful to have this analysis on a city and metro region basis
    - Comprehensive plans have goals
    - Could look at driver license data

ELECTRIC VEHICLES

- Light-duty vehicles data seems reasonable
- Medium-duty vehicles seems to track more with the heavy-duty vehicles, but this might not be realistic, they should be closer to the light-duty vehicle projections than the heavy-duty projections.
  - Medium-duty vehicles are still local travel and easier to electrify, especially when fleets begin to electrify and work with utilities
  - Heavy-duty vehicles travel longer distances and are harder to electrify
- 80x50 and 100x50 projections for medium-duty hybrids sales are too aggressive
- 70-75% carbon-free electricity by 2025 is too aggressive

BIO-FUELS AND OTHER LOW CARBON FUELS

- Hybrids not aggressive enough. Mid-class SUVs exist now. Hybrid flex-fuel vehicles
- Not enough focus on rural – longer miles driven
- EVs – are they mostly metro? E.g. shorter trips
- Does VMT really track population? There might be a scenario that results in growing VMT?
- Participant wants to look at assumptions about upstream biofuels emissions

TRANSIT/ELECTRIC TRANSIT/HEAVY DUTY

- Not clear on separation between public and private fleets/transit
    - Public may need to be more aggressive
- Biofuels for heavy-duty are not aggressive enough
    - B20 already mandated

What are you most excited about?

COMMUNITY DESIGN

- Exciting to see scenarios that are possible and achievable

ELECTRIC VEHICLES

- Overall seems balanced
- Mixes seem possible

BIO-FUELS AND OTHER LOW CARBON FUELS

- Excited to see that biofuels could be such a large wedge. (slightly skeptical)
- Pathways exists to meet GHG reductions in transportation
- Variety of approaches is key; makes overall goal seem more realistic
- Home-grown fuels can lead to prosperity for rural communities
- Opportunity to engage rural communities
- Opportunity to change discussion about biofuels – unify more biofuels with GHG reduction

TRANSIT/ELECTRIC TRANSIT/HEAVY DUTY

- Pathways exists, especially at 100 scenario
- Overwhelmingly difficult but possible
- Outcomes that will result
- Behavioral change
- Technology advancements
- Strategies with dual purpose – EVs as batteries
- Excited we are doing this
- Something in it for all sectors
- Oriented in the right direction

Do the initial results reflect what you envisioned? Why or why not?

COMMUNITY DESIGN

- Surprised it seems to bake in 1950 scenarios
- Thought that the results would include a broad range of VMT reduction strategies and they don't seem to be there
- Disruptive technology is not included. This would be an interesting next step. Telecommuting, vertical farming in metro area, autonomous vehicles (two rollouts of autonomous vehicles)

ELECTRIC VEHICLES

- Not too surprising, in general
- Was surprised by the minimal impact of VMT reductions
- Surprised cost is not included

BIO-FUELS AND OTHER LOW CARBON FUELS

- How does nature fit in? If we scale up biofuels, what is the impact of production practices?
- Co-benefits of certain agriculture practices? E.g. cover crops, biofuel crops
- GHG emissions reductions can also drive pollutant reductions—should be modeled
- Reduced need for petroleum infrastructure, is that tracked?

TRANSIT/ELECTRIC TRANSIT/HEAVY DUTY

- Expected policy levers associated with results
- What are the economics?
    - What will it cost to make these changes?
    - Will it impact adoption?
- Expected
    - More rapid shift from single occupancy
    - More rapid shift to transit / other modes

Are the results realistic?

COMMUNITY DESIGN

- Yes

ELECTRIC VEHICLES

- Needs to factor in cost and policies to be realistic
- VMT results don't seem realistic; seems like they would have bigger impact
- EV technology and battery advancement is uncertain so it's hard to know if the modeling will be realistic in this area.
- Is end-of-life battery emission incorporated? Does the lifecycle accounting include shipping EV materials to Minnesota?
    - A potential resource could be Energy Storage Association

BIO-FUELS AND OTHER LOW CARBON FUELS

- Nice vision, but we need infrastructure
- Exercise in futility without infrastructure. Combined heat and power, demand-side management, biofuels
- Need to sanity-check if results are plausible
- Electricity sector decarbonization – are we looking carefully enough at what needs to happen?
- Are we accounting for international emissions for imported petroleum (e.g. Alberta Oil Sands)?
- What can we control in the state? What is controlled federally?

TRANSIT/ELECTRIC TRANSIT/HEAVY DUTY

- Needs more detail
- Aggressive, but it needs to be
- Change to electric is going to be faster than predicted

Do you have any other feedback that hasn't been addressed thus far?

COMMUNITY DESIGN

- Some regional modeling focusing on metro areas will change the picture, including electricity decarbonization
    - This might help to tease out local and regional or urban/rural strategies
    - Run the modeling by MN Department of Transportation regions
    - Yield more actionable strategies
    - Drivers: population, age demographics/income level, vehicle ownership
    - This might also help identify equity issues
- Origin to destination study for trucking would be interesting
- First mile/last mile freight—how do we figure this out?

ELECTRIC VEHICLES

- Interest in seeing cost, including business as usual scenario
- What mandates will be needed to achieve these goals?
- Concerns about economic impacts
- Concerns for EV technology advancements that could happen quicker than expected
- Group was happy to see scenarios
- Interest in seeing state and national policies impacts, including policies—maybe this is part of the next phase?

BIO-FUELS AND OTHER LOW CARBON FUELS

- Energy security
- Does not tell us which policies but provides some guidance on where to focus. E.g. biofuels, EV charging
- EPA refinery waivers, 2.6 billion gallons drop in biofuel demand

- We don't know what farms will look like in 30 years
- Water – some agriculture practices that benefit water also benefit carbon and nitrous oxide
- Would like to see ethanol move into medium-heavy duty (MIT study)

TRANSIT/ELECTRIC TRANSIT/HEAVY DUTY

- Are we addressing price on carbon?
    - What is the impact on behavior change?
- Document key assumptions for attendees to review—not very clear in presentation
- Wanted: Graph of low-hanging fruit on what we can readily transition
- What are the sensitivities on assumptions?
    - Does VMT really matter?
    - Is idling more important?
    - Examine how long we're keeping vehicles. This might increase with electric vehicles – swap out battery instead of the vehicle.
- What are the key differences between 80x50 and 100x50 scenarios?
    - More details wanted
    - Are we focusing on the right things?

Next Steps

- Technical Stakeholder Meeting #3 via webinar on June 20, 10:00-11:30 am
- Information on public meetings and webinar: http://www.dot.state.mn.us/sustainability/pathways.html
- Send additional feedback via email to Carly Gelderman at cgelderman@gpisd.net and Tory Clark at tory@ethree.com by **May 22, 2019**. Feedback will be incorporated into final modeling results or noted in the final report.