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**Meeting #8 Summary**  
Minnesota Climate Change Advisory Group (MCCAG)  
St. Paul, Minnesota  
January 24, 2008

**Attendees:**

**MCCAG:** Jon Anderson, Fred McCormick (for Leith Anderson), Willis Anthony, Donald Hejna (For Peter Aube), Gretchen Bonfer (for Daniel Bartholomay), Alexander Bascom, Jan Callison, Rick Carter, Staci Bohlen (for Mitch Davis), Chuck Dayton, Jim Erkel, Barbara Freese, Ann Glumac, Bill Grant, J. Drake Hamilton, Scott Harrison, Andy Hart, Bill Heaney, Craig Pagel (for Jonathan Holmes), Robert Jagusch, Jenny Engh (for Greg Jason), Boise Jones, Jon Kuskie (for John Kelly), Julie Ketchum, Gail Eadie (for Jeffery Korsmo), Scott Lambert, Greg Langford, Chuck MacFarlane, Jim Marchessault, Tim McGraw, Dave McMillan, Jeffry Muffat, Eric Olsen, Pat Perry, Doug Peterson, David Sparby, Peter Sullivan, Barb Thoman, Clarence Lehman (for David Tilman), Bev Turner (for Nim Traeger), Jeff Wilkes, Bruno Zagar.

**Department of Commerce (DOC):** Edward Garvey, Linda Limback, Janet Streff.

**Pollution Control Agency (PCA):** Brad Moore, David Thornton, Todd Biewen, Peter Ciborowski, Anne Claflin, Colleen Coyne, Joan Heldt, Lisa Herschberger, Jeff Ledermann, John Seltz, Bill Sierks, Rebecca Walter.

**Center for Climate Strategies (CCS):** Tom Peterson, Bill Dougherty, Will Schroeer, Jeff Wennberg, and by telephone Tom Looby, Steve Roe, Adam Rose, Randy Strait, and Dan Wei.

**Others:** See Attachment for Members of the Public Who Attended MCCAG Meeting #8.

**Background Documents:** (all posted at [www.mnclimatechange.us](http://www.mnclimatechange.us))

1. Notice and Agenda
2. PowerPoint Presentation
3. Memo to MCCAG on Preparation for Meeting #8
4. Policy Option Descriptions for Analysis for Each Technical Work Group (TWG)

**Discussion and Conclusions:**

**1. Welcome and Introductions**

Edward Garvey thanked the MCCAG members for their hard work and dedication. The MCCAG proved Minnesota can reach the goals the group set, provided a powerful, robust framework for reducing greenhouse gas (GHG) emissions for the benefit of all

Minnesotans, and set a benchmark for moving forward toward implementing and expanding on the MCCAG's efforts.

Mr. Garvey acknowledged the several remaining issues and the MCCAG's differences of opinions on them. He noted those differences will provide valuable input for future work toward achieving the MCCAG's goals and identifying how to transform how Minnesotans use energy—at both macro (society) and micro (personal) levels. As the state moves forward and achieves technological advances, those transformations will happen faster. The state's long-term goal is to reduce GHG emissions by 80% below the 2005 levels by 2050. Recognizing the transitional uncertainties beyond 2025, the MCCAG needs to put in place mechanisms to help Minnesota reach the 80% goal.

Mr. Garvey explained that the Final Report will be based on the MCCAG's comments and work. It will be only the beginning of a continuing dialog the state needs to have—not the final word. An MCCAG member asked about the timeframe for the Final Report. Mr. Garvey responded as soon as possible, but not at the expense of undermining the final product's numerical analysis, draft text, and review by the MCCAG, TWGs, and the public. He estimated it may be released 4–5 weeks after Meeting #8, and the timing depends on whether the MCCAG can come to closure during its final meeting today and focus on next steps.

## **2. Approval of Summary of Prior Meeting; Other Logistics**

Regarding the Meeting #6 summary, one MCCAG member asked whether on page 4 costs to consumers are being considered (see the paragraph beginning with “Are costs to the economy and consumers being considered in this analysis?”). Tom Peterson responded yes, but added that it's not possible to conduct a detailed analysis of costs for consumers for each option. He said that CCS would clarify in the Final Report the primary and secondary costs. CCS will revise the Meeting #6 summary to address this question. The MCCAG had no additional comments on the summary.

The MCCAG did not consider approval of the draft summary for Meeting #7 because it wasn't posted in time for Meeting #8. The MCCAG agreed to submit comments to CCS by close of business the following day via e-mail, at which point CCS would incorporate additional comments and repost the summary. [Note: The MCCAG did not provide any comments after the meeting.]

## **3. Review of the MCCAG Process Status and Next Steps**

Tom Peterson noted that the policy option descriptions (PODs) for each TWG reflecting the MCCAG's final recommendations (including documentation of objections to approval) will be included in the appendixes to the report, and that the report will also include an executive summary, an introductory chapter, and a summary chapter for each POD. An MCCAG member asked if the report will include a discussion of what the analytical process is and is not. For example, they suggested that it note the lack of specificity in implementation mechanisms, if applicable, the numeric limitations of the Cap and Trade (C&T) analysis, and the need for more analysis regarding consumer costs. A TWG member noted that, to be balanced, the description of the process should also address benefits.

Mr. Peterson responded that the report will explain the analytical process. He also noted that the MCCAG and the public will have an opportunity to review all of the draft text before going final. Edward Garvey added that the report will be revised to incorporate the MCCAG's and TWG's comments and then will be provided to the public for comment.

The agenda was reviewed, and the reporting order of the TWGs was revised as follows: Agriculture, Forestry, and Waste Management (AFW), Cross-Cutting Issues (CC), Transportation and Land Use (TLU), Residential, Commercial, and Industrial (RCI), Energy Supply (ES), and C&T.

#### Slides #5 and 6—Draft MN GHG Supply Curve and 12 States GHG Supply Curve

Tom Peterson reviewed the first slide, showing the draft Minnesota supply curve based on the numbers derived from tonnage reductions for each policy option. Reflecting back to his presentation during Meeting #7, he noted that the combined supply curve for 12 states analyzed to date has the same “S-shape” for the various options. He added that McKinsey's recent evaluation of the impacts of energy policies yields essentially the same curve and range of results. CCS expects this shape will hold as the 12 state analysis is expanded to include additional states.

Tom Peterson further clarified that the supply curves the C&T TWG is using are based on MCCAG's recommendations. So the cap attains the measuring functionality required by those recommendations, and doesn't impose additional costs. The cap is set where it is. The analysis worked up the supply curve to meet the cap. The lowest-cost actions were selected until reaching the cap, though some high-cost actions have large benefits as well. An MCCAG member clarified that the items above the cost equilibrium point may still be undertaken because their benefits may be very high and be attractive for policy reasons.

Bill Dougherty noted that the results of the ES options were not completed in time to use them to update the C&T simulations prior to this meeting. The C&T simulations will be revised based on the numbers associated with the MCCAG's final recommendations for all of the TWGs. An MCCAG member said this is the most important of all the charts, because it gives a snapshot of the effects of all the actions. Not having the numbers for C&T distorts the big picture. He asked for confirmation on whether C&T is perceived as a means for reducing costs. Tom Peterson responded that C&T provides the flexibility for users to shop for the lowest-cost options. He observed that the supply curve should include a variety of implementation mechanisms, such as economic subsidies, market-based systems, best practices, and advanced technologies.

#### Slide 7—GHG Reductions—Existing Actions

Randy Strait reviewed a slide showing Minnesota GHG reductions from existing actions. He noted revisions to the numbers relative to those presented at Meeting #7. The business-as-usual (BAU) forecast represented by the top line in the chart incorporates the revised forecast for electricity sales and vehicle miles traveled (VMT) approved by the MCCAG during its prior meetings. The reductions from the conservation improvement

program (CIP) and the RES have also changed as a result of the revised forecast for electricity sales. The emission reductions have been scrubbed to eliminate double-counting of overlaps between the CIP and RES.

Mr. Strait noted that the current cost for ES-5 (Renewable and/or Environmental Portfolio Standard) is significantly higher than the original cost, and then explained some causes for this swing in the numbers. Originally, it was estimated that the CIP would yield a \$7.5 billion savings and the costs for the RES were near zero. However, the methods for estimating the cost of the RES have been revised to address the MCCAG's and TWG's comments from the last meeting and now the RES offsets the savings from the CIP.

One MCCAG member was surprised by the AFW TWG's cumulative GHG reduction of 275 million metric tons of CO<sub>2</sub> equivalent (MMtCO<sub>2</sub>e) (shown in the AFW summary table), and another was concerned about the feasibility of the tree-planting assumption. Steve Roe explained that most of the reductions are from the waste management and forestry sectors, and noted that the agricultural sector includes all of AFW-1, 2, 5, and 6. Steve Roe added that except for AFW-3a, the remaining reductions are scrubbed from the cumulative number and are represented under biofuels in the TLU-3 (Low-GHG Fuel Standard) option. Tom Peterson asked the TWG to check the numbers on the treatment of gas displacement.

A third MCCAG member asked whether the graph's reference case emissions line includes the proposed new Mesaba and Big Stone coal plants, which will result in an additional 4.7 MMtCO<sub>2</sub> when they come on line in 2013. Bill Dougherty responded that though the reference case doesn't include RES and CIP, it does include all planned additions. You don't see a jump in the line in 2013 because the analysis assumes old plants will come off line at that point. The ES TWG didn't include that assumption in calculations.

A fourth MCCAG member observed that, in contrast to the other sector summary tables, the ES summary table doesn't have totals for reductions from recent actions. Randy Strait explained that some ES numbers overlap with the RCI TWG's numbers, and the ES TWG didn't want to double count them. Where to show the shrinkage is an issue of presentation. The impacts after adjusting for overlaps between ES and RCI options were presented at the bottom of the RCI table.

#### Slides 8 and 9—MN GHG Targets to 2025

Tom Peterson covered these two slides noting that based on the results for policy options to date, they indicate that MN will be able to reach its 2015 and 2025 GHG reduction targets on both a consumption and a production basis. The reductions from the policies may change as a result of the decisions that the MCCAG makes today. He also noted that the emissions forecasts could shift up or down over time, and for that reason, the forecasts and progress toward meeting the goals should be periodically updated.

Slide 10—MN GHG Targets 2050

Randy Strait explained that the kink in the reductions associated with existing actions in the chart's red line occurs because the reductions are held constant at 2025 levels from 2025 to 2050. Thus, after 2025 the emission reductions associated with existing actions track the slope of the BAU forecast (shown in the chart as the top line in blue).

Slide 11—Draft Results

Tom Peterson noted that the tables shown in this slide provide the numbers upon which the charts in Slides 8 and 9 are based.

An MCCAG member asked whether it is expected that the MCCAG will adopt all of the strategies. They noted that the MCCAG has questions about the feasibility of some of the actions, not just the costs. In response, it will be up to the MCCAG to decide on what they will adopt as their final recommendations at today's meeting.

**4. Public Input and Announcements**

Public Input

Len Hinckl (Global Warming Working Group, Environmental Justice Advocates of Minnesota [EJAM]) first thanked Edward Garvey and David Thornton for their recent response to EJAM's request to engage in a dialogue to integrate equity into the MCCAG's recommendations. He asked the MCCAG to review EJAM's Ten Principles for Just Climate Change Policies in Minnesota, and to consider applying them to each set of the MCCAG's recommendations, to ensure "equitable mitigation of Minnesota's low-income working communities, indigenous nations, and communities of color."

Continuing on his Meeting #7 comments, Tim Brownell (Eureka Recycling) noted that the huge amount of paper still going into landfills could be diverted to recycling and composting through simple actions. He said that AFW-7 (Front-End Waste Management Technologies) sets forth visionary, achievable source reduction goals through recycling and composting, and achieves the greatest environmental benefits at the lowest cost. However, the option has no mandatory language saying that if the voluntary measures don't achieve the goals by a certain timeline, triggers would be set off that would make the goals mandatory. Eureka does not support AFW-8 (End of Life Waste Management Practices), which is a BAU scenario for composting, not a 1% increase in recycling or composting. If the MCCAG goes forward with AFW-8 without triggers for AFW-7, the outcome will be BAU.

Representative Karen Clark (Minnesota House of Representatives) expressed her concern that the MCCAG has drafted no formal statement on the effects of its recommendations on environmental justice, particularly public health. She noted that a disproportionate number of low-income Minnesotans are exposed to toxic pollutants that result in serious health effects, such as asthma. She recommended that a comprehensive study be conducted on the effects of environmental racism on higher heat, food, and transportation

costs for low-income communities, to ensure that environmental justice is not just an afterthought.

Rachael Dykoski (Environmental Justice Advocates of Minnesota) offered EJAM's collaboration and partnership. She added that her organization will also be the MCCAG's watchdog to move the state toward a transformative and transparent dialogue that includes all people and industries in its decision making.

## **5. Review and Approval of the Draft Policy Options**

The CCS facilitator for each TWG briefly reviewed the quantification results for each of the policy options that had not yet received approval of the MCCAG, invited TWG members to offer clarifying comments when their TWG policies were presented, and then invited questions and comments to be expressed by MCCAG members. Following are brief summaries of the discussion on each option, along with the MCCAG's final recommendations on the options.

### **Agriculture, Forestry, and Waste Management**

#### **Summary of Comments and Responses to Questions**

##### **AFW-3 (In-State Liquid Biofuels Production)**

Steve Roe explained the current summary table reflects additional lower gasoline displacement goals of 35% and 20%. The TWG estimates that the 35% goal will result in GHG reductions of 2.8 MMtCO<sub>2</sub>e in 2015 and 9 MMtCO<sub>2</sub>e in 2025 at a cost of \$5/tCO<sub>2</sub>e reduced. The estimates for the 20% goal are GHG reductions of 1.0 MMtCO<sub>2</sub>e in 2015 and 4.5 MMtCO<sub>2</sub>e in 2025 at a cost of \$3/tCO<sub>2</sub>e reduced.

Mr. Roe noted that although abundant biomass will be available in Minnesota in 2015, there is a question about the availability of resources in 2025, because of the additional demands that will be placed on biomass supply at that time. He then referred the MCCAG to Table 2 of the AFW POD, showing a range of 21.2–41.7 million dry tons of biomass per year currently available resulting from four expert studies. In some cases, these figures include biomass from municipal solid waste, urban tree maintenance, lawn and garden debris, waste wood, etc. in addition to agricultural residues, energy crops, and forest residues. The AFW TWG will recommend that additional study be done to ensure that biomass is a sustainable source of energy to meet the 2025 gasoline displacement goals and other biomass needs.

An MCCAG member questioned the feasibility of the assumption that sufficient biomass will be available in 2025. For example, there is no realistic means for collecting and storing cornstalk stover, and the federal Conservation Reserve Program only allows harvesting once every 3 years for hay and straw. She said the Final Report should note that these and other variables need to be considered, and offered to provide the MCCAG language regarding these concerns. Another MCCAG member added that biomass availability is constrained by seasonal and transportation limitations. Regarding the

former, though biomass demand is year-round, biomass production in Minnesota is seasonal. Regarding the latter, the location of biomass production land is important because of the expense of transporting the bulking materials to production facilities.

An MCCAG member asked for clarification about whether AFW-3 is an incentive-based measure, or mandatory. He added that the 2007 Energy Act calls for a national standard of transportation fuels from biofuels of 36 billion gallons by 2022, along with an economic analysis of the impacts of those requirements. Of the 36 billion, 20 billion are to be derived from advanced biofuels other than corn. He recommended that the TWG analyze these issues. Steve Roe responded that AFW-3 is an incentive-based measure, and agreed that the TWG should include the requirements of the Energy Act under existing programs.

Another MCCAG member asked which of the three gasoline displacement measures the TWG is recommending. Mr. Roe responded that the TWG is recommending the same 50% displacement it has been recommending throughout the MCCAG process. An MCCAG member noted that the middle (35%) option might be a good compromise, but added that she only saw the numbers a day ago and needs time to digest them. An MCCAG member emphasized the importance of the carbon reduction number, noting that more certainty is needed for the state legislature and more discussion is needed about the pros and cons of the three displacement measures.

An MCCAG member expressed serious concern about the 35% displacement measure, because all of the studies done to date show that having 10% ethanol going to cellulosic ethanol is a stretch. No studies have been done on the land required for this measure or the food production and cost impacts. Tom Peterson asked David Thornton whether the Minnesota Pollution Control Agency has evaluated the 35% numbers. Mr. Thornton replied it has not, and added that the higher the ethanol content, the lower the GHG emissions. These questions need further study before that fuel is allowed, except in flex-fuel cars. A TWG member pointed out that the 35% displacement measure is supposed to be overall, saying the real feasibility issue is how to develop crops with higher GHG sequestration potential, how to improve fuels, and how to address other social issues.

Another MCCAG member noted that the implementation mechanisms are all over the map, and asked what level of confidence the TWG has in them. A TWG member responded that until the TWG has analyzed the impact of the 2007 Energy Act on Minnesota fuel use, it can't pinpoint where the state will be with the federal mandate versus where it will be without targets. Mr. Roe added that the Energy Act doesn't ensure that any level of that production would happen in Minnesota.

An MCCAG member said a lot of work needs to be done on biofuels. He has several questions about the new numbers for TLU-3 (Low-GHG Fuel Standard), which were only released a couple of days before Meeting #8. Biofuels is a huge element of the total solution, and is a major economic and environmental initiative for Minnesota. He suggested that the MCCAG recommend that the University of Minnesota and other experts, through the Initiative for Renewable Energy, study the biofuels goals and the low-carbon fuel standard contained in AFW-3 and TLU-3. The study should analyze the

feasibility of the proposals for reducing CO<sub>2</sub> emissions, as well as the economic impacts on consumers and businesses and the impacts on land and water use, food production, and fuel costs and availability.

**AFW-7 (Integrated Waste Management) and AFW-8 (End of Use Waste Management Practices)**—These two options, which represent systems approaches to waste management, were discussed together. Steve Roe summarized the GHG reductions and cost-effectiveness of these options, as presented in the AFW summary table.

There was some discussion regarding whether to combine these two options and move forward with them as a final single recommendation. A TWG member explained that the TWG wanted to keep them separate to make the front-end waste management benefits apparent. Also, the TWG is looking into including Plan B in the feasibility section of AFW-8. (Plan B is a BAU scenario that assumes no change in Minnesota's current 41% recycling rate and is based on current MPCA waste management goals.)

Mr. Roe explained that additional analysis is being done to determine the effects of adopting AFW-7 and AFW-8 (the "Plan B" analysis cited above). The TWG will add language to provide additional clarification of the waste options and their implementation. That said, the TWG has determined that the remaining issues are insignificant in terms of voting on the two options.

An MCCAG member thought that a member of the public commented that the AFW-7 goals aren't aggressive enough. Steve Roe clarified that Tim Brownell actually said that AFW-7 sets forth visionary, achievable goals. Mr. Brownell's concerns are focused on the implementation mechanism as being voluntary rather than mandatory. A TWG member added that many people think the goals are achievable, as evidenced by Seattle and the Netherlands, and are confident Minnesota can achieve a 75% recycling rate.

Another MCCAG member asked whether the TWG has discussed whether, if the incremental targets for recycling and composting aren't met by 2013, they would become mandatory. A TWG member responded that though the TWG briefly discussed setting triggers for all of the options, it didn't pursue this avenue because it is confident these goals are achievable and thinks that making them mandatory is premature. Another TWG member said inserting trigger language would be useful for 2013. An MCCAG member responded that he would support AFW-7 without triggers, but would oppose it with triggers.

An MCCAG member pointed to the significant investment in waste-to-energy plants during the 1980s. He asked whether the AFW-8 numbers assume that the state will provide funding for waste-to-energy plants. A TWG member responded that the numbers don't assume a state subsidy of \$60 million to build these plants, and added that the Minnesota Supreme Court authorizes municipalities to build them.

## **AFW Voting**

Voting by the 42 MCCAG members present at today’s meeting is as follows:

**AFW-3**—As a result of the discussion noted above, 4 members objected to moving forward on this option as a final recommendation. The rest of the members agreed to move forward on AFW-3 as a final recommendation, provided the voting record note the high level of uncertainty about the 35% carbon displacement number and include the following language: “The MCCAG recommends that the University of Minnesota and other experts, through the Initiative for Renewable Energy, study the biofuels goals and the low-carbon fuel standard contained in AFW-3 and TLU-3. The study should analyze the feasibility of the proposals for reducing CO<sub>2</sub> emissions, as well as their impacts on land and water use, food production, fuel costs and availability, and the economic impacts on consumers and businesses.”

**AFW-7 and AFW-8**—Approved without any objections, with an acknowledgment that detailed implementation plans and the real costs impacts on specific Minnesota business and consumer sectors and taxpayers need to be determined.

## **Cross-Cutting Issues**

### **Summary of Comments and Responses to Questions**

**CC-2 (Statewide GHG Reduction Goals and Targets)**—There were no questions or clarifying comments on this option. The MCCAG agreed to move it forward as a final recommendation.

### **CC Voting**

Voting by the 42 MCCAG members present at today’s meeting is as follows:

**CC-2**—Approved without any objections.

## **Transportation and Land Use**

### **Summary of Comments and Responses to Questions**

**TLU-3 (Low-GHG Fuel Standard)**—This option would reduce the carbon content of transportation fuels by 10% by 2020 and 12% by 2025. The TWG looked at a variety of studies of potential cost of these reductions, including extensive studies by California, and a CCS study in Washington State. The TWG decided that the Washington State scenario was not representative of potential compliance scenarios in Minnesota, and that the California scenarios were more representative of the potential breadth of options in Minnesota. California concluded that 1) given the pace of technological change, it was not possible to cost out the compliance scenarios; and 2) because California needed the reductions from a Low-Carbon Fuel Standard, its policymakers decided that the lack of costing information would not prevent them from implementing the standard. The TWG arrived at the same place as California, and, given the huge costs of failing to make GHG

reductions, recommends the adoption of this recommendation without costing information.

**TLU-5 (Climate-Friendly Transportation Pricing)**—This option has two parts:

- 1) a general recommendation to the Governor and legislature to change the fixed costs of transportation to more variable costs to reflect the costs related to vehicle miles traveled (VMT) and GHG emissions. It doesn't recommend specific mechanisms.
- 2) A specific recommendation to make Pay as You Drive insurance as widely offered and adopted as possible, under which drivers see reductions in insurance costs based on their actual mileage.

One TWG member thinks this option is punitive, and disproportionately taxes rural and low-income, working-class people who are driving out of necessity, possibly making driving too expensive for them. Another TWG member responded that the option is modeled on basing drivers' insurance on how much they drive. It doesn't impose GHG car registration fees, and much of the cost of road building and maintenance is paid by property taxes.

An MCCAG member who isn't opposed to the option thinks the model is very simplistic from an insurance industry perspective. Much more work needs to be done to consider other variables—highway mileage, roads with frequent accidents, weather, etc. A database needs to be developed to price the product appropriately from an insurance perspective. The formula for pricing a product for an individual is proprietary and unique to each insurance company. Lots of work goes into setting rates, which need to be approved by the Minnesota Department of Commerce and actuarially justified. Will Schroeer responded that that is why the state commissioner needs to get involved and agreed that more work needs to be done.

Another MCCAG member noted that the introduction to this policy option says that this set of policies recommends that Minnesota take action in four areas. However, it is only recommending immediate action in one of the four options. He suggested that the recommendation be more general and list some examples of options that warrant further analysis. Will Schroeer responded that the TWG generally agreed to recommend that the state change its pricing structure, but couldn't agree on immediate action in the other areas. Because the TWG reached almost unanimous agreement on the "pay as you drive" (PAYD) insurance incentive, it decided to recommended moving forward where immediate results might be realized.

**TLU-6 (Adopt California Clean Car Standards)**—CCS completed the first study (not done by California) quantifying the difference between California Clean car and the new federal CAFE standards. The TWG is presenting the MCCAG with those new numbers. Will Schroeer noted that no one has done a cost analysis of the incremental benefits of adding the requirements of the California clean car standard to the new federal CAFE standard. At the previous MCCAG meeting, the TWG presented an estimated savings of

\$39/tCO<sub>2</sub>e reduced. The CAFE standard removes some of those savings. The TWG believes that adding the California clean car standard will still produce savings, but doesn't know whether it will be \$39/ton. He analysis to estimate the new incremental costs and benefits is beyond the scope of this process.

The TWG could not reach agreement on recommending this option. The “Barriers to Consensus” section of the POD contains two two-page pieces written by TWG members that attempt to capture the sources of disagreement in the TWG.

An MCCAG member questioned the TWG about the assumption in the CCS analysis that California's standard reaches maximum stringency in 2016, when California has said it will continue to tighten the standard through 2020. He asked, if California's AB 32 standard directs the state to reduce GHG emissions to 1990 levels by 2020, whether it's necessary for the state to continue to tighten the standard past 2016, producing an equivalent of 45 mpg by 2020, rather than the 36 mpg in 2016. Will Schroerer responded that the currently adopted California target reaches its highest level in 2016, and that the state has committed to a second round of reductions after 2016. The question for the TLU TWG is whether to use the 2016 or 2020 target for Minnesota. The current CCS analysis assumes only that California achieves the 2016 36 mpg target and stays at that level.

**TLU-7 (“Fix-it-First” Transportation Investment Policy and Practice)**—Will Schroerer explained that fix-it-first is a term of art that requires repairing existing infrastructure before building new roads, which are generally on the fringe of metropolitan areas. One member objected to moving this forward as a stand-alone option, and thinks it should be wrapped into TLU-2. Another member agreed that this option should be wrapped into TLU-2, noting that where new roads are built has significant implications for where land is developed, and transportation infrastructure should be prioritized.

**TLU-11 (Truck Stop Electrification)**—The MCCAG agreed to wrap this option into TLU-12.

**TLU-12 (Voluntary Fleet Emissions Reduction)**—“Voluntary Fleet” was added to this option's title. Though the TWG presented new benefit numbers, Will Schroerer noted that it's impossible to estimate the net savings, given the different emission reduction technologies fleets can choose to use.

**TLU-13 (Reduce Maximum Speed Limits)**—The TWG was divided on moving this option forward as a policy recommendation. Supporters noted that it could be put into effect very quickly; could be a great public relations tool, given the high price of gas; and could have significant safety benefits, given the uncontested relationship between high speed and loss of lives. Opponents noted that the option would require additional enforcement, and that Minnesotans will oppose reducing speed limits they are used to.

**TLU-14 (Freight Mode Shifts: Intermodal and Rail)**—The TWG agreed that developing specific recommendations for this action would be premature, given that the Minnesota Department of Transportation is currently conducting a study of the state's

freight policies. The TWG recommended that MnDOT pay close attention in that study to the state's GHG reduction targets, and how freight policy can help achieve them.

**TLU Area 1 (Reduce VMT)**—The TWG recommends adopting a VMT goal that represents the total of TLU-1, TLU-2, TLU-5, TLU-7, TLU-9, and TLU-14.

There was a question about whether the VMT reductions in each option came off the old or new (reduced VMT growth) baseline. Will Schroerer explained that all of the numbers are new and are based on the new MCCAG baseline. So now the MCCAG has both new and old numbers. The MCCAG directed CCS to develop a total VMT number and adopt it as an overall goal. If one of the options under this umbrella doesn't have the intended effect, then the overall goal will require other options to make up the difference. The MCCAG agreed to move this option forward as a recommendation.

### **TLU Voting**

Voting by the 42 MCCAG members present at today's meeting is as follows:

**TLU-3**—Approved without any objections, recognizing that further analysis is needed.

**TLU-5**— Approved, with 3 objections.

**TLU-6**—Approved, with 16 objections.

**TLU-7**—Approved, with 2 objections.

**TLU-11**—This option was wrapped into TLU-12.

**TLU-12**—Approved without any objections.

**TLU-13**—Approved, with 16 objections.

**TLU-14**— Approved without any objections.

**TLU Area 1**—Approved without any objections.

At the end of the voting, Tom Peterson asked for a record check on whether the MCCAG has resolved the definition of "super majority." The record check revealed that during MCCAG Meeting #1, Mr. Peterson noted the following: "Final decisions will be based on three levels of support: unanimous consent (no objections), super majority (four objections or less), or majority (less than half object)."

### **Residential, Commercial, and Industrial**

Bill Dougherty noted that revisions to RCI-7 and RCI-10 agreed upon at Meeting #7 still need to be made in the policy option descriptions. Specifically, these are deleting the fourth bullet under the RCI-7 Goals section (training and certification of fuel haulers), and deleting the sixth bullet (escrow account) and the words "and major retrofits" from the fourth bullet (Energy Star appliances) under the RCI-10 Goals section.

## **Summary of Comments and Responses to Questions**

**RCI-1b (Maximize Savings From the Utility Conservation Improvement Program [CIP])**—Bill Dougherty said that the MCCAG charged the TWG with analyzing the impacts of raising the energy efficiency target of this option from 1.5% to 2.0%. Upon further analysis, the TWG has found the numbers to be so speculative that it is recommending that a detailed study be performed to determine the costs and benefits associated with increasing the target. A TWG member noted that the American Council for an Energy Efficient Economy is conducting a similar study and suggested that the TWG might participate in that effort.

**RCI-7 (Conservation Improvement-Type Program for Propane and Fuel Oil Efficiency)**—A TWG member noted that the language regarding certification and training of fuel haulers was removed because the TWG was overstepping its bounds, making fuel haulers responsible for inspecting furnaces and fuel delivery systems.

### **RCI Voting**

Voting by the 42 MCCAG members present at today's meeting is as follows:

**RCI-1b**—Approved without any objections.

**RCI-7**—Approved without any objections.

## **Energy Supply**

### **Summary of Comments and Responses to Questions**

**ES-1 (Generation Performance Standard)**—This option requires new power plants to meet a carbon-intensity threshold. Bill Dougherty noted that there is a question regarding whether existing law supports or precludes this option. Also, there are numerous ways to look at a generation performance standard (GPS) if it were applicable to new power stations. The TWG is recommending that additional sensitivity analyses be conducted to determine the option's emission reductions and costs. Mr. Dougherty then asked TWG members to present supporting and opposing views.

Barbara Freese presented the minority TWG view that the GPS should apply to new power stations in MN whether such units are already in the regulatory pipeline or not. She went on to argue that exempting the proposed new Mesaba and Big Stone 2 coal plants will result in an additional 4.7 MMtCO<sub>2</sub> when they come on line in 2013. However, the application of the GPS to these coal units would result in GHG reductions of 4.7 MMtCO<sub>2</sub>e in 2015 and 4.8 MMtCO<sub>2</sub>e in 2025 (a cumulative reduction of 61.8 MMtCO<sub>2</sub>e), with a net present value (NPV) of -\$7.4 billion/MMtCO<sub>2</sub>e, and a cost-effectiveness of -\$120/MMtCO<sub>2</sub>e. The reference case emissions line the "GHG Reductions: Existing Actions" slide doesn't show a spike when the new plants come on line because this option assumes old plants will come off line at that point. The ES TWG didn't include that assumption in previous calculations. Emissions will rise dramatically

between 2013 and the MCCAG target of 2015. The old plants have no plans to back down when the new plants come on line. The policy option was for Minnesota not to approve new plants that couldn't meet the GPS.

Barbara continued to note that some TWG members contend that the Public Utilities Commission (PUC) will handle this issue, so the MCCAG needn't address it. However, the PUC doesn't ask whether a cost shift may occur; rather, it asks whether it's cheaper to build the coal plants. If so, the PUC will approve the plants, regardless of the increase in emissions. The MCCAG is the only organization looking at the emissions issue. Also, some TWG members contend that the MCCAG can't affect the outcome of the proposed plants because the plants are already under consideration. That's not true. Legislation can affect plants yet to be approved. At some point, Minnesota has to stop increasing its GHG emissions from the power supply sector. Many important questions remain about the impact these two coal plants will have on the state's ability to decrease its cost of reducing GHG emissions.

Dick Stone voiced an alternate perspective noting that the ES TWG had debated this issue extensively, and a majority voted (with four members opposing) to move forward a final recommendation that the GPS should not apply to new power stations that are in some stage of the regulatory review process. New regulations haven't applied to existing power plants, which have always been grandfathered in. Legislation exempts projects in the regulatory process—the same projects being discussed today. He disagreed with Barbara's contention that Minnesota doesn't need new plants because the projected growth in electricity demand is 0.82% per year, noting that NERC (the North American Electric Reliability Corporation) is forecasting much higher annual growth rates for electricity sales.

Another TWG member countered that the MCCAG has the responsibility to evaluate the option of exempting projects. The law says that although existing plants are exempt, its application isn't limited to other plants, including the proposed plants. The emissions that would result from the new plants are huge and would wipe out the gains from the other options.

Bill Dougherty clarified that a yes vote will mean the GPS will apply only to new plants that as yet unplanned (i.e., not in the regulatory pipeline), and that a no vote will mean that the GPS will apply to both planned and unplanned new plants. A TWG member opposing this option said that if the option applies only to coal plants not yet proposed, it will have no impact on reducing GHG emissions because demand is declining. An MCCAG member urged the group to vote on this option on its merit, and not just approve the majority TWG vote.

A TWG member commented that there are several questions about the model. When they ran the model, they thought the option's cost-effectiveness would be significantly less than  $-\$120/\text{MMtCO}_2\text{e}$ . Another TWG member said that from a utility viewpoint, he doesn't have faith in the modeling because it doesn't clearly represent costs. Bill Dougherty added that the TWG extensively discussed these and other issues, including shifting assumptions about the impact of an RES on large-scale plants, whether existing

plants would find other markets, the likelihood of reduced imports, leakage issues, etc. He agreed that the modeling approach has been a crude spreadsheet model representation of the MN energy system. This approach was adopted deliberately from the outset of the process to comply with time and resource constraints. The modeling approach was never intended to reproduce the type of hourly dispatch modeling used in utility resource planning.

An MCCAG member observed that grandfathering makes sense in ordinary circumstances. However, the first global warming calculations were made 100 years ago, and estimated we would have the problems we currently have 400 years from now. Given the IPCC (Intergovernmental Panel on Climate Change) scenarios for global warming, grandfathering doesn't make sense today.

An MCCAG member suggested voting on an amendment to have the GPS apply to the two new plants. A vote was taken on a motion to modify the current recommendation so that the GPS would apply to the two new plants. The motion was defeated, with 23 of 42 members opposing it. Hence, Mesaba and Big Stone, the two coal units at the center of the question, are exempt from the GPS.

A TWG member recommended voting to have the reference case baseline show the additional emissions from the two new plants, instead of assuming that old plants will back down, and not assume demand. Bill Dougherty explained that the TWG modeled emissions for both the backing down and the not backing down scenarios. He added that without demand constraints, Minnesota will be producing far more GHG emissions relative to existing demand. Also, about 28% of power produced in Minnesota comes from imports; the ES summary numbers don't include electricity exports. A TWG member noted that the statute includes CO<sub>2</sub> emissions from plants within Minnesota, as well as imported CO<sub>2</sub> emissions. Tom Peterson clarified that the 2025 emissions from the gross consumption graph will remain the same, but the 2025 emissions from the gross production graph will show the additional emissions expected from the new Mesaba and Big Stone coal plants.

**ES-5 (Renewable and/or Environmental Portfolio Standard)**—Although the MCCAG moved forward as a final recommendation with no objections at Meeting#7, Barbara Freese questioned the new numbers presented at Meeting #8. Bill Dougherty explained that CCS realized that the modeling approach it previously used was incorrect, so CCS used the levelized cost of each resource being displaced by renewable energy, which more accurately reflects the cost of this option. Given the complexity of the standard and the fact that the TWG didn't have a chance to examine the new numbers, the TWG agreed to reconvene by phone and e-mail before moving forward with this option as a final recommendation.

**ES-6 (Nuclear Power Support and Incentives)**—Bill Dougherty explained that the ES TWG was recommending that nuclear power not be considered as a mitigation option during the period 2005-2025. On the other hand, the ES TWG analyzed the option of installing a new nuclear power station in 2020 as part of a sensitivity analysis. An MCCAG member added the capital cost uncertainties range from half to twice as much as

the numbers presented in the summary for this option. He said that nuclear power needs to be considered as an option along with coal and renewable energy.

A TWG member noted that the policy option description needs to mention the several cost and risk issues that need to be resolved. Since there are no emission reductions before 2025, the state should determine whether it makes sense after 2025. Another TWG member said other language should have been deleted from the policy description or clarified. This option should be more technical and study oriented. The TWG unanimously approved this option, provided the Final Report states: “The MCCAG recommends that the state consider the costs and risks of installing a nuclear power station after 2025.”

**ES-8 (Carbon Capture and Storage and/or Reuse Policies)**—A TWG member objected to the \$3.5 billion NPV of the annual costs and the \$160/MMtCO<sub>2</sub>e cost. An MCCAG member pointed out that integrated gasification combined-cycle (IGCC) carbon capture and storage is the only long-term solution, and if combined with biomass, it can remove GHG from the atmosphere. Idle farmland could sequester a large amount of GHG emissions, and woody biomass is the only known method for scrubbing carbon from the air. He suggested that the MCCAG at least recommend studying and implementing this option for the long term. He also noted that the percentage of biomass co-firing originally recommended was 8%, but now the option only specifies 1%, yet Minnesota has enough biomass resources to recommend a rate of 10%. New power plants can burn biomass at whatever percentage the state specifies.

A TWG member recommended inserting language for using the best available technology, rather than pointing to a particular technology, since technological innovations are rapidly being made, such as using algae to convert CO<sub>2</sub> to energy. Another member noted that model’s numbers for IGCC technology are far into the future, so this option should recommend a study. The MCCAG approved the option without objections for the post-2025 period, with the following clarification: “The MCCAG recommends that Minnesota consider studying and/or facilitating carbon capture and storage demonstration projects, including carbon capture and storage paired with biomass.”

**ES-12 (Distributed Renewable Energy Incentives and/or Barrier Removal)**—Bill Dougherty presented new numbers for this option, which provides incentives for installing renewable energy technologies in residential and commercial buildings. The analysis assumes that by 2025 renewable energy will comprise 5% of new construction and will reduce GHG emissions by 0.5 MMtCO<sub>2</sub>e. He explained that the currently high cost (\$1,500/Kwh) of photovoltaic energy is expected to decline over time. The MCCAG approved this option without objections, provided that “should” is changed to “could” in the third line of the Goals section of the policy option description.

## **ES Voting**

Voting by the 42 MCCAG members present at today’s meeting is as follows:

- ES-1**—Approved, with 16 objections. A motion to modify ES-1 to make the GPS apply to the two new plants was defeated, with 23 of 42 members opposing it. The MCCAG agreed to revise the 2025 emissions from the gross production graph to show the additional emissions expected from the new Mesaba and Big Stone coal plants.
- ES-5**—Because of new numbers presented at Meeting #8, the TWG decided not to move forward with this option as a final recommendation until it has a chance to further consider only the modeling assumption - not opening up any of the other issues related to that.
- ES-6**—Approved without any objections, with the following clarification: “The MCCAG recommends that the state consider the costs and risks of installing a nuclear power station after 2025.”
- ES-8**—Approved without any objections, with the following clarification: “The MCCAG recommends that Minnesota consider studying and/or facilitating carbon capture and storage demonstration projects, including carbon capture and storage paired with biomass.”
- ES-12**—Approved without any objections, provided that “should” is changed to “could” in the third line of the Goals section of the policy option description.

## **Cap and Trade**

### **Summary of Comments and Responses to Questions**

**C&T-1 (Cap-and-Trade Program)**—Jeff Wennberg reported that new C&T numbers resulting from dozens of modeling runs reveal that Minnesotans would be best served by joining in a regional C&T program, rather than a Minnesota-only C&T program. Expanding the geographic coverage of the program creates a wider range of lower-cost opportunities for reducing GHG emissions. The TWG is recommending that the MCCAG move forward with C&T as a final recommendation. Specifically, it is recommending that, at a minimum, the geographic scope of the program be Midwest regional, including the partners in the Midwestern Governors Association (MGA) initiative while studying further the costs and benefits of linking with other regional programs including MGA observers and the Western Climate Initiative and its observers. Sector coverage is recommended to include the electric power sector, large industrial boilers and processes, transportation fuels, municipal waste incinerators, landfills, fossil fuels used in residential and commercial buildings, confined animal feeding operations and other large agricultural operations where it is possible to reliably measure GHG emissions. The point of regulation should vary with the sector covered, from some form of load-based approach for electric power, to a generation approach for large industrial sources, waste incinerators and landfills, to an ‘upstream’ approach for transportation fuels and heating

fuels. Gasses covered by the cap and trade program should include all six statutory GHGs. The TWG also recommends unlimited banking of allowances but is undecided on borrowing, a safety valve mechanism and offsets. The TWG recommends investigating compromise alternatives to allowance distribution but did not make a specific recommendation of their own. The TWG unanimously agrees that GHG emission reductions from non-cap and trade policies and measures should be credited toward achieving the cap. The TWG supported some form of early action incentive but did not have time to resolve the details of a baseline year or the specifics of the incentive.

Adam Rose explained that a regional C&T program enables the state to access low-cost options elsewhere to reduce GHG emissions. An MCCAG member asked whether a safety valve or price cap would affect the cost. Dr. Rose responded that the modeling doesn't directly answer this question, but the current result shows the cap could be achieved at a permit price of \$20/tCO<sub>2</sub>e.

An MCCAG member asked if the numbers in-hand were the final numbers. Dr. Rose said that the results are sensitive to the costs of the mitigation and sequestration options. For example, according to the new numbers, some power sector options may be recommended to be removed, and the costs of some options are adjusted upward. These changes would affect the permit price simulated from the modeling.

Dr. Rose noted that some preliminary runs with the new numbers indicate the permit price would increase to the level of \$30–\$45/tCO<sub>2</sub>e, depending on the geographical configuration of trading partners. The overall permit price limits the amount polluters choose to reduce emissions on their own, because it puts a cap on the price polluters pay to reduce their emissions. Most mitigation options produce cost savings or are in the low-cost range, but the cost per-ton reduced of high-cost options may be as high as \$100/tCO<sub>2</sub>e. If polluters can buy permits from the market at the price of \$30-45/tCO<sub>2</sub>e, they will not need to implement those high-cost options.

The total net compliance cost for Minnesota is negative for 2025. However, it is expected that beyond 2025, the net cost may become positive as more and more high-cost options need to be implemented to accomplish the state reduction goal.

The modelers worked out the costs of the mitigation options and ranked them from lowest to highest to develop the step cost curve. They believe the fitted cost curve is generally a good approximation of the step curve. It's important to note that any adjustment to the options' cost is reflected in both the step function and the fitted curve.

A TWG member asked about the differences between the free distribution of allowances versus requiring regulated sources to purchase them at auction. Dr. Rose explained that the answer sounds counter intuitive, but regardless of whether you do an auction and make everyone pay or grant them for free, the final value of the allowance come out to be about the same. The difference between the two is how much each source ultimately has to pay. Dr. Rose pointed out that the two systems were not exclusive – a program could be a hybrid, with some allowances distributed freely and some auctioned.

A TWG member asked whether there was a critical value to the cap and trade approach, beyond the fact that it tends to achieve the GHG reductions at a lower cost. Dr. Rose explained that the cap was a critical feature because by its very nature it limited the total emissions. He said that the cap and trade is more effective than other systems in reaching environmental goals.

A TWG member said that the Final Report should address the need for information about emission leakage, consumer prices, allowance distribution and other key issues the TWG didn't have time to examine. David Thornton suggested recommending that Minnesota work with neighboring states to determine the specifics of a regional C&T program.

An MCCAG member objected to including transportation fuels in the C&T program, noting that to meet the requirement for cleaner fuels refineries installed processes for lowering the benzene content. The proposed C&T option makes no accommodation for that effort, so he favored a federal program.

Another MCCAG member asked why large confined animal feeding operations (CAFOs) and other large agricultural operations were singled out, and asked for clarification on what "large" means. A TWG member explained that the TWG agreed that emissions that can be measured accurately should be included under the cap, such as CAFOs, large farms, mining operations, and refineries.

Another TWG member objected to including residential home heating fuels in the C&T, which will result in something like a carbon tax on their fuel with limited opportunities to switch to lower-carbon alternatives. He also noted that customers already have a hard time paying their heating bills.

An MCCAG member said he believed starting work on a regional C&T program would be a distraction from efforts to develop a national program. Another MCCAG member responded that while a national C&T program would be ideal, Minnesota needs to work with other states, learn from their experience, and develop a program that is consistent with theirs so the state can reconcile with a national program.

Jeff Wennberg reported that because the TWG is split between a 100% free distribution system versus a 100% auction, it is recommending further study, including a blend of both mechanisms and other alternatives, such as sector-specific distribution systems and a performance-based market system (i.e., no distribution). He added that setting a target of 2010 for implementing a regional C&T program is very ambitious, and that an earlier date is infeasible.

**C&T-4 (Carbon Tax)**—Adam Rose noted that the primary goal of a carbon tax is to limit carbon emissions. This option is more effective than penalties and enforcement, and would create a very straightforward single market, unlike the complicated markets the Federal Reserve Board deals with.

Jeff Wennberg said that the MCCAG is not recommending this option because it believes a comprehensive C&T program provides sufficient incentive and thus makes a carbon tax unnecessary.

AN MCCAG member stated that the carbon tax was transferred from the Energy Supply TWG so the Cap and Trade could cost it out, but Cap and Trade had not done so, and wondered why. A TWG member said that the cost of the carbon tax was about the same as the cap and trade with 100% auction, so they had looked at the cost. Dr. Rose said that a carbon tax is almost identical to what a complete auction would be under cap and trade. Other TWG members expressed concern that a full economic analysis of the carbon tax would need to be completed before a recommendation to adopt it could be made.

**C&T-5 (Market Advisory Group)**—There was strong support in the TWG for the MCCAG to recommend that the MGA convene a group to advise the states on the design of a regional cap and trade program. Some TWG members have no objections to a regional group, but suggested that Minnesota might want to form its own advisory group of specialists.

**C&T-6 (Regional and Multistate GHG Reduction Efforts)**—Jeff Wennberg explained that this option is largely covered by C&T-1, but leaves the door open for Minnesota to work with its neighbors on other regional GHG reduction initiatives.

**C&T-7 (Carbon Credit System for Minnesota)**—The C&T TWG has not had sufficient time to thoroughly study or consider this option. The MCCAG would like to study the administration's recently announced plan to pursue a similar policy before making a firm recommendation.

### **C&T Voting**

Voting by the 42 MCCAG members present at today's meeting is as follows:

**C&T-1**—Approved, with 9 objections.

**C&T-4**—The MCCAG TWG voted not to move forward with this option as a final recommendation, but recommends further study to determine the costs of this option.

**C&T-5**—Approved without any objections.

**C&T-6**—Approved without any objections.

**C&T-7**—The MCCAG TWG voted not to move forward with this option as a final recommendation, but recommends further study to determine the costs of this option.

## Attachment

### Members of the Public Attending MCCAG Meeting #8

St. Paul, Minnesota

January 24, 2008

<b>Name</b>	<b>Company</b>
John Bailey	Greater Minnesota Housing Fund
Deb Birgen	Minnesota Renewable Energy Society
Tim Brownell	Eureka Recycling
Rep. Karen Clark	State House
Doug Carnival	McGrann Shea Anderson Carnival Straughn & Lamb
Mike Cosnia	Minnesota Power
Greg Dana	
Laura Dooley	Alliance of Automobile Manufacturers
Glen Dorfman	
Allen Dotson	Minnesota Pollution Control Agency
Briane Draxten	OTP
Rachel Dykoski	Environmental Justice Advocates of Minnesota
Jenny Engh	Cargill
Stacey Fujii	Great River Energy
Steve Garvey	Minnesota Power
Darrell Gerber	Clean Water Action
Mike Gregerson	
Mary Ann Hecht	Minnesota Senate
Stephanie Hemphill	Minnesota Public Radio
Mike Hickey	National Federation of Independent Business
Rep. Bill Hilty	State House
Jerry Hinderman	
Lynn Hinkle	Environmental Justice Advocates of Minnesota
Rep Frank Hornstein	State House
Susan Hubbard	Eureka Recycling
Melissa Hysling	Minnesota House
Don Jorovsey	MN Senate Research, Committee Administrator
Heidi Karynenbelt	OTP
Rebecca Kenow	Flint Hills
Connie Kojlak	Metropolitan Council
Kirk Kowdelka	Minnesota House
Mike Kuhczyk	
Dennis Lein	Pioneer Press
Matthew Lemke	Winthrop & Weinstine
Yolanda Letnes	Minnesota Pollution Control Agency
Nick Mark	CenterPoint Energy
Bill McAuliffe	Star Tribune
Kathleen Micheletti	Excelsior Energy
Richard Newmark	Minnesota Audubon
Ryan O’Gara	SKB Environmental
Paul Aasen	Minnesota Center for Environmental Advocacy
Andy Pomroy	Minnesota House
Joe Reichstadt	Metro Transit
Kevin Rether	Minnesota Center for Environmental Advocacy
Carl Samulson	LCPPM
Bruce Saylor	Connexus Energy

Cindy Schulte  
Bret Smith  
Ed Sorenson  
Lee Sundberg  
Susan Turbes  
Jim Turnure  
Jamie Verbrugge  
Ingrid Vick  
William Watts  
Elenore Wesserle  
Allison Wolf

MECLI  
Sierra Club

Minnesota Rural Electric Association

Xcel Energy  
City of Rosemount  
LCPPM  
University of Minnesota Department of Mechanical Engineering  
Women's Environmental Institute  
Minnesota Center for Environmental Advocacy