

Interagency Pollution Prevention Advisory Team (IPPAT)
Minnesota DNR Carlos Avery Game Farm and North Metro Area Office
Thursday, October 26, 2006
Meeting Summary

Agenda

- DNR and Executive Order 05-16
- E85 and the Environment
- Executive Order 04-10 and the State Contract
- Future Alternative Vehicles

Announcements and Updates

- The Living Green 365 campaign at the Pollution Control Agency has begun with Erin Jordahl-Redlin as the coordinator. She will be creating a website and a periodic newsletter featuring messages from the Living Green Expo and the EcoExperience at the Minnesota State Fair. The EcoExperience attracted 350,000 visitors, the second most popular exhibit at the fair, after the Miracle of Birth exhibit. The State Fair and the Pollution Control Agency have a three-year commitment to the EcoExperience. The wind turbine blade in front of the building is lighted at night and serves as a giant billboard for wind power.
- As of October, 328 mayors from 46 states representing a total population of over 53.2 million citizens have signed onto supporting the Kyoto Accord, as a result of the Mayor's Conference on Climate Change in 2005. Mayors from eight cities in Minnesota, including the mayors of Minneapolis and St. Paul, have signed, and many others are considering the commitment. Ask Mike Nevala for information you can use to urge your city to join.
- Paul Gardner, executive director of the Recycling Association of Minnesota, is running against Phil Krinkie to represent district 53A in the Minnesota House of Representatives. (He won.)
- Mike Nevala is the reigning Pumpkin King of the Metropolitan Council's largest pumpkin challenge. Mike's pumpkins weighed in at 54 and 82 pounds each.

Implementing Executive Order 05-16 at the DNR

Don Matthys, Department of Natural Resources 651-259-5478

The Minnesota Department of Natural Resources (DNR) is implementing Executive Order 05-16, providing for energy conservation measures for state owned buildings. The executive order is attached to this meeting summary. The DNR properties consist of 2,500 buildings at 240 sites statewide. The system currently used by the DNR tracks cost of energy, not gallons or Kilowatts. The department has experienced a \$200,000 increase in energy costs, but it is difficult to measure the cost versus the energy actually used. The Management Resources team supports activities of the Fish and Wildlife, Forestry, Enforcement, Ecological Services, Lands and Minerals, Parks, Waters, and Trails and Waterways Divisions, providing facility operations management to all these programs.

To begin to implement Executive Order 05-16, Management Resources began planning an awareness campaign. They followed the awareness campaign with training and the benchmarking of the energy systems in all buildings covered by the campaign. Information feedback from building managers and staff was important to the ongoing success of the program.

The implementation contained a number of practices the DNR has been able to sustain. Annual facility and heating, ventilating and air conditioning (HVAC) systems inspections are ongoing. DNR continues to employ sustainable practices in new construction and remodeling. Lighting upgrades are ongoing, and day-lighting is employed wherever possible. Landscaping changes suggested by landscape architects on staff allow for lower

energy inputs, and the DNR strives for efficiency in all their HVAC units. Out of the 2,500 DNR buildings, 64 have been benchmarked. Six buildings earned high scores, and 20 need additional monitoring.

Some of the difficulties they have encountered are:

- Propane tanks are not metered, so how do you measure propane use for a monthly report?
- Humidity may drive the temperature setting in offices. You're balancing comfort and productivity versus a standard temperature.
- There are so many buildings that the Management Resources staff can't benchmark all of them.
- New technologies abound, but when do you jump in?
- The effort requires a cultural shift to a resource focus.

The projects so far have focused their efforts on energy conservation, but the Management Resources team is considering the use of geo-thermal HVAC systems. They are also looking for better tools for measuring, such as thermal imaging. Feedback from our employees has been valuable.

E85 and the Environment

Tim Gerlach, American Lung Association of Minnesota, 651-227-8014 www.CleanAirChoice.org

Ethyl alcohol, or White Lightning, as it is known has an approximate 110-octane rating and it is used as a high-performance racing fuel (E100 will be used to power the 2007 Indy Racing series including the Indianapolis 500). Adding ten-percent ethanol to gasoline blends, known as E10, boosts the octane by 3.5 points.

Ethanol is also used as a gasoline oxygenate, providing oxygen to the fuel in order to aid in more complete combustion. About 30 percent of all U.S. gasoline now contains ethanol in low-level blends of E5.7 to E10.

In the US, corn is the primary feedstock for ethanol production; however, only the starch from the kernel is used, leaving the protein and cellulose for animal feed. Other feedstocks used in the US and around the world include: sugar cane, wheat, and wastes from soda/beer and cheese making. Cellulose is a feedstock that is garnering a large amount of attention and research interest.

In 2006, the United States has a production capacity of ~5.1 billion gallons of ethanol. By 2008, that capacity is expected to surpass 7.5 billion gallons.

Fuel ethanol is always denatured or poisoned with gasoline (or other additives) before it leaves the production facility -- rendering it unfit for drinking (and it is taxed as fuel rather than liquor). Ethanol blends of up to 85 percent (E85) may be used in flexible fuel vehicles (FFVs). Currently there are 30-plus FFV models, and more are coming. Drivers can expect roughly 15 to 17 percent less fuel economy when using E85. This is due to both the fuel's lower energy density and the 'flexible' nature of the vehicles. Please note that E85 typically is priced 20 to 50 cents less than 87-octane gasoline sold in our region. E85 has lower emissions, also, lower oxides of nitrogen (NOx), hydrocarbons (HC) and lifecycle carbon dioxide (CO2) emissions.

Approximately 6 million FFVs are now on the road in the USA, but most of them are not yet using E85. Ways we can raise drivers' awareness of the fuel they should use in their FFVs include badging – marking the car somewhere to heighten awareness – and marking the fuel caps so that drivers see each time they open the fuel cap that they should fuel with E85. Some manufacturers have begun taking the lead on marketing them (Live Green Go Yellow campaign).

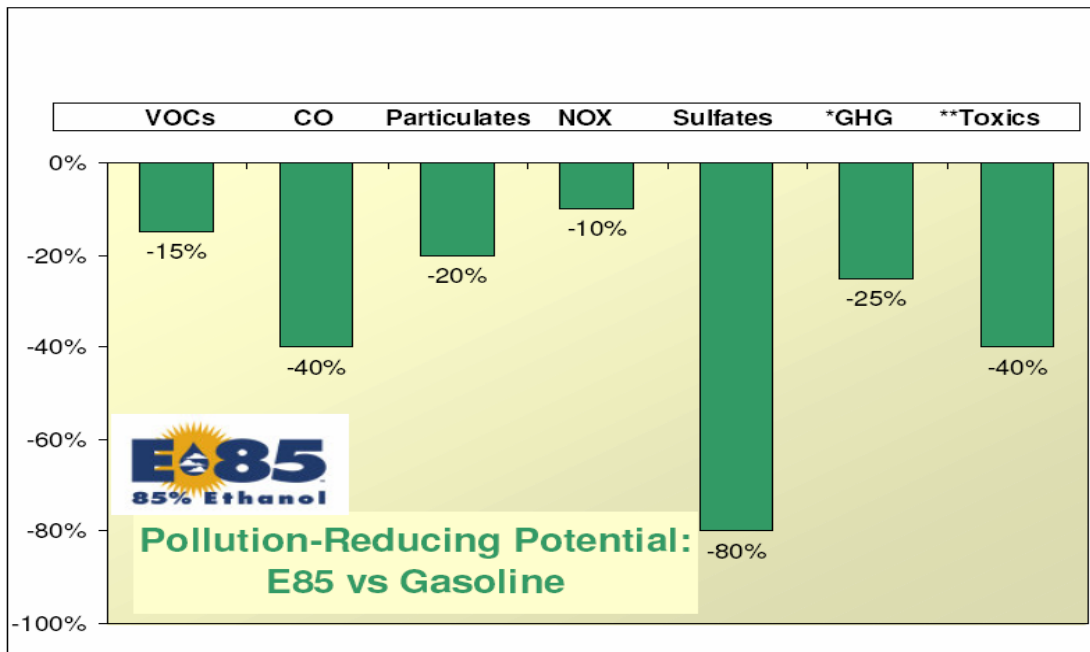
Why use bio-based fuels? We generally tell people to think of the three E's of biofuels:

- Economic Development (They are produced here)
- Energy Security (They are renewable-based, reducing our reliance on imported oil)
- Environmental (Using biofuels can lower emissions)

A significant advantage of using biofuels is that plants utilize carbon dioxide in photosynthesis. If using plant-based fuels, a "carbon cycle" is created in which carbon dioxide is released in combustion and re-used by the

next generation of plants. Because fossil fuels are used in the process, it is not a perfect cycle; however, today's technology may provide 25% to 30% reduction in fuel lifecycle CO2 emissions.

Plant fiber, called cellulose, is the most abundant organic molecule on earth. The bio-ethanol process takes cellulose and, using enzymes, turns it into fermentable sugars and subsequently into ethanol. Using carbon dioxide-absorbing plant material as an ethanol feedstock offers environmental advantages unequalled by other feedstocks or fuels. Ultimately, cellulose will be harvested and sent to a bio-energy facility for conversion to ethanol, electricity, carbon dioxide and possibly other co-products. The following graph shows estimated pollution-reduction potentials for some key pollutants for E85 versus gasoline.



Sources: USEPA 2002 Factsheet – Optimized E85 vehicles; MPCA Website (8/02)
* Wang et al; Argonne National Laboratory fuel lifecycles; 1997
** Winebrake et al; 2001 [CARB CUREs]

Minnesota was selected as a national pilot market by the US Department of Energy, Ford Motor Company, and others in 1997-98. An ad hoc “E85 Team” was created, and it is housed at the American Lung Association of MN offices. The Minnesota E85 Team consists of the following partners:

- Minnesota Corn Growers Association
- Minnesota Dept of Commerce Energy Division
- Minnesota Dept of Agriculture
- Minnesota Coalition for Ethanol
- AgStar Financial Services
- General Motors Corporation
- National Ethanol Vehicle Coalition
- US Dept of Energy Clean Cities
- American Lung Association of Minnesota

See www.CleanAirChoice.org for the latest listing of E85 stations in Minnesota and the surrounding states.

About 300 stations sell E85 in Minnesota today, with a goal of 1,800 stations within the next few years. Minnesota statewide sales of between 18 million and 20 million gallons are anticipated in 2006 – at an average cost averaging about 40 cents per gallon less than 87-octane. For comparison, 8.2 million gallons were sold in 2005; 2.7 million gallons were sold in 2004 and about 2.1 million gallons were sold in 2003.

E85 sales are gaining momentum. Wisconsin has about 60 stations, Illinois more than 120, the Dakotas more than 60, South Carolina 36, and Texas 19. The USA total is about 1,050, compared to the January 2004 nationwide total of 285.

A number of misconceptions plague the acceptance of E85: Misconception #1: if ethanol use grows, service stations will soon compete with grocery stores – It'll be fuel versus food! With corn as the only feedstock, that could conceivably happen one day in the future, but that is a long way off – and, many other potential feedstocks exist including the promise of developing cellulose-to-ethanol technologies. Think of the development as a line with the beginnings in the early corn-to-ethanol work and, ultimately, progressing to advanced conversion of cellulosic materials.

Misconception #2: It requires more energy to produce ethanol than is actually contained in the fuel. This is simply not true. Energy balance studies show the lifecycle of ethanol production to be less energy intensive than the lifecycle of gasoline production. The work of the two best-known anti-ethanol spokespeople (that seem to be quoted everywhere), have been rebutted by researchers at Argonne National Laboratory, Oak Ridge National Laboratory, the National Renewable Energy Laboratory and others.

Misconception #103: Ethanol plants use too much water. This is a fair question. Ethanol production, like many industries, uses a considerable amount of water, but newer technologies have reduced use considerably. During the biofuels “gold rush,” decision-makers need to ensure that sustainable water use levels are maintained.

Misconception #104: We cannot possibly grow enough corn to produce enough ethanol to replace all our petroleum needs. True, but that is not the real goal. US Department of Energy research puts the estimate at 30 percent of our transportation fuels being met with ethanol by 2030. Remember that new technologies and feedstocks (including cellulose) are part of the equation.

Misconception #105: Ethanol is highly subsidized and nothing more than “farmer welfare.” This sentiment ignores all the subsidies afforded the petroleum, aviation, banking/finance, automaking and all the other industries (including nonprofit tax considerations). One can argue that it is proper for government to invest in things that are of societal benefit.

Misconception #106: Ethanol burns hotter than gasoline. False. It actually burns cooler than gasoline.

Other misconceptions:

- Ethanol has trouble with cold starting (Not if blended properly),
- Special oil is required (Not any more, Chrysler finally dropped this holdover in their owners manuals)
- E85 creates trouble with corporate average fuel economy (CAFÉ) standards (Should automakers do more? One might argue, yes. However, without the incentive to build FFVs, we would not have 6 million FFVs on the road today and we would still be whining about the chicken/egg question on fuel stations/vehicles)
- This just isn't all that important – It really doesn't make any difference. (Well, unless we act on things like this, we will never reverse our dependence on foreign oil.)

The bottom line is that no silver bullets exist. The energy and fuel issues we face will require a lot of silver BBs. You can find an E85 Fleet Toolkit at <http://www.EERE.Energy.gov/AFDC/E85Toolkit> .

For more information, please visit the American Lung Association of Minnesota website at <http://www.CleanAirChoice.org> or give them a call 1-800-LUNG-USA.

State of Minnesota Executive Order 04-10 and Vehicle Acquisition Contracts
Tim Morse, Travel Management, Admin 651-201-2511

To carry out Executive Order 04-10 we need to purchase vehicles that use less petroleum fuel. We need to do this and, at the same time, remain cost effective. The Department of Administration Materials Management Division (MMD) is responsible for establishing vehicle contracts. There is a cooperative effort between MMD, MnDOT, DNR, and the Travel Management Division (TMD).

Vehicle acquisition contracts are affected in some important ways as a result of the Executive Orders. Contracts are focusing on vehicles that are capable of using cleaner fuels and on vehicles that achieve higher fuel economy ratings. What exactly does that mean for state agencies and political subdivisions? Flex-fuel vehicles are available – vehicles that can run on gasoline or E85 fuel. Hybrid vehicles are becoming available, offering increased fuel economy. Fuel economy is improving, especially in the smaller passenger car categories.

For the 2007 vehicle contracts all passenger cars needed to be flex-fuel or meet certain fuel efficiency criteria, which are a city mileage rating of 28 miles per gallon or a highway rating of 33 miles per gallon. Automobiles on the 2007 contract are:

- Ford Focus (gasoline 27/34) \$11,464
- Chevrolet Aveo (gasoline 26/34) \$11,687
- Chevrolet Malibu (gasoline 24/34) \$12,805
- Chrysler Sebring (flex-fuel) \$16,882
- Chevrolet Impala (flex-fuel) \$15,769
- Ford Crown Victoria (flex-fuel) \$22,838

The only station wagons are the Ford Focus Wagon (gasoline) \$12,978 and the Pontiac Vibe (gasoline) \$16,726. Mini-vans on the contract are:

- Dodge Caravan (flex-fuel) \$15,638
- Dodge Grand Caravan (flex-fuel) \$17,661
- Chevrolet Uplander (flex-fuel) \$18,078

Sport utility vehicles include:

- Dodge Durango (flex-fuel) \$18,642 - \$21,187
- Ford Escape (gasoline-electric hybrid) \$24,242 - \$25,670
- GMC Yukon / Chevrolet Tahoe (flex-fuel) \$26,993 – \$31,906

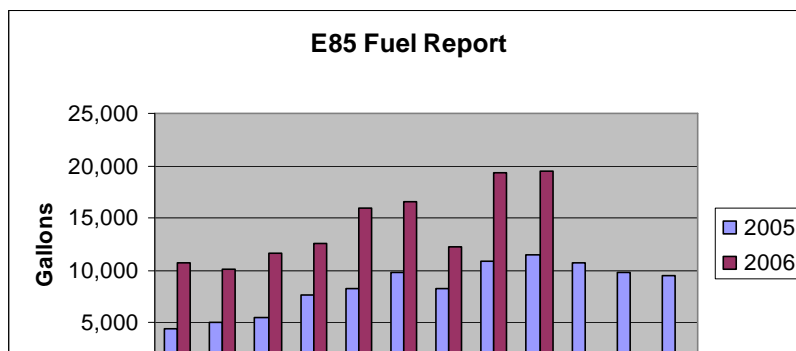
Passenger vans with electronic stability control include the

- GMC Savana 8/12 pass. (gasoline) \$19,666 – \$19,963
- Ford E350 – 12 pass. (gasoline) \$19,421

Several hybrid vehicles were eligible to bid, but the dealers chose not to bid. The strong retail market makes fleet sales less desirable to dealers. We may see more in future years.

The decreased variety of vehicle selection has not been popular with some agencies and some political subdivisions. Will this change help the State comply with Executive Order 04-10? Yes, because it is much more difficult to choose a vehicle that is not fuel efficient or not capable of using E85 fuel. Vehicle selections will be refined in response to available vehicles as changes happen in future years. Are we moving in the right direction? Yes. Acquisitions for the TMD fleet moved from an average of 60 percent flex fuel vehicles to 77 percent flex fuel vehicles in 2006.

There is a long and challenging road ahead of us. However, we have made a significant start and we will continue moving forward. The following table (next page) shows how the state is doing with E85 purchases.



Possible Future Alternative Vehicles

Wayne Cavadini, Department of Natural Resources 651-259-5443

A review of new vehicles being developed and marketed shows that several alternatives exist. Hybrid vehicles average 45 miles to the gallon of gasoline and are available in several makes and models. The DNR utilizes a Neighborhood Electric Vehicle at Itasca State Park for park maintenance. It has a maximum range of 55 miles and a maximum speed of 25 miles per hour.

News on alternative vehicles:

- A company plans to build an ethanol plant in Georgia that uses cellulose as a feedstock.
- British Petroleum and General Electric plan to build up to 15 hydrogen power plants by 2016.
- Solar-powered vehicles take to the racetrack and water.
- Toyota plans to pursue Plug-in Hybrid vehicles and consider flex-fuel vehicles.

Biodiesel is an alternative fuel produced from domestic, renewable resources. It has lower emissions than Petroleum. In 2005, U.S. distributors sold 75 million gallons of biodiesel. Biodiesel distributors are scattered across the country but are concentrated in the Midwest.

Plug-in hybrids achieve fuel efficiencies of up to 200 miles per gallon. They operate with an advanced lithium-ion battery development. Hydraulic hybrid technology is for large pickups and sport utility vehicles. They get up to 70 percent better fuel efficiency and 40 percent lower carbon dioxide emissions.

BMW, General Motors, Honda and others are pursuing hydrogen vehicles. MN Statute 216B.811 requires state agencies to identify opportunities to demonstrate hydrogen use in order to foster a transition toward energy security. Before hydrogen vehicles are in place, advanced engines such as displacement-on-demand engines are an option. They have six to eight percent improved fuel economy.

Another thing drivers can do is to consider their driving practices. OnStar has a new service that targets fuel economy. It notifies the subscriber when tire inflation is below recommended levels, analyzes driving patterns, and provides Powertrain emissions feedback.

Eco-driving is the term given to driving techniques designed to save fuel and promote safer driving. The principles of eco-driving are to avoid short trips, driving over 60mph, hard acceleration, fast braking, or unnecessary loads and to ensure that tires are inflated correctly and the vehicle is maintained regularly. Using these techniques can reduce your car's CO2 emissions and fuel consumption by up to 25 percent.

Next Meeting

The next IPPAT meeting will be on Thursday, January 25, 2007, in Conference Rooms 2A & B at the Pollution Control Agency, 520 Lafayette Road, St. Paul, MN. If you would like to suggest meeting topics or wish to offer to host a future meeting, please contact Emily Moore at 651-215-0201 or Emily.moore@state.mn.us.

Attendees

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Gordy Dormanen, Iron Range Resources 218-254-7967
Tim Gerlach, American Lung Association – Minnesota 651-223-9577
Colleen Hetzel, Pollution Control Agency 651-215-0203
Marilyn Jordahl-Larson, Department of Transportation 612-725-2372
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Gail McNertney, Department of Health 651-201-4982
Emily Moore, Pollution Control Agency 651-215-0201
Tim Morse, Department of Administration 651-201-2511
Anita Mujumdar, MNSCU Office of Chancellor 651-649-5410
Mike Nevala, Metropolitan Council Environmental Services 651-602-1065
Charles Pattain, Pollution Control Agency 651-282-6063
Lizz Sheridan, Pollution Control Agency 651-297-8566
John Thompson, Metropolitan Mosquito Control District 651-645-9149, ex 8364
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Mike Vennewitz, Retired Engineers Technical Assistance Project (RETAP) 612-781-1307
Roger Wirkkunen, Department of Revenue 651-556-4002

- Executive Order 05-16 next page –

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STATE of MINNESOTA



TIM PAWLENTY
GOVERNOR



EXECUTIVE ORDER 05-16

**PROVIDING FOR ENERGY CONSERVATION
MEASURES FOR STATE OWNED BUILDINGS**

I, TIM PAWLENTY, GOVERNOR OF THE STATE OF MINNESOTA, by virtue of the authority vested in me by the Constitution and applicable statutes, do hereby issue this executive order:

WHEREAS, energy prices including the costs for electric power, natural gas, heating fuel are predicted to rise significantly this year; and

WHEREAS, state government is a major consumer of energy and should be a leader in adopting energy conservation practices, thereby furthering fiscal, environmental and economic development goals, and

WHEREAS, conservation of energy resources are an effective means for mitigating against the demand pressures for energy consumption and for reducing state costs related to increases in energy prices; and

WHEREAS, state agencies are in a unique position to demonstrate to other governmental entities, businesses, organizations and individuals the cost and environmental benefits of energy conservation; and

WHEREAS, reduction and conservation of energy resources is consistent with other executive branch initiatives including Executive Order 04-10 which provides for the use of alternative fuels for the state's fleet and travel needs and Executive Order 04-08 which provides for state departments to take actions to reduce air pollution in daily operations.

NOW, THEREFORE, I hereby order:

1. All state agencies will take measures including, but not limited to the measures set forth in this order, to reduce energy usage in state owned buildings by 10% over the next calendar year.