



January 14, 2010

To: Citizen Advisory Committee
From: Susan Payne and Stacy Clauson, LCOG
Subject: CAC Agenda Item 8: Greenhouse Gas Planning

Action Recommended: None. Information only.

“Reducing transportation-related emissions of carbon dioxide-the primary greenhouse gas-that contribute to climate change and adapting to the consequences of climate change will be among the biggest public policy challenges facing the transportation profession over the coming decades.” *Transportation Research Board of the National Academies*

Purpose

This agenda item is to provide the CAC with an introduction to the efforts that the MPO has been taking to respond to new initiatives addressing Transportation and Greenhouse Gas Planning.

Status

Over the past several years, MPO staff have been anticipating and preparing for the need to incorporate planning for climate change into the MPO's activities, plans and programs. There has been no lack of studies and discourse on the subject but little coherent direction has been provided by the state and federal agencies with which we work and coordinate. Thus, we have participated in as many information exchanges, tutorials, workshops, and training sessions as possible in order to keep current as time and other work has permitted. We have initiated and participated in state committees on global warming. We have actively promoted the need to advance all MPOs' modeling tools and data collection efforts in order to be able to report defensible results. Attachment 1 lists the work that has been undertaken since July 2007.

There is now momentum at both state and federal levels for climate change legislation. The State Legislature, in the form of HB 2001 and HB 2186, has taken the first steps in defining roles and responsibilities.

Under HB 2001, the Jobs and Transportation Act, the following greenhouse gas strategies are included:

- ***New Funding.*** HB 2001 directs ODOT to participate in and finance the development of transportation plans needed to reduce greenhouse gas emission

by light vehicles by working with multiple agencies, local governments and other partners.

- **New Criteria for Funding.** HB 2001 calls for updating the criteria used to select projects programmed in the Statewide Transportation Improvement Program to ensure that project selection is consistent with GHG reduction goals.
- **Scenario Planning.** HB 2001 directs Portland Metro and the Central Lane MPO to each develop two or more land use/transportation scenarios reducing GHG from cars while planning for population growth. The Central Lane MPOs is required to complete the scenario planning work by July 2013.
- **Other.** HB 2001 also directs ODOT to create a provision for medium speed electric vehicles so that when they are manufactured to meet federal passenger car safety standards ODOT can be ready. In addition, HB 2001 directs ODOT to work with the Travel Information Council and the private sector to develop a plan for installing electric motor vehicle charging stations at rest areas.

Under HB 2186, the MPO GHG Task Force will be issuing recommendations to the interim legislature, expected to contain the following major components:

- **State Strategy for Reducing Transportation GHG.** The Oregon Transportation Commission (OTC) will prepare a statewide strategy for achieving transportation sector GHG emission reductions, establishing planning assumptions about state and federal programs, policies, and incentives expected to be in place to reduce GHG emissions.
- **Scenario Planning Guidelines.** The Department of Land Conservation and Development (DLCD) will prepare guidelines for preparation and evaluation of alternative land use and transportation scenarios, and the process for developing scenarios that allows for consideration of the full range of land use and transportation actions within the control of local governments.
- **Modeling and Best Practices Toolkit.** ODOT and DLCD will coordinate to develop a toolkit that includes 1) potential actions to reduce GHG emission at a regional and local level developed through a review of best practices; and 2) improved modeling and analysis tools and modeling assumptions that MPOs and local governments can use to assess GHG reduction benefits of a range of land use and transportation actions.
- **Scenario Planning Process.** MPOs will establish a GHG-reduction plan or integrate GHG reduction goals, objectives/methods, and projects into an existing plan to meet adopted targets. The plan would consider local governments' unique needs, resources and scheduling capacity and utilize the *State Strategy, Scenario Planning Guidelines, and the Toolkit*.

Our two-year Unified Planning Work Program (UPWP) anticipated that additional work would be needed to address greenhouse gas planning and, as a result, outlined Air Quality Planning and the Transportation System Modeling and Data Maintenance tasks.

This subject is complex, expansive and touches many of the facets of long range and short range transportation planning. It requires tracking of data and modeling of long range futures. This memo provides an introduction to the work that we are beginning. Staff will keep the CAC informed as progress is made and issues need to be resolved.

Background

State of Oregon Goals:

Oregon HB 3543 in 2007 established GHG reduction goals for the State which are those most likely to be applied to our region:

- 2010 -- stabilize emissions and begin reduction
- 2020 -- achieve 10% reduction below 1990 levels
- 2050 -- achieve 75% reduction below 1990 levels.

Meeting Reduction Goals:

Brian Gregor of the Oregon Department of Transportation recently highlighted the reduction in fuel use per capita that would be needed to achieve the State's goals, as follows¹:

Year	Fuel	Population	Fuel per capita
1990	1.6 b	2.8 m	567
2050	0.4 b	5.9 m	68

In order to achieve the reduction goals set out by the State, fuel use would need to drastically reduce from an average use of 567 gallons per person in 1990 to 68 gallons per person in 2050, a reduction of more than 88% from 1990 levels. It is important to note that state-level inventory work reports that transportation GHG emissions have grown since 1990, further complicating this challenge.

Transportation emissions are influenced by three main factors:

1. Vehicle technology,
2. Fuel characteristics and
3. Vehicle miles traveled (VMT).

There are four key strategies that will be examined to meet the State's reduction goals, including:

1. Use of Low-Carbon Fuels
2. Use of Cleaner and More Efficient Vehicles
3. Reduction of VMT
4. Optimization of System Operations/Congestion Reduction

In the case of greenhouse gas emissions, fleet-wide vehicle emission rates have been essentially stagnant since 1991 while VMT has grown over the same period. As a result, growth in driving has so far outpaced the emissions benefits of vehicle technology improvements. Yet, given the magnitude of change in fuel consumption that is projected to be needed, improvements in vehicle technology and fuel may not be sufficient, particularly if VMT continues its current pattern of growth.

¹ Brian Gregor: [Tools for Reducing GHGs from the Transportation Sector](#), 2009 Cutting Carbs Workshop, Oregon Environmental Council

Gail Achterman, Chair of the Oregon Transportation Commission, recently addressed the issue of VMT growth, recognizing that while Oregon's land use policies have curtailed sprawl as a key factor in increasing VMT, VMT growth in Oregon is still being realized and is therefore being influenced by other factors¹. Therefore, as we move forward in considering appropriate emission reduction strategies, it will be important to gauge the implementation and success of existing programs, as well as evaluate new approaches to changing existing behaviors.

Factors affecting the number of vehicle trips and each trip's distance (and thus VMT) made each day include (but are not limited to) age, income, population and household size, workers per household, auto ownership, access to transit, economic health/activity, and individual choice.

There are a number of studies that have begun to evaluate the effectiveness of different reduction strategies, and the MPO plans to consult this body of work as it moves forward with GHG gas planning efforts.

Existing Inventory Work:

A *state-level* inventory has been reported from 1990 forward that describes the changing contributions to greenhouse gas emissions² (GHGs) by sector. This shows that between 1990 and 2005, total CO₂ emissions grew by 26.3%; transportation emissions grew by 16.6%.

Using a variety of sources, Table 1 compares the estimated total CO₂ emissions/capita across the nation, the state, and the cities of Portland, Eugene and Springfield for 2005. The fraction of total emissions due to transportation sources is influenced by the type of fuel used to generate electricity. Thus, in the Central Lane area, transportation is a relatively higher fraction of the total CO₂ emissions (48%, 51%) due to the large amount of hydropower and other alternatives used in electricity generation (i.e., "clean energy").

Note that the City of Portland states that it has reached its goal of matching its 1990 level emissions. If so, and assuming that the inventory methods are comparable, it has a carbon footprint per capita that exceeds those of the cities in our region.

¹ Gail Achterman: [Transportation, Land Use & Climate Change](#), 2009 Cutting Carbs Workshop, Oregon Environmental Council

² Greenhouse gases are considered to include carbon dioxide (CO₂), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. These are combined and expressed as carbon dioxide equivalents, or CO₂e.

Table 1. Comparing GHG emissions

2005, estimated, per year	United States	Oregon	Portland	Eugene	Springfield
Total: CO2e metric tonnes/capita	20.4	17.2	12.5	8.6	7.9
% attributed to transportation	28%	38%	39%	51%	48%
Transportation-related: CO2e metric tonnes/capita	5.7	6.5	4.9	4.4	3.8
Mileage equivalent (miles/year/capita)					
at 25 mpg	16,193	18,466	13,920	12,500	10,795

An illustration of the challenge facing us can be shown as follows: to reduce our transportation-related footprint by 50 percent while accommodating a doubling of the population we need to achieve a transportation “budget” of around 1 ton of CO2e/capita. This is equivalent to driving a 25 mpg car using gasoline about 2,700 miles per year per capita. (This deduction is in line with that of Brian Gregor as described above.)

ODOT analysis has shown that for the State to meet its goals, all strategies have to be employed: demand management, low carbon fuels, electric vehicles and alternative modes including transit. No one approach will enable us to meet the goal.

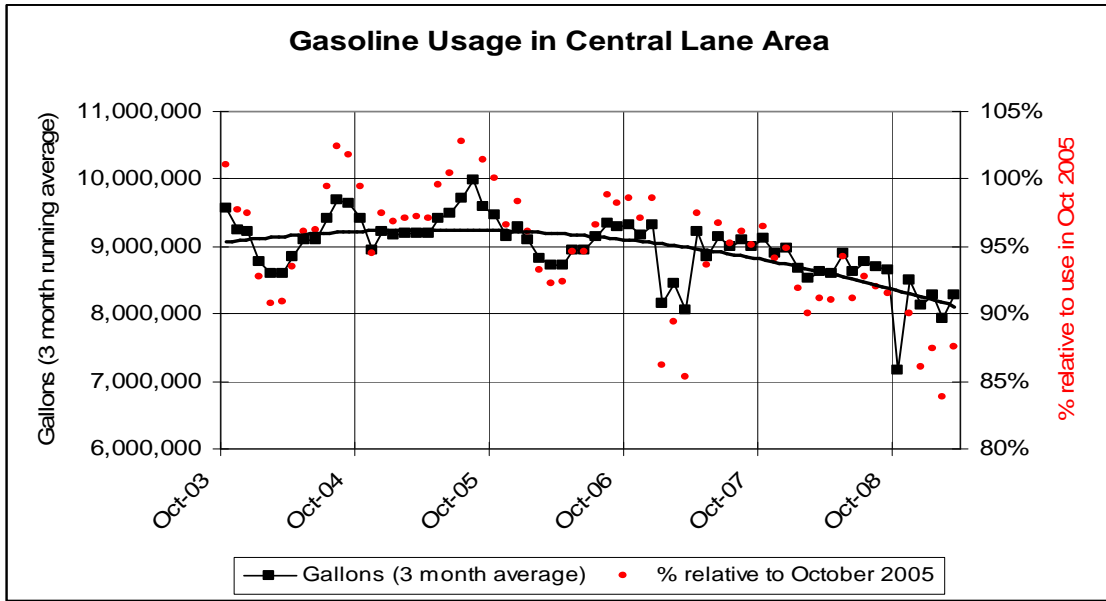
Trends:

It is and will continue to be advisable to collect and maintain data to complement any modeling forecasts. This is analogous to monitoring air pollutants that are analyzed under the air quality conformity rules of the Clean Air Act.

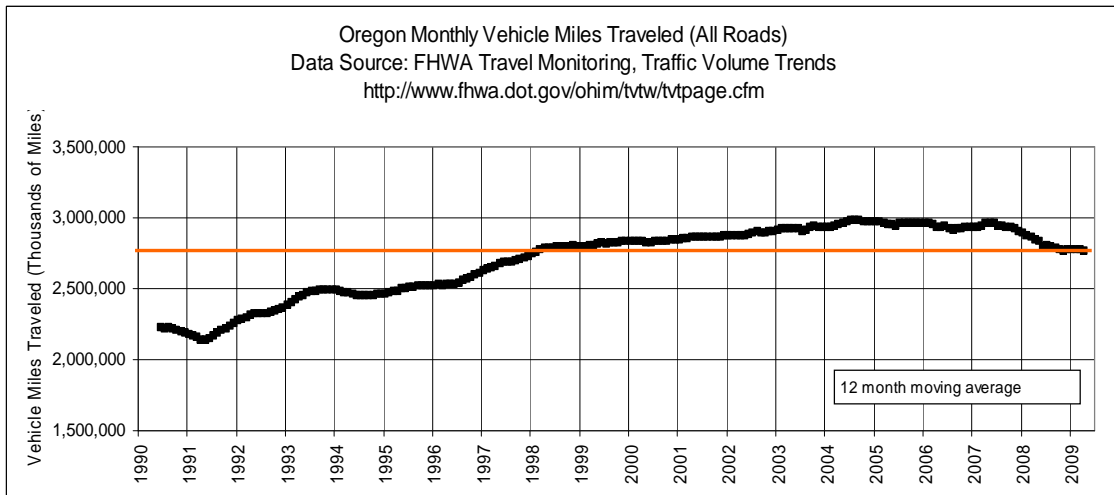
The following figures show trends extracted from federal and state data that are routinely reported on the web. It is clear that vehicle miles traveled on state highways (at least) have been declining within the state and local geographies. At the current time levels are approximately around 1997 levels.

It should be emphasized that VMT is not equivalent to GHG emissions over the **long** term. Emissions are highly dependent on vehicle operating conditions including congested speeds. Also, as low carbon fuels are introduced, the CO2 emissions rate per gallon of fuel burned decreases. And, the type and age of the vehicle is highly significant. The long-awaited USEPA MOVES emissions model will be able to calculate the appropriate CO2 emissions rates given the appropriate input data. Fuel usage (converted to carbon content) is probably the most representative metric in that it integrates all these factors.

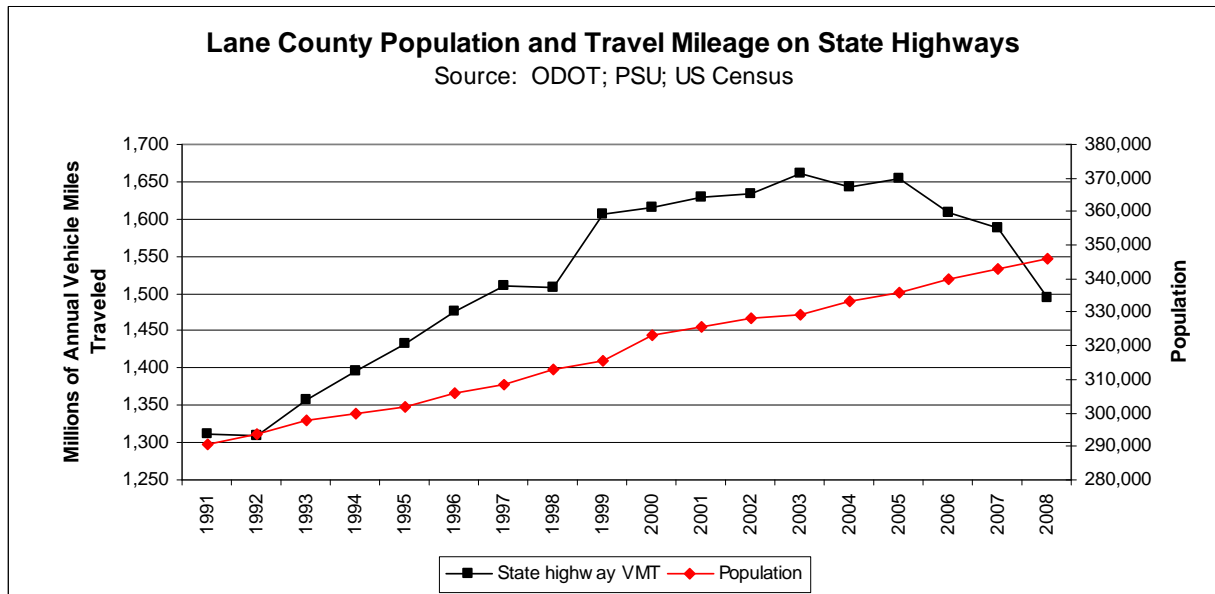
A. From local fuel sales tax receipts: in *March 2009*, fuel usage was about **88%** of usage in July 2005. We expect the levels of use to remain lower than 2005 levels until the economy begins to recover.



B. Vehicle Miles Traveled within Oregon: The following chart shows a 12-month running average of data reported by FHWA based on automatic recorders and statistical analysis. As of *April 2009* the reported miles were **94%** of the VMT estimated for July 2005.



C. Vehicle Miles Traveled on State Highways within Lane Co.: The following chart shows annual data reported by ODOT for **state** highways in Lane Co. based on automatic recorders and statistical analysis. As of **2008**, the reported miles were **90%** of the VMT estimated for 2005. During that period, population in the county increased by 2.9%. VMT/capita on state highways in Lane County in 2008 was less than that measured in 1991.



Challenges

This area of work presents some significant challenges to this MPO:

1. There is a high likelihood that the MPO will be required to respond to regulations at both the state and federal levels, which may be inconsistent, and even conflict with one another, as is the current situation with Air Quality Conforming regulations from DEQ and from EPA. The actions taken by the State thus far are addressed above. In addition, actions have begun at the federal level as well.

On December 7, 2009, the the U.S. Environmental Protection Agency (EPA) announced that greenhouse gases threaten the public health and welfare of the American people. The EPA also determined that GHG emissions from on-road vehicles contribute to that threat.

EPA's final findings responded to the 2007 U.S. Supreme Court decision that GHGs fit within the Clean Air Act definition of air pollutants. The findings do not in and of themselves impose any emission reduction requirements but rather allow EPA to finalize the GHG standards proposed earlier this year for new light-duty vehicles as part of the joint rulemaking with the Department of Transportation. These proposed rules would apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile, equivalent to 35.5 miles per gallon (MPG) if the automobile industry were to meet this carbon dioxide level solely through fuel economy improvements. The EPA might also take further steps to regulate emissions.

In addition to EPA actions that will be taken to fulfill their obligation to address GHG as an air pollutant, Congress may also take up this effort and pass comprehensive climate legislation.

Whether or not federal rules will trump state rules is not clear. Responding to two sets of regulations will represent a significant resource challenge.

2. Current legislation at the state and federal levels is prescriptive in that specific modeling tools, data and targets are to be provided to the MPOs. This is likely to provide conflicting requirements which, again, could require extensive staff time and effort. This may also penalize early adopters who begin work and make decisions ahead of regulations. In addition, differing approaches will produce differing results, leading to confusion.
3. While Metro is tasked with making their modeling tools available to us to use in scenario planning (per HB2001), it is not straightforward to implement these very complex models. Importing a model means accepting a framework within which an extensive amount of *local* analysis and data must be inserted. Models must be calibrated against the current conditions and then their forecasts validated. This is a non-trivial effort which is likely to take multiple years of work.
4. The basic travel demand model which all MPOs in Oregon use for their official work cannot model many of the small scale strategies that may be a part of the alternative scenario planning. This has been recognized at ODOT and at the national level. Metro is still probably a year away from having a working version of such an advanced tour-based model, and possibly two years before they are able to share the model with the other Oregon MPOs. We anticipate working with Metro and ODOT once that task is close to complete at Metro.
5. Model building and testing is a skilled profession. We will likely have to contract with private consultants to accomplish the work, regardless of the help provided by Metro. This will be expensive. It will thus be important to review our funding at the end of FY10 and assess our workload in light of these new and evolving requirements.
6. There is a significant coordination component to the development of rigorous greenhouse gas inventories. For example, there needs to be a protocol that is adopted statewide so that double counting of GHGs across jurisdictions does not occur. A decision as to using lifecycle costs must be made. Further, there needs to be a regular data conduit between the MPOs and the state agencies that manage fuels and passenger fleet information. This dialog has not yet included MPOs if indeed data management planning has begun.
7. The University of Oregon studies on climate change impacts indicate that the Willamette Valley may receive many "climate refugees" over the next 50 years. This may result in higher population growth than we typically expect from historical and demographic trends. The difficulty in meeting any goal provided to us will depend on how the carbon "cap" is computed and whether adjustments are made over time as growth rates change across the state, and across the nation.
8. There are four major efforts to be considered: a) inventory, b) development of strategies and analysis of impacts ("mitigation"), c) development of plans to adapt to environmental changes, d) incorporation of sequestration and offset options.

Next Steps

After several years of discovery and study, the roles and responsibilities of the various state, federal and local agencies are being decided.

The MPO Greenhouse Gas Emissions Task Force will be issuing their report to the interim Legislature, including recommended greenhouse gas planning legislation. Other components of the Task Force report will include findings relating to existing impediments to implementing land use and transportation scenarios, and the evaluation of fiscal and other resources relating to the implementation of Task Force recommendations.

The Central Lane MPO will begin the process of determining how to create defensible and realistic GHG inventories due to all transportation sources within the MPO area or other boundary, as agreed to by the State.

The results from a GHG inventory can be used to identify which sources contribute the greatest to local emissions and prioritize strategies for reducing GHG emissions. This inventory is an important step in not only tracking emissions trends, but also developing strategies and policies and assessing progress. In developing the methods and process for the GHG inventory, the Central Lane MPO's goal is to incorporate tools that can also later assist the MPO in evaluating the potential effectiveness of different GHG reduction strategies. That is, we wish to be strategic in the prioritization and details of the various emission sources – gathering data without a strategic use for that data can lead to wasteful effort. The 12-month calendar for the MPO currently shows completion of the GHG inventory in August, 2010.

The MPO is also working to implement an advanced land use model – one half of the integrated land use-transportation model that is required under the legislation. This is anticipated to be a long term, multi-year project. While this is going on, another effort is being considered to employ “sketch” planning tools which will allow scrutiny of various measures at a block-scale rather than at the larger scale areas that are used in regional travel demand modeling. Such tools can also be useful in public workshops to show participants the rule-of-thumb impacts that decisions or implementations can effect.

Summary

This memo serves as an introduction to this topic. Staff will be providing MPC, TPC and CAC with further information as the work progresses.

Attachment 1
Central Lane MPO Staff Activities concerning Climate Change: 2007-2009

- August 2007** Assisted City of Eugene with city's greenhouse gas inventory.
- Fall 2007** Attended DEQ Greenhouse Gas Advisory Committee meetings.
- January 2008** Attended NW Conference on Climate Change.
- MPO-DEQ-LRAPA-ODOT-USDOT-USEPA: Central Lane MPO staff organized this interagency meeting to bring awareness of the climate change issues to other MPOs and agencies.
- May 2008** Worked with ODOT staff to appoint a representative from Oregon MPOs and from local government to the Oregon Global Warming Commission Transportation and Land Use subcommittee. The Salem/Keizer MPO manager and Eugene's Planning Director were appointed.
- June 2008** Attended Global Warming seminar at Portland State University.
- Undertook EPA MOVES model training at 17th International Emission Inventory Conference (this was a very early release of this model followed by a meeting with EPA modelers to obtain feedback from local MPOs).
- July 2008** Initiated Oregon Modeling Steering Committee discussion of capability of modeling tools to address pricing and congestion effects on VMT and traveler behavior. These strategies are likely important to curbing trips.
- October 2008** Attended University of Oregon Climate Initiative workshop developing the Upper Willamette Basin report.
- Attended Energy, Water and Climate Change discussion at EWEB.
- Attended FHWA Peer Workshop on Climate Change in Seattle.
- December 2008** Worked with UO Climate Initiative to support grant application to encourage local mitigation and adaptation efforts (unsuccessful).
- Attended Oregon Modeling Users Group meeting concerning GREENSTEP, the ODOT modeling tool to estimate the impacts of strategies to reduce GHGs at the state (and, perhaps, the county – to be determined) level.
- January 2009** Attended Oregon Modeling Steering Committee meeting to underline need to support work on the climate change issues of data collection and modeling advances.
- Spring 2009** Began research to identify advanced land use models for use in scenario planning.

- February 2009** Facilitated UO Climate Initiative presentation concerning climate change impacts on the Upper Willamette Basin to LCOG Board and Regional Managers.
- Represented MPOs at Oregon Global Warming Commission (OGWC) Transportation and Land Use subcommittee meeting as alternate for Salem/Keizer MPO manager.
- Attended FHWA climate change webinar.
- Developed UPWP work plan including climate change planning and model/data work program.
- Consulted with Eugene's sustainability manager concerning future work on the city's climate action plan.
- April 2009** Attended webinars on climate change by National Association of Regional Councils, FHWA, Transportation for America.
- May 2009** Met with University of Oregon Climate Initiative leadership group to review an approach to adaption and mitigation issues within the MPO area and Lane County.
- Attended AMPO (Association of MPOs) climate change webinar.
- June 2009** Reviewed DLCD Climate Change Planning work program.
- Met with University of Oregon Climate Initiative, Lane County Public Health, Lane County Commissioner, City of Eugene, LRAPA, to continue discussion on climate change and adaptation approaches.
- Began research concerning the potential of using The Climate Registry protocols for mobile source inventories.
- Attended training on the latest release of the MOVES model which is expected to be formally approved for use by December.
- Tracked legislation concerning MPOs and climate change planning.
- Collaborated with local cities and University of Oregon on EPA grant opportunity for regional climate change planning efforts.
- Attended OGWC Transportation and Land Use subcommittee meeting.
- Prepared prospectus and submitted ARRA grant for integrated land use-transportation model to ODOT. Awaiting FHWA approval.
- July 2009** Discussed state-and federal GHG reduction initiatives at OMPOC July meeting in Bend. Topics included HB2186 and MPO GHG Emissions Task Force and DLCD's work plan relating to Climate Change.

- September 2009** Began to outline the components that need to be considered in developing an inventory in such a way that effectiveness of reduction strategies can be computed and assessed.
- October 2009** Participated in MPO Greenhouse Gas Emissions Task Force meetings
- November 2009** Participated in MPO Greenhouse Gas Emissions Task Force meetings
- December 2009** Participated in MPO Greenhouse Gas Emissions Task Force meetings
Participated in City of Eugene's Forum on Transportation and Land Use
Attended Oregon Environmental Council's Cutting Carbs Workshop.
Began study of "sketch" planning tools – INDEX and CommunityVIZ.

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