Memorandum

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To: TPB Technical Committee

From: Eulalie Lucas
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Subject: Climate Change Work Program Activities

Background

During the summer of 2007 Department of Transportation Planning Staff embarked on an exercise to develop mobile source CO_2 emissions inventories which is a major component of the greenhouse gases (GHG) to support the activities of the COG Climate Change Steering Committee (CCSC). Land use and transportation networks from the 2007 Constrained Long Range Plan (CLRP) and FY 2007-2012 Transportation Improvement Program (TIP) were used to estimate the travel demand and EPA's Mobile 6.2 model was used for CO_2 emissions rates. TPB's Scenarios Task Force has a "What Would It Take" scenario to meet the mobile source GHG reduction goals set forth in CCSC report. Since the travel demand model, land use, and highway and transit networks have changed since the 2007 CO_2 emissions inventories were developed, a work program element to update mobile source GHG emissions inventories to reflect the changes for the 2002, 2005, 2010, 2012, 2020, 2030 milestone years was included in the FY 2009 UPWP. The updated February 2009 inventories were developed based on the 2008 CLRP and FY 2009-2014 TIP. This memorandum discusses the methodology used to develop the new inventories, provides a comparison with the 2007 inventories, highlights the differences between the two sets of inventories and provides an update on the analysis of GHG emissions reduction TERMs.

Methodology

The geography for which CO_2 emissions inventory is developed is the same as the 8-hour ozone non-attainment area (see Map1). EH Pechan and associates was hired to develop a post-processor tool to be used along with the travel demand model to develop CO_2 inventories as well as Methane (CH_4) and Nitrous Oxide (N_2O) emissions, which are expressed as CO_2 equivalents. Total GHG is the sum of CO_2, methane as CO_2 equivalent, and N_2O as CO_2 equivalent. Since EPA's Mobile model rates does not include congressionally mandated new corporate average fuel economy standards (CAFÉ) standards for light duty vehicles another consultant (Dan Meszler) was hired to develop a program to estimate the impact of CAFÉ 35 on GHG emissions. Since CAFÉ impacts only light duty vehicles the percent reduction in CO_2 emissions due to the CAFÉ program is applied to the light duty total GHG emissions for the various milestone years.

Comparison of Summer 2007 and February 2009 inventories

Since there were changes to the land use, network, and travel demand model we wanted to isolate the impact of the changes to the emissions brought about by these differences. Exhibit 1 is a table comparing the model area VMT for the two inventories. We can observe an 8% difference (decrease) between the June 2007 VMT and February 2009 VMT. Exhibit 2 is a table comparing the CO_2 emissions from the June 2007 inventory and February 2009 inventory. The difference in the emissions inventory in 2030 is 5% (decrease). The difference in CO_2 emissions can be attributed to lower VMT due to updates in networks, land use and travel assumptions Exhibit 3 is a chart of the same data showing the June 2007 and February 2009 inventories.

GHG emissions inventories were developed results are shown in exhibit 4 emissions are reported by pollutant (CO_2, Methane, and Nitrous Oxide) for 2002 and 2030. We can observe that total GHG is about 4% higher than CO2 in the year 2002. However, by 2030 the same number drop down to 0.4% which means almost the entire total GHG comes from CO_2. This is also illustrated graphically in exhibit 5.

Exhibit 6 is a bar chart showing CO_2 inventory and the impact of CAFÉ 35 on the inventory in 2020 and 2030. By 2020 CAFÉ 35 reduces CO_2 emissions by 19.5% and by 2030 reduces it by 26.8%.

Highlights

The following are the highlights from the new inventories:

- In 2030 CO_2 emissions are 5% lower than the summer 2007 inventory.
- By 2030 mobile source GHG emissions are only 0.4% higher than CO_2 emissions.
- CAFÉ 35 reduces CO_2 emissions by 27% in 2030.
- CAFÉ 35 reduces GHG emissions by 33% in 2030.

Next Steps

1. Incorporate Alternate Fuel/ Technology Vehicles in our fleet.
    - Department of Energy (DOE) market estimates
    - VMT
    - GHG estimates

2. TERMs Analysis

Exhibit 7 shows all the "Transportation and Land Measures" from the CCSC's "National Capital Region Climate Report" and whether they would be analyzed as a TERM, analyzed under the scenario analysis or whether it is a policy measure. Staff has analyzed

a number of the TERM measures (shown shaded) and presented the technical analysis to the Travel Management Subcommittee. Staff is presently updating the measures based on comments received at the subcommittee meeting. The CO_2 and GHG emissions rates to be used in analyzing these measures are under development and are based on MOBILE 6.2 CO_2 emission rates and E H Pechan provided GHG emissions rates which will be adjusted to reflect 35 mpg CAFÉ standards and alternate fuel/technology vehicles impacts.

- Completion of this step will yield the baseline forecast inventories

3. Apply data in Scenarios Analysis (TPB & CCSC initiatives) to develop control strategies.

Map 1
Exhibits 1- 7