

National Capital Region Transportation Planning Board

777 North Capitol Street, N.E., Suite 300, Washington, D.C. 20002-4290 (202) 962-3310 Fax: (202) 962-3202 TDD: (202) 962-3213

MEMORANDUM

TO: TPB Scenario Study Task Force

FROM: Ronald F. Kirby
Director, Department of
Transportation Planning

SUBJECT: Development of New Scenarios for the TPB Regional Mobility and
Accessibility Scenario Study

DATE: February 15, 2008

Review of Proposal for Development and Analysis of New Scenarios

At the January 16, 2008 meeting of the TPB Scenario Study Task Force, the task force discussed a staff proposal that defined in greater detail the development and analysis of two new scenarios. The staff proposal for scenario analysis, outreach, and implementation, and the task force's related comments, are reflected in the Scenario Study element of the FY2009 Unified Planning Work Program, which will be presented to the TPB in draft form at its February 20 meeting. The development of the new scenarios themselves, however, is scheduled to take place during the remainder of FY2008, and the task force decided to hold a meeting on February 20 to get that process underway as expeditiously as possible.

As discussed at the January 16 task force meeting, the two scenarios to be developed will include the following: a "CLRP Aspirations" Scenario that would adhere to the traditional constraints of the TPB procedures and modeling process for air quality conformity analysis, with the exception of the fiscal constraint; and a "What Would It Take?" Scenario that would take as a starting point one or more goals desired for achievement in 2030, such as a specific reduction in mobile-source CO₂ emissions, and examine how such goals might be achieved through different combinations of implementation steps including some (such as significant changes in individual behavior) that are not normally reflected in the TPB travel demand modeling process.

Update on Variably Priced Lanes Scenarios

A draft final report entitled "Evaluating a Network of Variably Priced Lanes for the Washington Metropolitan Region" will be presented to the TPB Value Pricing Task Force on February 27, and to the full TPB at its March 19 meeting. The report will provide an opportunity to incorporate variable pricing of both new and existing roadway lanes into the new scenarios.

Developing the CLRP Aspirations Scenario

The first of the two scenario study activities scheduled to take place by June 30, 2008 is the development of the CLRP Aspirations Scenario. The intent of this exercise is to draw from the strategies explored in the previously studied scenarios, including the variably priced lanes scenarios, along with other possible strategies, to develop a scenario that represents realistic yet ambitious levels of transportation investment and accompanying land use stewardship. More than with the previous scenarios, a focus of this activity will be on fiscal and other implementation issues: the estimated costs of transportation improvements considered for incorporation in the scenario will be considered up front and in relation to their projected regional benefits; and issues associated with accompanying land-use strategies will also be addressed.

Consideration will also be given to the relationship of costs to potential revenues. Costs of new transit investments, for example, may be offset by revenues generated through pricing of selected facilities, or from “value capture” techniques applied to increased land values. The goal will be to keep the scenario within reach fiscally and administratively, but at the same time push the envelope of what might be possible in terms of improving conditions in relation to a 2030 baseline. (This 2030 baseline will be updated to reflect the 2008 CLRP, scheduled for approval by the TPB in July.)

Perhaps the most important distinction between this scenario and the other scenario, to be described below, is that the CLRP Aspirations Scenario will adhere to the representations of travel behavior reflected in the current TPB travel demand model, and to other procedural guidelines required for federal air quality conformity analysis. This preserves the possibility that the CLRP Aspirations Scenario could eventually serve as a de facto ‘unconstrained’ regional long-range transportation plan, following regional dialogue and outreach about the study findings.

Given the above description of the CLRP Aspirations Scenario, two key questions arise:

What is the ‘menu’ of transportation projects and land use strategies from which to derive the new scenario?

The original scenarios, each of which took a different approach to land-use shifts and complementary transportation investments, along with the recently completed variably priced lanes scenarios, provide an excellent starting point for constructing the new scenario. The scenarios available to draw upon include the following:

- More Households Scenario
- Households In Scenario
- Jobs Out Scenario
- Region Undivided Scenario
- Transit-Oriented Development Scenario
- Three Variably Priced Lanes Scenarios with pricing applied to different combinations of new versus existing lanes

More information about these scenarios is included in Attachment A.

But the menu is not limited to only these items. The Scenario Study outreach program conducted by TPB staff in 2006 and 2007 yielded several ideas from the public for projects or approaches not included in the original scenarios. This feedback was summarized in a report presented to the TPB on July 18, 2007. For instance, many outreach participants cited a need for more circumferential transportation infrastructure, especially transit. While the original scenarios included some circumferential links, more possibilities could be studied. Other audience members highlighted specific rights-of-way they consider to be underutilized, as possibilities for added transportation capacity.

In addition to the feedback summary report, the recommendations by the TPB CAC on next steps and additional scenario considerations is a valuable source of ideas, not so much for specific projects, but for overall approaches that may differ from the strategies used in developing the original scenarios. Other TPB committees such as the Regional Bus Subcommittee could be tapped for input on priority projects; in fact, the subcommittee's stated goals include providing "technical advice and input regarding regional transportation and land use coordination, including the development of transit assumptions for TPB planning studies" (Goal 4).

How do we go about choosing which items from the menu belong in the CLRP Aspirations Scenario?

A desire to keep the scenario within the realm of financial reality necessitates some method for prioritizing the transportation projects. At the same time, not all of the land-use strategies represented in the original scenarios can easily be combined into a single approach, though the overriding goal is generally to get jobs and households closer together.

Again turning to the feedback received about the original scenarios, we have gained some key insights about what the public sees as the most appealing strategies. We know that there is skepticism throughout the region about our ability to significantly improve transportation infrastructure because of funding limitations. Closely tied to that sentiment is skepticism about our ability to implement a regional strategy of concentrated development without causing negative impacts at the local level. If this scenario is to recognize the realities of implementation challenges in the region, it will be necessary to address these sources of skepticism directly in developing the scenario. It may be appropriate, for example, to focus on transportation projects and land-use strategies for which there are identifiable revenue sources as well as features that address the potential for undesired local impacts.

Further analysis is likely necessary to mine the original scenarios for information about which transportation projects and land-use shifts produce the most "bang for the buck." This includes sensitivity analysis at both the regional and local scales. Attachment B provides an example of this kind of analysis, which was presented to the Scenario Study Task Force at its January 16 meeting. This "drill-down" analysis demonstrates that the original scenarios can have a large impact on predicted travel behavior in small areas where concentrated land use and transit accommodation converge, even though the regional impacts may be modest.

An additional aid to the process of developing this new scenario could be sensitivity analyses designed to assess the effect of adding or subtracting particular projects or strategies on regional indicators like overall average VMT, as well as within a particular activity center or centers. Additional performance measures could also be applied to the original scenarios, including the variably priced lanes scenarios, to provide another means of prioritizing strategies.

Another filter through which to pass this scenario would be recent regional mapping work completed by TPB staff through the process of environmental consultation for the CLRP. Staff now has available GIS data regarding the locations of regionally significant historic and environmental resources.

Developing the “What Would It Take?” Scenario

The second new scenario takes a different approach entirely, and arises from a desire to engage in a scenario exercise that is goal-oriented and flexible enough to accommodate strategies and assumptions beyond those used to date. Rather than building a new scenario and then testing its performance against the 2030 baseline, the “What Would It Take?” Scenario will begin with one or more performance objectives and determine the scale and mixture(s) of interventions that might achieve those objectives. The scenario will be designed to facilitate regional dialogue with the public and among decision-makers about the steps necessary to implement a desired regional future, in a way that moves beyond the typical constraints of the TPB analysis process.

As with the CLRP Aspirations Scenario, a handful of key questions arise for consideration by the task force before scenario development proceeds:

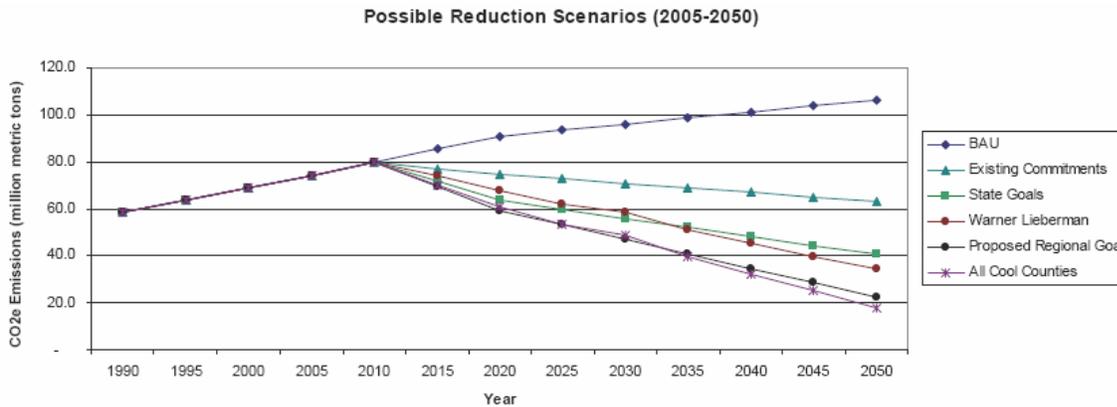
On what goals or objectives should the scenario focus and how should those goals be set?

There are several possibilities for scenario objectives that could be quantified in some way and represent a regional consensus for a desired 2030 outcome. The original scenarios focused on transportation indicators such as average daily VMT, peak-period congestion, and modal share. Other indicators analyzed in the earlier phases of the scenario study included job accessibility and some air quality measures, though not CO₂. Given the recent attention paid to the forces behind climate change and the challenges of reducing greenhouse gas emissions, an obvious choice would be to seek a specific reduction in CO₂ emissions by the scenario horizon date.

Using a CO₂ emissions reduction goal as the initial objective for this study activity has several benefits. It can serve as a rough surrogate for overall VMT and is also related to congestion. It addresses an issue that has catalyzed much discussion among transportation and land use planners and policy makers, and could contribute needed information to this important dialogue. It also affords the opportunity to incorporate the work of the COG Climate Change Steering Committee in setting goals for regional CO₂ emissions from all sources, of which mobile sources account for approximately 30%.

At its January 23, 2008 meeting, the COG Climate Change Steering Committee (CCSC) discussed a proposed regional goal of reducing overall regional CO₂ emissions to 20% below

2005 levels by 2020, and 70% below 2005 levels by 2050. These goals are based on the scientific conclusions of the Intergovernmental Panel on Climate Change (IPCC), and are consistent with the reduction goals in the Warner-Lieberman bill. The chart below shows this proposed regional goal in relation to the “business as usual” (BAU) trend and to other goals, including the aggregate regional effect of state goals as well as existing local commitments.



Source: Presentation by Joan Rohlf, MWCOG/DEP, to the COG Climate Change Steering Committee, January 23, 2008

The 2030 benchmark for this regional goal would be about a 37% decrease in CO₂ emissions below the 2005 level. Mobile-source emissions from transportation uses make up approximately 30% of overall regional CO₂ emissions, so the ability of the transportation sector to pull its weight in the reduction effort will have a large bearing on the region’s ability to meet such goals.

The recent passage of more stringent CAFE standards will have a significant impact on the mobile-source component of CO₂ emissions, but as shown in the chart below, mobile-source CO₂ emissions will still exceed 2005 levels by 7.8% in 2020 and 8.1% in 2030. This represents a large improvement over the baseline, but falls far short of the 20% decrease by 2020 and the 36.7% decrease by 2030 that would be consistent with the proposed regional goal.

CO₂ Emissions from Cars, Trucks, and Buses			
All figures are Annual Tons of CO ₂ Emissions (in Millions) in the 8-hour Ozone Non-Attainment Area			
	2005	2020	2030
Baseline Emissions	24.89	31.02	34.45
% Change from 2005 levels	---	24.6%	38.4%
Emissions With CAFE Reductions	24.89	26.83	26.91
% Change from 2005 levels	---	7.8%	8.1%
COG CCSC Proposed Regional Goal	24.89	19.91	*15.75
% Change from 2005 levels	---	-20.0%	*-36.7%

* Interpolated from 2050 goal of -70%

Achieving a goal of 20% reduction from 2005 levels by 2020 and a 36.7% reduction by 2030 obviously will require factors or interventions in addition to the heightened CAFE standards. One issue of note is that the gradual increase in the MPG standard under CAFE ends in 2020, so the beneficial effects between 2020 and 2030 are due only to continuing turnover of the vehicle

fleet. Further, the CAFE standards apply only to light duty vehicles, which account for about 80% of regional VMT; heavy duty vehicles, which contribute the remaining 20%, are unaffected by CAFE. It will take further increases in fuel economy, shifts to alternative fuels that generate less life-cycle CO₂ emissions, and/or reductions in VMT to reach the CO₂ goals currently under discussion.

Which possible interventions should be studied?

In addition to the land use and transportation strategies included in the CLRP Aspirations Scenario, what additional changes to the baseline should be studied? One benefit of conducting this kind of exercise using the TPB travel demand model is that it can offer insight into the complex relationships between the different model inputs that combine to influence travel behavior, and can help predict otherwise unexpected consequences. There are several independent variables that affect the dependent variable of regional mobile-source CO₂ emissions that could be analyzed through this scenario process:

- **The fuel efficiency of the vehicle fleet.** As the attached fact sheet on CO₂ emissions indicates, the recently passed federal Corporate Average Fuel Economy (CAFE) standards will not achieve, by themselves, the emissions reduction goal set by the COG Climate Change Steering Committee. This scenario could postulate the imposition of a more austere standard upon the expiration of the existing CAFE regime in 2020, or even before that date.
- **The emissions characteristics of the vehicle fleet.** Miles per gallon of standard gasoline is only one factor in determining CO₂ emissions rates, especially as alternative fuel technologies gain traction. Another variable for exploration through this scenario could be the extent to which alternative-fuel vehicles, such as biofuel-, electric-, or hydrogen-powered vehicles may impact lifecycle carbon emissions.
- **Regional vehicle miles traveled (VMT).** VMT is a function of several different factors, including fuel prices, fuel and other potential taxes, congestion, the availability of non-SOV alternatives, and individual lifestyles and behavior. Trip numbers and lengths are closely tied to land use patterns. The original scenarios took a relatively conservative approach in determining the amount of future growth “at play” to be influenced by land-use policy. This scenario could assume more infill development and other diversion of growth to desired areas to reduce regional VMT further than the original scenarios.
- **Additional changes in travel behavior in the region.** It is quite possible that, even independent of the above factors, there will be shifts in aggregate travel behavior due to increased consciousness of climate change and the effects of transportation choices. For instance, individuals may choose to switch to, or use with greater frequency, alternatives to SOV travel such as carpooling, transit, biking, and walking.

The resulting product of this “What Would It Take?” exercise essentially would be an array of “sliders” representing the variables discussed above. The scale for each “slider” would run from a minimum represented by the 2030 baseline, to a maximum represented by what it would take to reach the 2030 emissions reduction goal through a change *in that variable alone*, if possible. Using the travel demand model and/or other analysis tools, different combinations of changes in

the variables – combinations that would all achieve the reduction goal - could be assessed for their financial, administrative, and technological feasibility.

The process of developing this scenario, therefore, is fundamentally different than for the CLRP Aspirations scenario. Rather than determining where the growth might be located and what transportation projects could be implemented, the decisions are about what variables to include and what combinations to assess.

Summary

Staff proposes to proceed with the development of two new scenarios, a CLRP Aspirations Scenario and a “What Would It Take?” Scenario, as outlined above. The CLRP Aspirations Scenario will combine elements of previous scenarios along with recent input and ideas to create an aggressive but feasible vision of land-use and transportation implementation steps between now and 2030. The “What Would It Take?” Scenario will provide guidance on additional interventions that may be necessary to achieve regional goals, in particular the CO₂ emissions reduction goal set by the COG Climate Change Steering Committee. Staff will look to the Scenario Study Task Force, the CAC, and other TPB committees for input on the particulars of both scenarios.