

Memorandum

To: Chair and Commissioners

Date: November 5, 2007

From: JOHN F. BARNA, JR.
Executive Director

File: Book Item 4.5
Information

Ref.: **PRESENTATION OF DRAFT RTP GUIDELINES CLIMATE CHANGE RECOMMENDATIONS**

In January 2007, Senate Pro Tempore Don Perata forwarded a letter to the California Transportation Commission (Commission) requesting that the Commission use its current statutory authority to review its Regional Transportation Plan (RTP) Guidelines in order to incorporate climate change emission reduction measures. The letter also stated that the RTPs should utilize models that accurately measure the benefits of land use strategies aimed at reducing vehicles trips.

Status of Effort

To assist the Commission in developing revisions to the RTP Guidelines as requested by Senate Pro Tempora Perata, Commission staff established an RTP Guidelines Work Group. Commission staff invited representatives from the Assembly and Senate, Regional Transportation Planning Agencies, state and federal agencies/organizations, environmental interest groups, building and industry organizations, and county and city associations. To date, membership on the RTP Work Group includes 200+ members.

From this larger work group, three sub-work groups were formed: Climate Change, Smart Growth/Land Use, and Transportation Modeling and Analysis. Each of these sub-work groups has membership that represents each of the organizations from the larger RTP Work Group.

The Climate Action Sub-Work Group decided that this group would be used to assist the ARB in the development of their Scoping Plan. ARB is in the process of setting greenhouse gas emissions reduction targets for regions via a Scoping Plan. The Scoping Plan is due to the ARB board in January 2009.

At the November 2, 2007 meeting of the full RTP Work Group, the Smart Growth/Land Use and Transportation Modeling and Analysis sub-work groups brought forward draft language to be incorporated into the RTP Guidelines and suggested recommendations for necessary statutory changes. After discussion and revisions to the draft documents, each work group member was asked to forward any additional comments to Commission staff by November 9.

Commission staff will compile the additional comments and send out the suggested changes for final review by the full work group. Additional recommendations for statutory changes, outside of the RTP Guidelines, were also suggested by some members of the work group and Commission staff indicated that those recommendations would also be included in the Commission's response to Senate Pro Tempore Perata. Upon final review by the RTP Work Group, Commission staff will develop a response to Senate Pro Tempore Perata for the Commission's approval at its December 12-13, 2007 meeting.

Chair and Commissioners

November 5, 2007

Page 2

Commission staff appreciates the involvement of all work group members who have contributed many hours to this effort. Staff would like to acknowledge the efforts of each of the sub-work group facilitators: Climate Change Sub-Work Group – Lynn Terry, Deputy Executive Officer, Air Resources Board; Smart Growth/Land Use – Rusty Selix, Executive Director, California Association of Councils of Governments; and Transportation Modeling and Analysis – Bob McCleary, Executive Director, Contra Costa Transportation Authority.

CTC Regional Transportation Guidelines
Smart Growth/Land Use Subcommittee
Legislative and RTP Amendment Recommendations
October 30, 2007

**This document is subject to change
upon final review of the RTP Guidelines Work Group**

Proposed Legislation

**Statutory Requirement for Regional Transportation Plans to Address
Greenhouse Gases**

Regional transportation plans adopted after January 1, 2011 shall be required to include a greenhouse gas reduction strategy. The greenhouse gas reduction strategy shall include, but not be limited to, measures to reduce vehicle miles traveled (VMT) per capita. The strategy shall consider transportation investments, technology, pricing, and land use strategies that contribute to achieving climate action goals by using measurable performance objectives. All strategies should be developed considering their impact on the economy, environment, and social equity within the region.

Greenhouse Gas Analysis

Each metropolitan planning organization or regional transportation planning agency shall perform a greenhouse gas analysis as part of the regional transportation planning process for any plan adopted after January 1, 2011 based upon a trends or likely land use scenario that is consistent with Federal requirements and current or projected local general plans.

Additional Legislative Recommendations

1. Provide funding for developing and updating regional blueprints and for local general plans.

STIP Guideline Recommendations:

1. When requesting interregional transportation improvement program or other state program funds where the projects are selected by the Commission, where there is a regional blueprint, state transportation and other state infrastructure discretionary funding shall be allocated in a manner that provides incentives to cities and counties which support implementation of an adopted regional blueprint except where there is a finding by the state agency providing the funding that identifies an overriding state need that makes consistency with the blueprint infeasible.

2. Where there is a regional blueprint, a regional transportation planning agency or metropolitan planning organization may include a ranking of projects based upon regional transportation planning factors including the contribution they make to achieving blueprint goals in relationship to the cost of the project when requesting interregional transportation improvement program or other state program funds where the projects are selected by the Commission. Where such a ranking has been provided, the California Transportation Commission shall not fund a lower priority project in that region unless the Commission makes a finding that there is an overriding state need that makes it infeasible to approve the higher ranked project.

Proposed RTP Guideline Amendment

As part of the development by the RTPAs and MPOs of regional transportation plans, transportation planning and investment, technology, alternative planning and pricing, land use, performance measures, blueprints and base case scenarios, greenhouse gas analysis, reporting and transparency strategies that could be considered include, but are not limited to, examples below:

Policy Element

1. Emphasize investments to local jurisdictions that make land use decisions that support investments and programs that implement regional blueprints and other smart growth strategies.
2. Emphasize transportation investments in areas where desired land uses as indicated in a city or county general plan may result in VMT reduction or other lower impact use.

Transportation Planning and Investment Strategies

1. When possible, while accommodating local mobility, safety and interconnectivity needs, consider shifting transportation investments towards improving and expanding urban and suburban core transit, programs for walk-ability, bicycling and other alternative modes, transit access, housing near transit, and local blueprint plans that coincide with the regional blueprint.
2. Provide funds and technical assistance to local agencies to implement blueprint strategies.
3. Implement operational efficiencies that reduce congestion in vehicle throughput on roadways or improve transit access or other alternative access without physical expansion of the roadways.

Pricing Strategies

1. Consider the use of alternative mode programs, congestion pricing, toll roads, and parking strategies. Examples include, but are not limited to the following:
 - i. Road pricing and High Occupancy Toll (HOT) lanes. To reduce VMT, MPOs should model adding pricing to existing lanes, not just as a means for additional expansion. Variable/congestion pricing should be considered.
 - ii. User fees such as fuel taxes and parking charges.
 - iii. Free or reduced fare transit fares.
 - iv. Expansion of Parking Cashout Programs
 - v. Strategies to reduce the impacts of pricing strategies on low-income individuals.
2. Consider pricing signal implementation to improve transportation operations. Incorporating pricing signals into transportation operations is generally acknowledged to have the greatest potential for reducing VMT and improving efficiency.
3. Consider utilizing revenues from these pricing strategies for projects, such as mass transit, that improve mobility without increasing VMT or GHG emissions.

Land Use Strategies

1. Encourage twenty-year or longer regional housing forecasts by region, consistent with the RTP; housing need allocations that are consistent with the blueprint, and general plans to project twenty years forward in conjunction with the blueprint.
2. Encourage that:
 - The county or city general plan considers the blueprint plan for the region and links the general plan to reflect the best-case scenario.
 - There is a reasonable basis for the projected land use methods included in the RTP and reasonable assurance that the current or projected land use methods in the RTP agree with the local agency general plans.
 - Land use changes contained within city and county general plans are built into land use pattern projections in the base case for modeling purposes.
 - Where there is a blueprint, the planned land use base for the regional transportation plan is consistent with that regional agency's adopted portions of the blueprint.
 - The land use base for the blueprint is consistent with federal regulations and current or projected local general plans.
3. In setting priorities, RTPAs should include among its factors, transportation projects that increase connectivity or consider means to reduce VMT.
4. MPOs should perform land use sensitivity analyses to determine whether more compact and efficient growth patterns (than the base case) would further reduce VMT. As done in Sacramento, these land use changes are best done as iterative processes with supportive infrastructure scenarios that support more compact land uses.

Performance Measures

1. Include a VMT measurement as part of the environmental reporting requirements, taking into account growth projections for the area.
2. Compare projected blueprint development to actual development in applicable locations and provide an explanation for variances as updated.
3. Report the progress relative to whether the project(s) identified in the local RTP are consistent with city and county general plans or the blueprint strategy for the region.
4. Include a VMT measurement as part of the environmental reporting requirements.
5. Include an analysis of the projected blueprint growth scenario versus actual development that has occurred along with an explanation of variances.

Move to Modeling Amendment Language:

Alternative Planning and Pricing Scenarios -- Consider evaluating one or more alternative investment packages, alternative planning scenarios (a.k.a. alternative growth) and alternative pricing scenarios for the potential to further reduce greenhouse gas emissions, as indicated below. [Note that the current transportation models, with the possible exception of that used by the Sacramento Area Council of Governments (SACOG) are not sufficiently sensitive to land use and micro scale infrastructure change such as bicycle and pedestrian facilities. Updating these models is a matter of urgency and is dealt with in a separate section.]

CTC Regional Transportation Plan Guidelines
Transportation Modeling & Analysis Working Group
Second Revised DRAFT RECOMMENDATIONS
October 30, 2007

**This document is subject to change
upon final review of the RTP Guidelines Work Group**

Preamble. The goal of applying transportation models and analytical techniques as part of the regional transportation plan (RTP) process is to enhance the quality of information and analysis presented to educate public decision makers and the public at large regarding the implications of various policy options, while recognizing that the final decisions on policy choices are their responsibility.

RTP Guidelines Relative To Greenhouse Gas Emissions

1. For preparation of the regional transportation plan (RTP) required under Sections 65080 et seq. of the Government Code, by July 1, 2008 each metropolitan transportation planning organization (MPO) or regional transportation planning agency (RTPA) over 200,000 in population is urged to establish transportation modeling and analytical techniques that facilitate its evaluation of one or more alternative planning scenarios under the provisions of Section 65080.3.
2. As part of the five-year RTP process each MPO or RTPA should strive to enhance, to the extent that data and resources permit, its modeling and analytical techniques in order to improve its assessment of the likely implications of key policy options. Such improvements should educate decision-makers and the public regarding how such options would potentially affect trip making, choice of travel modes, vehicle miles traveled, major land use development decisions, and quality of life issues.
3. Transport produces almost half of greenhouse gases (GHGs) in California. To evaluate the effectiveness of policies to reduce GHGs, the ARB and others need to compare modeling outputs across all regions in the State. To be able to compare travel projections across regions in California, some basic recommended modeling protocols should be adopted. These should be specific to groups of regions, according to policy problems encountered. Caltrans districts should follow the same practices as used by the MPOs/RTPAs/CMAs/COGs in each district.

MPOs, RTPAs, CMAs, and COGs may be grouped according to modeling needs. For each group, we define: Model features and data, Possible Applications of the model, and Policy analysis capabilities. These recommendations are cumulative, with each set of model guidelines including the earlier ones on the list.

In addition, we include three attachments, from earlier reports, to advise modelers on types of models available.

Counties with very slow growth in population and jobs, little or no congestion, and no significant new road or transit construction plans (i.e., Modoc, Inyo, Siskiyou, which have 1990-2000 population growth rates below 3%)

Features and data: These counties do not need to run a network travel model.

Possible applications of the model: No model.

Policy analysis capabilities: Road congestion is not increasing rapidly. Emission changes from higher-MPG vehicles can be factored or derived from the ARB inventory.

Regions with attainment AQ, slow growth, or virtually no transit, plus the rural, isolated non-attainment areas.

Features and data: These RTPAs and CMAs can run 3-step models, at least for the next few years. These models should be run to equilibrium. They should implement 4-Ds add-on models, to account for the effects of land use characteristics on travel, in the short term. See the recent DKS report to Caltrans, which can be found at

http://www.dot.ca.gov/hq/research/researchreports/reports/2007/local_models_to_ols.pdf

The travel model should be documented, including all statistical goodness-of-fit measures derived from submodel specification. The model should also be put through sensitivity tests and other validation tests, with these tests documented, and then formally peer-reviewed, also resulting in a written report. The models should address changes in regional demographic patterns. GIS capabilities should be developed in these counties, leading to simple land use models in a few years. All natural resources data should be entered into the GIS. Parcel data should be developed within a few years and an existing land use data layer created.

Possible applications of the model: Agencies can define and evaluate Trend forecast, Combined General Plans, Preferred RTP, and Low-VMT scenarios. The Low-VMT scenario should achieve the regional VMT and GHG targets, if they are adopted by the ARB. Otherwise, the Low-VMT scenario can simply reduce VMT substantially and increasingly over time, compared to the Proposed RTP.

Policy analysis capabilities: These models can be used to evaluate increased density and mix, urban growth limits, and improved neighborhood walkability and bikeability. Performance measures can include on-road emissions of pollutants and GHGs.

Regions with rapid growth, nonattainment AQ, or the potential for significant transit use.

Features and data: These regions should develop 4-step travel models as soon as is possible. In the near-term, 4-Ds add-on models should be used. Simple land use models should be used, such as GIS rule-based ones, in the short term. Economic, market-based land use models should be developed within a few years. A simple freight model should be used. Several employment types

should be used, along with several trip purposes. Time periods should include peak and off-peak. The travel model set should be run to full equilibration across all model steps. All road capacities and speeds should be validated with surveys. The urban development footprint in GIS should be used to calculate environmental impacts on terrestrial and aquatic ecosystems. The travel model and land use model should be documented and tested, as above. Parcel data and an existing urban layer should be developed as soon as is possible. A digital general plan layer also needs to be developed in the short-term.

Possible applications of the model: More policy scenarios can be run. The same policies as in 2. could be run, plus one or more transit improvement proposals, as well as demand management and pricing strategies.

Policy analysis capabilities: In addition to the policies and performance measures in 2., these agencies can evaluate policies for their effects on lower-income households, as required by Federal and State law. This can be done by evaluating traveler welfare measures based on the mode choice logsums for each household income class, or based on travel costs for them. In addition, these agencies can evaluate simple road pricing, parking charges, and higher fuel taxes or carbon taxes in the Plan, or in the sec. 65080.3 alternative.

Regions with serious or worse ozone or CO non-attainment.

Features and data: These agencies should achieve the requirements of the Federal AQ Conformity Rule, meaning 4-step models with full feedback across travel model steps and some sort of land use modeling. In addition to the Conformity requirements, they should also add an auto ownership step and make this step and the mode choice equations for walk and bike and the trip generation step sensitive to land use variables. Walk and bike modes should be explicitly represented. They should implement simple land use models for the next RTP and develop formal, economic land use models in the next few years. Freight models should be implemented in the short term and commodity flows models within a few years. Simple Environmental Justice analyses should be done using travel costs or mode choice logsums, as in 3. Four or five time periods should be modeled. Agencies should develop and test joint mode-destination choice models. Small TAZs should be used, to increase sensitivity to densification near to rail stations and in BRT corridors. These regions should monitor the large RTPAs and MPOs, in 5. below, as they develop tour-based travel models and activity-based travel models. The next household travel survey should include activities and tours. Floorspace rent data should be collected. Parking quantity and cost should be represented in the travel model. The carpool mode should be included, along with access-to-transit submodes. Speed post-processing should be used and take into account the effects of corridor capacity continuity and bottlenecks on congested speeds and emissions.

Possible applications of the model: Five-step models permit the agencies to design and evaluate more land use policies, such as in 4., plus complex combinations of transit, land use, and pricing policies.

Policy analysis capabilities: A full range in performance and impact measures could be developed, for economic, environmental, and equity effects, as required

by SAFETEA-LU, NEPA, CEQA, and other laws. Traveler welfare could be measured and, if possible, locator welfare. Various measures of economic development could also be created, such as wages, jobs, production, and exports.

The largest four MPOs and other COGs and RTPAs with rapid growth and established transit systems.

Features and data: These regions should develop tour-based travel models in the short term and activity-based travel models within a few years. They should also build formal microeconomic land use models, as soon as is practical, so that they can be used to evaluate economic welfare (utility) and economic development (wages, jobs, exports). Commodity flows models should be developed, with truck and van tours, in a few years. The next household travel survey should include activities and tours. Geocoded employment data with occupational code should be purchased for two or more past years. Floorspace quantity and rent data should be gathered. Freight data also should be collected. Full sample enumeration of households in the travel model and land use model should be studied and implemented in a few years, if feasible. Households should be geocoded to location. Stated preference surveys of households and firms should be performed, as necessary, for use in location choice models. Microsimulation of households and firms should be investigated and developed, if feasible.

Possible applications of the model: The effects of transportation policies and land use policies interact with feedbacks in an integrated model set and so projections will be more accurate. With a market-based land use model, the agency can evaluate land pricing policies, such as infill subsidies.

Policy analysis capabilities: Economic measures from the land use model could be implemented. These measures are more complete than those from the travel model and include locator welfare, wages, and exports. Equity analysis could include change in welfare by household income class. Water quality, housing affordability, and fire hazard analysis are examples of the measures that such model sets can also produce. These microsimulation land use models can evaluate the energy use and GHGs produced by households and workers in building space. Economic development impacts may be comprehensively evaluated with this model set. Time-of-day road tolls can be evaluated.

The following recommendations for quality control through model consistency and peer review are essential in creating confidence in modeling results. These process recommendations should be implemented by all agencies as soon as is possible.

Consistency of RTP Modeling

For modeling groups 3, 4, and 5, the No Action alternative and the Proposed Plan alternative in an RTP should be modeled consistently. This means both should be done using the same land use model and the same travel model. The inputs for the models, including alternative land use policies, will be different, of

course. This practice will reduce the arbitrariness of zonal projections for households and employment in travel models. This practice also should apply to EIR/EIS studies. The same land use model used in the RTP modeling should be used in the impact assessment for the No Action alternative, the Proposed Plan alternative, and the Environmentally Preferable Alternative. Only in this way, will all of the outputs in the RTP and EIR be comparable. An alternative planning scenario under Gov. Code sec. 65080.3 should also be evaluated with the same models. County and corridor studies performed by Caltrans districts and by county agencies may use more-detailed networks and zones than the MPO uses, but the models should be otherwise consistent, structurally and in operation, with the MPO model.

Peer Review and Model Testing

All travel and land use models should be fully documented, with the documents on the web. They should also be validated and tested for sensitivity to changes in inputs, parameter values, and policies. Agencies should have an on-going model improvement program to increase model accuracy and policy sensitivity. All substantial model changes should be subjected to peer review and written up. The four largest MPOs should use the TMIP national peer review process, but include two California modelers, for their understanding of California laws. Other agencies should set up reviews using California modelers. Validation guidelines may be developed by the CIA Forum or other body of California modelers. Also, these bodies could develop guidelines for which types of VMT should be reduced in GHG-reduction scenarios and alternatives.

4. The RTP analyses should provide to decision-makers and the public:
 - a. A clear explanation of the modeling and analytical techniques applied in assessing the implications of the “likely” land use scenario, and any land use and other alternatives studied;
 - b. Reasonable transparency to that modeling and analytical process;
 - c. An understanding of the sensitivity of the forecast results to various policy assumptions; for example, where feasible offering estimates of the elasticities and cross elasticities of demand for various modes of travel with respect to critical variables such as access time, travel time, reliability, safety, privacy, and cost;
 - d. The degree to which analytical results can be expected to:
 - i. Be more indicative of a general expected trend or order of magnitude change rather than a quantifiably valid forecast;
 - ii. Provide the degree of certainty needed for the quantifiable forecasts; and
 - e. Any insights gained through market-based research into the variables that most influence consumer choices with respect to housing in transit

oriented and mixed-use developments, the use of transit services, and decision to use single occupant vehicles.

On-Going Technical Assistance

The California Transportation Commission (CTC) and the Department of Transportation (Caltrans) should provide technical assistance to the MPOs and RTPAs to enhance modeling and analytical techniques, appropriately scaled for various applications, that promote the advancement of best practices and evolution of them.

1. Statewide panel discussions on modeling practices, including staff from the MPOs, RTPAs, county transportation commissions, congestion management agencies and other parties as appropriate. The panel should convene no less than once per year, and more frequently as deemed necessary. The panel should consider how agencies at various levels – large urban areas, smaller urbanized counties, and rural counties – can build on “best practices” of other agencies and cost-effectively address assessment of alternative planning scenarios, for example through:
 - A. Cooperation with county transportation and city and county agencies, to account for likely and alternative development prospects at a parcel level (potentially focused on specific traffic analysis zones (TAZs) deemed most suitable for transit-oriented and/or mixed use development), and related assumptions about non-motorized trips including access times to transit;
 - B. Mechanisms for improving collaboration, sharing of information and cross-fertilization regarding the application of modeling and analysis to promote on-going improvements at all levels;
 - C. Desirable performance standards for evaluating output, and useful approaches to enhance travel model sensitivities to factors commonly associated with reductions in VMT and greenhouse gas emissions, including the locations of prospective new developments, and to the factors of development diversity (mixed-uses), density and design.
 - D. Standardization of core survey questions that would be used in all regional travel surveys done in California, in order to better understand the similarities and the differences in each region in consumer preferences;
 - E. Application of market-based survey approaches that could provide more insight into questions regarding choice of modes, consumer preferences for developments of various types including for projects with greater densities for housing and mixed use developments, market segmentation, and other attributes;
 - F. Application of market-based survey approaches that could provide greater insight into questions regarding traveler responses to congestion;
 - G. Techniques for presenting the assumptions, sensitivities, and results of modeling and analysis to the public in an effective way.

2. Provision of data on existing and historic traffic conditions and land use. Caltrans should continue to offer data obtained through routine data collection processes, such as traffic counts and congestion measures. In addition, Caltrans should establish new programs that sustain what are presently special-purpose efforts, such as statewide land-use data gathered for the California PECAS model. To facilitate data sharing, Caltrans should also create a GIS data collaborative to make parcel land use data available to smaller MPO's and rural planning agencies as needed.

Statutory Recommendations

1. The Legislature and Administration should provide on-going financial support for the enhancement of MPO, RTPA and congestion management agency (CMA) modeling and analytical practices in order to promote continued evolution and enhancement of them.
2. The Legislature should require periodic peer review of transportation modeling and analytical practices, to promote best practices and enhance the quality and veracity of information provided to educate decision-makers and the public regarding the implications of various policy choices.

Suggested References

The following are recommended as suggested references:

"Assessment of Integrated Transportation/ Land Use Models", May 2006. Available from Terry Parker at Caltrans HQ or Mike McCoy at UC Davis.

"Assessment of Local Models and Tools for Analyzing Smart-Growth Strategies," July 2007 DKS and Associates.

"Traveler Response to Transportation System Changes, Interim Handbook," TCRP Web Document 12 (Project B-12), March 2000;

"Metropolitan Travel Forecasting: Current Practice and Future Direction," Transportation Research Board, Special Report 288; and

Robert A. Johnston, "Review of U.S. and European Regional Modeling Studies of Policies Intended to Reduce Transportation Greenhouse Gas Emissions", July 30, 2007. On the VTPI web site and available from the author at UC Davis.