CTP2040
CALIFORNIA TRANSPORTATION PLAN

Subject: Comments on the CTP Strategies

Surface Transportation GHG Reduction Strategies

VMT Reduction (per capita)

Strategy	CSTDM (Yes/Maybe/No)	CSFFM (Yes/Maybe/No)	How difficult (Very Easy 1 to Very Hard 5)	CSTDM/CSFFM Comments
Pricing				
Mileage-based highway user fee (VMT Fee)	Yes	Yes	2/3	TDM – Yes, but only static implications not by vehicle type. FFM – Affects commodity and mode split modules; A VMT fee would be evaluated by modifying the truck cost function. Find further information in the attached (pp.5-6).
Congestion Pricing*	Yes	Maybe	4	(Please see notes)
Cordon Pricing	Yes	Yes	3.5	FFM – Affects commodity and mode split modules; Although "Cordon pricing" is not mainly aimed at freight demand, it can be assessed with the similar procedure used for the "VMT fees" strategy.
Tolling*	Yes	Maybe	4	TDM – Yes, single value of time. CSTDM does not have a toll mode, but can do it. FFM – (Please see notes)

TDM = Cambridge Systematics Comments
FFM = University of California Irvine Comments

Carbon taxes or cap-and-trade programs that raise fuel prices	Yes	Yes	1/3	TDM – Yes, make an assumption increase in operating costs. FFM – Affects commodity and mode split modules. The price of fuel is a variable in the truck shipping rate function, which is used to determine the truck cost function that is used in the commodity module's impedance function and the logit specification of the mode split module; Need to specify 1) who will pay, 2) by how much the price of fuel increases.
Pay-as-you-drive insurance	Yes	Maybe	2/3	TDM – Yes, increase auto operating costs. FFM – This strategy is probably meant for passenger demand. For trucks the strategy could be analyzed if it is presented as a $/mile or $/hr cost increase
Parking fees	Yes	No	Post-processing	TDM – Yes, CS can do. FFM – Microscopic simulation is needed because "parking fees" depend on parking duration, which cannot be determined by CSFFM. It may mainly affect service trucks rather than freight trucks.
Reduce parking capacity	Yes	No	5	TDM – Limiting parking then charge thereafter FFM – It is irrelevant to freight trucks because freight trucks are usually parked at designated location such as warehouse, trucking companies, and similar facilities.

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Transportation Alternatives				
Telecommute programs Alternative Work Schedules	Yes	No	3	TDM – Can calculate Home to Work trips FFM – (Meant for passenger model/demands)
Carpool/vanpool programs for both work and non-work trips	Maybe	No	?	TDM – Post processing necessary FFM – (Meant for passenger model/demands)
Car sharing programs	Maybe	No	-	TDM – Post processing necessary FFM – (Meant for passenger model/demands)
Mode Shift				
Expand transit, bike, pedestrian, HSR services	Yes	No	2	TDM – Cannot expand bike or ped FFM – (Meant for passenger model/demands)
Expand rail, air, marine freight like doublestack trains	Yes	Yes	3	TDM – Yes to air only. FFM – Affects commodity and mode split modules if the effect on rail shipping rates and rail transit times can be specified.

***) The most relevant module in CSFFM for evaluating strategies such as "Congestion Pricing" and "Tolling is the network module since it includes the network assignment procedures. A multi-class multi-path static assignment procedure is currently adopted in CSFFM, which is not designed to capture capacity-related elements such as congestion effects since the CSFFM network does not have passenger and service vehicle flows. In order to tackle such issues, the team has been investigating assignment alternatives for CSFFM.**

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Vehicle/System Operations

Strategy	CSTDM (Yes/Maybe/No)	CSFFM (Yes/Maybe/No)	How difficult (Easiest 1 to hardest 5)	CSFFM Comments
Operational Efficiency				
Ramp metering	Yes	No	Post-processing	TDM – The queuing on the local streets will not be accounted for in the model
HOV and HOT lanes	Yes	No	Post-processing	
Lowered speed limits	Yes	No	Post-processing	
Speed enforcement	No	No		
Design of highways to reduce high and low speeds	No	No	Post-processing	
Roundabouts	No	No	Post-processing	
Traffic management to suppress shock waves after traffic interruptions	No	No	Post-processing	
Electric plug-ins for truck auxiliary power at rest Stops	No	No	Post-processing	FFM – Behavioral analysis is required to generate demand changes caused by the given scenarios, which will be input data for CSTDM or CSFFM. Discrete choice models can be developed after conducting Revealed Preference (RP) or Stated Preference (SP) surveys. Additionally, before further assessment the practical feasibility of electric plug-in truck strategies in the context of freight truck movements should be carefully investigated.
Other programs to reduce HDV and LDV idling	No	No	Post-processing	
Real-time MPG readouts on dashboards	No	No	Post-processing	
ITS traffic management centers and ITS traveler information systems	No	No	Post-processing	TDM – CSTDM does not forecast accidents
Adaptive traffic signal control systems	No	No	Post-processing	

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Faster incident response to clear traffic incidents	No	No	Post-processing	
Elimination of highway bottlenecks*	Yes	Maybe	4	TDM – Yes, if identify bottlenecks FFM – (Please see notes)
Truck only lanes	Yes	Yes	3	FFM – The major effects will be observed in CSTDM because its network captures the interaction between truck and passenger vehicle flows.

Example: GHG reduction strategies: VMT fees

In order to evaluate scenarios such as the VMT fees, the most relevant element is a truck cost function which is interactive with commodity and mode split modules. Specifically, truck costs generated by the given function will be used for input data for a direct demand model by calculating Log-sum of all mode-specific impedance functions and input data for mode split modules as well. This cost function is as follows:

Where,

- is the distance between the origin and destination nodes.
- is the diesel fuel price in dollars per gallon.
- and are the estimated parameters that are obtained by estimating a fixed-effect model in the panel data models' literature. (The truck rates as well as the distances travelled by trucks are obtained from the website Truckloadrate.com. The diesel fuel prices are obtained from the Energy Information Administration (EIA) website). Two matrices for obtaining truck

rates are required: one with the shortest distance between every origin and destination pairs, and the other with the proportion of travel distance which goes through California territory for every origin and destination pair.

In addition to the truck cost function developed in CSFFM, a newly added function of VMT Fees by distance is introduced as follows. As a result, truck costs affected by VMT fee scenario can be estimated.

- will be provided by Caltrans or the other state agencies with specific plans and applied to the vehicle miles traveled within California.
- is the distance travelled within CA.

Therefore, the impact of VMT fees on freight demand will be possibly assessed through commodity and mode split modules in CSFFM. Furthermore, the same approach can be applied to all policies if the effect on truck rates and the other mode rates can be specified (i.e., Mileage-based highway user fee(VMT Fee), Cordon Pricing, Carbon taxes or cap-and-trade programs that raise fuel prices, Pay-as-you-drive insurance, Expand rail, air, marine freight like doublestack trains in the above list)

[Professor Michael McNally] Comments on VMT tax issues

Basically, a VMT tax charges per mile, regardless of the actual impact on transportation of the vehicle in question. More fuel-efficient vehicles, less polluting vehicles, would pay the same tax, effectively removing the incentive to purchase and use these vehicles. A driver replacing a large SUV with a Prius yet following the same driving behavior would incur the same VMT tax even though the GHG footprint would be greatly reduced. This tax could also be problematic with respect to vehicle weight. Heavier vehicles cause greater damage to transportation infrastructure, yet would pay the same tax. If a VMT was implemented, and there are many reasons to not do so, then it should reflect if not provide incentives to not simply drive less, but to drive more efficiently relative to overall impacts on the transportation system.