Item #17-3-4
Information

Land Use & Natural Resources Committee

March 1, 2017

SB 375 Greenhouse Gas Reduction Target Setting

Issue: Status of target setting and critical information related to future action by the SACOG Board.

Recommendation: None, this is for information only.

Discussion: SB 375 is the portion of the state's overall greenhouse gas (GHG) reduction goals achieved the combined effects of land use patterns and transportation investments on passenger vehicle travel. SB 375 is assigned to MPOs like SACOG for implementation, with oversight by the Air Resources Board (ARB). SACOG's "target" for GHG reduction is stated as a percentage decrease in per capita GHG, compared to 2005. SACOG has targets for 2020 and 2035. The target reduction by 2020 is 7 percent, and 16 percent by 2035. Through its quadrennial Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS), SACOG must demonstrate that its combined future land use and transportation plans would lead to per capita GHG 7 percent less than the 2005 level by 2020, and 16 percent less by 2035. SACOG has adopted MTP/SCS's in 2012 and 2016, which achieved these GHG reduction targets, and has had programs in place for supporting lead agencies in utilizing the various CEQA relief options provided by SB 375.

In 2015, Governor Brown signed an executive order increasing the state goals for overall GHG emissions reductions, and in 2016 those goals were adopted into law (SB 32). ARB is actively assessing how to set policies to implement those larger reduction goals. Those policies will be documented in the "Scoping Plan." Leading up to the finalization of the Scoping Plan, ARB has requested that the MPOs look at their current SB 375 targets and recommend new targets for 2035 that assist in this overall goal—in other words, in SACOG's case, to recommend GHG reduction targets higher than the current 16 percent reduction by 2035. The 2020 target is likely to remain unchanged. As part of this request, ARB requested that the MPOs perform various "stress tests," which may assist in identifying a larger target as well as potential means for achieving the larger target (see Attachment A for summary of stress test results). Over the last few months, SACOG staff, in concert with staff of several other MPOs around the state, have been performing the stress tests and working out several technical issues that complicate the process of increasing the targets.

ARB has proposed the following schedule for conclusion of these activities:

- MPOs to report to ARB Board progress on GHG emissions reduction target recommendations (March 23 & 24 in Riverside);
- MPOs to report to the ARB Board recommended updates to the SB 375 targets (April 27 & 28 in Sacramento);
- ARB Board to take action on their "Scoping Plan" (tentatively June 22 & 23 in Sacramento); and

- ARB Board to take action on the SB 375 GHG emissions reduction targets (later in Summer 2017).

This schedule would require the SACOG Board to approve a GHG emissions reduction target recommendation at its April 20 meeting. We are proposing the following process and schedule for meeting that deadline:

- March Transportation Committee (TC), Land Use and Natural Resources Committee (LUNR) and Government Relations & Public Affairs (GRPA) meetings: full briefing on the status of the target resetting activities under way by SACOG and several other large MPOs.
- April TC, LUNR and GRPA meetings: Presentation of staff recommendation on updating the targets.
- April Board of Directors meeting: Action on the recommended target updates, to be transmitted to ARB.

The stress tests have revealed several issues related to this target update that complicate potential changes to SACOG's target.

1. The first issue has been dubbed the "VMT rebound effect." The essence of this issue is that all forecasts of vehicle efficiency or miles-per-gallon (MPG), as well as vehicle power sources shifting from fossil fuels to electricity and hydrogen, would result in a long term DECREASE in the cost of driving, even taking into account likely higher fuel prices. So, although the higher MPG and lower tailpipe emissions will result in lower emissions overall, the reduction of costs of driving leads to increases in vehicle travel. Cheaper driving leads to more driving. That dynamic is the "VMT rebound effect."

   During the recent 2016 MTP/SCS update, a small scale version of the VMT rebound effect was a significant part of the plan development. In that update, the combination of expected vehicle efficiency and a forecast of lower future fuel prices led to a reduction in the cost of driving of 12% compared to the 2012 MTP/SCS. This resulted in a need to get an additional 1.8% reduction in vehicle travel to achieve the 16% GHG emissions reduction target, simply to account for the change in cost of driving.

   While staff is still reviewing the stress test results with ARB staff, our initial work indicates that looking forward to our 2020 MTP/SCS, which would be this agency's third SCS, the state's goals on vehicle efficiency and fuels would result in a much greater increase in average MPG, and a much greater reduction in the average cost of driving, than we experienced in the 2016 MTP/SCS update. Instead of a 12% reduction in cost of driving, we could see a 17% reduction in the cost of driving, compared to the 2016 MTP/SCS. Staff currently projects that this change could require 2.5% in additional reductions in vehicle travel to offset the reduced costs. Therefore, unless there is some way to offset these reductions, achieving the same 16% target could require much more aggressive changes to land use and transportation.

2. The second issue is the revenue side of the VMT rebound effect. Higher MPG would mean lower fuel sales than assumed in the 2016 MTP/SCS. This would mean less gas tax revenue. Since gas taxes are a primary way of funding roadway maintenance, this reduction would also affect the state-of-good-repair of the region's transportation system.

   In part to offset both the increase in vehicle fleet efficiency and declining fuel sales, there has been a growing discussion and exploration statewide of options to augment the fuel tax with some other

pricing mechanism or user fee. As an example, in 2015, the California State Transportation Agency, through the California Department of Transportation, launched a statewide pilot program to explore road use charging as a potential long-term replacement for the gas tax. Consistent with these efforts, the stress tests undertaken by the MPOs included an analysis of pricing/user fees at two different levels ($0.04 and $0.08 per mile). These tests were included to provide information relevant to GHG emissions reduction and potential offsets to the VMT rebound effect. The Southern California Association of Governments (SCAG), the MPO for the Los Angeles metropolitan area, has already built into its long range transportation plan and sustainable communities strategy an assumed a $0.04 per mile user fee starting in Year 2025 to assist in financing their current adopted plan.

3. The third issue relates to the target itself. Several other MPOs have proposed the concept of a "single target," at least for the four largest MPOs in the state. The current targets vary by region (e.g., the 2035 target for SACOG is 16 percent; for the San Francisco Bay Area, 15 percent; for SCAG and the San Diego region, 13 percent). The logic of this proposal is that while regional differences may account for some variation in the capacity for reduction in GHG emissions, the variance is confusing and having a uniform target would be simpler and more straightforward.

   If ARB ultimately recommends a uniform, increased target, SACOG's target would actually change the least of the four largest MPOs in the state, since its current target is the highest.

4. The fourth issue is the potential risks to SACOG and its member agencies if future MTP/SCSs failed to achieve the SB375 GHG emissions reduction targets. If SACOG's MTP/SCS is unable to meet the GHG emissions reduction targets, it would have to develop an "alternative planning strategy" (APS). An APS is an additional scenario for the MTP/SCS horizon year, which includes additional measures necessary to meet the GHG emissions reduction target. Beyond the cost of preparation and maintenance of an APS, the main risks to SACOG and its member agencies would be potential loss of some CEQA streamlining benefits, and potential loss of competitive grants, which may require or advantage an MTP/SCS over an APS. At this moment, no MPO has prepared and used an APS.

As noted, staff is continuing to review the stress test results with ARB and other MPO staff, and we will update the Committee and Board when information becomes available

Approved by:

Kirk E. Trost
Interim Chief Executive Officer

KT:BG:rh
Attachment

Key Staff: Matt Carpenter, Director of Transportation Services, (916) 340-6276
Kacey Lizon, Planning Manager, (916) 340-6265
Bruce Griesenbeck, Data Modeling Manger, (916) 340-6268

Attachment

Purpose of Stress Tests:
To provide ARB organized information on potential changes to long range plans that might affect GHG reductions. Stress tests on six policy factors: land use; transit; active transportation modes; pricing; electric vehicle market penetration; and enhanced modes--see Table 1.

Status on SACOG Stress Tests:

1) SACOG developed four test scenarios that cover five of the six factors. SACOG did not develop an "enhance mobility" scenario or test because the deployment rate, effects on travel behavior, and potential for public policy intervention for these emerging travel options are too uncertain to build into targets in the near term. More research and dialog are needed.
2) Draft results of SACOG stress tests—see Tables 2 & 3. Additional SB375 GHG reductions:
    a. Combined land use, transit, ATP: 4.0%
    b. 4 cent VMT charge: 2.4%
    c. 8 cent VMT charge: 4.7%
    d. "Enhanced" ZEV: 1.0%

Ongoing Dialog with ARB and other MPOs On:

1) "VMT Rebound Effect"—State/ARB is proposing significant changes in forecasts for vehicle fleets and power sources for vehicles: including more efficient vehicles and more electric/hydrogen powered vehicles. All this significantly reduces the COST of driving…which leads to more driving and more VMT (ergo, the "rebound effect"). The current SB375 target metric and technical approach for calculations forces the MPO's to account for these changes (i.e., find land use/transportation changes to offset the rebound).
    - SACOG estimates the rebound effect at +2.5% (i.e., our second MTP/SCS adopted in 2016, which met the SB375 target reduction, would need 2.5% more in land use & transportation changes to meet the same target). See Table 4 for details on changes in fuel price, fleet efficiency, cost of driving, and likely VMT rebound. SACOG and other MPO's are understandably reluctant to talk about bigger reduction targets when, in effect, meeting the same target would require more. It should also be noted that the adopted MTP/SCS is "constrained," that is to say it must be based on both a realistic forecast of future land use and revenue.

2) Lost Gas Tax Revenues—This is a related to the VMT rebound effect. Assuming the ARB goals for fleet and power sources are met, the overall amount of passenger vehicle fuel sold would drop by about 25%. There is no statewide proposal to offset this revenue.
    - SACOG estimates the impact on gas tax revenues, which are the dominant road maintenance funding source, could be $1-2 billion over the life of the plan—thus digging our maintenance backlog deeper and reducing federal transit revenues.

Table 1: Requested "Stress Test" Factors

	RTP/SCS	Ambitious & Achievable Target Recommendation	Unbound Scenario	Mobile Source Strategy Clean Tech Scenario Goal: 7.5% Reduction by 2035
Land Use	RTP/SCS	MPO Target Recommendation Informed By Stress Test	Implausibly Aggressive See Table 3 for SACOG scenario	Implausibly Aggressive See Table 3 for SACOG scenario
ATP	RTP/SCS	MPO Target Recommendation Informed By Stress Test	Implausibly Aggressive See Table 3 for SACOG scenario	Account for Additional Funding from User Fee See Table 3 for SACOG scenario
Pricing	RTP/SCS	MPO Target Recommendation Informed By Stress Test	4.0 Cents/Mile User Fee Gas Tax in Effect (Loses Money Over Time). Additional 4.0 Cents Maintains Funding at Current Levels. Consistent with Road User Charge Committee Assumption.	8 Cents/Mile User Fee This variable varies to highlight what is needed to meet the 7.5 goals. Multiple iterations may be necessary to meet the 7.5% goal.
Transit	RTP/SCS	MPO Target Recommendation Informed By Stress Test	Implausibly Aggressive See Table 3 for SACOG scenario	Account for Additional Funding from User Fee See Table 3 for SACOG scenario
Greater ZEV Penetration	RTP/SCS	MPO Target Recommendation Informed By Stress Test	Advanced Clean Cars (ACC) Penetration & Accelerated Penetration Resulting from MPO Infrastructure Investments	Advanced Clean Cars (ACC) Penetration & Accelerated Penetration Resulting from MPO Infrastructure Investments
Enhanced Mobility	RTP/SCS	MPO Target Recommendation Informed By Stress Test	Base Market Penetration MPO Technical Staff To Develop	Increase from Base Market Penetration MPO Technical Staff To Make a Recommendation

SACOG SB375 "Stress Test" Scenarios

All SACOG Stress Test scenarios were based on the 2016 MTP/SCS, with all passenger vehicle fleet efficiency and fuel price assumptions consistent with the forecasts for the 2016 MTP/SCS.

Test 1: Ambitious Land Use, Transit, and ATP Deployment Scenario

SACOG combined three of the requested tests into one scenario: Land Use, Alternative Transportation Projects (ATP), and Transit. SACOG did this for two reasons: first, SACOG utilized an alternative scenario (Scenario 3) developed as part of the alternatives analysis for the 2016 MTP/SCS, which combined more ambitious land use, transit, and ATP deployment, compared to the adopted 2016 MTP/SCS, and this scenario was readily available for the requested tests; and from a practical standpoint, it made more sense to combine these policy scenario factors than to treat them as separate, siloed factors.

Test 1 additional costs:

- Estimated additional land-side infrastructure costs of $1-2B over the life of the plan. Land-side infrastructure would be needed to incentivize higher levels of infill development than projected for the 2016 MTP/SCS.
- Estimated additional transit operating/maintenance costs of $2-3B over the life of the plan. Would cover additional transit service, plus additional costs of vehicle replacements and fleet needed to maintain the higher service level.

Test 1 Results: Approx. 4% additional SB375 GHG emissions reductions; also results in a 23% increase in transit trips per capita and no increase in overall congestion.

Test 2: Pricing Level 1 (average $0.04 per mile)

SACOG assumed a pricing scenario which added $0.04 per mile to auto operating costs, compared to the 2016 MTP/SCS. The pricing change was modeled as a change to average auto operating cost. The change could be implemented as a VMT fee, congestion pricing, increase parking pricing, increases to the fuel excise tax, or some combination of these things adding up to a combined $0.04 per mile average cost increase.

Test 2 additional costs: Unknown additional costs for implementation of pricing.

Test 2 Results: Approximately 2.4% additional SB375 GHG emissions reductions; modest decrease in congestion and modest increase in transit and non-motorized travel.

Test 2A: Pricing Level 2 (average $0.08 per mile)

Same approach and caveats as Test 2.

Test 2A Results: Approximately 4.7% additional SB375 GHG emissions reductions; significant decrease in congestion and increase in transit and non-motorized travel.

Test 3: Expanded Local EV Incentive Program

SACOG assumed an expansion of its planned EV incentive program, combining: extension/expansion of the local agency direct incentives for EV purchase; expansion of EV

charging infrastructure deployment; and additional planning and building code support for integration of EV chargers in new & existing buildings.
Test 3 additional costs: $100M for additional direct incentives and new charging infrastructure.
Test 3 Results: Approx. 1% additional SB375 GHG emissions reductions.

Test 4: "Enhanced Mobility" Scenario

This stress test was intended to focus on the many technology-based transportation services which are being quickly deployed now (e.g., Uber, Lyft, Zip-car, bike share, etc.), plus newer technologies which have unknown deployment trajectories (e.g., autonomous and autonomous/connected vehicles). There is more prognostication than knowledge on the future effects that these changes will have on VMT, GHG, and the SB375 GHG target metric. In general, more of the prognostication, especially for AV's, lands on HIGHER VMT than lower due to the unfettered deployment of these technologies over time, due to the effects that AV's may have on how travelers value their time in vehicles, and what happens to AV's AFTER they drop off a passenger at a destination. Additionally, the potential policy interventions which may affect deployment over time are only now being developed, and their potential impact on how "enhanced mobility" is deployed is also unknown at this time. For all of these reasons, SACOG recommends NOT including any explicit accounting of this scenario in the target resetting.

Table 2. DRAFT SACOG Stress Test Results

Additional GHG Reduction	**4.0%**	**2.4%**	**4.7%**	**1.0%**	**Unk.**
Test Factor	**SACOG Test 1***	**SACOG Test 2**	**SACOG Test 2A**	**SACOG Test 3**	**SACOG Test 4**
Land Use	X				
ATP	X				
Pricing		+4.0 Cents	+8.0 Cents		
Transit	X				
Greater ZEV Penetration				+3% EV's in Fleet	
Enhanced Mobility					Unk.
Additional Cost	**$3-5B add'l cost** $1-2B add'l land-side costs $2-3B in add'l transit costs				

Table 3. SACOG

Scenario Variable	Adopted MTP/SCS	Test 1 Scenario (Land Use, Transit, ATP)
Share of dwelling unit growth in…		
…Center & Corridor Communities	30%	36%
…Established Communities	28%	27%
…Developing Communities	40%	36%
…Rural Residential areas	2%	1%
Share of job growth in…		
…Center & Corridor Communities	35%	35%
…Established Communities	49%	53%
…Developing Communities	16%	12%
…Rural Residential areas	<1%	<1%
Transportation System Inputs		
Transit Service Hours (% change from 2008)	+106%	+127%
Major Roadway Lane Miles (% change from 2012)	+21%	+18%
Bike Lane Miles (% Change from 2012)	+123%	+137%

Table 4. Auto Operating Costs, Round 1, 2 and 3 SCS's

		Fuel Price $2010	Fleet Avg. MPG	Fuel/Mile	Non Fuel/Mile	Total Auto Op. Cost/Mile
2005	Round 1*	$2.70	20.6	$0.131	$0.066	$0.197
	Round 2**	$2.72	19.5	$0.139	$0.050	$0.189
2035	Round 1*	$5.30	29.3	$0.181	$0.108	$0.289
	Round 2**	$4.68	28.2	$0.166	$0.088	$0.253
	Round 3***	$4.84	39.4	$0.123	$0.088	$0.210
	Round 3 Diff from Round 2 for 2035					-16.9%
	Impact on VMT:					+2.5%

Source: SACOG, February 2017.

*From SACOG 2012 SCS. Estimated from 2009 Dept. of Energy fuel price forecasts & EMFAC2007 + Pavley Post-processor passenger vehicle fleet efficiency projections.

**From SACOG 2016 SCS. Estimated from 2013 Dept. of Energy fuel price forecasts & EMFAC2011 passenger vehicle fleet efficiency projections.

***Estimated based on 2015 Dept. of Energy fuel price forecasts & EMFAC2014 passenger vehicle fleet efficiency projections. Note that 2017 Dept. of Energy fuel price forecasts will be used for 2020 SCS, and may be different than the 2015 forecasts.