



Land Use & Natural Resources Committee

Item #17-4-2 Information

April 4, 2017

SB 375 Greenhouse Gas Emissions Reduction Target Setting

Issue: What SB375 greenhouse gas (GHG) emissions reduction target for 2035 should be recommended to the Air Resources Board?

Recommendation: For information only. The Transportation Committee will take action on this item.

Discussion: The action on SB 375 targets contains two decision points:

- 1) Should SACOG take the opportunity to comment to the ARB on the resetting of the targets?
- 2) If SACOG decides to take this opportunity, what should the recommendation be?

Staff recommends that the Board take the opportunity to recommend our own target. The ARB is authorized by SB 375 to set GHG emissions reduction targets, and will do so absent a recommendation. However, the ARB was very cooperative and inclusive of SACOG in setting the current targets. Additionally, several other MPOs have indicated they will recommend targets to the ARB, and staff recommends that the SACOG Board add its voice to this dialog, particularly to ensure that the target remains ambitious but achievable. Finally, in forming our own recommendation on a reset of the target, SACOG can identify and include in the recommendation key issues of concern regarding State policy and actions, and can identify key assumptions and expectations about State actions needed to support SACOG, as well as other MPOs, in reaching higher GHG emissions reduction targets. This opportunity to attach assumptions and expectations to SACOG's target would be missed if a recommendation were not made.

Staff recommends an increase in SACOG's 2035 GHG emissions reduction target from 16 to 18 percent, conditioned on assumptions outlined below.

Required Future Actions by SACOG to Support Achievement of Higher GHG Emissions Reductions and Implementation of SCSs

The actions described below list the major steps needed to reach a higher target. However, there is a range of options available within each action, and different levels of implementation could be combined to reach the recommended higher target. All the actions are consistent with policy priorities in the current MTP/SCS, although the specific implementation strategies are variable and would be up to the discretion of the Board and implementing agencies. Note that many of these actions require additional funding, over and above the revenues currently projected; this

issue will be addressed below, in a section describing required actions by the state to achieve higher GHG emissions reductions.

- ***Incentivize early growth in infill and transit-oriented development (TOD) areas.*** Residents of infill and TOD areas tend to have shorter vehicle trips, and more trips by transit, biking, and walking, than residents of other areas. Finding ways to create incentives for growth in those areas will assist in meeting higher GHG targets. The stress tests done for the ARB included a scenario which shifted modest growth into infill and TOD areas in the early years (before 2035) of the next plan (6 percent of total dwelling unit growth), added more transit service to those areas, and added more pedestrian and bicycle facilities. The scenario generated 4 percent more GHG emissions reductions. The full extent of this scenario **would not** need to be implemented, but some pieces of it would. Examples include:
 - Accelerating development in TOD areas like the Downtown/Riverfront Streetcar corridor and the Folsom corridor in Rancho Cordova;
 - Accelerating employment growth in centers serving housing-rich areas (e.g., El Dorado County and the City of Elk Grove); and
 - Early implementation of maintenance and rehabilitation projects in infill areas, where a single project can both advance goals on state of good repair (SOGR), and complete street projects, which will encourage alternative modes of travel and activate infill development.
- ***Increase transit service and modernize deployment of transit services.*** In concert with acceleration of growth in infill and TOD areas, additional transit service both supports growth and provides options for residents to shift out of vehicle modes. Over the last 10 years, we have all observed what happens to transit ridership as major cuts in service are made. To reach higher GHG emissions reduction targets, this trendline needs to be reversed. Additionally, disruptive changes in transportation services and new mobility options have created an imperative to reinvent transit to focus on travel markets it can efficiently serve, and to find ways to leverage new mobility options to provide better access to and from fixed-route/fixed-schedule corridors. Examples include:
 - Elk Grove Transit’s “Comprehensive Operational Analysis”; and
 - Regional Transit’s “Station Link” partnership with Uber, Lyft, and Yellow Cab.
- ***Continue to prioritize maintenance and state of good repair.*** Through the development of the current MTP/SCS, fix-it-first, SOGR, and addressing a long-term backlog in infrastructure maintenance was a high priority. The adopted plan shifted \$2 billion from other expenditures to maintenance and rehabilitation, relative to the 2012 MTP/SCS. However, fully addressing the maintenance backlog would have required significantly more funding (estimated at \$4 billion based on the currently adopted MTP/SCS). Additionally, the potential for long-term net savings through early spending on the maintenance backlog, totaling up to \$10 billion, was presented and discussed in the development of our current MTP/SCS. These long-term net savings result from the avoided cost of future major maintenance projects (e.g., doing earlier and cheaper roadway resurfacing and other maintenance on a regular schedule to avoid major reconstruction at a much higher cost later). This condition aligns with similar provisions

related to cost savings and efficiencies in SB 1/AB 1 and the 2016 Sacramento Measure B proposal.

- ***Innovation and investment in specific programs that generate additional GHG emissions reductions.*** The stress tests prepared by SACOG and the other MPO's looked at the potential effect of locally-initiated programs to accelerate the rate of electric vehicle market penetration. Our ability to reach higher GHG emissions reductions will require continued exploration of new ideas and investments in expanding deployment of successful programs. Examples include:
 - SMUD, PG&E, and El Dorado County all provide vehicle purchase incentives to local residents, over and above the state and federal purchase incentives;
 - The much-publicized Volkswagen settlement could fund a significant expansion of local, supportive EV infrastructure (e.g., public charging stations), which could significantly expand on SACOG's current EV infrastructure program; and
 - SACOG's own TDM Innovation Grant Program is intended to inspire new ideas for providing mobility and managing the impact of transportation, which could provide significant GHG reductions if successful pilot programs are scaled up.

Required Future Actions by the State to Support Achievement of Higher GHG Emissions Reductions and Implementation of SCSs

The actions described below are necessary for the state to lead to offset some of the unintended consequences of policies on vehicles and fuels, and to support the MPOs' ability to reach higher GHG emissions reduction targets.

- ***Offsetting the long-term decline in driving cost.*** By our estimates, the average cost of driving will decline by 17 percent per mile over the long term, in part due to state policy initiatives on vehicle efficiency and fuels. This decline results in a "VMT rebound," which, while very positive, adversely impacts SACOG's ability to reach higher GHG emissions reduction targets.
- ***Offsetting the loss of fuel-based tax revenues.*** The flip side of the decline in driving cost is a decline in fuel sales and taxes on a per-mile traveled basis. This is a historic trend, which will be exacerbated by the more aggressive state policies implementing SB 32. This would result in \$1-2 billion in reduced fuel tax revenues for our next MTP/SCS update, relative to the current MTP/SCS.

The ARB has recognized both concerns in staff conversations, and most recently in a hearing of the Board in March. The ARB also has acknowledged that these concerns might be addressed by transitioning from the current fuel-sourced taxes to a mileage-based user fee. Such a fee addresses the first concern, in part because the fee is more directly tied to actual use of the roadway than the current fuel-based taxes. Second, such a fee would broaden the base of drivers paying for the use of roadways by including non-fossil fuel powered vehicles. Finally, a mileage-based user fee would not be subject to the erosion of revenues caused by vehicles becoming more fuel efficient over time.

The state has already begun steps to address these two concerns. The California Road Charge Pilot Test explicitly recognizes the concerns and is exploring options, including changes to vehicle license fees, tolling, increases to the fuel tax, and mileage-based user fees (or “road charges”). SB 1, scheduled for a final vote this week, increases fuel taxes, but also includes a vehicle charge for ZEVs to offset partially the loss of revenue from ZEV roadway users.

State action on these two concerns would both address the VMT rebound issue and provide additional revenues for transportation-related investments. For those investments to generate additional GHG emissions reductions, and to achieve other policy goals of the MTP/SCS, such as investments in system maintenance and rehabilitation, the state would also need to support and promote use of additional revenues for those purposes.

- ***Return to source of any additional revenues.*** Based on the goals of the MTP/SCS and the state imperative to play a role in achieving higher GHG emissions reductions, additional funding is needed. Although the current MTP/SCS shifted resources into maintenance and SOGR, additional progress requires greater revenues. SACOG’s stress tests demonstrated that additional GHG emissions reductions could be achieved through coordinated land use and transportation measures, but without additional funding none of that could be achieved. The GHG emissions reduction target recommendation assumes a return to source for any new revenues.
- ***Additional revenues used to achieve multiple objectives.*** In order for any new revenues to be available to implement multiple MTP/SCS policy priorities, including achieving higher GHG emissions reductions, SACOG needs flexibility in using the revenues. Flexibility would provide the ability to pursue projects that achieve multiple goals, such as advancing SOGR with a street reconstruction and including a complete street improvement within the project.
- ***Normalization of exogenous factors related to calculation of the target reductions.*** In order for the work of MPOs on SB 375 and GHG emissions reductions to focus on the combined effects of land use and transportation on vehicle travel and GHG emissions, some of the technical assumptions in SACOG’s first two SCSs, such as long-range fuel price forecasts and long-range emissions rate estimates, should be consistent with those used to set the targets.

Framework for Reaching Higher GHG Reductions

The key actions by the state and by SACOG outlined above are critical to achievement of higher GHG emissions reductions. However, the recommendation of 18 percent, though clearly ambitious, is achievable with a range of possible “levels” of actions by the state and SACOG. The different “levels” of aggressiveness will depend on the preferences of the Board and the state, practical constraints on their ability to take action, and the opportunities to take specific steps implementing each action. For example, if the state pursued a mileage-based user fee to both replace the existing fuel tax and offset the decline in driving cost, that action would both fully offset the “VMT rebound” and provide a significant revenue source for activating more land use and transportation strategies. In such a case, less would be required from innovative

programs to achieve the recommended 18 percent target. Other combinations of implementation levels of the key actions could result in reaching the same level of reduction. Attachment C provides a matrix of “scenarios” of differing implementation levels of these key actions, each of which could reasonably get to the 18 percent target. The main point is that though reaching 18 percent will be ambitious and challenging, the Board will have options in formulating the policy framework of the next plan.

Potential Risks if Future MTP/SCS does not Meet the GHG Emissions Reductions Targets

As we have discussed with the Board over the last cycles, when an MTP/SCS cannot demonstrate that the proposed plan meets the SB 375 GHG emissions reduction targets, an Alternative Planning Strategy (APS) which does meet the target must be prepared. The APS can ignore some constraints that apply to the development of the MTP/SCS. For example, additional revenues over and above those reasonably expected for the MTP/SCS could be assumed to be available and fund transportation improvements. Transportation investments and land use changes deemed to be infeasible for political or practical reasons also could be included in the APS. In effect, the APS is a separate scenario to the MTP/SCS, which identifies some of the additional steps that would be needed to meet the GHG emissions reduction targets. Development of the APS would require staff time and potentially other resources (e.g., consultants) to prepare.

To date, no MPO has prepared and relied on an APS, so the risks, beyond the extra cost of preparing it, are not known. However, some of the cap-and-trade funding programs include consistency with an SCS as one of the evaluation criteria, so there is some uncertainty around the competitiveness of a project relying upon an APS.

Attached to this item are summaries of prior information and discussion from the February and March Committee and Board meetings:

- Attachment A provides a summary of background information on:
 - State transitioning from AB 32 climate change goals to more aggressive SB 32 goals;
 - SB 375 Sustainable Communities and Climate Change Act;
 - SB 375 target metric: percent reduction in per capita GHG, compared to year 2005;
 - Current SB 375 targets for SACOG: 7 percent by 2020, 16 percent by 2035;
 - SACOG’s history on SB 375: adopted MTP/SCS in both 2012 and 2016 meets targets;
 - Dialog with ARB and other MPOs on resetting SB 375 targets—ARB expects MPOs to assist in meeting higher statewide GHG emissions reduction goals, other MPOs will be recommending higher reduction targets;
 - “Stress tests” performed by the four large MPOs (including SACOG) to help inform the target resetting;
 - “VMT rebound effect”—the expected long range decline in cost of driving, caused in part by increasing vehicle efficiency (i.e., more miles per gallon), increasing percentage of electric and hydrogen vehicles, and declining gasoline

prices, results in an increase in driving, which makes achieving GHG emissions reductions more difficult; and

- Expected long-range decline in fuel sales and gas tax revenues—less funding for infrastructure and maintenance, and further evidence that the current excise tax will continue to fall behind needs (staff will discuss the projected impact of pending SB 1 at the Committee meeting).
- Attachment B includes responses to several key questions that were raised on issues related to the SB 375 targets.

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Attachments

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SB375 Background Material

The following summarizes information provided to the SACOG Board through Committee meetings and presentations to the Board in February and March.

AB 32 and SB 32 Statewide Climate Change Policies and Goals

AB 32 was landmark legislation on climate change, and set statewide goals for greenhouse gas (GHG) emissions reductions. AB 32 set the first statewide target for GHG emissions reductions: rolling back total GHG emissions reductions from all sectors in the state to 1990 levels by the year 2020. The California Air Resource Board (ARB) has a key role in implementation of AB 32, and adopted the first “Scoping Plan,” which outlines implementing policies to achieve the AB 32 targets, in 2008.

<https://www.arb.ca.gov/cc/ab32/ab32.htm>

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). SB 32 added a new GHG reduction target for the state: 40 percent below 1990 levels by the year 2030. ARB is actively assessing how to set policies to implement those larger reduction goals in a major update of the “Scoping Plan.”

<https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm>

SB 375—Sustainable Communities & Climate Protection Act

With regard to transportation sector GHG emissions reduction, the state’s policy is often described as a “tripod” with three “legs”:

1. Vehicles: policies and regulations to increase the efficiency and reduce the tailpipe emissions of the fleet of vehicles operating within the state.
2. Fuels: promoting fuels and power sources with lower GHG emissions (e.g., lower-carbon fossil fuels, electricity, and hydrogen cell).
3. Reducing the amount of vehicle travel: promoting policies for reducing the amount of vehicle miles traveled and, by extension, the amount of GHG emissions, through better land use and transportation planning.

SB 375 is the portion of the third “leg” to be achieved by 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). The “Sustainable Community Strategy” (SCS) is the land use allocation and future transportation investment strategy which achieves the GHG reduction targets for each MPO.

<https://www.arb.ca.gov/cc/sb375/sb375.htm>

SB 375 Targets and Target Metric

The “target” metric for GHG emissions reduction for SB 375 is stated as a percentage decrease in per capita GHG, compared to 2005. SACOG has targets for 2020 and 2035. SACOG’s SB375 targets are:

- 7 percent by 2020; 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 adopted MTP/SCSs in 2012 and 2016 that achieved these GHG emissions reduction targets, and has had programs in place for supporting lead agencies in utilizing the various CEQA relief options provided by SB 375.

The ARB has the authority to reconsider SB 375 targets every 4 years. In 2014, after the first 4 years of SB 375, the ARB chose to leave the initial targets in place. Now approaching eight years in, the ARB has decided to reevaluate the SB 375 targets, with an eye toward increasing them, consistent with the intent of the SB 32.

SACOG's SB 375 History

SACOG has adopted two SCSs that achieve the SB 375 GHG emissions reduction targets: the first in 2012, the second (and current) in 2016. Both SCSs were adopted as integral parts of SACOG's Metropolitan Transportation Plan (MTP), which is updated every four years. As part of SACOG's MTP/SCS implementation activities, SACOG provides SCS consistency findings on request to member agencies for their use in CEQA.

<http://www.sacog.org/pod/determination-mtpscscs-consistency-worksheet>

<http://sacog.maps.arcgis.com/apps/StoryMapBasic/index.html?appid=5a6452c96f6c4ac88c49721411a0db8b>

Dialog with ARB and Other MPOs on the Target Setting

Over a year ago, an active dialog between the four largest MPOs (Southern California Association of Governments or SCAG, MPO of the Los Angeles Basin; Metropolitan Transportation Commission or MTC, MPO of the San Francisco Bay Area; San Diego Association of Governments or SANDAG; and SACOG) and the ARB was initiated related to SB 32, the Scoping Plan, and SB 375 targets.

The ARB requested that the MPOs look at their current SB 375 targets and recommend new targets for 2035 that assist the state in achieving the higher GHG emissions reduction goals set by SB 32. In other words, in SACOG's case, to recommend GHG reduction targets higher than the current 16 percent reduction by 2035. As part of this request, the ARB requested that the MPOs perform various "stress tests," which may assist in identifying a higher target as well as potential means for achieving the higher target. The stress tests are NOT constrained by revenues or other practical concerns—they were intended to be speculative "what if" scenarios.

The stress tests looked at the following policies:

- Land Use—More growth in focused in compact, infill, TOD, and other lower-VMT areas.
- Transit—More transit investments and service.

- Active Transportation Projects—More investments in pedestrian and bike projects and amenities.
- Greater Zero Emission Vehicle (ZEV) Penetration—Projects and policies which accelerate penetration of ZEV's into the passenger vehicle fleet, over-and-above the aggressive state policies in place now, or expected to be in place with implementation of SB 32.
- Pricing—Impact of transportation pricing policies, such as mileage-based user fees.
- Enhanced Mobility—These policies relate to all the new modes of travel (e.g., Uber, Lyft, car share, bike share, etc.) which actually EXIST, and are increasing in utilization and importance over time. They also include the effects of new travel modes and transportation services which either do not exist, or are not fully deployed, such as automated or connected vehicles.

The four largest MPOs agreed to evaluate the potential impact of these policies on achieving GHG emissions reductions over and above the achievement in their current adopted SCSs.

The additional GHG emissions reductions for SACOG stress tests are shown below:

- Land Use / Transit / ATP Combined: 4 percent (at a cost of \$3-5 billion over life of MTP/SCS)
- Greater ZEV Penetration: 1 percent (at a cost of \$100M over life of MTP/SCS)
- Pricing: 4 to 6 percent (depending on the level of user fee charged—tests assumed \$0.04 to \$0.08 per mile)
- Enhanced Mobility: No result provided—too early to tell how these new modes/services will affect VMT and GHG.

Other MPOs also performed the stress tests. In general, they found: less potential on Land Use / Transit / ATP (results ranging from 0-2 percent); greater potential on ZEV penetration (up to 20 percent!); similar results for Pricing (although some MPOs looked at much higher mileage fees); and agreement on Enhanced Mobility (too early to build effects into targets).

See the following for more details on the SACOG stress test results.

http://www.sacog.org/sites/main/files/file-attachments/7-sb_375.pdf

Stress Test Land Use/Transit/Active Transportation Project Scenario

The Land Use/Transit/Active Transportation Project combined scenario was based on “Scenario 3” from the alternatives analysis of the current adopted MTP/SCS. The alternatives analysis was done and presented to the SACOG Board to provide an idea of the range of potential land use and transportation scenarios, and their relative performance across a range of indicators. In the analysis, Scenario 2 was the 2012 MTP/SCS. Scenario 1, relative to Scenario 2, included slightly less compact development and growth in Centers & Corridor areas, and included less transit and more highway investments. Scenario 3, relative to Scenario 2, included more compact development and growth in Center & Corridor areas, and included more transit and active transportation projects. These alternatives were also used in the California Environment Quality Act (CEQA) analysis of the current adopted MTP/SCS. Table 1 provides a comparison of the Scenario 3 to the current adopted SCS.

Table 1. SACOG Scenario 3

Scenario Variable	Adopted MTP/SCS	Scenario 3
<i>Share of 2012-2036 Dwelling Unit Growth in...</i>		
...Center & Corridor Communities	30%	36%
...Established Communities	28%	27%
...Developing Communities	40%	36%
...Rural Residential areas	2%	1%
<i>Share of 2012-2036 Job Growth in...</i>		
...Center & Corridor Communities	35%	35%
...Established Communities	49%	53%
...Developing Communities	16%	12%
...Rural Residential areas	<1%	<1%
<i>Transportation System Inputs</i>		
Transit Service Hours (% change from 2012)	+122%	+143%
Major Roadway Lane Miles (% change from 2012)	+21%	+18%
Bike Lane Miles (% Change from 2012)	+123%	+137%

Source: SACOG, March 2017.

Scenario 3 was ruled out as a reasonable alternative in part because of assessments of the marketability of the location and type of development it included, and in part due to financial constraints. The MTP/SCS draft environmental impact report states that “To achieve this level of transit performance for Alternative 3, land use assumptions were made that go beyond the federal requirements of what is reasonable to assume. For instance, the alternative relies on a higher amount of attached housing, especially near transit, than the market and financial incentives currently will support. Additionally, Alternative 3 includes a high funding allocation for transit and relies on an exceptionally high farebox recovery rate, which are unlikely to occur under current operations.”

2016 MTP/SCS DEIR:

<http://www.sacog.org/general-information/2016-mtpscs-draft-environmental-impact-report>

SACOG staff has estimated the cost of additional transit service included in Scenario 3, compared to the current adopted MTP/SCS, as \$2-3 billion. This additional funding would primarily be required to operate transit at higher service frequencies in areas where the underlying demographics and land uses would support high frequency transit. Further, estimates of the land-side infrastructure needed to make some of the targeted growth in Center & Corridor communities and transit-oriented development (TOD) areas are \$1-2 billion over and above the current adopted MTP/SCS. These funds would be used for upgrading utilities, upgrading street and pedestrian environments, providing other lands-side infrastructure like parks, etc., in Center & Corridor communities and TOD areas. These investments would make development in these areas more likely, and, in combination with more frequent transit service in those areas, would make Scenario 3 more achievable.

VMT Rebound Effect

One key issue came up in the dialog between the ARB and the MPOs regarding the target setting. The ARB, as part of the vehicle efficiency and lower-carbon fuels policies (“legs” #1 and #2 of the state’s transportation GHG emissions reduction program) have the effect of reducing the average cost of driving over time, as vehicles become more efficient and lower-cost power sources like electricity become more prevalent in the vehicle fleet. Although the overall impact of these “legs” of the state’s program result in significant decreases in overall tailpipe emissions, the declining average cost of driving also results in a slight increase in vehicle travel. This slight increase in VMT due to declining driving costs is known as the “VMT rebound effect.” Due to the method of modeling and accounting for vehicle travel and GHG emissions from passenger vehicles in the SB 375 targets, the VMT rebound effect decreases the overall GHG emissions reductions accounted for in the SB 375 target metrics.

Table 2 provide a tally of the average driving costs (or auto operating cost) for the first two SACOG SCSs. For 2035 forecasts:

- Average driving cost decreased by 12 percent between the first SCS (adopted in 2012) and the second SCS (adopted in 2016). This decline in driving cost resulted in a 1.8 percent increase in VMT for the second SCS. This “rebound” had to be covered by a combination of slightly more compact land uses, and additional investments in supporting EV infrastructure programs. The decline in driving cost was caused by a decline in the Department of Energy long range forecast of the cost of gasoline.
- Based on the currently available projections of vehicle fleet efficiency and DOE gasoline price forecasts, the expected average driving cost will drop by 17 percent going from the second SCS to the third SCS (expected adoption in 2020). This decline in driving cost will cause a 2.5 percent increase in VMT for the third SCS. This “rebound” is a major topic of discussion with the ARB regarding the potential for getting to higher SB 375 targets.

Table 2. 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 2 Diff from Round 1 for 2035					-12.4%
	Round 1 to 2 VMT Rebound:					+1.8%
	Round 3 Diff from Round 2 for 2035					-16.9%
	Impact on VMT:					+2.5%

Source: SACOG, March 2017.

Shaded are the main "drivers" of the VMT rebound. From Round 1 to Round 2, the main driver was a drop in the DOE long range forecast for gasoline. From Round 2 to the expectation of Round 3, the main driver is the major increase in average MPG.

*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.

**Attachment B: SB375 Target Setting
Responses to Questions from March TC, LUNR and GRPA**

-Won't SB 1/AB1 offset both the user cost decline and VMT rebound, as well as the revenue decline, raised as a concern for the target setting?

The impact of SB 1 /AB 1 on the per-gallon price of fuel is significant, adding \$0.12 per gallon to the forecast year, which is a significant increase in the taxes paid per gallon in 2020 and 2035 (16 to 18 percent increase—see Table 1). However, that increment in taxes, once factored into the average cost of driving on a per-mile basis, is minimal (1 to 2 percent increase). Note that these figures were calculated from a draft of the bill, not the current bill language.

In terms of revenue expected over the life of the MTP/SCS, a verbal briefing will be provided at the Committee meetings based on the current version of the bill.

**Attachment B: SB375 Target Setting
Responses to Questions from March TC, LUNR and GRPA**

Table 1. Effect of SB 1 / AB 1 On Fuel Prices and Driving Costs

Year	Scenario	Pass.	Gas	Fuel Tax per Gallon				Driving Cost Per Mile			
		Vehicle MPG	Price (\$2015)	Current	SB1/AB1	Diff	% Diff	Current	SB1/AB1	Diff	% Diff
2012		20.0	\$4.19	\$0.638				\$0.270			
2020	AB 32	24.9	\$4.33	\$0.678				\$0.250			
2035	AB 32	28.2	\$5.14	\$0.737				\$0.278			
2020	SB 32	24.7	\$4.17	\$0.666	\$0.786	\$0.120	+18%	\$0.245	\$0.250	\$0.005	+2%
2035	SB 32	39.4	\$5.36	\$0.753	\$0.873	\$0.120	+16%	\$0.232	\$0.235	\$0.003	+1%
<i>SB1 / AB1 Differences</i>											
2020		-0.2	-\$0.16	-\$0.012	+\$0.108			-\$0.005	-\$0.000		
2035		+11.2	+\$0.22	+\$0.016	+\$0.136			-\$0.046	-\$0.043		
2035 % Diff		+40%	+4%	+2%	+18%			-17%	-15%		

Source: SACOG, March 2017.

Notes:

/1/ Projections based on best available information on passenger vehicle fleet efficiency (ARB EMFAC 2011) and fuel prices (per Department of Energy 2013 “Outlook” report). This is the fleet efficiency and fuel price forecast used by SACOG for the 2016 MTP/SCS.

/2/ Projections based on best available information on passenger vehicle fleet efficiency (ARB EMFAC ****2014****) and fuel prices (per Department of Energy 2013 “Outlook” report). This is the fleet efficiency and fuel price forecast used by SACOG for the 2016 MTP/SCS.

Attachment B: SB375 Target Setting Responses to Questions from March TC, LUNR and GRPA

-What share of total GHG is accounted for by passenger vehicles today? How does that share change over time to the 2035 horizon?

The ARB shows significant decrease over time in passenger vehicles by 2035 (current Scoping Plan shows decline from 112 to 78 million metric tonnes, a 30% decline in total, based on AB32 GHG emissions reduction goals). The SB32 goals will be lower still, but even these forecasts of aggressive change to vehicles, fuels, and power sources for passenger vehicles show passenger vehicles emitting a significant amount of GHG.

2014: passenger vehicles generate 111.85 MMT CO₂e (25.4% of all GHG emissions)

Source: ARB 2016 GHG Inventory,

https://www.arb.ca.gov/cc/inventory/data/graph/treemap/scopingplan_2000-14.htm

2035 (AB32): passenger vehicles generate 78 MMT CO₂e

Source: ARB, "First Update to the Climate Change Scoping Plan", May 2014.

2035 (SB32): passenger vehicles generate 78 MMT CO₂e

-Are there any estimates of how much GHG is thrown up by a forest fire?

One estimate of GHG release from fires collectively in the US is 290 million metric tonnes per year (compared to about 1,800 million metric tonnes emitted collectively by the transportation sector, and 6,870 million metric tonnes in total). If forest fires increase in frequency or severity, this share would increase, and clearly is a concern if reduction of total GHG is a goal.

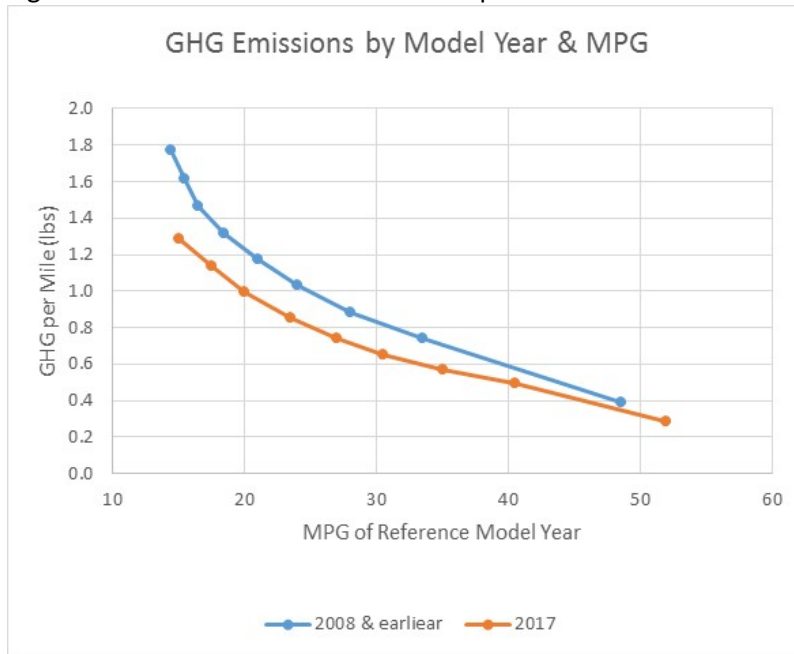
Source: University of California, reported in the journal *Carbon Balance and Management*.

-How do tailpipe emissions for passenger vehicles compare on a per-mile and per-gallon fuel burned between 2005 and 2017?

Based on the per-mile GHG emissions rates of vehicles 2008 and earlier, compared to 2017 model year vehicles, rates have decreased by 15 to 20 percent, depending on the fuel economy of the vehicle. However, for purposes of SB 375 emissions reduction targets, the vehicle technology and fuel changes which drive this decline are largely excluded from the reduction calculation. The SB 375 target focuses on the amount of vehicle travel per capita. The reductions generated by vehicle technology and fuel are tracked and tallied as part of the state's GHG emissions reduction programs, and are not double-counted in the SB 375 target calculation.

Attachment B: SB375 Target Setting Responses to Questions from March TC, LUNR and GRPA

Figure 1. 2008 vs. 2017 GHG Emissions per Mile



Source: SACOG, March 2017, based on:

<https://www.epa.gov/greenvehicles/greenhouse-gas-rating>

-What is the hit on jobs and the economy of California's GHG emissions reduction policies?

The ARB draft Scoping Plan recognizes potential impact of GHG regulations on businesses and jobs in California, but does not put a specific number to it:

“Further, some sources may not be able to achieve a required percent reduction in GHGs each year, forcing them to cut production to meet their annual caps, potentially affecting jobs and the price of their products. This would negatively impact both the California economy and global GHG emissions. Goods that are currently produced in California would be produced elsewhere potentially reducing in-state employment. Assuming California residents still want buy these products, they would be produced out-of-state and imported in, potentially increasing GHG emissions. Under Alternative 4, there are limited mechanisms to address emissions leakage, which may increase under this scenario.”

The Scoping Plan also references potential threats of climate change to other industries within the state (e.g., impact of increasingly frequent or severe droughts on agriculture), and the effect of attracting other jobs to the state based on the same policies (e.g., alternative energy industry). All of the references at this point are not detailed or quantified.

Source: ARB, draft Scoping Plan, January 2017.

-Is there research & development on reducing CO2 output of vehicles?

In the meeting, the active parts of the California GHG emissions reduction policies (increasing vehicle efficiency, increasing the percentage of non-fossil fuel burning vehicles in use, reducing the carbon intensity of fossil fuels burned by vehicles) were all mentioned.

**Attachment B: SB375 Target Setting
Responses to Questions from March TC, LUNR and GRPA**

UC Davis supports two active research centers on low-carbon vehicles and fuels: Plug-In Hybrid and Electric Vehicle Research Center and the Sustainable Transportation Energy Pathways (STEPS) program.

Additionally, UC Davis supports two active research centers on sustainable transportation and land use planning: National Center for Sustainable Transportation, and the Urban Land Use and Transportation Center.

SACOG has collaborated or actively used research from all of these research programs in our planning work. For example, the Plug-In Hybrid and Electric Vehicle Research Center assisted in formulating SACOG's Plug-In Electric Vehicle Plan.

**Attachment C
SB 375 GHG Emissions Reduction Targets**

Framework for Higher GHG Reductions

Potential Scenarios

Implementing Actions	Going from...	Potential Scenarios				...to
State Offset Decline in Driving Cost	State partially offsetting decline in cost					State fully offsetting decline in driving cost
New Revenues Return to Source	Nearly all new revenues return					Half or less of new revenues return
Enable/Encourage Use of New Revenues for Achieving Multiple Objectives (funding flexibility plus "two-fer" projects = revenue multiplier)	High flexibility = 20% revenue multiplier					Low Flexibility = no multiplier
Prioritize Maintenance and SOGR (based on share of new revenue available to maintenance)	80% or more of new revenue dedicated to maintenance					50% or less of new revenue dedicated to maintenance
Incentivize Early Growth in Infill and TOD Areas (share of new revenue available for land use activation, transit, ATP investment)	20% or less of new revenue to LU, transit, ATP					50% or less of new revenue to LU, transit, ATP
Innovative Programs (e.g. EV infrastructure, shared mobility, etc.)	Maximum investment in innovative programs (\$200M+)					Minimum investment in innovative programs (\$100M or less)
Potential Additional GHG Reduction:		2%	2%	2%	2%	
GHG Reduction Target:		18%	18%	18%	18%	

- Key:
- High
 - Medium-High
 - Medium
 - Low-Medium
 - Low