Determining Fair Share Regional Targets for Reduction of Greenhouse Gas Emissions from Transportation and Land Use

California's Experience Under Senate Bill 375

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California passed landmark planning legislation, Senate Bill (S.B.) 375, in 2008, calling on the state's urban regions to reduce greenhouse gas emissions through more efficient transportation and land use. During 2010, the California Air Resources Board worked with the state's 18 metropolitan planning organizations to define and adopt performance targets for emissions reductions in each region according to S.B. 375. This target-setting process represents the first systematic effort by a U.S. state to assess the impacts of existing regional transportation and land use plans on greenhouse gas emissions and to adopt specific, realizable alternative scenarios in furtherance of state climate policy goals. This paper considers the technical and political challenges of defining the performance targets across regions and agencies with different conditions and capabilities. The paper depicts the S.B. 375 target-setting process as inherently political and collaborative. The paper also presents analysis from the target-setting documentation. Scenarios modeled to achieve emissions reductions in California's largest urban regions indicate that the greatest benefits are possible through combining pricing and land use strategies. The findings will inform policy makers in other states who also seek to address climate change systematically through coordinated transportation and land use strategies.

In September 2008, California passed Senate Bill (S.B.) 375, and became the first state in the nation to commit itself to achieving specific targeted reductions in greenhouse gas (GHG) emissions using coordinated land use and transportation policy. The law itself did not dictate the amount of those reductions; rather, it gave the California Air Resource Board (CARB) until September 2010 to work with the state's 18 metropolitan planning organizations (MPOs) to establish specific GHG reduction targets. This paper explores this lively and unprecedented process to translate state-level climate policy into a workable structure for regions and regional agencies with very different conditions, political outlooks, and technical capacities.

The paper first introduces S.B. 375 and compares its framework to the traditional regional planning process. It then examines the main stages of the target-setting process, beginning with a procedural stage in which an advisory committee to CARB defined a structured decision process, followed by a data-analytical stage in which MPOs estimated the potential for regional GHG reductions, and, finally, a negotiation stage in which final targets were determined. The paper concludes by considering the implications of the target-setting process for achievement of S.B. 375 objectives. With many U.S. states and regions now developing transportation-related climate policies (*1*, *2*), a review of California's target-setting process will inform policy makers elsewhere who also are seeking to reduce emissions from transportation and land use.

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S.B. 375

S.B. 375 was passed to help implement California's groundbreaking climate legislation, the Global Warming Solutions Act (Assembly Bill 32) of 2006. Assembly Bill 32 calls for reducing GHG emissions to 1990 levels by 2020. In addition, Governor Arnold Schwarzenegger signed Executive Order S-3-05 in 2005, calling for even larger reductions by 2050, to 80% below 1990 levels.

CARB is charged with implementing Assembly Bill 32, and many of CARB's strategies address transportation emissions because they are the largest single source of GHGs in California, at 37% (*3*). CARB proposed three strategies for passenger transportation: improving fuel efficiency, improving vehicle efficiency, and reducing vehicle travel (*4*). CARB considers the first two strategies especially important in the short run (accounting for 83% of targeted emissions reductions from passenger transportation by 2020), but considers the third strategy essential in the long run because an increase in vehicle miles traveled could eventually erode emissions benefits derived from technological improvements alone.

In 2008, California passed S.B. 375 to accomplish the third strategy outlined by CARB: to reduce GHG emissions by reducing vehicle travel and improving system efficiency. S.B. 375 was widely heralded as the first state law to legislatively link mandated GHG reductions to urban growth patterns. It calls on California's 18 MPOs to achieve GHG emissions reduction targets for 2020 and 2035, which are mandated by CARB, through more efficient transportation and land use "if there is a feasible way to do so." The law stipulated that CARB establish the regional targets with input from the MPOs by September 30, 2010. After that, CARB must update the targets every 8 years at a minimum.

Under S.B. 375, each MPO must develop and implement a Sustainable Communities Strategy (SCS) as part of its periodic development of a regional transportation plan (RTP). An SCS is a regional development scenario that is designed, in combination with proposed

transportation investments and policies in the RTP, to reduce GHGs from automobiles and light trucks by the targeted amount "if there is a feasible way to do so." The SCS must also be consistent with state-mandated plans for ensuring that localities provide adequate housing for all income levels to accommodate each region's projected population and workforce. If an MPO proves unable to devise an SCS capable of achieving the target using feasible means based on "the most recent planning assumptions" and a "realistic projection of available revenues," then the MPO must also complete an Alternative Planning Strategy to demonstrate how the target could be achieved using additional resources or measures, which need not be similarly constrained. (The text of S.B. 375 is at http://www.leginfo.ca.gov/pub/07-08/bill/sen/sb_375_bill_20080930_chaptered.pdf; the law is incorporated in statute at California Government Code §65080.)

MPOs are a logical institutional focus for integrating transportation and land use policy. They are regional transportation planning agencies designated responsible for developing federally mandated long-range (20+ years) investment plans, the RTPs. In California, MPOs generally also are constituted as councils of governments—forums of local governments. MPOs thus provide an interface between federal, state, and local governments, linking federal and state transportation and environmental policy to locally controlled land use and transport policy.

Although considered groundbreaking in its imposition of regional GHG reduction targets, S.B. 375 builds only incrementally upon existing planning processes. SCSs are a modification of long-range land use and development projections that MPOs have long produced to estimate impacts of proposed investments. Similarly, S.B. 375 builds on the process by which MPOs must demonstrate conformity of RTPs with federal and state air quality standards. MPOs already face mandated targets for reducing various air pollutants through their RTPs; S.B. 375 adds a new target for reducing carbon dioxide (CO_2).

However, S.B. 375 introduces new elements into these traditional processes. GHG emissions are an air quality problem of global, not regional, proportions. Defining an objective standard for a region's fair share contribution to GHG reduction is not straightforward. While the federal and state Clean Air Acts require mitigation of regionally measured air pollution levels, the global nature of GHGs presents an inherently different institutional challenge with less clearly defined benchmarks for determining a region's appropriate mitigation level.

S.B. 375's focus on land use also introduces a new element into the traditional process. Traditionally, MPO investments were geared to address transportation needs related to development patterns determined largely by local governments acting on their own. The SCS approach changes expectations by calling for collaborative consideration of alternative local land use scenarios as a basis for improving transportation efficiency and for adoption of RTPs with coordinated land use and transportation measures to achieve climate goals.

Thus, S.B. 375 requires close planning collaboration between MPOs and local governments to succeed. To accomplish this, S.B. 375 builds on planning innovations in California's largest metropolitan regions during the past decade, specifically, blueprint planning undertaken by MPOs to help achieve air quality conformity and make efficient investments (*5*). Blueprint planning uses coordinated outreach to local officials and the public to develop support for a preferred course of future development—one which has generally included more compact development than under status quo local plans and policies. Since 2005, the state government has provided $21 million for blueprint planning. Eight plans have been completed—four in the state's largest regions (the Los Angeles, Sacramento, San Diego, and San Francisco Bay areas), two in Shasta and San Luis Obispo Counties, one in the Monterey Bay region, and another by a consortium of eight MPOs in the Central Valley. By 2009, one-third (38%) of California cities located in regions with an adopted blueprint plan reported having aligned their general plan—the constitution for local development—with the regional blueprint (*6*).

Although it depends on local cooperation, S.B. 375 provides few new incentives to achieve this outcome. MPOs can choose to design their programs and policies in a manner that encourages supportive local government land uses policies. Along these lines, three of the state's four largest MPOs have instituted competitive grant programs, funded at approximately $10 million annually, for local smart growth projects. However, MPOs directly control only a portion of total transportation funds in their regions (15% of capital funds, on average, in California) (*7*). Furthermore, the MPOs' governing structures depend on consensus among member governments, which inhibits enactment of policies that create new winners and losers. The primary direct incentive in S.B. 375 for local participation in SCS development is streamlined environmental review under the California Environmental Quality Act (CEQA) for infill projects consistent with SCSs or Alternative Planning Strategies. Under CEQA, public agencies must evaluate and require mitigation, if feasible, of significant adverse environmental impacts of proposed development projects and plans. S.B. 375 reduces review requirements for certain infill projects.

The CEQA streamlining provision will ease infill development for communities motivated to build such projects in the first place. A few recent state policies may support infill, including modifications to CEQA guidelines in 2010 that now require review and mitigation of climate impacts of development projects. However, various other state policies work in the opposite direction, including recent state budget and program cuts to local transit and redevelopment and the lack of systematic, ongoing support for infill and associated infrastructure needs.

Thus, S.B. 375 does not radically alter existing planning processes, attempting instead to better coordinate and align them. It depends on voluntary participation; in fact, the law stipulates that local governments are not required to alter land use decisions to conform to an SCS. In spite of ambitious goals, S.B. 375 provides few new incentives or mandates for either plan development or implementation.

REGIONAL TARGETS ADVISORY COMMITTEE

S.B. 375 relies on collaboration within regions for constructing SCSs, and on collaboration among regions for allocating targets for GHG reduction. S.B. 375 set the foundation for a collaborative target-setting process by stipulating that CARB set the targets "in consultation" with affected MPOs, with input from affected stakeholders. To facilitate these goals, S.B. 375 mandated the establishment of a Regional Targets Advisory Committee (RTAC) to "recommend factors to be considered and methodologies to be used" for setting GHG targets for MPOs (California Government Code 65080 [b][2][A][i]).

Established in January 2009, RTAC was made up of stakeholders such as MPO directors, environmental advocates, homebuilders, and other interest group advocates. The committee issued its report to CARB the following September (*8*). Its 9-month deliberations provided a forum to define a process for setting the emission reduction targets. This section focuses on key issues addressed by RTAC, including devising a target metric, devising a process for data analysis, and determining the role of modeling in that process.

Since S.B. 375 did not specify the metric for measuring GHG reductions, this task was a primary concern of RTAC. One immediate question was what year to establish as the baseline for measuring emissions reductions; the committee selected 2005, because all MPOs could provide data for it. Another key question was whether the metric should be absolute or relative. The committee recommended a relative measure—a percent per capita reduction metric—to facilitate comparisons across regions regardless of differences in population growth rates and to account, to some degree, for steps already taken by regions to reduce GHGs.

Yet another key question was whether the metric should be applied uniformly statewide or tailored to each region. RTAC recommended that CARB establish a uniform statewide target but also provide room to adjust for regional differences. This approach balanced statewide accountability with local flexibility, but also raised questions about how to determine a region's reduction capability and fair share contribution. RTAC tried to explicate the standard for the expected level of effort by recommending that each regional target be the most ambitious and achievable possible.

Another measurement question was how to allocate responsibility for interregional trips. RTAC decided to allocate half of these trips to the origin region and half to the destination region. Many small and midsize MPOs, for whom interregional trips constitute a large percentage of travel, objected, as noted in more detail below.

RTAC's second major concern was to consider how data should be compiled and analyzed for target-setting purposes. The committee recommended a structured seven-step approach. Each MPO was to estimate GHG emissions for 2005, 2020, and 2035 on the basis of the policies in its adopted, fiscally constrained RTP. RTAC recommended standardizing assumptions for fuel prices and auto operating costs, fleet mix and fuel efficiency standards, population forecasts, funding shortfalls and expected revenues, and interaction of goods movement with passenger vehicles. RTAC called for these data so as to be able to compare the effect of modeled policy scenarios for reducing emissions.

MPOs were then asked to model potential new policy measures for reducing GHGs and to share results to facilitate comparison of alternative scenarios in terms of performance and feasibility. MPOs were asked to submit this work to CARB by May 2010. CARB would respond with preliminary standards in June and provide opportunity for discussion before CARB's board of directors adopted final targets in September 2010.

This process was structured as collaborative, with MPOs called on to inform CARB and one another about regional conditions and options for GHG reduction. Ultimately, accountability for defining appropriate and equitable targets under S.B. 375 is political; it is dependent on the transparency and reliability of MPO data and stakeholder scrutiny and peer-group pressure. This process presents a high bar, because MPO data and methods are complex and not easily interpreted by laypersons.

RTAC devoted much attention to considering the role of travel demand modeling in informing the target process. Reliance on MPO data presents a challenge in implementing systematic analysis across agencies with very different technical capacities. RTAC organized a survey of MPOs to assess modeling practices; this survey revealed that while all MPOs use travel demand models, their complexity and the staff resources devoted to them vary widely throughout the state. S.B. 375 calls for MPO modeling capable of assessing "residential development patterns, expanded transit service and accessibility, the walkability of communities, and the use of economic incentives and disincentives"—options that require either advanced modeling techniques or other postprocessing tools (http://www.leginfo.ca.gov/pub/07-08/bill/sen/sb_0351-0400/sb_375_bill_20080930_chaptered.pdf). Pursuant to S.B. 375, the California Transportation Commission established graduated modeling standards for MPOs in regions of different population size, projected population growth rates, and air quality attainment levels (*9*). The state also provided $90 million from bond funds for competitive grants to MPOs and localities for planning and modeling improvements.

RTAC debated how to apply a systematic analytical requirement to agencies with varying capacity to respond. The committee ultimately recommended, particularly for smaller agencies, augmenting traditional MPO modeling with use of a postprocessor tool or a best management practice spreadsheet, or both, to identify the magnitude of GHG reductions possible through various policies and practices. Larger agencies are moving from traditional four-step models to advanced activity-based models integrated with land use models and are expected to apply these new tools to the target-setting process.

The issues debated during the target-setting process point to technical and political challenges of allocating responsibilities among diverse MPOs. RTAC had to determine how to balance priorities such as the need for technically sound estimates of potential GHG reductions versus the need to adopt and implement beneficial policies, even if exact GHG effects are hard to determine. Some participants resisted a heavy focus on technical improvements, arguing that best management practice benchmarks may be adequate for MPOs with fewer resources to identify impacts of policies and programs.

EVALUATING GHG REDUCTION POTENTIAL

The RTAC report defined the procedure to be followed by the MPOs and CARB during the rest of the target-setting process. A data-analytical stage came next, in which MPOs first used standardized assumptions to model projected emissions based on policies in their adopted RTPs. Then they devised alternative policy scenarios and estimated their emissions reduction potential, after which they proposed preliminary targets to CARB.

By this point in the process, a tacit tripartite distinction of MPOs in the state had emerged, reflecting differences in geography, population size, and modeling capacity among the state's regions. The first group contains the four largest MPOs, representing the state's four main metropolitan areas of Los Angeles, Sacramento, San Diego, and San Francisco. These regions account for most (82%) of the state's total population, according to 2010 census data, and the modeling capabilities of their MPOs are the most advanced. Reflecting these factors, these four MPOs jointly devised methods for modeling policy alternatives for target-setting purposes.

The second group contains eight single-county MPOs located in California's San Joaquin (Central) Valley. This conjoined region accounts for another 11% of the state's population, or nearly 4 million residents. Traditionally an agricultural region, the valley has been absorbing spillover growth from coastal areas. With rapid population growth (more than 20% from 2000 to 2010), and multiple planning concerns related to economic development, education, air pollution, development of prime agricultural lands, introduction of high-speed rail, and other issues, the Central Valley has gained the attention of state policy makers. The state government has promoted greater valleywide planning collaboration; these efforts include providing $7 million for a coordinated blueprint process, which was completed in 2009.

The final group contains the remaining six small to midsize MPOs scattered around the state, typically in mountainous areas or along the coast. These MPOs have more limited planning capacity, and some have fewer smart growth opportunities. In contrast to the other MPOs, these six did not act in concert in the target-setting process. Their data submittals were often scant. As a result, CARB focused mainly on the other two groups.

This paper presents and analyzes some of the information that MPOs submitted to CARB for target setting. The data permit a comparison of certain performance indicators across all MPOs and, for a smaller subset, a first-stage assessment of the feasibility of policy measures for achieving GHG reductions under S.B. 375.

Projected Emissions Based on Currently Adopted RTPs

On the basis of their currently adopted RTPs, adjusted for effects of the economic downturn, the four largest MPOs all projected a decrease in per capita S.B. 375–related weekday CO_2 emissions from 2005 to 2020 and 2035 (Table 1). The Sacramento area projected the most substantial decrease in emissions, as well as the most rapid population growth rate among the four (Table 2). By contrast, the eight Central Valley MPOs collectively projected an increase in per capita emissions to 2035 (individually, four projected an increase and four a decrease). Given the astonishing growth rate projected for the Central Valley—more than two-thirds (67%) from 2005 to 2035, or an absolute gain of 2.5 million people (Table 2)—the projected uptick in CO_2 emissions caused concern. The valley's share of statewide emissions is expected to grow markedly from 2005 to 2035.

Most (11 of 18) MPOs projected a decline in per capita CO_2 emissions from 2005 to 2020, followed by an uptick between 2020 and 2035. CARB asked the MPOs to explain the pattern; the MPOs pointed to different assumed vehicle mixes between the two periods, differences in congested speeds (i.e., greater constraint on roadway capacity in the later period), frontloaded benefits of planned capacity improvements during the earlier period, varying rates of population growth, changes in the jobs–housing balance, and exhaustion of infill capacity in the later period (see http://www.arb.ca.gov/cc/sb375/mpo/info.htm). The effects of state vehicle and fuel efficiency standards do not explain these patterns, because the modeled emissions data exclude effects of these policies.

TABLE 2 Baseline Population Projections for California MPOs (*10*)

MPO	2005 Share of Metropolitan Population (%)	Population Growth from 2005 (%)	
		2020	2035
Los Angeles area (SCAG)	50	18	33
San Francisco Bay area (MTC–ABAG)	20	13	28
San Diego area (SANDAG)	9	20	31
Sacramento area (SACOG)	6	23	50
Central Valley (eight MPOs)	11	30	67
Other MPOs	5	14	29
All MPOs	100	19	36

NOTE: Data are from most recent RTPs, adjusted for the economic downturn.

Large MPOs' Scenario Analysis

After the MPOs presented these emissions projections, they developed alternative policy scenarios. The four largest MPOs took the lead, and their analysis provides insight into challenges and opportunities faced by large urban regions in coordinating land use and transportation.

The four largest MPOs devised a joint strategy for modeling policy alternatives. First, they identified policy categories for modeled scenarios:

1. Transportation demand management and transportation system management measures,
2. Transportation system improvements,
3. Land use measures, and
4. Pricing measures.

Each MPO then identified specific policy measures within each category; these were policies they considered technically feasible,

TABLE 1 Baseline CO_2 Emissions for California MPOs (*10*)

MPO	S.B. 375–Related per Capita Weekday CO_2 Emissions (lb/person)			Share of These Emissions Statewide (%)		
	2005	2020	2035	2005	2020	2035
Los Angeles area (SCAG)	21.2	20.1	20.4	51	50	50
San Francisco Bay area (MTC–ABAG)	20.8	20.1	20.5	20	19	19
San Diego area (SANDAG)	26.0	23.7	24.6	11	10	10
Sacramento area (SACOG)	22.4	21.5	19.6	6	7	6
Central Valley (eight MPOs)	16.3	16.0	16.8	8	9	11
Other MPOs	15.6	16.5	16.5	4	4	4
All MPOs	20.8	19.8	20.1	100	100	100

NOTE: Baseline values based on policies in most recent RTPs, with adjustments made for the economic downturn. Data exclude reductions from vehicle and fuel efficiency regulations. SCAG = Southern California Association of Governments, MTC = Metropolitan Transportation Commission, ABAG = Association of Bay Area Governments, SANDAG = San Diego Association of Governments, SACOG = Sacramento Area Council of Governments.

TABLE 3 Scenario Modeling by San Francisco Bay Area MPO (Percent Change in CO_2 Emissions from 2005) (*10–12*)

		Alternative Scenarios							
Horizon Year	Baseline	Heavy Maintenance	Project + Land Use	Heavy Maintenance + Land Use	Project + Pricing	Heavy Maintenance + Pricing	Project + Land Use + Pricing	Heavy Maintenance + Land Use + Pricing	Proposed Target
2020	–3	–3	–7	–5	–7	–5	–10	–7	–7
2035	–1	–1	–10	–8	–10	–8	–12	–9	–15

NOTE: Baseline based on policies in adopted RTPs, adjusted for economic trends. Heavy maintenance scenario includes transit expansion. Land use scenario transfers 200,000 people from suburbs to San Francisco. Pricing scenario increases auto costs fivefold on some routes (including congestion pricing for certain highway trips only).

although not always politically feasible (*11*). Then they modeled performance outcomes for policy alternatives, including combined strategies across the categories.

The policy scenarios for improving system capacity or efficiency generally were projected to offer fewer GHG benefits than pricing or land use policy scenarios (Tables 3 through 6). Hybrid scenarios combining aggressive land use and pricing strategies appeared to hold out the most promise, and the outlook improved even further when other policies for system improvements and demand management measures were added in. However, some MPOs also emphasized that the most ambitious scenarios should not be considered realistic or feasible (*11*). The more ambitious scenarios were not financially constrained to reasonably match expected revenue forecasts (like RTPs must be). This means that the ambitious scenarios may depend on funding not forthcoming without new legislative action or local initiative. Ambitious modeled pricing scenarios were sometimes projected to be cost effective but politically difficult.

Various differences among the regions and their scenarios underlie the modeled results. To consider differences, the MPOs compiled data comparing baseline conditions on transportation expenditures, land use patterns, pricing policies and assumptions, and transportation expansion measures (*11*).

The regions differ substantially in their transportation system capacity and land use patterns (Table 7). For example, the Los Angeles and Sacramento regions have nearly twice the mixed flow lane miles per capita as the other two regions, while the San Francisco Bay Area and Los Angeles area have more than twice the number of high-occupancy vehicle (HOV) and high-occupancy toll (HOT) lane miles. The Bay Area stands above the rest in transit seat miles, with more than double the per capita number of the other regions.

The Bay Area also has the lowest share of residential units comprising low-density single-family homes (43%). Bay Area planners noted that smart growth strategies adopted in the region help account for its low per capita CO_2 levels, but also may provide less room to capture low-hanging fruit for reducing GHGs easily in the face of relatively slow population growth.

The data also indicate the direction of the MPOs' investment strategies. The northern California MPOs (MTC and SACOG) have allocated much higher shares of funds toward maintenance and operations than the southern California MPOs. Given the relatively ambitious targets proposed by these two MPOs, this finding suggests that their GHG reductions do not primarily depend on providing new system capacity.

The MPOs' investments are geared to produce substantial increases in HOV–HOT lane miles per capita. All regions but the Bay Area also project significant increases in transit seat miles per capita. Despite the projected decline in transit seat miles per capita, the Bay Area's data also include a substantial projected increase in daily transit trips compared with the other regions. This pattern suggest that the Bay Area is reaping benefits from past transit-related policies. The Bay Area scenarios indicate that system capacity is expected to affect travel behavior less than other factors, including the relative price and time of travel mode options and the influence of land use patterns on travel choices.

In the Bay Area scenarios, system capacity is expected to affect travel behavior less than other factors, including the relative price and time of travel mode options and the influence of land use patterns on travel choices. The Bay Area MPO modeled a particularly aggressive pricing scenario designed to increase auto operating costs for some trips nearly fivefold. The MPO noted, "This is necessary to move the GHG emissions 'needle' because the Bay Area is a relatively high-income region that is less sensitive to price changes" (*11*, p. 2).

Subsequent to submitting these data, the four MPOs notified CARB about their proposed targets (Tables 3 through 6). With

TABLE 4 Scenario Modeling by Los Angeles Area MPO (Percent Change in CO_2 Emissions from 2005) (*10–12*)

		Alternative Scenarios				
Horizon Year	Baseline	Blueprint Land Use	Blueprint Land Use, TDM–TSM, and System Improvements	Blueprint, More TDM–TSM and System Improvements, and Pricing	Aggressive Land Use, More TDM–TSM and System Improvements, and Pricing	Proposed Target
2020	–5	–7	–8	–9	–10	–6
2035	–4	–5	–6	–10	–12	–8

NOTE: Baseline based on policies in adopted RTPs, adjusted for economic trends. Scenario 1: blueprint land use, gradual improvements in infrastructure and pricing. Scenario 2: blueprint land use, incrementally more aggressive infrastructure and pricing. Scenario 3: blueprint land use, most aggressive infrastructure and pricing, with a 2-cent VMT fee in 2035. Scenario 4: More aggressive land use, most aggressive infrastructure and pricing policies. TDM = transportation demand management, TSM = transportation system management.

TABLE 5 Scenario Modeling by San Diego Area MPO (Percent Change in CO_2 Emissions from 2005) (*10–13*)

		Alternatives, No Land Use				Alternatives Plus Aggressive Land Use				
Horizon Year	Baseline	System Efficiency and TDM	System Development	Pricing	Hybrid	System Efficiency and TDM	System Development	Pricing	Hybrid	Proposed Target
2020	–9	–12	–10	–15	na	–13	–11	–16	na	–7
2035	–5	–9	–7	–11	–19	–10	–9	–12	–20	–13

NOTE: Baseline based on policies in adopted RTPs, adjusted for economic trends; na = not available. System efficiency and TDM scenario: reduces bottlenecks, increases telecommuting, rideshare options, Safe Routes to School. System development scenario: regional transit system improvements, bike–pedestrian system development. Pricing scenario: HOT lanes, vehicle miles traveled fee, parking pricing.

regard to modeled scenarios, the Bay Area and Sacramento area selected the most ambitious targets for 2035. The Bay Area target exceeded even its most ambitious modeled scenario (this outcome is described further below).

If the MPO data are difficult to parse, this pattern depicts the target-setting process accurately. By providing baseline information and modeled policy alternatives, the MPOs showed their cards; the MPOs' proposed targets could then, presumably, be compared with the modeled alternatives to help assess level of effort; however, some factors complicated this goal. First, the MPOs revised their numbers along the way, so that data analysis was a moving target. Second, no fully standardized or objective method was devised for comparing actions across MPOs. The modeled scenarios are not exactly comparable across MPOs and may themselves encompass different levels of effort.

Contributions of Small and Midsize MPOs

The concerns and involvement of small and midsize MPOs in the target-setting process contrasted somewhat with those of the largest MPOs. The Central Valley MPOs took steps to develop a joint analytical approach, but only in relation to one issue of common concern: allocating responsibility for interregional travel. The analytical methods used by the small and midsize MPOs varied, and only some submitted data to CARB for target-setting purposes.

Noting that only four of eight Central Valley MPOs submitted modeled scenarios, CARB concluded that, "Overall, the data from the Valley MPOs provides a limited technical foundation for target-setting" (*16,* p. 5). In these submittals, projected per capita GHG emissions ranged from a 7% reduction to a 12% increase.

Three of the six remaining MPOs submitted data to CARB. CARB described these MPOs as the most limited in resources, staffing, and technical expertise needed for engaging in target-setting discussions. Some of the smaller MPOs do not even maintain modelers on staff and must outsource these tasks.

The small and midsize MPOs submitted a joint memo to CARB about how to develop an equitable and accurate approach for measuring and allocating interregional travel (*17*). Their memo emphasized that trips cross MPO boundaries primarily because of jobs–housing imbalances between jobs-poor, housing-affordable regions and jobs-rich regions with more costly housing. Concerned about the disproportionate role of interregional trips in vehicle miles traveled as compared with the major metropolitan areas, these MPOs questioned how equitable RTAC's 50–50 rule would be for apportioning vehicle miles traveled for trips that cross MPO boundaries. As it stands, these MPOs have little information on such trips. The Central Valley MPOs hired consultants to develop an alternative methodology for counting them.

The small and midsize MPOs also raised concerns about other types of trips they feel unable to control, such as trips to tourist destinations and to and from tribal lands and military bases (which are not included in MPO jurisdictions). Some MPOs, notably Kern County's, sought to exempt other travel generated by internal land uses intentionally sited in inaccessible locations, including prisons and wind farms.

Some small and midsize MPOs also expressed concern about their ability to implement smart growth solutions because, for example, low projected growth rates may imply that land use changes are unable to significantly affect future vehicle miles traveled. However, MPOs in some Central Valley urban areas with high recent growth rates feel more confident about such policies in selected areas. For example, the cities of Stockton and Fresno both have substantial unused capacity in their urban centers that they are hoping to develop.

NEGOTIATION OF FINAL TARGETS

The final stage of the process was iterative negotiation between CARB and the MPOs over adoption of regional reduction targets. CARB issued draft target ranges for MPOs in June 2010 that were based on the data submitted by MPOs (*16*). Then MPO boards of

TABLE 6 Scenario Modeling by Sacramento Area MPO (Percent Change in CO_2 Emissions from 2005) (*10–12, 14*)

		Alternative Scenarios						
Horizon Year	Baseline	Land Use Enhancements	Transit Enhancements	TSM–TDM Enhancements	Pricing	Land Use, Transit, TSM–TDM	Land Use, Transit, TSM–TDM, Pricing	Proposed Target
2020	–4	–6	–4	–5	–5	–7	–8	–7
2035	–13	–14	–13	–13	–15	–14	–17	–16

NOTE: Baseline based on policies in adopted RTPs, adjusted for economic trends. Land use scenario: blueprint. Transit enhancements scenario: increase transit service 18%. TSM–TDM scenario: employer-based incentives for non–single-occupancy vehicle commuting, intelligent transportation system–incident management resources, subsidized car-sharing pilot programs. Pricing scenario: congestion pricing, vehicle miles traveled fee, employment parking, transit subsidies.

TABLE 7 Comparison of Indicators for California's Four Largest MPOs (*11*, *15*)

Indicator	MTC/ABAG	SCAG	SANDAG	SACOG
Projected per Capita System Capacity and Trips				
Mixed flow lane miles				
2005	1.97	3.59	2.06	3.41
2035 RTP	1.60	3.21	1.91	3.09
2035 most ambitious scenario	1.60	3.22	1.96	3.09
HOV–HOT lane miles				
2005	0.05	0.05	0.01	0.03
2035 RTP	0.09	0.07	0.08	0.07
2035 most ambitious scenario	0.09	0.08	0.11	0.07
Transit seat miles (weekday)				
2005	5.36	2.08	1.67	1.23
2035 RTP	5.15	2.75	2.61	2.31
2035 most ambitious scenario	5.15	3.97	2.61	2.72
Transit trips (daily)				
2005	0.16	0.09	0.08	0.05
2035 RTP	0.22	0.09	0.08	0.09
2035 most ambitious scenario	0.28	0.10	0.19	0.10
Auto trips (daily)				
2005	2.48	2.80	5.32	3.51
2035 RTP	2.56	2.97	4.81	3.66
2035 most ambitious scenario	2.29	2.79	4.56	3.63
Current RTP Expenditures				
Road maintenance and operations	30%	10%	20%	34%
Transit maintenance and operations	51%	31%	24%	28%
Road expansion (HOV, HOT, ML)	2%	20%	16%	3%
Road expansion (general purpose)	1%	5%	23%	13%
Transit expansion	14%	18%	14%	12%
Other	2%	16%	3%	10%
Housing Units by Type as Share of All Units				
Attached				
2005	37%	41%	35%	30%
2035 RTP	39%	42%	44%	31%
2035 most ambitious scenario	42%	46%	46%	33%
Small lot single-family (<5,500 ft^2)				
2005	20%	10%	19%	3%
2035 RTP	21%	11%	15%	11%
2035 most ambitious scenario	23%	12%	15%	11%
Low density single-family				
2005	43%	49%	46%	67%
2035 RTP	40%	47%	41%	58%
2035 most ambitious scenario	35%	42%	39%	56%
Driving Cost per Mile (2009 $)				
2005	$0.21	$0.21	$0.18	$0.20
2035 RTP	$0.30	$0.30	$0.25	$0.29
2035 most ambitious scenario	$1.15	$0.32	$0.41	$0.43

NOTE: Costs are based on a 22-mile round trip, except SACOG estimates, which are based on a 20-mile round trip. ML = managed lane.

directors deliberated and submitted final proposed targets to CARB (Table 8). In response, CARB staff issued final proposed targets in August (*12*), in anticipation of the final vote by CARB's board of directors on September 23, 2010.

Up to the very end, some MPOs revised scenarios and proposed targets in response to political and technical concerns. The outcome of this highly charged process reinforces the conclusion that S.B. 375 target setting is an ongoing political balancing act with many elements still a work in progress.

In issuing proposed targets, CARB reinforced the three-tier grouping of MPOs introduced earlier in the data-analytical process, treating each group distinctly. This approach signaled CARB's intention of diverging from the RTAC recommendation to impose a single statewide per capita target to be applied to all MPOs. CARB's interim target ranges reflected scenario data received from MPOs, with one exception. Noting that, "Staff is guided by the principle that the targets in the San Joaquin Valley should reflect a reduction, not an increase, in per capita greenhouse gas emissions," CARB recommended only targeted reductions for every Valley MPO, in spite of some data submittals to the contrary (*16*, p. 5). CARB recommended giving the six small MPOs a pass in the first round of SCS development by proposing that they rely on current projections,

TABLE 8 Iteration of MPO GHG Reduction Targets Under S.B. 375 (*12*, *16*, *18*)

Agency	Submitted	Date	Target Year	Percent Reduction in per Capita S.B. 375–Related CO_2 Emissions from 2005				
				Los Angeles Area (SCAG)	SF Bay Area (MTC/ABAG)	San Diego Area (SANDAG)	Sacramento Area (SACOG)	Central Valley (8 MPOs)
MPOs	Most ambitious scenarios	May 2010	2020	–10	–10	na	–8	–1 to –6
			2035	–12	–12	–20	–17	–7 to +12
CARB staff	Interim targets	June 30, 2010	2020	–5 to –10	–5 to –10	–5 to –10	–5 to –10	–1 to –7
			2035	–3 to –12	–3 to –12	–5 to –19	–13 to –17	–1 to –7
MPOs	Proposed targets	Various: July to September[a]	2020	–6[b]	–7	–7	–7	–2
			2035	–8[b]	–15	–13	–16	–5
CARB staff, board of directors	Proposed targets, adopted targets	August 9 and September 23, 2010	2020	–8[c]	–7	–7	–7	–5[d]
			2035	–13[c]	–15	–13	–16	–10[d]

NOTE: na = not available.
[a]SCAG Board of Directors (BoD), September 2, 2010; MTC BoD, July 28, 2010; SANDAG BoD, July 23, 2010; SACOG BoD, August 19, 2010; letter from San Joaquin Valley Regional Planning Agencies Directors Committee and San Joaquin Valley Air District (*18*).
[b]SCAG submitted original board-approved targets in May, before CARB released its preliminary targets in June. The preliminary proposal was for an 8% per capita reduction for 2020 and a 5% to 6% reduction for 2035. SCAG's final board-approved target proposal included a provision to negotiate with CARB regarding CARB's higher proposed targets, contingent on specified funding availability.
[c]Subject to negotiations with SCAG.
[d]Placeholder target to be revisited in 2012.

adjusted for the impacts of the recession, as the basis for individual targets.

After the interim targets were released, MPO boards deliberated targets to propose to CARB. For two large MPOs—those in the San Diego and Sacramento areas—the process was straightforward. That is, CARB designated interim targets based on the MPOs' submitted scenarios, and then the MPO boards adopted proposed targets and the CARB board ratified them in September (Table 8). However, for two MPOs—SCAG in the Los Angeles area and MTC in the San Francisco Bay Area—the process was more unpredictable.

The SCAG board of directors recommended a lower reduction target than the other large MPOs (a 5% to 6% reduction by 2035, later increased to 8%). However, CARB rejected SCAG's recommendation, proposing a substantially more ambitious target, a 13% reduction, which it called "more in line with the other major MPOs" (*12*, p. 24). In this fashion, CARB acted as mediator, ensuring that every MPO in a given class must meet the same standard.

CARB's proposal provoked intense controversy at SCAG's board of directors meeting in September 2010. Following a substantial lobbying effort from the region's homebuilders, the SCAG board, in a close vote, endorsed less ambitious targets than CARB had proposed, while agreeing to negotiate the higher targets if certain conditions were met. The conditions related to funding needs for implementing S.B. 375, including, in particular, restoration of the region's transportation and redevelopment budgets and provision of more funds for local planning. Needless to say, the stipulated financial resources are not under CARB's direct control.

SCAG's response to the target-setting process may reflect politics in the vast Los Angeles region, but it also highlights an essential, unresolved issue under S.B. 375. Many local voices complain that S.B. 375 constitutes an unfunded mandate because the state has provided little direct support for implementation. SCAG's protest put this issue squarely on the table. All MPOs have an out under S.B. 375, in that they can adopt an Alternative Planning Strategy if their reduction target proves infeasible through an SCS. In that sense, the process provides wiggle room for such controversies. However, an Alternative Planning Strategy is a hypothetical document without the teeth of an SCS in the form of required consistency with funded transportation plans and local land use plans. Thus, striking the right balance between ambitious and achievable targets carries consequences for the state's climate goals.

Events in the San Francisco Bay region took an opposite turn. The MPO board voted to propose a more ambitious set of targets to CARB than its initial scenarios suggested would be feasible. Facing pressure from local stakeholders, including well-organized transit advocacy groups, to improve the sensitivity of models in evaluating smart growth policies, the MPO revised its scenarios up to the end. Ultimately, it concluded that the proposed higher targets would be ambitious, but achievable.

The process for the other MPOs also reflected political differences among regions. Like the Los Angeles MPO, at the very last minute the San Joaquin Valley MPOs rejected CARB's proposed targets and recommended less ambitious ones (*18*). Resistance in the valley, as in the Los Angeles region, suggests that implementation of S.B. 375 will not be easy in many places. However, the outcome proved to be more encouraging in relation to the six small MPOs. In proposing final targets, CARB had essentially recommended giving them a pass; however, the boards of four of these MPOs—those in the Monterey Bay, Santa Barbara, Tahoe, and Shasta regions—voted to propose more ambitious targets than CARB had recommended.

Thus, local forces affected the target-setting process in unpredictable ways, depending on political dynamics. It may be alarming to some to conclude that S.B. 375 target setting is highly political and, with supposedly objective data analysis, subject to change. However, that dynamic was built into the S.B. 375 process; it is an ongoing learning curve, both politically and technically. Feasible GHG reductions under S.B. 375 depend on local and regional political choices, and so political support and opposition are part of the fabric of the process.

Ultimately, CARB's board of directors voted to officially adopt its staff's proposed targets, unless MPOs had proposed more ambitious ones in the interim. SCAG and CARB pursued further negoti-

ations and determined by February 2011 that SCAG would aim to achieve CARB's adopted targets, while CARB would provide almost $500,000 for smart growth demonstration projects in the region (*18*).

While some observers of the process—Los Angeles area and Central Valley participants in particular—view CARB's adopted targets as unreasonably high, others see them as disappointingly low. The targets, expressed as per capita reductions, produce a net increase in total projected emissions statewide because of projected population growth (*10*). CARB estimates that S.B. 375-related CO_2 emissions from passenger vehicles and trucks will increase by 10% from 2005 to 2020 and by 18% from 2005 to 2035, based solely on the targeted reductions adopted under S.B. 375.

CARB is not relying solely on S.B. 375 to achieve emissions reductions from passenger vehicles, however, as noted earlier. CARB expects that other policy measures, in particular mandated improvements to vehicle and fuel efficiency, will achieve the bulk of emissions reductions targeted from the passenger transportation sector needed to meet Assembly Bill 32 goals by 2020 (*12*). The question remains, however, whether this approach will be sufficient in the long run (beyond 2020) if vehicle miles traveled—and associated emissions—continue to rise.

Despite this concern, it would be inaccurate to conclude that CARB acquiesced to each MPO's desire in assigning targets. CARB instead steered a course as a mediator among regions with different needs, capacities, and challenges.

CONCLUSION

With the S.B. 375 targets adopted, attention has turned to implementing them. Time will tell whether the target-setting process marks a turning point for California in which planning practice shifts toward regional coordination of smart growth strategies as a normal part of doing business.

The S.B. 375 target-setting process has been fruitful, prompting MPOs to collaborate in devising standardized methods for comparing conditions and strategies. It has prompted the state government to support improvements in MPO modeling capacity and the regions to clarify and weigh potential benefits of policy options, including how to combine them. It has caused the MPOs and state agencies to communicate more extensively.

At the same time, the target-setting process has highlighted challenges of applying systematic planning requirements to agencies and regions with varying capacity to respond. The target-setting process struggled to develop standardized and objective methods for measuring level of effort and to strike the right political balance between ambitious and achievable goals. The tension between these poles will persist over coming years as the iterative target-setting process unfolds alongside the iterative SCS process. Target-setting under S.B. 375 is inherently political and will remain so.

In conclusion, the S.B. 375 target-setting process revealed challenges and opportunities of creating a more systematic growth management framework. The challenges are enormous, whether for modeling or implementing the policies that S.B. 375 requires. In particular, without more substantial support from the state or federal government, or both, for implementation, regional and local strategies alone may not suffice. The MPOs—SCAG in particular—used the target-setting process to reinforce this message. Thus, the target-setting process has helped clarify what is required to achieve the goals of the new law and how to proceed collaboratively in doing so.

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