Filed 10/29/14

COURT OF APPEAL, FOURTH APPELLATE DISTRICT

DIVISION ONE

STATE OF CALIFORNIA

SIERRA CLUB, Plaintiff and Respondent, v. COUNTY OF SAN DIEGO, Defendant and Respondent.	D064243 (Super. Ct. No. 37-2012-00101054-CU-TT-CTL)

APPEAL from a judgment of the Superior Court of San Diego County, Timothy Taylor, Judge. Affirmed.

Thomas E. Montgomery, County Counsel, and C. Ellen Pilsecker, Chief Deputy County Counsel, for Defendant and Appellant.

Law Office of Malinda R. Dickenson, Malinda R. Dickenson; Chatten-Brown & Carstens, Douglas P. Carstens and Josh Chatten-Brown for Plaintiff and Respondent.

This action arises out of the County of San Diego's (County's) 2011 general plan update, wherein the County issued a program environmental impact report (PEIR), and adopted various related mitigation measures. In this action the Sierra Club sought, in a

petition for writ of mandate, to enforce one mitigation measure adopted by the County: the Climate Change Mitigation Measure CC-1.2 (Mitigation Measure CC-1.2). With Mitigation Measure CC-1.2, the County committed to preparing a climate change action plan with "more detailed greenhouse gas [GHG] emissions reduction [GHG] targets and deadlines" and "comprehensive and enforceable GHG emissions reductions measures that will achieve" specified quantities of GHG reductions by the year 2020.

However, the Sierra Club alleged that instead of preparing a climate change action plan that included comprehensive and enforceable GHG emission reduction measures that would achieve GHG reductions by 2020, the County prepared a climate action plan (CAP) as a plan-level document that expressly "does not ensure reductions." The County also developed associated guidelines for determining significance (Thresholds). According to the Sierra Club, review of the CAP and Thresholds project under the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.) was performed after the fact, using an addendum to the general plan update PEIR, without public review, without addressing the concept of tiering, without addressing the County's failure to comply with the express language of Mitigation Measure CC-1.2, and without a meaningful analysis of the environmental impacts of the CAP and Thresholds project.

The court granted the petition, concluding that the County's CAP did not comply with the requirements of Mitigation Measure CC-1.2 and thus violated CEQA. The court found that the CAP did not contain enforceable GHG reduction measures that would achieve the specified emissions reductions.

The County appeals, asserting (1) the statute of limitations bars the claim that the mitigation measures are not enforceable; (2) the CAP met the requirements of Mitigation Measure CC-1.2; and (3) that the trial court erred in finding that a supplemental EIR was required. We affirm.

FACTUAL AND PROCEDURAL BACKGROUND

A. *Executive Order S-3-05*

In 2005 then-California Governor Arnold Schwarzenegger issued Executive Order No. S-3-05,[1] which acknowledged California's vulnerability to the effects of climate change and established targets for reducing GHG emissions in California over time. Specifically, Executive Order No. S-3-05 set statewide targets for three points in time: 2010, 2020, and 2050. The target for 2010 (2010 Target) was to reduce emissions to the levels they were at in the year 2000. The target for 2020 is to reduce emissions to the levels they were at in 1990 (2020 Target). The target for 2050 is that emissions be 80 percent below the levels they were at in 1990 (2050 Target).

Executive Order No. S-3-05 was based on then-available climate science and represented California's share of worldwide GHG reductions necessary to stabilize climate. As the Attorney General explained, "Executive Order [No.] S-3-05 is an official policy of the State of California, established by gubernatorial order in 2005, and designed to meet the environmental objective that is relevant under CEQA (climate stabilization)."

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1 On March 24, 2014, the County requested that we take judicial notice of Executive Order No. S-3-05. We grant that request.

B. *The Legislature Addresses the Need for GHG Emission Reductions*

In response to Executive Order No. S-3-05, the California Legislature enacted the California Global Warming Solutions Action of 2006, Assembly Bill No. 32. (Health & Saf. Code, § 38500 et seq.) Consistent with Executive Order No. S-3-05, Assembly Bill No. 32 required the California State Air Resources Board (CARB) to determine 1990 levels of GHG emissions and then to establish "a statewide greenhouse gas emissions limit that is equivalent to that level, to be achieved by 2020." (Health & Saf. Code, § 38550.) Assembly Bill No. 32 also stated that GHG reductions must continue after 2020, requiring that the statewide greenhouse gas emissions limit established by CARB "remain in effect unless otherwise amended or repealed" (Health & Saf. Code, § 38551, subd. (a)) and further that "[i]t is the intent of the Legislature that the statewide greenhouse gas emissions limit continue in existence and be used to maintain and continue reductions in emissions of greenhouse gases beyond 2020." (Health & Saf. Code, § 38551, subd. (b).) Assembly Bill No. 32 also required that CARB "prepare and approve a scoping plan [for] achieving the maximum technologically feasible and cost-effective reductions in greenhouse gas emissions by 2020." (Health & Saf. Code, § 38561, subd. (a).)

In December 2008 CARB approved the scoping plan. The scoping plan "identifies California's cities and counties as 'essential partners' within the overall statewide effort, and recommends that local governments set a GHG reduction target of 15% below 2005-2008 levels by 2020." Thus, it was acknowledged that CARB would accept this target as a substitute for the 1990 level referenced in Assembly Bill No. 32 and Executive Order No. S-3-05.

C. *The County's General Plan Update PEIR*

The County acknowledged in the general plan update PEIR that it needed to "reduce GHG emissions to 1990 levels by 2020" and that changes were required both in the community and in the County's operations, buildings, vehicle fleet, and with respect to its employee commutes, water, and waste.

A GHG emissions inventory was prepared as a special appendix (Appendix K). Appendix K set forth projected emissions reductions and assumptions then-available, and promised that the "Greenhouse Gas Reduction/Climate Action Plan, which will be prepared as an implementation strategy, will further detail the County's GHG emissions and how those reductions will occur."

There was extensive public comment on the general plan update, including from the California Attorney General:

> "[W]e encourage the County to (l) commit in the General Plan to adopt by a date certain a CAP with defined attributes (targets, enforceable measures to meet those targets, monitoring and reporting, and mechanisms to revise the CAP as necessary) that will be integrated into the General Plan; (2) incorporate into the General Plan interim policies to ensure that any projects considered before completion of the CAP will not undermine the objectives of the CAP; and (3) for all GHG impacts the County has designated as significant, adopt feasible mitigation measures that can be identified today and that do not require further analysis." (Fn. omitted.)

D. *Mitigation Measures*

The County thereafter promised to take a series of additional actions. These promises took the form of a group of climate change-related mitigation measures: Mitigation Measures CC-1.1 through CC-l.19 (the Mitigation Measures). The Mitigation

Measures included requirements to update, review, and implement County programs; implement a strategic energy plan; revise the zoning ordinance; coordinate with other entities; educate the public; reduce vehicle miles traveled and encourage alternative modes of transportation; and, based thereon, to revise the County guidelines for determining significance.

The County made the following finding with regard to Mitigation Measure CC-1.2:

> "[Mitigation Measure] CC-l.2 requires the preparation of a County Climate Change Action Plan within six months from the adoption date of the General Plan Update. The Climate Change Action Plan will include a baseline inventory of greenhouse gas emissions from all sources and *more detailed greenhouse gas emissions reduction targets and deadlines*. The County Climate Change Action Plan *will achieve comprehensive and enforceable GHG emissions reduction* of 17% (totaling 23,572 MTC02E) from County operations from 2006 by 2020 and 9% reduction (totaling 479,717 MTC02E) in community emissions from 2006 by 2020. Implementation of this Climate Change Action Plan will contribute to meeting the [Assembly Bill No.] 32 goals, in addition to the State regulatory requirements noted above." (Italics added.)

Mitigation Measure CC-l.2 formed the basis for Mitigation Measure CC-l.8, which required "revision of the County Guidelines for Determining Significance based on the Climate Change Action Plan."

Mitigation Measure CC-1.8, in turn, formed the basis for Mitigation Measure CC-1.7, which required that the County guidelines for determining significance anticipated by Mitigation Measure CC-1.8 incorporate CARB's recommendation for a threshold for determining significance of impacts on climate change. Should the recommendation "not be released in a timely manner," the County would "prepare its own threshold."

As required by CEQA (Pub. Res. Code, § 21081.6), the County incorporated a mitigation monitoring and reporting program (MMRP) into the general plan update PEIR.

Included in the MMRP was a promise to achieve GHG reductions by 2020 through comprehensive and enforceable GHG emission reduction measures. In addition to committing to the 2020 Target, the County also committed to compliance with the Executive Order No. S-3-05 trajectory. The County found "significant impacts associated with substantial climate-related risks" such as those "on water supply, wildfires, energy needs, and impacts to public health" would occur as a result of its general plan update. However, as a result of its commitment to adopt a CAP and Thresholds, and other mitigation measures, the County was able to make a finding that the climate change impacts anticipated by the general plan update PEIR would be avoided or substantially lessened.

E. *The CAP and Thresholds Project*

According to the County, the CAP was prepared for the following purposes:

1. To mitigate the impacts of climate change by achieving meaningful greenhouse gas (GHG) reductions within the County, consistent with Assembly Bill No. 32, the governor's Executive Order S-3-05, and CEQA guidelines (Cal. Code Regs., tit. 14, § 15000 et seq. [CEQA Guidelines]).

2. To allow lead agencies to adopt a plan or program that addresses the cumulative impacts of a project.

3. To provide a mechanism that subsequent projects may use as a means to address GHG impacts under CEQA.

4. To comply with the 2011 adopted County General Plan Environmental Impact Report (EIR) Mitigation Measure CC-1.2, Preparation of a Climate Action Plan.

Although compliance with Mitigation Measure CC-1.2 was one purpose of the CAP, two of the four purposes relate to preparation of the CAP as a plan-level document so that environmental review could be avoided on future projects that were determined to be below specified "thresholds." (CEQA Guidelines, § 15183.5.) However, the CAP did not mitigate climate change impacts consistent with Assembly Bill No. 32 and Executive Order No. S-3-05, did not satisfy the plan-level requirements of CEQA Guideline 15183.5, and it did not meet the requirements of Mitigation Measure CC-1.2

Instead, the CAP expressly acknowledged the possibility that "communitywide inventories will indicate that the community is not achieving its reduction targets" and admitted that the CAP "does not ensure reductions." Further, the CAP did not include a meaningful analysis of "measures that extend beyond the year 2020." Rather, the County documented that instead of continuing to reduce GHG emissions after 2020, GHG emissions allowed as a result of the general plan update were anticipated to *increase* after 2020.

The CAP and Thresholds were presented to the planning commission and the board of supervisors as "the project." The Thresholds, like the CAP, purport to expressly facilitate post-2020 development that would have significant adverse climate change impacts, without any consideration of post-2020 climate science as required by Assembly Bill No. 32 and Executive Order No. S-3-05.

F. *The Comment Period*

The Sierra Club submitted extensive comments to the County. In particular, the Sierra Club commented on the need to take action consistent with climate science and achieve the Assembly Bill No. 32 and Executive Order No. S-3-05 GHG emissions reductions targets. The Sierra Club also provided specific examples of feasible GHG Reduction measures that would actually reduce GHG emissions and could be adopted without delay. The Sierra Club submitted additional comments and testified at the planning commission hearing, attempted to appeal the planning commission's decision, and testified at the board of supervisors hearing.

G. *Proceedings Before the Planning Commission*

The final agenda for the April 27, 2012 regular meeting of the County Planning Commission Regulation Meeting made no reference to the associated Thresholds, which were also presented to the planning commission. Despite acknowledging the significant climate change effects as well as the requirements of Assembly Bill No. 32 and Executive Order No. S-3-05, staff took the position that no additional environmental review was required. The planning commission voted to adopt staff's recommendation with one addition relating to installation of electric vehicle recharging stations.

H. *Proceedings Before the Board of Supervisors*

The Project was placed on the agenda for the June 20, 2012 board of supervisors meeting as "County of San Diego Climate Action Plan (District: All)." The staff report and supporting documents presented to the board of supervisors included (1) the CAP, (2) the Thresholds, (3) the environmental documentation , and (4) public documentation.

The environmental documentation included a memorandum referencing "CEQA Guidelines Section 15164 Addendum to the County of San Diego General Plan Update [PEIR] (SCH 2002111067)" (Addendum) which was dated the same day as the hearing, June 20, 2012. The addendum defined the project as "the CAP and Significance Guidelines." The addendum included attachments entitled "Environmental Review Update Checklist Form" (environmental checklist) and "Environmental Review Update Checklist for County of San Diego Climate Action Plan." The environmental checklist included a determination by staff that the "new information included in the CAP and Significance Guidelines represent minor technical additions to the previously certified EIR."

At the board of supervisors hearing, staff acknowledged that "[s]tate and local measures in the climate plan are insufficient to achieve our target in 2035" and explained that the CAP measures were not required, but rather that staff "believe[d]" that "education and incentives" might produce a result.

The County also documented that GHG emissions were anticipated to *increase*, not decrease, after 2020. Staff explained that the County would not comply with Executive Order No. S-3-05 because "the State's plan right now goes out to 2020." Staff further explained to the Board of Supervisors that the Thresholds would result in a less than significant finding for greenhouse gas emissions for future development projects.

Ultimately, the board of supervisors took the following actions:

1. Adopted environmental findings including in attachment C.

2. Adopted the plan titled "County of San Diego Climate Action Plan (Attachment A)."

The only findings made by the County were the following:

1. The environmental impact report (EIR) dated August 3, 2011 on file with the Department of Planning and Land Use (DPLU) as Environmental Review Number SCH 2002111067 was completed in compliance CEQA and the State and County CEQA Guidelines and that the Board of Supervisors has reviewed and considered the information contained therein and the Addendum thereto dated June 20, 2012 on file with DPLU and attached thereto; and

2. There were no changes in the project or in the circumstances under which the project was undertaken that involved significant new environmental impacts which were not considered in the previously certified EIR dated August 3, 2011, that there was no substantial increase in the severity of previously identified significant effects, and that no information of substantial importance had become available since the EIR was certified as explained in the environmental checklist dated June 20, 2012 and attached thereto.

I. *The Sierra Club Files Suit*

The Sierra Club filed a petition for writ of mandate, challenging the June 20, 2012 approval of the CAP and Thresholds project, including the associated environmental review. The Sierra Club alleged that the CAP did not meet the requirements of Mitigation Measure CC-1.2, the Thresholds were not adopted pursuant to the requirements of CEQA Guideline section 15064.7, and that an EIR should have been prepared.

J. *The Trial Court's Decision*

The trial court determined that the CAP did not comply with the requirements for a CAP as set forth in Mitigation Measure CC-l.2, and thus violated CEQA. The trial court found that the CAP neither contained enforceable GHG reduction measures that

will achieve the specified emissions reductions, nor detailed deadlines for GHG emission reductions.

The trial court further found that the approval process violated CEQA, noting: "There is no showing that the County properly considered whether the CAP is within the scope of the PEIR" and that "environmental review is necessary to ascertain whether the CAP met the necessary GHG emission reductions when considering the CAP is merely hortatory and contains no enforcement mechanism for reducing GHG emissions."

Further, the trial court determined that whether or not the Thresholds were adopted was a subsidiary issue that did not need to be reached in light of the trial court's decision on the CAP (which formed the basis for the Thresholds) and the process by which it was approved.

DISCUSSION

I. *STANDARD OF REVIEW*

The Sierra Club and the County agree as to the applicable standards of review.

In reviewing the County's actions under CEQA, we must determine whether there was "a prejudicial abuse of discretion." (Pub. Resources Code, § 21168.5.) "'Abuse of discretion is established if the agency has not proceeded in a manner required by law, or if the determination or decision is not supported by substantial evidence.'" (*Mira Mar Mobile Community v. City of Oceanside* (2004) 119 Cal.App.4th 477, 486.)

"[A] reviewing court must adjust its scrutiny to the nature of the alleged defect." (*Vineyard Area Citizens for Responsible Growth, Inc.* v. *City of Rancho Cordova* (2007) 40 Cal.4th 412, 435 (*Vineyard*).) Challenges to an agency's failure to proceed in the

manner required by CEQA are subject to a significantly different standard of review than challenges that an agency's decision is not supported by substantial evidence. (*Ibid.*) Where the challenge is that the agency did not proceed in the manner required by law, a court must "determine de novo whether the agency has employed the correct procedures, 'scrupulously enforc[ing] all legislatively mandated CEQA requirements.'" (*Ibid.*)

Furthermore, when a prior environmental impact report has been prepared and certified for a program or plan, the question for a court reviewing an agency's decision not to use a tiered EIR for a later project "is one of law, i.e., 'the sufficiency of the evidence to support a fair argument.'" (*Sierra Club* v. *County of Sonoma* (1992) 6 Cal.App.4th 1307, 1318.) "[I]f there is substantial evidence in the record that the later project may arguably have a significant adverse effect on the environment which was not examined in the prior program EIR, doubts must be resolved in favor of environmental review and the agency must prepare a new tiered EIR, notwithstanding the existence of contrary evidence." (*Id.* at p. 1319, fn. omitted.) The court "must set aside the decision if the administrative record contains substantial evidence that a proposed project might have a significant environmental impact; in such a case, the agency has not proceeded as required by law." (*Id.* at 1317.)

II. *OVERVIEW OF CEQA*

"The fundamental goals of environmental review under CEQA are information, participation, mitigation, and accountability." (*Lincoln Place Tenants Assn.* v. *City of Los Angeles* (2007) 155 Cal.App.4th 425, 443-444 (*Lincoln Place II*).) As the California Supreme Court has explained: "If CEQA is scrupulously followed, the public will know

the basis on which its responsible officials either approve or reject environmentally significant action, and the public, being duly informed, can respond accordingly to action with which it disagrees. [Citations.] The EIR process protects not only the environment but also informed self-government." (*Laurel Heights Improvement Assn. v. Regents of the University of California* (1988) 47 Cal.3d 376, 392 (*Laurel Heights*).)

CEQA requires a public agency to prepare an environmental impact report (EIR) before approving a project that may have significant environmental effects. (Pub. Resources Code, § 21100.) The EIR is "'the heart of CEQA' . . . an 'environmental "alarm bell" whose purpose it is to alert the public and its responsible officials to environmental changes before they have reached ecological points of no return.'" (*Laurel Heights, supra,* 47 Cal.3d at p. 392.)

CEQA authorizes the preparation of various kinds of environmental impact reports depending upon the situation, such as the subsequent EIR, a supplemental EIR, and a tiered EIR. (Pub. Resources Code, §§ 21l66, 21068.5, 21093, 21094.) Whereas the subsequent EIR and supplemental EIR are used to analyze modifications to a particular project, a tiered EIR is used to analyze the impacts of a later project that is consistent with an EIR prepared for a general plan, policy, or program. (CEQA Guidelines, § 15385; compare Pub. Resources Code, § 21166 & CEQA Guidelines §§ 15162, 15163 & 15164 [referencing "the project"] with Pub. Resources Code, § 21093 [stating that later projects may use tiering].)

CEQA requires that "environmental impact reports shall be tiered whenever feasible." (Pub. Resources Code, § 21093, subd. (b).) Tiering means "the coverage of

general matters in broader EIRs (such as on general plans or policy statements) with subsequent narrower EIRs . . . incorporating by reference the general discussions and concentrating solely on the issues specific to the EIR subsequently prepared." (CEQA Guidelines, § 15385; Pub. Resources Code, § 21068.5.) In the context of program and plan-level EIR's, the use of tiered EIR's is mandatory for a later project that meets the requirements of Public Resources Code section 21094, subdivision (b). (Pub. Resources Code, § 21094, subd. (a).)

Another requirement of CEQA is that public agencies "should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects." (Pub. Resources Code, § 21002.) "A 'mitigation measure' is a suggestion or change that would reduce or minimize significant adverse impacts on the environment caused by the project as proposed." (*Lincoln Place II*, *supra*, 155 Cal.App.4th at p. 445.)

If the agency finds that mitigation measures have been incorporated into the project to mitigate or avoid a project's significant effects, a "public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation." (Pub. Resources Code, § 21081.6, subd. (a)(1).)

If a mitigation measure later becomes "impracticable or unworkable," the "governing body must state a legitimate reason for deleting an earlier adopted mitigation

measure, and must support that statement of reason with substantial evidence." (*Lincoln Place Tenants Association v. City of Los Angeles* (2005) 130 Cal.App.4th 1491, 1509 (*Lincoln Place I*).)

III. *ANALYSIS*

A. *Statute of Limitations Defense*

The County asserts that the Sierra Club's claim that the mitigation measures it adopted are not enforceable is barred by the statute of limitations because the Sierra Club should have challenged the County's approval of the general plan update EIR, not the CAP. We reject this contention.

The petition was filed 30 days after the County's June 20, 2012 approval of the CAP. In addition, the lawsuit was filed 29 days after the County filed a notice of determination (NOD). The Sierra Club's July 20, 2012 petition was timely filed 29 days after. Thus, the County triggered the 30-day statute of limitations set forth in Public Resources Code section 21167, subdivisions (b) and (e).

The Sierra Club is not challenging the validity of the general plan update PEIR or the enforceability of the mitigation measures provided in that document. Rather, the Sierra Club is challenging the project before the Board of Supervisors on June 20, 2012, and seeks to enforce a key mitigation measure set forth in the EIR and MMRP - Mitigation Measure CC-1.2.

Further, the Court of Appeal in *Lincoln Place II, supra,* 155 Cal.App.4th 425 rejected a similar argument to that made by the County. In that case, a tenants' association sought to compel the City of Los Angeles to enforce mitigation measures

contained in a vesting tentative tract map issued by the city. The city argued that the 180-day statute of limitations contained in Public Resources Code section 21167 for challenges to approval of projects without determining whether they have a significant effect on the environment barred the plaintiffs' action. In rejecting that action, the Court of Appeal held "[t]he statute's plain language demonstrates it has no application to this case seeking to *enforce mitigating conditions.*" (*Lincoln Place II*, at p. 453, fn. 23, italics added.)

Moreover, the cases cited by the County in support of its position are inapposite. The County cites *River Valley Preservation Project* v. *Metropolitan Transit Development Bd.* (1995) 37 Cal.App.4th 154 and *Friends of Davis* v. *City of Davis* (2000) 83 Cal.App.4th 1004 for the proposition that because the time period within which to challenge the general plan update EIR has expired, the EIR is conclusively presumed to have complied with CEQA. Here, however, the Sierra Club is not challenging the general plan update EIR, but the CAP and Thresholds project, and is seeking to enforce Mitigation Measure CC-1.2.

The County's reliance upon *Environmental Council of Sacramento* v. *City of Sacramento* (2006) 142 Cal.App.4th 1018 and *Mount Shasta Bioregional Ecology Center v. County of Siskiyou* (2012) 210 Cal.App.4th 184 is also unavailing. The petitioners in those actions were challenging the adequacy of the mitigation measures themselves. Here, the Sierra Club does not attack the adequacy of the mitigation measure in the general plan update PEIR. To the contrary, the Sierra Club's lawsuit is in *support* of the County's past findings and promises to achieve GHG Reductions.

B. *Failure To Proceed in a Manner Required by Law*

As detailed, *ante*, implementation of Mitigation Measure CC-l.2 was only one of the purported purposes of the CAP and Thresholds project. The CAP and Thresholds project also purports to be a plan-level document for use in review of later projects.

As we shall explain, *post*, with respect to the CAP as mitigation for a plan-level document, the County failed to proceed in the manner required by CEQA by proceeding with the CAP and Thresholds project in spite of the express language of Mitigation Measure CC-l.2 that the CAP "include . . . more detailed greenhouse gas emissions reduction targets and deadlines" and that the CAP "will achieve comprehensive and enforceable GHG emissions reduction" by 2020. With respect to the CAP as a plan-level document itself, the County failed to proceed in the manner required by law by failing to incorporate mitigation measures into the CAP as required by Public Resources Code section 21081.6.

1. *The County failed to adopt a CAP that complied with the requirements of Mitigation Measure CC-1.2*

"Mitigating conditions are not mere expressions of hope." (*Lincoln Place I, supra,* 130 Cal.App.4th at p. 1508.) Once incorporated, mitigation measures cannot be defeated by ignoring them or by "attempting to render them meaningless by moving ahead with the project in spite of them." (*Lincoln Place II, supra,* 155 Cal.App.4th at p. 450.) This is true even where subsequent approvals are ministerial. (*Katzeff v.California Department of Forestry & Fire Protection* (2010) 181 Cal.App.4th 601, 614 [public agency "may not authorize destruction or cancellation of the mitigation—whether or not

the approval is ministerial—without reviewing the continuing need for the mitigation, stating a reason for its actions, and supporting it with substantial evidence"].) If a mitigation measure later becomes "impractical or unworkable," the "governing body must state a legitimate reason for deleting an earlier adopted mitigation measure, and must support that statement of reason with substantial evidence." (*Lincoln Place I*, *supra*, 130 Cal.App.4th at p. 1509.)

a. *The CAP does not include enforceable GHG emissions required by Mitigation Measure CC-1.2*

When it adopted the general plan PEIR, the County promised to achieve specified GHG reductions by 2020. However, when it approved the CAP and Thresholds project, the County stated that the CAP does not ensure the required GHG emissions reductions. Rather, the County described the strategies as recommendations.

Until this litigation was initiated, the County described the CAP as the most critical component of the County's climate change mitigation efforts. The CAP was intended to "'provide[] the specific details associated with [the General Plan] strategies and measures for greenhouse gas (GHG) emissions reduction *that were not available* during the program-level analysis of the General Plan.'" (Italics added.)

The County agreed to the mitigating requirement of a CAP containing "comprehensive and enforceable GHG emissions reduction measures that will achieve" the specified GHG Reductions by 2020. This is because, as the County acknowledges, Executive Order No. S-3-05 requires consistent emissions reductions each year from

2010 through 2020 and then a greater quantity of emissions reductions each year from 2020 through 2050.

The County asserts that "[f]ive of the reduction measures incorporated into the CAP are also embodied in state or federal law" and that "CEQA permits reliance on existing regulatory standards as mitigation when it is reasonable to believe compliance will occur."

However, the County acknowledges that these measures will not, alone, achieve the specified GHG emissions reductions by 2020. In fact, the record shows that without local measures the requirements of Assembly Bill No. 32 will not be met.

Further, the record demonstrates that many of the mitigation measures set forth in the MMRP are not likely to achieve GHG emissions reductions by 2020 as promised by Mitigation Measure CC-1.2 because they are not currently funded. The record show that the County has not funded essential programs like replacing its own vehicle fleet, implementing water conservation programs, preparing town center plans, and reducing water demand. The County cannot rely on unfunded programs to support the required GHG emissions reductions by 2020, as Mitigation Measure CC-1.2 requires.

Transportation is a major concern, which the County concedes is the largest source of community GHG emissions. The Sierra Club presented evidence below that driving reductions needed to achieve Assembly Bill No. 32 and Executive Order No. S-3-05 targets are not met. The County did not dispute this evidence. The record shows that transit-related measures are either unfunded, that the County is not making meaningful

implementation efforts, and in some instances that the County is acting contrary to mitigation measures incorporated into the general plan update PEIR.

For example, two of the four transportation measures, T1 (increase transit sse) and T2 (increase walking & biking), rely on at least one unfunded program. In addition, measures T1 and T2, as well as T3 (increase ridesharing), also rely on "coordination" with SANDAG and/or other entities.

In response to Sierra Club's comments relating to the effectiveness of these measures as a result of current SANDAG (San Diego Association of Governments) priorities, the County did not request funds based on the fact that it does not control how SANDAG spends its money. As the County stated, "The County does not control regional plans or allocation of regional transportation funding." This position was rejected by the Supreme Court in *City of Marina v. Board of Trustees of the California State University* (2006) 39 Ca1.4th 341, 367 [holding respondent could not disclaim responsibility for making payments without first asking for funds].

The CAP's transportation section also does not include an analysis of the County's own operations, and the record appears to include contradictions even over programs over which the County has exclusive control, such as replacement of its own vehicle fleet with alternatively fueled vehicles. Although the County suggests it will implement "1 % greater efficiency per year", the County has not formally bound itself do so. Indeed, there is no mention of potential funding sources with respect to reductions related to County operations.

b. *The CAP contains no detailed deadlines for reducing GHG emissions*

As the trial court found, the CAP contained no detailed deadlines. The County argues on appeal that the 2020 goal and the timeframes set forth in the MMRP are sufficient to meet the requirement of "more detailed . . . deadlines." However, Mitigation Measure CC-1.2 expressly required that the CAP provide more detailed deadlines. If the County did not intend for the CAP to do anything further with respect to deadlines than already set forth, the County would not have used the word "more." Indeed, in addition to not providing the promised deadlines, the CAP acknowledges that it will not be effective unless it is updated.

c. *The evidence cited by the County*

The County asserts that CAP measures will be effective because "[p]articipation rates were discussed and modified," and the "feasibility of attaining reduction targets was assessed." However, the County does not cite any evidence in the record to support its belief that people will participate in the various programs to the extent necessary to achieve the reductions asserted, or even assert that feasible measures will actually be implemented.

Rather, the County cites to entire appendices and chapters of the CAP. However, information contained in appendices are "'not a substitute for "a good faith reasoned analysis."'" (*Vineyard*, *supra*, 40 Cal.4th at p. 442.) "The audience to whom an EIR must communicate is not the reviewing court but the public and the government officials deciding on the project." (*Id.* at p. 443.)

The County also asserts that the CAP "demonstrates a [GHG emissions] reduction of 19%." However, the CAP expressly states that it does not ensure reductions. Instead, the County's evidence relates to quantification of the respective measures. Quantifying GHG reduction measures is not synonymous with implementing them. Whether a measure is effective requires more than quantification, but an assessment of the likelihood of implementation. There is no evidence in the record that the above-referenced mitigation measures will make any contribution to achieving GHG emissions reductions by 2020.

2. *The County's failure to make findings regarding the environmental impact of the CAP and Thresholds project*

Instead of analyzing and making findings regarding the environmental effects of the CAP and Thresholds project, the County made an erroneous assumption that the CAP and Thresholds project was the same project as the general plan update. (*Sierra Club, supra,* 6 Cal.App.4th at p. 1320 ["section 21166 and its companion section of the [CEQA] Guidelines appear to control only when the question is whether more than one EIR must be prepared for what is essentially the same project"].) As a result, the County failed to render a "written determination of environmental impact" before approving the CAP and Thresholds project. (*No Oil, Inc.* v. *City of Los Angeles* (1974) 13 Cal.3d 68, 81; Pub. Resources Code, § 21151.) This constitutes a failure to proceed in the manner required by law. (*No Oil, supra,* 13 Cal.3d at p. 81.)

By inaccurately assuming the CAP and Thresholds project was the same project as the general plan update, the County failed to analyze the environmental impacts of the

CAP and Thresholds project itself. (*Natural Resources Defense Council, Inc.* v. *City of Los Angeles* (2002) 103 Cal.App.4th 268, 283 [holding CEQA violated where "no evidence that the [County] formally addressed whether or not the [] project fell within the concept of a 'tiered' EIR"].) As a result, the County never made the required findings that the effects of the CAP and Thresholds project were examined, mitigated, or avoided. (Pub. Resources Code, § 21094, subd. (a).)

The facts of the present case, as the trial court found, are similar to *Center for Sierra Nevada Conservation* v. *County of El Dorado* (2012) 202 Cal.App.4th 1156 (*CSNC*). In *CSNC*, the county prepared a general plan and PEIR. (*Id.* at p. 1162.) In the PEIR, one of the mitigation measures was the preparation of a management plan, including a fee program, to mitigate the general plan's impacts on oak woodland habitat. (*Id.* at p. 1163.) The initial study concluded that the project was merely an implementation of the county's general plan. (*Id.* at p. 1176.)

The Court of Appeal rejected this argument, holding that a tiered EIR was required to examine the management plan since the PEIR did not include sufficient details, rejecting the argument that the management plan was merely an implementation of the general plan. (*CSNC, supra,* 202 Cal.App.4th at pp. 1176, 1184-1185.)

The County attempts to distinguish *CSNC* by asserting the general plan update PEIR analyzed the same environmental issue addressed in the CAP. However, the record reveals that the necessary details were not available to the County at the time the general plan update PEIR was certified. Indeed, no component of the project, the CAP or the Thresholds, had even been created at the time of the general plan update.

As the Court of Appeal in *CSNC* explained:

> "That the preceding 2004 program EIR contemplated adverse environmental impacts resulting from development under the 2004 General Plan does not remove the need for a tiered EIR for the oak woodland management plan. . . . Here, the specific project—the oak woodland management plan (including Option B fee program)—required a tiered EIR to examine its specific mitigation measures and fee rate." (*CSNC, supra,* 202 Cal.App.4th at p. 1184.)

The general plan update anticipated implementation of mitigation measures—CC-l.2, CC-1.7, and CC-l.8—as mitigating conditions to mitigate the adverse climate change environmental impacts of the general plan update. Those measures were analyzed in the PEIR. However, the PEIR never considered the use of the CAP and the Thresholds as a plan-level program. Thus, the environmental impacts of its use needed to be considered in an EIR. (*NRDC, supra,* 103 Cal.App.4th at p. 281 [project did not arise until after PEIR and thus was not contemplated therein].)

The County contends that the Board of Supervisors made an "implied finding" that the CAP complied with Mitigation Measure CC-1.2 and that finding is "entitled to great deference." However, "such an 'implicit finding' does not satisfy CEQA's requirement of express findings." (*Sacramento Old City Assn.* v. *City Council* (1991) 229 Cal.App.3d 1011, 1037.) "'[T]he board of supervisors must make findings . . . to permit a reviewing court to bridge the analytic gap between the evidence and the ultimate decision.'" (*People* v. *County of Kern* (1976) 62 Cal.App.3d 761, 777; see *Citizens for Quality Growth* v. *City of Mt. Shasta* (1988) 198 Cal.App.3d 433, 442 ["passing references to the mitigation measures are insufficient to constitute a finding, as nothing in City's resolutions binds it to follow these measures"].)

Moreover, even if "implied findings" were permissible, there can be no "interpretation" of Mitigation Measure CC-1.2 contrary to its express terms. (*Southern Cal. Edison Co.* v *Public Utilities Com.* (2000) 85 Cal.App.4th 1086, 1105 ["an agency's interpretation of a regulation or statute does not control if an alternative reading is compelled by the plain language of the provision"]; see *Santa Clarita Organization for Planning the Environment v. City of Santa Clarita* (2011) 197 Cal.App.4th 1042, 1062 [agency's "view of the meaning and scope of its own ordinance" does not enjoy deference when it is "'clearly erroneous or unauthorized"'].)

3. *The County failed to proceed in the manner required by law by failing to incorporate mitigation measures directly into the CAP*

As discussed, *ante*, one of the major differences between the climate change action plan anticipated by Mitigation Measure CC-1.2 in the general plan update PEIR and the CAP and Thresholds project as prepared, is that the general plan update PEIR did not analyze the CAP as a plan-level document that itself would facilitate further development. As a plan-level document, the CAP is required by CEQA to incorporate mitigation measures directly into the CAP:

> "A public agency *shall provide the measures to mitigate or avoid significant effects on the environment are fully enforceable through permit conditions, agreements, or other measures*. Conditions of project approval may be set forth in referenced documents which address required mitigation measures or, *in the case of the adoption of a plan*, policy, regulation, or other public project, *by incorporating the mitigation measures into the plan*, policy, regulation, or project design." (Pub. Resources Code, § 21081.6, subd. (b), italics added.)

As authority for the assertion that it did not need to incorporate enforceable mitigation measures into the CAP directly, the County cites *Twain Harte Homeowners Assn. v. County of Tuolumne* (1982) 138 Cal.App.3d 664, 689-690. However, *Twain Harte* was decided before enactment of Public Resources Code section 21081.6, subdivision (b), which, as discussed, *ante*, requires "in the case of the adoption of a plan" that mitigation measures be fully enforceable "by incorporating the mitigation measures into the plan . . . ."

"The purpose of CEQA is not to generate paper, but to compel government at all levels to make decisions with environmental consequences in mind." (*Bozung v. Local Agency Formation Com.* (1975) 13 Cal.3d 263, 283.) By failing to consider environmental impacts of the CAP and Thresholds project, the County effectively abdicated its responsibility to meaningfully consider public comments and incorporate mitigating conditions. In addition to the example discussed, *ante*, related to transportation impacts, the Sierra Club also provided examples of mitigation implemented by other regions to mitigate the effects of climate change in the energy sector. The County neither implemented nor responded to these examples which have already been implemented elsewhere.

4. *The trial court's finding that the County must prepare an EIR*

As set forth in *Lincoln Place I*, a supplemental EIR must be prepared when a public agency determines a previously adopted mitigation measure is infeasible. (*Lincoln Place I*, *supra*, 130 Cal.App.4th at pp. 1508-1509.) In addition, CEQA guidelines,

section 15183.5, subdivision (b)(1)(F) provides that a plan for the reduction of GHG emissions should "[b]e adopted in a public process following environmental review."

The County's failure to comply with Mitigation Measure CC-1.2 and Assembly Bill No. 32 and Executive Order No. S-3-05 supports the conclusion that the CAP and Thresholds project will have significant, adverse environmental impacts that have not been previously considered, mitigated, or avoided.

a. *Substantial evidence supports the court's finding preparation of an EIR was required*

The County asserts that the substantial evidence standard of review applies to the question of whether a supplemental EIR was required, under which deference is given to an agency's determination. (*Latinos Unidos de Napa v. City of Napa* (2013) 221 Cal.App.4th 192, 200-202.) The Sierra Club, on the other hand asserts that the "fair argument" test applies, under which "deference to the agency's determination is not appropriate and its decision not to require an EIR can be upheld only when there is no credible evidence to the contrary." (*Sierra Club, supra,* 6 Cal.App.4th at p. 1318.) We conclude that under either standard, the trial court did not err in finding a supplemental EIR was required.

The fair argument versus substantial evidence test is of no moment because, here, there is no substantial evidence in the record supporting the County's erroneous conclusion that "activities associated with the CAP and Significance Guidelines are within the scope of the General Plan Program EIR."

The County does not dispute that "to avoid serious climate change effects, atmospheric GHG concentrations need to be stabilized as quickly as possible." In fact, the County warns that expected local adverse effects of climate change include "higher temperatures, [¶] a greater number of extremely hot days, [¶] changes in the pattern and amount of precipitation, [¶] decreased water supplies accompanied by increased demand, [¶] increased wildfire risk, [¶] changes in ecosystems, and [¶] decline or loss of plant and animal species." However, the CAP and Thresholds project was approved without the appropriate environmental analysis to avoid or mitigate these consequences. As the trial court found, "environmental review is necessary to ascertain whether the CAP met the necessary GHG emission reductions when considering the CAP is merely hortatory and contains no enforcement mechanism for reducing GHG emissions."

Moreover, as the County acknowledges, the details of the CAP "were not available during program-level analysis of the General Plan." For example, the general plan update PEIR did not provide a "baseline GHG emissions inventory; detailed GHG-reduction targets and deadlines; comprehensive and enforceable GHG emissions-reduction measures; and implementation, monitoring, and reporting of progress toward the targets defined in the CAP." In 2011 the County found that implementation of mitigation measures, including CC-l.2, CC-1.7, and CC-l.8, were part of the mitigation imposed to mitigate the climate change impacts of the general plan update. It cannot be said that failing to comply with Mitigation Measure CC-1.2, Assembly Bill No. 32, and Executive Order No. S-3-05 does not change the environmental conclusions in the general plan update PEIR.

Further, the general plan update PEIR did not contemplate that preparation of the CAP and Thresholds project was at the "plan-level." As a plan-level document, the CAP and Thresholds project was required to undergo environmental review as a matter of law. (CEQA Guidelines, § 15183.5, subd. (b)(l)(F).) The general plan update PEIR also did not contemplate that as a result of the CAP, "[m]ore projects will fall below the bright line threshold, and will not have to conduct detailed analysis", much less study the environmental impact of such. County staff, the planning commission, and the board of supervisors were all aware that approving the CAP and Thresholds project would allow more projects to avoid a climate change analysis, including projects with post-2020 climate change impacts without post-2020 environmental review.

Furthermore, in 2011, the County found that climate change impacts were mitigated not only by implementation of mitigation measures, but also by "compliance with applicable regulations" including Assembly Bill No. 32 and Executive Order No. S-3-05.

By contrast, the CAP and Thresholds project now acknowledges it does not comply with Executive Order No. S-3-05. Instead of maintaining a constant rate of GHG emissions reductions after 2020, as required by Executive Order No. S-3-05, the County admits that GHG emissions will instead increase after 2020. Thus, the County's own documents demonstrate that the CAP and Thresholds project will not meet the requirements of Assembly Bill No. 32 and Executive Order No. S-3-05 and thus will have significant impacts that had not previously been addressed in the general plan update PEIR.

The explanation given to the board of supervisors for failing to address the post-2020 impacts facilitated by the CAP and Thresholds project was that "the State's plan doesn't go out that far, and it would be speculative for us to do that."

However, contrary to the County's argument that it would be "speculative" to consider the environmental impacts of the CAP, the County has acknowledged that other agencies have, in fact, been able to do so. It is an abuse of discretion to reject alternatives or mitigation measures that would reduce adverse impacts without supporting substantial evidence. (CEQA Guidelines, §§ 15043, 15093, subd. (b).) The County's assumption that considering post-2020 impacts is "speculative" is not supported by substantial evidence. (Pub. Resources Code, § 21082.2, subd. (c) ["Argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly inaccurate or erroneous . . . is not substantial evidence. Substantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts."].)

The Sierra Club provided feasible mitigation measures. The County rejected these mitigation measures without substantial evidence for doing so.

In sum, the CAP does not fulfill the County's commitment under CEQA and Mitigation Measure CC-1.2, to provide detailed deadlines and enforceable measures to ensure GHGF emissions will be reduced.

DISPOSITION

The judgment is affirmed. The Sierra Club shall recover its costs on appeal.

NARES, J.

I CONCUR:

McCONNELL, P. J.

I CONCUR IN THE RESULT:

HUFFMAN, J.

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March 19, 2012

VIA HAND DELIVERED and EMAILED TO: (*Anna.Lowe@sdcounty.ca.gov)*

Anna Lowe, Department of Planning and Land Use
County of San Diego
5201 Ruffin Road, Suite B
San Diego, CA 92123-1666

Re: Comments Regarding the Draft Climate Action Plan and Related Documents

Dear Ms. Lowe:

The San Diego & Imperial Counties Chapter of the Sierra Club (the "Sierra Club" or the "Chapter") respectfully requests that the Draft County of San Diego Climate Action Plan ("Draft CAP"), the Draft Guidelines for Determining Significance: Climate Change ("Draft Significance Thresholds"), and the Draft Report Format and Content Requirements: Greenhouse Gas Analyses and Reporting ("Draft GHG Report Requirements") be returned to staff for revisions and subsequent recirculation before presentation to the Board of Supervisors for consideration at a public hearing.

In failing to require greenhouse gas ("GHG") reductions past 2020 projections, the County Draft CAP, Draft Significance Thresholds, and Draft GHG Report Requirements, if adopted, will themselves contribute to the ultimate human catastrophe: climate destabilization.

Additionally, the County has failed to keep its own promises to the people – promises made just last year in the 2011 County of San Diego General Plan Update Environmental Impact Report ("General Plan EIR").

As set forth below, the Draft CAP does not meet its stated goals of (1) complying with General Plan EIR Mitigation Measure CC-1.2 or Assembly Bill 32 ("AB 32"); or (2) mitigating the impacts of climate change consistent with the reduction requirements contained in Executive Order S-3-05 ("the Executive Order").[1]

To make matters worse, and instead of contributing to the solution, the Draft Significance Thresholds and the Draft Report Requirements serve to further exacerbate the devastating impacts of climate change by purporting to limit California Environmental Quality Act ("CEQA") review – and therefore consideration of mitigation measures and alternatives - based on thresholds that do nothing to avoid dangerous anthropogenic interference ("DAI") within the climate system.

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[1] In addition, the Draft CAP does not mitigate the impacts of climate change consistent with the California Environmental Quality Act ("CEQA") Guidelines, allow lead agencies to adopt a plan or program that addresses the cumulative impacts of a project, or provide a mechanism that subsequent projects may use as a means of addressing GHG impacts under CEQA.

For this reason, adoption of the Draft Significance Thresholds and the Draft Report Requirements themselves would have adverse environmental impacts that have not been analyzed by the County as required by CEQA.

I. THE DRAFT CAP DOES NOT COMPLY WITH THE REQUIREMENTS OF MITIGATION MEAURE CC-1.2 OR AB 32.

The General Plan EIR identified significant impacts related to GHG emissions and was adopted based on findings that the mitigation measures identified and described therein would be implemented. Specifically, in certifying the General Plan EIR, the Board of Supervisors made findings that Mitigation Measure CC-1.2 would mitigate potentially significant climate change impacts to a level below significance:

> **CC-1.2 requires the preparation of a County Climate Change Action Plan within six months from the adoption date of the General Plan Update. The Climate Change Action Plan will include a baseline inventory of greenhouse gas emissions from all sources and more detailed greenhouse gas emissions reduction targets and deadlines. The County Climate Change Action Plan will achieve comprehensive and enforceable GHG emissions reduction of 17% (totaling 23,572 MTCO2E) from County operations from 2006 by 2020 and 9% reduction (totaling 479,717 MTCO2E) in community emissions from 2006 by 2020. Implementation of the Climate Action Plan will contribute to meeting the AB 32 goals, in addition to the state regulatory requirements…**

General Plan EIR, Finding A-37, Attachment H-1, p. 71-72. Mitigation Measure CC-1.2 states as follows, and requires the County to:

> **Prepare a County Climate Change Action Plan with an update baseline inventory of greenhouse gas emissions from all sources, more detailed greenhouse gas emissions reduction targets and deadlines; and a comprehensive and enforceable GHG emissions reduction measures that will achieve a 17% reduction in emissions from County operations from 2006 by 2020 and a 9% reduction in community emissions between 2006 and 2020. Once prepared, implementation of the plan will be monitored and progress reported on a regular basis.**

General Plan EIR, p. 7-80.

The Draft CAP is not the County Climate Change Action Plan contemplated by Mitigation Measure CC-1.2. As set forth below, the Draft CAP: (A) does not provide an updated baseline inventory; (B) does not provide detailed reduction targets and deadlines; (C) does not contain "comprehensive and enforceable GHG emissions reduction measures"; (D) does not "achieve a 17% reduction in emissions from County operations from 2006 by 2020 and a 9% reduction in community emission between 2006 and 2020"; and (E) precludes meaningful monitoring and reporting.

A. THE DRAFT CAP DOES NOT PROVIDE AN UPDATED BASELINE INVENTORY.

Mitigation Measure CC-1.2 required that County "Prepare a County Climate Change Action plan with an update baseline inventory of greenhouse gas emissions from all sources…" but the Draft CAP does not provide such an updated inventory. Instead, the Draft Cap appears to use 2005 and 2006 baselines that were already in existence at the time Mitigation Measure CC-1.2 was adopted.

B. THE DRAFT CAP DOES NOT PROVIDE MORE DETAILED REDUCTION TARGETS AND DEADLINES.

Mitigation Measure CC-1.2 required that the County "Prepare a County Climate Change Action plan with…more detailed greenhouse gas emissions reduction targets and deadlines…," but the Draft CAP in fact provides *less* detailed targets and deadlines than provided in AB 32 and the Executive Order.

The Draft CAP appears to ignore certain requirements of AB 32 as interpreted by the County's own data. For example, the County's position is that, "To achieve AB 32's 2020 target, community-wide emissions would have to be reduced by 479,717 MT CO2e from 2006 levels. ***A 9% reduction from 2006 levels is necessary to achieve 1990 levels***…" General Plan EIR, CEQA Findings Regarding Significant Effects, Attachment A, p. 2. The Draft CAP does not distinguish between community emissions reductions and County emissions reductions and omits any reference to the 9% community reductions set forth in Mitigation Measure CC-1.2.

Instead, the entirety of the established targets and deadlines appears to be "15% below 2005 levels by 2020." Draft CAP, p. 20. The Draft CAP in fact recognizes that to be on track to meet the goals of the Executive Order emissions reductions would have to be 49% below 2005 levels by 2035; and that the Draft CAP does <u>not</u> meet that goal. Draft CAP, p. 49.

As if an excuse, the Draft CAP states that only "current technology and existing state and federal regulations" are considered. Draft CAP, p. 49. Notwithstanding that there is no excuse for contributing to climate destabilization, the Draft CAP makes inaccurate assumptions and statements with respect to currently available solutions. For example, in assuming it cannot meet the Executive Order requirements, the Draft CAP must be presuming it will not meet the regulatory goals already established by the California Public Utilities Commission. If the County were to meet the already established California Energy Efficiency Strategic Plan goals for 2020, GHG emissions from stationary electricity usage would drop 50% by 2020 compared to a 2008 baseline year. See Attachment 1. The GHG reduction would exceed 80% by 2030 if the same pace of zero net energy building retrofits is assumed in the 2020-2030 timeframe. See Attachment 2. Currently available transportation related GHG reduction solutions are presented in the Appendix. See also Attachments 5-7.

C. THE DRAFT CAP DOES NOT PROVIDE COMPREHENSIVE AND ENFORCEABLE GHG EMISSIONS REDUCTION MEASURES.

It was no mistake that Mitigation Measure CC-1.2 used language like "comprehensive," "enforceable," and "will achieve." Proposed mitigation measures are required by law to be "fully enforceable." Cal. Pub. Res. Code § 21081.6(b); Guidelines § 15126.4(a)(2). Mitigation measures must be definite and defined so that their effectiveness is ascertainable. *See, e.g., San Franciscans for Reasonable Growth v. City & County of San Francisco*, 151 Cal.App.3d 61, 79 (1984).

Instead of "achieving" the reductions set forth in Mitigation Measure CC-1.2 and required by law, the Draft CAP concedes that it "does not ensure reductions…" Draft CAP, p. 69. In addition, the Draft CAP uses language such as "addressing," "informing and inspiring meaningful GHG reductions," and "Allow lead agencies to adopt a plan or program that addresses the cumulative impacts of a project." These vague statements should be replaced with mandatory requirements that actually produce results.

The CAP provides seventeen GHG reduction measures that the drafters conclude will allow the County to achieve the goal of reducing emissions to 15% below 2005 levels by 2020. Draft CAP, p. 22. However, the measures do not explain the strategies that will be implemented, they do not provide cost breakdowns, they do not describe any incentives, they do not set forth specific mechanisms for monitoring each measure, and they do not explain the role of each implementation partner listed.

For example, measure E1, Energy-Efficient New Development, states that the County will "use incentives to encourage builders to exceed current energy efficiency standards by 15%." Draft CAP, p. 29. What incentives? It then states there are also educational programs that "will create the educated and experienced workforce that is needed to take advantage of the County's Green Building Incentive program." *Ibid.* Where is the description of the County's Green Building Incentive program? Who will participate in the educational program? How will the program be implemented or monitored? E1 also neglects to explain the likelihood of securing funding from the listed "Potential Funding Sources" and how instrumental are each to the success of the measure. *Ibid.* In addition, the measure does not indicate the roles of each implementation partner. *Ibid.* Without this important information, how could the County accurately determine the GHG reductions anticipated from this measure or the participation rate? All these things must be considered in order to provide full information and demonstrate enforceability to achieve acceptable mitigation under CEQA.

The Draft CAP concedes that some of the strategies provided in will not yield quantifiable emissions reductions. Draft CAP, p. 22. The strategies that will not yield quantifiable emissions reductions are not, and must be, identified. There is no information about the percentage of reductions that do not yield quantifiable emissions reductions, and there is therefore no way to analyze their effect on the requirements of Mitigation Measure CC-1.2.

In summary, the Draft CAP does not provide comprehensive and enforceable mechanisms that will actually reduce GHG emissions. With inadequate reduction measures it is far from clear whether or not the Draft CAP will achieve the County GHG emissions reduction target of 15% below 2005 levels by 2020. Further, with an ambiguous reduction target, it is not possible to determine that such a target will be sufficient even to comply with AB 32.

D. THE DRAFT CAP DOES NOT PROVIDE COMPREHENISVE REDUCTION MEASURES THAT WILL ACHIEVE A 17% REDUCTION IN EMISSIONS FROM COUNTY OPERATIONS AND A 9% REDUCTION IN COMMUNITY EMISSIONS.

Mitigation measure CC-1.2 requires the CAP to achieve a 17% reduction in emissions from County operations from 2006 by 2020 and a 9% reduction in community emissions between 2006 and 2020. As set forth above, the Draft CAP does not actually achieve *any* emission reductions. In addition, the CAP only gives one emissions reduction target - 15% below 2005 levels by 2020.

Nowhere in the Draft CAP is there a reference to reducing "9% community emissions between 2006 and 2020." Moreover, the terms "County" and "community" are used in the General Plan EIR, "municipal" and "community" are used in Attachment A to General Plan EIR Attachment H-1 ("Attachment A"), and just "County" is used in the Draft CAP. *See e.g.* Attachment A, p. 3. The inventory update in Attachment A says the *community* baseline year is changed to 2005, however, the 2005 baseline year used in the Draft CAP is for the *County*. No explanation is provided for the absence of the "9% reduction between 2006 and 2020" requirement of Mitigation Measure CC-1.2 in the Draft CAP.

E. THE CAP MONITORING PROGRAM PRECLUDES EFFECTIVE IMPELEMENTATION.

The Draft CAP also fails to provide for effective implementation. Mitigation Measure CC-1.2 requires that, "Once prepared, implementation of the plan will be monitored and progress reported on a regular basis." The inadequate Draft CAP itself concedes that, "it is imperative to monitor progress toward the goals set in CAP and to revisit and update the CAP periodically." Draft CAP, p. 69. However, the proposed monitoring tool that can "track progress between inventories and examine effectiveness of specific measures" and is contemplated to be "revisited periodically to reflect any changes in emissions projections or reduction potential," neglects to define "periodically." *Ibid.* In addition, the monitoring section of the CAP does not explain how the County will "coordinate monitoring efforts at the community and local government levels," which seems to be the key to the success of the program. *Ibid.* Without full participation and information from those implementing the Draft CAP, as well as those affected by the Draft CAP measures, the monitoring system will not receive the necessary and relevant information to make an assessment about the progress of implemented measures.

II. THE DRAFT CAP DOES NOT COMPLY WITH THE EXECUTIVE ORDER

The Governor's Executive Order S-3-05 states:

> **[T]he following greenhouse gas emission reduction targets are hereby established for California: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; by 2050, reduce GHG emissions to 80 percent below 1990 levels**

The CAP acknowledges the targets established in the Executive Order and the developed emissions forecasts for 2035 necessary to reach 2050 GHG emissions reductions. Draft CAP, p. 20. The Draft CAP explains that reductions "would need to reach 49% below 2005 levels by 2035, based on emissions forecasts for 2035 and 2050 under BAU conditions, to meet the 2050 goal." *Ibid.* However, after expressing dedication to meeting legislative goals and the need to look beyond 2020 deadlines, and determining reduction targets for 2035 and 2050, the CAP stops short. Draft CAP, p. 49, 52. The Draft CAP utilized the same measures developed for 2020 scenario for the 2035 scenario, with the only change being an increase in rates of participation. Draft CAP, p. 49. This planning only yields a potential reduction of 13.7% below 2005 levels by 2035 and "does not achieve the 49% reduction target." *Ibid.*

The scientific community recognizes that DAI within the climate system will not be avoided by 2020 reductions alone. See Attachments 3, 4. As set forth above, the Draft CAP inaccurately states that "current technology and existing state and federal regulations" are considered. Draft CAP, p. 49. Regulatory goals already established by the California Public Utilities Commission provide current solutions and guidance to achieve 2035 and 2050

reductions. See Attachments 1, 2. Similarly, currently available transportation related GHG reduction solutions are presented in the Appendix, in which specific comments are provided and inadequacies explained. See also Attachments 5-7.

III. THE DRAFT SIGNIFICANCE THRESHOLDS AND THE DRAFT REPORT REQUIREMENTS, AS DRAFTED, WILL CONTRIBUTE TO CLIMATE DESTABILIZATION AND ARE SUBJECT TO CEQA.

Instead of trying to avoid DAI within the climate system, the Draft Significance Thresholds and Draft Report Requirements serve to further exacerbate the devastating impacts of climate change.

The CEQA Guidelines explained that lead agencies may adopt thresholds of significance for use in environmental review but that the thresholds must be supported by substantial evidence:

> (a) Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects. A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.
> (b) Thresholds of significance to be adopted for general use as part of the lead agency's environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence.
> (c) When adopting thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.

CEQA Guidelines § 15064.7. Here, there is no substantial evidence that supports adoption of the Draft Significance Thresholds and Draft Report Requirements which do not even purport to provide for emissions reductions past 2020 targets. The scientific of climate change reveals that 2020 targets are insufficient to avoid DAI within the climate system. Adoption of the Draft Significance Thresholds and/or the Draft Report Requirements will therefore themselves adversely impact the environment. An EIR would be required before either or both could be adopted.

CEQA Guideline section 15064.4, entitled, Determining the Significance of Impacts from Greenhouse Gas Emissions, provides additional guidance for determining GHG impact significance:

> (a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the lead agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based to the extent possible on scientific and factual data, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion

> to determine, in the context of a particular project, whether to:
> (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model or methodology it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; and/or
> (2) Rely on a qualitative analysis or performance based standards.
> (b) A lead agency should consider the following factors, among others, when assessing the significance of impacts from greenhouse gas emissions on the environment:
> (1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting;
> (2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
> (3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such requirements must be adopted by the relevant public agency through a public review process and must reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

Again, as set forth above, there has been no effort based on existing scientific and factual data to calculate the GHG emissions that would result from adoption of the Draft Significance Thresholds or the Draft Report Requirements. To the contrary, existing scientific and factual data reveals that thresholds that do not meet 2035 requirements are insufficient. See Attachment 3, Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group Meeting #15, p. 2. As set forth and referenced in the attached letter from the Center for Biological Diversity, not even compliance with the Executive Order will avoid dangerous anthropogenic interference with the climate system. See Attachment 4. Failing to address emissions reductions past 2020 necessarily renders the Draft Significance Thresholds and Draft Report Requirements insufficient.

I have attached an appendix and seven (7) documents, which are in incorporated by reference as part of our comments on the County's proposed plan. This letter, its appendix and the incorporated documents must be included in any review of your plan. We request written responses to each and every comment made in this submission. Please notice our organization at the above address of any further processing of this plan or meetings on this plan.

Thank you for your fine staff work and including us in this process.

Respectfully submitted,

/s/ *John Stump*

John Stump, Chair
Chapter Executive Committee

cc. Ms. Malinda Dickensen, Chapter Vice Chair
Ms. Mollie Bigger, Chapter Conservation Chair
Mr. Mike Bullock, Chapter Transportation Chair
Ms. Masada Disenhouse, Chapter Climate Chair

Enclosures (7)

Attachment 1 – California Energy Efficiency Strategic Plan, January 2011 Update
Attachment 2 – California Energy Efficiency Strategic Plan Zero Net Energy Action Plan: Commercial Building Sector 2010-2012
Attachment 3 – Letter from Center for Biological Diversity to Elaine Chang, Deputy Executive Officer of Planning, Rule Development, and Area Sources of the South Coast Air Quality Management District**;** *Comments on Survey of CEQA Documents on Greenhouse Gas Emissions Draft Work Plan and Development of GHG Threshold of Significance for Residential and Commercial Projects*, dated April 15, 2009.
Attachment 4 – Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #5, dated September 28, 2010
Attachment 5 – Letter from Sierra Club Transportation Chair to SANDAG Board, *California Air Resources Board (CARB) Greenhouse Gas (GHG) Reduction Targets, Issued to SANDAG, in Accordance with SB 375, for the Year 2035*, dated April 20, 2011
Attachment 6 – M. Bullock & J. Stewart, *A Plan to Efficiently and Conveniently Unbundle Car Parking Costs*; Paper 2010-A-554-AWMA, from the Air and Waste Management Association's 103rd Annual Conference and Exhibition; Calgary, Canada, June 21-24, 2010
Attachment 7 – Letter from M. Bullock to the Honorable President Richard Holober and Members of the Board of Trustees, San Mateo County Community College District; *An Updated Parking Policy, in Light of the Controversy Surrounding the Removal of Building 20, Greenhouse, and Gardens, to Add Parking*, dated July 27, 2011

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The San Diego Chapter of the Sierra Club is San Diego's oldest and largest grassroots environmental organization, founded in 1948. Encompassing San Diego and Imperial Counties, the San Diego Chapter seeks to preserve the special nature of the San Diego and Imperial Valley area through education, activism, and advocacy. The Chapter has over 14,000 members. The National Sierra Club has over 700,000 members in 65 Chapters in all 50 states, and Puerto Rico.

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APPENDIX

Summary

Improvements to Chapters 1 and 2 are given. Chapter 2 suggestions include computing the driving reductions needed to achieve the S-3-05's trajectory by 2035. Feasible mitigation measures would eliminate congestion, improve air quality, increase social equity, and empowering people to make meaningful decisions both about methods of transit and how to spend their hard earned dollars.

Qualifications

Understanding the relationship between global warming and transportation requires mathematics. The Chapter Transportation Chair, Mike Bullock, a contributor to this letter and drafter of this Appendix, has a BSEE degree and a Masters of Science, Engineering (MSE) degree. He worked for 36 years at Lockheed Martin, in Sunnyvale. For the last 20 years there, he worked as a satellite-systems engineer. One of his responsibilities was to develop equations and methods to measure and then compensate out, through satellite database upload, the misalignments of the key antennas on the MILSTAR communication satellite.

Specific Comments on the Draft CAP

1.1 Comments on the Draft CAP's Purpose

The Attorney General Office's (AG's) excellent letter found at http://ag.ca.gov/cms_attachments/press/pdfs/n2056_santa_clarita_letter.pdf compels a high standard of specificity. This CAP must identify the needed GHG reductions and show how those needed reductions will be achieved.

The words, "informing and inspiring meaningful GHG reductions" should be replaced with "achieving meaningful GHG reductions."

The first sentence on the top of the right column should include the *regional* level. SANDAG's RTP2050 is a $214B dollar plan, with direct impacts on GHG emissions. SANDAG's work should not be ignored.

Table 1.1 should be labeled so the reader understands the year of the reductions. If the year is 2020, a similar table is needed for 2035.

1.3 Comments on the Greenhouse Effect

This section fails to inform the reader of the urgency and extreme danger posed by our climate crisis. The June 2008 issue of *Scientific American* (*The Ethics of Climate Change*, by Professor John Broome) reports that the levels of GHG expected in 20 years will result in a 5% chance of a 14.4 degree Fahrenheit increase in the earth's temperature and this would be an "utter catastrophe" and create the possibility of a "devastating collapse of the human population, perhaps even to extinction".

The plot shown on Page 6 fails to show the historic temperature profile. For that information, it is necessary to also show Figure 1 and 2. They are well known. Note that the 450 PPM value is shown. That would be the peak level of atmospheric C02, if the world achieves the S-3-05 trajectory. That peak value would occur in year 2050 and then the atmospheric level of C02 would gradually be brought down to less-dangerous levels.

Figure 1 shows that the C02 levels shown on your Page-6 plot, which are 400 PPM up to 1000 PPM, correspond to temperatures of well over 10 degrees Centigrade. Such temperatures would risk a catastrophic collapse of the human population, to include the eventual extinction of our species. There are no adaptation strategies that could deal with such an event.

Figure 2 clearly shows that, although the temperature rise is somewhat masked by solar activity, underneath that relatively high frequency temperature variation, the temperature rise, which is due to the trapped heat caused by the higher-than-normal C02, is already taking place. The trapped heat's effect on our atmosphere will be delayed as it melts ice and warms the ocean. We must at least achieve the S-3-05 trajectory.

Figure 1 **Atmospheric CO2 and Mean Temperature, 800,000 Years Ago, with 450 PPM C02 Shown**

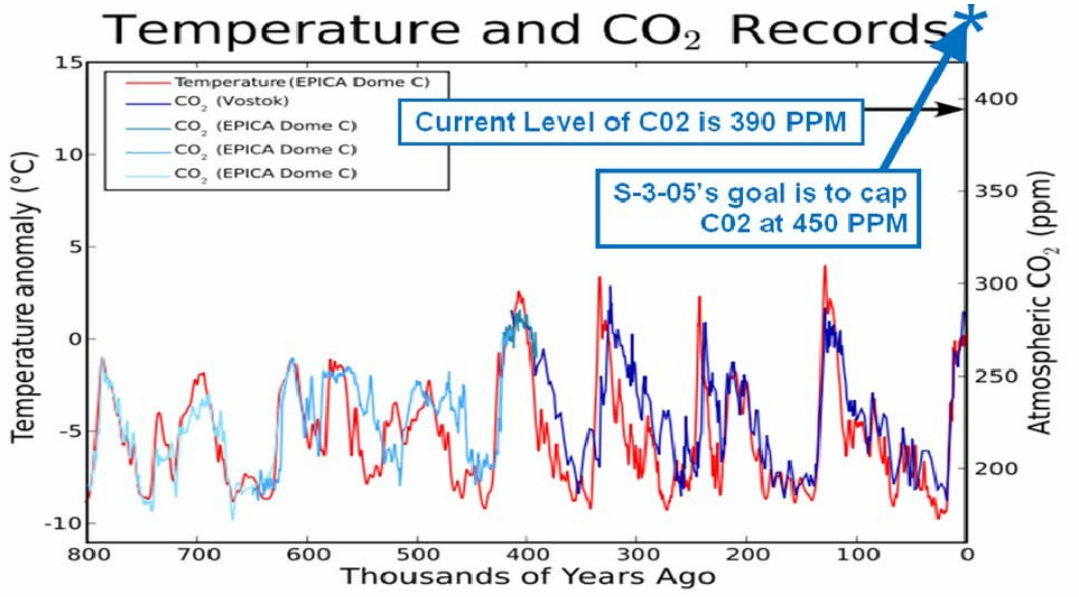
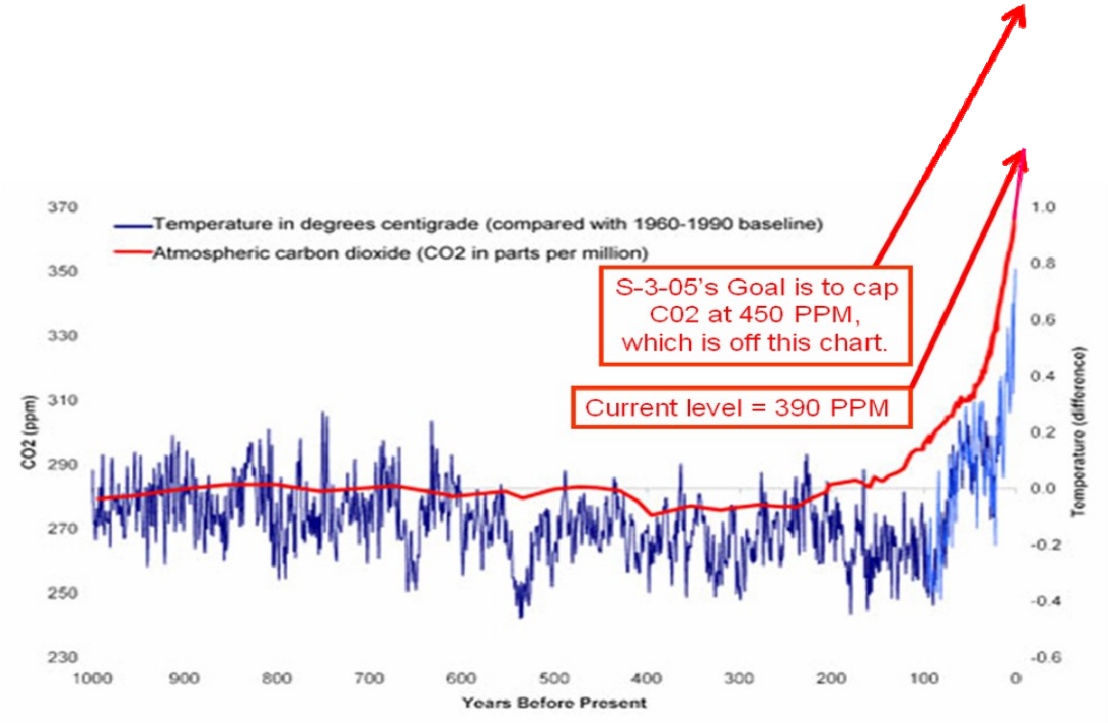


Figure 2 Atmospheric CO2 and Mean Temperature, Over the Last 1,000 Years



Attachment 3, also available at http://www.aqmd.gov/ceqa/handbook/GHG/2009/april22mtg/CBDcomments.pdf, has descriptions of the likelihoods of various S-3-05 outcomes, first in terms of temperature rise. Even if we achieve S-3-05, there is a 50% chance that the temperature rise will exceed 2 Degrees Centigrade. A 2 degree Centigrade rise in temperature would have very serious negative consequences, as described. There is a 30% chance that the temperature change would exceed 3 Degrees Centigrade, which is described as "exponentially worse" than the 2-Degrees-Centigrade outcome. And so on. Going above 500 PPM is unthinkable and yet that seems to be exactly what we are doing.

On Page 6 the Draft CAP, failing to meet S-3-05 is described by saying that "climate change will threaten our economic well-being, public health, and environment". The dangerous and currently out-of-control predicament in fact threatens human extinction. A bullet on Page 7 states that local effects could include "the decline or loss of species", but does not reveal that our own species is at risk. This sort of over sight continues throughout Pages 8 and 9.

On Page 9 it says, "The extent to which these changes produce negative impacts will depend on actions taken today to ensure resilience in the face of climate change and, where necessary, adaptation to its impacts". This ignores our responsibility to limit our GHG emissions and the fact that without sufficient and timely limitations, adaptation will not be possible.

1.4 Comments on the "Local Effects of Climate Change" and "Potential Climate Change Health Effects" Sections

These sections do not describe the severity of our climate crisis.

1.5 Comments on the "Relationship to Other State and County Documents"

It is crucial that the Draft CAP require strategies that will reduce emissions to levels at least as low as the S-3-05 trajectory.

Table 1.2 is valuable but must be improved in at least the following ways.
The description of S-3-05 needs to contain the following additional sentence: "These targets must be considered as points that define straight-line trajectories. It should also be understood that world-wide emission levels must at least stay beneath these straight lines. The net emissions, over the years, must be limited. The net emission is proportional to the area under these straight lines. Any year that emissions are above the lines creates a surplus that then requires years beneath the lines. The world is currently emitting at levels well above the line between the first two points.

The SB 375 description is incorrect because what the Metropolitan Planning Organization (MPOs) must achieve is GHG reductions that do not include reductions from state programs of cleaner cars and cleaner fuels. This means that the reductions can only be achieved by driving reductions, or, in other words, reducing vehicle miles travelled (VMTs). Therefore, it would be more accurate to simply change the "GHG emissions" words to "VMTs", to say "VMTs from passenger vehicles must be reduced . . ."

1.6 Comments on the "Scope and Content of the CAP"

The bullet "Community Measures and Actions" should identify Table 3.2, since it provides the estimated GHG emissions. For example, T2, shown on Page 41, gives the results as a "50% increase in bicycle and pedestrian facilities"; T3 gives "50% of employers using TDM. It is not until Table 3.2 that the reader learns of the GHG reductions. Besides this, the estimated GHG reductions (only from VMT reductions, for cars and light-duty trucks) need to be for years 2035 and 2050, not just 2020 as stated in that bullet.

2.1 Comments on the Draft CAP's Chapter 2

2.2 Comments on the "Business-as-Usual Projections"

Regarding the transportation sector; cleaner cars, cleaner fuels, and other state-transportation programs are out of the County's direct control but the County can play an important role by seeking improved legislation and rule making. The County's primary role, in terms of transportation, however, is to reduce VMT. Table 2.3's BAU should therefore assume the state's transportation programs will perform as currently estimated but assume VMT will be "BAU", meaning as currently projected with no county or regional programs to reduce driving.

2.3 Comments on the "GHG Emissions-Reduction Targets"

We appreciate your recognition of the critical need to meet S-3-05. Given the dire predictions as set forth in Attachment 3 and reference materials therein http://www.aqmd.gov/ceqa/handbook/GHG/2009/april22mtg/CBDcomments.pdf, compliance with S-3-05 should be stated as the *minimum* to be accomplished.

The computation of the critical value of 49% below the 2005 value by 2035 should be set forth. This value means that the 2035 emissions need to be (.51)*(2005 emissions). In Attachment 5, letter from Sierra Club to SANDAG, April 20, 2011, *California Air Resources Board (CARB)*

Greenhouse Gas (GHG) Reduction Targets, Issued to SANDAG, in Accordance with SB 375, for the Year 2035) the computation was .525, instead of .51.

Driving reductions needed to achieve 2020 or 2035 reductions are not met. This calculation can only be done by assuming some achieved improvement from cleaner cars and cleaner fuels. The work shown here will repeat the process shown in Attachment 5.

Overview of Relationships and Derivation of Key Formula

The S-3-05 net reduction in GHG emissions, from cars and light-duty trucks, expressed as a fraction of 2005 emissions, is obtained by multiplying four factors together. The definitions of Table 1 apply.

Table 1 **Factor Definitions, with Respect to Year 2005**

Factor Definitions	
All are for for the year of interest, with respect to year 2005 values. Except for Population, all are for cars and light-duty trucks.	
f	**net factor of the emissions of Greenhouse Gas**
f_Pavley	**factor of the average statewide mileage**
f_Fuel	**factor of the reduction of GHG due to fuels that burn less carbon**
f_Population	**factor of the population in the region of interest**
f_PerCapitaVMT	**factor of per capita driving**

The following equations apply.

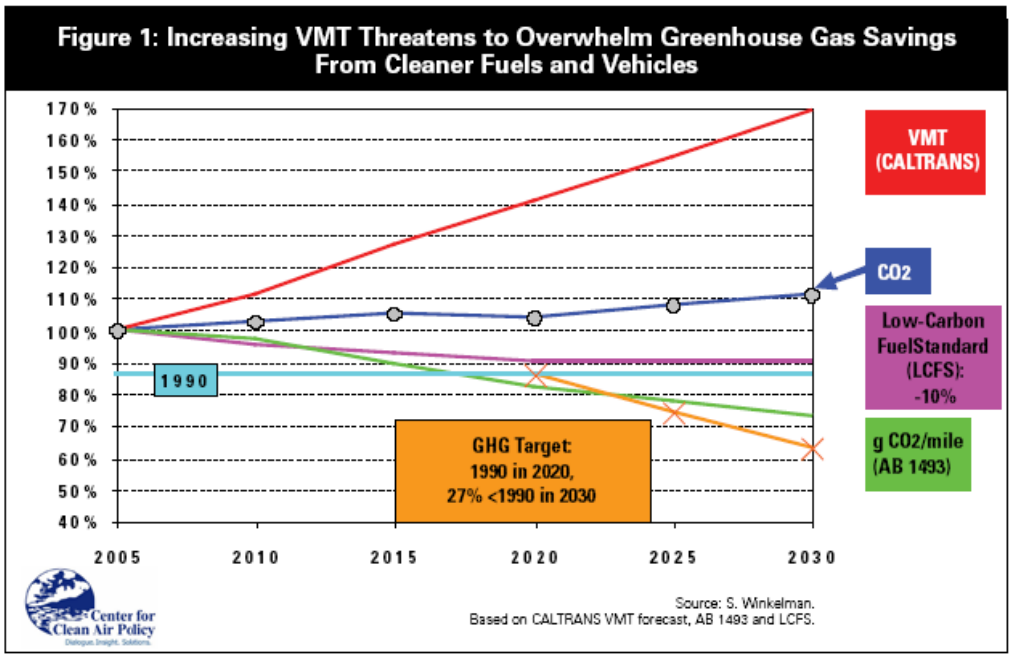
Eq. 1 f **=** f_Pavley **x** f_Fuel **x** f_Population **x** f_PerCapitaVMT

Eq. 2 is derived from Eq. 1.

Eq. 2 f_PerCapitaVMT **=** f ***/*** **(** f_Pavley **x** f_Fuel **x** f_Population**)**

Figure 3 is from http://www.nrdc.org/globalWarming/sb375/files/sb375.pdf, a widely-respected report on SB 375. Note that all of its values are in the units of factors (same as fraction) of their values in year 2005. Figure 3 will supply all of the needed values, except for the factor of population. (Neither the red line nor the blue line are used.) Its gold line is the S-3-05 trajectory. (CARB ignored this line when it issued the MPO driving-reduction values for year 2035.)

Figure 3 **GHG Reductions from Pavley (AB 1493, in Green); the Low Carbon Fuel Standard (in Purple); the Predicted Driving (VMT, in Red); the Net Result of GHG (C02, in Blue); and & the S-3-05 Trajectory (in Gold)**



Getting the Net Factor of the Emissions of Greenhouse Gas in 2035, with Respect to 2005 Values

To get the net factor of the emissions of GHG, for year 2035, with respect to year 2005, it is necessary to extrapolate the Governor's Executive Order target values (the gold line of Figure 1), out to year 2035. The gold line shows that this factor is 0.87 in 2020 and is 0.64 in 2030. Therefore, in year 2035, the factor will be

$$0.64 + [(.64 - .87) / (2030-2020)] * (2035-2030) = 0.525$$

However, as stated above, the value of .51 will be used, to correspond to your ".49 down" value.

Getting the Factor of the Average Statewide Mileage in 2035, with Respect to the 2005 Value

To get the Pavley reduction factor, for Year 2035, it is necessary to extrapolate the average statewide mileage factor data, which is Figure 1's green line, out to Year 2035. It is 0.82 in 2020 and it is 0.73 in 2030. Therefore, in year 2035 the statewide mileage factor data will be

$$0.73 + [(.73 - .82) / (2030-2020)] * (2035-2030) = 0.685$$

Pavley 1 ends in Year 2017. It is widely assumed that it will be replaced by what is often called "Pavley 2". The extrapolation computed here is based on the assumption made by the author of Figure 1, as shown in the slope of the green line from year 2020 to 2030. Based on the authoritative credentials of the authors of Figure 1, this is the best assumption that can be made. Assuming that the California fleet will continually get

more efficient, in terms of C02 per mile driven, relies on an assumption that a significant fraction of our car owners will be able to purchase newer-model cars.

Getting the Factor of the Reduction of GHG Due to Fuels that Burn Less Carbon

Looking at the purple line of Figure 1, it is clear that this factor will be 0.9 in 2035.

Getting the Factor of the Increase in Population

The factor for population in San Diego County is computed using the populations estimated in CARB's http://arb.ca.gov/cc/sb375/mpo.co2.reduction.calc.pdf, namely 3,034,388 people in 2005 and 3,984,753 people in 2035. So the factor, from 2005 to 2035 is 3,984,753/3,034,388 = 1.313. Note that this number will be different for the unincorporated area. If the unincorporated value is larger, the per-capita factor will be smaller and so the needed per-capita reduction in driving will be larger. If the unincorporated value is smaller, the per-capita factor will be larger and so the needed per-capita reduction in driving will be smaller. The net driving change compared to 2005 will be unchanged, regardless of what population growth is assumed.

Computing the Required Driving Reduction, for 2035

The 4 values computed above are used in Eq. 2 to compute the required factor.

Eq. 3 f_PerCapitaVMT **=** .51 **/ (** .685 **x** 0.9 **x** 1.313 **)**

Therefore, f_PerCapitaVMT = .630. **This corresponds to a 37.0% reduction in per-capita driving, in year 2035, compared to year 2005.**

It is also important to compute the net driving factor and the net driving reduction. The net driving factor is the per-capita driving reduction factor (.630) multiplied by the population factor (1.313).

Eq. 4 f_netDriving **=** .630 **x** 1.313 = .827.

This means that even with more efficient cars, cleaner fuels, and a larger population; the net driving in San Diego County will have to be 17.3% less than in year 2005.

Therefore, there is absolutely no reason to add highway capacity. The only rational course of action is to shift all the currently-allocated-highway-expansion money to transit expansion.

Please add these important calculations and conclusions to your GHG Emissions-Reduction Targets section.

3.0 Comments on the Draft CAP's Chapter 3 Land Use and Transportation Community Measures and Actions, for Year 2035

Given the large role that the driving of cars and light-duty trucks plays in emitting GHG, the CAP must achieve the year 2035 driving reductions shown at the end of this letter's Section 2.0. This is a per-capita driving reduction of 37.0% and a net driving reduction of 17.3%. Both of these values are with respect to year 2005. Given the large change needed, LU1, T1, T2, and T3 will be insufficient. At least two more transportation "Measures and Actions" will be required.

3.1 Comments on LU 1

This section should be improved. "Near existing and planned transit corridors" should say "Within walking distance of existing and funded transit stops on transit lines with service at or above levels shown to significantly reduce driving reductions and car ownership for those living

within walking distance of its stops." The "25% of new development" shown in Table 3.2 should be at least 75%. As soon as possible, California needs to implement an equitable and environmentally-sound road use fee pricing system that will unbundle the costs of building roads, of maintaining roads, and of the external economic losses road use imposes on society in general, such as environmental and health costs. This will cause the market to support so-called "smart growth", mixed-use development over urban sprawl. The County needs to seek legislation to help make this happen.

"Smart" should be defined as "VMT-reducing". This will allow strategies that are proposed or required at such developments to be evaluated for value. Unbundling the cost of parking should also be developed and required, as described in Reference 3 (Reference 3 was presented by our Transportation Chair in Calgary, Canada, at the Sustainable Land Use and Transportation Session of the Air and Waste Management Association's 103rd Conference and Exposition, in the summer of 2010. It is therefore published and peer reviewed.) This will give consumers, residents and employees more control over their money. It will also reduce driving, as shown in Reference 3's Table 1.

Zoning within the qualifying areas should eliminate density and height limitations, as well as minimum parking requirements. Investors will respect the market limitations as there will be poor demand for developments that don't work for those that buy, rent or lease in such developments. Besides this, when projects are proposed, good modeling will determine functionality. Meeting the relaxed zoning does not have to mean automatic approval. The political process will litigate the tension between neighborhood concerns and the need to reduce driving. The off-street parking ordinance should require that the parking costs are unbundled, using either the method of parking operating as its own profit center or using the methods describe in Reference 3.

3.2 Comments on T 1, "Increase Transit Use"

Many of the comments of Section 3.1 apply. Given that the CAP must achieve the year 2035 driving reductions shown at the end of this letter's Section 2.0; in particular, a net driving reduction of 17.3%, compared to year 2005; the TransNet tax money allocated to highway expansion needs to be reallocated to transit. Although this is a SANDAG Board decision, it should be pointed out by our County Board at every opportunity. However, it is still doubtful that great transit service can be expanded out to cover all of the unincorporated areas, and the unbundling proposals are important.

3.3 Comments on T 2, "Increase Walking and Biking"

Most of this section is valuable. However, its reliance on the regional plans, including the Regional Bicycle Plan, should be reduced and the need to improve those plans should be stated. The primary problem with these plans stems from the reluctance of the SANDAG Board to require that expenditures be ranked on their estimated ability to decrease driving. The ranking should be based on driving reduction per dollar spent. This point has been made many times by our Transportation Chair and it has been ignored by the SANDAG's Board and Executive Director.

Education and Projects to Support Bicycle Transportation

As stated, the criteria for spending money for bicycle transportation should be to maximize the resulting estimated reductions in driving. The following strategies will probably do this.

Projects

Each of SANDAG's smart growth place types, both existing and planned, shown on SANDAG's well-documented Smart-Growth Concept Map, should be checked to see if bicycle access could be substantially improved with either a traffic calming project, a "complete streets" project, more shoulder width, or a project to overcome some natural or made-made obstacle. These projects should be prioritized using a cost/benefit ratio metric.

It is hereby assumed that 80% of the money available for the Regional Bicycle Plan (over a billion dollars) should be used to fund the projects. They should be selected for implementation, from top of the list (lowest cost/benefit ratio) down, until the money is used up. An example of one of these projects, for the proposed town center near the corner of I-5 and SR-78, is to devise a method to restore the shortest-distance route from Vista Way to Vista Way, which is currently broken by Interstate 5. This would connect a large South Oceanside coastal neighborhood with a regional shopping center, which includes a large grocery store, avoiding a circuitous and hilly current route.

Building recreational bike paths is generally not a cost-effective expenditure. It sends a message that bikes do not belong on the road.

Education

The remaining 20% of the money should be used to do the following.

1.) Teach interested adults about bicycle accident statistics (most serious injuries occur to cyclists in accidents that do not involve a motor vehicle), car-bike accident statistics (most are caused by wrong-way riding and errors in intersections; clear cut hit-from-behind is rare), and how to ride in all conditions, to minimize problems.

2.) Teach riding-in-traffic skills and how to ride in other challenging conditions, by having the class members and instructor go out and ride in real conditions, until proficiency is achieved.

Students that pass a rigorous written test and demonstrate proficiency in traffic and other challenging conditions are paid for their time and effort.

These classes should be based on the curriculum developed by the League of American Bicyclists and taught by instructors certified by the League.

Assuming a class size of 3 riders per instructor and that each rider passes both tests and earns $100 and that the instructor, with overhead, costs $500 dollars, for a total of $800 for each 3 students, means that $200M (computed as 20% of $1B) could educate $200M/$800 = 250,000 classes of 3 students, for a total of 750,000 students, out to year 2050. This is about 20% of the population of San Diego County.

3.4 Comments on T3, "Increase Ridesharing"

By taking the position that transportation demand management must only be programs that reduce driving, the CAP is helping to foster the widespread belief that driving levels are the result of free economic choice, and that this free choice must be made less likely by offering some new incentive to not drive or causing drivers to suffer some sort of punitive measure when they insist on driving. That approach to TDM is conventional but it is also misleading.

To engender objectivity, please generalize the concept and go beyond the conventional. More specifically, please state that TDM is the adoption of policies that affect the amount of driving. These 3 classifications of TDM are suggested in Reference 3:

- "Positive", which reduces driving, such as charging for parking at a higher rate than what is justified by its cost,
- "Zero", which is neutral in its effect on driving, such as charging for parking at the rate which is justified by its cost, and
- "Negative", which increases driving, such as charging for parking at a lower rate than what could be justified by its cost.

It should then be pointed out that so called "free parking" is a widespread form of a (significantly) negative TDM. The only way to make this TDM more negative would be to pay people for parking their car.

This treatment will increase objectivity towards the idea of "TDM". After all, who really wants their demand for anything to be "managed". However, many current policies manage demand for driving by encouraging driving. If we could just get all the "levers" adjusted to "Zero TDM", all of our congestion and driving-related climate destabilization problems would be greatly reduced. Besides this, there is a basic fairness issue. Having at least "Zero TDM" should be the law of the land. This is true, even without the challenge and mandate of climate stabilization. One of the best TDM measures would be to unbundle the cost of parking in all locations, as explained in Reference 3. After these systems are installed, it would be possible to adjust the charge above the zero TDM level. It is important to note that the earnings go back to those for whom the parking is built. This makes the positive TDM more popular since everyone likes getting monthly earnings.

3.5 Comments on T4, “Alternative Fuel Vehicles”

This is a state program. The county should urge CARB to take actions to increase the GHG reductions it can achieve. It is also correct to work for enough charging stations. However, the estimate derived from Figure 3’s green line is all that can be assumed at this time. If at some later time CARB believes that if can do better than Figure 3’s green line, then at that time, perhaps the calculation shown in Section 2.2 can be updated. However, there is nothing wrong with achieving more GHG reductions than what is required by the S-3-05 trajectories. Most of the driving reductions will come from increased equity, in any case.

3.6 Comments on an Additional “Community Measure and Action”

In Section 2.2 it was shown that the per-capita driving needs to be at least reduced by 37.0% by 2035. Reforming transportation to increase economic equity should not wait. For these reasons, LU-1, T-1, T-2, and T-3 are insufficient. This measure is needed as soon as it can be developed and instituted.

Unbundling the Cost of Car Parking

For the vast majority of destinations in California, the cost of car parking is hidden within other costs. This has serious consequences. For example, at most places of employment, parking costs reduce the wages that can be paid to all the employees, even those that never use the parking. Similarly, at most apartment complexes, bundled parking costs increase the rent and this is true, even for families that do not own a car. Bundled parking costs routinely increase the costs of goods, such as groceries, for all customers. Again, this is even true for those that do not drive. Since governments require businesses to provide minimum levels of parking, they are involved in this economic discrimination towards those that drive less.

Driving less is, to some degree, a lifestyle choice. Since government has no valid reason to encourage driving, the lifestyle choice of less driving deserves constitutional, or at least legal,

protection from any practices that discriminate against it, economically. So far, the County has not taken an active role in educating its citizens on how parking policy effects economic fairness or how parking policies that are more fair could reduce driving.

On June 22nd 2010, our Transportation Chair presented a paper on how parking could be operated to unbundle parking costs in a way that supports the sharing of parking. This was at the 101st Conference and Exhibit of the Air and Waste Management Association, in Calgary, Canada. The session, *Sustainable Land Use and Transportation*, included the paper, *A Plan to Efficiently and Conveniently Unbundle Car Parking Costs*. The paper was extremely well received. It was published as a proceeding of the Conference. See Attachment 6.

The following points, taken from Attachment 6, apply.

- Vehicle miles traveled (VMT) are a major cause of global warming and pollution.
- California's Metropolitan Planning Organizations (MPOs) need to adopt strategies that reduce vehicle miles traveled (VMT), in order to at least meet the S-3-05 trajectory, for years 2020 and 2035.
- The appropriate pricing of parking is one of the least costly tools documented to reduce VMT.
- New technologies, such as sensors feeding computer-generated billing, offer the potential to efficiently bill drivers for parking and alert law enforcement of trespassers.
- Reformed parking policies can increase fairness, so that, for example, people who use transit or walk do not have to pay higher prices or suffer reduced wages, due to parking.
- Methods to unbundle parking cost are inefficient, unless they support the spontaneous sharing of parking spaces. Shared parking, with unbundled cost, would ultimately allow the county to require significantly less parking.
- Typical current systems of timed parking and metered parking are far from ideal. Such parking has no automated record keeping, so it is difficult to know where there is too much or too little parking.
- Good policies will eventually let cities and the county to turn parking minimums into parking maximums.

Less land and resources devoted to parking will support mixed use and make "smart growth" more economically viable. It should therefore be a key ingredient supporting the CAP's LU-1.

Here is a copy of the abstract of Attachment 6.

> The *Introduction* shows documented driving reductions due to the pricing of parking. It notes that although the benefits of priced and shared parking are known, such parking has not been widely implemented, due to various concerns. It states that a solution, called "*Intelligent Parking*," will overcome some of these concerns, because it is easy to use and naturally transparent. It asserts that this description will support a "Request for Proposal" (RFP) process. Eight background information items are provided, including how priced parking would help California achieve greenhouse gas reduction targets. A story demonstrates some of the key features of *Intelligent Parking*. Arguments for less parking, shared parking, and priced parking are made. Barriers to progress are identified. The fair pricing of parking is described. New ways to characterize transportation demand management are presented. Seven goals of

Intelligent Parking are listed. Eleven definitions and concepts, that together define *Intelligent Parking*, are described. This includes a method to compute a baseline price of parking and how to adjust that price instantaneously to keep the vacancy above 15% ("Congestion Pricing"). An implementation strategy is described.

This abstract aroused enough interest among those responsible for A&WMA's *Sustainable Land Use and Parking* session that they requested that a manuscript, which was ultimately selected to become part of the written Conference Proceedings and for presentation.

The County could also play a pivotal role by helping to find a demonstration project, probably at a school or an office. Attachment 7 sets forth specific solutions. Attachment 6 describes an implementation strategy in its Implementation Section, on Page 16. The County has the authority, in its off-street parking ordinances, to require cooperation with an agency implementing unbundling and this would be the correct action, after a sufficient number of successful demonstrations have been achieved. "Successful" would need to mean that nearly all stakeholders would be pleased with the program.

If fully implemented, this strategy, by itself, would probably decrease driving throughout California by between 15% and 25%. This is shown in Table 1 of Attachment 6.

Below is an email indicating that the basic features of enforcement, charging, distributing earnings, and sending out monthly statements would not be difficult.

Email Showing that the Basic Required Technology Could Be Easily Developed

----- Original Message -----

From: David Carta
To: 'Lisa Rodman' ; 'Mark Tanner' ; 'Kelli' ; 'Nicole' ; 'Mark S.' ; 'John'
Cc: 'Mike Bullock'
Sent: Wednesday, January 13, 2010 5:40 PM
Subject: RE: RFID_ParkingNewCalsbadHS

Dear Carlsbad School Board,

I wanted to send a quick note discussing the technical feasibility of tracking cars into a lot without impacting students or requiring the need for gates. Mike Bullock and I have discussed this project; it can be accomplished straightforwardly by utilizing Radio Frequency Identification and/or Video Cameras integrated with automated license recognition systems. The cars would need to register with the system at the start, but it would be fairly painless for the users after the initial installation. The back end database system can also be implemented both straightforwardly and at a reasonable price.

This is not necessarily a recommendation of the proposal for unbundled parking. Rather it is strictly an unbiased view of the technical feasibility of the proposal to easily and unobtrusively track cars, both registered and unregistered, into a fixed lot.

Best regards,

David R. Carta, PhD
CEO Telaeris Inc.
858-449-3454

3.7 Comments on an Additional State-Wide "Community Measure and Action", Unbundling the Costs of Driving and a Summary of Results of All Additions

This measure would require a state and/or federal government action. Therefore, like advocating for cleaner cars, the role of the County would be to understand the value and then advocate for this measure, at the state and federal level.

Unbundling

"Unbundling", in the heading above, denotes that the money collected should be paid out to those that are losing money under the current system. This means, for example, that the money collected to account for increased health-care costs, caused by the air pollution the public must breathe, would go to reduce the cost of health care, not to build or even maintain roads.

3.7.1 A Comprehensive Road-Use-Fee Pricing System

Abstract This section contains a listing of road pricing principles. It provides an example of a road-use fee structure that supports the listed principles. Useful background information is provided. Arguments in favor of the presented example are presented.

Initial Note For many reasons, including the climate crisis, a comprehensive road-use fee pricing system is needed. It would be optimal for the state to implement the type of system described in this section. However, the state has a long history of irresponsibility in pricing road use. It is hoped that global warming will change this. Certainly, all the MPO's in the state should be urging our state government to wake up and take action. If these efforts fail, the MPO's will have to proceed as best they can to implement as much of these road-use pricing system components as possible.

Road-Use Fee Principles

1. The first principle is that of "full-cost pricing". Driving has enjoyed a favored status in this state and in this country, resulting in sprawl, health-damaging pollution, global warming emissions, and congestion. We should advocate for the elimination of that favoritism in California, primarily by adopting this first principle.

2. Secondly, the current economic rewards for good mileage vehicles must not be eroded. Due to global warming, motorists need to "go electric" as soon as possible.

3. In addition, road-wear factors (primarily weight), the noise generated, and the pollution generated by each individual vehicle must be taken into account. This will increase fairness and support a shift to lighter, cleaner, and quieter vehicles.

4. The time and place of travel must be incorporated to reduce congestion.

5. Any road-use fee structure must do no economic harm to low-income drivers.

6. As road-use fee technologies evolve, privacy must be protected at each step.

An Example of a Conforming Road-Use Fee Structure

Condition 1

100% of the funding for all of the expenses of public roads, *excluding* those costs associated with future expansion (covered in Condition 3), comes from a road-use fee (that may include a fuel excise tax), that ultimately (as affordable technology can support) would contain the following **Features**:

1. VMT Fee A base, per-mile (VMT) component fee paid by all motorized vehicles for road construction and maintenance. It would vary by model so that the incentive to drive efficient vehicles is at least as large as for our current fuel excise tax. This means that a Prius would be much cheaper, per mile, than a Hummer.

2. Carbon Fee An additional per-mile carbon component part is computed using an effective fee per gallon that is equal or larger than the fuel tax that this per-mile carbon fee might replace, to correlate with the amount of CO2 emitted. This could either be charged at the pump, as it is now done, or could be added to the VMT fee by using a price per mile computed by dividing the effective price per gallon by the charged vehicle's (year and model) average mileage, in the units of mile per gallon.

3. Road Wear Fee An additional per-mile component part that is proportional to the vehicle's (year and model) average weight, or other road-wear variable of the vehicle being charged.

4. Air Pollution Fee An additional per-mile component part proportional to the charged vehicle's (year and model) average pollution level, to be used to compensate people, schools, businesses, governments, and corporations harmed by pollution, with this rate set for full compensation.

5. Noise Pollution Fee An additional per-mile component part proportional to the average noise pollution level of the charged vehicle, to compensate people, schools, businesses, governments, and corporations harmed by noise pollution, with the rate set for full compensation.

6. Congestion Fee An additional per-mile component part or, alternatively a multiplier, to account for either time and place, or instantaneous traffic flow rate, to reduce or eliminate congestion, with the proceeds of this fee (collection minus collection cost) used for either the expansion or the operation of transit systems that would tend to reduce this congestion.

7. Low Income Relief A fractional multiplier that would reduce the total per-mile cost for drivers with a sufficiently low income and a sufficiently high need to drive, but only available for a period of calendar time sufficient for the driver to change their circumstance creating the need to drive, unless this is impossible. Section V's Section 7 has more detail.

8. Privacy Privacy protections so that where and when people drive, the vehicle they drive, and any Feature 7 advantage, is fully protected, unless a warrant is issued by a judge in response to substantiated allegations of a serious, felony crime.

Condition 2

The per-mile charges of Condition 1 must be large enough to fund yearly payments to the municipalities having large, limited access roads (AKA "freeways") within their boundaries (thereby keeping land off of their property-tax rolls), with these yearly payments equal to the average yearly property tax per acre of the adjacent land, multiplied by the total acreage covered by the road's right of way, including frontage roads.

Condition 3

No expansion of the system of public roads should be done unless market research and traffic modeling show that the net revenue of the proposed road or additional lanes will fund all the expenses identified in Conditions 1 and 2.

Condition 4

No expansion of the system of public roads should be done unless it is shown that the expansion will not negatively impact the state's AB32 and S-3-05 goals and responsibilities.

Condition 5

The sales tax on gasoline and diesel fuel should remain. Its revenue can be used as is the revenue from any other sales tax that is collected on consumer items.

Background Material

This section provides information about the current level of the fuel tax, the difficulty of raising the fuel tax, the use of the fuel *sales* tax, lane performance during times of high demand, demand under the condition of "full cost pricing", political "push back" to full cost pricing, other opinions that a pure fuel tax is becoming obsolete, and finally, information indicating that a road-use fee could be raised by a simple majority in the state legislature.

1. Current Level of Fuel Excise Tax

A full accounting of the fuel excise tax and what it currently pays for is not our responsibility. A significant segment of the population probably believes that current fuel tax rates are high enough. However, a San Diego County newspaper, the North County Times (NCT), in a February 9, 2009 article, reported that the Chair of the California Transportation Commission (CTC) recently wrote that the fuel tax currently contributes nothing to road construction **and only provides half of the money needed annually for repairs:**

http://www.nctimes.com/articles/2009/02/09/news/columnists/downey/z8591536f3e7332da882575510076fa1e.txt

Increasing the state gas and diesel taxes, unchanged at 18-cents per gallon since 1994 – when the final one-cent increase mandated by Proposition 111 (June, 1990 that doubled the nine-cent excise fuel tax over a 5-year period) was added, is long overdue.

2. The Difficulty of Raising the Fuel Tax

To raise the fuel tax would require a 2/3rd majority vote of the legislature. In addition, according to a CNN report, http://www.cnn.com/2009/POLITICS/02/20/driving.tax/

"Officials including [Secretary of Transportation] LaHood have opposed raising the national gas tax, particularly in the current recession, and have said a new system is needed."

3. Use of the Fuel *Sales* Tax

California has a sales tax on all consumer items sold in the state, except food and medicine. The revenues from sales taxes are generally placed in our state's general fund. However, an exception to the general rule has been made for the sales tax on gasoline and diesel. By the conditions of a successful ballot measure, the sales tax on fuel must be used to support roads, which supplements the excise tax on fuel (also known as the "gas tax"), allowing the excise tax to be lower than necessary.

4. Lane Performance During Times of High Demand

From the DOT's Freeway Management and Operations Handbook:

http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/fmoh_complete_all.pdf, Page 1-18, comes the following:

> As flow increases from zero, density also increases, since more vehicles are on the roadway. When this happens, speed declines because of the interaction of vehicles.

> This decline is negligible at low and medium densities and flow rates. As the density further increases, these generalized curves suggest that speed decreases significantly just before capacity is achieved, with capacity being defined as the product of density and speed resulting in the maximum flow rate. This condition is shown as optimum speed So (often called critical speed), optimum density Do (sometimes referred to as critical density), and maximum flow Vm. (7). In general, this maximum flow (i.e. capacity) occurs at a speed between 35 and 50 mph.
>
> Efficient freeway operation depends on the balance between capacity and demand. In the simplest terms, highway congestion results when traffic demand approaches or exceeds the available capacity of the highway system. As vehicle demand approaches highway capacity, traffic flow begins to deteriorate. Flow is interrupted by spots of turbulence and shock waves, which disrupt efficiency. Then, traffic flow begins to break down rapidly, followed by further deterioration of operational efficiency.

Therefore, when demand is allowed to significantly exceed capacity, the flow rate drops well below optimum. In fact, speed can drop to nearly zero. With no intervention, freeway lanes can be counted on to fail, just when they are needed the most.

5. Demand, Under the Condition of "Full-Cost" Pricing

The price-setting stipulations of "An Example of a Conforming Road-Use Fee Structure", Features 1 through 6 of Condition 1, in conjunction with Condition 2, could be described as "full cost pricing". It is not our responsibility to do an analysis to calculate what the average price per mile would need to be or to then determine how much driving would be reduced in reaction to this price. It could be that driving would decrease so much that congestion would disappear and the new problem would be to figure out what to do with the excess land buried under unneeded highway lanes and how to meet the large new demand for transit.

6. Political Pushback to the Notion of Full-Cost Pricing

There are many, well-funded "think tanks" and political figures and institutions that argue against raising the cost of driving. So far they have been largely successful in keeping the taxes on driving low.

7. Other Opinions That a Pure Fuel Tax Is Becoming Obsolete

There are many indications that more decision makers are adopting the view that the fuel tax either needs to be replaced or supplemented. We have undertaken no comprehensive search and evaluation to quantify this. However the following examples are presented, with the first three being taken from the same NCT article identified in Section-1 of this Section.

First the Chair of the CTC pointed out that, "People are driving more-fuel-efficient cars and ones that run on alternative fuels and buying less gas. As a result, they are paying less in gas taxes". The author of the NCT article states that the CTC Chair and others are calling for "phasing out the gas tax," in favor of a VMT fee.

Second, Will Kempton, director of the California Department of Transportation, told local officials in Valley Center recently "we need to make a transition to a new way of collecting transportation funds." Kempton also said the state should consider following the lead of Oregon, which is exploring a tax based on the number of miles a person drives.

Third, Jim Earp, a California Transportation Commission member from Roseville, added, "Either that or we're going to have to jack up the gas tax considerably."

Fourth, the Christian Science Monitor editorial, February 27, 2009, “A road map to better US roads,” says, “Congress should heed a panel that suggests replacing a tax on gas with one on miles driven.”

http://www.csmonitor.com/2009/0227/p08s01-comv.html It goes on to say, “In Europe, the Netherlands will transition to a VMT by 2014 and Denmark by 2016. Changing behavior is the key to 21st century transport that must unclog crowded highways and reduce dependence on fossil fuels. Taxing miles alerts drivers to the real cost of using roads and can better motivate them to drive less. A VMT (fee) is the more reliable and efficient way to pay for transport. Its time has come.”

Finally, according to a CNN report, http://www.cnn.com/2009/POLITICS/02/20/driving.tax/, Speaking to The Associated Press, Transportation Secretary LaHood, an Illinois Republican, said, "We should look at the vehicular miles program where people are actually clocked on the number of miles that they traveled."

8. Raising a Road-Use Fee Could Be Done By a Simple Majority

The Sacrament Bee printed an article by Dan Walters, on January 20th, 2009, describing a proposal to help close California’s budget gap.

http://www.nctimes.com/articles/2009/01/20/opinion/walters/zd5e9d64561b6efd78825753e006c951a.tx.

The key elements from the article are as follows.

1.) Senate President Pro Tem Darrell Steinberg, the scheme's father, insists that it's legal, basing that assertion on a 5-year-old opinion from the Legislature's legal office.

2.) The plan would eliminate excise and sales taxes on gasoline and raise other taxes to help close the budget deficit, then "backfill" the gasoline taxes with a new "fee" that would actually increase the bite on motorists by 50 percent, from 26 cents a gallon to 39 cents. **A "fee" can be imposed by a simple majority vote as long as it relates to actual services rendered by government.**

Note that this fee approach is relatively far from meeting all of the stipulations of this letter. However, it would represent significant progress.

Arguments in Favor of Road Use Fees

This Section provides an analogy demonstrating why roads should be operated for the equal benefit of all. It presents some of the consequences of the current level of our state fuel tax. It argues that a road-use fee should include a vehicle miles traveled (VMT) component and that furthermore, a component should relate to congestion pricing (i.e. needs to account for *specific* time and place of travel). A road-use fee should account for environmental impacts, should protect low-income families, and contain privacy protections. It explains why revenue from a road use fee should be used to pay an effective property tax to municipalities. It argues that this resolution offers methods that would help to alleviate the state’s budget problems. It states that it is easier to discuss setting a road use fee than it is to discuss increasing an excise tax on fuel. Finally, it briefly discusses some of the emerging technologies and the relationship between technology and this resolution.

1. Full-Cost Pricing

Roads should be priced so that they are no longer an economic burden on those that choose to drive less than average. Yet, it is hard to be objective about roads. Here’s an analogy.

Assume that California owned a large number of 2-bedroom apartments that it allowed families to live in if they paid a tax of $500 a month, even though the market rental value of the apartments was $1000 a month. Clearly, the people living in the apartments are the winners and all the other citizens of California are the losers, because if the state set the price to the market value, it would have additional money that it could either use for the benefit of all citizens or it could return the money to everyone as a tax rebate. Some might note that since there are a large number of these apartments, almost everyone that wants one could get one, so those that don't live in these 2-bedroom apartments are losing out because of their own poor choice. However, since not every citizen wants to live in these apartments, the State's practice is indefensible. The correct thing for the state to do would be to allow low-income citizens to remain in the rental units at the subsidized price of $500 a month, stop calling the price-per-month a "tax" and instead call the price-per-month a "user fee", and set the price for the families that are not low income to the market value of $1000 per month. In this case, the low-income families remain winners. Even though all the others are losers, they are losing much less than before. This assumes that the state takes the additional earnings and uses it in a way that benefits all citizens. Buying more 2-bedroom apartments would not qualify. This analogy's original operation is similar to what California does by underpricing road use fees, as described below.

2. Consequences of the Current Level of Fuel Tax

a. Economic Inequity

Because our state fuel tax is too low, funds derived from taxes (and fees) that are not related to the choice of driving a car must be used to support our system of public roads. Examples are our sales tax, our income tax, our property tax, and the development fees that increase many of our costs. In effect what is happening is that money is systematically *being taken* from those that drive less and *being given* to support those that drive more.

This violates a fundamental principle of our free market system. People should pay for what they use and, conversely, people should not be forced to pay for what they do not use. It is true that we often willingly violate this principle, for some higher purpose. Education, mass transit, and Section 8 housing are good examples. However, there is no valid reason to increase driving by making it artificially cheap to drive, or for that matter, to park a car. The facts about global warming suggest quite the opposite.

b. Global Warming Threat and the California Example of Road-Use Pricing

From http://www.sandiego.edu/EPIC/ghginventory/GHG-On-Road1.pdf.pdf, we learn that in San Diego County, emissions from on-road vehicles are about 46% of regional GHG emissions. Many world leaders know that many of our citizens have taken all of the time and cost variables into account and then built their life around their automobiles. How can we expect the world to do its part to reduce GHG emissions, if they see us unwilling to reform the way we price the use of roads, so as to conform to the basic free-market principles that we claim to hold dear?

c. Other Pollution

Besides GHG emissions it is well known that on-road transportation contributes significantly (around 50% by some accounts) to our air and noise pollution. Cars cause air and water pollution directly and indirectly. This occurs when they are manufactured, when their fuel is transported and refined (refineries are, by far, the biggest cause of ground-water contamination in California), and when they are driven.

d. Urban Sprawl

The dominance of the automobile is the primary reason for our sprawling, urban land-use patterns. For example, it is well known that a simple 4-lane freeway, with frontage roads, can consume 26 acres per mile. An acre of land can only park 117 cars. Sprawl has taken valuable farm land, wet lands, and wild-life habitat. It makes it more difficult to walk or to bicycle. It also makes it more difficult to provide or to use transit.

e. Summary Statement

GHG emissions, urban sprawl and air, water, and noise pollution are made worse by making driving seem artificially inexpensive to the public. Note that for every penny earned by raising the price per mile to drive to its correct value, a penny could be cut from other taxes and fees that are unrelated to driving. Secretary of Transportation Ray LaHood's statement ("we can't raise the gas tax in a recession") shows that he misses this important point. This point has been made by the Sierra Club, as shown in http://www.sierraclub.org/policy/conservation/trans.aspx, where it says, of subsidies to driving, "These subsidies should be publicly scrutinized and eliminated by appropriate fuel and carbon taxes, parking and road user charges, . . ."

3. The Use of the Gasoline *Sales* Tax

As stated in Section III. 3, currently the *sales* tax on fuel must be used for the same purposes as the *excise* tax on fuel. This is contrary to the normal rule for sales taxes, whereby sales taxes are used for general-fund purposes, unrelated to the item sold. For example, the sales taxes from running shoes are not removed from the general fund to be used to build running facilities. Likewise, the sales tax on alcoholic beverages is not separated out to be used to subsidize the building of more drinking establishments. If we are going to end our unfortunate favoritism towards roads, we need to end the practice of using the sales tax from gasoline as if it were an additional fuel excise tax. This practice would be ended if the implied recommendations of this report were enacted. The sales tax on gasoline should continue, but the tax on the sale of gasoline should go to the general fund, as does the tax on the sale of other consumer items.

4. Reasons to Adopt a VMT Based, Road-Use Fee

From a Global Warming perspective, there is a hierarchy of favored transportation modes.

Mode 0: Telecommuting (no need to leave the house)

Mode 1: Walking

Mode 2: Cycling (skate boarding and any other device-aided, non-motorized transportation mode)

Mode 3: Transit

Mode 4: Electric cars or cars that get great mileage

Mode 5: Other cars

In terms of reducing pressure to expand road capacity, Modes 0, 1 and 2 are many times more desirable than even Mode 4, which is many times better than Mode 5. The point here is that as much as we want to see more electric cars and more cars that get exceptional mileage, we should not lose sight of the fact that unless all road users pay their fair share, those people using Modes 0, 1 and 2 are not being fully rewarded for not using road capacity, and this is

poor environmental policy, based on the desirability factors suggested. All cars are large, manufactured devices with a finite life. They promote sprawl. People that routinely use Modes 0, 1 and 2 have often set up their lives so that they could drive less. Those life-style choices need to be fully rewarded. The statements of Sections 2a and 2d of this Section apply.

5. Reasons to Adopt Road-Use Pricing Methods Tied to *Specific* VMT

a. Need to Support Section II's Feature 6

The current fuel tax is simple and, in theory it could be raised to cover the costs of driving, for those vehicles that use fuel. Alternatively, it is easy to imagine odometers that transmit their values at scheduled times to a billing computer. With vehicle-recognition schemes, implemented at the pump or within the billing computer containing odometer data, it would be possible to expand these simple methods to support Features 1 through 5, Feature 7, and Feature 8. However, these simple methods would not support congestion pricing, Feature 6, which is sufficiently important that it must be identified and supported.

b. Value Feature 6: Congestion Pricing

Various names have been proposed for Feature 6, including "congestion pricing" or "convenience pricing". Regardless of the name, it is a powerful way to reduce our society's propensity for expanding highways. Proponents of freeway expansion frequently mention the fact that highway "gridlock" harms our public safety because it can significantly delay emergency vehicles. Individuals in society see this in personal terms. We can all imagine a need to get home to attend to a child, or to get to an emergency room. The consequences of congestion can go well beyond being just a frustrating inconvenience. Sometimes people feel that they would pay almost anything to be able to drive at higher speeds. How many people have missed a plane, or a train, or a critical business meeting, "stuck in traffic"? Besides this, lanes also often support transit. Transit success requires dependable and reasonably fast bus travel. In addition, stop and go traffic wastes fuel, increases GHG, and increases unhealthy emissions.

"Convenience Lanes" could provide an option for drivers when they feel it is worth the extra money to drive beyond congestion speeds. This pricing also provides a means to keep one or more lanes operating close to their theoretical capacity, instead of at the greatly reduced flow rate that comes when demand is large. The pricing can adjust automatically so as to keep demand below capacity, on one or more lanes. This means that congestion in parallel lanes will clear sooner than if all lanes were allowed to stay severely congested.

"Convenience Lanes" also offer the hope of significant revenue generation, if enough people are willing to, in effect, bid up the price. (This will probably happen if the price of driving is kept low enough in regular lanes that there are still times and places where congestion is significant.) Feature 6 would require that proceeds (collection minus collection costs) be used for transit systems that would tend to reduce the congestion. The lanes and roads that are parallel to the "convenience priced" lanes can be counted on to fail to carry their capacity when serious congestion strikes. Fortunately, there is no comparable effect for transit. Although it is conceivable that transit demand could exceed transit carrying capacity, when this happens, the transit can be counted on to continue to carry its full capacity.

c. Feature 6 and Road Price Variability

Some roads are relatively expensive to build; others are relatively inexpensive. There is no reason we have to settle for charging the same per-mile price for all roads. Similarly, driving at different times should be priced differently. It is well understood that freeways are sized and

expanded to facilitate peak driving times. Since it is more costly to provide the added capacity needed at peak times, it is reasonable to charge peak-time drivers more. Charging more at the times that demand is high will tend to smooth out traffic demand over various times of the day.

d. Feature 6 and Pollution

Feature 6 can reduce congestion. This is important because stop-and-go traffic emits more pollution and GHG emissions than lanes operating at "optimum speed" as identified above.

e. Feature 6 Supported by the CTC

These powerful arguments have evidently been recognized by the CTC. In their *Addendum to the 2007 Regional Transportation Plan Guidelines*, *Addressing Climate Change and Greenhouse Gas Emissions During the RTP Process***,** adopted on May 29, 2008, they provide strong support to lane pricing.

http://www.catc.ca.gov/programs/rtp/Adopted_Addendum_2007_RTP_Guidelines.pdf,

In the CTC's Pricing Strategies Section (Page 3), the CTC instructs Metropolitan Planning Organizations to "model adding pricing **to existing lanes**, not just as a means for additional expansion. **Variable/congestion pricing should be considered**."

Variable/congestion pricing cannot be done without Section II's Feature 6 of its Condition 1.

f. Arguments to Support Road-Pricing Guideline

There is widespread confusion regarding who owns existing lanes and what promises were made. Converting existing, "free" lanes to be lanes that are priced can be justified by explaining that fuel taxes have always been road-use fees and that any stated or implied promise that paying fuel tax entitled drivers, for all time forward, to drive free on the roads that the fuel taxes may have been used to fund was specious. Specifically, the claim that drivers "already paid" for roads through the payment of fuel taxes is incorrect because (*i*) many drivers have just started driving; (*ii*) many drivers that paid fuel tax for many years have died; and (*iii*) paying a fee to use a public road is no different than paying rent to use property and paying rent does not lead to quasi ownership. These same arguments can be used against statements supporting the idea that drivers can forever drive free over a bridge because the tolls have paid off the loan for the bridge.

6. Reasons for Features 2 – 5

These features charge vehicles for their environmental impacts.

7. Reasons for Feature 7

The ability of low-income families to be able to drive to work and other essential family errands must be protected. However, given our challenge of global warming, this needs to be "constructive charity". The features shown in Section II suggest that a billing computer will probably be involved. If so, that computer's database can, perhaps at the individual's discretion, be supported with information such as current housing details, current salary, job location, occupation and job skills to include a full resume, childcare, location of family and friends, hobbies, or recreational pursuits, and other items that could be related to the individual's current need to drive. When the software determines that the person qualifies for a reduced multiplier of the full cost of driving (a subsidy), it could then also run various programs to offer, in creative, tailored, form letters, suggestions for changing circumstances to reduce driving. This could involve a search for jobs, a search for suitable housing, a search for daycare, and a search for better locations to pursue hobbies or recreational pursuits. The

availability of transit would be considered in the software and would be offered. Job training could be suggested or offered at a discount. If circumstances support it, the person could also be asked if they would be interested in a class on riding a bicycle in traffic. Taking such a class could earn the person a financial award, perhaps to include a new or used bicycle. The software would put a high priority on helping the person achieve a lifestyle that requires less driving. As a last resort the software would take into account the congestion level of various routes and offer a driving route that requires a reduced subsidy. If no billing computer is involved, the person receiving the subsidy might be required to send in data to support the running of these programs to reduce driving and the subsidy to driving.

8. Reasons for Feature 8

Privacy must be protected, unless confidential disclosure to law enforcement agencies is ordered by a judge based on reasonable cause. We currently rely on laws and judges to protect our privacy regarding what we say on the telephone, our emails, our internet activities, and the information we provide on our tax forms. This information could be both politically revealing and highly embarrassing, to the point where it could seriously degrade our personal and professional lives. In terms of protecting our democracy, it is especially important that our political activities be protected. Where we drive and park a car is also somewhat sensitive in this regard. However, in most cases it is less sensitive than our emails and what we say on the phone. Cell phone companies already have information about our travel. Many locations, such as Dallas, have “toll-tags” that record every time someone goes through a toll plaza and charges them accordingly. The conclusion is that the argument that many people will never accept a computer, with built in privacy protections, from having information about where we drive is overblown and not supported by the facts.

9. Reasons for Condition 2

Railroads pay property tax on the land under their tracks. Utility companies pay property taxes on the land under their transmission lines. There is no reason that large highways should not pay a property tax for the land they take off the tax rolls in each community. The favored status of roads should be eliminated.

10. California’s Budget Problem

California currently has a large budget gap. Children may lose their health care and education cuts will probably be severe. State parks may close. Most state funding for transit may be cut. This strategy might help to reduce some of these cuts.

11. Raising the Fuel Tax vs. Pricing a Road-Use Fee

There are advantages in reframing the question from should we raise the fuel tax to: Should we replace the fuel tax with a road-use fee and, if so, how should we set the price of the road-use fee? Section III. 2 showed that a 2/3rds vote is needed in the state legislature to raise a tax; while, as shown in Section III. 8, only a simple majority is needed to set and then raise a user fee. Besides this, there are a lot of common misunderstandings about our fuel taxes. Many think they are a mechanism whereby drivers somehow buy new roads. This confusion was discussed in detail in this Section’s Subsection 5f. If we can move the discussion to one of how to properly set the price of road use, we will have already made large gains in framing the question to the advantage of environmentalists and everyone that recognizes that it is time to stop favoring driving.

12. Technology

It is not our responsibility to pick the technologies that will ultimately be used in the implementation of the road-use pricing described. Email and phone conversations with employees of "Skymeter", http://www.grushhour.blogspot.com/, indicate that they were ready to respond to a Request For Proposal (RFP) to implement VMT pricing in the Netherlands, to include every road in the country. Their proposal would have been that each car will have a GPS unit, about as large as an eye-glasses case, sitting on the dash. It will contain a database of roads and a variable set of pricing coefficients. The GPS software will determine the car's location with sufficient accuracy so as to support software computing a running tabulation of charges, as the car is driven. They state that the final challenge was to design the software so that the unit would function when the car was being driven in the presence of GPS reflections, such as in city "canyons" which is to say around multiple large buildings. They have solved this problem with additional algorithms and have demonstrated this in the most severe conditions they could find. However, they don't want to have to distinguish between lanes, suggesting that congestion pricing on large multi-lane roads, where pricing varies between parallel lanes, may require a Radio Frequency Identification (RFID) overlay pricing scheme, such as is currently used for "toll tags."

There are probably several, perhaps even many, ways to accomplish road-use pricing that has the features described in this Section.

3.7.2 Conclusions

The best strategies to reduce VMT are shown here, with the estimated driving reductions for each one shown in square brackets:

- Comprehensive (equitable and environmentally sound) road use fee pricing system, as could be installed by *Skymeter*; [15%]
- Unbundling the cost of car parking; [15%] (This estimate is based on Table 1 of Reference 3.)
- Good bicycle projects and bicycle education; [5%,] (This estimate should be checked by the League of American Bicyclists.)
- Stopping all freeway expansions and reconfiguring TRANSNET to be 67% for transit and 33% for road maintenance [10%]

These strategies could be implemented by 2020, not 2035, and would decrease per capita driving by a sum of at least 45% (15+15+5+10). The strategies to do this are primarily those that increase fairness for all, especially families that drive less than average.

Equitable and Environmentally-Sound Car-Parking Policy at a Work Site

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Aug. 30, 2015

Introduction

This paper describes a parking policy that distributes the benefit of parking to all employees, regardless of how often they choose to drive. It does this by

- Charging a fair price for the parking, per unit of time parked, and by
- Giving the total earnings (*total parking-lot earnings*) to the employees, such that each employee's share of the *total parking-lot earnings* is proportion to the time they spend at the work site served by the parking.

The following, additional, optional action would guarantee that no driver loses money under the policy:

- Adding a *must-drive bonus* to each driver's share of the *parking-lot earnings*, if it happened that their share of the *parking-lot earnings* is less than their parking-lot charge. This means that the employee's *must-drive bonus* would be equal to their *parking-lot charge* minus their share of the *parking-lot earnings*.

If an employer decided to pay a *must-drive bonus* to its employees, it would be possible to allow employees to effectively "opt out" of the program so they would not need to be mailed the car-parking statements. The system would feel like "free parking" to them.

Reference 1 describes a more comprehensive policy that will efficiently and conveniently unbundle the cost (or the benefit) of parking in all circumstances. It is available at the following URL: http://sierraclub.typepad.com/files/mike-bullock-parking-paper.pdf.

The system described herein is less complex because it does not include congestion pricing, price predictions, or policies that are unique to on-street parking. These features can be eliminated, because it is assumed that there will be an adequate supply of parking, so no congestion pricing is needed; that the price can be relatively stable, so no price predictions are needed; and finally, that employees can be successfully required to park only in their employee parking, so there is no need for new, on-street parking policies, designed to protect adjoining neighborhoods from the intrusion of additional parked cars. If the adjoining neighborhoods had permit parking with a 2-hour limit for cars with no permit, very few employees would ever park in those neighborhoods, in any case.

Rationale

This system of “unbundled parking cost” will allow all stakeholders to see the actual value of the parking. It will reduce single-occupancy driving to work. Less driving will reduce traffic congestion, air pollution and greenhouse gas (GHG) emissions.

Parking is expensive to provide. Therefore, if no parking had been provided, the saved money could have been invested to increase employee salaries. The method described in this paper allows employees to gain some of that lost salary back, by driving less.

Providing free or underpriced parking only benefits employees that would drive every day, even if they had a method to recover some of their lost salary.

Methods

The parking is operated on the behalf of the employees, as if it were their own business. Those that drive to work are therefore their own customers.

Charge for parking is proportional to time parked and is charged to the employee associated with the car. (A charge rate that is acceptable to all must be established.) For example, if sixty cents per hour is selected, the charging software could round off the parking duration time to the nearest minute and apply a one-cent-per-minute charge. The data-collection method could be implemented with RFID’s on cars being detected at parking-lot entrances and exits. Unauthorized cars coming into the employee parking facilitiy would be identified with license-plate detection and, if a car belonging to a felon is driven into the parking lot, a warning notice could be sent to authorities, if this is desired by the company leaders.

Earnings (net revenue, minus the cost of collection and distribution) are given to the employees; in proportion to the time they spend at the work site. This could be based on an employee’s schedule or, for more accuracy, could be based on “time-at-the-work-site” data, collected using personal radio frequency identification units (RFIDs) and detectors that are tied to a central, implementing computer. The variables used to compute the amount of money to be paid to an employee are shown in Table 1. The corresponding formula is shown in Figure 1.

Parking statements are automatically sent out monthly, showing the individual’s charges and earnings. If desired, the statements could include a *must-drive bonus*, so that no driver losses money under the system. The *must drive bonus* would probably need to come from funds available for employee compensation.

Implementation

Since this is a new system, it would be prudent for the company leaders to have the vendor take the full responsibility for operating the system, for the first 10 years. This arrangement would ensure that the vendor would debug the system and continue to look for operational efficiencies, over the 10 year period. A sliding scale of vendor-compensation could be specified in the contract, as follows: The vendor could operate the system for 10% of the revenue, for the first 5 years; 5% of the revenue, for the next 3 years; and 2% of the revenue, for the final 2 years. For example, if it is assumed that, on average, 600 cars are parked for 8 hours, for 200 days per year, at a rate of 50 cents per hour, then the yearly revenue would be $480,000 per year. The vendor would therefore collect $240,000 over the first 5 years, $72,000 over the next 3 years, and $28,800 over the last two years. Figure 2 shows contact information and excerpts of received emails, from a San Diego vendor. This vendor has stated that the design and installation of a fully-automated system would be easy to perform.

Table 1 Variables Used to Compute an Employee's Monthly Earnings

Definitions to Compute an Employee's Monthly Earnings	
$T_{Employee}$	The Employee's Monthly Time at the Work Site
$T_{AllEmployees}$	Total Monthly Time at the Work Site, All Employees
$E_{AllEmployees}$	Total Monthly Earnings from the Employee Parking

Figure 1 Formula Used to Compute an Employee's Monthly Earnings

$$E_{Employee} = T_{Employee} * (E_{AllEmployees} / T_{AllEmployees})$$

Introducing a New Price Differential, for Driving, Compared to Not Driving

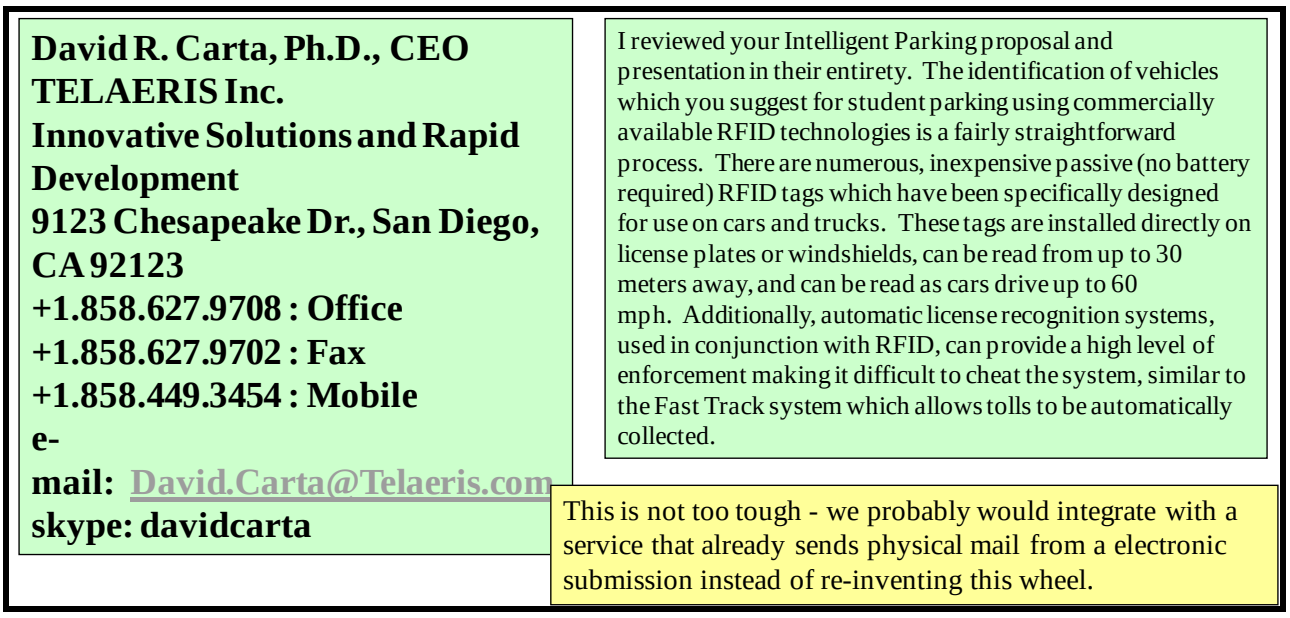
Table 2 shows that introducing a price differential into the choice of how often to drive will decrease the amount of driving.

Other Benefits

Depending on the work site's location and the size of its access roads, there could be a substantial decrease in local congestion, improving the health of all employees and those living near the congestion. This parking policy will show neighbors that the company is working to be a good citizen. This program will encourage active transportation, meaning

modes that provide exercise for the employees. It will also teach the employees the value of parking. It is recommended that the method of determining the selected rate of charge be shared with both the employees and the community at large. This program can be thought of as a demonstration project of a new approach to parking.

Figure 2 One Set of Identified-Vendor Information



Green House Gas Impacts

S-3-05 is a California Governor's Executive Order to drop the state's Year 2020 levels of greenhouse gas (GHG) emissions to the state's level of 1990 emissions and to drop the state's Year 2050 level of GHG emissions to 80% *below* the state's 1990 levels. If the world were to achieve similar reductions, the earth's level of atmospheric C02 would be capped at 450 parts per million (PPM). Figures 3, 4, and 5 show how large 450 PPM is, compared to values over the last 800 thousand years. Reference 2 shows that the goal of S-3-05 is to limit atmospheric C02 to 450 PPM and it also shows that even if this cap is achieved, the risk of a human catastrophe caused by global warming is significant. Reference 3's Figure 1 shows that a significant reduction in driving is critically needed.

Conclusion

Adopting this program would benefit the employer, the employees, and the community, in many ways. They will all gain an added understanding of economics, technology, and the power of the free-market principle that sometimes it is better to have people pay for what they use and not force people to lose money for something they don't use. All the members

of the work-place community could take pride in being part of this pioneering effort to reduce driving and greenhouse gas emissions. It would be a demonstration of the fundamental features of Reference 1. It would set an example for other employers.

Table 2 Eleven Cases of Pricing Impact on the Amount of Driving

Impact of Financial Incentives on Parking Demand			
Location	**Scope**	**1995 dollars per mo.**	**Parking Use Decrease**
Group A: Areas with little or no public transportation			
CenturyCityDistrict, West Los Angeles	3500 employees at 100+ firms	$81	15%
Cornell University, Ithaca, NY	9000 faculty & staff	$34	26%
San Fernando Valley, Los Angeles	1 employer, 850 employees	$37	30%
Costa Mesa, CA		$37	22%
Average for Group		**$47**	**23%**
Group B: Areas with fair public transportation			
Los Angeles Civic Center	10000+ employees, several firms	$125	36%
Mid-Wilshire Blvd., Los Angleles	1 mid-size firm	$89	38%
Washington DC Suburbs	5500 employees at 3 worksites	$68	26%
Downtown Los Angeles	5000 employees, 118 firms	$126	25%
Average for Group		**$102**	**31%**
Group C: Areas with good public transportation			
University of Washington, Seattle Wa.	50,000 faculty, staff & students	$18	24%
Downtown Ottowa, Canada	3500+ government staff	$72	18%
Bellevue, WA	1 firm with 430 employees	$54	39%[2]
Average for Group, but not Bellevue Washington		**$45**	**21%**
Over All Average, Excluding Bellevue Washington			**25%**

[1] **Parking vacancy would be higher!** [2] **Not used, since transit & walk/bike facilities also improved.**

Figure 3 Atmospheric CO2, Increasing Over Recent Decades

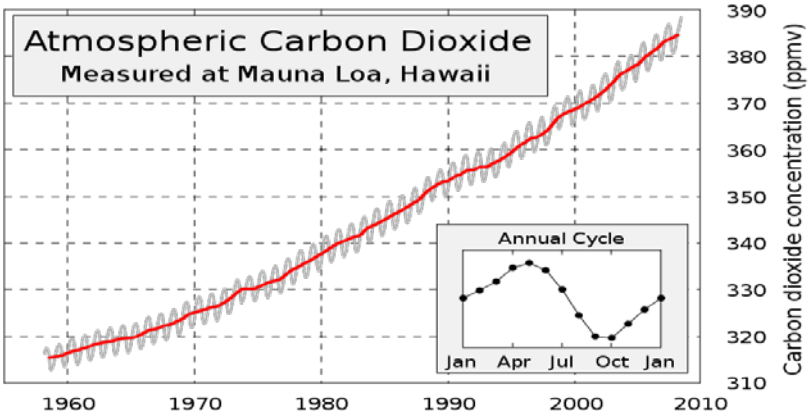


Figure 4 **Atmospheric CO2 and Mean Temperature, 800,000 Years Ago, with 450 PPM C02 Shown**

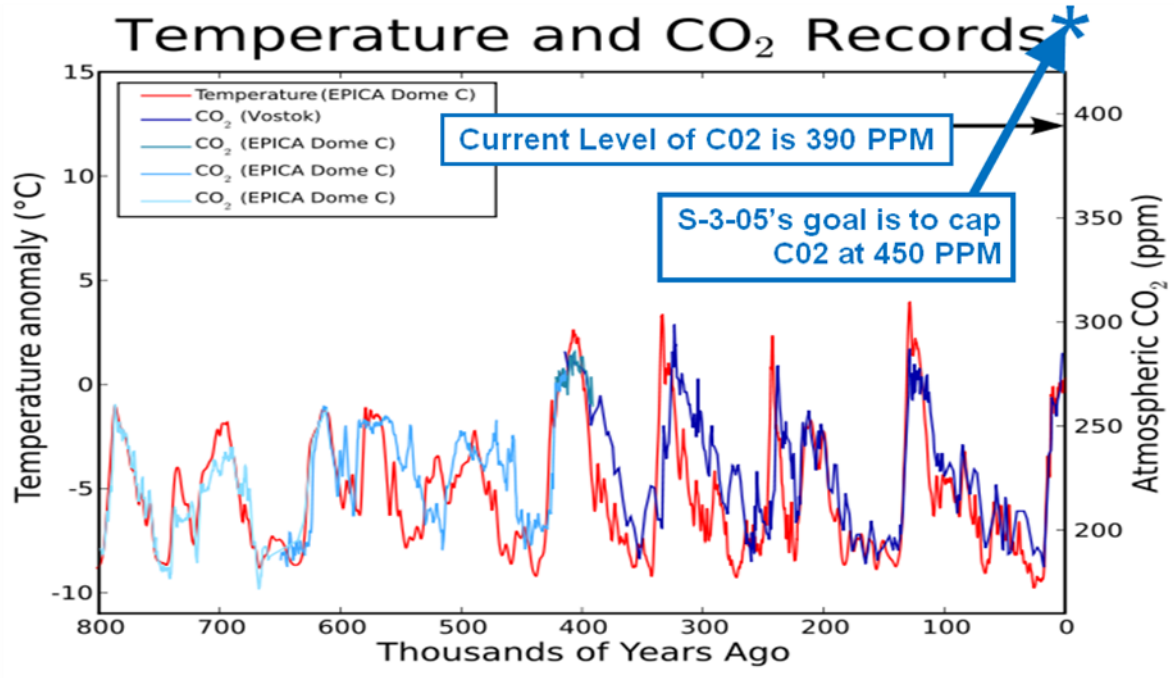
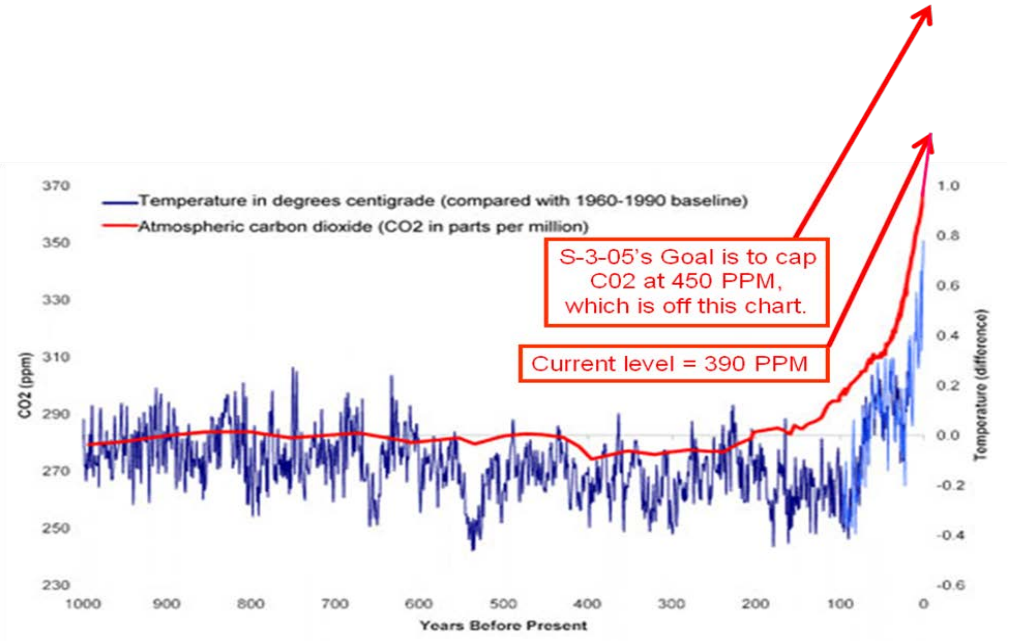


Figure 5 **Atmospheric CO2 and Mean Temperature, Over the Last 1,000 Years**



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1.) *A Plan to Efficiently and Conveniently Unbundle Car Parking Costs***,** Paper 2010-A-554-AWMA of the proceedings of the 103rd Conference and Exhibition of the Air And Waste Management Association; Mike R. Bullock and Jim R. Stewart, PhD; presented on June 22nd, 2010. http://www.sandiego.gov/environmental-services/pdf/sustainable/parkingcosts.pdf.

2.) Letter from *Center for Biological Diversity*, to Elaine Chang, Deputy Executive Officer of Planning, Rule Development, and Area Sources of the South Coast Air Quality Management District**;** *Comments on CAPCOA's Conceptual Approaches Regarding Potential Significance Thresholds for Greenhouse Gas Emissions*; April 17, 2008. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-1/ghg-meeting-1-comment-letter-center-for-biological-diversity.pdf

3.) *Communities Tackle Global Warming*, Tom Adams (California League of Conservation Voters), Amanda Eaken, and Ann Notthoff (Eaken and Notthoff are employees of the Natural Resources Defense Council); June 2009. http://www.nrdc.org/globalwarming/sb375/files/sb375.pdf

SUPERIOR COURT OF CALIFORNIA,
COUNTY OF SAN DIEGO
CENTRAL

MINUTE ORDER

DATE: 04/19/2013 TIME: 03:36:00 PM DEPT: C-72

JUDICIAL OFFICER PRESIDING: Timothy Taylor
CLERK: Patricia Ashworth
REPORTER/ERM: Not Reported
BAILIFF/COURT ATTENDANT:

CASE NO: **37-2012-00101054-CU-TT-CTL** CASE INIT.DATE: 07/20/2012
CASE TITLE: **SIERRA CLUB vs. County of San Diego [E-FILE]**
CASE CATEGORY: Civil - Unlimited CASE TYPE: Toxic Tort/Environmental

APPEARANCES

The Court, having taken the above-entitled matter under submission on 04/19/2013 and having fully considered the arguments of all parties, both written and oral, as well as the evidence presented, now rules as follows:

1. Overview and Procedural Posture.

In this CEQA case, this court for the second time in the last 6 months is required to address the controversial topic of global climate change. The court last addressed this subject in Cleveland Nat'l. Forest Foundation v. SANDAG, Case No. 2011-00101593; that case is now on appeal (D063288). As noted in its December 2012 ruling, this court recognizes it is but a way station in the life of most CEQA cases, and it seems this one will likely fit this pattern.

Because the trial courts are not final, it is important that they be prompt, and the court has done its best in that regard. The petition was filed on July 20, 2012. The case was assigned to Judge Hayes, but the Sierra Club challenged her, and the case was reassigned to Dept. 72. ROA 9, 11. The petition was promptly served. ROA 10.

The parties were first before the court on November 6, 2012, when they sought a hearing date and supplied the court with a stipulated briefing schedule. The court granted the requests. ROA 15, 16. The County filed its answer on January 9, 2013 (ROA 19), and the briefing began in February, 2013. ROA 21-25. The 4300+ page Certified Administrative Record (AR) is contained on a compact disk which was lodged on April 4 (the CD lodged with the opening brief, ROA 22, was either blank or incompatible with the court's aging desktop computers). The court has reviewed the briefing and the record.

Sierra Club contends that the County's June 20, 2012 "Climate Action Plan" (CAP), which is AR 002-126, is insufficient and violates CEQA in several respects: it does not comply with mitigation measures spelled out in the County's 2011 Program EIR (PEIR), adopted in connection with the 2011

General Plan Update (GPU)(AR 0441 ff); it fails to satisfy the requirements for adopting thresholds of significance for greenhouse gas emissions (GHG); and it should have been set forth in a stand-alone environmental document rather than in an addendum to the PEIR. The County denies these claims, and asserts the CEQA challenge is time-barred, the CAP complies with all legal requirements, the use of an addendum was appropriate, and that all relief is barred by the Sierra Club's failure to notify the AG as required by Pub. Res. Code section 21167.7. Although briefed by Sierra Club, neither standing nor exhaustion are challenged by the County.

Following publication of a tentative ruling on April 16, the case was argued on the afternoon of April 19 by Cory Briggs, Esq. on behalf of Sierra Club, and Ellen Pilsecker, Deputy County Counsel, on behalf of the County. The arguments were focused and thoughtful. Following the arguments, the court took the matter under submission. The court's ruling follows.

2. Overview of the CEQA Process.

A. The Court's Role in CEQA Cases.

In Mira Mar Mobile Community v. City of Oceanside, 119 Cal.App.4th 477, 486 (2004) (Mira Mar Mobile Community), the court explained that "[i]n a mandate proceeding to review an agency's decision for compliance with CEQA, [courts] review the administrative record de novo [citation], focusing on the adequacy and completeness of the EIR and whether it reflects a good faith effort at full disclosure. [Citation.] [The court's] role is to determine whether the challenged EIR is sufficient as an information document, not whether its ultimate conclusions are correct. [Citation.]" An EIR is presumed adequate. Pub. Res. Code § 21167.3, subd. (a).

Courts review an agency's action under CEQA for a prejudicial abuse of discretion. Pub. Res. Code § 21168.5. "Abuse of discretion is established if the agency has not proceeded in a manner required by law or if the determination or decision is not supported by substantial evidence." Id.; see Mira Mar Mobile Community, supra, 119 Cal.App.4th at 486; County of San Diego v. Grossmont-Cuyamaca Community College Dist. ("Grossmont"), 141 Cal. App. 4th 86, 96 (2006)(same).

In defining the term "substantial evidence," the CEQA Guidelines state: " 'Substantial evidence' ... means enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached. Whether a fair argument can be made ... is to be determined by examining the whole record before the lead agency. Argument, speculation, unsubstantiated opinion[,] narrative [or] evidence which is clearly erroneous or inaccurate ... does not constitute substantial evidence." CEQA Guidelines, § 15384(a). "In applying the substantial evidence standard, [courts] resolve all reasonable doubts in favor of the administrative finding and decision. [Citation.]" Mira Mar Mobile Community, supra, 119 Cal.App.4th at 486; Grossmont, supra, 141 Cal. App. 4th at 96.
Although the lead agency's factual determinations are subject to the foregoing deferential rules of review, questions of interpretation or application of the requirements of CEQA are matters of law. While judges may not substitute their judgment for that of the decision makers, they must ensure strict compliance with the procedures and mandates of the statute. Grossmont, supra, 141 Cal. App. 4th at 96.

B. The Three Steps of CEQA.

CEQA establishes "a three-tiered process to ensure that public agencies inform their decisions with

environmental considerations." Banker's Hill, et al v. City of San Diego, 139 Cal. App. 4th 249, 257 (2006)("Banker's Hill"); see also CEQA Guidelines, § 15002(k)(describing three-step process).

First Step in the CEQA Process.

The first step "is jurisdictional, requiring that an agency conduct a preliminary review in order to determine whether CEQA applies to a proposed activity." Banker's Hill, supra, 139 Cal. App. 4th at 257; see also Guidelines, § 15060. The Guidelines give the agency 30 days to conduct this preliminary review. (Guidelines, § 15060.) The agency must first determine if the activity in question amounts to a "project." Muzzy Ranch Co. v. Solano County Airport Land Use Com. (2007) 41 Cal.4th 372, 380. "A CEQA ...project falls into one of three categories of activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment (§ 21065.)" Sunset Sky Ranch Pilots Assn. v. County of Sacramento (2009) 47 Cal.4th 902, 907.

As part of the preliminary review, the public agency must also determine the application of any statutory exemptions or categorical exemptions that would exempt the proposed project from further review under CEQA. See Guidelines, § 15282 (listing statutory exemptions); Guidelines, §§ 15300–15333 (listing 33 classes of categorical exemptions). The categorical exemptions are contained in the Guidelines and are formulated by the Secretary under authority conferred by CEQA section 21084(a). If, as a result of preliminary review, "the agency finds the project is exempt from CEQA under any of the stated exemptions, no further environmental review is necessary. The agency may prepare and file a notice of exemption, citing the relevant section of the Guidelines and including a brief 'statement of reasons to support the finding.' " Banker's Hill, supra, 139 Cal.App.4th at 258, citing Guidelines, §§ 15061(d), 15062(a)(3).

Second Step in the CEQA Process.

If the project does not fall within an exemption, the agency proceeds to the second step of the process and conducts an initial study to determine if the project may have a significant effect on the environment. (Guidelines, § 15063.) If, based on the initial study, the public agency determines that "there is substantial evidence, in light of the whole record ... that the project may have a significant effect on the environment, an environmental impact report [(EIR)] shall be prepared." [CEQA, § 21080(d).] On the other hand, if the initial study demonstrates that the project "would not have a significant effect on the environment," either because "[t]here is no substantial evidence, in light of whole record" to that effect or the revisions to the project would avoid such an effect, the agency makes a "negative declaration," briefly describing the basis for its conclusion. (CEQA, § 21080(c)(1); see Guidelines, § 15063(b)(2); Banker's Hill, supra, 139 Cal.App.4th at 259.)

The Guidelines and case law further define the standard that an agency uses to determine whether to issue a negative declaration. "[I]f a lead agency is presented with a fair argument that a project may have a significant effect on the environment, the lead agency shall prepare an EIR even though it may also be presented with other substantial evidence that the project will not have a significant effect." (Guidelines, § 15064(f)(1), italics added.) This formulation of the standard for determining whether to issue a negative declaration is often referred to as the "fair argument" standard. See Laurel Heights Improvement Assn. v. Regents of University of California, 6 Cal.4th 1112, 1134–1135 (1993). Under the fair argument standard, a project "may" have a significant effect whenever there is a "reasonable possibility" that a significant effect will occur. No Oil v. City of Los Angeles, 13 Cal.3d 68, 83-84 (1974). Substantial evidence, for purposes of the fair argument standard, includes "fact, a reasonable assumption predicated upon fact, or expert opinion supported by fact." § 21080, subd. (e)(1).

Substantial evidence is not argument, speculation, unsubstantiated opinion or narrative, evidence that is clearly inaccurate or erroneous, or evidence of social or economic impacts unrelated to physical impacts on the environment. § 21080, subd. (e)(2).

If the initial study reveals no substantial evidence that the project may have a significant environmental effect, the agency may adopt a negative declaration. Pub. Res. Code § 21080, subd. (c)(2); Guidelines, § 15070, subd. (b); Grand Terrace, supra, 160 Cal.App.4th at 1331; Save the Plastic Bag Coalition v. City of Manhattan Beach, 52 Cal. 4th 155, 175 (2011)(holding common sense is part of the substantial evidence analysis). "Alternatively, if there is no substantial evidence of any net significant environmental effect in light of revisions in the project that would mitigate any potentially significant effects, the agency may adopt [an MND]. [Citation.] [An MND] is one in which '(1) the proposed conditions "avoid the effects or mitigate the effects to a point where clearly no significant effect on the environment would occur, and (2) there is no substantial evidence in light of the whole record before the public agency that the project, as revised, may have a significant effect on the environment." (§ 21064.5 . . . .)' [Citations.]" Grand Terrace, supra, at 1331-1332. The MND allows the project to go forward subject to the mitigating measures. Pub. Res. Code §§ 21064.5, 21080, subd. (c); see Grand Terrace, supra, 160 Cal. App. 4th at 1331.

Third Step in the CEQA Process.

If no negative declaration is issued, the preparation of an EIR is the third and final step in the CEQA process. Banker's Hill, supra, 139 Cal. App. 4th at 259; Guidelines, §§ 15063(b)(1), 15080; CEQA, §§ 21100, 21151.

C. The Environmental Impact Report.

Central to CEQA is the EIR, which has as its purpose informing the public and government officials of the environmental consequences of decisions before they are made. [Citation.] "An EIR must be prepared on any 'project' a local agency intends to approve or carry out which 'may have a significant effect on the environment.' Pub. Res. Code §§ 21100, 21151; Guidelines, § 15002, subd. (f)(1). The term 'project' is broadly defined and includes any activities which have a potential for resulting in a physical change in the environment, directly or ultimately. Pub Res. Code § 21065; Guidelines, §§ 15002, subd. (d), 15378, subd. (a); [Citation].) The definition encompasses a wide spectrum, ranging from the adoption of a general plan, which is by its nature tentative and subject to change, to activities with a more immediate impact, such as the issuance of a conditional use permit for a site-specific development proposal." CREED v. City of San Diego, 134 Cal. App. 4th 598, 604 (2005).

"To accommodate this diversity, the Guidelines describe several types of EIR's, which may be tailored to different situations. The most common is the project EIR, which examines the environmental impacts of a specific development project. (Guidelines, § 15161.) A quite different type is the program EIR, which 'may be prepared on a series of actions that can be characterized as one large project and are related either: (1) Geographically, (2) As logical parts in the chain of contemplated actions, (3) In connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program, or (4) As individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.'" Guidelines, § 15168, subd. (a); CREED, supra, 134 Cal. App. 4th at 605. As the court held in CREED, a program EIR may serve as the EIR for a subsequently proposed project only to the extent it contemplates and adequately analyzes the potential environmental impacts of the project. CREED, supra, 134 Cal. App. 4th at 615.

As noted in part 1 above, the EIR at issue in this case is of the latter variety, a PEIR.

Under CEQA, an EIR is presumed adequate (Pub. Resources Code, § 21167.3), and the plaintiff in a CEQA action has the burden of proving otherwise. (Preserve Wild Santee v. City of Santee, 210 Cal. App. 4th 260, 275 (2012), internal quotation marks omitted, quoting Concerned Citizens of South Central L.A. v. Los Angeles Unified School Dist. (1994) 24 Cal.App.4th 826, 836.) Courts review an agency's determinations and decisions for abuse of discretion. An agency abuses its discretion when it fails to proceed in a manner required by law or there is not substantial evidence to support its determination or decision. [§§ 21168, 21168.5; Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova (2007) 40 Cal.4th 412, 426-427 (2007) ("Vineyard")]. "Judicial review of these two types of error differs significantly: While [courts] determine de novo whether the agency has employed the correct procedures, 'scrupulously enforc[ing] all legislatively mandated CEQA requirements' [citation], [courts] accord greater deference to the agency's substantive factual conclusions." (Vineyard, supra, 40 Cal. 4th at 435.)

Consequently, in reviewing an EIR for CEQA compliance, courts adjust "scrutiny to the nature of the alleged defect, depending on whether the claim is predominantly one of improper procedure or a dispute over the facts." (Vineyard, supra, 40 Cal.4th at 435.) For example, where a petitioner claims an agency failed to include required information in its environmental analysis, the court's task is to determine whether the agency failed to proceed in the manner prescribed by CEQA. Conversely, where a petitioner challenges an agency's conclusion that a project's adverse environmental effects are adequately mitigated, courts review the agency's conclusion for substantial evidence. (Vineyard, supra, 40 Cal. 4th at 435.)

D. Further Requirements of CEQA.

In addition to the foregoing public process/decision maker information steps, the Legislature in enacting CEQA also intended to "provide certain substantive measures for protection of the environment. [Citations.] In particular, one court noted [Public Resources Code] section 21002 requires public agencies 'to deny approval of a project with significant adverse effects when feasible alternatives or feasible mitigation measures can substantially lessen such effects.' [Citation.] (Quail Botanical Gardens Foundation, Inc. v. City of Encinitas (1994) 29 Cal.App.4th 1597, 1601-1602, citing No Oil, Inc. v. City of Los Angeles (1974) 13 Cal.3d 68, 75 and Laurel Heights Improvement Assn. v. Regents of University of California (1993) 6 Cal.4th 1112, 1123 . . . .). The Legislature declared its intention in enacting CEQA "that all public agencies responsible for regulating activities affecting the environment give prime consideration to preventing environmental damage when carrying out their duties. [Citations.] CEQA is to be interpreted 'to afford the fullest possible protection to the environment within the reasonable scope of the statutory language.' " (Mountain Lion Foundation v. Fish & Game Com. (1997) 16 Cal.4th 105, 112.)

3. RFJN.

Sierra Club, with its reply briefing, filed a Request for Judicial Notice to which was attached a copy of the AG's letter acknowledging receipt of a copy of the petition in July of 2012 (shortly after it was filed). The court grants the request for judicial notice under Evid. Code section 452(c) and (g). This conclusively eliminates the County's third affirmative defense and the argument under Pub. Res. Code section 21167.7 contained on pp. 14-15 of the County's brief. In fact, this argument was meritless from the outset, as Sierra Club filed a proof of service on the AG last July (ROA 8). In other words, the County's

argument that "the case file contains no indication that [the AG notification requirement] was met" was demonstrably untrue when the County's answer was filed and when it brief was filed. County Counsel forthrightly acknowledged this at the April 19 hearing.

4. Discussion and Ruling.

Former Governor Schwarzenegger issued, in 2005, Executive Order S-03-05, which for the first time set a state goal of reducing greenhouse gas emissions. This Executive Order gave rise to the Global Warming Solutions Act of 2006 (AB 32), which is codified at H&S Code section 38500 et seq. Section 38550 provides:

"By January 1, 2008, the [Air Resources Board] shall, after one or more public workshops, with public notice, and an opportunity for all interested parties to comment, determine what the statewide greenhouse gas emissions level was in 1990, and approve in a public hearing, a statewide greenhouse gas emissions limit that is equivalent to that level, to be achieved by 2020. In order to ensure the most accurate determination feasible, the state board shall evaluate the best available scientific, technological, and economic information on greenhouse gas emissions to determine the 1990 level of greenhouse gas emissions."

In the 2011 PEIR for the GPU, the County concluded that the GHG and climate-change impacts from the County's own operations and from community sources were "potentially significant" both in relation to compliance with AB 32 and with regard to the updated general plan itself. AR 488 (end of first paragraph under "Summary"), 493 (end of "Summary" paragraph). Consequently, the County had to adopt a series of mitigation measures to render these impacts insignificant. AR 494-500. Among those mitigation measures was CC-1.2, which is the focus of Sierra Club's attack:

"Prepare a County Climate Change Action Plan with an update[d] baseline inventory of greenhouse gas emissions from all sources, more detailed greenhouse gas emissions reduction targets and deadlines; and a comprehensive and enforceable GHG emissions reduction measures that will achieve a 17% reduction in emissions from County operations from 2006 by 2020 and a 9% reduction in community emissions between 2006 and 2020. Once prepared, implementation of the plan will be monitored and progress reported on a regular basis." [AR 496]

The County undertook to prepare the CAP, in accordance with Mitigation Measure CC-1.2, within six months [AR 313-314]. The County did not do so; the CAP was not approved until nearly a year after the PEIR was certified.

The central questions in this case are whether the CAP was properly approved, and whether it meets the requirements of Mitigation Measure CC-1.2. Thus, the court rejects the County's first affirmative defense which is addressed on pp. 5-7 of the County's brief. These arguments are premised on the notion that because the GPU and PEIR were adopted in the summer of 2011, an action filed in July of 2012 cannot pass muster under the 180 day limitations period of Pub. Res. Code section 21167. But the court agrees with Sierra Club that the gravamen of its petition is not an attack on the PEIR, but rather an effort to enforce the PEIR's requirement of enforceable mitigation measures. The case law relied on by the County all arose in settings in which the mitigation measures themselves were challenged as inadequate, or the cases are otherwise inapplicable. This case was filed 30 days after the June 20, 2012 approval by the County of the CAP, and it is not time-barred.

Regarding the first central question identified above: the court finds the CAP should have been the subject of a supplemental EIR instead of an addendum to the PEIR that concluded the CAP is within the scope of the PEIR. (AR 16:1372, second sentence of last paragraph.) Thus, the CAP was not properly approved and violates CEQA.

There is no explanation and no substantial evidence to justify why the CAP was not subject to a supplemental EIR with public notice and opportunity for comment. There is no showing that the County properly considered whether the CAP is within the scope of the PEIR; a supplemental EIR would require the Board of Supervisors to confront this issue. Further, environmental review is necessary to ascertain whether the CAP met the necessary GHG emission reductions when considering the CAP is merely hortatory and contains no enforcement mechanism for reducing GHG emissions.

In this regard, the case has some similarities to Center for Sierra Nevada Conservation v. County of El Dorado (2012) 202 Cal.App.4th 1156 (County of El Dorado). That case, like this one, involved a program EIR for a general plan. Id. at 1175. One of the mitigation measures called for implementation of a mitigation fee program. The county later did an initial study for the fee program, and stopped short of a more complete environmental review. The court of appeal held a tiered EIR was required to examine the specific mitigation measures and fee rate, rejecting the argument that the fee program was merely implementation of the general plan. Here, the CAP "provides the specific details associated with the ... General Plan ... strategies and measures for greenhouse gas (GHG) emissions and reductions that were not available during program-level analysis of the General Plan" (AR 16:1357), and as such, the CAP should have been the subject of a supplemental EIR [as opposed to an IS followed by addendum to the PEIR]. Thus, the CAP was not properly approved and violated CEQA.

Turning to the second central question identified above: the court finds that even if the CAP was properly approved, it does not comport with the requirements of Mitigation Measure CC-1.2; thus, the CAP violates CEQA. In this regard, there is no substantial evidence in the AR that the CAP satisfies Mitigation Measure CC-1.2; in fact, the evidence in the AR discloses the reverse is true.

For instance, the AR shows the CAP fails to meet Mitigation Measure CC-1.2 GHG emission reduction goals and targets. The CAP admits "The CAP itself does not itself ensure reductions ..." [AR 2:74]; the CAP regards its goals and strategies as mere recommendations [AR 2:27 - "The goals and strategies recommended in the CAP ..."]; and the CAP describes itself as a "living document," a "working document," and "a platform for the County to build strategies to meet its emission-reduction targets" [AR 2:15, 73.] As the court noted in its December 2012 decision, the County's adoption of the CAP occurs "in a setting in which hundreds of thousands of people in [the County] live in low-lying areas near the coast, and are thus susceptible to rising sea levels associated with global climate change." There is no time for "building strategies" or "living documents;" as the PEIR quite rightly found, enforceable mitigation measures are necessary now.

The AR shows the CAP contains no detailed deadlines for GHG emission reductions. This is borne out by the consultant who prepared the CAP for the County pointing out early on "[t]he Draft CAP neglects to describe how the County will monitor the effectiveness of the plan and its component measures over time" [AR 83:1947, last paragraph]; the County's admission "the CAP did not set such dates" [County's opposition memorandum, page 11:21-22]; and the word "deadline" appears but once in the CAP, in describing Mitigation Measure CC-1.2 [AR 2:76.]

Further, the AR shows the CAP contains no enforcement mechanism for reducing GHG emissions. The

CAP's goals and strategies are mere recommendations [AR 2:27 - "The goals and strategies recommended in the CAP..."]; there is no indication in the CAP how the measures described for community activities (Chapter 3) and the County's operations (Chapter 4) can or will be enforced [AR 2:26-57, 59-63]; the County contends five of the CAP's twenty-seven GHG reduction measures are required under state law and thus enforceable but fails to address the other twenty-two reduction measures [County's opposition memorandum, page 9:1-8; and Exhibit A to County's opposition memorandum]; and no evidence is related in the AR that supports the "belief" of the County staffer that GHG emissions reductions can be achieved through only education and incentives [AR 20:1581 and AR 23:1629 -"It is important to note that, as currently written, none of these measures are mandates. We believe that the emission reduction can be achieved through education and incentives."]

At the April 19 argument, County Counsel suggested that some of the absent benchmarks can be found in the Minutes of the Board reflecting its approval of the CAP. Having reviewed the minutes, the court agrees with Sierra Club that the minutes do not set forth enforceable standards or create any mandatory duty that could later be enforced if not carried out.

As such, the CAP, even if it was properly approved, does not comport with the requirements of Mitigation Measure CC-1.2, and thus violates CEQA.

In view of the foregoing, the court finds it unnecessary to address the subsidiary dispute over whether the guidelines for determining thresholds of significance for GHG were adopted or not. Compare Natter v. Palm Desert Rent Review Comm'n., 190 Cal. App. 3d 994, 1001 (1987); Young v. Three for One Oil Royalties, 1 Cal. 2d 639, 647-648 (1934).

Let a writ of mandate issue forthwith, directing respondent the County of San Diego to set aside its June 20, 2012 approval of the CAP. Counsel for petitioners is directed to forthwith submit same to the court for signature.

IT IS SO ORDERED.

Judge Timothy Taylor

First Update to the Climate Change Scoping Plan

Building on the Framework

From: http://www.arb.ca.gov/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf

B. Achieving Climate Stabilization

Scientific research indicates that an increase in the global average temperature of 2°C (3.6°F) above pre-industrial levels, which is only 1.1°C (2.0°F) above present levels, poses severe risks to natural systems and human health and well-being. Considering knowledge from the paleo-climate record with changes currently observed in the Greenland and Antarctic ice sheets, we can expect substantial sea level rise, 0.4 to 0.8 meters, with upper end uncertainties approaching one meter above present day during the 21st Century and continued substantial increase after 2100 even with stringent mitigation of emissions to achieve 2°C stabilization. Increased climate extremes, already apparent at present day climate warming (~0.9°C), will no doubt be more severe. To have a good chance (not a guarantee) of avoiding temperatures above those levels, studies focused on a goal of stabilizing the concentration of heat-trapping gases in the atmosphere at or below the 450 parts per million (ppm) CO2-equivalent (CO2e, a metric that combines the climate impact of all well-mixed GHGs, such as methane and nitrous oxide, in terms of CO2).

The CO2e target is a somewhat approximate threshold, and the exact level of CO2e is not precisely known because the sensitivity of the climate system to GHGs has uncertainty. Different models show slightly different outcomes within this range. **An example of a pre-IPCC assessment study (Meinshausen et al. 2009)15 which has synthesized many studies on climate sensitivities, concluded that we would need to stabilize at about 400 ppm CO2e (Bullock note: We have already exceeded 400 PPM!!!!!!!!!) in order to likely avoid exceeding the 2°C threshold (even at that stabilization target, there is still about a 20 percent chance of exceeding the temperature target).** Further, a recent paper by an international team of scientists (**Hansen et al. 2013**)16 asserts that the **widely accepted target of limiting human-made global climate warming to 2°C above preindustrial levels is likely too high and may subject future generations and nature to irreparable harm. Recognizing this fact, the international community agreed in meetings in Cancun in 2012 to review, by 2015, progress to the 2°C target and consider whether it should be strengthened to a 1.5°C threshold.**

What is important to recognize in these studies of warming thresholds is the critical importance of non-CO2 gases, particularly the short-lived climate pollutants. For example, to avoid 2°C warming at a 66 percent confidence level, total carbon emissions (as CO2e) must be kept to 1000 GtC. Considering that we have already emitted about 500 GtC, which leaves 500 GtC to be divided up among nations. If the non-CO2 gases are included then

the total CO2e emissions are at 790 GtC, leaving only 210 GtC to be emitted. Thus, there is a compelling case to reduce the short-lived climate pollutants.
In early May 2013, the Mauna Loa monitoring station, which has been shown to provide excellent measurements of CO2 throughout the global atmosphere, recorded atmospheric CO2 of 400 ppm,17 substantially higher than the 316 ppm recorded when the station made its first measurements in 1958. The monitoring station offers the longest-running record of atmospheric CO2 measured directly from the air. This recent reading will take a few years to become the international average; however, reaching 400 ppm at Mauna Loa is significant and has surpassed a worrisome milestone.

Although stabilizing atmospheric GHG concentration below 450 ppm CO2e is important, it does not mean that once that level is reached, temperatures will immediately level off. Because of time lags inherent in the Earth's climate, the initial warming that occurs in response to a given increase in the concentration of CO2 ("transient climate change") reflects only about half the eventual total warming ("equilibrium climate change").

Observational data reveal that, in recent decades, some climate extremes are already increasing in response to relative modest warming; these extremes would likely increase considerably with warming of 2°C or more. While the findings suggest that even at relatively low levels of global warming the world will have to face significant sea level rise, the studies also demonstrate that the potential impacts are substantially greater if we allow warming to reach a level as high as 2°C. If they occur, changes such as these would not rapidly reverse, as even if the atmospheric CO2 amount declines, it would take many centuries for the deep ocean to cool.

To prevent exceeding 450 ppm CO2e, developed countries must substantially reduce their emissions in the near term. The 2008 World Energy Outlook suggests that Organization for Economic Co-operation and Development (OECD) countries must reduce emissions by about 40 percent below 2006 levels by 2030.18 The Union of Concerned Scientists has suggested a 2030 emissions target for the United States of 56 percent below 2005 levels (44 percent below 1990 levels).19 A governmental study from the Netherlands finds that Europe would have to reduce emissions by 47 percent below 1990 levels and the United States would have to reduce emissions by 37 percent below 1990 levels by 2030.20 The International Energy Agency comes to a similar conclusion, finding that the United States would have to reduce emissions by about 38 percent below 1990 levels by 2030.21 Note that percent reductions by 2030 depend on the assumed overall trajectory of emissions, including the amount after 2030.

Because of the cumulative effects of GHG emissions and resultant changes to the earth's energy balance and the inertia in the climate system, delaying efforts to reduce emissions will likely mean that global average temperature will increase by more than 2°C, increasing the costs associated with combatting climate change. Reducing the global concentration to 450 ppm CO2e after delaying mitigation actions for ten more years is estimated to cost an additional $3.5 trillion, compared to levels of investment needed now if low-carbon strategies were to be adopted immediately.22

From : http://www.cadem.org/our-california/platform/2016-platform-energy-and-environment

From the 2016 California Democratic Party (CDP) Platform

Transportation

- Support vehicle regulations to provide healthier air for all Californians, support strong and workable low-emission and zero-emission vehicle standards that will continue to be a model for the country, support Clean Vehicle Incentive programs to include the installation of charging infrastructure, and provide assistance to small businesses to meet the low-emission standards;
- Demand Regional Transportation Plan (RTP) driving-reduction targets, shown by science to support climate stabilization;
- Work for equitable and environmentally-sound road and parking operations; Support strategies to reduce driving, such as smart growth, “complete streets”; teaching bicycling traffic skills; and improving transit, from local systems to high speed rail
- Work for shared, convenient and value-priced parking, operated with a system that provides earnings to those paying higher costs or getting a reduced wage, due to the cost of providing the parking; and,
- Demand a state plan showing how cars and light-duty trucks can hit climate-stabilizing targets, by defining enforceable measures to achieve the needed fleet efficiency and per-capita driving;
- Support policies, including tax policies and the use of Greenhouse Gas Reduction Fund (GGRF) grants, that empower business owners, especially small business owners, to make investments in transportation infrastructure to ensure that freight moves by lower-emission local, short-line freight railroads, instead of adding to highway congestion and pollution.

Climate-Stabilizing, California Light-Duty Vehicle Requirements, Versus Air Resource Board Goals

Paper 881

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ABSTRACT

An Introduction is provided, including the importance of light-duty vehicles (LDVs: cars and light duty trucks) and a definition of the top-level LDV requirements to limit their carbon dioxide ("CO2") emissions.

Anthropogenic climate change fundamentals are presented, including its cause, its potential for harm, California mandates, and a greenhouse gas (GHG) reduction road map to avoid disaster.

A 2030 climate-stabilizing GHG reduction target value is calculated, using statements by climate experts. The formula for GHG emissions, as a function of per-capita driving, population, fleet CO2 emissions per mile, and the applicable low-carbon fuel standard (LCFS) is given. The ratio of the 2015 value of car-emission-per-mile to the 2005 value of car-emission-per-mile is obtained.

Internal Combustion Engine (ICE) mileage values from 2000 to 2030 are identified, as either mandates or new requirements. A table is presented that estimates 2015 LDV fleet mileage.

Zero Emission Vehicle (ZEV) parameters are given. A table is shown that uses 2030 ZEV and ICE (ICE LDVs) requirements, named the "Heroic Measures" case, to compute the LDV fleet-equivalent mileage. That equivalent fleet mileage is used, with population and the required emission reduction, to compute a required per-capita driving reduction, with respect to 2005. Measures to achieve this per-capita driving reduction are described, with reductions allocated to each measure. The energy used per year for the Heroic Measures case is estimated

The "Heroic Measures" set of fractions of ZEV's purchased, as a function of year, is compared to the California Air Resources Board (CARB) goals.

INTRODUCTION

Within the context of working the anthropogenic-climate-change problem and from a systems engineering perspective, the top-level requirement is to reduce greenhouse gas (GHG) emissions enough to support stabilizing our climate at a livable level. This top-level requirement must flow down to the subsystem of LDVs, especially due to the magnitude of their emissions. (As an example, LDVs emit 41% of the GHG in San Diego County[1].)

More specifically, LDV requirements will be identified that, taken together, will result in GHG emission reductions sufficient to "support climate stabilization". "Support climate stabilization" means that the LDV emission level will be equal to a climate-stabilizing target. Such a target is expressed as an emission level in some target year. The target is based on climate science.

From a systems engineering perspective, at the top level, the needed LDV requirements are

- LDV fleet efficiency, meaning the greenhouse gas (GHG) emissions per mile driven, applicable to the entire fleet, on the road in the year of interest and
- an upper bound on per-capita driving, given the derived fleet efficiency and the predicted population growth.

The fleet efficiency requirement will be developed as a function of lower-level requirements, such as Corporate Average Fuel Efficiency (CAFÉ) requirements, requirements on how fast Battery Electric Vehicles (BEVs) must be added into the fleet each year, and requirements to get low-efficiency vehicles off the roads. The second top-level requirement, the upper bound on per-capita driving, will spawn transportation-system requirements designed to result in less driving, such as better mass transit. This paper will derive a formulae to compute the required per-capita driving levels, based on fleet efficiency, predicted population growth, and the latest, science-based, climate-stabilizing GHG emission target.

In this work, three categories of LDV emission-reduction strategies will be considered: cleaner cars, cleaner fuels, and less driving.

BACKGROUND: OUR ANTHROPOGENIC CLIMATE CHANGE PROBLEM

Purpose of This Section

Before going to work to solve a systems-engineering problem, it is important to understand the nature of the problem. How complex is the problem? How much is at stake if the problem is not solved? Is it reasonable to take a chance and only solve the problem with a reasonably high probability or is there too much at stake to gamble? This section is an attempt to answer these questions.

Basic Cause

Anthropogenic climate change is driven by these two processes[2]: First, our combustion of fossil fuels is adding "great quantities" of CO_2 into our atmosphere. Second, that additional atmospheric CO_2 is trapping additional heat.

California's First Three Climate Mandates

California's Governor's Executive Order S-3-05[3] is similar to the Kyoto Agreement and is based on the greenhouse gas (GHG) reductions that were recommended by climate scientists for industrialized nations back in 2005. In 2005, many climate scientists believed that the reduction-targets of S-3-05 would be sufficient to support stabilizing Earth's climate at a livable level, with a reasonably high level of certainty. More specifically, this executive order aims for an average, over-the-year, atmospheric temperature rise of "only" 2 degree Celsius, above the preindustrial temperature. It attempts to do this by limiting our earth's level of atmospheric CO_2_e to 450 PPM by 2050 and then reducing emissions further, so that atmospheric levels would come down to more tolerable levels in subsequent years. The S-3-05 emission targets are 2000 emission levels by 2010, 1990 levels by 2020, and 80% below 1990 levels by 2050.

It was thought that if the world achieved S-3-05, there might be a 50% chance that the maximum temperature rise will be less than 2 degrees Celsius, thus leaving a 50% chance that it would be larger than 2 degrees Celsius. A 2 degree increase would put over a billion people on the planet into a condition described as "water stress" and it would mean a loss of 97% of the earth's coral reefs.

There would also be a 30% chance that the temperature increase would be greater than 3 degrees Celsius. A temperature change of 3 degree Celsius is described in Reference 3 as being "exponentially worse" than a 2 degree Celsius increase.

The second California climate mandate is AB 32, the *Global Warming Solutions Act of 2006*. It includes provisions for a cap and trade program, to ensure meeting S-3-05's 2020 target of the 1990 level of emissions. It continues after 2020. AB 32 requires CARB to always implement measures that achieve the maximum *technologically feasible and cost-effective* (words taken from AB 32) greenhouse-gas-emission reductions.

In 2015 Governor Brown signed Executive Order B-30-15. This Executive Order established a mandate to achieve an emission level of 40% below 2020 emissions by 2030, as can be seen by a Google search. If Executive Order S-3-05 is interpreted as a straight line between its 2020 target and its 2050 target, then the B-30-15 target of 2030 is the same as S-3-05's implied target of 2035, because 2035 is halfway between 2020 and 2050 and 40% down is halfway to 80% down.

California is on track to achieve its S-3-05 second (2020) target. However, the world emission levels have, for most years, been increasing, contrary to the S-3-05 trajectory. In part because the world has been consistently failing to follow S-3-05's 2010-to-2020 trajectory, if California is still interested in leading the way to stabilizing the climate at a livable level, it must do far better than S-3-05, going forward, as will be shown.

Failing to Achieve these Climate Mandates

What could happen if we fail to achieve S-3-05, AB 32, and B-30-15 or if we achieve them but they turn out to be too little too late and other states and countries follow our example?

It has been written[4] that, "A recent string of reports from impeccable mainstream institutions-the International Energy Agency, the World Bank, the accounting firm of PricewaterhouseCoopers-have warned that the Earth is on a trajectory to warm by at least 4 Degrees Celsius and that this would be incompatible with continued human survival."

It has also been written[5] that, "Lags in the replacement of fossil-fuel use by clean energy use have put the world on a pace for 6 degree Celsius by the end of this century. Such a large temperature rise occurred 250 million years ago and extinguished 90 percent of the life on Earth. The current rise is of the same magnitude but is occurring faster."

Pictures That Are Worth a Thousand Words

Figure 1 shows (1) atmospheric CO_2 (in blue) and (2) averaged-over-a-year-then-averaged-over-the surface-of-the-earth world atmospheric temperature (in red). This temperature is with respect to a recent preindustrial value. The data starts 800,000 years ago. It shows that the current value of atmospheric CO_2, which is now over 400 PPM, far exceeds the values of the last 800,000 years. It

also shows that we should expect the corresponding temperature to eventually be about 12 or 13 degrees above preindustrial temperatures. This would bring about a human disaster[3,4,5].

Figure 2 shows the average yearly temperature with respect to the 1960-to-1990 baseline temperature (in blue). It also shows atmospheric levels of CO_2 (in red). The S-3-05 goal of 450 PPM is literally "off the chart", in Figure 2. Figure 2 shows that, as expected, temperatures are starting to rise along with the increasing levels of CO_2. The large variations in temperature are primarily due to the random nature of the amount of solar energy being received by the earth.

FURTHER BACKGROUND: CALIFORNIA'S SB 375 AND AN IMPORTANT DATA SET

As shown in the Introduction, LDVs emit significant amounts of CO_2. The question arises: will driving need to be reduced or can cleaner cars and cleaner fuels arrive in time to avoid such behavioral change? Steve Winkelman, of the Center for Clean Air Policy (CCAP), worked on this problem.

SB 375, the *Sustainable Communities and Climate Protection Act of 2008*

Under SB 375, the California Air Resources Board (CARB) has given each Metropolitan Planning Organization (MPO) in California driving-reduction targets, for the years 2020 and 2035. "Driving" means yearly, per capita, vehicle miles travelled (VMT), by LDVs, with respect to 2005. The CARB-provided values are shown at this Wikipedia link, http://en.wikipedia.org/wiki/SB_375. It is important to note that although this link and many other sources show the targets to be "GHG" and not "VMT", SB 375 clearly states that the reductions are to be the result of the MPO's Regional Transportation Plan (RTP), or, more specifically, the Sustainable Communities Strategy (SCS) portion of the RTP. Nothing in the SCS will improve average mileage. That will be done by the state and federal government by their Corporate Average Fleet Efficiency (CAFÉ) standards. The SCS can only reduce GHG by reducing VMT. The only way an SCS can reduce GHG by 12%, for example, is to reduce VMT by 12%.

Under SB 375, every Regional Transportation Plan (RTP) must include a section called a Sustainable Communities Strategy (SCS). The SCS must include driving reduction predictions corresponding to the CARB targets. Each SCS must include only *feasible* transportation, land use, and transportation-related policy data. If the SCS driving-reduction predictions fail to meet the CARB-provided targets, the MPO must prepare an Alternative Planning Strategy (APS). An APS uses *infeasible* transportation, land use, and transportation-related policy assumptions. The total reductions, resulting from both the SCS and the APS, must at least meet the CARB-provided targets.

Critical Data: Useful Factors from Steve Winkelman's Data

Figure 3[6].shows 6 variables as a percent of its 2005 value. The year 2005 is the baseline year of SB 375. The red line is the Caltrans prediction of VMT. The purple line is California's current mandate for a Low Carbon Fuel Standard (LCFS). As shown, by 2020, fuel in California must emit 10% less per gallon than in 2005. The turquoise line is the 1990 GHG emission in California. As shown, it is 12% below the 2005 level. This is important because S-3-05 specifies that in 2020, state GHG emission levels must be at the

1990 level. The green line is the C02 emitted per mile, as specified by AB 1493, also known as “Pavley 1 and 2” named after Senator Fran Pavley. The values shown do not account for the LCFS. The yellow (or gold) line is the S-3-05 mandate, referenced to 2005 emission levels. The blue line is the product of the red, the purple, and the green line and is the percentage of GHG emissions compared to 2005. Since VMT is not being adequately controlled, the blue line is not achieving the S-3-05 line. Figure 3 shows that driving must be reduced. For this reason, Steve Winkelman can be thought of as the true father of SB 375.

Figure 1. Atmospheric CO_2 and Mean Temperature from 800,000 Years Ago

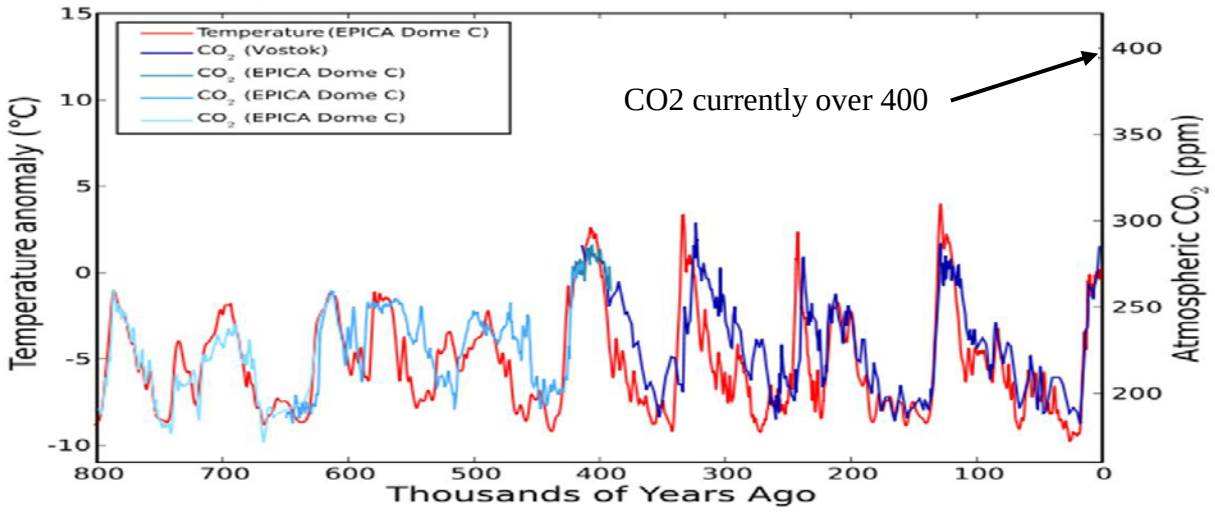
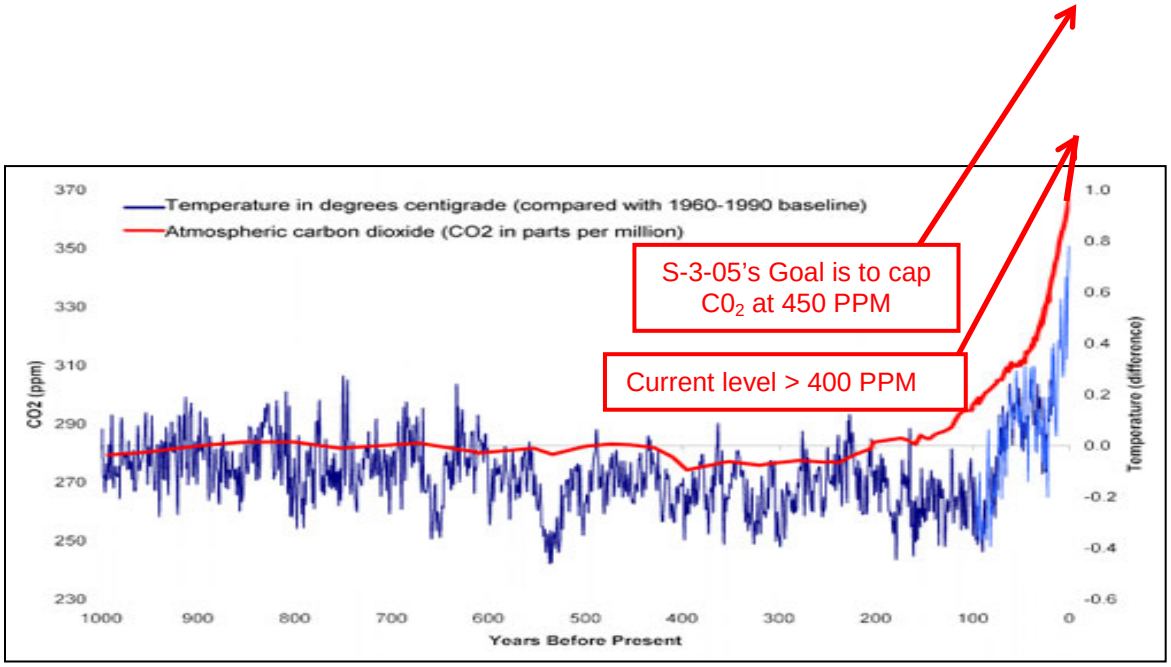
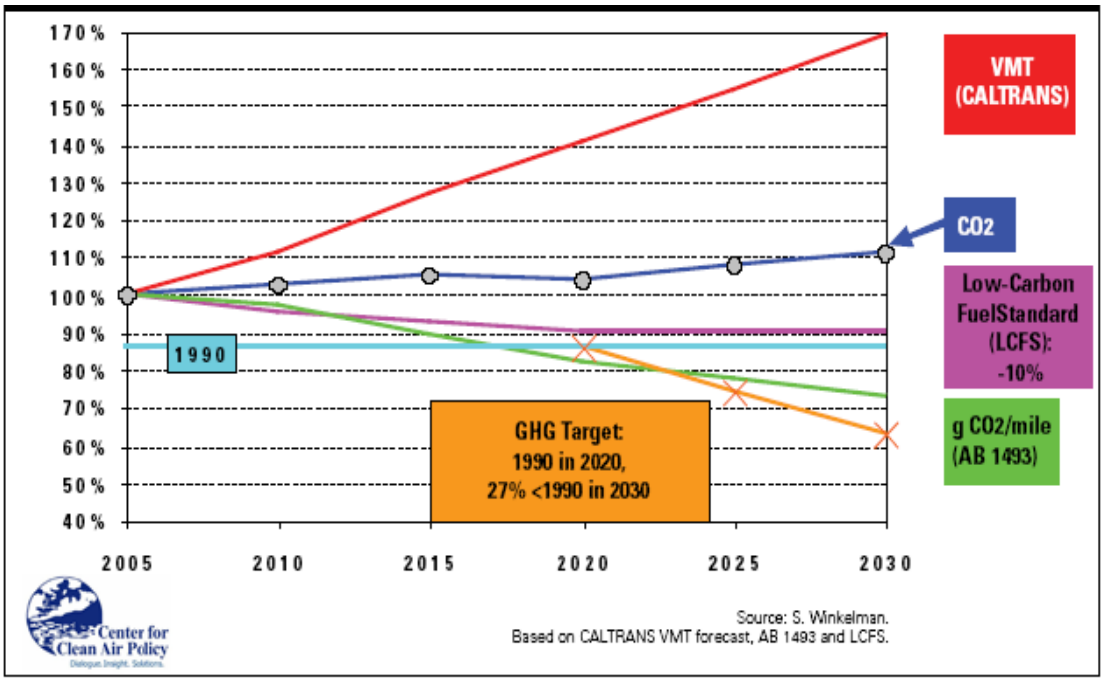


Figure 2. Atmospheric CO_2 and Mean Temperature, Over the Last 1,000 Years



This table provides inspiration for a road map to climate success for LDVs. Climate stabilization targets must be identified and achieved by a set of requirements to define fleet efficiency and per-capita driving.

Figure 3 **The S-3-05 Trajectory (the Gold Line) AND the CO_2 Emitted from Personal Driving (the Blue Line), where that CO_2 is a Function (the Product) of the California-Fleet-Average CO_2 per Mile (the Green Line), The Predicted Driving (VMT, the Red Line), and the Low-Carbon Fuel Standard (the Purple Line)**



THE DEVELOPMENT OF CALIFORNIA'S TOP-LEVEL LDV REQUIREMENTS TO SUPPORT CLIMATE STABILIZATION

It is also clear that cleaner cars will be needed and can probably be achieved. As will be seen, much cleaner cars will be needed if driving reductions are going to remain within what many people would consider achievable. Mileage and equivalent mileage will need to be specified. A significant fleet-fraction of Zero-Emission Vehicles (ZEVs, either Battery-Electric LDVs or Hydrogen Fuel Cell LDVs) will be needed. Since mileage and equivalent mileage is more heuristic than emissions per mile, they will be used instead of CO2 per mile driven.

Since the SB-375 work used 2005 as the reference year, it will remain the reference year here.

GHG Target to Support Climate Stabilization

The primary problem with S-3-05 is that California's resolve and actions have been largely ignored by other states, our federal government, and many countries. Therefore, rather than achieving 2000 levels by 2010 and being on a track to achieve 1990 levels by 2020, world emission have been increasing. Reference 7 states on Page 14 that the required rate of reduction, if commenced in 2020,

would be 15%. That rate means that the factor of 0.85 must be achieved, year after year. If this were done for 10 years, the factor would be $(0.85)^{10} = 0.2$. We don't know where world emissions will be in 2020. However, it is fairly safe to assume that California will be emitting at its 1990 level in 2020, in accordance with S-3-05. This situation shows that the correct target for California is to achieve emissions that are reduced to 80% below California's 1990 value by 2030. Note that if the reductions start sooner, the rate of reduction of emissions can be less than 15% and the 2030 target could be relaxed somewhat. However, it is doubtful that the world will get the reduction rate anywhere near the needed 15% by 2020. Therefore, the target, of 80% below 1990 levels by 2030 is considered to be correct for California. Reference 7 also calls into question the advisability of aiming for a 2 degree Celsius increase, given the possibilities of positive feedbacks that would increase warming. This concern for positive feedbacks is another reason that this paper will work towards identifying LDV requirement sets that will support achieving 80% below 1990 values by 2030.

Notes on Methods

The base year is 2005. An intermediate year of 2015 is used. The car efficiency factor of 2015 with respect to 2005 is taken directly from Figure 3. The car efficiency factor of 2030 with respect to 2015 is derived herein, resulting in a set of car-efficiency requirements. It is assumed that cars last 15 years.

Primary Variable Used

Table 1 defines the primary variables that are used.

Table 1 Variable Definitions

Variable Definitions	
e_k	**LDV Emitted C02, in Year "*k*"**
L_k	**Low Carbon Fuel Standard (LCFS) Factor that reduces the Per-Gallon CO2 emissions, in Year "*k*"**
C_k	**LDV CO2 emitted per mile driven, average, in Year "*k*", not accounting for the Low Carbon Fuel Standard (LCFS) Factor**
c_k	**LDV CO2 emitted per mile driven, average, in Year "*k*", accounting for the Low Carbon Fuel Standard (LCFS) Factor**
p_k	**Population, in Year "*k*"**
d_k	**Per-capita LDV driving, in Year "*k*"**
D_k	**LDV Driving, in Year "*k*"**
M_k	**LDV Mileage, miles per gallon, in Year "*k*"**
m_k	**LDV Equivalent Mileage, miles per gallon, in Year "*k*" accounting for Low Carbon Fuel Standard (LCFS) Factor, so this is M_k/L_k**
N	**Number of pounds of CO2 per gallon of fuel but not accounting for the Low Carbon Fuel Standard (LCFS) Factor**

Fundamental Equations

The emissions are equal to the CO2 per mile multiplied by the per-capita driving multiplied by the population, since per-capita driving multiplied by the population is total driving. This is true for any year.

Future Year k: $$e_k = c_k * d_k * p_k \quad \textbf{(Eq. 1)}$$

Base Year i: $$e_i = c_i * d_i * p_i \quad \textbf{(Eq. 2)}$$

Dividing both sides of Equation 1 by equal values results in an equality. The terms on the right side of the equation can be associated as shown here:

$$\frac{e_k}{e_i} = \frac{c_k}{c_i} * \frac{d_k}{d_i} * \frac{p_k}{p_i} \quad \textbf{(Eq. 3)}$$

Since carbon dioxide emitted per gallon is just a constant (about 20 pounds per gallon), the constant cancels out of the ratio of emissions per mile, leaving the following relationship.

To work with mileage: $$\frac{m_i}{m_k} = \frac{c_k}{c_i} \quad \textbf{(Eq. 4)}$$

Putting Equation 4 into Equation 3 results in the following equation:

$$\frac{e_k}{e_i} = \frac{m_i}{m_k} * \frac{d_k}{d_i} * \frac{p_k}{p_i} \quad \textbf{(Eq. 5)}$$

Showing the base year of 2005, the future year of 2030, introducing the intermediate year of 2015 and the year of 1990 (since emissions in 2030 are with respect to the 1990 value) results in Equation 6.

$$\frac{e_{2030}}{e_{1990}} * \frac{e_{1990}}{e_{2005}} = \frac{c_{2030}}{c_{2015}} * \frac{c_{2015}}{c_{2005}} * \frac{d_{2030}}{d_{2005}} * \frac{p_{2030}}{p_{2005}} \quad \textbf{(Eq. 6)}$$

The ratio on the far left is the climate-stabilizing target, which is the factor of the 2030 emission to the 1990 emission. It is shown to be 0.20 or 80% less. The next ratio is the emission of 1990 compared to 2005. It is the turquoise line of Figure 3, which is 0.87. The first ratio on the right side of the equation is the fleet emission per mile in 2030 compared to the value in 2015. This ratio will be derived in this report and it will result in a set of car efficiency requirements. Moving to the right, the next ratio is the car efficiency in 2015 compared to 2005. It can obtained by multiplying the purple line 2015 value times the green line 2015 value, which is 0.90 * 0.93.The next term is the independent variable. It is the driving reduction required, compared to the 2005 level of driving. The final term on the far right is the ratio of the population in 2030 to the population in 2005. Reference 8 shows that California's population in 2005 was 35,985,582. Reference 9 shows that California's population in 2030 is predicted to be 44,279,354. Therefore,

$$p_{2030}/p_{2005} = 44279354 \div 35985582 = 1.2305 \quad \textbf{(Eq. 7)}$$

Putting in the known values results in Equation 8:

$$0.20 * 0.87 = \frac{c_{2030}}{c_{2015}} * 0.90 * 0.93 * \frac{d_{2030}}{d_{2005}} * 1.2305 \qquad \textbf{(Eq. 8)}$$

Combining the values, solving for the independent variable (the per-capita driving ratio), and changing from emission-per-mile to equivalent-miles-per-gallon results in the following:

$$\frac{d_{2030}}{d_{2005}} = 0.1689 * \frac{m_{2030}}{m_{2015}} \qquad \textbf{(Eq. 9)}$$

With the coefficient being so small, it is doubtful that we can get the equivalent mileage in 2030 to be high enough to keep the driving ratio from falling below one. The mileage of the 2005 fleet will be based on the best data we can get and by assuming cars last 15 years. The equivalent mileage in 2030 will need to be as high as possible to keep the driving-reduction factor from going too far below 1, because it is difficult to reduce driving too much. The equivalent mileage will be dependent on the fleet-efficiency requirements in the near future and going out to 2030. Those requirements are among the primary results of this report.

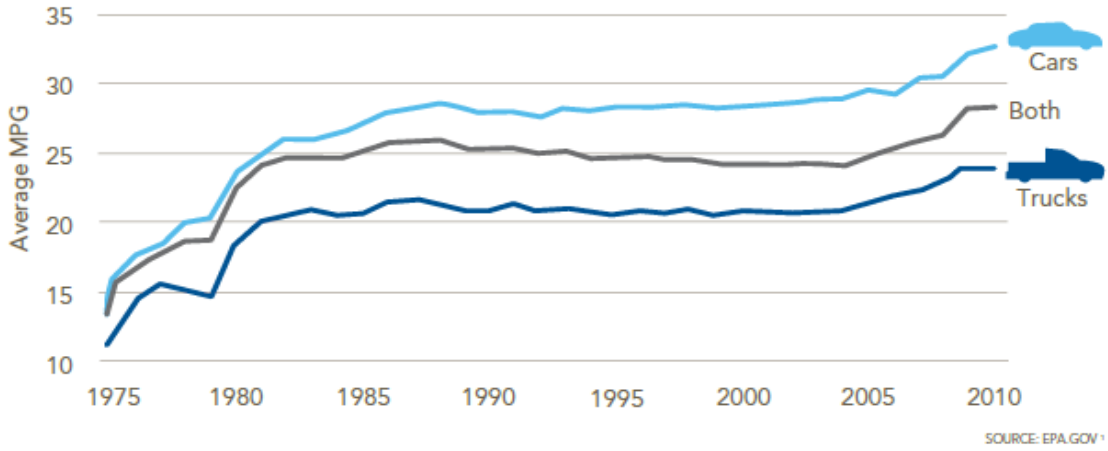
Internal Combustion Engine (ICE) Mileage, from Year 2000 to Year 2030

The years from 2000 to 2011 are taken from a plot produced by the PEW Environment Group,

http://www.pewenvironment.org/uploadedFiles/PEG/Publications/Fact_Sheet/History%20of%20Fuel%20Economy%20Clean%20Energy%20Factsheet.pdf

The plot is shown here as Figure 4. The "Both" values are used.

Figure 4 **Mileage Values From the PEW Environment Group**



The values from 2012 to 2025 are taken from the US Energy Information Agency (EIA) as shown on their website, http://www.c2es.org/federal/executive/vehicle-standards#ldv_2012_to_2025. They are the LDV Corporate Average Fleet Efficiency (CAFÉ) values enacted into law in the first term of President Obama. From 2025 to 2030, it is assumed that the yearly ICE improvement in CAFÉ will be 2.5 MPG.

Mileage of California's LDV Fleet in 2015

Table 2 uses these values of the Internal Combustion Engine (ICE) LDV mileage to compute the mileage of the LDV fleet in 2015. It assumes that the fraction of ZEVs being used over these years is small enough to be ignored. The 100 miles driven, nominally, by each set of cars, is an arbitrary value and inconsequential in the final calculation, because it will divide out. It is never-the-less used, so that it is possible to compare the gallons of fuel used for the different years. The "f" factor could be used to account for a set of cars being driven less. It was decided to not use this option by setting all of the values to 1. The Low Carbon Fuel Standard (LCFS) values are taken from Figure 3. The gallons of fuel are computed as shown in Equation 10, using the definition for L_k that is shown in Table 1.

Table 2 Calculation of the Fleet MPG for 2015

LDV Set	Years Old	Model Year	CAFE MPG	LCFS Factor L_{Year}	Factor Driven f	Gallons Used Per f*100 Miles
1	14-15	2001	24.0	1.0	1.0	4.17
2	13-14	2002	24.0	1.0	1.0	4.17
3	12-13	2003	24.0	1.0	1.0	4.17
4	11-12	2004	24.0	1.0	1.0	4.17
5	10-11	2005	25.0	1.0	1.0	4.00
6	9-10	2006	25.7	.9933	1.0	3.87
7	8-9	2007	26.3	.9867	1.0	3.75
8	7-8	2008	27.0	.9800	1.0	3.63
9	6-7	2009	28.0	.9733	1.0	3.48
10	5-6	2010	28.0	.9667	1.0	3.45
11	4-5	2011	29.1	.9600	1.0	3.30
12	3-4	2012	29.8	.9533	1.0	3.20
13	2-3	2013	30.6	.9467	1.0	3.09
14	1-2	2014	31.4	.9400	1.0	2.99
15	0-1	2015	32.6	.9333	1.0	2.86
					Sum of Gallons:	54.29
					Miles = 100*Sum(f's):	1500
					MPG = Miles/(Sum of Gallons):	27.63

$$Gallons\ Used\ per\ f * 100\ miles = \frac{fx100}{(CAFE\ MPG)/L_k} \quad \text{(Eq. 10)}$$

How ICE Mileage Values Will Be Used with ZEV Equivalent Mileage Values

As will be seen, after 2015, the net (computed using both ICEs and ZEVs) mileage values for each year are assumed to greatly improve by having a significant fraction of ZEVs. The ICE CAFÉ standards are used in this report as just the ICE contribution to fleet MPG. The ICE MPG values are inadequate by themselves and will therefore need to become less important because ZEVs will need to quickly take over the highways.

Federal requirements will need to change dramatically. Currently, federally-mandated corporate average fuel efficiency (CAFÉ) standards have been implemented, from 2000 to 2025. These standards require that each corporation produce and sell their fleet of cars and light-duty trucks in the needed proportions, so that the combined mileage of the cars they sell, at least meet the specified mileage.

The car companies want to maximize their profits while achieving the required CAFÉ standard. In California, the car companies will already be required to sell a specified number of electric vehicles, which have a particularly-high, equivalent-value of miles-per-gallon. If the laws are not changed, this will allow these companies to sell more low-mileage, high profit cars and light-duty trucks, and still achieve the federal CAFÉ standard.

It will be better to apply the CAFÉ standards to only the ICEs and then require that the fleet of LDVs sold achieve some mandated fraction of ZEVs. The ZEVs will get better and better equivalent mileage, as our electrical grid is powered by more renewable sources of energy. Therefore, their equivalent mileage is not fixed, but will improve over the years. Requirements developed here are for 2030. Therefore a high percentage of all the electricity generated in the state, including both the "in front of the meter" (known as the "Renewable Portfolio Standard" or "RPS") portion and the "behind the meter" portion is assumed to come from sources that do not emit CO2. More specifically, he value of 80% is assumed. This therefore becomes a fleet-efficiency requirement.

ZEV Equivalent Mileage Values

To calculate the mileage of the 2030 fleet of LDVs, it is necessary to derive a formula to compute the equivalent mileage of ZEVs, as a function of the percent of electricity generated without emitting CO2, the equivalent ZEV mileage if the electricity is from 100% fossil fuel, and the equivalent ZEV mileage if the electricity is from 100% non-C02 sources. The variables defined in Table 3 are used.

The derivation of the equation for equivalent ZEV mileage is based on the notion that the ZEV can be imagined to travel "r" fraction of the time on electricity generated from renewables and "(1-r)" fraction of the time on fossil fuel. If the vehicle travels "D" miles, then, using the definitions shown in Table 3, the following equation can be written.

$$\boldsymbol{G = \frac{r \times D}{m_{zr}} + \frac{(1-r) \times D}{m_{zf}}} \qquad \textbf{(Eq. 11)}$$

$$\boldsymbol{m_z = D/G = D/\left(\frac{r \times D}{m_{zr}} + \frac{(1-r) \times D}{m_{zf}}\right)} \qquad \textbf{(Eq. 12)}$$

Dividing the numerator and the denominator by D and multiplying them both by the product of the two equivalent mileage values results in Equations 13.

$$\boldsymbol{m_z = m_{zr} \times m_{zf} / \left(r \times m_{zf} + (1-r) \times m_{zr}\right)} \qquad \textbf{(Eq. 13)}$$

Again, using the definitions in Table 3 results in the following.

$$\boldsymbol{m_z = Num/(Den)} \qquad \textbf{(Eq. 14)}$$

Table 3 Variables Used in the Calculation of ZEV Equivalent Mileage

Variable	Definition
m_z	ZEV Equivalent mileage
m_{zr}	ZEV Equivalent mileage if the electricity is from renewables
m_{zf}	ZEV Equivalent mileage if the electricity is from fossil fuels
r	fraction of electricity generated from sources not emitting CO2
G	Gallons of equivalent fuel used
D	Arbitrary distance travelled
Num	$m_{zr} \times m_{zf}$
Den	$r \times m_{zf} + (1 - r) \times m_{zr}$

Table 4 shows an assignment of assumed values and the result of a calculation, using Equations 13, 14, and the definitions in Table 3, to produce a ZEV equivalent mileage.

Table 4 Variable Assignment and the Resulting ZEV Mileage

m_{zr}	m_{zf}	r	1-r	Num	Den	m_z
5000	70	0.8	0.2	350000.00	1056.00	331.44

Computing an LDV Fleet Mileage Assuming Heroic Measures (HM)

Table 5 shows the additional definitions that will be used in this calculation. Table 6 computes the 2030 LDV mileage, assuming "Heroic Measures" to reduce the miles driven in poor-mileage ICE's, in building and selling a significant fraction of ZEVs, and in getting the Low Carbon Fuel Standards to continue to improve beyond the Figure 3 minimum of 0.90.

Table 5 Additional Variables Used in the Calculation of 2030 LDV Mileage

Variable	Definition
D_i	Distance travelled by ICE vehicles
D_z	Distance travelled by ZEVs
G_i	Gallons of Equivalent fuel used by ICE vehicles
G_z	Gallons of Equivalent fuel used by ZEVs

As shown by the values for "f", government policies must be adopted, in 2030, to reduce the miles driven by the ICE's, from model years 2016 to 2023. The 2016 model ICE's are driven only 30% as much as the nominal amount. The 2017 year ICE's can be driving 10% more. This rate of change continues up to 2023, when the ICE's are doing less damage, due to the large fraction of ZEVs on the road.

Table 6 Calculation of 2030 LDV Mileage Assuming Heroic Measures

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	.9267	37.01	.3	30.0	.8105	.04	4	.012	32.8	.7901	41.51
2017	35.1	.9200	38.15	.4	40.0	1.0484	.07	7	.021	44.2	.9962	44.37
2018	36.1	.9133	39.53	.5	47.5	1.2018	.12	12	.036	56.0	1.1494	48.72
2019	37.1	.9000	40.92	.6	54.0	1.3197	.18	18	.054	67.2	1.2567	53.47
2020	38.3	.8500	42.56	.7	52.5	1.2337	.24	24	.072	77.2	1.3225	58.37
2021	40.3	.8000	47.41	.8	48.0	1.0124	.34	34	.103	86.8	1.2162	71.37
2022	42.3	.8000	52.88	.9	40.5	.7660	.48	48	.145	94.8	1.0299	92.05
2023	44.3	.8000	55.38	1.0	30.0	.5418	.62	62	.187	100.0	.8733	114.51
2024	46.5	.8000	58.13	1.0	15.0	.2581	.76	76	.229	100.0	.6422	155.71
2025	48.7	.8000	60.88	1.0	5.0	.0821	.90	90	.272	100.0	.4358	229.46
2026	51.2	.8000	64.00	1.0	5.0	.0781	.95	95	.287	100.0	.3648	274.16
2027	53.7	.8000	67.13	1.0	5.0	.0745	.98	98	.296	100.0	.3255	307.24
2028	56.2	.8000	70.25	1.0	5.0	.0712	.99	99	.299	100.0	.3129	319.56
2029	58.7	.8000	73.38	1.0	5.0	.0681	.99	99	.299	100.0	.3123	320.18
2030	61.2	.8000	76.50	1.0	5.0	.0654	.99	99	.299	100.0	.3118	320.75
Sum of Miles and then Gallons of Equivalent Fuel:										1259.00	11.34	
Equivalent MPG of LDV Fleet in 2030:										***111.03***		
Sum of ZEV Miles = **865**. Fraction of Miles Driven by ZEVs = **68.7%**												

As shown, the ZEV fraction of the fleet assumes the value of 12%, just 2 years from now (shown in the green field.) It then proceeds upward, to 18% in 2019; 24% in 2020; 34% in 2021; and so on, until it reaches 99% by 2028.

Achieving these fractions of ZEVs might be compared to what was done during World War II, when automobile productions lines were rapidly converted to produce tanks. This reduced the new cars that could be purchased. Besides this, rationing gasoline made it difficult to drive at times and, due to shortages of leather, which was being used to produce boots for soldiers, some citizens found it hard to even buy shoes. These rapid and inconvenient changes were tolerated, because most people agreed that the war needed to be won. The heroic measures assumed here may not be possible unless citizens and the political leaders they elect understand the dire consequences of climate destabilization and therefore accept, and even demand, the measures that are needed to support climate stabilization.

The equivalent miles per gallon of the LDV fleet in 2030, specifically 111.03 miles per gallon, will be considered as a potential 2030 LDV requirement.

Computing the Heroic-Measures (HM) Case Per-Capita and Net Driving Factor Requirements, Based on the Result Shown in Table 6

Plugging the

- equivalent MPG of the LDV fleet in Year 2030, taken from the bottom of Table 6, which is 111.03 MPG (m_{2030}), and
- the MPG of the LDV fleet in Year 2015, taken from the bottom of Table 2, which is 27.63 MPG (m_{2015}),

into Equation 9, gives the following result:

$$\frac{d_{2030}}{d_{2005}} = 0.1687 * \frac{m_{2030}}{m_{2015}} = 0.1687 * \frac{111.03}{27.63} = 0.68 \qquad \textbf{(Eq. 14)}$$

This means that the per-capita driving in 2030 will need to be about 32% less than in year 2005. The net driving can be computed by multiplying the per-capita driving, 0.68, by the population factor of 1.2305, computed in Equation 7, resulting in 0.84 (since 0.68 x 1.2305 = 0.84.) This means that, even with the 23% increase in California's population, the net driving will have to drop by 16%. If this LDV requirement set is selected, all of California's transportation money can be used to improve transit, improve active transportation (mainly walking and biking), and maintain, but not expand, roads. The good news is that there can be little or no congestion because highway capacity now is larger than it was in 2005. Policies will be needed to achieve the required reduction in driving.

Case 2: Computing LDV Requirements that Support Climate Stabilization but Still Allow 2005 Per-Capita Driving

The first step is to use Equation 9 and the value of the mileage in 2015 to compute the needed LDV equivalent fleet mileage for 2030 if the left side of the equation is equal to 1.0.

$$\mathbf{m_{2030} = 1.0 \text{ x } m_{2015} / 0.1689 = 27.63 / 0.1689 = 163.59 \text{ MPG}} \qquad \textbf{Eq. 15)}$$

Table 7 is constructed, with the fraction of ZEVs selected to achieve the needed equivalent fleet mileage of about 163.59 MPG. Since its ZEV fractions are larger and sooner than in the "Heroic Measures" table, Table 7 is showing what has been called the "Extra-Heroic Measures" (EHM) case. The ICE "f" values are unchanged; as are the LCFS values. The EHM ZEV differences from the HM case are the highlighted "z" values.

This means that with the 23% increase in California's population, computed in Equation 7, the net driving would also increase by 23%. If this LDV requirement set were to be implemented, a lot of California's transportation money would be needed to expand the highway system, leaving less to improve transit, improve active transportation (mainly walking and biking), and maintain roads.

Table 7 Calculation of 2030 LDV Mileage Assuming Extra-Heroic Measures

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	.9267	37.01	.3	30.0	.8105	.04	0	.012	32.8	.7901	41.51
2017	35.1	.9200	38.15	.4	36.0	.9436	.10	10	.030	46.0	.9738	47.24
2018	36.1	.9133	39.53	.5	35.0	.8855	.25	25	.075	62.5	1.024	61.02
2019	37.1	.9000	40.92	.6	30.0	.7332	.40	40	.121	76.0	1.000	75.96
2020	38.3	.8500	42.56	.7	21.0	.4935	.65	65	.196	89.5	.7718	115.96
2021	40.3	.8000	47.41	.8	8.0	.1687	.90	90	.272	98.0	.4403	222.59
2022	42.3	.8000	52.88	.9	4.5	.0851	.95	95	.287	99.5	.3717	267.66
2023	44.3	.8000	55.38	1.0	5.0	.0903	.95	95	.287	100.0	.3769	265.31
2024	46.5	.8000	58.13	1.0	5.0	.0860	.98	98	.296	100.0	.3301	302.95
2025	48.7	.8000	60.88	1.0	5.0	.0821	.98	98	.296	100.0	.3285	304.38
2026	51.2	.8000	64.00	1.0	5.0	.0781	.99	99	.299	100.0	.3143	318.14
2027	53.7	.8000	67.13	1.0	5.0	.0745	.99	99	.299	100.0	.3136	318.88
2028	56.2	.8000	70.25	1.0	5.0	.0712	.99	99	.299	100.0	.3129	319.56
2029	58.7	.8000	73.38	1.0	5.0	.0681	.99	99	.299	100.0	.3123	320.18
2030	61.2	.8000	76.50	1.0	5.0	.0654	.99	99	.299	100.0	.3118	320.75
Sum of Miles and then Gallons of Equivalent Fuel:										1304.30	7.97	
Equivalent MPG of LDV Fleet in 2030:										*163.59*		

Comparing the ZEV Fraction Values of the "Heroic-Measures" (HM) Case to the "Extra-Heroic Measures" (EHM) Case

Table 8 shows the direct comparison of the ZEV fractions that are ZEV requirements for the HM Case and the EHM Case. The largest differences are highlighted. The EHM case does not appear to be achievable.

Table 8 HM Case and the EHM Case Which Supports 2005 Per-Capita Driving

Cases	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
HM	.04	.07	.12	.18	.24	.34	.48	.62	.76	.90	.95	.98	.99	.99	.99
EHM	.04	.10	.25	.40	.65	.90	.95	.95	.98	.98	.99	.99	.99	.99	.99

ACHIEVING THE REQUIRED DRIVING REDUCTION OF THE HEROIC-MEASURES (HM) CASE

As shown in Equation 14, in 2030, the per-capita driving will need to at least 32% below the 2005 value. As shown in this link, http://en.wikipedia.org/wiki/SB_375, California's Metropolitan Planning Organizations (MPOs) are adopting Region Transportation Plans (RTPs) that will achieve reductions in year 2020 and 2035. As also shown there, the targets, for year 2035, range from 0% for Shasta to 16% for Sacramento Area Council of Governments. Since this is for 2030 instead of 2035, and to be reasonably conservative, it is assumed here that the state will achieve a 10% reduction in per-capita driving, in 2030, compared to 2005. This leaves 22% to be achieved by new programs.

The title of each of the following subsections contains the estimated per-capita driving reduction each strategy will achieve, by 2030.

Reallocate Funds Earmarked for Highway Expansion to Transit and Consider Transit-Design Upgrades (3%)

San Diego County has a sales tax measure called "TransNet", which allocates one-third for highway expansion, one-third for transit, and one-third for road maintenance. It has a provision that allows for a reallocation of funds, if supported by at least two-thirds of SANDAG Board members, including a so-called weighted vote, where governments are given a portion of 100 votes, proportional to their population. It is hereby proposed to reallocate the TransNet amount, earmarked for highway expansion, to transit and to do similar reallocations throughout California.

This money could be used to fund additional transit systems; improve transit operations; and/or the redesign and implementation of the redesign of existing transit systems. The redesign could include electrification and automation or even upgrading to a different technology.

A Comprehensive Road-Use Fee Pricing and Payout System to Unbundle the Cost of Operating Roads (7.5%)

Comprehensive means that pricing would be set to cover all costs (including road maintenance and externalities such as harm to the environment and health); that privacy and the interests of low-income drivers doing necessary driving would be protected; that the incentive to drive fuel-efficient cars would be at least as large as it is under the current fuels excise tax; and, as good technology becomes available, that congestion pricing is used to protect critical driving from congestion.

The words *payout* and *unbundle* mean that some of the money collected would go to people that are losing money under the current system.

User fees (gas taxes and tolls) are not enough to cover road costs[10] and California is not properly maintaining its roads. Reference 10 shows that in California user fees amount to only 24.1% of what is spent on roads. Besides this, the improved mileage of the ICEs and the large number of ZEVs needed mean that gas tax revenues will drop precipitously.

This system could be used to help reduce the ICE LDV miles driven in 2016 to 2022, as shown in the "f" column of Tables 6 and 7. This system could probably be implemented in less than 5 years.

Unbundling the Cost of Car Parking (7.5%)

Unbundling the cost of car parking[11] throughout California is conservatively estimated to decrease driving by 7.5%, based on Table 1 of Reference 11. That table shows driving reductions resulting from introducing a price for parking, for 10 cases. Its average reduction in driving is 25% and its smallest reduction is 15%.

Good Bicycle Projects and Bicycle Traffic Skills Education (3%)

The best criterion for spending money for bicycle transportation is the estimated reduction in driving per the amount spent. The following strategies may come close to maximizing this parameter.

Projects to Improve Bicycle Access

All of the smart-growth neighborhoods, central business districts, and other high trip destinations or origins, both existing and planned, should be checked to see if bicycle access could be substantially improved with either a traffic calming project, a "complete streets" project, more shoulder width, or a project to overcome some natural or made-made obstacle.

League of American Bicyclist Certified Instruction of "Traffic Skills 101"

Most serious injuries to bike riders occur in accidents that do not involve a motor vehicle[12]. Most car-bike accidents are caused by wrong-way riding and errors in intersections; the clear-cut-hit-from-behind accident is rare[12].

After attending *Traffic Skills 101,* students that pass a rigorous written test and demonstrate proficiency in riding in traffic and other challenging conditions could be paid for their time and effort.

As an example of what could be done in San Diego County, if the average class size was 3 riders per instructor and each rider passes both tests and earns $100 and if the instructor, with overhead, costs $500 dollars, for a total of $800 for each 3 students, that would mean that $160M could teach $160M/$800 = 200,000 classes of 3 students, for a total of 600,000 students. The population of San Diego County is around 3 million.

Eliminate or Greatly Increase the Maximum Height and Density Limits Close to Transit Stops that Meet Appropriate Service Standards (2%)

As sprawl is reduced, more compact, transit-oriented development (TOD) will need to be built. This strategy will incentivize a consideration of what level of transit service will be needed, how it can be achieved, and what levels of maximum height and density are appropriate. Having no limits at all is reasonable if models show that the development can function without harming the existing adjacent neighborhoods, given the level of transit service and other supporting transportation policies (such as car parking that unbundles the cost and supports the full sharing of parking[11]) that can be assumed.

Net Driving Reduction from All Identified Strategies

By 2030, the sum of these strategies should be realized. They total 23%, resulting in a 1% margin over the needed 22% (which is added to the existing 10% to get the needed 32%.)

ADDITIONAL ELECTRICITY REQUIRED

The URL http://www.energy.ca.gov/2013_energypolicy/documents/2013-06-26_workshop/presentations/09_VMT-Bob_RAS_21Jun2013.pdf shows that Californians drove about 325 Billion miles per year, from 2002 to 2011. This value can be multiplied by the 0.84 factor reduction of driving, computed right after the calculation shown in Equation 14, and the fraction of miles driven by ZEVs, shown at the bottom of Table 6, of 0.687 (from 68.7%), to give the 2030 miles driven by ZEVs = 325 Billion x 0.84 x 0.687 = 188 Billion miles per year.

Using the Tesla information here http://en.wikipedia.org/wiki/Tesla_Roadster, it is assumed that 21.7 kW-h is used per 100 miles, or 0.217 kW-h per mile. The total energy used per year is therefore 188 Billion miles x 0.217 kW-h = 40,699 GW-h.

http://www.cpuc.ca.gov/cfaqs/howhighiscaliforniaselectricitydemandandwheredoesthepowercomefrom.htm, shows that California is using about 265,000 GW-h per year. Therefore the electricity needed to power California's HM ZEV LDF fleet in 2030 is 100% x 40,648/265,000 = 15.34% of the amount of electricity California is currently using. Table 4 shows that 80% (r = 0.80, with "r" defined in Table 3) of electricity must generated without producing CO2. This estimated 15.34% increase in demand should help the California Public Utilities Commission (CPUC) and the California Energy Commission (CEC) with their planning.

COMPARISON WITH CALIFORNIA AIR RESOURCES BOARD (CARB) PLANNING

The following quote[13] allows us to compare the CARB plan for LDVs with what would be required to stabilize the climate at a livable level, in the form of the Heroic Measures case:

> *Regulations on the books in California, set in 2012, require that 2.7 percent of new cars sold in the state this year be, in the regulatory jargon, ZEVs. These are defined as battery-only or fuel-cell cars, and plug-in hybrids. The quota rises every year starting in 2018 and reaches 22 percent in 2025. Nichols wants 100 percent of the new vehicles sold to be zero- or almost-zero-emissions by 2030*

Table 9 shows the values implied by this statement and compares them to the HM values. Table 10, which is similar to Tables 6 and 7, computes the overall mileage of the 2030 fleet, using the CARB values.

Computing the Heroic-Measures (HM) Case Per-Capita and Net Driving Factor Requirements, Based on the Result Shown in Table 10

Plugging the

- equivalent MPG of the LDV fleet in Year 2030, taken from the bottom of Table 10, which is 74.25 MPG, and
- the MPG of the LDV fleet in Year 2015, taken from the bottom of Table 2, which is 27.63 MPG,

into Equation 8, gives the following result:

$$\frac{d_{2030}}{d_{2005}} = 0.1687 * \frac{m_{2030}}{m_{2015}} = 0.1687 * \frac{74.25}{27.63} = 0.45 \qquad \textbf{(Eq. 16)}$$

Table 9 Zero Emission Vehicle (ZEV) % of Fleet, for Two Cases

Year	CARB	Heroic Measures	Year	CARB	Heroic Measures
2016	2.7%	4.0%	**2024**	19.6%	76.0%
2017	2.7%	7.0%	**2025**	22.0%	90.0%
2018	5.1%	12.0%	**2026**	37.6%	95.0%
2019	7.5%	18.0%	**2027**	53.2%	98.0%
2020	9.9%	24.0%	**2028**	68.8%	99.0%
2021	12.4%	34.0%	**2029**	84.4%	99.0%
2022	14.8%	48.0%	**2030**	100.0%	99.0%
2023	17.2%	62.0%			

This means that the per-capita driving will need to be about 55% less in 2030 than in year 2005. The net driving can be computed by multiplying the per-capita driving, 0.45, by the population factor of 1.2305, computed in Equation 7, resulting in 0.55. This means that, even with the 23% increase in California's population, the net driving will have to drop by 45%. If CARB wants the LDV sector to achieve a reasonable climate-stabilizing target, it will need to require ZEV adoption profile closer to the Heroic Measures Case. The adoption profile they have now will required a reduction in driving that will probably be very difficult to achieve.

CONCLUSION

A requirement set named "Heroic Measures" (HM) is quantified. Table 8 shows that the HM LDV efficiency requirements are much easier to achieve than those needed to allow per-capita driving to remain close to its 2005 level, which has been quantified as the "Extra Heroic Measures Case". Strategies to achieve the required HM driving reductions are also allocated and described. They are perhaps about as difficult as achieving the HM LDV fleet efficiency. It is computed that the 2030 fleet of LDV HM ZEVs would require an amount of electricity which is equal to about 15% of what California is using today. The current CARB plan for ZEV adoption is shown to require a very large reduction in driving if LDVs are to achieve a climate-stabilizing target.

Table 10 Calculation of 2030 LDV Mileage Assuming the CARB Values

Year	ICE Parameters and Calculations						ZEVs			Yearly Totals		
	CAFÉ MPG	LCFS	Eq. MPG	f	D_i	G_i	z	D_z	G_z	Total Miles	Total Gallons	2030 MPG
2016	34.3	.9267	37.01	.3	30.0	.8105	.03	3	.008	31.9	.79681	40.02
2017	35.1	.9200	38.15	.4	40.0	1.0484	.03	3	.008	41.6	1.0283	40.48
2018	36.1	.9133	39.53	.5	47.5	1.2018	.05	5	.015	52.6	1.2158	43.23
2019	37.1	.9000	40.92	.6	54.0	1.3197	.08	8	.023	63.0	1.3787	45.70
2020	38.3	.8500	42.56	.7	52.5	1.2337	.10	10	.030	73.0	1.5114	48.29
2021	40.3	.8000	47.41	.8	48.0	1.0124	.12	12	.037	82.5	1.5162	54.39
2022	42.3	.8000	52.88	.9	40.5	.7660	.15	15	.045	91.5	1.4954	61.17
2023	44.3	.8000	55.38	1.0	30.0	.5418	.17	17	.052	100.0	1.5475	64.62
2024	46.5	.8000	58.13	1.0	15.0	.2581	.20	20	.059	100.0	1.4425	69.32
2025	48.7	.8000	60.88	1.0	5.0	.0821	.22	22	.066	100.0	1.3477	74.20
2026	51.2	.8000	64.00	1.0	5.0	.0781	.38	38	.113	100.0	1.0884	91.87
2027	53.7	.8000	67.13	1.0	5.0	.0745	.53	53	.161	100.0	.8577	116.59
2028	56.2	.8000	70.25	1.0	5.0	.0712	.69	69	.208	100.0	.6517	153.44
2029	58.7	.8000	73.38	1.0	5.0	.0681	.84	84	.255	100.0	.4673	214.02
2030	61.2	.8000	76.50	1.0	5.0	.0654	1.0	100	.302	100.0	.3017	331.44
Sum of Miles and then Gallons of Equivalent Fuel:										1236.00	16.65	
Equivalent MPG of LDV Fleet in 2030:										*74.25*		

ABREVIATIONS AND ACRONYMS

AB 1493	California's Assembly Bill 1493	**HM**	"Heroic Measures" LDV Case
AB 32	California's Assembly Bill 32	**ICE**	Internal Combustion Engine LDV
APS	Alternative Planning Strategy	**kW-h**	Kilo Watt-hour
CAFE	Corporate Average Fuel Efficiency	**LCFS**	Low Carbon Fuel Standard
CARB	California Air Resources Board	**LDV**	Light-Duty Vehicle
CBD	Center for Biological Diversity	**MPO**	Metropolitan Planning Organization
CEC	California Energy Commission	**Pavley**	Senator Pavley's AB 1493
CEQA	California Environmental Quality Act	**PPM**	Parts per Million
CPUC	California Public Utilities Commission	**RPS**	Renewable Portfolio Standard
CCAP	Center for Clean Air Policy	**RTP**	Regional Transportation Plan
CNFF	Cleveland National Forest Foundation	**S-3-05**	Governor's Executive Order S-3-05
SB 375	California's Senate Bill 375	**SANDAG**	San Diego Association of Governments
CO_2	Carbon Dioxide		
CO_2_e	Carbon Dioxide Equivalent GHG	**SCS**	Sustainable Community Strategy
EHM	"Extra Heroic Measures" LDV Case	**TransNet**	San Diego County sales tax
GEO	Governor's Executive Order	**URL**	Universal Resource Locator
GHG	Greenhouse gas	**VMT**	Vehicle Miles Travelled
GW-h	Giga Watt-Hours	**ZEV**	Zero Emission Vehicle LDV

ACKNOWLEGEMENTS

Darrell Clarke, Lead Volunteer for the Sierra Club's "Beyond Oil Campaign"; Dr. Dennis Martinek, Oceanside Planning Commissioner; Sandra Goldberg, formerly California Deputy Attorney General; Dr. Nilmini Silva-Send, Senior Policy Analyst of the Energy Policy Initiative Center; Diane Nygaard, Director of Preserve Calavera and founder of *Nelson Nygaard Consulting Associates*; Jack Shu, CNFF President; Joan Bullock; San Diego Sierra Club Executive Committee Chairs: Caroline Chase, John Stump, and (former Assembly Member) Lori Saldaña; Malinda Dickenson, *Law Offices of Malinda R. Dickenson*; Conservation Committee Chair Mollie Biggers; Ed Mainland and Jim Stewart, Co-Chairs, Energy-Climate Committee, Sierra Club California; Bern Grush, Chief Scientist, *Skymeter Corporation*; and SANDAG Staff: Susan Baldwin, Senior Regional Planner; Charles Stoll, Director of Land Use and Transportation Planning; and Stephan Vance, Senior Regional Planner.

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KEYWORDS

Driving, climate, mandates, S-3-05, SB 375, RTP, CEQA, Unbundled, GHG, CAFÉ, ZEVs

A Plan to Efficiently and Conveniently Unbundle Car Parking Costs

Air and Waste Management Association Paper 2010-A-554-AWMA

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ABSTRACT

The *Introduction* shows documented driving reductions due to the pricing of parking. It notes that although the benefits of priced and shared parking are known, such parking has not been widely implemented, due to various concerns. It states that a solution, called "*Intelligent Parking,"* will overcome some of these concerns, because it is easy to use and naturally transparent. It asserts that this description will support a "Request for Proposal" (RFP) process. Eight background information items are provided, including how priced parking would help California achieve greenhouse gas reduction targets. A story demonstrates some of the key features of *Intelligent Parking*. Arguments for less parking, shared parking, and priced parking are made. Barriers to progress are identified. The fair pricing of parking is described. New ways to characterize transportation demand management are presented. Seven goals of *Intelligent Parking* are listed. Eleven definitions and concepts, that together define *Intelligent Parking,* are described. This includes a method to compute a baseline price of parking and how to adjust that price instantaneously to keep the vacancy above 15% ("Congestion Pricing"). An implementation strategy is described.

INTRODUCTION:

It has been well established that appropriately priced parking will significantly reduce driving[1]. Most case studies presented in Table 1 are evaluations of the most general type of "car-parking cash-out": *a program that pays employees extra money each time they get to work without driving*. They show that a price differential between using parking and not using parking will significantly reduce driving, even when transit is described as poor. Since driving *must* be reduced[2], the pricing of parking is desirable.

Shared parking is also recognized as desirable because it can sometimes result in less parking being needed.

Although the advantages of pricing and sharing parking have been recognized for many years, these practices are still rare. This paper identifies some of the reasons for this lack of progress. The pricing and sharing method of this paper has a natural transparency and ease of use that would reduce many of the concerns. This paper also suggests that those governments that have the necessary resources can take the lead role in developing and implementing the described systems. These governments will recover their investments, over time.

This paper describes how parking facilities could be tied together and operated in an optimum system, named *Intelligent Parking*. The description of *Intelligent Parking* is sufficient to support a "Request for Proposal" process, leading to full implementation.

There are two distinct parts to *Intelligent Parking*. The first is how to set the price. The second is how to distribute the earnings. Briefly, the earnings go to the individuals in the group for whom the parking is built.

Table 1 Eleven Cases of Pricing Impact on Parking Demand

Location	Number of Workers @ Number of Firms	1995 $'s Per Mo.	Parking Use Decrease
Group A: Areas with poor public transportation			
West Los Angeles	3500 @ 100+	$81	15%
Cornell University, Ithaca, NY	9000 Faculty & Staff	$34	26%
San Fernando Valley, Los Angeles	850 @ 1	$37	30%
Costa Mesa, CA	Not Shown	$37	22%
Average for Group		**$47**	**23%**
Group B: Areas with fair public transportation			
Los Angeles Civic Center	10,000+ @ "Several"	$125	36%
Mid-Wilshire Blvd, Los Angeles	1 "Mid-Size" Firm	$89	38%
Washington DC Suburbs	5,500 @ 3	$68	26%
Downtown Los Angeles	5,000 @ 118	$126	25%
Average for Group		**$102**	**31%**
Group C: Areas with good public transportation			
U. of Washington, Seattle, WA	50,000 employees, students	$18	24%
Downtown Ottawa, Canada	3,500 government staff	$72	18%
Bellevue, WA	430 @ 1	$54	39%*
Average for Group, except Bellevue, WA Case*		**$45**	**21%**
Overall Average, Excluding Bellevue, WA Case*			**25%**

* Bellevue, WA case was not used in the averages because its walk/bike facilities also improved and those improvements could have caused part of the decrease in driving.

PERTINENT BACKGROUND INFORMATION

- Vehicle miles traveled (VMT) are a major cause of global warming and pollution[2, 3].
- California's Metropolitan Planning Organizations (MPOs) will need to adopt strategies that reduce vehicle miles traveled (VMT), in order to meet SB375 GHG reduction targets, to be issued by the California Air Resources Board in late 2010, for years 2020 and 2035[2].
- The appropriate pricing of parking is one of the least costly documented tools to reduce VMT.
- New technologies, such as sensors feeding computer-generated billing, offer the potential to efficiently bill drivers for parking and alert law enforcement of trespassers.
- Reformed parking policies can increase fairness, so that, for example, people who use transit or walk do not have to pay higher prices or suffer reduced wages, due to parking.

- Methods to unbundle parking cost are inefficient unless they support the spontaneous sharing of parking spaces. Shared parking with unbundled cost would ultimately allow cities to require significantly less parking.
- Typical systems of timed parking and metered parking are far from ideal. Parking has no automated record keeping, so it is difficult to know where there is too much or too little.
- Good policies will eventually let cities turn parking minimums into parking maximums.

A GLIMPSE INTO A POSSIBLE FUTURE

Jason is driving to work for the first time in several years. He has decided to save money by carrying home a new 3-D, big-screen computer, which he plans to purchase at a store near his office after work. He wanted to avoid paying delivery charges.

Things have been changing around his office development since they unbundled the cost of parking at the near-by train station. Many people who caught the early trains and lived close to the station stopped driving and parking in the best parking spaces; demand for housing close to the station went up; and wealthy riders, who insisted on driving, did so, confidant that they could always find parking as close to the platform as their schedules required, due to congestion pricing. Who would have guessed how much those people were willing to pay? It was shocking. Parking-lot earnings, paid to round-trip train riders, meant that the net cost to ride the train went significantly down. Ridership and neighborhood vitality both went significantly up. All Jason knew was that the price to park at his office had been going up yearly because of increased land values. His parking-lot earnings from his office had been increasing almost every month, due to the ripple effect of train riders parking off-site at cheaper parking. Some of them were using his office parking.

As he pulls out of his driveway, he tells his GPS navigation unit his work hours (it already knew his office location), the location of the store where he plans to buy the computer, and his estimated arrival and departure times at the store. He tells the GPS unit he wants to park once, park no more than 1 block from the store, walk no more than 1 mile total, and pay no more than an average of $2 per hour to park. He is not surprised to hear the GPS tell him that his request is impossible. He tells the GPS he will pay an average of $3 per hour and learns that the GPS has located parking.

It guides him into a church parking lot. He hopes the church will use his money wisely. The GPS tells him the location of a bus stop he could use to get to work and the bus's next arrival time at the stop. With automatic passenger identification and billing, the bus has become easy to use, except that it is often crowded. Jason gets out of the car and walks to work, with no action required regarding the parking.

Three weeks later, when Jason gets his monthly statement for his charges and income for automotive road use, transit use, parking charges, and parking earnings, he finds that the day's parking did indeed cost about $30 for the 10 total hours that he parked. He notes that the parking-lot earnings for his office parking averaged about $10 per day that month. He then notices the parking lot earnings from the store, where he spent about $1000 dollars. He sees that the parking-lot earnings percent for the store that month was 1.7%, giving him about $17. So for the day, Jason only spent a net of about $3 on parking. Then he realized that he should have had the computer delivered after all. If he would have bicycled that day, as he usually did, he would have still gotten the $27 earnings from the two parking facilities and he would have paid nothing

for parking. So the choice to drive cost him $30. He remembers that the delivery would have only been $25 dollars. Oh well. He enjoyed his before-work and after-work walks.

THE CASE FOR LESS PARKING

Less parking will support more compact development.[1] This makes walking and biking more enjoyable and less time consuming. There would certainly be less "dead space", which is how parking lots feel to people, whether they arrive by car or not, after they become pedestrians.

Since parking can be expensive, less parking can reduce overhead costs significantly, such as leasing expense and parking-lot maintenance cost. Less overhead means more profit and less expense for everyone. A need for less parking can create redevelopment opportunities at existing developments and reduce project cost at new developments.

At new developments, car-parking costs could prevent a project from getting built.[2]

THE CASE FOR SHARED PARKING

Shared parking for mixed uses means that less parking is needed. For example, shared parking could be used mostly by employees during the day and mostly by residents at night.

Fully shared parking means that very little parking would be off limits to anyone. In a central business district with shared parking, drivers would be more likely to park one time per visit, even when going to several locations. Pedestrian activity adds vitality to any area.

THE CASE FOR APPROPRIATELY-PRICED PARKING

To Reduce Driving Relative to Zero Pricing

Traditional Charging or Paying Cash-out Payments

As shown in the Introduction, this relationship (pricing parking reduces driving) is not new.[3]

Using results like Table 1, at least one study[4] has used an assumption of widespread pricing to show how driving reductions could help meet greenhouse gas (GHG) target reductions. Dr. Silva Send of EPIC http://www.sandiego.edu/epic/ghgpolicy/ assumes that all work locations with 100 employees or more in San Diego County will implement cash-out, to result in 12% less driving to work. Currently, almost all employees in San Diego County "park for free", unless they happen to work in a downtown core area.

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[1] This is especially true of surface parking, which only accommodates 120 cars per acre.

[2] On September 23, 2008, a panel of developers reviewed the Oceanside, Ca. "Coast Highway Vision" http://www.ci.oceanside.ca.us/pdf/chv_finalvisionstrategicplan.pdf. Parts of this plan were described as smart growth.

At the review, developer Tom Wiegel said, "Parking is the number 1 reason to do nothing," where "do nothing" meant "build no project." The other developers at the meeting agreed.

[3] For many years the Victoria Transport Policy Institute (VTPI) has been recognized as a source of reliable information on "Transportation Demand Management", or TDM.

From http://www.vtpi.org/tdm/tdm72.htm#_Price_Parking:

> Even a relatively small parking fee can cause significant travel impacts and provide significant TDM benefits.

"TDM Benefits" refers to the many public and private benefits of having fewer people choosing to drive.

Current, Best-Practice "Unbundling"

The "best-practice" use of the phrase, "unbundled parking cost", is to describe the case where either the cost of parking, for the case of a condominium, or the rent for parking, for the case of an apartment, is separated from either the purchase price and common fees or the rent of the dwelling unit.

This gives the resident families the choice of selecting the number of parking spaces they would like to rent or buy, including the choice of zero. This would tend to reduce the average number of cars owned per dwelling unit and, in this way, would also tend to reduce driving. Its major drawback is that this method does not encourage sharing.

To Increase Fairness and Protect the US Economy

It is stated above that almost all employees in San Diego County "park for free". Of course there is really no such thing as "parking for free". So-called "free parking" always reduces wages or increases costs. At a work site, it reduces everyone's wage, even those employees that never drive. At an apartment complex, so-called "free parking" increases the rent. Therefore, "free parking" at work or at apartments violates the fundamental rule of the free market, which is that people should pay for what they use and not be forced to pay for what they do not use. Parking should at least be priced to achieve fairness to non-drivers.

The US economy would also benefit. Reductions in driving would lead to reductions in oil imports, which would reduce the US trade deficit.[4]

BARRIERS TO PROGRESS

Given all this, it might seem that the widespread pricing of parking should have happened by now. However there are barriers. In 2007, a majority of the City Council of Cupertino, Ca. indicated that they wanted their City Manger to negotiate reduced parking requirements with any company that would agree to pay sufficient cash-out payments. To this date, no company, including Apple Inc., has expressed an interest. Most companies probably perceive cash-out as expensive. Even if they realize they could get a reduced parking requirement in exchange for paying sufficient cash-out amounts and even if the economics worked in support of this action (quite possible where land is expensive), they want to stay focused on their core business, instead of getting involved in new approaches to parking, real estate, and redevelopment.

On the other hand, simply charging for parking and then giving all the employees a pay raise is probably going to run into opposition from the employees, who will feel that they would be losing a useful benefit.

In addition, neighbors fear the intrusion of parked cars on their streets. Permit parking, which could offer protection, is not always embraced. City Council members know that a sizable fraction of voting citizens believe that there can actually never be too much "free parking",

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[4] From http://en.wikipedia.org/wiki/Balance_of_trade#Warren_Buffett_on_trade_deficits, Warren Buffet wrote in 2006,

> "The U.S. trade deficit is a bigger threat to the domestic economy than either the federal budget deficit or consumer debt and could lead to political turmoil. Right now, the rest of the world owns $3 trillion more of us than we own of them."

Professor Shoup's famous book[5] notwithstanding. Some Council members probably feel that way themselves.

It doesn't help that current methods of charging for downtown parking are often very inefficient.[5] For example, downtown Oceanside, California has parking meters that will only accept coins. Besides this, all their on-street, downtown parking is timed, with maximums from 10 minutes to 4 hours. These time limits are enforced by a city employee, who applies chalk from a tire to the street and then records the time. However, by watching the time and moving their car soon enough, drivers can avoid getting a ticket. Of course, they could instead drive to the mall and not have to worry about having coins or elapsed time since parking. It is not surprising that downtown merchants often object to charging for parking.

In summary, those that resist charging for parking, *based on their perceptions*, include

- Companies, *who fear the complexity and expense of paying cash-out payments*;
- Employees, *who fear of losing a current benefit*;
- City leaders, *who fear the political repercussions*;
- Downtown patrons, *who dislike the inconvenience and worry*;
- Downtown business owners, *who fear that it will drive away customers*.

THE COST, VALUE, AND FAIR PRICE OF PARKING

Estimated and Actual Capital Cost

Surface Parking

One acre of surface parking will accommodate 120 cars. Land zoned for mixed use is sometimes expensive. At $1.2 million per acre, the land for a single parking space costs $10,000. Construction cost should be added to this to get the actual, as-built cost of each parking space. Estimated cost can be determined by using appraised land value and construction estimates. For new developments, after the parking is constructed, it is important to note the actual, as-built cost.

Parking-Garage Parking

One acre of parking-garage will accommodate considerably more than 120 cars. The construction cost of the garage and the value of its land can be added together to get the total cost. Dividing that total cost by the number of parking spaces yields the total, as-built cost of each parking space. Adding levels to a parking garage may seem like a way to cut the cost of each parking space, for the case of expensive land. However, there is a limit to the usefulness of this strategy because the taller the parking garage, the more massive the supporting structural members must be on the lower levels, which increases total cost. Parking-garage parking spaces are often said to cost between $20,000 and $40,000. The actual costs should be noted.

Underground Parking

In order to compute an estimate for the cost of a parking space that is under a building, it is necessary to get an estimate of the building cost with and without the underground parking. The difference, divided by the number of parking spaces, yields the cost of each parking space. The

[5] According to Bern Grush, Chief Scientist of Skymeter Corporation http://www.skymetercorp.com/cms/index.php, often two-thirds of the money collected from parking meters is used for collection and enforcement costs.

cost or value of land plays no role in the cost of this parking. However, it does not follow that this parking is cheap. Underground parking spaces are often said to cost between $60,000 and $90,000 dollars each. Although there will be an “as built” cost of the building with the parking, there will never be an “as built” cost of the building without the parking. However, after the construction is done, the estimate for the cost of the underground parking should be reconsidered and re-estimated if that is needed. The final, best-estimate cost should be noted.

Value

Initially, value and cost are the same. For surface parking and parking-garage parking, the value would initially be the same as the as-built cost. For underground parking, the value would initially be the same as the best-estimate cost. However, over time, the value must be updated. Both construction costs and land-value costs will change. The value assigned to a parking place should always be based on the current conditions.

Fair Pricing

Parking space “values”, as described above, must first be converted to a yearly price by using a reasonable conversion factor. This conversion factor could be based on either the “cost of money” or the “earnings potential of money”. It is expected that this conversion factor would be 2% to 5% during times of low interest rates and slow growth; but could be over 10% during times of high-interest and high growth. For example, if the surface parking value is $12,000 and it is agreed upon to use 5% as the conversion factor, then each parking spot should generate $600 per year, just to cover capital costs. The amount needed for operations, collection, maintenance, depreciation, and any special applicable tax is then added to the amount that covers capital cost. This sum is the amount that needs to be generated in a year, by the parking space.

The yearly amount of money to cover capital cost needs to be re-calculated every year or so, since both the value and the conversion factor will, in general, change each year. The cost of operations, collection, maintenance, depreciation, and any special applicable tax will also need to be reconsidered.

Once the amount generated per year is known, the base price, per unit year, can be computed by dividing it (the amount generated per year) by the estimated fraction of time that the space will be occupied, over a year. For example, if a parking space needs to generate $900 per year but it will only be occupied 50% of the time, the time rate charge is $1800 per year. This charge rate per year can then be converted to an hourly or even a per-minute rate. The estimated fraction of time that the parking is occupied over a year will need to be reconsidered at least yearly.

NEW DEFINITIONS TO PROMOTE AN OBJECTIVE VIEW OF PRICING

- The “fair price” means the price that accounts for all costs.
- The “baseline amount of driving” means the driving that results from the application of the fair price.
- “Zero transportation demand management” (“zero TDM”) is the amount of demand management that results when the fair price is used. It will result in the baseline amount of driving.
- “Negative TDM” refers to the case where the price is set below the fair price. This will cause driving to exceed the baseline amount. Since TDM is commonly thought to be an action that reduces driving, it follows that negative TDM would have the opposite effect.
- “Positive TDM” refers to the case where the price is set above the fair price. This would cause the amount of driving to fall below the baseline amount.

Clearly, so-called “free parking” is an extreme case of negative TDM. The only way to further encourage driving would be to have a system that pays a driver for the time their car is parked.

THE GOALS OF *INTELLIGENT PARKING*

- There is only one agency operating all parking. (“All parking” does not include driveways and garages in single-family homes.) *Intelligent Parking* is designed and installed by regional or state government, using low-bid contractors, with design and start-up costs covered by the overhead portion of collection fees.
- Nearly all parking is shared. Almost always, anyone can park anywhere. Those who want exclusive rights to parking will pay “24/7” (all day, every day).
- Parking is operated so that the potential users of parking will escape the expense of parking by choosing to not use the parking. This characteristic is named “unbundled” because the cost of parking is effectively unbundled from other costs.
- Parking is priced and marketed to eliminate the need to drive around looking for parking.
- Parking at any desired price is made as easy as possible to find and use.
- Records of the use of each parking space are kept, to facilitate decisions to either add or subtract parking spaces.
- The special needs of disabled drivers, the privacy of all drivers, and, if desired, the economic interests of low-income drivers are protected.

DEFINITIONS & CONCEPTS OF *INTELLIGENT PARKING*

Parking Beneficiary Groups

There are at least 7 types of beneficiary groups. Note that in all cases, members of beneficiary groups must be old enough to drive.

1.) People who have already paid for the capital cost of parking. An example of this type of beneficiary group would be the owners of condominiums, where parking has been built and the cost is included in the price of the condominium. Note that although they have technically already paid for the parking, if they borrowed money to pay for some portion of the price, the cost is built into their monthly payment. This illustrates why the value of parking and the cost of borrowing money (rate of return on money) are key input variables to use to compute the appropriate base, hourly charge for parking.

2.) People who are incurring on-going costs of parking. An example of this type of beneficiary group is a set of office workers, where the cost of ‘their” parking is contained in either the building lease or the cost of the building. Either way, the parking costs are reducing the wages that can be paid to these employees.[6]

3.) People who are purchasing or renting something where the cost of the parking is included in the price. Examples of this beneficiary group are people that rent hotel rooms, rent an apartment, buy items, or dine in establishments that have parking.

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[6] Such parking is often said to be “for the benefit of the employees”. Defining this beneficiary group will tend to make this statement true, as opposed to the common situation where the employees benefit only in proportion to their use of the parking.

4.) People who own off-street parking as a business. They could be the individual investors or could be a government or government-formed entity.

5.) People who are said to benefit from parking, even though the money for the parking has been supplied by a source that may have very little relationship to those that are said to benefit. An example of this group would be train riders that make round trips from a station which has parking that is said to be "for riders". Students at a school with parking would be another example.

6.) People who are considered by many to be the logical beneficiaries of on-street parking. Owners of single-family homes are the beneficiaries of the parking that is along the boundaries of their property. The same status is given to residents of multi-family housing.

7.) Governments. Since they build and maintain the streets, they should get a significant benefit from on-street parking.

Unbundled Cost and Spontaneous Sharing

"Unbundled cost" means those who use the parking can see exactly what it costs and those who don't use the parking will either avoid its cost entirely or will get earnings to make up for the hidden parking cost they had to pay. This conforms to the usual rule of the free market where a person only pays for what they choose to use. Unbundled cost is fair.

"Spontaneous sharing" means that anyone can park anywhere at any time and for any length of time. Proper pricing makes this feasible.

How to Unbundle

The method of unbundling can be simply stated, using the concept of "beneficiary group" as discussed above. First, the fair price for the parking is charged. The resulting earnings[7] amount is given to the members of the beneficiary group in a manner that is fair to each member. Methods are described below.

Why this Supports Sharing

Members of a beneficiary group benefit financially when "their" parking is used. They will appreciate users increasing their earnings. They are also not obligated to park in "their" parking. If there is less-expensive parking within a reasonable distance, they might park there, to save money. This is fine, because all parking is included in the *Intelligent Parking* system.

Computing the Earnings for Individuals

Intelligent Parking must be rigorous in paying out earnings[7]. For a mixed use, the total number of parking spaces must first be allocated to the various beneficiary groups. For example in an office/housing complex, 63.5% of the parking might have been sold with the office. If so, the housing portion must be paying for the other 36.5%. For this case, it would follow that the first step is to allocate 63.5% of the earnings to the workers and 36.5% to the residents.

[7] The earnings amount is the revenue collected minus the collection cost and any other costs that will have to be paid due to the implementation of *Intelligent Parking*. The costs associated with the parking, paid *before* the implementation of *Intelligent Parking*, should *not* be subtracted from the revenue because they will continue to be paid as they were before the implementation of *Intelligent Parking*. Therefore, these costs will continue to reduce wages and increase the prices of goods and services.

How the monthly earnings are divided up among the members of the beneficiary group depends on the beneficiary group type. For each member, the group's total monthly earnings amount is always multiplied by a quantity and divided by the sum (the sum is the denominator) of that quantity, for all members.

For example, for each employee, the multiplier is the number of hours that the employee worked over the month while the denominator is the total number of hours worked by all employees over the month. At a school, for each student, the numerator is the total time spent at the school, over the month, while the denominator is the sum of the same quantity, for all the students.

For a train station with parking being supplied for passengers that ride on round trips of one day or less, the numerator is the passenger's monthly hours spent on such round trips, over the month; while the denominator is the total number of hours spent by all passengers on such round trips, over the month. Radio Frequency Identification (RFID) units on passengers could support an automated calculation of monthly charges for fares, as well as monthly hours on round trips.

At a shopping center, the numerator is the sum of the money spent by the shopper, over the month, while the denominator is the total amount of money spent by all shoppers over the month.

At a condominium, the numerator is the number of parking places that were paid for (directly or indirectly) by the resident family and the denominator is the total number of parking places at the condominium project; similarly, for apartment complexes.

Where Earnings Are Low

The goal is that if someone doesn't park, they don't pay, either directly or indirectly, because the earnings that they get will balance out their losses (like reduced wages, for example). However, charging for parking that few want to use will not sufficiently compensate the people that have been forced, or are being forced, to pay for such parking. The only remedy in this case is to redevelop the parking or lease the parking in some other way, for storage, for example. The earnings from the new use should go to those that are in the beneficiary group that was associated with the low-performing parking.

Why This Method of Unbundling Will Feel Familiar to Leaders

Developers will still be required to provide parking and will still pass this cost on, as has been discussed. There will be no need to force an owner of an exiting office with parking to break his single business into two separate businesses (office and parking).

Parking beneficiaries are identified that conform to traditional ideas about who should benefit from parking.[8]

Unbundling the Cost of On-Street Parking

The revenue from on-street parking in front of businesses will be split evenly between the city and the business's parking beneficiaries. All of the earnings from on-street parking in front of apartments or single-family homes will be given to the resident families.[9]

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[8] Showing exactly where parking earnings go will reduce the political difficulties of adopting pay parking in a democracy where the high cost of parking is often hidden and rarely discussed.

[9] Although governments own the streets, often, back in history, developers paid for them and this cost became embedded in property values. Admittedly, how to allocate on-street parking earnings is somewhat arbitrary. With

Special Considerations for Condominiums

Unbundling for a condominium owner means that, although their allocated amount of parking has added to their initial cost, their allocated amount of parking also earns money for them. Unbundling for a condominium could also mean that an owner can choose to have control over a single or several parking places. Such parking spaces could be equipped with a red light and a green light. If the red light is lit, this will mean that the space is not available for parking, except for the person who is controlling the spot. If the green light is lit, it will mean that the space is available to anyone. A space that is being reserved with a red light is charged at the full price to the condominium owner that has control over the space. The owner that controls these spaces can change the state of the parking space (available or not available) by either a phone call, on line, or at any pay station system that might be in use for the system. After condominium owners experience the cost of reserving a space for themselves, they might give up on the idea of having their own, personal, unshared parking space; especially since *Intelligent Parking* will give most owners and their guests all the flexibility they need in terms of parking their cars.

Some people think that condominium parking should be gated, for security reasons. However, parking within parking garages needs to be patrolled at the same frequency level as on-street parking, which is enough to ensure that crime around either type of parking is very rare. Cameras can help make parking garages that are open to the public safe from criminal activity.

Special Considerations for Renters

Unbundling for renters means that, although their allocated amount of parking increases their rent, their allocated amount of parking also earns money for them. Therefore, their traditional rent (includes parking) is effectively reduced by the money earned by those parking spaces allocated to them. Renters will be motivated to either not own a car or to park in a cheaper location. Parking in a cheaper location is not a problem because all parking is part of the *Intelligent Parking* system. Renters will welcome anyone to park in "their" parking, because it will increase their earnings.

Special Considerations for Employers

At first, companies may want the option of offering "free parking" to their employees so as to be able to compete with traditional job sites. This means giving employees that drive every single day an "add-in" amount of pay so that the sum of the add-in and their parking-lot earnings equals their charge, for any given monthly statement. The operator of the parking, which sends out statements, can pay out the "add in" amount, in accordance with the company's instruction. The company will then be billed for these amounts. There could be no requirement for the company to provide any such "add-in" amount to the employees that don't drive every day. This would allow the company to treat its every-day drivers better than other employees and so this would be a negative TDM. However, this economic discrimination would be substantially less than the current, status-quo, economic discrimination, where drivers get "free" parking and non-drivers get nothing.

Clusters of Parking

Clusters are a contiguous set of parking spaces that are nearly equal in desirability and thus can be assigned the same price. They should probably consist of from 20 to 40 spaces. For off-street

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congestion pricing and efficient methods, governments may earn significantly more than they are under current practices.

parking, they could be on either side of the access lane to the parking spaces, so that an observer could see the 20 to 40 cars, and get a feel for the vacancy rate. At a train station, clusters will normally be organized so that their parking spaces are approximately an equal distance from the boarding area. On-street clusters would normally conform to our current understanding of what a block is, which is to say from one cross street to the next cross street. The width of the street and the length of the block should be taken into account in defining on-street clusters of parking and in deciding if the parking on either side of the street should or should not be in the same cluster of parking spaces.

Examples of Good and Bad Technology

Parking Meters or Pay Stations

Parking meters are a relic of an earlier period, before computers. Pay stations do not add enough usefulness to merit their inclusion in *Intelligent Parking*, except as a bridge technology. Once good systems are set up, pay stations should cost additional money to use because of their expense. It would be best to devise an implementation strategy that will minimize their use when the system is first put into effect and will take them out of service as soon as possible.

Radio Frequency Identification Backed Up by Video-Based "Car Present" and License Recognition

Government will eventually enter into an RFID (Radio Frequency Identification) age. Organizers of large athletic events already have. Organizers that put on large open-water swims, foot races, and bike rides have routinely used RFID for many years.[10] An RFID vendor in San Diego[11] states that passive RFID units cost less than $5, are reliable, are durable, and they could be used to identify cars as well as people. He also sees no problem in implementing most of the features of *Intelligent Parking*.[12]

Automatic Data Collection and Sending Out Statements

Note that the "back end database" of Dr. Carta's written statement[12] refers to the ability to send statements of earnings and billing to students.[13]

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[10] For example, over 20,000 people ran the 2008 Bay-to-Breakers foot race in San Francisco. Each runner had a "chip" in their shoe lace. Each runner's start time and finish time were recorded and all results were available as soon as the last runner crossed the finish line.

[11] David R. Carta, PhD, CEO Telaeris Inc., 858-449-3454

[12] Concerning a Final Environmental Impact Report-approved and funded new high school in Carlsbad, California, where the School Board has signed a *Settlement Agreement* to consider "*unbundled parking*", "*cash-out*", and "*pricing*", Dr. Carta wrote, in a January 13th, 2010 written statement to the Board,

> I wanted to send a quick note discussing the technical feasibility of tracking cars into a lot without impacting students or requiring the need for gates. Mike Bullock and I have discussed this project; it can be accomplished straightforwardly by utilizing Radio Frequency Identification and/or Video Cameras integrated with automated license recognition systems. The cars would need to register with the system at the start, but it would be fairly painless for the users after the initial installation. The back end database system can also be implemented both straightforwardly and at a reasonable price.
>
> This is not necessarily a recommendation of the proposal for unbundled parking. Rather it is strictly an unbiased view of the technical feasibility of the proposal to easily and unobtrusively track cars, both registered and unregistered, into a fixed lot.

[13] In an earlier email on this subject, Dr. Carta wrote,

Putting it Together

Certainly, government, and in particular transit agencies and parking agencies, could use RFID-based technology. For example, when a person with an RFID unit which is tied to a billable address or a credit card with an open account gets on a bus or a train, they should not have to pay at that time, visit a pay station, or "swipe a card" that has a positive balance. Utility customers that pay their bills are not required to pre-pay. The same courtesy should be extended to transit riders, people that drive on roads, people that get parking-lot earnings, and people that park cars. There should be one monthly bill or statement, for all four activities.

Global Positioning Systems GPS

An alternative model is to have GPS systems in cars that would detect the car's parking location, that location's current charge rate, and would perform all of the charging functions in the car. The only information the parking-lot-enforcement system would need is whether or not a car being parked is owned by a bill-paying owner. The car owner's responsibility would be to pay the bills indicated by the box in the car. The box would need to process a signal that a bill had been paid. It would also need to process pricing signals.

Not Picking Winners

The purpose of this report is to describe what an ideal system would do, *not* how it is done. How a proposed system works is left to the systems, software, and hardware engineers that work together to submit a proposal based on this description of what an ideal system does.

Privacy

Privacy means that no one can see where someone has parked, without a search warrant. Also, the level of the detail of information that appears on a bill is selected by the customer.[14]

Ease of Use for Drivers

For credit-worthy drivers that have followed the rules of the system, pay parking will not require any actions other than parking. Paying for all parking fees over a month is then done in response to a monthly billing statement. Parking will feel to the consumer like a service provided by a municipality, such as water, energy, or garbage. One important difference is that users belonging to a "beneficiary group" will get an earnings amount in their monthly statement. Those that earn more than what they are charged will receive a check for the difference. This ease of use will make all parking less stressful.

Base Price

Off-Street

This is not too tough - we probably would integrate with a service that already sends physical mail from an electronic submission instead of re-inventing this wheel.

[14] License plates that have no RFID tags fail to use the best technology to accomplish the primary purpose of license plates, which is to identify and help intercept cars used in a crime. Identifying cars is a legitimate government goal. Protecting privacy is also a legitimate goal. Both goals can be realized with good laws, good enforcement, and good systems engineering.

Off-street parking is priced so that even if demand does not threaten to fill the parking beyond 85%, the money generated will at least equate to an agreed-upon return on the parking value and pay all yearly costs. Equation 1 shows the calculation of the hourly rate.

$$r_{BaselineHourly} = \frac{(r_{Investment} \times v_{Parking}) + c_{YOPD}}{(n_{HoursPerYear} \times f_{TO})} \quad \textbf{(Eq. 1)}$$

where:

$r_{BaselineHourly}$	=	the computed baseline hourly rate to park
$r_{Investment}$	=	yearly return on investment, such as .06
$v_{Parking}$	=	value of a parking space, such as (parking garage) $40,000
c_{YOPD}	=	yearly operations[15] plus depreciation, per space, such as $100
$n_{HoursPerYear}$	=	number of hours per year, 24 x 365 = 8760 Hours per Year
f_{TO}	=	fraction of time occupied, such as 0.55.

For the example values given, the base hourly rate of parking, to cover the cost of the investment, operations[15], and depreciation is $0.519 per hour. This could be rounded up to $0.52 per hour. This price could also be increased to result in positive TDM, to reduce driving more than the fair-price, zero-TDM amount.

On-Street

If on-street parking is located within walking distance (one-quarter mile) of off-street parking, its base price is set equal to the closest off-street parking's base price. Otherwise, it is set to some agreed-upon value, like fifty cents per hour. However, on-street parking has a special meaning for downtown merchants and for neighborhoods, two powerful political forces in any city. Merchants that have few cars parking on their street, even though it is permitted, are probably failing in their businesses. They would like free parking to help draw visitors to their store front. Neighborhoods that are not impacted by parking would probably prefer no pricing. For these reasons, for any on-street parking cluster, no price is charged until the cluster occupancy reaches 50%. (Time of day is irrelevant.)

Congestion Pricing

The time-rate price of parking is dynamically set on each cluster of parking, to prevent the occupancy rate from exceeding 85% (to reduce the need to drive around looking for parking). An 85% occupancy rate (15% vacancy) results in just over one vacant parking space per city block[5]. If the vacancy rate is above 30%, the price is left at the baseline hourly rate. If vacancies fall below 30%, the price can be calculated in a stair-step method, such as shown in Table 2.

Equation 2 is an alternative method.

In either case, the total charge is time parked, multiplied by the time-averaged, time-rate price. The base multiplier would be adjusted to be just large enough to keep the vacancy rate from falling below a desired level, such as 15%, so it is always easy to find parking.

[15] This includes money for policing, cleaning, maintenance, any applicable parking tax, and all collection costs. Collection costs will need to include an amount to recover the development and installation costs of *Intelligent Parking*.

Table 2 Hourly Rates for 2 Base Multipliers and a Baseline Hourly Rate of $0.52

Vacancy Rate	Base Multiplier = 2			Base Multiplier = 2.5		
	Multiplication		Hourly Rate	Multiplication		Hourly Rate
	Formula	Value		Formula	Value	
Above 30%	2^0	1	$0.52	2.5^0	1	$0.52
25% to 30%	2^1	2	$1.04	2.5^1	2.5	$1.30
20% to 25%	2^2	4	$2.08	2.5^2	6.25	$3.25
15% to 20%	2^3	8	$4.16	2.5^3	15.625	$8.13
10% to 15%	2^4	16	$8.32	2.5^4	39.0625	$20.31
5% to 10%	2^5	32	$16.64	2.5^5	97.6563	$50.78
Below 5%	2^6	64	$33.28	2.5^6	244.1406	$126.95

$$r_{HourlyRate} = r_{BaselineHourly} \times \left(B^{(30-V)/5}\right), for\ V < 30;\ r_{BaslineHourly}, otherwise \quad \textbf{(Eq. 2)}$$

where:

$r_{HourlyRate}$ = the congestion-priced hourly rate to park

$r_{BaselineHourly}$ = the baseline hourly rate to park, such as $0.52 per hour (taken from from Eq. 1.

B = the base of the multiplier being computed, such as 2.50

V = the vacancy rate percent, such as 17.5, for 7 vacancies in a cluster of 40 spaces, 100*(7/40) = 17.5

For the example values given, the hourly rate of parking would be $9.88 per hour.

Pricing Predictions and Notifications

Drivers will develop strategies for their routine trips. The computer system that keeps records of parking use will also provide help for users. The *Intelligent Parking* website will direct a user to an appropriate cluster of parking if the user provides the destination location or locations, the time and date, and the hourly rate they wish to pay. If the walk is going to be long, the website could suggest using transit to get from the cheaply-priced parking to the destination. In such cases, the website may also suggest using transit for the entire trip.

Another user option is to specify the time, location, and the distance the user is willing to walk. In this case, the computer would give the cheapest cluster of parking available at the specified walk distance. The price prediction would be provided.

All price predictions would also have a probability of correctness associated with them. If a user can show that a computer has predicted a much lower price than what actually occurred, with a sufficiently high probability, it would be reasonable to charge the user the predicted price rather than the actual price.

Websites could routinely inform viewers when occupancy rates are expected to be unusually high, due to a special event (for example, a sporting event). The parking system website will always give current and predicted hourly rates for all locations. The hourly rates of parking will

also be available at a phone number and possibly at pay stations. The base-price hourly rate, for any parking cluster, would be stable and could therefore be shown on signs. Parking garage entrances could have large video screens showing both predicted and existing price. Users will also learn to look at parking and judge whether congestion pricing applies, or could apply, while their car is parked. It would not be long before these capabilities are added into GPS navigation systems.

Prepaid RFID

To be inclusive, pay stations or convenience stores will offer a pre-paid RFID that can be set on the dashboard of a car. This will support drivers with poor credit or drivers who have not obtained the necessary equipment to support the normal, trouble-free methods. This will also work for drivers that do not trust the system to protect their privacy for a certain trip (by removing or disabling the permanent RFID) or for all trips. No billing would occur.

Enforcement

The system would notify the appropriate law enforcement agency if an unauthorized car was parked. Authorized cars would need either a pre-paid RFID or equipment indicating that their owners had *Intelligent Parking* accounts and were sufficiently paid up on their bills.

IMPLEMENTATION

This description of *Intelligent Parking* will help to implement efficient parking systems. Parking at train stations, schools, and government buildings could introduce many of these concepts. This description of *Intelligent Parking* is sufficient to support a "Request for Proposal" process, which could lead to full implementation. Widespread installation should be done by a government agency, to minimize actions required on the part of the private sector. Laws would simply require the cooperation of all private-sector and government entities.

SUMMARY

A parking plan, *Intelligent Parking* has been described.

1. Technology will make it easy to use for most drivers.
2. Its parking is almost always shared, to support mixed uses.
3. It unbundles cost by charging and having earnings go to the parking beneficiaries.
4. Traditional groups, such as single-family home owners, employees, tenants, train riders, and students benefit from parking. The benefit is equal for drivers and non-drivers.
5. Baseline prices are computed primarily from the value of the parking and an agreed-upon rate of return. On-street parking is free until it is half full, at which time its base price often matches that of the closest off-street parking.
6. For all parking, price is dynamically increased to guarantee availability. Earnings are therefore only limited by what people are willing to pay.
7. Technology helps drivers find parking and decide if they want to drive or use transit.
8. Prepaid RFIDs provide service to those who have poor credit or don't want to be billed.
9. Disabled and perhaps low-income drivers will have accounts that allow them to park at reduced prices and perhaps avoid congestion pricing. Specially designated spots might also be required for disabled drivers.

10. The system will provide reports showing where additional parking would be a good investment and where it would be wise to convert existing parking to some other use.
11. Privacy will be protected. Law enforcement officials would need a search warrant to see where someone's car has been parked. The level of detail on billing would be selected by the car's owner.
12. Implementations could begin in carefully selected locations and expand.

Global warming, air pollution, trade deficits, and fairness are some of the significant reasons that governments have a responsibility to implement *Intelligent Parking*.

ACKNOWLEGEMENTS

The following people have offered encouragement, specific information, and/or special insights.

Dr. Dennis Martinek, Oceanside Planning Commissioner; Sandra Goldberg, California Deputy Attorney General; Jerry Kern, Oceanside, City Council; Amy Volzke, Principal Planner, City of Oceanside; Dr. Nilmini Silva-Send, Senior Policy Analyst of the Energy Policy Initiative Center; Diane Nygaard, Director of Preserve Calavera and founder of Nelson Nygaard, Consulting Associates; Lisa Rodman, Trustee, Carlsbad Unified School District; Dr. Michael McQuary, President, La Jolla Democratic Club; Joan Bullock; Judy Jones, San Diego County Central Committee, California Democratic Party; Patrick Siegman, Principal and Shareholder, Nelson Nygaard; Andy Hamilton, San Diego Air Pollution Control District; Renee Owens, Conservation Chair, San Diego Sierra Club; Caroline Chase, Executive Committee Chair, San Diego Sierra Club; Ed Mainland, Co-Chair, Energy-Climate Committee, Sierra Club California; Bern Grush, Chief Scientist, Skymeter Corporation; and the following San Diego Area Government (SANDAG) employees: Susan Baldwin, Senior Regional Planner; Bob Leiter, former Director of Land Use and Transportation Planning; Coleen Clementson, Principle Planner; and Stephan Vance, Senior Regional Planner.

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KEYWORDS

A&WMA, Parking, Unbundled, Shared, TDM, cash-out, pricing, beneficiary, greenhouse gas, GHG, GPS, RFID